AIDSFree NIGERIA ASSESSMENT OF INFECTION PREVENTION AND CONTROL AND HEALTH CARE WASTE MANAGEMENT

IN SELECTED LGAs IN AKWA IBOM, CROSS RIVER, AND RIVERS STATES

JULY 2016

USAID FROM THE AMERICAN PEOPLE

AIDSFree
Strengthening High Impact Interventions for an AIDS-free Generation

AIDSFree NIGERIA ASSESSMENT OF INFECTION PREVENTION AND CONTROL AND HEALTH CARE WASTE MANAGEMENT

IN SELECTED LGAs IN AKWA IBOM, CROSS RIVER, AND RIVERS STATES

AIDSFree

The Strengthening High Impact Interventions for an AIDS-free Generation (AIDSFree) Project is a five-year cooperative agreement funded by the U.S. Agency for International Development under Cooperative Agreement AID-OAA-14-000046. AIDSFree is implemented by JSI Research & Training Institute, Inc., with partners Abt Associates Inc., Elizabeth Glaser Pediatric AIDS Foundation, EnCompass LLC, IMA World Health, the International HIV/AIDS Alliance, Jhpiego Corporation, and PATH. AIDSFree supports and advances implementation of the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) by providing capacity development and technical support to USAID missions, host-country governments, and HIV implementers at the local, regional, and national level.

Recommended Citation

Fatusi, Adesegun, Moyosola A. Bamidele, Abimbola O. Sowande, Jennifer Pearson. 2016. *Baseline Assessment of Infection Prevention and Control and Health Care Waste Management in Selected LGAs in Akwa Ibom, Cross River, and Rivers States*. Arlington, VA: Strengthening High Impact Interventions for an AIDS-free Generation (AIDSFree) Project.

JSI Research & Training Institute, Inc.
1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
Web: aidsfree.usaid.gov

AIDSFree Nigeria
JSI Research & Training Institute, Inc.
Health Care Waste Management Project
Gwandal Center - Plot 1015 Fria Close off
Coree Bay Crescent - Wuse II
Abuja, FCT

ACKNOWLEDGMENTS

The efforts and contributions of the following people to the success of this study are acknowledged:

- The staff of AIDSFree, including Dr. Funke Jibowu, Mr. Kelechi Amaefule, Dr. Ngozi Agbanusi, Pharm Bala Muazu, Mrs. Chinwendu Ologe, and Sonja Schmidt.
- The staff and associates of the Academy for Health Development (AHEAD), who were involved in the study, particularly Ms. Olayinka Asubiaro, Dr. Modupe Elendu, Dr. Olaitan Oyedun, Mr. Samuel Adebayo, and Dr. Temitope Ojo.
- All research personnel who participated in the data collection and data entry, as well as the officials who participated in the key in-depth interviews.
- Isa Iyortim, USAID Nigeria, for his guidance and support.

CONTENTS

ACKNOWLEDGMENTS V

ABBREVIATIONS & ACRONYMS XI

EXECUTIVE SUMMARY XIII

Methodology xiii

Findings xiv

Conclusion xvi

Recommendations xvi

BACKGROUND 1

Introduction 1

HIV, Health Care Waste Management, and Infection Prevention in Nigeria 2

Goal and Objectives of Current Study 3

METHODOLOGY 5

Study Design 5

Target Population 5

Sample Size and Sampling Procedure 5

Data Collection Tools 7

Data Quality Assurance 7

Data Analysis 9

Ethical Considerations 10

FINDINGS: AKWA IBOM STATE 11

Policy and Operational Frameworks 11

Environmental Conditions and Water and Sanitation Facilities 13

Worker and Patient Safety: Knowledge and Practice 14

Safety Boxes, Syringes and Needles: Commodity Logistics 19

Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice 22

Observations on Waste Storage, Disposal, and Treatment Facilities 25

FINDINGS: CROSS RIVER STATE **29**
Policy and Operational Frameworks 29
Environmental Conditions and Water and Sanitation Facilities 31
Worker and Patient Safety: Knowledge and Practice 32
Safety Boxes, Syringes and Needles: Commodity Logistics 36
Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice 39
Observations on Waste Storage, Disposal, and Treatment Facilities 41
FINDINGS: RIVERS STATE **45**
Policy and Operational Frameworks 45
Environmental Conditions and Water and Sanitation Facilities 47
Worker and Patient Safety: Knowledge and Practice 48
Safety Boxes, Syringes, and Needles: Commodity Logistics 52
Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice 55
Observations on Waste Storage, Disposal, and Treatment Facilities 58
FINDINGS: STAKEHOLDER INTERVIEWS **61**
Importance of Health Care Waste Management 61
Challenges Faced in Health Care Waste Management 62
Role of Key Sectors in Health Care Waste Management 63
Recommendations for Health Care Waste Management across the Three States 67
DISCUSSION **69**
REFERENCES **71**
SUPPLEMENTARY DATA **75**
APPENDIX I: QUESTIONNAIRE FOR HEALTH FACILITIES' OFFICERS-IN-CHARGE (TOOL 01) **81**
Section A: Characteristics of Health Care Facility 82
Section B: Health Care Waste Management 85
Section C: Infection Prevention and Control 89
Section D: Risk Perception and Management 91
Section E: Challenges and Ways Forward 93
Section F: Partnership 94

APPENDIX II: QUESTIONNAIRE FOR FACILITIES' CLINICAL SERVICE PROVIDERS (TOOL 02) 97

Section A: Characteristics of the Health Care Facility 98

Section B: Health Care Waste Management 99

Section C: Infection Prevention and Control 101

Section D: Risk Perception and Management 103

Section E: Challenges and Ways Forward 104

APPENDIX III: HEALTH FACILITY CHECKLIST (TOOL 03) 107

Section A: Environmental Sanitation 107

Section B: Health Care Waste Management 110

Section C: Infection Prevention and Control 111

Section D: Risk Prevention and Management 112

Section E: Job Aids 112

APPENDIX IV: QUESTIONNAIRE FOR WASTE HANDLERS/ENVIRONMENTAL HEALTH WORKERS (TOOL 04) 113

Section A: Characteristic of Health Care Facility 114

Section B: Health Care Waste Management 115

Section C: Infection Prevention and Control 117

Section E: Challenges and Ways Forward 119

APPENDIX V: STRUCTURED OBSERVATION OF STORE/PHARMACY: INVENTORY OF SUPPLIES IN CENTRAL PHARMACY STORES AND MAIN STORE ROOM (TOOL 05) 121

APPENDIX VI: STRUCTURED OBSERVATION OF INJECTION PRACTICES (TOOL 06) 125

APPENDIX VII: GUIDE FOR IN-DEPTH INTERVIEW WITH GOVERNMENT STAKEHOLDERS (TOOL 07) 131

Introduction 131

ABBREVIATIONS & ACRONYMS

AIDSTAR-One	AIDS Support and Technical Assistance Resources, Sector 1, Task Order 1
ART	antiretroviral therapy
CSP	clinical service provider
EHO	environmental health officer
FCT	Federal Capital Territory
GON	Government of Nigeria
HCW	health care waste
HCWM	health care waste management
HBV	hepatitis B virus
HCV	hepatitis C virus
IPC	infection prevention and control
IS	Injection safety
JSI	JSI Research & Training Institute, Inc.
LGA	Local Government Area
MMIS	Making Medical Injections Safer
MOEV	Ministry of Environment
MOH	Ministry of Health
NPHCDA	National Primary Healthcare Development Agency
NARHS	National HIV/AIDS and Reproductive Health Survey
OIC	officer-in-charge
PEFFAR	U.S. President's Emergency Plan for AIDS Relief
PEP	post-exposure prophylaxis
PHC	primary health center
PMTCT	prevention of mother-to-child transmission [of HIV]
PPE	personal protective equipment
RUP	reuse-prevention [syringe]
SHF	secondary health care facility
SOP	standard operating procedure
TA	technical assistance
THF	tertiary health care facility
VIP	vented improved pit [toilet]
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNEP	United Nations Environmental Program
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

In developing countries, health care waste management (HCWM) has not received the attention it deserves, and as a result, hazardous medical wastes are handled and disposed of with general municipal waste—at great risk to the health of clinic service providers (CSPs), environmental health officers (EHOs), waste handlers, the public, and the environment. In Nigeria, with U.S. Government initiatives to scale up HIV services to reduce number of children born with HIV, health care services are being decentralized to primary health care facilities (PHCs); it is expected that this increase in service provision will concomitantly increase quantities of waste—and create a greater-than-ever need to strengthen HCWM systems. An assessment of sampled health facilities in Akwa Ibom, Cross River, and Rivers states was conducted by AIDSFree. The assessment is the subject of this report.

The specific objectives of the study were to examine:

- Availability of sustainable infection prevention and control (IPC) and HCWM commodities.
- Compliance with IPC and HCWM training.
- The use of sustainable IPC and HCWM treatment and disposal methods.

Methodology

A comparative cross-sectional mixed-methods approach was used. The study covered the health care facilities in the PEFFAR local government area (LGA) sites in the three focal states—Akwa Ibom, Cross River, and Rivers—with primary focus on public sector facilities. However, because PEPFAR also involves some private facilities, private facilities were also included. The sampling unit was the health facility. For the public sector facilities in the focal LGAs, all secondary health care facilities (SHFs) and tertiary health care facilities (THFs) were included in the study. For the public sector primary health care facilities, all the primary health centers (PHCs) were included in the study while health posts were excluded.

Data were collected by trained research assistants, supervised by HCWM experts. Questionnaires were administered to facilities' officers-in-charge (OICs), CSPs, and EHOs/waste handlers; assessors observed facilities' injection safety, waste management practices, and medical stores/pharmacy operations; on-site workers weighed facility wastes for a week; and key government and private sector informants were interviewed in depth. Quantitative data were analyzed using SPSS and Stata statistical packages, with the analysis primarily univariate in nature. Thematic analysis was carried out for the qualitative data.

Findings

Policy and Operational Framework

- *National Policy on Health Care Waste Management* and the *National Policy on Infection Prevention and Control* were not available in almost all the health facilities across the three states.
- The proportion of facilities with job aids for HCWM ranged from 13.6 percent (Rivers State) to 17.9 percent (Akwa Ibom State), while the proportion with job aids for injection safety ranged from 15.4 percent (Akwa Ibom and Cross River states) to 25 percent (Rivers State).
- Most facilities do not have annual workplan for HCWM. For example, whereas 25 percent of facilities in Rivers State reportedly have the annual workplan for HCWM, only 5.1 percent of facilities in Akwa Ibom State and 7.4 percent of those in Cross River have an annual workplan.
- Most facilities—74.4 percent of those in Akwa Ibom State, 92.3 percent of those in Cross River, and 81.8 percent of those in Rivers State—do not have annual budgetary provision for HCWM.

Environmental Conditions, Water, and Sanitation Facilities

- A fairly high proportion of facilities across the three states, especially primary health care facilities, have structural problems such as leaking roofs.
- A fairly high proportion of the toilets available within health facilities, especially the toilets for clients, are not in a satisfactory state. They are smelly and evidence sanitary concerns—hand-washing facilities and running water are fairly uncommon.
- The proportion of health facilities with hand-washing facilities and soap near toilets is low—including only 20.5 percent of facilities in Akwa Ibom.
- Used/soiled swabs were found on the floor in facilities—in 12.8 percent of facilities in Akwa Ibom State and 22 percent of PHC facilities in Rivers State.

Worker and Patient Safety: Knowledge and Practice

- Most health workers interviewed had a low perception of risk from HCWM, or none at all.
- A fairly high proportion of health workers reported experience of needlestick injury over the six months preceding the study. For example, among CSPs, about a third (38.2 percent in Akwa Ibom, 33.2 percent in Cross River, and 29.5 percent in Rivers State) reported an experience of needlestick injuries in their facility over the time period.
- HIV post-exposure prophylaxis (PEP) was not available in most facilities—structured observation in pharmacies/stores showed that only 25.6 percent of facilities in Akwa Ibom, 29.5 percent in Rivers State, and 37 percent in Cross River State had PEP.
- The proportion of EHOs/waste handlers and CSPs who reported having been vaccinated against hepatitis B (in terms of receiving at least one dose) is lower than for tetanus. The

proportion of EHOs/waste handlers who reported having been vaccinated against tetanus and hepatitis B was much lower than that of CSPs.

- Most EHOs/waste handlers on duty were observed as not using personal protective equipment (PPE) while handling waste—up to 50 percent were observed to be not using any type of PPE in any of the states, including overalls/aprons, nose mask, heavy duty gloves, and heavy duty boots.
- Reuse of syringes and needles was reported from every state, though the proportion was fairly low.
- Good injection preparation practices, in terms of preparing injections on a clean surface and washing hands with soap (or using an alcohol-based hand rub), was found to be high—but not universal—among CSPs, particularly for therapeutic injections.
- Poor disposal practices were observed in the injection area in many facilities with regards to sharps and other wastes—a used dirty swab was observed in 25.6 percent of injection areas in health facilities in Akwa Ibom, for example.

Safety Boxes and Syringes and Needles

- Standard disposable needles were observed to be available to varying degrees in health facilities across the states. However, fewer than half of the health facilities in each of the three states had RUP syringes of any particular size, despite the Federal Ministry of Health directive mandating their use.
- Sterilizable needles, which have been phased out, were observed in use in some facilities in Rivers State, but not in Akwa Ibom or Cross River states.
- A review of stock cards in health facilities' pharmacy section/stores revealed that most facilities had experienced a stockout of essential injection safety commodities (e.g., needlestick-prevention syringes) and HCWM materials (including bin liners, vacutainers, and safety boxes).
- The proportion of facilities found to have adequate supplies of standard disposable syringes for a two-week period was generally low—26.9 percent in Cross River State, 30 percent in Akwa Ibom State, and 59.5 percent in Rivers State.

Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice

- Lack of basic understanding of waste was noted among EHOs/waste handlers, with some indicating erroneously, for example, that their facilities did not generate general waste or infectious waste.
- A fairly high proportion of EHOs/waste handlers and OICs of facilities demonstrated a lack of knowledge of waste segregation and low awareness of the use of yellow for color coding infectious waste.

- The practice of waste segregation and disposal was generally found to be poor—color-coded health care waste segregation was observed in only 11.4 percent of health facilities studied in Rivers State.
- Open burning of waste was prevalent in health facilities—at 51.9 percent of those in Cross River State, 25.6 percent in Akwa Ibom State, and 22.7 percent in Rivers State.

Public Sector and Private Sector Stakeholder Views

Stakeholders from both the public and private sectors agreed on the importance of effective HCWM in Nigeria, as well as the magnitude of the task and the dire consequences of failure to meet the challenge.

Government Representative Key Observations

- Although relevant agencies have been established, they are not adequately equipped, and supportive legislations and regulations are lacking.
- Inadequate budgetary provision for HCWM issues is a challenge.
- Lack of relevant resources is hampering the functionality of HCWM activities and units.

Private Sector Operatives Key Observations

- The government is not doing enough to further effective HCWM in health facilities or in states as a whole.
- Regulations can ensure both facility use of private sector HCWM experts and government monitoring.
- The private sector has the potential to do more for HCWM than at present and, with effective government support and partnership, could contribute significantly to the growth of the national economy.

Conclusion

This study provides a snapshot of a health care system in three states that has not yet attained international quality benchmarks for HCWM and injection safety in many areas that require focused attention. Close analysis of the study data can be instrumental in advocating for increased attention and funding for all areas of HCWM and injection safety. Insights from close data analysis will enable Akwa Ibom, Cross River, and Rivers policymakers to prioritize coordinated and comprehensive HCWM and overall IPC initiatives.

Recommendations

Based on study findings, the following were recommended to policymakers and relevant stakeholders:

- State governments should establish a budget line specifically for HCWM, in addition to their budget for municipal waste management. A health care waste unit should be put in place to facilitate the process.
- Similarly, health facilities should be encouraged to budget for HCWM.
- IPC and HCWM training and capacity building should be extended to public and private health facilities beyond AIDSFree project sites.
- States' Ministry of Environment (MOEV), in collaboration with the state waste management agencies and any other appropriate bodies, should establish a transport system specifically for health care waste from both public and private health facilities.
- Public–private sector collaboration should be sought to sustain an improved HCWM system.
- Appropriate agencies that oversee private facilities should ensure that training is provided, that IPC and HCWM commodities are supplied, and that supportive supervision for compliance is regularly conducted at the facilities.
- Collaboration between the Ministry of Health (MOH) and MOEV in the area of HCWM should be sought and sustained.

BACKGROUND

Introduction

The risk associated with health care waste and its management has gained attention globally. Poor HCWM is associated with substantial disease burden as it exposes health care workers, patients/clients, and community members to infectious agents and toxic substances. However, efforts to address the problem of poor HCWM, particularly in low- and middle-income countries, are too often inadequate.

The World Health Organization (WHO) describes all waste generated by health care establishments, research facilities, and health laboratories as health care waste. It can be classified as either non-hazardous, or general, health care waste, comparable to domestic waste, or as hazardous waste, which has the potential to pose a variety of health risks. Hazardous health care waste may also include infectious waste, pathological waste, sharps, pharmaceutical waste, genotoxic waste, chemical waste, waste with high heavy metal content, pressurized containers, and radioactive waste. WHO estimates that between 10 and 25 percent of all health care waste is hazardous or infectious (WHO 2015).

Unsafe disposal of health care waste, such as of contaminated syringes and needles, is a public health risk. In 2000, WHO estimated that contaminated syringes caused 21 million hepatitis B virus (HBV) infections (including 32 percent of all new infections); 2 million hepatitis C virus (HCV) infections (including 40 percent of all new infections); and at least 260,000 HIV infections (5 percent of all new infections). Results of a WHO assessment conducted in 22 developing countries in 2002 showed that the proportion of health care facilities that did not use proper waste disposal methods ranged from 18 to 64 percent (WHO 2004).

Development within the health care sector has been prominently guided by values such as patient and personnel safety and service quality. However, efforts to minimize environmental impacts caused by health care wastes are sometimes not optimally prioritized on the health care development agenda (Karlsson and Öhman 2005). Proper handling of waste during storage, transportation, treatment, and disposal is important. Poor management of health care waste can cause significant inconvenience and become a health risk to the population (Sheshinski 2002; WHO 2005b).

Segregation, categorization, and quantification of waste support health care waste minimization. In the same way, health care waste minimization supports environmental protection efforts, occupational safety, and regulatory compliance. Source reduction of health care waste is therefore critical—it encompasses material elimination, change or product substitution,

technology or process change, good operating practice, and preferential purchasing, such as "green purchasing" (WHO 2005b; Drain et al. 2003; Takeuchi et al. 2005). Management of health care waste should be sustainable, environmentally safe, financially affordable, and socially acceptable.

HIV, Health Care Waste Management, and Infection Prevention in Nigeria

Nigeria has a population of approximately 160 million spread across 36 states and a Federal Capital Territory (FCT), and, per the National HIV & AIDS and Reproductive Health Survey (NARHS Plus II), overall HIV prevalence is 3.4 percent (Federal Ministry of Health 2013). Although that rate is low, Nigeria's population makes the national burden large. At 3.4 million, the nation's population of people living with HIV/AIDS is the world's third largest of any country, representing 10 percent of the global prevalence. Approximately 1,423,000 of Nigeria's HIV-positive people require treatment, and only about 543,000 are currently on treatment (Federal Ministry of Health 2013). Prevalence in all of AIDSFree Nigeria's target states exceeds the national average, ranging from 4.4 percent in Cross River State to 15.2 percent in Rivers State.

Health care waste poses serious risks to public health and the environment. In Nigeria, USAID has supported activities in injection safety (IS) and HCWM since 2004, gearing efforts toward identifying gaps and implementing interventions for IS and health care waste (HCW) in line with WHO standards in focal states. Under the USAID-funded Making Medical Injections Safer (MMIS) project, JSI provided technical assistance to the Government of Nigeria (GON) from 2004 through 2009 to promote best practices in IS and HCWM. Results included the bundling of syringes with safety boxes and utilization of reuse-preventive devices within therapeutic services.

In 2009, when MMIS ended, USAID/Nigeria provided funding through the AIDSTAR-One project to further strengthen IS progress in Nigeria. Seed stock of HCWM commodities was distributed to focal health facilities in 24 LGAs in new scale-up states, and training in IS and HCWM was conducted in health facilities across 12 states and the FCT. The project also facilitated development of the GON policy on introduction of reuse-prevention syringes and discontinuation of conventional syringes in federal tertiary hospitals. Additionally, safe phlebotomy practices were introduced as a strategy for eliminating the use of standard disposable syringes for phlebotomy.

Decentralization of services for prevention of mother-to-child transmission of HIV (PMTCT) and antiretroviral therapy (ART) to PHCs necessitated an increase in clinical activities at PHC level and increased the amount of HCW generated. However, HCWM has not yet received sufficient attention in Nigeria, largely due to limited resources and insufficient political will. In many areas of the country, health care waste is still handled, collected, and disposed of together with

domestic waste, without any safeguards, thereby posing great risk to the health of waste handlers, the public, and the environment, including water sources (Federal Ministry of Health 2013).

To achieve the HIV 90-90-90 treatment and control target by 2020, set by the Joint United Nations Programme on HIV/AIDS (UNAIDS), the U.S. Government (USG) is working with the GON to scale up treatment services in selected high-HIV-burden states and LGAs in Nigeria. This strategy requires decentralizing services to secondary hospitals and PHCs, where people can most readily access care. The increase in activities in these facilities has led in turn to an increase in the quantity of health care waste generated and, concomitantly, a greater-than-ever need to strengthen HCWM systems. Developing and implementing a more coordinated, centralized HCWM system is imperative. Strengthening linkages among services and agencies is particularly pertinent, to bridge the gaps in the areas of collaboration and coordination with respect to the HCWM system.

Goal and Objectives of Current Study

The Federal Ministry of Health has shown commitment to improving IPC and HCWM in Nigeria through the the 56th National Health Council's approval of the comprehensive national IPC policy and strategy. The national policy for HCWM was approved by the Federal Executive Council in 2013. An enabling environment at the national level is therefore in place—in terms of relevant policy frameworks and documents—to establish sustainable HCWM systems that can be translated into practice at the level of the state ministries of health and health facilities.

AIDSFree Nigeria is working to institutionalize standard precautions in health facilities and promoting sustainable HCWM systems in focal sites to ensure protection for patients, health workers, communities, and the environment. In addition, AIDSFree is providing technical assistance on IS to ensure that each injection given is safe and necessary and poses no risk to patient, health care provider, or community.

Specific study objectives were to examine:

- Availability of sustainable IPC and HCWM commodities.
- Compliance with IPC and HCWM training.
- Use of sustainable IPC and HCWM—including waste treatment and disposal methods.

METHODOLOGY

Study Design

The research was cross-sectional in design and involved a mixed methods approach toward data collection process—quantitative and qualitative—featuring comparisons among different facility levels. The study design was reviewed and approved by USAID/Nigeria.

Target Population

Target populations included health care workers of three categories: health facilities' OICs; CSPs; and EHOs/waste handlers. The study population also included government officials with responsibilities relevant to IPC and HCWM.

Sample Size and Sampling Procedure

The study covered health care facilities in the PEFFAR LGA sites in the three focal states—Akwa Ibom, Cross River, and Rivers—with primary focus on public sector facilities. However, because PEPFAR also involves some private facilities, private facilities were also included (Table 1).

The sampling unit was the health facility. Categorization of health facilities was based on the information available in the directory of health facilities produced by the Federal Ministry of Health (2011) and reviewed by the AIDSFree team with respect of facilities not found in the directory. For public sector facilities in the focal LGAs, all secondary and tertiary facilities were included in the study, in view of their small number and high degree of clinical activities, with the expected attendant high volume of waste generation. For public sector primary health care facilities, all the PHCs were included but health posts (the lowest level of the primary health care system, which often have very few clinical activities and minimal staff) were excluded. The approach of excluding health posts is in line with WHO recommendation (WHO 2008).

Table 1. Number of Facilities in Focal LGAs in Akwa Ibom, Cross River, Rivers States

STATE/LGA	Public health facilities						Private facilities	Total number of facilities (public and private)
	Primary facilities			Secondary facilities	Tertiary facilities	Total public facilities		
	Health posts	Health centers	Total facilities					
AKWA IBOM								
Ikot Ekpene	3	3	6	2	0	8	3	11
Uyo	1	12	13	1	1	15	30	45
Uruan	3	7	10	2	0	12	0	12
Okobo	0	7	7	1	0	8	0	8

STATE/LGA	Public health facilities						Private facilities	Total number of facilities (public and private)
	Primary facilities			Secondary facilities	Tertiary facilities	Total public facilities		
	Health posts	Health centers	Total facilities					
Oron	3	2	5	1	0	6	5	11
Subtotal	10	31	41	7	1	49	38	87
CROSS RIVER								
Calabar Municipal	5	15	20	4	1	25	14	39
Calabar South	1	8	9	2	0	11	8	19
Subtotal	6	23	29	6	1	36	22	58
RIVERS								
Eleme	0	6	6	0	0	6	3	9
Obio/Akpor	0	16	16	3	1	20	53	73
Port-Harcourt	0	14	14	1	1	16	33	49
Subtotal	0	36	36	4	2	42	89	131
TOTAL	**16**	**90**	**106**	**17**	**4**	**127**	**149**	**276**

In all, 111 public sector facilities—90 primary health care facilities were targeted to be included in the study. As this approach captured the total population of existing public sector facilities technically eligible for the study (with the health posts excluded), no sampling process was needed for the public sector facilities.

In addition to the public sector facilities, a fifth of private sector facilities were included in the study. This proportion met the recommendation of WHO and the United Nations Environmental Programme (UNEP) that a minimum of 10 percent of health care facilities in any category should be included in HCWM surveys (WHO 2005a). A stratified sampling approach was used for selection of the private facilities, with LGAs as the stratification factor and 20 percent of the facilities in each LGA sampled using simple random approach.[1] As a result, the number of private facilities included in the study was proportional to the number of health facilities in the LGAs and states.

Based on the number of private facilities in each LGA, the number of private facilities targeted to be included in the study was 33 (Table 2).

[1] Further stratification into primary and secondary categories for private facilities was not considered very appropriate because the basis of classification of the private facilities into these two categories could not be objectively verified and the possibility of misclassification was quite high.

Table 2. Number of Private Facilities to Be Sampled in Each Focal State and LGA

State/LGA	Number of private facilities available	Number of private facilities selected for study
AKWA IBOM		
Ikot Ekpene	3	1
Uyo	30	6
Uruan	0	0
Okobo	0	0
Oron	5	1
Subtotal		8
CROSS RIVER		
Calabar Municipal	14	3
Calabar South	8	2
Subtotal		5
RIVERS		
Eleme	3	1
Obio/Akpor	53	11
Port-Harcourt	33	7
Subtotal		19
TOTAL		**32**

For the qualitative aspect of the study, interviews were conducted with nine stakeholders purposively selected by the AIDSFree Nigeria project. A total of nine interviews were conducted with both private and government HCWM stakeholders across the three states in which the study was conducted.

Data Collection Tools

Questionnaires and a field observation checklist were derived from two WHO tools: the Tool C–Revised and the Rapid Assessment tool for HCWM (World Health Organization 2008, World Health Organization 2014). These had also been used in Nigeria under the AIDSTAR-One project (Akpan et al. 2012; Fatusi, Ojo, and Sowande 2014). The tools were reviewed by the AIDSFree technical staff and a research consultant with a focus on the study objectives. The tools were used to objectively assess IPC activities and HCWM practices in the focal health facilities. The tools included questionnaires (administered to relevant health workers) as well observation instruments and a checklist (Table 3).

Data Quality Assurance

The state coordinators and the research consultant held a joint two-day orientation on the study instruments and procedures. Following this, training was conducted for data collectors and supervisors at state level. The state coordinators and supervisors provided oversight and

supervision during data collection and conducted on-the-spot checking as well and reviewed completed questionnaires daily to ensure the completeness and consistency of the information collected.

Table 3. Data Collection Tools and Selection of Respondents

Instrument/ Data collection	Target respondent and selection process
Questionnaire for the OIC	Administered to the officer-in-charge (e.g., the medical director or the chief nursing officer of secondary and tertiary health facilities and the officer-in-charge at primary health care facilities).
CSP questionnaire	**Administered to:** **The most senior nurse or clinical service provider on duty.** **The most junior nurse or clinical service provider on duty.** **Three other nursing staff or CSPs who were on duty, selected rando mly (or all the staff, in locations where there were three or fewer total staff).**
Waste handling staff and EHO personnel questionnaire	Administered to three waste handling staff: **The most senior.** **The most junior.** **One other staff member selected randomly from the rest.** **Where there were fewer than three staff, all available staff were interviewed.**
Structured work-based health worker observation	**Comprised:** **Four injection scenes (e.g., both therapeutic and immunization) involving, where possible, at least two health workers.** **Where four scenes did not occur in a day, the maximum number of scenes was observed.** **In facilities with a dental center, at least one observation was carried out there.**
Observational instrument for IPC and HCWM practices	Observation sought to appropriately cover waste management processes within the health facility as a whole, as well as within the immediate vicinity of the facility and the facilities' overall premises. Observation occurred in these sections of facilities: **Immunization-administration section (e.g., infant welfare clinic, immunization clinic).** **One section where therapeutic injection was administered (e.g., outpatient department)** **The accident and emergency section.** **One ward where blood transfusion was likely to take place (e.g., maternity or surgical ward).** **One laboratory.**
Observation of stock room/medical stores	**Covered availability of relevant IPC and waste management commodities, their stock level, and proper placement of the commodities.**

Instrument/ Data collection	Target respondent and selection process
Key in-depth interview with other stakeholders	Were held with: **One state ministry of health official (e.g., focal officer-in-charge of IPC or HCWM).** **One waste management agency official (e.g., focal officer-in-charge of IPC or HCWM).** **Two private sectors operatives involved in HCWM identified by health officials or officials of waste management agencies.**

Data Analysis

Management of the quantitative data was carried out by the use of SPSS and Stata statistical software and was primarily univariate in nature, with the proportions of facilities, individuals, and observations, meeting set criteria or having specific attributes generated in line with the study objectives.

Analysis of qualitative data was carried out using both thematic/content analysis and framework analysis. Codes were developed using a mix of both inductive and deductive coding methods. Inductive coding was implemented by developing codes from reading the data directly without the influence of other outside sources; deductive coding was executed by developing codes from the study proposal and interview guides.

The interviews with both private and government HCWM stakeholders were recorded and transcribed by research personnel selected by AIDSFree Nigeria. Each transcript was read and reread by four analysts, who immediately noted and recorded immediately evident points and developed codes and short memos using a code matrix. Afterwards, the analysis team convened as a group and considered the codes developed by the individuals and noted areas in which they agreed or disagreed, then adapted an interim codebook. Thereafter, the study objectives and interview guides were used to cross-check codes developed to decide whether the codes conformed to AIDSFree Nigeria objectives, to study objectives, and to the questions in the interview guides.

Because qualitative data analysis is an iterative process, the development, renaming, merging, and splitting of codes went on throughout the analysis. Following completion of primary coding using the developed codebook, all quotes within the codes were reviewed in an auxiliary coding process. Here, redundant codes were cleaned out, split, merged, and renamed. Network diagrams were drawn to show relationships among codes and quotations. Throughout the process, coding was carried out to recording the data analysis process for use in report writing procedures.

Further triangulation to ensure data quality was carried out during the report writing stage. At this time, analysts drafted reports as a team and individually reviewed the document to ensure that all salient themes had been captured.

Ethical Considerations

Ethical clearances for this study were obtained from the states' Health Research Ethics Review Committees following the submission of study protocols, including survey questionnaires and the details of the consent procedure and the consent form. A formal letter was given to each health care facility, and permission was secured at all levels.

Informed consent was obtained from each study participant and their responses kept confidential. Data protection was ensured, and only study personnel with relevant responsibilities were allowed to access the data.

FINDINGS: AKWA IBOM STATE

Thirty-nine facilities were included in the study in Akwa Ibom State: 33 primary health care facilities, five secondary facilities, and one tertiary facility. Thirty-nine facility OICs, 69 CSPs, and 60 EHOs/waste handlers participated. Findings are grouped into categories:

- Policy and operational frameworks.
- Environmental conditions and water and sanitation facilities.
- Worker and patient safety: knowledge, and practice.
- Safety boxes, syringes, and needles: commodity logistics.
- Waste generation, segregation, treatment, and disposal: knowledge and practice.

Policy and Operational Frameworks

Availability and Use of Policy and Operational Guidelines by Officers-in-Charge

Information from the OICs of the focal facilities indicated that neither the national policy on HCWM nor the national policy on IPC was available in any of the three types of health facilities (Table 4).

Availability of Job Aids on Health Care Waste Management and Injection Safety

Job aids with HCWM messages were sighted in 17.9 percent of facilities, and job aids for IS found in 15.4 percent of facilities.

Availability of Health Care Waste Management Workplan and Report

Only few OICs (5.1 percent) indicated that their facilities had a workplan on HCWM, and the majority of facilities (74.4 percent) had no budgetary allocations for HCWM (Table 5).

Functional Infection Prevention and Control Committee

In the study, among OICs, only 23.7 percent indicated that their facilities had an IPC committee coordinator, while17.9 percent reported the existence of a functional IPC committee, defined as one that met regularly, at least once every month or by schedule. Among CSPs, 20.3 percent reported the existence of an IPC coordinator and 21.7 percent reported the existence of a functional IPC committee in their facility (Table 5).

Table 4. Policy Documents and Operational Guidelines at Focal Health Facilities in Akwa Ibom State per Facilities' Officers-in-Charge

Materials available	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N*	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Policy document and guidelines												
National/state policy on IPC available, sighted	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0
National/state policy on HCWM available, sighted	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0
National guidelines on IPC	33	0	0.0	5	1	20.0	1	0	0.0	39	1	2.6
National guidelines on HCWM	33	0	0.0	5	1	20.0	1	0	0.0	39	1	2.6
Internal guidelines and SOP on IPC and HCWM available, sighted	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0
Job aids												
Job aids for HCWM available in facility, sighted	33	5	15.2	5	1	20.0	1	0	0	39	7	17.9
Job aids for IS available, sighted	33	4	12.1	5	1	20.0	1	1	100	39	6	15.4

Table 5. Budget Provision, Workplan, and Infection Prevention and Control Committee at Focal Health Facilities in Akwa Ibom State per Facilities' Officers-in-Charge and Clinic Service Providers

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OIC response												
No budgetary allocation for HCWM	33	26	78.8	5	2	40.0	1	1	100	39	29	74.4
Annual work plan on HCWM exists	33	0	0.0	5	1	20.0	1	1	100	39	2	5.1
Annual HCWM activity report exist	33	0	0.0	5	0	0.0	1	1	100	39	1	2.6
IPC Committee Coordinator available	32	7	21.9	5	1	20.0	1	1	100	38	9	23.7
Functional IPC committee exists	33	2	6.1	5	4	80.0	1	1	100	39	7	17.9
CSP response												
Functional IPC committee exists	51	5	9.8	15	8	53.4	3	2	66.7	69	15	21.7
IPC Committee Coordinator operational	51	11	21.6	15	1	6.7	3	2	66.7	69	14	20.3

* "N" represents the total number of respondents, observation, or other units of study.

Awareness of Policy and Operational Guidelines by Clinic Service Providers

Awareness of the existence of the national IPC and HCWM policies among CSPs was highest in the tertiary facility (100 percent), next highest in the secondary facilities (60.0 percent and 40.0 percent respectively); PHCs recorded the lowest level of awareness (37.3 percent and 21.6 percent respectively). Although the awareness level seems moderately high across all levels, availability of the policies was generally poor at all levels.

The proportion of CSPs who indicated using IPC national policies and guidelines on HCWM and IPC was poor across all the facility categories. Only 5.8 percent indicated using the national guidelines on HCWM in their work and even fewer, 2.9 percent, indicated using the national guidelines on IPC.

Environmental Conditions and Water and Sanitation Facilities

Structural Facilities

The overall structural state of facilities has implications for safe HCWM practices. For example, lack of fencing may enable community members to gain easy access to facilities' compounds, including the waste in storage containers and waste storage areas. Leaky roofs in commodity stores and other areas could compromise the integrity of the commodity management system, potentially destroying stock cards and safety boxes. Only about half the focal facilities in Akwa Ibom State were fenced (51.3 percent): 42.4 percent of PHCs, 60 percent of secondary facilities, and the only tertiary facility.

Many facilities suffer from structural challenges: the roofs of 25.6 percent were observed to leak, and the walls of 30.8 percent had visible cracks; this was evident in both primary and secondary facilities, although not in the tertiary facility.

General Cleanliness

In the focal health facilities, the floors of most wards (76.9 percent) were observed to be generally clean—without dirt or litter, although littered floors were found in some other parts of 17.9 percent of facilities (Annex 1, Table A1). Used or soiled dressings were found on the floor in 12.8 percent of facilities, and litter and waste were found on the ground within the compound in 42.1 percent of facilities. The observed tertiary facility wall had no cobwebs. Overgrown bushes were found at 39.4 percent of PHCs and 40 percent of secondary facilities but not in the tertiary facility. Waste bins designated for general or municipal refuse were found in the tertiary facility and in 54.5 percent of PHCs and 60 percent of secondary facilities. Waste bins were overflowing in 12.8 percent of all focal facilities in the state.

Water Supply

The most common source of water supply to all three categories of health care facilities was running water from a facility borehole (41 percent). None of the focal facilities depended for water on a protected dug well within or outside the facility, but 30.3 percent of PHCs (and none of secondary or tertiary facilities) depended on a public running water tap outside the facility.

Toilet Facilities

In 9.1 percent of PHC facilities, the floor of the toilet was found to be wet; in only 15.4 percent of all focal facilities was water found to be running in the toilet. A water closet type of toilet was available for staff in the tertiary health facility, in 80 percent of secondary facilities, and in 75.8 percent of PHCs. Separate toilets for male and female staff were available in only 10.3 percent of facilities. The staff toilet was found to be visibly clean in 64.1 percent of the facilities but was smelly in 20.5 percent.

For clients, a water closet type of toilet was available in 71.8 percent of facilities. However, fewer than half of facilities' client toilets (48.7 percent) were visibly clean, while 17.9 percent of client toilets were smelly. Hand-washing facilities were available near the client toilet in 41 percent of facilities, and hand-washing facilities with soap in 20.5 percent of these client facilities. Notably, the tertiary facility had hand-washing facilities near neither client nor staff toilets. Separate toilets for males and females were available in only 17.9 percent of facilities (Annex 1, Table A2).

Worker and Patient Safety: Knowledge and Practice

Knowledge of Health Workers on Injection Safety and Health Care Waste Management

Knowledge of Disease Transmission from Improper Health Care Waste Management and Needlestick Injuries

Knowledge that some diseases can be transmitted through improper HCWM and needlestick injuries was virtually universal among both CSPs and EHOs/waste handlers at primary, secondary, and tertiary levels of health care.

Knowledge of Personal Protective Equipment among Environmental Health Officers

Knowledge of PPE varies widely among EHOs/waste handlers by type of facility as well as type of PPE. All mentioned latex gloves as an item that could be used to handle HCW, followed by nose masks (66.7 percent); knowledge of heavy duty boots (41.7 percent), heavy duty gloves (31.7 percent), overalls (26.7 percent), and protective goggles (18.3 percent) as useful for personal protection was generally low.

Self-Risk Perception of Health Workers, Protective Practices, and Injuries

Self-Risk Perception and Experience of Needlestick Injuries

In terms of occupational hazards, 34.8 percent of CSPs and 15 percent of EHOs/waste handlers indicated that they perceived themselves at no risk or low risk of sustaining a needlestick injury (Table 6). However, when asked whether they had experienced a needlestick injury over the six months prior to the study, 7.7 percent of OICs, 33.3 percent of CSPs, and 18.3 percent of EHOs replied in the affirmative.

Table 6. Self-Risk Perception of Clinic Service Providers and Environmental Health Officers in Focal Health Facilities in Akwa Ibom State

Perception and experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
CSPs												
No risk or low risk of needlestick perceived	51	19	37.3	15	5	33.3	3	0	0.0	69	24	34.8
Medium risk of needlestick perceived	51	1	2.0	15	1	6.7	3	1	33.3	69	3	4.3
High risk of needlestick perceived	51	30	58.8	15	9	60.0	3	2	66.7	69	41	59.4
EHOs/waste handlers												
No risk or low risk of needlestick perceived	46	6	13.0	11	3	27.2	3	0	0.0	60	9	15.0
Medium risk of needlestick perceived	46	3	6.5	11	2	18.2	3	0	0.0	60	5	8.3
High risk of needlestick perceived	46	37	80.4	11	6	54.6	3	3	100	60	46	76.7
Experienced needle stick injury during the preceding six months												
OICs	33	3	9.1	5	0	0	1	0	0	39	3	7.7
CSPs	51	14	27.5	15	8	53.3	3	1	33.3	69	23	33.3
EHOs/waste handlers	46	9	19.6	11	2	18.2	3	0	0	60	11	18.3

Availability of HIV Post-Exposure Prophylaxis

In interviews, the proportion of respondents who indicated availability of PEP in their facilities was 55.1 percent among CSPs and 31.7 percent among EHOs/waste handlers. However, PEP was observed in the store/pharmacy of 25.6 percent of all Akwa Ibom State focal facilities, although not in the tertiary facility (Table 7).

Table 7. HIV Post-Exposure Prophylaxis in Focal Health Facilities in Akwa Ibom State

Opinions and observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Opinion on PEP availability												
CSPs	51	20	39.2	15	15	100	3	3	100	69	38	55.1
EHOs/waste handlers	46	12	26.1	11	4	36.4	3	3	100	60	19	31.7
Observation on PEP availability												
Available PEP sighted in pharmacy	33	7	21.2	5	2	40.0	1	0	0	39	10	25.6

Vaccination Experience of Health Workers

Vaccination against tetanus was reported by 94.2 percent of CSPs and 71.7 percent of EHOs/waste handlers (Table 8). Similarly, 60.9 percent of CSPs and 50.0 percent of EHOs reported having been vaccinated against hepatitis B, although the proportion who had received the three full doses of the hepatitis B vaccine was not known. Consequently, these figures are best interpreted as the proportion that had received at least one dose of the hepatitis B vaccine.

Table 8. Vaccination Experiences of Clinic Service Providers and Environmental Health Officers in Focal Health Facilities in Akwa Ibom State

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
CSPs												
Tetanus	51	47	92.2	15	10	66.7	3	3	100	69	65	94.2
Hepatitis	51	29	56.9	15	12	80.0	3	1	33.3	69	42	60.9
EHOs/waste handlers												
Tetanus	46	32	69.6	11	5	45.5	3	0	0.0	60	43	71.7
Hepatitis	46	19	41.3	11	4	36.4	3	0	0.0	60	30	50.0

Use of Personal Protective Equipment

A full package of PPE for waste handlers includes heavy duty gloves and boots, overalls or apron, and a nose mask. Only 1 percent of HCW handlers observed were found to be wearing either an overall or an apron while handling waste, 0.3 percent were observed wearing a nose mask, and 0.8 percent were using heavy duty gloves (Table 9).

Table 9. Use of Personal Protective Equipment in Focal Health Facilities in Akwa Ibom State

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW handlers wore overalls	33	0	0	5	2	40.0	1	0	0	39	2	0.5
Waste handlers used nose masks	33	0	0	5	0	0	1	1	100	39	1	0.3
HCW handlers wore heavy duty gloves	33	2	6.1	5	1	20.0	1	0	0	39	3	0.8
HCW handlers wore apron	33	1	3.0	5	1	20.0	1	0	0	39	2	0.5
HCW handlers wore boots	33	0	0	5	1	20.0	1	1	100	39	1	0.3

Reuse of Needles

OICs were asked about the reuse of syringes and needles in their facilities during the six months prior to the study, while CSPs were asked about their reuse of syringes and needles during the full year leading up to the study. Although no OIC reported reuse, one CSP (1.4 percent), a worker from a tertiary facility, reported reusing syringe and needles during that period.

Disposal of Sharps and Other Wastes

Safety boxes were observed in all injection areas in 69.7 percent of PHCs and 20 percent of secondary facilities; they were not observed in all injection areas in the tertiary facility. Soiled or dirty swabs in injection areas were observed in 25.6 percent of facilities. Sharps were found to have been properly disposed of in 69.2 percent of facilities, although used sharps were found around 21.2 percent of primary health facilities (Table 10).

Table 10. Disposal of Used Needles and Swabs in Focal Health Facilities in Akwa Ibom State

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Solid or dirty swab in injection area	33	7	21.2	5	2	40.0	1	1	100	39	10	25.6
Safety boxes in stock	33	30	90.9	5	2	40.0	1	0	0	39	33	84.6
Safety boxes in all injection areas	33	23	69.7	5	1	20.0	1	0	0	39	25	64.1
Overflowing sharp boxes, or pierced or open sharp boxes	33	5	15.2	5	0	0.0	1	1	100	39	11	28.2
Sharps properly disposed of	33	21	63.6	5	3	60.0	1	1	100	39	27	69.2
Used sharps seen around facility	33	7	21.2	5	0	0.0	1	0	0	39	13	33.3

Injection Preparation: Structured Observation

Injections should be prepared on a dedicated table or tray that is visibly clean, where contamination of the equipment with blood, body fluids, or dirty swabs is unlikely. As part of the study, structured observation of injection practices was carried out, with a focus on four types of services that might have been witnessed at the focal facility at the time of the study: vaccination; therapeutic injection; provision of family planning services; and provision of dental services.

For vaccination, 77.8 percent of observed procedures met the desired standard for injection preparation, but only 16.7 percent of service providers appropriately washed their hands before preparing the injections. In general, the same pattern of results was seen for therapeutic injections and provision of family planning services. Only one dental-related injection was observed, and it did meet the desired standard as to both the prep surface and provider pre-injection hand-washing. Overall, standards are likely not to be met in therapeutic injections (Table 11).

Table 11. Injection Preparation Practices in Focal Health Facilities in Akwa Ibom State

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	N	(%)	N	n	(%)	N	n	(%)	N	n	(%)
Appropriate injection preparation												
Vaccination	15	13	86.7	2	1	50.0	1	0	0	18	14	77.8
Therapeutic	25	14	56.0	6	3	50.0	1	0	0	32	17	53.1
Family planning	5	4	80.0	3	2	66.7	1	1	100	9	7	77.8
Dental	0	0	0.0	1	1	100	1	1	100	2	2	100
Provider pre-injection hand-washing												
Vaccination												
Washed hands with soap and running water	15	3	20.3	2	0	0.0	1	0	0.0	18	3	16.7
Washed hands with alcohol-based hand rub	15	0	0.0	2	0	0.0	1	0	0.0	18	0	0.0
Therapeutic injection												
Washed hands with soap and running water	25	5	20.0	6	1	16.7	1	0	0.0	32	6	18.8
Washed hands with alcohol-based hand rub	25	2	8.0	6	1	16.7	1	0	0.0	32	3	9.4
Family planning												
Washed hands with soap and running water	5	2	40.0	3	1	33.3	1	1	100	9	4	44.4
Washed hands with alcohol-based hand rub	5	0	0.0	3	1	33.3	1	0	0.0	9	1	11.1
Dental												
Washed hands with soap and running water	0	0	0.0	1	1	100	1	0	0.0	2	1	100
Washed hands with alcohol-based hand rub	0	0	0.0	1	0	0.0	1	0	0.0	2	0	0.0

Safety Boxes, Syringes and Needles: Commodity Logistics

Reported Availability of Health Care Waste–Related Materials, Storage, and Transportation Facilities

Reported Availability of Personal Protective Equipment

When focal facilities' OICs in Akwa Ibom State were asked about PPE availability, 97.4 percent indicated that their facilities had latex gloves, 51.3 percent indicated availability of aprons, while less than half indicated availability of other materials (46.2 percent nose masks, 35.9 percent boots, and 23.1 percent overalls).

Health Care Waste Management Equipment and Materials

When interviewed, most OICs (97.4 percent) and CSPs (91.3 percent) indicated that safety boxes are available in their facilities. About four-fifths (82.1 percent) of OICs indicated that safety boxes are available in all injection rooms while 68.1 percent of CSPs reported that safety boxes are available in all units. Less than a tenth of OICs (7.7 percent) and CSPs (8.7 percent) reported that their facility experienced stockout of safety boxes during the six months preceding the study.

Most of the OICs also indicated that their facilities had broom (94.9 percent) and dust bin/waste bin (92.3 percent). However, less than half of them indicated having bin liners (33.3 percent) and dino (wheelie) bins (20.5 percent), while only the tertiary facility as expected has high-temperature incinerator. Only 15.3 percent have equipment for on-site transportation of wastes such as wheel barrow.

Health Care Waste Temporary Storage and Transportation Practices

Information from OICs indicated that the tertiary health care facility as well as 60 percent of secondary facilities and 36.4 percent of PHCs had designated areas for temporary storage of HCWs. Only 28.2 percent of facilities reportedly stored hazardous and nonhazardous wastes separately; this figure was higher than the 10.3 percent of OICs who indicated that they knew about color coding, suggesting that some health workers may understand the need to separate hazardous and nonhazardous wastes but are not aware of the related standard practice of color coding.

As for transport of these facilities' HCW, 2.6 percent of OICs indicated that their health institutions used municipal transport facilities, while 25.6 percent indicated that closed-device mechanisms were used to transporting waste off site. Overall, PHCs had the lowest availability of HCW storage and transportation supplies/equipment (Table 12).

Table 12. Health Care Waste Temporary Storage and Transportation Practices in Focal Health Facilities in Akwa Ibom State per Facilities' Officers-in-Charge

Practices	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Designated area for temporary storage of HCW exists	33	12	36.4	5	3	60.0	1	1	100	39	16	41.0
Designated area for temporary storage with access restricted to authorized personnel	33	8	24.2	5	2	40.0	1	0	0.0	39	10	25.6
Hazardous and nonhazardous waste are collected and stored separately	33	8	24.2	5	2	40.0	1	1	100	39	11	28.2
Closed device is used to transport HCW off site	33	8	24.2	5	2	40.0	1	0	0.0	39	10	25.6
Use municipal services for HCW transportation	33	0	0.0	5	1	20	1	0	0.0	39	1	2.6

Observations on the Availability of Syringes, Needles, and Safety Boxes

Availability of Syringes and Needles by Type

Standard disposable syringes and reuse-prevention (RUP) syringes of various dimensions—0.5 ml, 1 ml, 2 ml, 5 ml, and 10 ml—were observed in health facilities. Most commonly observed were 5 ml standard (76.9 percent) and 2 ml standard (61.5 percent). A significant proportion of facilities lacked RUP syringes, with 48.7 percent having those of 0.5 ml type, 30.8 percent having 5 ml type, and 2.6 percent having 2 ml type. No facility in Akwa Ibom was found to be using sterilizable syringes and needles.

Table 13. Availability of Needle Types in Focal Health Facilities in Akwa Ibom State

Syringes and needles	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Standard disposable syringes												
0.5 ml, standard disposable	33	6	18.2	5	2	40.0	1	0	0.0	39	8	20.5
1 ml, standard disposable	33	2	6.1	5	0	0.0	1	0	0.0	39	2	5.1
2 ml,standard disposable	33	19	57.6	5	4	80.0	1	1	100	39	24	61.5
5 ml, standard disposable	33	25	75.8	5	5	100	1	0	0.0	39	30	76.9
10 ml, standard disposable	33	10	30.3	5	5	100	1	0	0.0	39	15	38.5
RUP syringes												
0.5 ml, auto-disable	33	19	57.6	5	0	0.0	1	0	0.0	39	19	48.7
1 ml, auto-disable	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0

Syringes and needles	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
2 ml, auto-disable	33	1	3.0	5	0	0.0	1	0	0.0	39	1	2.6
5 ml, auto-disable	33	12	36.4	5	0	0.0	1	0	0.0	39	12	30.8
10 ml, auto-disable	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0

Stockout Experiences

Stockout had been experienced within the six months preceding the study in 41 percent of facilities for bin liners, 30.8 percent for vacutainers, and 12.8 percent for safety boxes.

More than a fifth (21.2 percent) of PHCs in Akwa Ibom State had experienced a stockout of disposable gloves during the six months immediately prior to the study.

Stockout was experienced in 44.7 percent of facilities for needlestick-prevention syringes and in 32 percent for RUP syringes. No focal health facility experienced a stockout of standard disposable syringes (Table 14).

Adequacy of Available Supplies

The total number of syringes needed for a two-week period was estimated and checked against the number available in the store/pharmacy. (The check was for 5 ml syringes, facilities' most-used size, and, partially reflecting patient load, the needed number reflected how many syringes were used in the facility.) About half of facilities (51.3 percent) had enough stock of standard disposable syringes to last two weeks, while 48.7 percent had enough stock of RUP syringes but only 0.5 percent of facilities had a stock of needlestick-prevention syringes adequate to last two weeks (Table 14).

Table 14. Store/Pharmacy Stockout Experiences and Availability of Health Care Waste Management Commodities in Focal Health Facilities in Akwa Ibom State

Experiences	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW materials stockout in the six months preceding the study												
Bin liners	33	14	42.4	5	2	40.0	1	0	0	39	16	41.0
Vacutainers	33	11	33.3	5	1	20.0	1	0	0	39	12	30.8
Safety boxes	33	2	6.1	5	3	60.0	1	0	0	39	5	12.8
Disposable gloves	33	7	21.2	5	0	0	1	0	0	39	7	17.9
Syringe stockout in the six months preceding the study												

Experiences	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Needlestick-prevention syringes	33	1	3.0	5	1	20.0	1	0	0	39	2	0.5
RUP syringes	33	5	15.2	5	1	20.0	1	0	0	39	6	15.4
Standard disposable syringes	33	11	33.3	5	2	40.0	1	1	100	39	14	35.9
5 ml syringes in store adequate for two weeks' use												
Standard disposable syringes	33	16	48.5	5	4	80.0	1	0	0	39	20	51.3
RUP syringes	33	19	57.6	5	0	0	1	0	0	39	19	48.7
Needlestick-prevention syringes	33	2	6.1	5	0	0	1	0	0	39	2	0.5

Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice

Knowledge of Waste Segregation and Color Coding among Clinic Service Providers and Environmental Health Workers

All CSPs in Akwa Ibom State (100 percent) know that waste should be segregated into general waste and sharps, while a high proportion (89.3 percent) know to segregate infectious waste (86.7 percent). However, knowledge was poor on the importance of segregating radioactive waste (7.1 percent), recyclables (25.0 percent), and chemicals (35.7 percent). Also, a high proportion of the state's EHOs/waste handlers knew that waste should be segregated into general waste (85.7 percent), sharps (85.7 percent), and infectious waste (61.9 percent); EHO knowledge was poor on the importance of segregating radioactive waste (9.5 percent), anatomic waste (19.0 percent), and chemicals (14.3 percent).

Awareness of color coding among sampled health workers in all facility categories in Akwa Ibom was quite low—OICs (10.3 percent), CSPs (27.5 percent), and EHOs/waste handlers (13.3 percent). Overall, the proportion of health workers who reported knowing that yellow bin liners should be used for infectious wastes was 2.6 percent for OICs, 8.7 percent for CSPs, and 5.0 percent for EHOs.

Table 15. Health Worker Knowledge of Waste Segregation and Color Coding in Focal Health Facilities in Akwa Ibom State

Waste segregation and color coding	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Aware of waste color coding												
OICs	33	2	6.1	5	1	20	1	1	100	39	4	10.3
CSPs	51	8	15.7	15	8	53.3	3	3	100	69	19	27.5
EHOs/waste handlers	46	4	8.7	11	2	18.2	3	2	66.7	60	8	13.3
Knowledge that infectious waste should be coded yellow among subjects aware of color coding												
OICs	2	0	0.0	1	1	100	1	0	0.0	4	1	25.0
CSPs	8	2	25.0	8	3	37.5	3	1	33.3	19	6	31.6
EHOs/waste handlers	4	0	0.0	2	1	50	2	2	100	8	3	37.5
Knowledge that infectious waste should be coded yellow among ALL subjects												
OICs	33	0	0.0	5	1	20.0	1	0	0.0	39	1	2.6
CSPs	51	2	3.9	15	3	20.0	3	1	33.3	69	6	8.7
EHOs/waste handlers	46	0	0.0	11	1	9.1	3	2	66.7	60	3	5.0

Waste Generation, Segregation, Treatment, and Disposal Practices Reported

Waste Generation at Health Facilities

When interviewed, nearly all EHOs/waste handlers in focal health facilities in Akwa Ibom State indicated that their facilities generated sharps (96.7 percent), general waste (95 percent), and infectious waste (80 percent)). This points to a possible gap in training/understanding of the health risks facing waste handlers. Fewer than half of these officers indicated that their facilities generated chemicals (20 percent) and radioactive wastes (10 percent).

Frequency of Removal of Wastes from Wards

All OICs (100 percent) in secondary and tertiary facilities and 69.7 percent of OICs of PHCs indicated that wastes were removed from their wards daily. Most EHOs/waste handlers in secondary facilities (90.9 percent) and PHCs (80.4 percent) confirmed the practice of daily waste removal from wards; all EHOs/waste handlers in the tertiary facility (100 percent) reported that waste removal from their wards was carried out in shifts. Generally, there are two PHC shifts in PHCs—morning and afternoon—and three shifts in secondary and tertiary facilities.

Waste Segregation

When interviewed, 59 percent of OICs surveyed in Akwa Ibom State reported segregation of waste at its source in their facilities. Only a fifth of OICs (20.5 percent) indicated the use of leakproof and puncture-proof containers for waste segregation; 2.6 percent confirmed that generated waste was weighed. Only 10.3 percent noted color coding of waste receptacles and

containers, although 20.5 percent affirmed that bin liners were used for segregating wastes in their facilities.

Overall, 12.8 percent of OICs reported a shortage of waste storage container shortage within the six months prior to the study and 10.3 percent a shortage of bin liners.

Table 16. Waste Segregation Processes in Focal Health Facilities in Akwa Ibom State per Facilities' Officers-in-Charge

Process	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		N	(%)		n	(%)		n	(%)
Waste segregation at source	33	18	54.5	5	4	80.0	1	1	100	39	23	59.0
Leak- and puncture-proof containers used for waste segregation	33	6	18.2	5	1	20.0	1	1	100	39	8	20.5
Generated waste weighed	33	0	0.0	5	1	20.0	1	0	0.0	39	1	2.6
Waste receptacles and containers color coded	33	2	6.1	5	1	20.0	1	1	100	39	4	10.3
Yellow bin liners used for infectious wastes	33	0	0.0	5	1	20.0	1	0	0.0	39	1	2.6
Bin liners used to segregate waste	33	6	18.2	5	1	20.0	1	1	100	39	8	20.5
Bin liner shortage experienced during the six months prior to the study	33	2	6.1	5	2	40.0	1	0	0.0	39	4	10.3
Waste storage container shortage during the six months prior to the study	33	5	15.2	5	0	0.0	1	0	0.0	39	5	12.8

Health Care Waste Treatment and Disposal

Treatment and Disposal Practices

When interviewed, OICs said that open burning in a hole or enclosure was the most common method of HCW treatment and disposal in their facilities (89.7 percent), followed by waste burial (43.6 percent). Only 10.3 percent of OICs noted that their facilities transported HCW off site for treatment. None of the OICs indicated that their facilities dumped HCW in unsupervised pit. High- or medium-temperature incineration was mentioned by the tertiary facility's OIC.

Overall, based on their own judgement without an objective measure, 33.3 percent of OICs rated their facilities' HCW treatment capacity as adequate. Fewer than half of EHOs/waste handlers believed that HCW in their facility was safely managed (41.7 percent) or managed in an "environmentally friendly" way (45 percent).

Table 17: Quality and Environmental Friendliness of Health Care Waste Treatment and Disposal in Focal Health Facilities in Akwa Ibom State per Officers-In-Charge and Environmental Health Workers

Treatment and disposal methods in their facilities	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OICs												
Current treatment capacity adequate	32	11	34.4	5	0	0.0	1	1	100	38	12	31.6
EHOs/waste handlers												
HCW safely managed	46	22	47.8	11	1	9.1	3	2	66.7	60	25	41.7
HCW managed in an environmentally friendly way	46	22	47.8	11	3	27.3	3	2	66.7	60	27	45.0

Observations on Waste Storage, Disposal, and Treatment Facilities

Storage Bins and Bin Liners

Waste storage bins were observed within 74.4 percent of all focal facilities in Akwa Ibom State (Table 18). However, of the containers used, only 46.2 percent were covered. Waste storage containers were found to be overfilled in 10.3 percent of facilities. Color-coded bin liners were not sighted in any focal facilities. Waste disposal sites were seen at 60.6 percent of PHCs and 60 percent in secondary facilities but not in the tertiary facility.

On-Site Disposal and Treatment Facilities

Open burning in a secured pit or enclosure was the most common on-site HCW treatment and disposal method (51.3 percent). Open burning on the ground was observed to be practiced in 24.2 percent of PHCs and 40 percent of secondary facilities. Dumping in an unprotected pit was found in only one PHC (3 percent), and dumping in an unsupervised area was observed in one other PHC (3 percent).

Health Care Waste Treatment Process and Site

Open-waste drainage was found in 56.4 percent of all focal facilities, including the tertiary facility. Central waste collection was found to exist in 48.7 percent of facilities (Table 19). The treatment facility was observed to be well maintained in the tertiary facility, in 33.3 percent of PHCs and 20 percent of secondary facilities [average: 33.3 percent].

Table 18. Health Care Waste Materials and Treatment Facilities in Focal Health Facilities in Akwa Ibom State

Materials and treatment facilities	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		N	(%)		n	(%)		n	(%)
Storage bins and bin liners												
Waste storage bins available within the facility building	33	24	72.7	5	4	80.0	1	1	10	39	29	74.4
Waste storage bins available outside the facility	33	8	24.2	5	2	40.0	1	1	100	39	11	28.2
Color-coded bin liners sighted	33	0	0	5	0	0.0	1	0	0.0	39	0	0
HCW containers color coded	33	0	0	5	0	0.0	1	0	0.0	39	0	0
Condition of storage bins												
Waste storage container covered	33	12	36.4	5	3	60.0	1	0	0.0	39	18	46.2
Waste storage container leaky	33	9	27.3	5	1	20.0	1	0	0.0	39	15	38.5
Waste storage container overfilled	33	2	6.1	5	1	20.0	1	1	100	39	4	10.3
Waste storage area												
Storage access restricted to authorized personnel	33	5	15.5	5	1	20.0	1	1	100	39	7	17.9
Waste disposal site seen	33	20	60.6	5	3	60.0	1	0	0.0	39	23	59.0
On-site disposal facility												
Open burning on the ground	33	8	24.2	5	2	40.0	1	0	0	39	10	25.6
Open burning in secured pit or enclosure		17	51.5		3	60.0		0	0		20	51.3
Burial		1	3.0		0	0		0	0		1	0.3
Dumping in protected pit		0	0		0	0		1	100		1	0.3
Dumping in unprotected pit		1	3.0		0	0		0	0		1	0.3
Dumping in unsupervised area		1	3.0		0	0		0	0		1	0.3
Others		5	15.2		0	0		0	0		5	12.8

Table 19. Health Care Waste Treatment and Site in Focal Health Facilities in Akwa Ibom State

Process and characteristics	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste treatment process												
Open-waste drainage within hospital	33	20	60.6	5	1	20.0	1	1	100	39	22	56.4
Central waste collection exists	33	15	45.5	5	3	60.0	1	1	100	39	19	48.7
Central waste collection point well maintained	33	11	33.3	5	1	20.0	1	1	100	39	13	33.3

Process and characteristics	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste treatment site characteristics												
Treatment facility well maintained	33	11	33.3	5	1	20.0	1	1	100	39	13	33.3
Transport available for off-site treatment	33	9	27.3	5	0	0.0	1	0	0.0	39	9	23.1

FINDINGS: CROSS RIVER STATE

In the study in Cross River State, 27 facilities were included: 25 PHCs, one secondary facility, and one tertiary facility. Twenty-seven OICs, 68 CSPs, and 57 EHOs/waste handlers participated. Findings are grouped into categories:

Waste generation, segregation, treatment and disposal: knowledge and practice.

- Policy and operational frameworks.
- Environmental conditions and water and sanitation facilities.
- Worker and patient safety: knowledge, and practice.
- Safety boxes, syringes, and needles: commodity logistics.
- Waste generation, segregation, treatment, and disposal: knowledge and practice.

Policy and Operational Frameworks

Policies, Standards, and Operational Guidelines

The *National Policy on Infection Prevention and Control* was available and sighted in only 7.4 percent of focal health facilities. Similarly, the *National Policy on Health Care Waste Management* was available and sighted in only 3.7 percent of facilities. Both the national standards and norms on IPC and those on HCWM were available in only 3.7 percent of facilities. These documents were not available to data collectors at secondary or tertiary facilities in Cross River State.

Availability of Job Aids for Health Care Waste Management and Injection Safety

Job aids with HCWM messages were sighted in 18.9 percent of facilities and job aids for injection safety in 29.6 percent of facilities.

Annual Workplan and Report

Only 7.4 percent of health facilities had an annual workplan on HCWM, and most facilities (92.3 percent) had no budgetary allocation for HCWM—only two primary facilities in Cross River State reported a budgetary allocation for HCWM. No facility had had an annual HCWM activity report for the previous year.

Functional Infection Prevention and Control Committee

Although 33 percent of the facilities had an operational IPC committee coordinator, only 22 percent of all health facilities had functional IPC committees, per OICs. However, 35 percent of

CSPs indicated that an operational IPC committee coordinator existed in their facility, but only 17.6 percent reported that the IPC committees in their health facilities were functional..

Awareness of Policy and Operational Guidelines by Clinic Service Providers

About three-fifths of CSPs interviewed were aware of the existence of the national policy on IPC, although the document was sighted in only 18.6 percent of facilities. About half (55.9 percent) were aware of the national HCWM policy and the document was sighted in 15.8 percent of cases.

Table 20. Policy Documents and Operational Guidelines at Focal Health Facilities in Cross River State

Materials available	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Policies and guidelines												
National/state policy on IPC available, sighted	25	2	8.0	1	0	0.0	1	0	0.0	27	2	7.4
National/state policy on HCWM available, sighted	25	1	4.0	1	0	0.0	1	0	0.0	27	1	3.7
National guideline on IPC	25	1	4.0	1	0	0.0	1	0	0.0	27	1	3.7
National guideline on HCWM	25	1	4.0	1	0	0.0	1	0	0.0	27	1	3.7
Internal guidelines and SOP on IPC and HCWM available, sighted	25	0	0.0	1	0	0.0	1	0	0.0	27	0	0.0
Job aids												
Job aids for HCWM available in facility, sighted	24	4	16.7	2	0	0	1	1	100	27	5	18.5
Job aids for IS available, sighted	24	5	20.8	2	0	0	1	1	100	27	8	29.6

Table 21. Budget Provision, Workplan, and Infection Control Committee at Focal Health Facilities in Cross River State per Facilities' Officers-in-Charge

Availability	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OIC responses												
No budgetary allocation for HCWM	25	23	92.0	1	1	100	1	1	100	27	25	92.3
Annual workplan on HCWM exists	25	1	4.0	1	1	100	1	0	0	27	2	7.4
Annual HCWM activity report exists	25	0	0.0	1	0	0	1	0	0	27	0	0.0
Functional IPC committee exists	25	4	16.0	1	1	100	1	1	100	27	6	22.2
IPC committee coordinator operational	25	8	32.0	1	1	100	1	0	0	27	9	33.3

Availability	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
CSP responses												
Functional IPC committee exists	62	8	12.9	3	1	33.3	3	3	100	68	12	17.6
IPC committee coordinator operational	62	19	30.7	3	2	66.7	3	0	0.0	68	24	35.3

Environmental Conditions and Water and Sanitation Facilities

Structural Facilities

Three-quarter of PHCs were fenced, while all secondary and tertiary facilties were fenced. However, structural challenges were observed among PHCs, with roofs leaking in 29.2 percent and visible cracks in the walls of 20.8 percent.

General Cleanliness

Ward floors were generally clean (92.6 percent), although cobwebs were found in 14.8 percent of facilities, and 14.8 percent had litter and waste on the ground within the compound. Used or soiled dressings were not found on the floor of any PHC facility observed. Overgrown bushes were observed in 11.1 percent of facilities, notably the tertiary facility and two PHCs. However, overflowing waste bins were not observed in any facility.

Water Supply

Running tap water from a public source (55.6 percent) most commonly provided PHC water supplies. All secondary facilities obtained water from a facility borehole. The only tertiary facility surveyed obtained water from a borehole within the facility.

A protected dug well outside the facility was the water source for 12 percent of PHC facilities (Annex, Table A3).

Toilet Facilities

The toilet floor was wet in 22 percent of facilities. Overall, 48 percent of facilities had running water in their toilets.

Across facilities, most staff toilets (85.2 percent) were of the water closet type. Separate toilets for males and females were available in only 25.9 percent of facilities. Staff toilets were visibly clean in 48.2 percent of facilities, and 51.9 percent had a hand-washing station near the toilet. About two-fifths of facilities had soap at their hand-washing facility.

Of patient toilets, 96.3 percent were of the water closet type. Separate toilets for males and females were available in 40.7 percent of facilities. Toilets were visibly clean in 66.7 percent of facilities, smelly in 14.8 percent. Although 63 percent of facilities had soap for hand-washing, only one-third of facilities (33 percent) had a hand-washing station near the toilet (Annex, Table A4).

Worker and Patient Safety: Knowledge and Practice

Knowledge of Health Workers on Injection Safety and Health Care Waste Management

Knowledge of Disease Transmission from Improper Health Care Waste Management and Needlestick Injuries

Knowledge that some disease can be transmitted through improper HCWM and needlestick injuries was universal among both CSPs and EHOs/waste handlers at the primary, secondary and tertiary health facilities.

Knowledge of Personal Protective Equipment among Environmental Health Workers

Knowledge of personal protective equipment was generally high among EHOs/waste handlers, especially among those at secondary and tertiary facilities. Overall, knowledge was highest on the importance of latex gloves (82.3 percent) and nose masks (91.2 percent) and lowest for protective goggles (59.6 percent).

Self-Risk Perception of Health Workers, Protective Practices, and Injuries

Self-Risk Perception and Experience of Needlestick Injuries

Almost one-third of CSPs reported perceiving no risk of needlestick injury to themselves or low risk, while 50 percent perceived themselves of being at high risk. Similarly, although most EHOs/waste handlers (54.4 percent) perceived themselves as at high risk for needlestick injury, some (26.3 percent) perceived no risk or low risk for this. However, 11.1 percent of OICs, 38.2 percent of CSPs, and 9 percent of EHOs/waste handlers reported an episode of needlestick injury during the six months prior to the study.

Table 22. Self-Risk Perception of Clinic Service Providers and Environmental Health Workers in Focal Health Facilities in Cross River State

Perception and experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Self-perception of risk of needle stick injury												
CSPs												
No risk or low risk of needlestick injury perceived	62	26	41.9	3	1	33.3	3	0	0.0	68	27	39.7
Medium risk of injury perceived	62	7	11.3	3	0	0	3	0	0.0	68	7	10.3
High risk of needlestick injury perceived	62	29	46.8	3	2	66.7	3	3	0.0	68	34	50.0
EHOs/waste handlers												
No risk or low risk of needlestick injury perceived	51	15	29.4	3	0	0	3	0	0.0	57	15	26.3
Medium risk of injury perceived	51	7	13.7	3	1	33.3	3	0	0.0	57	8	14.0
High risk of needlestick injury perceived	51	29	56.9	3	2	66.7	3	3	0.0	57	31	54.4
Experienced needlestick injury during the preceding six months												
OICs	25	3	12.0	1	0	0.0	1	0	0.0	27	3	11.1
CSPs	62	24	38.7	3	1	33.3	3	1	33.3	68	26	38.2
EHOs/waste handlers	51	5	9.8	3	0	0.0	3	0	0.0	57	5	8.8

Availability of HIV Post-Exposure Prophylaxis

The proportion of interviewees who indicated that PEP was available in their facilities was 70.6 percent among CSPs and 56.1 percent among EHOs/waste handlers. However, PEP was available in pharmacies in 37 percent of health facilities—but not in the tertiary facility.

Table 23. HIV Post-Exposure Prophylaxis in Focal Health Facilities in Cross River State

Opinion and observation	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Opinion on PEP availability												
CSPs	62	42	67.7	3	3	100	3	3	100	68	48	70.6
EHOs	51	27	52.9	3	2	66.7	3	3	100	57	32	56.1
Observation on PEP availability												
Available PEP sighted in pharmacy	24	7	29.2	2	1	50.0	1	0	0	27	10	37.0

Vaccination Experience of Health Workers

The majority of CSPs reported having been vaccinated for tetanus (85.3 percent) and hepatitis (64.7 percent). Among EHOs/waste handlers, 71.9 percent reported vaccination against tetanus and 52.6 percent against hepatitis.

Table 24. Vaccination Experiences of Clinic Service Providers and Environmental Health Workers in Focal Health Facilities in Cross River State

Vaccination experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
CSPs												
Tetanus	62	52	83.9	3	3	100	3	3	100	68	58	85.3
Hepatitis	62	40	64.5	3	1	33.3	3	3	100	68	44	64.7
EHOs/waste handlers												
Tetanus	51	39	76.5	3	1	33.3	3	1	33.3	57	41	71.9
Hepatitis	51	28	54.9	3	1	33.3	3	1	33.3	57	30	52.6

Use of Personal Protective Equipment

In general, the use of PPE by HCW handlers was poor across health facilities. Aprons were observed being worn by HCW handlers in only 25.9 percent of facilities and heavy duty gloves worn by waste handlers in 29.6 percent of all health facilities. In 12 percent of PHCs, waste handlers wore overalls; none were sighted in the secondary or tertiary facilities. HCW handlers in 22.2 percent of health facilities wore boots.

Table 25: Use of Personal Protective Equipment in Focal Health Facilities in Cross River State

PPE	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW handler wore overalls	25	3	12.0	1	0	0.0	1	0	0.0	27	6	22.2
Waste handler used nose mask	25	7	28.0	1	0	0.0	1	0	0.0	27	7	25.9
HCW handlers wore heavy duty gloves	25	7	28.0	1	0	0.0	1	1	100	27	8	29.6
HCW handlers wore apron	25	7	28.0	1	0	0.0	1	0	0.0	27	7	25.9
HCW handlers wore boots	25	5	20.0	1	1	100	1	0	0.0	27	6	22.2

Reuse of Needles

OICs were asked about the reuse of syringes and needles in their facilities in the six months prior to the study, while CSPs were asked about their reuse of syringes and needles over the year before the study. On the whole, 3.7 percent of OICs and 2.9 percent of CSPs reported having reused syringes and needles.

Disposal of Sharps and Other Wastes

Observations made in injection areas in the majority of health facilities documented safety boxes in stock (in 77.8 percent of facilities) and safety boxes in all injection areas (88.9 percent).

Sharps were found to have been properly disposed in 77.8 percent of facilities, while used sharps were sighted in 3.7 percent of health facilities. Overflowing or pierced or open sharp boxes were sighted only in the tertiary facility.

Table 26. Disposal of Used Needles and Swabs in Focal Health Facilities in Cross River State

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Solid or dirty swab in injection area	25	1	4.0	1	0	0.0	1	0	0	27	1	3.7
Safety boxes in stock	25	21	84.0	1	0	0.0	1	0	0	27	21	77.8
Safety boxes in all injection areas	25	23	92.0	1	2	100	1	0	0	27	24	88.9
Overflowing sharp boxes, or pierced or open sharp boxes	25	0	0	1	0	0.0	1	1	100	27	1	3.7
Sharps properly disposed of	25	19	76.0	1	1	100	1	1	100	27	21	77.8
Used sharps seen around facility	25	1	4.0	1	0	0.0	1	0	0	27	1	3.7

Injection Preparation: Structured Observation

As noted, injections should be prepared on a dedicated table or tray that is visibly clean and where equipment contamination with blood, body fluids, or dirty swabs is unlikely. The preparation of injections across health facilities was observed to this standard in almost all facilities. Injections were prepared on such a table or tray in 100 percent of family planning and dental services, although for only 83.3 percent of therapeutic injections and 86.7 percent of vaccinations (Table 27). Similarly, the practice of hand-washing or use of alcohol-based hand rubs before preparing injections was highest for family planning and dental services, where 100% was recorded for each, much lower for vaccination services, and lowest for therapeutic injections.

Table 27. Injection Preparation Practices in Focal Health Facilities in Cross River State

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	n	(%)	N	n	(%)	N	n	(%)	N	n	(%)
Appropriate injection preparation												
Vaccination	13	11	84.6	1	1	100	1	1	100	15	13	86.7
Therapeutic	28	23	82.1	1	1	100	1	1	100	30	25	83.3
Family planning	5	5	100	1	1	100	0	0	0.0	6	6	100
Dental	0	0	0.0	0	0	0.0	1	1	100	1	1	100
Vaccination												
Washed hands with soap and running water	13	7	53.9	1	1	100	1	0	0.0	15	8	53.3
Washed hands with alcohol-based hand rub	13	5	38.5	1	0	0.0	1	0	0.0	15	5	33.3

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	n	(%)	N	n	(%)	N	n	(%)	N	n	(%)
Therapeutic injection												
Washed hands with soap and running water	28	11	39.3	1	1	100	1	0	0.0	30	12	40.0
Washed hands with alcohol-based hand rub	28	8	28.6	1	1	100	1	0	0.0	30	9	30.0
Family planning												
Washed hands with soap and running water	5	5	100	1	1	100	0	0	0.0	6	6	100
Washed hands with alcohol-based hand rub	5	3	60.0	1	0	0.0	0	0	0.0	6	3	50.0
Washed hands with soap and running water	0	0	0.0	0	0	0.0	1	1	100	1	1	100
Washed hands with alcohol-based hand rub	0	0	0.0	0	0	0.0	1	1	100	1	1	100

Safety Boxes, Syringes and Needles: Commodity Logistics

Reported Availability of Health Care Waste–Related Materials, Storage and Transportation Facilities

Reported Availability of Personal Protective Equipment

When interviewed, most OICs (88.9 percent) reported latex gloves as widely available. The availability of the other types of PPE was reported to be poor, especially goggles (29.6 percent) and overalls (14.8 percent). It is important to note that the tertiary facility had all PPE except boots, while at the surveyed secondary facility, latex gloves were the only available item of PPE.

Health Care Waste Management Equipment and Materials

All OICs indicated in their interviews that brooms and safety boxes were available, while 48.1 percent of them reported that their facilities had bin liners. Only 18.5 percent indicated that they had wheelbarrows or other equipment to use to transport wastes.

Health Care Waste Temporary Storage and Transportation Practices

More than half of OICs (59.3 percent) indicated that their facilities had a designated area for temporary HCW storage and 33.3 percent of OICs interviewed noted that access to these designated areas were restricted to an authorized person. Almost half of OICs (44.4 percent) indicated that they collected and stored hazardous and nonhazardous wastes separately.

Only 7.4 percent of OICs—those at two primary facilities—indicated that their health facilities used municipal services to transport HCW (Table 28).

Table 28. Health Care Waste Temporary Storage and Transportation Practices in Focal Health Facilities in Cross River State per Facilities' Officers-in-Charge

Practices	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Designated area for temporary storage of HCW exists	25	16	64.0	1	0	0.0	1	0	0.0	27	16	59.3
Designated area for temporary storage with access restricted to authorized personnel	25	9	36.0	1	0	0.0	1	0	0.0	27	9	33.3
Hazardous and nonhazardous waste are collected and stored separately	25	12	48.0	1	0	0.0	1	0	0.0	27	12	44.4
Hazardous and nonhazardous waste are transported separately	25	17	68.0	1	0	0.0	1	0	0.0	27	17	63.0
Closed device is used to transport HCW off site	25	11	44.0	1	0	0.0	1	1	100	27	12	44.4
Use municipal services for HCW transportation	25	2	8.0	1	0	0.0	1	0	0.0	27	2	7.4

Observations on the Availability of Syringes, Needles, and Safety Boxes

Availability of Syringes and Needles by Type

Standard disposable needles and auto-disable syringes were observed to varying degrees across the three types of health facilities. The standard disposable 5 ml syringe was the most available (69.2 percent).

Stockout Experiences

A review of stock cards documented that in the six months prior to the study, two-thirds of health facilities had experienced a stockout of bin liners, 11.5 percent of safety boxes, and 15.4 percent of vacutainers (Table 30).

Approximately 15 percent of facilities had experienced a stockout of RUP needles and standard disposable syringes over the same period.

Adequacy of Available Supplies

Generally, across facilities, fewer than 30 percent had adequate supplies of 5 ml syringes in store for two weeks' use. There were inadequate stocks of needlestick-prevention syringes in store for two weeks' use as well. Only 26.9 percent of facilities had adequate supplies of standard disposable syringes (Table 30).

Table 29. Availability of Various Needle Types in Focal Health Facilities in Cross River State

Syringes and needles	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Standard disposable syringes												
0.5 ml, standard disposable	24	2	8.3	1	0	0.0	1	0	0.0	26	2	7.7
1 ml, standard disposable	24	1	4.2	1	0	0.0	1	0	0.0	26	1	3.8
2 ml, standard disposable	24	9	37.5	1	0	0.0	1	1	100	26	10	38.5
5 ml, standard disposable	24	17	70.8	1	0	0.0	1	1	100	26	18	69.2
10 ml, standard disposable	24	9	37.5	1	0	0.0	1	1	100	26	10	38.5
Sterilizable needles												
0.5 ml, sterilizable	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
1 ml, sterilizable	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
2 ml, sterilizable	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
5 ml, sterilizable	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
10 ml, sterilizable	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
RUP (Auto-disable) syringes												
0.5 ml, auto-disable	24	11	45.8	1	0	0.0	1	0	0.0	26	11	42.3
1 ml, auto-disable	24	1	4.2	1	0	0.0	1	0	0.0	26	1	3.8
2 ml, auto-disable	24	3	12.5	1	1	100	1	0	0.0	26	4	15.4
5 ml, auto-disable	24	7	29.2	1	0	0.0	1	0	0.0	26	7	26.9
10 ml, auto-disable	24	1	4.2	1	0	0.0	1	1	100	26	2	7.7

Table 30. Store/Pharmacy Stockout Experiences and Availability of Adequate Health Care Waste Management Commodities in Focal Health Facilities in Cross River State

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW materials stockout in the six months preceding the study												
Bin liners	24	17	70.8	1	1	100	1	0	0.0	26	18	69.2
Vacutainers	24	4	16.7	1	0	0.0	1	0	0.0	26	4	15.4
Safety boxes	24	3	12.5	1	0	0.0	1	0	0.0	26	3	11.5
Disposable gloves	24	8	33.3	1	0	0.0	1	1	100	26	9	34.6
Syringe stockout in the six months preceding the study												
Needlestick-prevention syringes	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0
RUP syringes	24	4	16.7	1	0	0.0	1	0	0.0	26	4	15.4
Standard disposable syringes	24	4	16.7	1	0	0.0	1	0	0.0	26	4	15.4
5 ml syringes in store adequate for two weeks' use												
Standard disposable syringes	24	6	25.0	1	0	0.0	1	1	100	26	7	26.9
RUP syringes	24	5	20.8	1	0	0.0	1	0	0.0	26	5	19.2
Needlestick-prevention syringes	24	0	0.0	1	0	0.0	1	0	0.0	26	0	0.0

Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice

Knowledge of Waste Segregation and Color Coding among Clinic Service Providers and Environmental Health Workers

A high proportion of surveyed CSPs knew that wastes could be segregated into general (91.7 percent), sharps (91.7 percent), and infectious waste (81.7 percent). However, knowledge of some categories of waste was poor, especially knowledge of radioactive waste (8.3 percent) and recyclables (16.7 percent). The same pattern was observed among EHOs/waste handlers, with a high proportion being knowledgeable about sharps (95.3 percent) and general waste (90.7 percent) and a considerable lower proportion knowledgeable about radioactive waste (9.3 percent) and recyclables (16.3 percent).

Only 52 percent of OICs, 78 percent of CSPs, and 70 percent of EHOs/waste handlers showed awareness of color coding. Overall, the proportion of all health workers who correctly identified yellow as the color code for infectious waste was low—22.2 percent of OICs, 36.8 percent of CSPs, and 24.6 percent EHOs/waste handlers.

Table 31. Health Worker Knowledge of Waste Segregation and Color Coding in Focal Health Facilities in Cross River State

Waste segregation and color coding	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Aware of waste color coding												
OICs	25	13	52.0	1	0	0.0	1	1	100	27	14	51.9
CSPs	62	47	75.8	3	3	100	3	3	100	68	53	77.9
EHOs/waste handlers	51	35	68.6	3	3	100	3	2	66.7	57	40	70.2
Knowledge that infectious waste should be coded yellow among subjects aware of color coding												
OICs	13	5	38.5	0	0	0.0	1	1	100	14	6	42.9
CSPs	47	21	44.7	3	1	33.3	3	3	100	53	25	47.2
EHOs/waste handlers	35	12	34.3	3	1	33.3	2	1	50.0	40	14	35.0
Knowledge that infectious waste should be coded yellow among ALL subjects												
OICs	25	5	20.0	1	0	0.0	1	1	100	27	6	22.2
CSPs	62	21	33.9	3	1	33.3	3	3	100	68	25	36.8
EHOs/waste handlers	51	12	23.5	3	1	33.3	3	1	33.3	57	14	24.6

Waste Generation, Segregation, Treatment and Disposal Practices Reported

Waste Generation at Health Facilities

Most EHOs/waste handlers indicated understanding that their facilities generate sharps (94.7 percent), general waste (89.5 percent), infectious waste (84.2 percent), and anatomic waste (73.7 percent). Fewer than one-fifth of these officers indicated that their facilities generated chemical waste (10.5 percent) and radioactive waste (15.8 percent).

Frequency of Removal of Wastes from Wards

In PHCs, the majority of OICs (64 percent) and EHOs/waste handlers (70.6 percent) said that wastes were removed from wards daily; in secondary facilities, waste handling staff indicated removal on a shift basis. For tertiary facilities, OICs indicated shift basis removal while all waste handling staff noted daily removal.

Waste Segregation

Most Cross River State facility OICs (96.3 percent) reported that waste was segregated at the source in their facilities, while 18.5 percent indicated that leakproof and puncture-proof containers were used to do so (Table 32).

Only 22.2 percent of OICs reported knowing that yellow bin liners were used for infectious wastes. Overall, 66.7 percent reported a shortage of bin liners and 48.1 percent a shortage of waste storage containers in their facilities in the six months preceding the study.

Table 32. Waste Segregation Processes in Focal Health Facilities in Cross River State per Facilities' Officers-in-Charge

Waste segregation process	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste segregation at source	25	25	100	1	0	0	1	1	100	27	26	96.3
Leak- and puncture-proof container used for waste segregation	25	5	20.0	1	0	0	1	0	0	27	5	18.5
Generated waste is weighed	25	0	0	1	0	0	1	0	0	27	0	0
Waste receptacles and containers color coded	25	13	52.0	1	0	0	1	1	100	27	14	51.9
Yellow bin liners used for infectious wastes	25	5	20.0	1	0	0	1	1	100	27	6	22.2
Bin liners used to segregate waste	25	15	60.0	1	0	0	1	1	100	27	16	59.3
Bin liner shortage experienced during the six months prior to the study	25	17	68.0	1	0	0	1	1	100	27	18	66.7
Waste storage container shortage during the six months prior to the study	25	11	44.0	1	1	100	1	1	100	27	13	48.1

Health Care Waste Treatment and Disposal

Treatment and Disposal Practices

The majority of OICs (77.8 percent) indicated that open burning in a hole or enclosure was the HCWM disposal method in their facility, and burial was the next most common method (48.1 percent).

About a third of OICs (37 percent) indicated that their facilities transported wastes off site.

Overall, only 18.5 percent of OICs rated the their facility's current HCW treatment capacity as adequate. All EHOs/waste handlers in the secondary and tertiary facilities—but only 60.8 percent in PHCs—believed that HCW was safely managed in their facility.

Overall, based on their own judgement without an objective measure, over half of EHOs/waste handlers (54.4 percent) believed that HCW was managed in an "environmentally friendly" way in their facility (Table 33).

Table 33. Quality and Environmental Friendliness of Health Care Waste Treatment and Disposal in Focal Health Facilities in Cross River State per Facilities' Officers-in-Charge and Environmental Health Workers

HCW treatment and disposal methods	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OICs												
Current treatment capacity adequate	25	5	20.0	1	0	0	1	1	0	27	5	18.5
EHOs/waste handlers												
HCW safely managed	51	31	60.8	3	3	100	3	3	100	57	37	64.9
HCW managed in an "environmentally friendly" way	51	28	54.9	3	0	0	3	3	100	57	31	54.4

Observations on Waste Storage, Disposal, and Treatment Facilities

Storage Bins and Bin Liners

Most health facilities (88.9 percent) had storage bins within the facility. Color-coded bin liners were sighted in only 40.7 percent of these, and only 25.9 percent of health facilities used color coding for HCW containers. Waste storage containers were covered in 44.4 percent of facilities. None of the facilities had leaky waste storage containers (Table 34).

Waste Storage Area and On-Site Treatment Facilities

Over half of PHCs and the single tertiary facility studied had a waste storage area. None of the secondary facilities did. Access to the waste storage area was restricted to authorized persons in 33.3 percent of the health facilities.

Open burning on the ground was the most common type of on-site disposal practice across the facilities (52 percent), including the tertiary facility. Open burning in secured pit or enclosure was the next most common waste disposal practice (22.2 percent) across the facilities.

Health Care Waste Treatment Process and Site

Central waste collection points existed in 59 percent of facilities, and the central waste collection point was well maintained in 48.2 percent of these. One-third of the facilities (33.3 percent) had open-waste drainage. The waste treatment facility was well maintained in 48 percent of health facilities, but transportation was available for off-site treatment in only 29.6 percent (Table 35).

Table 34. Health Care Waste Materials and Treatment Facilities in Focal Health Facilities in Cross River State

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Storage bins and bin liners												
Waste storage bins available within the facility building	25	22	88.0	1	1	100	1	1	100	27	24	88.9
Waste storage bins available outside the facility	25	14	56.0	1	1	100	1	1	100	27	16	59.3
Color-coded bin liners sighted	25	10	40.0	1	1	100	1	0	0	27	11	40.7
HCW containers color coded	25	6	24.0	1	1	100	1	0	0	27	7	25.9
Condition of storage bins												
Waste storage container covered	25	12	48	1	0	0.0	1	0	0	27	12	44.4
Waste storage container leaky	25	2	8.0	1	0	0	1	0	0	27	2	7.4
Waste storage container overfilled	25	0	0	1	0	0	1	0	0	27	0	0.0
Waste storage area												
Storage area well designated	25	15	60.0	1	0	0.0	1	1	100	27	16	59.3
Storage access restricted to authorized personnel	25	9	36.0	1	0	0.0	1	0	0	27	9	33.3
Waste disposal site seen	25	16	64.0	1	1	100	1	1	100	27	18	66.7
On-site disposal facility												
Open burning on the ground	25	13	52.0	1	0	0	1	1	100	27	14	51.9
Open burning in secured pit or enclosure		5	20.0		1	100		0	0		6	22.2
Burial		0	0		0	0		0	0		0	0
Dumping in protected pit		1	4.0		0	0		0	0		1	3.7
Dumping in unprotected pit		0	0		0	0		0	0		0	0

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Dumping in unsupervised area		1	4.0		0	0		0	0		1	3.7
Others		3	12.0		0	0		0	0		3	11.1

Table 35. Health Care Waste Treatment and Site in Focal Health Facilities in Cross River State

Process and characteristics	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste treatment process												
Open-waste drainage within hospital	25	8	32.0	0	0	0.0	1	1	100	27	9	33.3
Central waste collection exists	25	15	60.0	0	0	0.0	1	1	100	27	16	59.3
Central waste collection point well maintained	25	13	52.0	0	0	0.0	1	0	0	27	13	48.2
Waste treatment site characteristics												
Treatment facility well maintained	25	11	44.0	1	1	100	1	1	100	27	13	48.2
Transport available for off-site treatment	25	7	28.0	0	0	0.0	1	1	100	27	8	29.6

FINDINGS: RIVERS STATE

A total of 44 facilities in Rivers State were included in the study, including 41 PHCs, two secondary facilities, and one tertiary facility. Forty-four OICs, 105 CSPs, and 77 EHOs/waste handlers participated in the study. Findings are grouped into categories:

- Policy and operational frameworks.
- Environmental conditions and water and sanitation facilities.
- Worker and patient safety: knowledge and practice.
- Safety boxes, syringes, and needles: commodity logistics.
- Waste generation, segregation, treatment, and disposal: knowledge and practice.

Policy and Operational Frameworks

Policies, Standards, and Operational Guidelines

OICs' information indicated that both the *National Policy on Infection Prevention and Control* and the *National Policy on Healthcare Waste Management* were each available in 9.1 percent of all facilities. Each of the national standards and norms (on IPC and on HCWM) was being used in 4.5 percent of facilities (Table 36).

Availability of Job Aids for Health Care Waste Management and Injection Safety

Job aids with HCWM messages were sighted in 13.6 percent of facilities and job aids for injection safety found in 25.0 percent of facilities as well.

Annual Workplan and Report

Most health facilities (81.8 percent) reported no budgetary allocation for HCWM, and only 25 percent of facilities had an annual HCWM workplan, while 36.4 percent reportedly had an annual HCWM activity report for the previous year (Table 37).

Functional Infection Prevention and Control Committee

According to the OICs, 50 percent of all the facilities had an operational IPC committee coordinator, while 29.5 percent had functional IPC committees (Table 37).

However, when interviewed, CSPs reported that only 15.2 percent of facilities had a functional IPC committee and 44.8 percent that they had an operational IPC committee coordinator.

Awareness of Policy and Operational Guidelines by Clinic Service Providers

Only about half of CSPs were aware of the existence of the national policy on IPC (55.2 percent) and HCWM (48.6 percent). A copy of the IPC policy was sighted in 12.1 percent of facilities and a copy of the HCWM policy in 2 percent.

Table 36. Policy Documents and Operational Guidelines at Focal Health Facilities in Rivers State per Facilities' Officers-in-Charge

Materials available	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Policies and guidelines												
National/state policy on IPC available and sighted	41	3	7.3	2	0	0.0	1	1	100	44	4	9.1
National/state policy on HCWM available and sighted	41	3	7.3	2	0	0.0	1	1	100	44	4	9.1
National guideline on IPC available and sighted	41	1	2.4	2	0	0.0	1	1	100	44	2	4.5
National guideline on HCWM available and sighted	41	1	2.4	2	0	0.0	1	1	100	44	2	4.5
Internal guidelines and SOP on IPC and HCWM available and sighted	41	0	0.0	2	0	0.0	1	0	0.0	44	0	0.0
Job aids												
Job aids for HCWM available in facility and sighted	41	5	12.2	2	1	50.0	1	0	0.0	44	6	13.6
Job aids for IS available and sighted	41	9	22.0	2	1	50.0	1	1	100	44	11	25.0

Table 37. Budget Provision, Workplan, and Infection Control Committee at Focal Health Facilities in Rivers State per Facilities' Officers-in-Charge

	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OIC responses												
No budgetary allocation for HCWM	41	34	83	2	2	100	1	0	0.0	44	36	81.8
Annual workplan on HCWM exists	41	9	21.9	2	0	0.0	1	1	100	44	11	25.0
Annual HCWM activity report exists	9	3	33.3	2	0	0.0	1	1	100	11	4	36.4
Functional IPC committee exists	41	11	26.8	2	1	50.0	1	1	100	44	13	29.5
IPC committee coordinator operational	41	19	46.3	2	2	100	1	1	100	44	22	50.0
CSP responses												
Functional IPC committee exists	97	11	11.3	5	2	40.0	3	3	100	105	16	15.2
IPC committee coordinator operational	97	42	43.3	5	2	40.0	3	3	100	105	47	44.8

Environmental Conditions and Water and Sanitation Facilities

Structural Facilities

Almost all of the focal health facilities were fenced (93.2 percent). Although no structural problems were observed in the secondary and tertiary facilities, walls in 22.0 percent of PHC facilities had visible cracks, and roofs in 12.2 percent were leaking.

General Cleanliness

Floors were clean in wards in the majority of facilities (77.3 percent), although in 22.0 percent of PHCs, litter was found on the floors. Also in PHCs, used or soiled dressings were found on the floor in 9.8 percent and litter and waste found on the ground within the compound in 34.2 percent. In 41.5 percent of PHCs, cobwebs were seen, and in 4.9 percent, bushes were overgrown. None of the aforementioned conditions noted were observed secondary and tertiary facilities.

Waste bins for general use were found in the secondary and tertiary facilities but in only 92.7 percent of PHCs. Overflowing bins were found in 14.6 percent of PHCs—none were seen in the secondary and tertiary facilities.

Water Supply

The most common water supply source for all facilities was running water from a facility borehole (95.5 percent). Only one PHC (2.4 percent) obtained its tap water from a public source.

Toilet Facilities

The toilet floor was found to be wet in 13.6 percent of facilities. There was water in the toilets in the secondary and tertiary facilities but in those of only 75.6 percent of PHC facilities. A water closet type of toilet was available for staff in all secondary and tertiary facilities and in 92.7 percent of PHC facilities. Only 40.9 percent of facilities had a separate toilet for male and female staff. The secondary and tertiary facilities' staff toilets were odor-free but those in 7.3 percent of PHC facilities were smelly. Only three-quarters of staff toilets (75.0 percent) were found to be visibly clean. Only 88.6 percent of all facilities had hand-washing facilities near the toilet, and these facilities had soap in all secondary and tertiary health facilities but in only 34.2 percent of PHCs.

For patients, a water closet was available in all focal health facilities. The secondary and tertiary facilities had separate toilets for males and females but only 26.8 percent of PHCs had them. Toilets were visibly clean in the secondary and tertiary facilities but in only about two-thirds (65.9 percent) of PHCs. Patient toilets were smelly in only three PHC facilities (7.3 percent).

Hand-washing facilities near the toilet were available in 29.3 percent of PHCs, and almost all had soap. Both the secondary and the tertiary properties had hand-washing facilities with soap near the toilets (Annex, Table A4).

Worker and Patient Safety: Knowledge and Practice

Knowledge of Health Workers on Injection Safety and Health Care Waste Management

Knowledge of Disease Transmission from Improper Health Care Waste Management and Needlestick Injuries

Knowledge that disease can be transmitted through improper HCWM and needlestick injuries was virtually universal among both CSPs and EHPs at all facilities.

Knowledge of Personal Protective Equipment among Environmental Health Officers

Knowledge of PPE was generally high among EHOs, especially among those in the secondary and tertiary facilities. Overall, knowledge was highest for latex gloves (90.9 percent) and nose masks (87 percent) and lowest for overalls (44.2 percent) and protective goggles (15.6 percent).

Self-Risk Perception of Health Workers, Protective Practices, and Injuries

Self-Risk Perception and Experience of Needlestick Injuries

Slightly more than one-third of CSPs (42.9 percent) and CHWs (41.6 percent) reported that they perceived themselves at no risk or low risk for needlestick injury. More than half of CSPs (50.5 percent) reported feeling at high risk for needlestick injury. On the other hand, among OICs, 9.1 percent reported having experienced needlestick injury in the six months preceding the survey, compared to 10.4 percent of EHOs/waste handlers and 29.5 percent of CSPs.

Table 38. Self-Risk Perception of Clinic Service Providers and Environmental Health Workers in Focal Health Facilities in Rivers State

Perception and experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		N	(%)		n	(%)		n	(%)
CSPs												
No risk or low risk of needlestick perceived	97	41	42.3	5	3	60.0	3	1	33.3	105	45	42.9
Medium risk of needlestick perceived	97	7	7.2	5	0	0	3	0	0	105	7	15.0
High risk of needlestick perceived	97	49	50.5	5	2	40.0	3	2	66.7	105	53	50.5

Perception and experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		N	(%)		n	(%)		n	(%)
EHOs/waste handlers												
No risk or low risk of needlestick perceived	70	28	40.0	4	2	50.0	3	2	66.7	77	32	41.6
Medium risk of needlestick perceived	70	7	10.0	4	1	25.0	3	0	0	77	8	10.4
High risk of needlestick perceived	70	34	48.6	4	1	25.0	3	1	33.3	77	36	46.8
Experienced needlestick injury during the preceding six months												
OICs	42	4	9.5	1	0	0	1	0	0	44	4	9.1
CSPs	97	29	29.0	5	0	0	3	2	66.7	105	31	29.5
EHOs	70	8	11.4	4	0	0	3	0	0	77	8	10.4

Availability of HIV Post-Exposure Prophylaxis

In interviews, 48.6 percent of CSPs and 13.0 percent of EHOs/waste handlers indicated that PEP was available in their facilities. PEP was observed in the store/pharmacy of 29.5 percent of all the focal facilities and not in the state's tertiary facility.

Table 39. HIV Post-Exposure Prophylaxis in Focal Health Facilities in Rivers State

Opinions and observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Opinion on PEP availability												
CSPs	97	45	46.4	5	4	80.0	3	2	66.7	105	51	48.6
EHOs/waste handlers	70	8	11.4	4	2	50.0	3	0	0	77	10	13.0
Observation on PEP availability												
Available PEP sighted in pharmacy	41	12	29.3	2	0	0.0	1	1	100	44	13	29.5

Vaccination Experience of Health Workers

A high proportion of CSPs self-reported having been vaccinated against tetanus (94.3 percent) while 83.8 percent had received at least a dose of hepatitis B vaccine. By comparison, 63.6 percent of EHOs/waste handlers had been vaccinated against tetanus or had received at least one dose of hepatitis B vaccine (53.5 percent).

Table 40. Vaccination Experiences of Clinic Service Providers and Environmental Health Workers in Focal Health Facilities in Rivers State

Vaccination experience	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
CSPs												
Tetanus	97	92	94.9	5	5	100	3	2	66.7	105	99	94.3
Hepatitis	97	82	84.5	5	5	100	3	1	33.3	105	88	83.8
EHOs/waste handlers												
Tetanus	70	46	65.7	4	3	75.0	3	0	0	77	49	63.6
Hepatitis	70	39	55.7	4	2	50.0	3	0	0	77	41	53.2

Use of Personal Protective Equipment

Generally, the use of PPE among HCW handlers was poor in Rivers State. Only 18.2 percent of those observed in facilities were found to wear overalls; 22.7 percent also wore aprons. One-third (31.8 percent) were observed using nose masks, while 38.6 percent used heavy duty gloves and 29.5 percent wore boots (Table 41).

Table 41. Use of Personal Protective Equipment in Focal Health Facilities in Rivers State

PPE	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW handlers wore overalls	41	7	17.1	2	0	0.0	1	1	100	44	8	18.2
Waste handlers used nose masks	41	12	29.3	2	1	50.0	1	1	100	44	14	31.8
HCW handlers wore heavy duty gloves	41	15	36.6	2	1	50.0	1	1	100	44	17	38.6
HCW handlers wore aprons	41	9	22.0	2	1	50.0	1	0	0.0	44	10	22.7
HCW handlers wore boots	41	12	29.3	2	0	0.0	1	1	100	44	13	29.5

Reuse of Needles

OICs were asked about the reuse of syringes and needles in their facilities over the six months preceding the study and CSPs were asked about their reuse of syringes and needles in the year prior to the study. Among the OICs, 2.3 percent reported having reused syringes and needles, and 0.9 percent of CSPs so reported.

Disposal of Sharps and Other Wastes

Soiled/dirty swabs was observed in 7.3 percent of PHCs but not in the secondary or tertiary facilities.

Safety boxes were in stock in 65.9 percent of facilities, and safety boxes were found in all injection areas observed in the tertiary facility, 65.9 percent of PHC injection areas, and 50 percent of secondary facility injection areas.

Sharps had been properly disposed of in 86.4 percent of facilities, although used sharps were found around 11.4 percent (Table 42).

Table 42. Disposal of Used Needles and Swabs in Focal Health Facilities in Rivers State

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Soiled or dirty swab in injection area	41	3	7.3	2	0	0.0	1	0	0	44	3	6.8
Safety boxes in stock	41	27	65.9	2	1	50.0	1	1	100	44	29	65.9
Safety boxes in all injection areas	41	27	65.9	2	1	50.0	1	1	100	44	29	65.9
Overflowing sharp boxes, or pierced or open sharp boxes	41	6	14.6	2	0	0.0	1	1	100	44	7	15.9
Sharps properly disposed of	41	36	87.8	2	1	50.0	1	1	100	44	38	86.4
Used sharps seen around facility	41	5	12.2	2	0	0.0	1	0	0	44	5	11.4

Injection Preparation: Structured Observation

As noted, there is a right way to prepare injections—that is, on a clean, dedicated table or tray, where equipment contamination by blood, body fluids, or dirty swabs is unlikely. Injections met this standard in 63.3 percent of observed preparations for therapeutic injections and 58.6 percent of vaccination injections. It was observed that injection preparations for vaccination and therapeutic injections met this standard in the single tertiary facility involved in the study in Rivers State.

Fewer than half of all observed CSPs (44.8 percent) washed their hands with soap and water and and a small percentage (6.9 percent) used an alcohol-based hand rub before preparing injections for vaccinations. Forty percent cleaned their hands—with soap and water—before preparing therapeutic injections.

Additionally, 42.9 percent of CSPs washed their hands before preparing family planning injections, and 36.7 percent cleaned their hands with alcohol-based hand rub before preparing to administer therapeutic injections. All CSPs washed their hands with soap and water before preparing injections for dental services.

Table 43. Injection Preparation Practices in Focal Health Facilities in Rivers State

Observations	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	N	(%)	N	n	(%)	N	N	(%)	N	N	(%)
Appropriate injection preparation												
Vaccination	28	16	57.1	0	0	0.0	1	1	100	29	17	58.6
Therapeutic	28	17	60.7	1	1	100	1	1	100	30	19	63.3
Family planning	7	3	42.9	0	0	0.0	0	0	0.0	7	3	42.9
Dental	1	1	100	0	0	0.0	0	0	0.0	1	1	100
Provider pre-injection handwashing												
Vaccination												
Washed hands with soap and running water	28	12	42.9	0	0	0.0	1	1	100	29	13	44.8
Washed hands with alcohol-based hand rub	28	1	3.6	0	0	0.0	1	1	100	29	2	6.9
Therapeutic injection												
Washed hands with soap and running water	28	10	35.7	1	1	100	1	1	100	30	12	40.0
Washed hands with alcohol-based hand rub	28	11	39.3	1	0	0.0	1	0	0.0	30	11	36.7
Family planning												
Washed hands with soap and running water	7	3	42.9	0	0	0.0	0	0	0.0	7	3	42.9
Washed hands with alcohol-based hand rub	7	0	0.0	0	0	0.0	0	0	0.0	7	0	0.0
Dental												
Washed hands with soap and running water	1	1	100	0	0	0.0	0	0	0.0	1	1	100
Washed hands with alcohol-based hand rub	1	1	100	0	0	0.0	0	0	0.0	1	1	100

Safety Boxes, Syringes, and Needles: Commodity Logistics

Reported Availability of Health Care Waste–Related Materials, Storage, and Transportation Facilities

Reported Availability of Personal Protective Equipment

When OICs of the state's focal facilities were asked about PPE availability in their facilities, they reported having latex gloves (100 percent), aprons and nose masks (86.4 percent), overalls (40.9 percent), and goggles (29.6 percent).

Health Care Waste Management Equipment and Materials

All OICs said that their facilities had dust bins and brooms (100 percent), safety boxes (90.9 percent), and bin liners (75 percent). Fewer respondents indicated having dino/wheelie bins (38.6 percent) and high-temperature incinerators (9.1 percent).

Health Care Waste Temporary Storage and Transportation Practices

Most OICs (93.2 percent) indicated that their facilities had a designated area for temporary waste storage; 54.6 percent of this group indicated that only authorized persons had access to such storage facilities. Most OICs (84.1 percent) said that hazardous and nonhazardous wastes were collected and stored separately, but only 47.7 percent indicated that hazardous and nonhazardous wastes were transported separately.

In terms of who transported focal facilities' health care waste, 9.1 percent of OICs reported that their institutions used municipal facilities, and 61.4 percent indicated that closed device mechanisms were used for off-site HCW transport (Table 44).

Table 44. Health Care Waste Temporary Storage and Transportation Practices in Focal Health Facilities in Rivers State per Facilities' Officers-in-Charge

Practices	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Designated area for temporary storage of HCW exists	41	38	92.7	2	2	100	1	1	100	44	41	93.2
Designated area for temporary storage with access restricted to authorized personnel	41	22	53.7	2	1	50.0	1	1	100	44	24	54.6
Hazardous and nonhazardous waste are collected and stored separately	41	34	82.9	2	2	100	1	1	100	44	37	84.1
Hazardous and nonhazardous waste are transported separately	41	18	43.9	2	2	100	1	1	100	44	21	47.7
Closed device is used to transport HCW off site	41	25	60.9	2	1	50.0	1	1	100	44	27	61.4
Use municipal services for HCW transportation	41	4	9.8	2	0	0.0	1	0	0	44	4	9.1

Observations on the Availability of Syringes, Needles, and Safety Boxes

Availability of Syringes and Needles by Type

Most OICs across all the three categories of health facilities (95.5 percent) indicated that their institutions used standard disposable syringes and RUP syringes (63.6 percent) and had these types of syringes in stock.

Syringes of sizes 2 ml and 5 ml were the most common syringe types available. Standard disposable syringes, RUP syringes, and auto-disable syringes of various sizes were available in specific sizes and to different degrees across the three categories of health facilities (Table 45).

Table 45. Availability of Needle Types in Focal Health Facilities in Rivers State

Syringes and needles	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Standard disposable syringes												
0.5 ml, standard disposable	39	5	12.8	2	0	0.0	1	0	0.0	42	5	11.9
1 ml, standard disposable	39	3	7.7	2	0	0.0	1	0	0.0	42	3	7.2
2 ml, standard disposable	39	26	66.7	2	2	100	1	1	100	42	29	69.0
5 ml, standard disposable	39	24	61.5	2	2	100	1	1	100	42	27	64.3
10 ml, standard disposable	39	18	46.2	2	2	100	1	1	100	42	21	50.0
Sterilizable needles												
0.5 ml, sterilizable	39	0	0.0	2	0	0.0	1	0	0.0	42	0	0.0
1 ml, sterilizable	39	0	0.0	2	0	0.0	1	0	0.0	42	0	0.0
2 ml, sterilizable	39	0	0.0	2	1	50.0	1	0	0.0	42	1	2.4
5 ml, sterilizable	39	0	0.0	2	1	50.0	1	1	100	42	2	4.8
10 ml, sterilizable	39	0	0.0	2	1	50.0	1	1	100	42	2	4.8
RUP syringes												
0.5 ml, auto-disable	39	4	10.3	2	0	0.0	1	0	0.0	42	4	9.5
1 ml, auto-disable	39	1	2.6	2	0	0.0	1	0	0.0	42	1	2.4
2 ml, auto-disable	39	0	0.0	2	0	0.0	1	0	0.0	42	0	0.0
5 ml, auto-disable	39	2	5.1	2	0	0.0	1	0	0.0	42	2	4.8
10 ml, auto-disable	39	1	2.7	2	0	0.0	1	0	0.0	42	1	2.4

Stockout Experiences

A review of stock cards revealed no stockouts of HCWM commodities during the six months preceding the survey in the tertiary health facility.

However, within the six months preceding the survey, there were stockouts of bin liners in 18 percent of PHC facilities and of disposable gloves in 50 percent of secondary facilities. There were no stockouts of vacutainers except in 2.6 percent of PHCs.

The tertiary facility observed had a stockout of RUP syringes in the 6 months preceding the survey, as did 2.6 percent of PHC facilities for needlestick-prevention syringes and 4.8 percent of PHCs and secondary facilities for standard disposable syringes (Table 48)

Adequacy of Available Supplies

The stock of standard disposable syringes was sufficient for two weeks' use in 59.5 percent of facilities (Table 46) as was the stock of needlestick-prevention syringes across 4.8 percent of observed facilities. Only 9.5 percent of facilities had adequate RUP syringes in store for two weeks' use.

Table 46. Store/Pharmacy Stockout Experiences and Availability of Health Care Waste Management Commodities in Focal Health Facilities in Rivers State

Experiences	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
HCW materials stockout in the six months preceding the study												
Bin liners	39	7	18.0	2	0	0.0	1	0	0.0	42	7	16.7
Heavy duty gloves	39	7	18.0	2	1	50.0	1	0	0.0	42	8	19.0
Boots	39	8	20.5	2	0	0.0	1	0	0.0	42	8	19.0
Vacutainers	39	1	2.6	2	0	0.0	1	0	0.0	42	1	2.4
Safety boxes	39	3	7.7	2	0	0.0	1	0	0.0	42	3	7.1
Disposable gloves	39	9	23.1	2	1	50.0	1	0	0.0	42	10	23.8
Syringe stockout in the six months preceding the study												
Needlestick-prevention syringes	39	0	0.0	2	0	0.0	1	1	100	42	1	2.4
RUP syringes	39	1	2.6	2	0	0.0	1	0	0.0	42	1	2.4
Standard disposable syringes	39	1	2.6	2	1	50.0	1	0	0.0	42	2	4.8
5 ml syringes in store adequate for two weeks' use												
Standard disposable syringes	39	22	56.4	2	2	100	1	1	100	42	25	59.5
RUP syringes	39	4	10.3	2	0	0.0	1	0	0.0	42	4	9.5
Needlestick-prevention syringes	39	0	0.0	2	1	50.0	1	1	100	42	2	4.8

Waste Generation, Segregation, Treatment, and Disposal: Knowledge and Practice

Knowledge of Waste Segregation and Color Coding among Clinic Service Providers and Environmental Health Officers/Waste Handlers

A high proportion of CSPs knew that wastes should be segregated into general waste (93.3 percent), infectious waste (81.3 percent), and sharps (84 percent). However, knowledge of some categories of waste was poor, particularly of radioactive waste (13.3 percent), chemical and pharmaceutical waste (17.3 percent), and recyclables (20 percent). The same pattern was observed among EHOs/waste handlers.

Awareness of color coding for HCWs was low among health workers in general—that is, among 27.3 percent of OICs, 40 percent of CSPs, and 37.7 percent of EHOs/waste handlers. Overall, the proportion of all health workers who correctly identified yellow as the color signifying infectious waste was 5.2 percent for EHOs/waste handling staff, 9.1 percent for OICs, and 11.4 percent for CSPs.

Table 47. Health Worker Knowledge of Waste Segregation and Color Coding in Focal Health Facilities in Rivers State

Waste segregation and color coding	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Aware of waste color coding												
OICs	41	11	26.8	2	0	0.0	1	1	100	44	12	27.3
CSPs	97	39	40.2	5	1	20.0	3	2	66.7	105	42	40.0
EHOs/waste handlers	70	24	34.3	4	3	75.0	3	2	66.7	77	29	37.7
Knowledge that infectious waste should be coded yellow among subjects aware of color coding												
OICs	11	3	27.3	0	0	0.0	1	1	100	12	4	33.3
CSPs	39	10	25.6	1	1	100	2	1	50.0	42	12	28.6
EHOs/waste handlers	24	3	12.5	3	0	0.0	2	1	50.0	29	4	13.8
Knowledge that infectious waste should be coded yellow among ALL subjects												
OICs	41	3	7.3	2	0	0.0	1	1	100	44	4	9.1
CSPs	97	10	10.3	5	1	20.0	3	1	33.3	105	12	11.4
EHOs/waste handlers	70	3	4.3	4	0	0.0	3	1	33.3	77	4	5.2

Waste Generation, Segregation, Treatment, and Disposal Practices

Waste Generation at Health Facilities

A high proportion of EHOs/waste handlers interviewed in the state's focal health facilities indicated that their facilities generated sharps (92.2 percent), general waste (88.3 percent), and infectious waste (58.4 percent). Fewer than half of these officers indicated that their facilities generated recyclables (48.1 percent), pharmaceutical waste (31.2 percent), chemical waste (7.8 percent), and radioactive waste (7.8 percent).

Frequency of Removal of Wastes from Wards

Overall, according to OICs, waste was removed daily from about three-quarters of the health facilities (68.2 percent). According to EHOs/waste handlers, however, wastes were removed daily from 47.1 percent of PHCs and 50 percent of secondary facilities. Wastes were removed from another 44.2 percent of facilities on shift basis.

Waste Segregation

When interviewed, most OICs in the state's study facilities (79.6 percent) indicated that waste was segregated at its source.

Overall, among the facilities, only 17.1 percent reported having leakproof and puncture-proof containers for waste segregation, 34.3 percent reported color coding of containers, and 9.1

percent reported yellow bin liners. However, none these items was reported to be available in either of the two secondary facilities surveyed.

During the six months preceding the survey, a shortage of bin liners had been experienced in 31.3 percent of PHCs, 50 percent of secondary health facilities, and 34.3 percent of facilities overall. Waste storage containers had been in short supply in 18.2 percent of all facilities. Only 14.3 percent of facilities weighing the wastes generated.

Table 48. Waste Segregation Processes in Focal Health Facilities in Rivers State per Facilities' Officers-in-Charge

Process	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste segregation at source	41	32	78.1	2	2	100	1	1	100	44	35	79.6
Leak- and puncture-proof containers used for waste segregation	32	6	18.8	2	0	0	1	0	0	35	6	17.1
Generated waste weighed	32	4	12.5	2	1	50.0	1	0	0	35	5	14.3
Waste receptacles and containers color coded	32	11	34.4	2	0	0	1	1	100	35	12	34.3
Yellow bin liners used for infectious wastes	41	3	7.32	2	0	0	1	1	100	44	4	9.1
Bin liners used to segregate waste	32	18	56.3	2	2	100	1	1	100	35	21	60.0
Bin liner shortage experienced during the six months prior to the study	32	10	31.3	2	1	50.0	1	1	100	35	12	34.3
Waste storage container shortage during the six months prior to the study	41	7	17.1	2	1	50.0	1	0	0	44	8	18.2

Health Care Waste Treatment and Disposal

Treatment and Disposal Practices

In interviews, transportation for off-site treatment was the most commonly reported method of HCWM treatment or disposal, followed by burial and open burning in a hole or enclosure (40.9 percent).

Overall, most OICs (61.4 percent) rated their facility's current capacity for HCW treatment as adequate. Among EHOs and waste handling staff, 72.2 percent believed HCW to be safely managed in their facilities and based on their own judgement without an objective measure 74 percent also believed it was managed in an environmentally friendly way (Table 49).

Table 49. Quality and Environmental Friendliness of Health Care Waste Treatment and Disposal in Focal Health Facilities in Rivers State per Officers-In-Charge and Environmental Health Workers

Treatment and disposal methods in their facilities	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
OICs												
Treatment capacity adequate	41	26	63.4	2	1	50.0	1	0	0.0	44	27	61.4
EHOs/waste handlers												
HCW safely managed	70	50	71.4	4	4	100	3	2	66.7	77	56	72.7
HCW managed in an environmentally friendly way	70	51	72.9	4	4	100	3	2	66.7	77	57	74.0

Observations on Waste Storage, Disposal, and Treatment Facilities

Storage Bins and Bin Liners

Waste storage bins were found within the facility building in all secondary and tertiary facilities but only 95.1 percent of PHCs. Waste storage bins were sighted outside the facility building in all secondary and tertiary facilities and 63.4 percent of PHCs. Color-coded HCW containers were observed in only 11.4 percent of all facilities (Table 50).

Waste storage containers were covered in 73.2 percent of PHCs and in all secondary and tertiary facilities. Leaky waste storage containers were seen in 7.3 percent of PHCs, but not in secondary and tertiary facilities. The waste storage area was well-designated in 63.6 percent of facilities, although only 43.2 of facilities restricted access to it authorized persons. A waste disposal site was seen in only 40.9 percent of the focal facilities.

On-Site Disposal and Treatment Facilities

Open burning on the ground was the only type of on-site disposal practice found at the tertiary facility and the most common disposal method at PHCs (22 percent).

Among secondary facilities, 50 percent dispose of HCW in a high- or medium-temperature incinerator. Among observed primary health facilities, 12.2 percent dump waste in an unsupervised site.

Health Care Waste Treatment Process and Site

Central waste collection exists in all secondary and tertiary facilities and in 70.7 percent of PHCs.

Open-waste drainage was observed in 26.8 percent of PHCs. The treatment facility was observed to be well maintained in the tertiary facility and in 39 percent of PHCs but not in either of the two secondary facilities.

Table 50. Health Care Waste Materials and Treatment Facilities in Focal Health Facilities in Rivers State

Materials and treatment facilities	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Storage bins and bin liners												
Waste storage bins available within the facility building	41	39	95.1	2	2	100	1	1	100	44	42	95.5
Waste storage bins available outside the facility	41	26	63.4	2	2	100	1	1	100	44	29	65.9
Color-coded bin liners sighted	41	8	19.5	2	1	50.0	1	0	0.0	44	9	20.5
HCW containers color coded	41	4	9.8	2	1	50.0	1	0	0.0	44	5	11.4
Condition of storage bins												
Waste storage container covered	41	30	73.2	2	2	100	1	1	100	44	33	75.0
Waste storage container leaky	41	3	7.3	2	0	0.0	1	0	0.0	44	3	6.8
Waste storage container overfilled	41	5	12.2	2	0	0.0	1	0	0.0	44	5	11.4
Waste storage area												
Storage area well designated	41	26	63.4	2	1	50.0	1	1	100	44	28	63.6
Storage access restricted to authorized personnel	41	16	39.0	2	2	100	1	1	100	44	19	43.2
Waste disposal site seen	41	17	41.5	2	0	0.0	1	1	0.0	44	18	40.9
On-site disposal facility												
—Open burning on the ground	41	9	22.0	2	0	0.0	1	1	100	44	10	22.7
—Open burning in secured pit or enclosure		6	14.6		0	0.0		0	0.0		6	13.6
—High or medium temp incineration		0	0.0		1	50.0		0	0.0		1	2.3
—Burial		1	2.4		0	0.0		0	0.0		1	2.3
—Dumping in protected pit		3	7.3		0	0.0		0	0.0		3	6.8
—Dumping in unprotected pit		5	12.2		0	0.0		0	0.0		5	11.4

Table 51. Health Care Waste Treatment and Site in Focal Health Facilities in Rivers State

Process and characteristics	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Waste treatment process												
Open-waste drainage within hospital	41	11	26.8	2	2	100	1	0	0	44	13	29.5
Central waste collection exists	41	29	70.7	2	2	100	1	1	100	44	32	72.7

Process and characteristics	Primary facilities			Secondary facilities			Tertiary facilities			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Central waste collection point well maintained	41	17	41.5	2	2	100	1	1	100	44	20	45.5
Waste treatment site characteristics												
Treatment facility well maintained	41	16	39.0	2	0	0	1	1	100	44	19	43.2
Transport available for off-site treatment	41	27	65.9	2	2	100	1	0	0	44	29	65.9

FINDINGS: STAKEHOLDER INTERVIEWS

Nine in-depth interviews were conducted across the three states where the study was conducted. Both private and government HCWM stakeholders were interviewed.

The findings from these interviews reflect the opinions, beliefs, and thoughts about HCWM in the focal states. There are four broad themes:

- The importance of HCWM
- The challenges faced in HCWM
- Involvement of key sectors in HCWM
- Recommendations for the improvement of HCWM

Anecdotes from interviews conducted were used to corroborate study findings. Participating private stakeholders were involved only in internal waste handling—that is, moving HCW from preliminary disposal bins to the sites where they would then be moved by external waste handlers to dump sites or incinerators.

Importance of Health Care Waste Management

Respondents from both public and private sectors noted that proper HCWM was very important so as to avoid creating problems for their society. Some respondents opined that poor HCWM would constitute hazards to society's health and well-being and that proper management was important to a maintaining a healthy environment and reducing the likelihood of disease outbreaks as well as to preventing injury to scavengers and community members when they come into contact with sharps.

> *The importance of health care waste management cannot be overemphasized because of the diseases that can result from poor health care waste management—for example, Lassa fever, which is transmitted by rats. Hepatitis B, hepatitis C, and HIV can equally be transmitted by poor health care waste management practices.*
>
> —Staff, Ministry of Health, Akwa Ibom State

> *Without proper management of health care waste there will be an outbreak of diseases emanating from these waste products. Improper disposal of sharps waste could injure scavengers and other community members. Possibly cholera, diarrhoea, Lassa fever, and HIV/AIDS could occur as a result of improper disposal of health care waste*
>
> —State Ministry of Health, Cross River State

If the waste being generated accumulates, there will be a breakout of infection or diseases. To my knowledge, diseases that can result are HIV/AIDS and cholera.

—Private Health Care Waste Management Agency, Cross River

Challenges Faced in Health Care Waste Management

Proper HCWM was considered a major challenge in the states by the various stakeholders, but the dimension of the challenge was unclear to some.

It's a big issue in that we have health facilities operating at both primary and secondary levels. They generate a huge amount of health waste, which when not properly handled will constitute hazards to the community.

—State Ministry of Health, Cross River

In Cross River State, HCW was not managed by government agencies but rather by private organizations. Consequently, the State Waste Management Authority had extremely limited knowledge about HCWM in the state. This was noted repeatedly at various points during the interview.

For health care waste, I have no idea about the challenges.

—Waste Management Authority, Cross River

Specific HCWM challenges were clearly identified by stakeholders from the State Ministry of Health and the private sector. Some challenges identified include nonavailability of HCWM materials, irregular payment by health facility management and the government to private waste management companies, and operational inefficiency in waste management organizations, which translates to their delayed emptying of gathered HCW.

The big challenge of health care waste management we encounter is the delay in the emptying of general and generated waste by those in charge of it (the external waste handlers). It is indeed a challenge, because this form of mismanagement of health care waste could possibly expose one of my workers to infections after the waste generated from the health facility piles up and is not disposed of and taken out of the area soon. And if the waste that has been generated gets to accumulate, there will be a break out of infection or diseases.

—Staff, Private Health Care Waste Management Agency, Cross River State

> *Yes, it is a big challenge because most of our health care workers are yet to embrace the reasons why health care waste should be properly managed. If you pay a visit to some of our health facilities, you will realize that facilities that should aid and support effective management of health care waste are not available. Facilities like the sharps boxes, bin liners, and bins are not available to efficiently manage health care waste.*
>
> —Staff, Ministry of Health, Akwa Ibom State

A matter of major concern to many stakeholders is improper HCWM. They noted that health care waste and general household waste were both being disposed of at the same dump sites, which put both community members and waste handlers at high risk for infection and injury.

> *I was asking this question last week. This hospital waste—who takes care of it? Where is it dumped? This is the third time we are talking about it. The person I asked before said he cannot answer. Because I keep asking, I say: because they are not supposed to move hospital waste to the same place that domestic waste is kept. But as I am sitting here now, I cannot answer where hospital waste is being dumped. That is why I was saying that it means sending you to the waste people so that they can answer. Whether in course of carting away this waste, whether the hospital people have agreement of how they cart it away or where they dump it—what is been done with it?*
>
> —Staff, Government Waste Management Agency, Rivers

Respondents believed that a major factor affecting the nonsegregation of household waste and HCW at their final disposal sites was insufficient government involvement in the provision of receptacles for HCW as well as lack of laws and regulations that would clearly distinguish disposal sites for HCW from those for household and environmental waste.

> *To my knowledge, government needs to put more effort into health care waste management because from what I have seen, general and environmental waste are being dumped with health care waste. There are government actions that promote and also do not promote, like in terms of dump sites and metallic dust bins. If they don't sanction and provide dust bins for health care waste . . . . No regulations. I hope government can create a standard law that creates a dump site for medical waste different from the site for general and environmental waste.*
>
> —Private Health Care Waste Management Agency, Cross River

Role of Key Sectors in Health Care Waste Management

Stakeholders recognized that various sectors—the government, the private sector, and development partners—have related and complementary roles to play with respect to their involvement in HCWM in the three states. The roles include provision of services, receptacles and equipment used in HCWM, training of HCW handlers, and provision of HCW incinerators and waste treatment plants, among others. In general, the degree of involvement of the private sector and assigned roles differed among states.

Private Sector

In Cross River State, the private sector in HCWM in Cross River state provided services to various government-owned health care facilities. The private agencies included internal and external waste handlers. Internal waste handlers were concerned with cleaning and clearing hospital wards and offices, as well as emptying waste bins into the external waste bins for transportation to treatment or disposal sites. External waste handlers cleared waste within the health facilities and took it from the facilities to final disposal sites or treatment plants.

> *Our job descriptions and coverage is vast, such as sweeping of access route to facilities, gathering waste, cleaning gutters, and sealing up broken places, evacuating waste and taking it to the incinerator for treatment. Our coverage areas are the teaching hospital, the navy hospital, immigration, and the museum.*
>
> —Private Health Care Waste Management Agency, Cross River

> *We do internal cleaning, tidying of hospital offices and wards, and emptying of waste bins.*
>
> —Private Health Care Waste Management Agency, Cross River

Reported advantages of private sector involvement in HCWM include job creation for youth, profit making, and manpower development. In addition, supervision of private sector HCW handlers has led to less mismanagement of health waste.

> *The number one advantage is that private sector involvement in health care waste management created jobs for unemployed youths. Another advantage is that the private sector involvement in health care waste management checks against lackadaisical services in terms of health care waste management. Private sector involvement goes a long way in preventing health care waste mismanagement.*
>
> —Private Health Care Waste Management Agency, Cross River

Disadvantages of private sector involvement included breach of contracts by the facilities receiving services, inadequate and or late payment of wages to private staff, and the lack of health care services provided to HCW handlers who sustained a work-related injury. Some respondents opined that the government failure to appropriately monitor, supervise, and regulate the operations and activities of private HCWM agencies could be associated with increased inefficiency on the part of private sector operatives. Stakeholders were of the view that better regulation and oversight by relevant government agencies would improve private sector HCWM organizations' performance. Stakeholders also believed that appropriate regulation could improve engagements of HCWM experts and organizations by both public and private health facilities.

Private sector organizations expressed frustrations in their work with public sector facilities, in terms of the latter's willingness to pay for services and to pay regularly for services rendered. Stakeholders were of the view that health care facilities to whom private organizations supplied services would be less likely to default on the terms of their contracts and more likely to pay in timely fashion if the government were to set up supervisory bodies to monitor hospital activities. On the other hand, some of them indicated that some private facilities engage in practices to ensure that that the private facilities pay minimally for HCWM.

> *To cut down on office running cost, most of these private facilities dispose of some of the waste generated first, as every bag is weighed before carting away for treatment by the private waste management company.*
>
> —Official, Private Health Care Waste Management Agency, Rivers State

> *[There has been] no government supervision on this facility in respect to health care waste management. This has led to management breach of contract—they are not paying wages to their contract staff. This has led to job inefficiency by us.*
>
> —Official, Private Health Care Waste Management Organization, Cross River State

A major challenge to the operation of private sector waste management organizations is inadequate funding to procure the major equipment needed for efficient HCWM operations. Government support to private sector waste management organizations is said to be low, and the same is said to be true in terms of provision of services to private facilities. The strength of HCWM public–private partnerships was differently rated by different stakeholders and across the states, ranging from "weak" to "significant."

> *Most doctors who own private facilities understand the importance of effective management of health care waste. I am not aware of government's efforts in involving the private sector in health care waste management.*
>
> —Official, Ministry of Health, Cross River State

Overall, there is broad consensus among both public and private sector stakeholders that the private sector has the potential to do more in the area of HCWM than at present, and with effective government support and partnership, the private sector can better contribute to the growth of the economy.

Public Sector (State Governments)

Respondents in each of the three states noted that the state had an environmental protection and waste management agency in place, but responses from the interviews suggest that these agencies' involvement specifically in HCWM may be minimal. There are also other units in the state ministries of health that are involved in HCWM issues (e.g., environmental health and

epidemiology units) as well as state ministries of the environment. However, respondents were generally uncertain about their roles in HCWM beyond policy-related issues. In Cross River, the government is said to have established the Calabar Urban Development Agency to oversee management of waste in the city, but its mandate does not appear to cover HCWM. Respondents from the private sector generally felt that the role of government in HCWM had so far been limited at best and altogether lacking in some situations. Some respondents opined that although the government was "trying hard," it had not done enough in promoting and supporting HCWM.

> *Though the government have done their best in waste management, it is not enough. Health care waste is not incorporated into government waste management. They have not given much awareness to providing support to health care waste management.*
>
> —Official, Private Health Care Waste Management Agency, Cross River

Contrary to the opinion of some stakeholders, interviewees from state ministries of health generally held the position that the governments of their states were involved in the disposal of HCW to a large extent. Efforts credited to the government included capacity building of HCW handlers and provision of an enabling environment for private sector providers to function. Government, in some cases, was noted to have constructed incinerators and provided trucks for transportation of wastes. Yet there was concern, even among this group of stakeholders, regarding the adequacy of government budgets to support HCWM.

> *Government is doing its best in that we go down to the grassroots informing and educating on health care waste management, There is capacity building of health workers and supplies of commodities and accessibility has also been made easy for those in need. Though sustainability is a hindrance, we still believe that with the inclusion of it in the budget, better measures will be put in place.*
>
> *—Official, State Ministry of Health, Cross River Government is giving a lot of attention to health care waste management but as we know, the resources of government are limited. Almost all resources that come from government are limited and not adequate. Government has been supportive in terms of funding but never adequate, regular, or enough.*
>
> —Official, State Ministry of Health, Akwa Ibom State

> *I cannot be too specific as to the government work in Rivers State.* [Respondent shows a file with the picture of an incinerator, abandoned and not functional.] *Don't know if it would be expanded but it cannot take care of the waste generated in Rivers State.*
>
> —Official, State Ministry of Health, Rivers State

Interview results suggest a lack of prepared policy guidelines, laws, or regulations used by HCWM agencies in the course of their duties, although an official of the Cross River State Ministry of Health noted that policy documents regulating the handling and disposal of HCW products were currently being developed.

> *In relation to legislation and regulations, there are policy documents in the making aimed at guiding health care waste management, [so there will be] availability of a policy that guides the operation of health care waste management.*
>
> —Official, Private Health Care Waste Management Agency, Cross River State

> *Specifically, on legislation, we have none on ground now, but there is a plan to adopt an IPC policy in the state.*
>
> —Official, State Ministry of Health, Akwa Ibom State

> *In relation to legislation and regulations, there are policy documents in the making that are aimed at guiding health care waste management.*
>
> —Official, State Ministry of Health, Cross River State

Other Key Partners

Respondents expressed the opinions that there had been few activities by development partners around HCWM. Although most stakeholders across the three states reported no form of support for HCWM from any development partner, a Cross River State respondent, an official of the State Ministry of Health, remarked that the WHO had provided an incinerator to the state—which had hitherto not had one—and that the government was building an emergency operation center at Ikot Ekpene and planned to install an incinerator there.

Recommendations for Health Care Waste Management across the Three States

Improve Knowledge and Capacity of Best Practices in HCWM

Respondents opined that training and other capacity building activities should be carried out statewide and should cover both public and private sector personnel, in order to significantly improve their knowledge and capacity of best practices around HCWM.

> *The movement of staff from facility to facility in search of better takehome packages calls for consistent training of health care waste handlers, for which most facilities are not willing to bear the cost.*
>
> —Official, Private Waste Management Organization, Rivers State

Health care waste is dangerous waste that needs special handling, so any private body going into it should be adequately equipped with knowledge of proper management and adequate tools for work. Again, for health care waste to be managed properly, government should be supportive.

—Official State Waste Management Authority, Cross River State

Government Support

Respondents commented that political will, leadership, and commitment on the part of the government is very important to ensuring proper HCWM in the states. The recommendations in that respect include adequate budgetary allocation to HCWM activities and strengthening the capacity of government agencies and units involved in HCWM activities. Government should also support HCWM by providing commodities, equipment, and facilities needed in the provision and handling of waste products at public sector facilities and by public sector agencies, and formulation and/or adoption of relevant policies and guidelines and enactment of relevant legal provisions. Some respondents viewed it as necessary for government to support private HCWM organizations and partner with them more effectively to do a better job at HCWM. In addition, respondents recommended that the government develop or enact laws, policies, regulations, and guidelines relating to HCWM and ensure that they are enforced.

To strengthen infection prevention and control, HCW handlers should be trained, commodities should be adequately provided for the work, and we must ensure that health care waste should not be taken out of the hospital facility and that a dump pit be provided for final disposal of waste so as to prevent bad effects on the community.

—State Ministry of Health, Cross River

DISCUSSION

This study examined the availability of sustainable IPC and HCWM commodities, compliance with IPC and HCWM training, and the use of sustainable IPC and HCWM treatment and disposal methods in 110 facilities—99 PHCs, eight secondary facilities, and three tertiary facilities—in Akwa Ibom, Cross River, and Rivers states. The study also explored the perspectives of private and public stakeholders across the three states regarding IPC and HCWM with in-depth interviews.

Findings highlighted an almost complete absence of relevant national policies and guidelines in the health facilities in the three states. Fewer than one-fifth of health facilities in each of the states had HCWM-related job aids. Among health workers, knowledge of potential disease transmission resulting from poor HCWM was high, but self-risk perception was low. Yet a fair proportion of the health care staff surveyed reported an experience of a needlestick injury during the six-month period preceding the study, although it was not clear whether they were reporting their personal experience of injury or knowledge of injury to others in their facilities. Nevertheless, the needlestick injury reports signaled the great risks that health workers potentially face in the course of their work in health facilities in the Nigerian setting as a result of poor HCWM and unsafe injection practices.

The low level of use of needlestick-prevention syringes, despite relevant directives from the Federal Ministry of Health mandating such, undoubtedly contributes to an increase in the risk of such injuries. Unfortunately, more than three-fifths of health facilities lacked PEP, vaccination against tetanus was not found to be universal among health workers, and the level of hepatitis B vaccination was relatively low. In addition, the proportion of EHOs and waste handlers using PPE in the course of handling waste management was low. Thus, the overall picture suggests that Nigerian health workers are at great risk for acquiring transmissible diseases such as HIV and hepatitis as a result of occupational exposure. The study also showed that health care workers themselves engage in unsafe injection and HCWM practices that put the their clients and patients at risk: unsatisfactory preparation and handling of therapeutic injections, poor disposal of used syringes and needles, and leaving used swabs in the injection area.

The study also showed that a high proportion of facilities continue to experience both critical shortages as well as stockouts of HCWM commodities, including needlestick-prevention syringes, bin liners, vacutainers, and safety boxes. The proportion of facilities found to have supplies of standard disposable syringes sufficient for two weeks' use was generally low. In addition, health workers' knowledge of waste segregation and color coding was low; waste segregation and disposal practices were generally poor; and a large proportion of facilities covered in this study, particularly PHCs, were found to have significant structural and

infrastructural deficits, including leaky roofs, unhygienic toilet facilities, and inadequate sanitation facilities.

In-depth interviews of government and private stakeholders revealed major concerns about the growing challenge of HCW issues and inadequate government response. Partnership between the private and public sectors in their involvement in HCWM was also found to be low, and government regulation of HCWM practices was insufficient.

Although some data reported by the study (e.g., vaccination experience) was obtained by self-report—a limitation—emphasis on the use of observation as a methodological approach constitutes a major study strength. The use of mixed methods, both quantitative and qualitative approaches, further strengthens the study, although the sample of stakeholders selected for in-depth interviews was small. In conclusion, it should be noted that because the study focused largely on public sector facilities, its findings may not be directly applicable to private sector health facilities and other private sector institutions.

To improve the HCWM situation in each of the three states, the following are needed:

- *Statewide training and related capacity building activities*—These will improve knowledge and capacity in HCWM practices.
- *Policy level*—Relevant policies, laws, guidelines need to be enacted or developed and then enforced for both public and private sector operatives.
- *Funding*—Government needs to improve its commitment to funding HCWM activities and providing relevant HCWM materials and equipment to relevant government agencies and public sector facilities.
- *Public–private partnerships:* Strengthening government's support for and partnership with the private sector is needed to increase its participation in HCWM and to improve its level of operational effectiveness and efficiency.

REFERENCES

Akpan, Toyin, Funke Jibowu, Abimbola Sowande, and Quail Rogers-Bloch. 2012. *Assessment of Injection Safety in Selected Local Government Areas in Five States in Nigeria: 2011 Baseline Report*. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order 1. https://aidsfree.usaid.gov/sites/default/files/aidstar-one_nigeria_hcwm_report.pdf.

Ananth, A. Prem, V. Prashanthini, and C. Visvanathan. 2010. "Health Care Waste Management in Asia." *Waste Management* 30, no. 1: 154–161. ePub September 1, 2009. doi: 10.1016/j.wasman.2009.07.018

Chartier, Yves, Jorge Emmanuel, Ute Pieper, Annette Prüss, Philip Rushbrook, Ruth Stringer, William Townend, Susan Wilburn, and Raki Zghondi. 2014. *Safe Management of Wastes from Health Care Activities,* 2nd edition. Geneva: World Health Organization. http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1.

Coad, Adrian, ed. 1992. *Managing Medical Wastes in Developing Countries. Report of a Consultation on Medical Wastes Management in Developing Countries.* Geneva: WHO. http://apps.who.int/iris/bitstream/10665/63022/1/WHO_PEP_RUD_94.1.pdf.

Drain, Paul K., Josoa S. Ralaivao, Alexander Rakotonandrasana, and Mary A. Carnell. 2003. "Introducing Auto-Disposable Syringes to the National Immunization Program in Madagascar." *Bulletin of the World Health Organization* 81: (8). doi:10.1590/S0042-96862003000800004.

Fatusi Adesegun, Temitope Ojo, and Ambimbola O. Sowande. 2014. *An Assessment of Injection Safety and Health Care Waste Management in Nigeria at Selected Health Facilities in Abuja Municipal Area Council, Federal Capital Territory, and Makurdi Local Government Area, Benue State*. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order 1. https://aidsfree.usaid.gov/sites/default/files/aidstar-one_nigeria_hcwm_report.pdf.

Federal Ministry of Health. 2011. *Health Facilities in Nigeria by Type and Ownership, December 2011*. Abuja: Federal Ministry of Health. https://knoema.com/atlas/sources/Federal-Ministry-of-Health-Nigeria?topic=Health-Facilities.

Federal Ministry of Health. 2013. *National HIV/AIDS and Reproductive Health Survey 2012 (NARHS Plus II)*. 2012. Abuja: Federal Ministry of Health. http://naca.gov.ng/new/content/hiv-prevalence-rate-states.

Karlsson, Mårten, and Dolores Pigretti Öhman. 2005. "Material Consumption in the Healthcare Sector: Strategies to Reduce Its Impact on Climate Change—The Case of Region Scania in

South Sweden." *Journal of Cleaner Production* 13, no. 10–11: 1071–1081. doi:10.1016/j.jclepro.2004.12.012.

Prüss, Annette, Eric Giroult, and Philip Rushbrook, eds. 1999. *Safe Management of Wastes from Health Care Activities*. Geneva: World Health Organization. http://apps.who.int/iris/bitstream/10665/42175/1/9241545259.pdf.

Sabiha-Javied, M. Tufail, and Sofia Khalid. 2008. "Heavy Metal Pollution from Medical Waste Incineration at Islamabad and Rawalpindi, Pakistan." *Microchemical Journal* 90, no. 1: 77–81. doi: 10.1016/j.microc.2008.03.010.

Sheshinski, Ruth H. 2002. "Indirect Data Collection for Waste Statistics and Waste Indicators." *Statistical Journal of the United Nations Economic Commission for Europe* 19, no. 1–2: 53–63. http://content.iospress.com/articles/statistical-journal-of-the-united-nations-economic-commission-for-europe/sju00520.

Takeuchi Hiroyuki, Iwaho Kikuchi, Mari Kitade, Jun Kumakiri, Katsuyuki Kinoshita, Yuka Takehiro, and Emiko Tanimura. 2005. "Disposable Laparoscopic Surgical Instruments and the Economic Effects of Repackaging." *Journal of Laparoendoscopic & Advanced Surgical Techniques* 15, no. 2: 176–181. doi: 10.1089/lap.2005.15.176.

Woolridge, Anne, Anne Morrissey, and Paul S. Phillips. 2005. "The Development of Strategic and Tactical Tools, Using Systems Analysis, for Waste Management in Large Complex Organizations: A Case Study in UK Healthcare Waste." *Resources, Conservation and Recycling* 44, no. 2: 115–137. doi:10.1016/j.resconrec.2004.11.001.

World Health Organization (WHO). 1999. *Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies.* Geneva: WHO. http://www.who.int/water_sanitation_health/medicalwaste/unwantpharm.pdf.

WHO. 2005a. *Preparation of Health-Care Waste Management Plans in Sub-Saharan Countries. Guidance Manual.* Geneva: Secretariat of the Basel Convention/UNEP and WHO. http://www.who.int/water_sanitation_health/medicalwaste/en/guidancemanual.pdf?ua=1.

WHO. 2005b. "Technical Briefs." *Journal of Environmental Health* 66, no. 1: 40–41. Geneva, WHO.

WHO. 2006. *Health Care Waste Management Training at National Level.* Geneva: WHO. http://www.health carewaste.org/en/440_train _medium.ht ml.

WHO. 2008. *Revised Injection Safety Assessment Tool (Tool C—Revised).* Geneva: WHO. http://www.who.int/injection_safety/Injection_safety_final-web.pdf.

WHO. 2004. *Safe Health-Care Waste Management: Policy Paper.* Geneva: WHO. http://www.who.int/water_sanitation_health/medicalwaste/hcwmpolicy/en/.

WHO. 2014. *Health Care Waste Management Rapid Assessment Tool.* http://www.who.int/water_sanitation_health/facilities/waste/hcwmtool/en/.

WHO. 2015. "Fact Sheet No. 253: Health-Care Waste." http://www.who.int/mediacentre/factsheets/fs253/en/.

Zhao, Lijuan, Fu-Shen Zhang, Kaisheng Wang, and Jianxin Zhu. 2008. "Chemical Properties of Heavy Metals in Typical Hospital Waste Incinerator Ashes in China." *Waste Management* 29, no. 3: 1114–1121. doi: 10.1016/j.wasman.2008.09.003.

Zhao, Lijuan, Fu-Shen Zhang, Mengjun Chen, Zhengang Liu, and Da Bo Jianzhi Wu. 2010. "Typical Pollutants in the Bottom Ashes from a Typical Medical Waste Incinerator." *Journal of Hazardous Materials* 173, no. 1–3: 181–185. doi: 10.1016/j.jhazmat.2009.08.066.

SUPPLEMENTARY DATA

Table A1. Structural Facilities, General Cleanliness, and Water Supply in Focal Health Facilities in Akwa Ibom State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N	Yes	
		n	(%)		n	(%)		n	(%)		n	(%)
Structural facilities												
Facility fenced	33	14	42.4	5	3	60.0	1	1	100	39	20	51.3
Visible cracks on the wall	33	11	33.3	5	1	20.0	1	0	0.0	39	12	30.8
Facility roof leakages	33	8	24.2	5	1	20.0	1	0	0.0	39	10	25.6
General cleanliness												
Ward floors are clean	33	27	81.8	5	3	60.0	1	0	0.0	39	30	76.9
Floor littered with rubbish	33	5	15.2	5	1	20.0	1	1	100	39	7	17.9
Used or soiled dressings on the floor	33	3	9.1	5	1	20.0	1	1	100	39	5	12.8
Cobwebs on wall	33	20	60.6	5	3	60.0	1	0	0.0	39	23	59.0
Litter and waste on ground within compound	33	13	39.4	5	2	40.0	1	1	100	39	16	42.1
Overgrown bushes	33	13	39.4	5	2	40.0	1	0	0.0	39	15	38.5
Waste bins available for general use within premises	33	18	54.5	5	3	60.0	1	1	100	39	22.	56.4
Waste bin overflowing	33	3	9.1	5	1	20.0	1	1	100	39	5	12.8
Water supply to health facility												
Running tap water from public source	33	5	15.2	5	3	60.0	1	1	100	39	9	23.1
Running tap water from facility borehole	33	14	42.4	5	2	40.0	1	0	0.0	39	16	41.0
Water from protected dug well within health facility	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0
Water obtained from protected dug well, outside the facility	33	0	0.0	5	0	0.0	1	0	0.0	39	0	0.0
Water fetched directly from public-source running tap outside the facility	33	10	30.3	5	0	0.0	1	0	0.0	39	10	25.6
Other (facility borehole from the university)	33	2	6.1	5	0	0.0	1	0	0.0	39	2	5.1

Table A2. Toilet Facilities in Focal Health Facilities in Akwa Ibom State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
General toilet conditions												
Toilet floor wet	31	5	16.1	4	0	0.0	1	0	0.0	36	5	13.9
Toilet water running	28	5	17.9	4	2	50.0	1	1	100	33	8	24.2
Toilet for staff												
Type of toilet available for staff												
Water closet available	31	25	80.6	5	4	80.0	1	1	100	37	30	81.1
Pour flush toilet		0	0.0	5	0	0.0		0	0.0		0	0.0
Ventilated improved pit (VIP) toilet		0	0.0	5	0	0.0		0	0.0		0	0.0
Pit toilet		1	3.2	5	0	0.0		0	0.0		1	2.7
Toilet for male and females												
Separate toilets for male and female staff	25	3	12.0	4	1	25.0	1	0	0.0	30	4	13.3
Conditions of toilet												
Toilet visibly clean	27	20	74.1	4	3	75.0	1	1	100	32	24	75.0
Toilet smelly	26	6	23.1	3	1	33.3	1	0	0.0	30	7	23.3
Houseflies in the toilet	26	3	11.5	4	2	50.0	1	0	0.0	31	5	16.1
Hand-washing facility near toilet	26	14	53.8	4	2	50.0	1	0	0.0	31	16	51.6
Hand-washing facility has soap	27	9	33.3	4	1	25.0	1	0	0.0	32	10	31.2
Toilet for clients												
Type of toilet available for clients												
Water closet available	30	23	76.7	5	4	80.0	1	1	100	36	28	77.8
Pour flush toilet		0	0.0		1	20.0		0	0.0		1	2.8
VIP toilet		2	6.7		0	0.0		0	0.0		2	5.6
No toilet		1	3.3		0	0.0		0	0.0		1	2.8
Toilet for males and females												
Separate toilets for males and females	26	4	15.4	5	1	20.0	1	1	100	32	6	18.8
Conditions of toilet												
Toilet visibly clean	27	18	66.7	5	1	20.0	1	0	0.0	33	19	57.6
Toilet smelly	25	4	16.0	3	2	66.7	1	1	100	29	7	24.1
Houseflies in the toilet	27	5	18.5	5	2	40.0	1	0	0.0	33	7	21.2
Hand-washing facility with soap	26	8	30.8	3	0	0.0	1	0	0.0	30	8	26.7
Hand-washing facility near toilet	**28**	**14**	**50.0**	**5**	**2**	**40.0**	**1**	**0**	**0.0**	**33**	**7**	**21.2**

Table A3. Structural Facilities, General Cleanliness, and Water Supply in Focal Health Facilities in Cross River State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N	Yes	
		n	(%)		n	(%)		n	(%)		n	(%)
Structural facilities												
Facility fenced	25	19	76.0	1	1	100	1	1	100	27	21	77.8
Visible cracks on the wall	25	5	20.8	1	0	0	1	0	0	27	5	18.5
Facility roof leakages	25	7	29.2	1	0	0	1	0	0	27	7	25.9
General cleanliness												
Ward floors clean	25	24	96.0	1	1	100	1	0	0	27	25	92.6
Floor littered with rubbish	25	1	4.0	1	0	0	1	1	100	27	2	7.4
Used or soiled dressings on floor	25	0	0	1	0	0	1	0	0	27	0	0
Cobwebs on the wall	25	4	16.0	1	0	0	1	1	100	27	5	18.5
Litter and waste on ground within compound	25	4	16.0	1	0	0	1	0	0	27	4	14.8
Overgrown bushes	25	2	8.0	1	0	0	1	1	100	27	3	11.1
Waste bins available for general use within premises	25	22	88.0	1	1	100	1	1	100	27	24	88.9
Waste bin overflowing	25	0	0	1	0	0	1	0	0	27	0	0
Water supply to health facility												
Running tap water from public source	25	15	60.0	1	0	0	1	0	0	27	15	55.6
Running tap water from facility borehole		3	12.0		1	100		1	100		5	18.5
Water from protected dug well within health facility		1	4.0		0	0		0	0		1	3.7
Water obtained from protected dug well outside the facility		3	12.0		0	0		0	0		3	11.1
Water purchased from hawkers		1	4.0		0	0		0	0		1	3.7
Other (facility borehole from the university)		2	8.0		0	0		0	0		2	7.4

Table A4. Toilet Facilities in Focal Health Facilities in Cross River State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
General toilet conditions												
Toilet floor wet	**25**	**4**	**16.0**	**1**	**1**	**100**	**1**	**1**	**100**	**27**	**6**	**22.2**
Toilet water running	**25**	**12**	**48.0**	**1**	**1**	**100**	**1**	**0**	**100**	**27**	**13**	**48.2**
Toilet for staff												
Type of toilet available for staff												
Water closet available	25	21	84.0	1	2	100	1	1	100	27	23	85.2
Pour flush toilet		0	0		0	0		0	0		0	0
VIP toilet		0	0		0	0		0	0		0	0
Pit toilet		1	4.0		0	0		0	0		1	3.7
No toilet		3	12.0		0	0		0	0		3	11.1
Toilet for males and females												
Separate toilets for male and female staff	25	7	28.0	1	0	0.0	1	0	0	27	7	25.9
Conditions of toilet												
Toilet visibly clean	25	13	52.0	1	0	0.0	1	0	0.0	27	13	48.2
Toilet smelly	25	3	12.0	1	1	100	1	0	0.0	27	4	14.8
Houseflies in the toilet	25	1	4.0	1	0	0	1	0	0.0	27	1	3.7
Hand-washing facility near toilet	25	13	52.0	1	1	100	1	1	100	27	14	51.9
Hand-washing facility has soap	25	10	40.0	1	0	0.0	1	0	0.0	27	10	37.0
Toilet for clients												
Type of toilet available for clients												
Water closet available		24	96.0		1	100	1	1	100	27	26	96.3
Pour flush toilet		0	0	1	0	0		0	0		0	0
VIP toilet		0	0		0	0		0	0		0	0
No toilet	25	1	4.0		0	0		0	0		1	3.7
Toilet for males and females												
Separate toilets for males and females	25	11	44.0	1	0	0.0	1	0	0	27	11	40.7
Conditions of toilet												
Toilet visibly clean	25	18	72.0	1	0	0.0	1	0	0	27	18	66.7
Toilet smelly	25	3	12.0	1	0	0	1	1	100	27	4	14.8
Houseflies in the toilet	25	2	8.0	1	0	0	1	0	0	27	2	7.4
Hand-washing facility near toilet	25	9	36.0	1	0	0.0	1	0	0	27	9	33.3
Hand-washing facility has sop	25	16	64.0	1	0	0.0	1	1	100	27	17	63.0

Table A5. Structural Facilities, General Cleanliness, and Water Supply in Focal Health Facilities in Rivers State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
Structural facilities												
Facility fenced	41	38	92.7	2	2	100	1	1	100	44	41	93.2
Visible cracks on wall	41	9	22.0	2	0	0.0	1	0	0.0	44	9	20.5
Facility roof leakages	41	5	12.2	2	0	0.0	1	0	0.0	44	5	11.4
General cleanliness												
Ward floors clean	41	32	78.1	2	2	100	1	0	0.0	44	34	77.3
Floor littered with rubbish	41	9	22.0	2	0	0.0	1	0	0.0	44	9	20.5
Used or soiled dressings on floor	41	4	9.8	2	0	0.0	1	0	0.0	44	4	9.1
Cobwebs on the wall	41	17	41.5	2	0	0.0	1	0	0.0	44	17	38.6
Litter and waste on ground within compound	41	14	34.2	2	0	0.0	1	0	0.0	44	14	31.8
Overgrown bushes	41	2	4.9	2	0	0.0	1	0	0.0	44	2	45.5
Waste bins available for general use within premises	41	38	92.7	2	2	100	1	1	100	44	41	93.2
Waste bin overflowing	41	6	14.6	2	0	0.0	1	0	0.0	44	6	13.6
Water supply to health facility												
Running tap water from public source	41	1	2.4	2	0	0.0	1	0	0.0	44	1	22.7
Running tap water from facility borehole		39	95.1		2	100		1	100		42	95.5
Purchased from vendor/hawker		1	2.4		0	0.0		0	0.0		1	2.3

Table A6. Toilet Facilities in Focal Health Facilities in Rivers State

	Primary facility			Secondary facility			Tertiary facility			Total		
	N	Yes		N	Yes		N	Yes		N		
		n	(%)		n	(%)		n	(%)		n	(%)
General toilet conditions												
Toilet floor wet	41	5	12.2	2	1	50.0	1	0	0.0	44	6	13.6
Toilet water running	41	31	75.6	2	2	100	1	1	100	44	34	77.3
Toilet for staff												
Type of toilet available for staff												
Water closet available	41	38	92.7	2	2	100	1	1	100	44	41	93.2
No toilet	41	3	7.3	2	0	0.0	1	0	0.0	44	3	6.8
Separate toilets for males and females												
Separate toilets for male and female staff	41	15	36.6	2	2	100	1	1	100	44	18	40.9
Conditions of toilet												
Toilet visibly clean	41	30	73.2	2	2	100	1	1	100	44	33	75.0
Toilet smelly	41	3	7.3	2	0	0.0	1	0	0.0	44	3	6.8
Houseflies in the toilet	41	1	2.4	2	0	0.0	1	0	0.0	44	1	2.3
Hand-washing facility near toilet	41	36	87.8	2	2	100	1	1	100	44	39	88.6
Hand-washing facility has soap	41	14	34.2	2	2	100	1	1	100	44	17	38.6
Toilet for clients												
Type of toilet available for clients												
Water closet available	41	39	95.1	2	2	100	1	1	100	44	42	95.5
Separate toilets for males and females												
Separate toilets for male and female clients	41	11	26.8	2	2	100	1	1	100	44	14	31.8
Conditions of toilet												
Toilet visibly clean	41	27	65.9	2	2	100	1	1	100	44	30	68.2
Toilet smelly	41	3	7.3	2	0	0.0	1	0	0.0	44	3	6.8
Houseflies in the toilet	41	3	7.3	2	0	0.0	1	0	0.0	44	3	6.8
Hand-washing facility near toilet	41	12	29.3	2	2	100	1	0	0.0	44	14	31.8
Hand-washing facility has soap	41	37	90.2	2	2	100	1	1	100	44	40	90.9

APPENDIX I: QUESTIONNAIRE FOR HEALTH FACILITIES' OFFICERS-IN-CHARGE (TOOL 01)

HEALTH FACILITY OFFICER-IN-CHARGE
Informed Consent
Thank you for taking the time to meet with me today. My name is ..... and I would like to talk to you about your experiences with respect to infection prevention and control and health care waste management—specifically, as part of a baseline assessment commissioned by AIDSFree Nigeria, which can give information on how to improve infection prevention and control and health care waste management in ..... The interview should take a few minutes. All responses will be kept confidential. This means that your interview responses will be shared only with research team members, and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to discuss, and you may end the interview at any time. Are there any questions about what I have just explained? Are you willing to participate in this interview? Informed consent statement: (Accept to participate) .....

FACILITY NAME .....SENATORIAL ZONE.....

STATE.....LGA: .....

DESIGATION OF INTERVIEWEE: .....

FACILITY TYPE (CHOOSE ONE): ❑ PUBLIC ❑ PRIVATE ❑ NGO

NAME OF INTERVIEWER: ..... INTERVIEW DATE: .....

Section A: Characteristics of Health Care Facility

1. How many beds do you have in total? *(specify number)*
2. What is the average bed occupancy? *(number of bed spaces occupied on average by admitted patients daily, divided by number of available beds)*

    a. ❑ Less than 20 percent per day

    b. ❑ 20–50 percent per per day

    c. ❑ 51–100 percent per day

3. How many of the beds in your facility are occupied presently? *(specify number)*
4. How many outpatients come each day on average? *(specify number)*

QUESTIONS	INFECTION PREVENTION AND CONTROL IN THIS FACILITY?	HEALTH CARE WASTE MANAGEMENT IN THIS FACILITY?	IF YES, IS THE DOCUMENT SIGHTED
5. Do you have the national/state policy on …	❑ YES ❑ NO **IF NO, SKIP TO Q7**	❑ YES ❑ NO **IF NO, SKIP TO Q7**	❑ YES ❑ NO
6. Do you use the national/state policy on…	❑ YES COMPLETELY ❑ YES PARTIALLY ❑ NOT AT ALL	❑ YES COMPLETELY ❑ YES PARTIALLY ❑ NOT AT ALL	
7. Do you have the national guidelines on…	❑ YES ❑ NO **IF NO, SKIP TO Q11**	❑ YES ❑ NO **IF NO, SKIP TO Q11**	❑ YES ❑ NO
8. Do you use the national guidelines on…	❑ YES COMPLETELY ❑ YES PARTIALLY ❑ NOT AT ALL	❑ YES COMPLETELY ❑ YES PARTIALLY ❑ NOT AT ALL	

9. Do you face any challenges implementing the state policy documents on IPC and HCWM in this facility? YES ❑ NO ❑ NA ❑
10. If yes, what are the problems?

    ……

    ……

11. Do you have internal guidelines and SOP on IPC and HCWM? YES ❑ NO ❑
12. Is it available and sighted?

    a. ❑ Not available **IF NOT AVAILABLE, SKIP TO Q14**

    b. ❑ Available and sighted

c. ❑ Available and not sighted

13. If available, do you use internal guidelines and SOP?

a. ❑ YES, ALWAYS

b. ❑ YES, SOMETIMES

c. ❑ NEVER

14. Is budget allocated for HCWM to this facility?

a. ❑ Not allocated **IF NOT ALLOCATED SKIP TO Q16**

b. ❑ Ongoing plans for allocation

c. ❑ Allocated but not used

d. ❑ Allocated and used

e. ❑ I don't know

15. If budget is allocated, complete the table below for your health facility

YEAR	PROPOSED BUDGET FOR HCWM (NAIRA)	FUNDS RELEASED FOR HCWM, INCLUDING TRAINING (NAIRA)	REMARKS
2013			
2014			
2015			

16. Do you have annual work plan for HCWM?

a. ❑ YES

b. ❑ NO **IF NO, SKIP TO Q20**

17. If yes, is it available and can you produce a copy of the document?

a. ❑ Available and produced a copy

b. ❑ Could not produce a copy

18. Do you have an annual report regarding HCWM activities?

a. ❑ YES

b. ❑ NO **IF NO, SKIP TO Q20**

19. If yes, is it available and can you produce a copy of the document?

a. ❑ Available and produced a copy

b. ❑ Could not produce a copy

20. Is there a functional IPC in this facility?

    a. ❑ YES

    b. ❑ NO **IF NO, SKIP TO Q26**

21. If yes, please list three members and their official designation

    .....

    .....

    .....

22. How frequently do the IPC committee of this facility?

    a. ❑ Once a month

    b. ❑ Once a quarter

    c. ❑ Once every six months

    d. ❑ Once a year

    e. ❑ Other (please specify)..... .....

23. When last did the IPC committee meet? *(MONTH YYYY)*
24. Are there records of the minutes of the last meeting? YES ❑ NO ❑ **IF NO, SKIP TO Q26**
25. Can you produce the minutes of the last meeting? SIGHTED ❑ NOT SIGHTED ❑
26. Is there a designated and fully operational person (coordinator) responsible for HCWM?

    a. ❑ Not identified

    b. ❑ Identified but not operational

    c. ❑ Operational

27. Has the designated staff ever been trained on IPC and HCWM?

    YES ❑ NO ❑ DON'T KNOW ❑ **IF NO OR DON'T KNOW, SKIP TO Q30**

28. If yes, what kind of training has the staff had?

    .....

    .....

    .....

    .....

29. When was the last time the officers participated in injection IPC and HCWM training? (*MONTH YYYY)*

    .....

Section B: Health Care Waste Management

30. What category of waste is generated in this facility? *(tick all that apply)*

    a. ❑ General *(food wastes, used clothes, etc.).*

    b. ❑ Recyclables *(empty bottles, metal objects, waste papers)*

    c. ❑ Radioactive *(unused liquids from radiotherapy or laboratory; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources)*

    d. ❑ Infectious *(laboratory samples, cultures and stocks; tissues; dressings, swabs or other items soaked with blood; blood bags)*

    e. ❑ Sharps *(needles and syringes)*

    f. ❑ Chemicals *(liquid and solid; acids, reactive chemicals)*

    g. ❑ Pharmaceutical waste *(expired drugs)*

    h. ❑ Anatomical waste *(human parts ,umbilical cords, placenta)*

    i. ❑ Others *(please specify)*.....

31. Is waste segregated at its source? YES ❑ NO ❑ **IF NO, SKIP TO Q40**

32. If yes, into what categories are wastes segregated? *(tick all that apply)*

    a. ❑ General/noninfectious waste

    b. ❑ Recyclables waste

    c. ❑ Radioactive waste

    d. ❑ Infectious waste

    e. ❑ Sharps

    f. ❑ Chemical/pharmaceutical waste

    g. ❑ Highly infectious/anatomical waste

    h. ❑ Others *(please specify)*

33. Into what type of containers do you segregate waste? *(tick all that apply)*

    a. No specific container

    b. Plastic

    c. Metallic

    d. Cardboard boxes

    e. Bag (bin liners)

    f. Others (please specify).....

34. If you use containers, which of the following best describe the containers:

a. Leakproof

f. Puncture-proof

g. Leakproof and puncture-proof

h. ❑ Neither leak nor puncture-proof [ ]

i. Others (specify) .....

.....

35. Is the waste generated at this facility also weighed in this facility?

If yes, the interviewer should ask about estimated quantity of each type of waste generated.

TYPE OF WASTE GENERATED	ESTIMATED QUANTITY IN KG OR L/DAY
General waste/noninfectious waste	
Recyclables waste	
Radioactive waste	
Infectious waste	
Sharps	
Chemical/pharmaceutical waste	
Highly infectious/anatomical waste	

36. Do you color code wastes? YES ❑ NO ❑ **IF NO, SKIP TO Q38**
37. If yes, what color do you use for infectious waste?
38. Have you experienced a shortage of bin liners in the past six months? YES ❑ NO ❑
39. If yes, what was the reason for shortage? **IF NO, SKIP TO Q40**

Budget ❑ Logistic ❑ Other *(please specify)* .....

40. Do you have the following types of equipment for HCWM?

a. Bin liners YES ❑ NO ❑

b. Waste bin (dustbin) YES ❑ NO ❑

c. Wheeler (dino) bins YES ❑ NO ❑

d. Broom YES ❑ NO ❑

e. Transport van/wheelbarrow YES ❑ NO ❑

f. High-temperature incinerator YES ❑ NO ❑

g. Safety box YES ❑ NO ❑

41. Have you experienced shortage of waste containers in the past six months? YES ❑ NO ❑ NA ❑
42. If yes, what was the reason for shortage?
    a. Budget
    b. Logistics
    c. Other (please specify).....
43. Do you have the following personal protective equipment available?
    a. Latex gloves YES ❑ NO ❑
    b. Heavy duty gloves YES ❑ NO ❑
    c. Boots YES ❑ NO ❑
    d. Nose masks YES ❑ NO ❑
    e. Aprons YES ❑ NO ❑
    f. Overalls YES ❑ NO ❑
    g. Goggles YES ❑ NO ❑
44. Is there a designated area for storage of HCW? YES ❑ NO ❑
45. Is the designated area accessible only to authorized personnel? YES ❑ NO ❑
46. Are hazardous and nonhazardous waste materials stored separately? YES ❑ NO ❑
47. Are hazardous and nonhazardous waste materials transported separately? YES ❑ NO ❑
48. What means do you use to transport HCW?
    a. ❑ Open device
    b. ❑ Closed device
    c. ❑ Other (please specify).....
49. Who transports HCW?
    a. ❑ The health care facility
    b. ❑ A municipal service
    c. ❑ A private company (name) .....

50. How are the following types of waste handled by your health facility?

	TREATMENT OPTIONS			REMARKS
	NO TREATMENT	TREATED ON SITE	TREATED OFF SITE	
General waste/noninfectious waste				
Sharps				
Infectious waste (nonsharps)				
Highly infectious/anatomical waste				
Chemical/pharmaceutical waste				

51. What kind of treatment method do you use for HCW in your facility? *(tick all that apply)*

a. ❑ Open burning in a hole or in an enclosure

b. ❑ High- or medium-temperature incineration (e.g., two chamber, rotary kiln, industrial, Demont Forte or waste disposal unit)

c. ❑ Low-temperature incineration/burning (single-chamber, drum, brick)

d. ❑ Burial

e. ❑ Dumping in a protected (secure) pit (including a needlepit)

f. ❑ Dumping in an unprotected pit

g. ❑ Dumping in an unsupervised area

h. ❑ Transportation for off-site treatment (specify type of transportation) .....

i. ❑ Other (please specify) .....

52. Is the current capacity of the treatment method adequate? ? YES ❑ NO ❑

53. Please give reason(s) for your answer

....

54. Are there any operational problems with the treatment system? YES ❑ NO ❑

55. If yes, what is/are the problem(s)? *(tick all that apply)*

a. ❑ Money

b. ❑ Human capacity

c. ❑ Maintenance

d. ❑ Spare parts

e. ❑ Other (please specify) .....

56. What do you do if the treatment method does not function?

.....

.....

57. How would you rate the quality of the treatment technology?

a. ❑ Very poor
b. ❑ Poor
c. ❑ Fair
d. ❑ Good
e. ❑ Excellent

58. Please give reason(s) for your answer

.....

.....

59. How would you rate the maintenance of the treatment technology?

a. ❑ Very poor
b. ❑ Poor
c. ❑ Fair
d. ❑ Good
e. ❑ Excellent

60. Please give reason(s) for your answer.

Section C: Infection Prevention and Control

61. What type of syringe do you use in this facility? *(tick all that apply)*

a. ❑ Standard disposable
b. ❑ Auto-disable *(reuse prevention)*
c. ❑ Retractable *(needlestick prevention)*

62. What type do you currently have in stock? *(tick all that apply)*

a. ❑ Standard disposable
b. ❑ Auto-disable *(reuse prevention)*
c. ❑ Retractable *(needlestick prevention)*

63. Have you reused a needle and syringe on the same or another patient in the course of your work over the last six months? ? YES ❑ NO ❑

64. If yes, what was responsible for the reuse of needle and syringe?

    a. ❑ Patient could not afford to buy

    b. ❑ Disposable syringes were out of stock

    c. ❑ Provider's choice *("I prefer to use that")*

    d. ❑ Other (please specify).....

65. Do you have safety boxes in your health facility? YES ❑ NO ❑ **IF NO, SKIP TO Q69**
66. If yes, are the safety boxes available in the units where needles and syringes are used?

    a. ❑ YES, IN ALL UNITS

    b. ❑ YES, IN SOME UNITS

67. Have you experienced stockout of safety boxes in this health facility over the last six months?

    YES ❑ NO ❑ **IF NO, SKIP TO Q69**

68. If yes, at the time when you were out of stock of safety boxes, how did you dispose of sharps?

    .....

69. On the average, how many injections do you administer in this facility per day?
70. Have you experienced needlestick injury in the last six months?❑ **IF NO, GO TO Q75**
71. If yes, what did you do at that time?
72. How many cases of needlestick injuries have been reported in this facility over the past six months?

    .....

    .....

73. Do you have a record of needlestick injuries? YES ❑ NO ❑
74. What is the protocol for managing needlestick injuries in this facility?

    .....

    .....

    .....

75. Have you had any training on IPC? YES ❑ NO ❑
76. When was the last training on IPC/HCW held in this facility?
77. How many people have been trained on IPC/HCWM in this facility over the last two years?

Section D: Risk Perception and Management

78. Do you think that diseases can be transmitted through improper HCWM? YES ❑ NO ❑

79. Do you think that diseases can be transmitted through needlestick injuries? YES ❑ NO ❑
80. Please give three examples of diseases that can be transmitted through improper HCWM and needlestick injuries.

.....

.....

.....

81. What is/are your information source(s) on the transmission of the diseases? *(tick all that apply)*

    a. ❑ In-service training
    b. ❑ Pre-service training
    c. ❑ Radio/TV
    d. ❑ Supervisor
    e. ❑ Books/brochure
    f. ❑ Newspaper
    g. ❑ Billboards
    h. ❑ Social media/online
    i. ❑ Other (please specify)

82. Which of the above information sources do you consider most important to you?

.....

.....

83. Which of the following have you been vaccinated against?

    a. Tetanus? YES ❑ NO ❑
    b. Hepatitis B? YES ❑ NO ❑
    c. Neither YES ❑ NO ❑

84. Do you have HIV post-exposure prophylaxis (PEP) in your health facility? YES ❑ NO ❑
85. How will you describe your risk of contracting infection from accidental needle injury?

    a. ❑ Nonexistent
    b. ❑ Low risk
    c. ❑ Medium-level risk
    d. ❑ High risk

86. Please give reason(s) for your answer?

.....

.....

.....

87. What are the key steps in managing HCW in your facility, from waste generation to final disposal?

.....

.....

.....

.....

88. How often are wastes removed from the ward?

a. ❑ Daily

b. ❑ Every shift

c. ❑ Once in two days

d. ❑ Twice weekly

e. ❑ Weekly

f. ❑ Other (please specify) .....

89. How often are wastes transported for final disposal?

a. ❑ Daily

b. ❑ Once in two days

c. ❑ Twice weekly

d. ❑ Weekly

e. ❑ No formal schedule

f. ❑ As and when it becomes necessary

g. ❑ Other (please specify) .....

Section E: Challenges and Ways Forward

90. Do you think HCW is safely managed in this facility? YES ❑ NO ❑

91. Please give a reason for your answer.

.....

.....

92. What are the challenges in HCWM in this facility?

.....

.....

.....

.....

93. What can be done to improve HCWM in this facility?

.....

.....

.....

.....

.....

Section F: Partnership

94. In what way does the Waste Management Authority support your health care facilities in the area of HCWM?

.....

.....

.....

.....

.....

95. Do you have a partnership with private sector operatives for HCWM for your facility?
YES ❑ NO ❑

96. Human resource and capacity development

NO.	ITEM	MEDICAL DOCTOR	MIDWIFE	GENERAL NURSE	COMMUNITY HEALTH WORKERS (CHEW)	PHARMACIST AND PHARM TECHNICIANS	HEALTH ATTENDANT/ORDERLY	ENVIRONMENTAL HEALTH OFFICER	LABORATORY SCIENTIST AND LAB TECHNICIAN	OTHER
1	How many funded positions does this facility have for this type of staff member? *(write number)*									
2	How many are currently employed by this facility?*(write number)*									
3	How many left this facility in the last 12 months? *(write number)*									
4	Of those that left, how many were transferred to another facility?*(write number)*									
5	How many were posted to this facility in the last 12 months? *(write number)*									
6	How many have been trained on IPC and HCWM in this facility in the last two years?*(write number)*									
7	Do you have new entrant training package in this facility?	YES				NO				
8	If yes, how many have been trained using the new entrants package in this facility?*(write number)*									

THANK YOU!

APPENDIX II: QUESTIONNAIRE FOR FACILITIES' CLINICAL SERVICE PROVIDERS (TOOL 02)

HEALTH FACILITY ASSESSMENT TOOL
CLINICAL SERVICE PROVIDER

Informed Consent

Thank you for taking the time to meet with me today. My name is ..... and I would like to talk to you about your experiences with respect to infection prevention and control and health care waste management—specifically, as part of a baseline assessment commissioned by AIDSFree Nigeria, which can give information on how to improve infection prevention and control and health care waste management in ..... The interview should take a few minutes.

All responses will be kept confidential. This means that your interview responses will be shared only with research team members, and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to discuss, and you may end the interview at any time.

Are there any questions about what I have just explained? Are you willing to participate in this interview?

Informed consent statement:
(Accept to participate) .....

FACILITY NAME .....SENATORIAL ZONE.....

STATE.....LGA: .....

DESIGATION OF INTERVIEWEE: .....

FACILITY TYPE (CHOOSE ONE): ❑ PUBLIC ❑ PRIVATE ❑ NGO

NAME OF INTERVIEWER: ..... INTERVIEW DATE: .....

Section A: Characteristics of the Health Care Facility

1. Are you aware of the national policy on injection safety and health care waste management?
   YES ❑ NO ❑ **IF NO, SKIP TO Q9**
2. If yes, is a copy of the document available and sighted? YES ❑ NO ❑

3. Do you use the national policy on injection safety and HCWM?

   YES COMPLETELY ❑ YES PARTIALLY❑ NOT AT ALL ❑

4. Do you have the national guidelines on injection safety and HCWM? YES ❑ NO ❑ **IF NO, SKIP TO Q9**
5. If yes, is a copy of the document sighted? YES ❑ NO ❑
6. Do you use the national guidelines on injection safety and HCWM?

   YES, COMPLETELY ❑ YES, PARTIALLY ❑ NOT AT ALL ❑

7. Do you face any challenges implementing the national guidelines on injection safety and HCWM?

   YES ❑ NO ❑ **IF NO, SKIP TO Q9**

8. If yes, what are the problems?

   .....

9. Do you have internal guidelines and SOPs on injection safety and HCWM? YES ❑ NO ❑
10. Are your guidelines and SOPs available and sighted?

    a. ❑ Not available IF NOT AVAILABLE, SKIP TO Q12

    b. ❑ Available and sighted

    c. ❑ Available and not sighted

11. If available, do you use internal guidelines and SOPs?

    a. ❑ YES, ALWAYS

    b. ❑ YES, SOMETIMES

    c. ❑ NEVER

12. Is there a functional IPC in the health care facility?

    YES ❑ NO ❑ **IF NO, SKIP TO Q18**

13. If yes, please list three members and their official designation

    .....

    .....

    .....

14. How frequently does the IPC committee of this health care facility meet?

    a. ❑ Once a month

    b. ❑ Once a quarter

    c. ❑ Once every six months

    d. ❑ Once a year

    e. ❑ Other *(please specify)*.....

15. When did the IPC committee last meet? *(MONTH YYYY)*
16. Did you record minutes at the meeting of the IPC committee? YES ❑ NO ❑
17. Can you produce the minutes of the last meeting? SIGHTED ❑ NOT SIGHTED ❑
18. Is there a designated and fully operational person (coordinator) responsible for HCWM?

    a. ❑ Not identified

    b. ❑ Identified but not operational

    c. ❑ Operational

19. Has the designated staff ever been trained on injection safety and HCWM? YES ❑ NO ❑
20. If yes, what kind of training has the staff had?

    .....

    .....

    .....

21. How often does the staff participate in training?

    Every year ❑ Every two years ❑ Every three years ❑ Other *(please specify)* .....

Section B: Health Care Waste Management

22. What category of waste is generated in this health care facility*? (tick all that apply)*

    a. ❑ General (food wastes, used clothes, etc.)

    b. ❑ Recyclables (empty bottles, metal objects, waste papers)

    c. ❑ Radioactive (unused liquids from radiotherapy or laboratory; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources)

    d. ❑ Infectious (laboratory samples, cultures, and stocks; tissues; dressings, swabs or other items soaked with blood; blood bags; sharps)

    e. ❑ Sharps (needles and syringes)

    f. ❑ Chemicals (liquid and solid; acids, reactive chemicals)

g. ❑ Pharmaceutical waste (expired drugs)

h. ❑ Anatomic waste (human parts ,umbilical cords, placenta)

i. ❑ Other type of waste (please specify).....

.....

.....

.....

23. Are you aware of the concept of waste segregation at the source? YES ❑ NO ❑
24. If yes, into what categories can HCW be segregated? *(Tick all that apply)*

a. ❑ General/noninfectious waste

b. ❑ Recyclables

c. ❑ Radioactive waste

d. ❑ Infectious waste

e. ❑ Sharps

f. ❑ Chemical/pharmaceutical waste

g. ❑ Highly infectious/anatomic waste

h. ❑ Other *(please specify)*.....

.....

25. Into what type of containers should waste be segregated? *(tick all that apply)*

a. ❑ No specific container

b. ❑ Plastic

c. ❑ Metallic

d. ❑ Cardboard box

e. ❑ Bag (bin liners)

f. ❑ Other *(please specify)*.....

26. Are you aware of waste color coding? YES ❑ NO ❑ **IF NO, SKIP TO Q28**
27. If yes, what color should infectious waste be coded?
28. Can you mention the personal protective equipment that can be used by health care workers?

a. Latex gloves YES ❑ NO ❑

b. Heavy duty gloves YES ❑ NO ❑

c. Boots YES ❑ NO ❑

d. Nose masks YES ❑ NO ❑

e. Aprons YES ❑ NO ❑

f. Overalls YES ❑ NO ❑

g. Goggles YES ❑ NO ❑

29. Where should HCW be stored?
30. Mention the waste disposal methods you are aware of? *(tick all that apply)*

a. Open burning in a hole or in an enclosure

b. High- or medium-temperature incineration (two chamber, rotary kiln, industrial, Demont forte or waste disposal unit)

c. Low-temperature incineration/burning (single-chamber, drum, brick)

d. Burial

e. Dumping in a protected (secure) pit (including a needle pit)

f. Dumping in an unprotected pit

g. Dumping in an unsupervised area

h. Transportation for off-site treatment (please specify type of transportation) .....

i. Other (please specify).....

Section C: Infection Prevention and Control

31. What type of syringe do you use in this facility? *(tick all that apply):*

j. ❑ Standard disposable

k. ❑ Auto-disable *(reuse prevention)*

l. ❑ Retractable *(needlestick prevention)*

32. Have you reused a needle and syringe on the same or another patient in the course of your work in last year? YES ❑ NO ❑ **IF NO, SKIP TO Q34**
33. If so, what was responsible for the reuse of needle and syringe?

a. Patient could not afford to buy

b. Disposable syringes were out of stock

c. Provider's choice *("I prefer to use that")*

d. Other *(please specify)* .....

1.

34. Do you have safety boxes in your health facility? Yes [ ] No [ ] **IF NO, SKIP TO Q38**
35. If yes, are the safety boxes available in units where needles and syringes are used?
    a. ❑ Yes, in ALL units
    b. ❑ Yes in SOME units
36. Have you experienced stockout of safety boxes in this health facility over the last six months?

    YES ❑ NO ❑ **IF NO, SKIP TO Q41**
37. If yes, at that time of out of stock of safety boxes, how did you dispose of sharps?

    .....

    .....
38. Have you ever experienced needlestick injury? YES ❑ NO ❑ **IF NO, GO TO QUESTION 41**
39. If yes, when did you experience needlestick injury last? .

    .....

    .....
40. The last time you experienced needlestick injury, what did you do?

    .....

    .....

    .....
41. What measures should be taken when such an accident occurs?

    .....

    .....

    .....

    .....
42. What measures are available to health care workers who experienced needlestick injury?

    .....

    .....

    .....
43. Have you had any training on universal precautions and injection safety?
    YES ❑ NO ❑ **IF NO SKIP TO Q45**
44. If yes, when was the last training in this facility held? *(MONTH YYYY)*

Section D: Risk Perception and Management

45. Do you think that diseases can be transmitted through improper HCWM? YES ❑ NO ❑
46. Do you think that diseases can be transmitted through needlestick injuries? YES ❑ NO ❑
47. Please give three examples of diseases that can be transmitted through such routes?

    .....

    .....

    .....

48. What is/are your information source(s) on the transmission of the diseases? *(tick all that apply)*

    a. ❑ In-service training
    b. ❑ Pre-service training
    c. ❑ Radio/TV
    d. ❑ Supervisor
    e. ❑ Books/brochure
    f. ❑ Newspaper
    g. ❑ Billboards
    h. ❑ Social media/online

49. Which of the above source of information do you consider most important to you?

    .....

50. Which of the following have you been vaccinated against?

    a. Tetanus YES ❑ NO ❑
    b. Hepatitis YES ❑ NO ❑
    c. Neither YES ❑ NO ❑

51. Do you have HIV post-exposure prophylaxis in your health facility? YES ❑ NO ❑
52. How will you describe your risk of contracting infection from accidental needle injury?

    a. ❑ Nonexistent
    b. ❑ Low risk
    c. ❑ Medium-level risk
    d. ❑ High risk

53. Please give reason(s) for your answer

    .....

    .....

54. What is the sequence of HCWM? *Tick as correct if mentioned in this order:* Segregation—Collection—Storage—Treatment—Disposal CORRECT ❑ WRONG ❑

55. How often are wastes removed from the ward?

    a. Daily
    b. Every shift
    c. Once in two days
    d. Twice weekly
    e. Weekly
    f. Others *(please specify)* .....

56. How often are wastes transported for final disposal?

    a. ❑ Daily
    b. ❑ Once in two days
    c. ❑ Twice weekly
    d. ❑ Weekly
    e. ❑ No formal schedule
    f. ❑ As and when it becomes necessary
    g. ❑ Other *(please specify)*.....

Section E: Challenges and Ways Forward

57. What kind of shortcomings (weak points) regarding HCWM in this HCF can you point out?

.....

.....

.....

.....

.....

.....

58. Do you think HCW is safely managed in this facility? YES ❑ NO ❑ **IF NO, SKIP TO Q60**

59. Please give reason(s) for your answer.

.....

.....

.....

60. If no, what can be done to improve the safety of HCWM?

.....

.....

.....

.....

61. Do you think HCW is managed in an environmentally friendly way?

YES ❑ NO ❑ **IF NO, SKIP TO Q63**

62. Please give reason(s) for your answer.

.....

.....

.....

63. If you answered in the negative, what can be done to make it more environmentally friendly?

.....

.....

.....

.....

THANK YOU!

APPENDIX III: HEALTH FACILITY CHECKLIST (TOOL 03)

FACILITY NAME .....SENATORIAL ZONE.....

STATE.....LGA: .....

OBSERVER NAME .....

ASSESSMENT TYPE .....

Section A: Environmental Sanitation

NO	CHARACTERISTICS	OBSERVATIONS			REMARKS
1	**Facility fenced**	YES	NO		
2	**Condition of health facility floor and walls**				
2A	Floor littered with rubbish	YES	NO		
2B	Are there visible cracks on the wall	YES	NO		
2C	Evidence of cobwebs on the walls	YES	NO		
2D	Evidence of used/soiled dressings on the floor (any part of the hospital)	YES	NO		
3	**Health facility roof leaking**	YES	NO	NOT ASSESSED	
4	**Condition of HF toilet**				
4A	Toilet floor wet	YES	NO		
4B	Toilet smelly	YES	NO		
4C	Toilet water running/available	YES	NO		

NO	CHARACTERISTICS	OBSERVATIONS		REMARKS
5	**Working toilets/latrine available for clients**			
5A	Type of working toilets available for **clients**	1) Water closet 2) VIP latrine 3) Pit latrine 4) Others *(please specify)*..... 5) No toilet for clients **IF NO TOILET, SKIP TO Q6**		
5B	Are toilets for male and female clients separate?	YES	NO	
5C	Are the toilets visibly clean?	YES	NO	
5D	Is the latrine smelly?	YES	NO	
5E	Are there houseflies within the toilet?	YES	NO	
5F	Is there any hand-washing facility within or near the toilets for the clients?	YES	NO	
5G	Do the hand-washing facilities have soap?	YES	NO	
6	**Working toilets/latrines available for staff**			
6A	Type of working toilets available for staff	1) Water closet 2) VIP latrine 3) Pit latrine 4) Others *(please specify)* ..... 5) No toilet for staff **SKIP TO 6G**		
6B	Are toilets for male and female staff separate?	YES	NO	
6C	Are the toilets visibly clean?	YES	NO	
6D	Is the latrine smelly?	YES	NO	
6E	Are there houseflies within the toilet?	YES	NO	
6F	Is there any hand-washing facility within or near the toilets for the staff?	YES	NO	

NO	CHARACTERISTICS	OBSERVATIONS			REMARKS
6G	Do the hand-washing facilities have soap?	YES	NO		
7	**Source of water supply to the health facility**	1. **Running** tap water within the HF from a **public source** 2. **Running** tap water within the facility from a facility **borehole** 3. Water obtained from a **protected dug well** within the HF compound 4. Water obtained from a **protected dug well** outside the HF compound 5. Water obtained from an **unprotected dug well** within the HF compound 6. Water obtained from an **unprotected dug well** outside the HF compound 7. Water fetched directly from a public-source running tap **outside** the facility 8. Water supplied to the facility by **water tanker** 9. Water purchased from hawkers 10. Other sources *(specify)* …….. 11. None			
8	**Open-waste drainage exists**	YES	NO	NOT ASSESSED	
9	**Central waste collection point**	YES	NO	**IF NO, SKIP TO Q11**	
10	**Does the central waste collection point look well maintained?**	YES	NO	*(Specify why)*	
11	**Obnoxious odor within the health facility**	YES	NO	*(Specify sources, please)*	
12	**General cleanliness of facility premises**				
12A	Are there litter and waste on the ground within the compound?	YES	NO		
12B	Are there overgrown bushes?	YES	NO		
12C	Are waste bins available for general use within the premises?	YES	NO		
12D	Is the waste bin overflowing?	YES	NO		

NO	CHARACTERISTICS	OBSERVATIONS		REMARKS
13	**Health facility wards**			
13A	Are the wards' floors clean (free of dirt)?	YES	NO	
13B	What is the floor made of?	*(Please specify substance)*		

Section B: Health Care Waste Management

NO	CHARACTERISTICS	OBSERVATIONS		REMARKS
1	**Availability of waste storage bins**			
1a	Availability of waste storage bin *within* the facility building (e.g., wards, laboratory)	YES	NO	
1b	Availability of waste storage bin *outside* the facility building	YES	NO	
2	**Evidence of waste segregation at its source (color coded bin liners/bin sighted)**	YES	NO	
3	**Color coding of HCW containers**	YES	NO	
4	**Condition of waste storage containers**			
4A	Is the waste storage container leaky?	LEAKY	NOT LEAKY	NOT ASSESSED
4B	Is the waste storage container overfilled?	YES	NO	
4C	Is the waste storage container lidded (i.e., has a well-fitted cover)?	YES	NO	
5	**Is the storage area well designated?**	YES	NO	NOT ASSESSED
6	**Access of storage only to authorized personnel>**	YES	NO	
7	**Waste treatment site**	SEEN	NOT SEEN	*(Comment on its state, if seen)*

NO	CHARACTERISTICS	OBSERVATIONS			REMARKS
	Type of on-site waste treatment facility seen	1. Open burning on the ground. 2. Open burning in a hole or in an enclosure 3. High- or medium-temperature incineration 4. Low-temperature incineration or burning (single-chamber, drum, brick) 5. Burial 6. Dumping in a protected (secure) pit (including a needle pit) 7. Dumping in an unprotected pit 8. Dumping in an unsupervised area 9. Other *(please specify)*			*(Comments, if any)*
8	**Does the waste treatment facility appear well maintained**	YES	NO		
9	**Transportation available for waste to off-site treatment site**	YES	NO	NOT APPLICABLE *(if waste is fully treated on site)*	*(Type of transportation facility)*

Section C: Infection Prevention and Control

NO	CHARACTERISTICS	OBSERVATIONS			REMARKS
1	**Soiled/dirty swab in the injection area**	YES	NO		
2	**Availability of safety boxes in stock (outside those in use)**	YES	NO	*(State number in stock)*	
4	**Presence of safety boxes in all areas where needles and syringes are used**	YES IN ALL AREAS	YES IN SOME AREAS	NOT AT ALL	
5	**Presence of overflowing or pierced or open sharp boxes**	YES	NO		
6	**Number of full sharp box(es) waiting for disposal stored safely**	*(State how many)*			
7	**Number of full sharp box(es) waiting for disposal stored in an unsupervised fashion**	*(State how many)*			
8	**Used sharps properly disposed of ?**	YES	NO		
9	**Used sharps seen around the health care facility?**	YES	NO		

NO	CHARACTERISTICS	OBSERVATIONS			REMARKS
10	**Availability of syringes**	STANDARD DISPOSABLE	AUTO-DISABLE (REUSE PREVENTION)	RETRACTABLE (NEEDLE STICK PREVENTION)	*(Comment)*
10a	Availability of syringes by type (*please tick as applicable*)				
12	**Observation of other injection-related processes**				
12A	Is injection tray clean?	YES	NO		
12B	Are the needle and syringe in a sterile pack?	YES	NO		

Section D: Risk Prevention and Management

NO	CHARACTERISTICS	OBSERVATIONS		REMARKS
1	Waste handler wears overalls	YES	NO	
2	Waste handler uses nose masks	YES	NO	
3	Waste handler uses heavy duty gloves	YES	NO	
4	Waste handler uses apron	YES	NO	
5	Waste handler uses boots	YES	NO	
6	Availability of drugs for HIV post-exposure prophylaxis (PEP) sighted in pharmacy	YES	NO	

Section E: Job Aids

NO	CHARACTERISTICS	OBSERVATIONS		REMARKS
1	Job aids available for HCWM in facility and sighted	YES	NO	
2	Job aids available for IPC in the facility and sighted	YES	NO	

APPENDIX IV: QUESTIONNAIRE FOR WASTE HANDLERS/ENVIRONMENTAL HEALTH WORKERS (TOOL 04)

HEALTH FACILITY ASSESSMENT TOOL
WASTE HANDLER/ENVIRONMENTAL HEALTH WORKER

Informed Consent

Thank you for taking the time to meet with me today. My name is ..... and I would like to talk to you about your experiences with respect to infection prevention and control and health care waste management—specifically, as part of a baseline assessment commissioned by AIDSFree Nigeria, which can give information on how to improve infection prevention and control and health care waste management in..... The interview should take a few minutes.

All responses will be kept confidential. This means that your interview responses will be shared only with research team members, and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to discuss, and you may end the interview at any time.

Are there any questions about what I have just explained? Are you willing to participate in this interview?

Informed consent statement:
(Accept to participate) .....

FACILITY NAME .....SENATORIAL ZONE.....

STATE.....LGA: .....

DESIGATION OF INTERVIEWEE: .....

FACILITY TYPE (CHOOSE ONE): ❑ PUBLIC ❑ PRIVATE ❑ NGO

NAME OF INTERVIEWER: ..... INTERVIEW DATE: .....

Section A: Characteristic of Health Care Facility

1. Are you aware of the national policy on infection prevention and control (IPC), and HCWM?
   YES ❑ NO ❑ **IF NO, SKIP TO Q9**
2. If yes, is a copy of the document available and sighted? YES ❑ NO ❑
3. Do you use the national policy on IPC and HCWM?

   YES, COMPLETELY ❑ YES, PARTIALLY ❑ NOT AT ALL ❑
4. Do you have the national guidelines on IPC and HCWM? YES ❑ NO ❑ **IF NO,SKIP TO Q9**
5. If yes, is a copy of the document sighted? YES ❑ NO ❑
6. Do you use the national guidelines on IPC and HCWM?

   2. YES COMPLETELY ❑ YES PARTIALLY ❑ NOT AT ALL❑

7. Do you face any challenges implementing the national guidelines on IPC and HCWM?

   YES ❑ NO ❑

   IF NO, SKIP TO Q9

8. If yes, what are the problems?

   .....

   .....

   .....

9. Do you have internal guidelines and SOPs on IPC and HCWM? YES ❑ NO ❑
10. Are they available and sighted?

    a. ❑ Not available **IF NOT AVAILABLE, SKIP TO Q12**

    b. ❑ Available and sighted

    c. ❑ Available and not sighted

11. If available, do you use internal guidelines and SOPs?

    3. YES, ALWAYS YES ❑ YES, SOMETIMES ❑ NEVER ❑

12. Is there a designated and fully operational person (coordinator) responsible for HCWM

    a. ❑ Not identified

    b. ❑ Identified but not operational

    c. ❑ Operational

13. Has the designated staff ever been trained on IPC and HCWM? YES ❑ NO ❑

Section B: Health Care Waste Management

14. What category of waste is generated in this facility? *(tick all that apply)*

    a. ❑ General (food wastes, used clothes, etc.).

    b. ❑ Recyclables (empty bottles, metal objects, waste papers)

    c. ❑ Radioactive (unused liquids from radiotherapy or laboratory; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources)

    d. ❑ Infectious (laboratory samples, cultures and stocks; tissues; dressings, swabs or other items soaked with blood; blood bags)

    e. ❑ Sharps (needles and syringes)

    f. ❑ Chemicals (liquid and solid; acids, reactive chemicals)

    g. ❑ Pharmaceutical waste (expired drugs)

    h. ❑ Anatomical waste (human parts ,umbilical cords, placenta)

    i. ❑ Others (please specify) .....

15. Are you aware of the concept of waste segregation at the source? YES ❑ NO ❑
16. If yes, into what categories can HCW be segregated? *(Tick all that apply)*

    a. ❑ General/noninfectious waste

    b. ❑ Recyclables

    c. ❑ Radioactive waste

    d. ❑ Infectious waste

    e. ❑ Sharps

    f. ❑ Chemical/pharmaceutical waste

    g. ❑ Highly infectious/anatomical waste

    h. ❑ Others (please specify).....

17. Into what type of containers should waste be segregated? *(tick all that apply)*

    a. ❑ No specific container

    b. ❑ Plastic

    c. ❑ Metallic

    d. ❑ Cardboard boxes

    e. ❑ Bag (bin liners)

    f. ❑ Others *(please specify)*.....

18. Are you aware of waste color coding? YES ❑ NO ❑ **IF NO, SKIP TO Q20**
19. If yes, what color should infectious waste be coded?
20. Can you mention the personal protective equipment that can be used by health care workers?
    a. Latex gloves YES ❑ NO ❑
    b. Heavy duty gloves YES ❑ NO ❑
    c. Boots YES ❑ NO ❑
    d. Nose masks YES ❑ NO ❑
    e. Aprons YES ❑ NO ❑
    f. Overalls YES ❑ NO ❑
    g. Goggles YES ❑ NO ❑
21. Where should HCW be stored?

    .....

    .....

    .....

    .....

22. Mention the waste treatment and disposal methods you are aware of? *(Tick all that apply)*
    a. ❑ Open burning in a hole or in an enclosure
    b. ❑ High- or medium-temperature incineration *(e.g., two chamber, rotary kiln, industrial, Demont Forte or waste disposal unit)*
    c. ❑ Low-temperature incineration/burning *(single-chamber, drum, brick)*
    d. ❑ Burial
    e. ❑ Dumping in a protected (secure) pit (including a needlepit)
    f. ❑ Dumping in an unprotected pit
    g. ❑ Dumping in an unsupervised area
    h. ❑ Transportation for off-site treatment *(specify type of transportation)* .....
    i. ❑ Other *(please specify)* .....

Section C: Infection Prevention and Control

23. Have you experienced needle stick injury during the past six months? YES ❑ NO ❑

    IF NO, GO TO QUESTION 25

24. The last time you experienced needle stick injury, what did you do?

    .....

    .....

    .....

    .....

25. What measures should be taken when such accident occurs?

    .....

    .....

    .....

    .....

26. What measures are available to health care workers who experienced needle stick injury?

    .

    .....

    .....

    .....

    .....

    .....

    .....

27. Have you had any training on HCWM? YES ❑ NO ❑ **IF NO, SKIP TO Q30**
28. If yes, when was the last training in this facility held? *(MONTH YYYY)*
29. Do you think that diseases can be transmitted through improper HCWM? YES ❑ NO ❑
30. Do you think that diseases can be transmitted through needle stick injuries? YES ❑ NO ❑
31. Please give three examples of diseases that can be transmitted through such routes?

    .....

    .....

    .....

    .....

    .....

32. What is/are your information source(s) on the transmission of the diseases? *(tick all that apply)*

    a. ❑ In-service training
    b. ❑ Pre-service training
    c. ❑ Radio/TV
    d. ❑ Supervisor
    e. ❑ Books/brochure
    f. ❑ Newspaper
    g. ❑ Billboards
    h. ❑ Social media/online
    i. ❑ Others *(please specify)* .....

33. Which of the above source of information do you consider most important to you?

    .....

    .....

34. Which of the following have you been vaccinated against?

    a. Tetanus YES ❑ NO ❑
    b. Hepatitis YES ❑ NO ❑
    c. Neither YES ❑ NO ❑

35. Do you have HIV post-exposure prophylaxis in your health facility? YES ❑ NO ❑
36. How will you describe your risk of contracting infection from accidental needle injury?

    a. ❑ Nonexistent
    b. ❑ Low risk
    c. ❑ Medium-level risk
    d. ❑ High risk

37. Please give reason(s) for your answer.

    .....

    .....

38. What is the sequence of HCWM?

    Tick as correct if mentioned in this order Segregation—Collection—Storage—Treatment—Disposal

    CORRECT ❑ WRONG ❑

39. How often are wastes removed from the ward?

    a. ❑ Daily
    b. ❑ Every shift

c. ❑ Once in two days

d. ❑ Twice weekly

e. ❑ Weekly

f. ❑ Others *(please specify)* .....

40. How often are wastes transported for final disposal?

a. ❑ Daily

b. ❑ Once in two days

c. ❑ Twice weekly

d. ❑ Weekly

e. ❑ No formal schedule

f. ❑ As and when it becomes necessary

g. ❑ Others *(please specify)* .....

Section E: Challenges and Ways Forward

41. What kind of shortcomings (weak points) regarding HCWM in this health facility can you point out?

.....

.....

.....

42. Do you think HCW is safely managed in this facility? YES ❑ NO ❑ **IF NO, SKIP Q43**

43. Please give reason(s) for your answer?

.....

.....

.....

44. If you answered in the negative, what can be done to improve safety of HCWM?

.....

.....

.....

.....

45. Do you think HCW is managed in an environmentally friendly way? YES ❑ NO ❑

IF NO, SKIP Q46

46. Please give reason(s) for your answer

.....

.....

.....

.....

47. If you answered in the negative, what can be done to make it more environmentally friendly?

.....

.....

THANK YOU!

APPENDIX V: STRUCTURED OBSERVATION OF STORE/PHARMACY: INVENTORY OF SUPPLIES IN CENTRAL PHARMACY STORES AND MAIN STORE ROOM (TOOL 05)

ASSESSMENT ON INFECTION PREVENTION AND CONTROL AND HEALTH CARE WASTE MANAGEMENT

FACILITY NAME .....SENATORIAL ZONE.....

STATE.....LGA: .....

FACILITY TYPE *(choose one)* ❑ PUBLIC ❑ PRIVATE ❑ NGO

NAME OF ASSESSOR..... ASSESSMENT DATE .....

1. What types of injection equipment do you use in this facility? *(tick ALL appropriate types)*
   a. ❑ Retractables *(needlestick prevention)*
   b. ❑ Auto-disable *(reuse prevention)*
   c. ❑ Standard disposable

2. Stock cards and stockout experiences

SUPPLIES	STOCK CARD EXISTS	REGISTER EXISTS	NO STOCK CARD OR REGISTER	IF STOCK CARD EXIST, HOW MANY DAYS AGO WAS IT UPDATED?		DID YOU EXPERIENCE STOCKOUT OF THIS SUPPLY IN THE *PAST 6 (SIX) MONTHS*	
				< 30 DAYS	> 30 DAYS	YES	NO
A Retractable							
B Auto-disable							
C Standard disposable							
D Vacutainers							
E Safety boxes							
F Disposable gloves							
G Bin liners							

	SUPPLIES	STOCK CARD EXISTS	REGISTER EXISTS	NO STOCK CARD OR REGISTER	IF STOCK CARD EXIST, HOW MANY DAYS AGO WAS IT UPDATED?		DID YOU EXPERIENCE STOCKOUT OF THIS SUPPLY IN THE *PAST 6 (SIX) MONTHS*	
					< 30 DAYS	> 30 DAYS	YES	NO
H	Heavy duty gloves							
I	Boots							

3	What quantity of the standard disposable syringes (in units) do you have available on the stock card or register?	
	a. 10 ml	
	b. 5 ml	
	c. 2 ml	
	d. 1 ml	
	e. 0.5 ml	
	f. Total disposable syringes	
	g. Is the number of **5 ml** standard disposable syringes sufficient to last two weeks?	1. YES 2. NO
4	What quantity of **auto-disable** syringes (in units) do you have available on the stock card or register?	
	a. 10 ml	
	b. 5 ml	
	c. 2 ml	
	d. 1 ml	
	e. 0.5 ml	
	f. Total auto-disposable syringes	
	g. Is the number of **5 ml** auto-disposable syringes available sufficient to last two weeks?	1. YES 2. NO
5	What quantity of **retractable** syringes (in units) do you have available on the stock card or register?	
	a. 10 ml	
	b. 5 ml	
	c. 2 ml	1. YES 2. NO
	d. 1 ml	1. YES 2. NO
	e. 0.5 ml	1. YES 2. NO
	f. Total retractable syringes	
	g. Is the number of **5 ml** retractable syringes available sufficient to last two weeks?	1. YES 2. NO
6	What quantity of **vacutainers** (in units) do you have available on the stock card or register?	
7	Are oral formulations of the following drugs available?	
	a. ACT (for malaria treatment)	1. YES 2. NO

b. Paracetamol	1. YES 2. NO
c. Ampicillin/ampiclox/septrin	1. YES 2. NO

APPENDIX VI: STRUCTURED OBSERVATION OF INJECTION PRACTICES (TOOL 06)

DATE .....

STATE .....

NAME OF FACILITY .....

LGA.....

TYPE OF FACILITY *(choose one)* ❑ PUBLIC ❑ PRIVATE ❑ NGO

SEX OF SERVICE PROVIDER: MALE ❑ FEMALE ❑

AGE OF SERVICE PROVIDER .....

NUMBER OF YEARS IN PROFESSIONAL PRACTICE .....

DESIGNATION OF THE SERVICE PROVIDER.....

CATEGORY OF HEALTH WORKERS

CATEGORY	**"A" VACCINATION**	**"B" THERAPEUTIC**	**"C" FAMILY PLANNING**	**"D" DENTAL**
Doctors				
Nurses				
Community health officers				
Senior community health extension workers (SHEW)				
Junior community health extension workers (JCHEW)				
Auxiliary nurse				
Others *(please specify)*				

4. NAMES OF ASSESSORS

Up to four injections are to be observed and reported on using this tool. One injection of each of the following types that are performed during the facility evaluation should be included if possible: one vaccination, one therapeutic, one for family planning, and/or one dental.

The fieldworker should ask where each type of injection might be performed and check with staff at each of these locations to see when injections are likely to occur on that day. If the facility has more than one location where a particular type of injection is performed, ask to be informed when and where the first injection of each type might be observed. If more than one location or department might perform the same type of injection at the same time, select outpatient over inpatient departments. Remember to verify what type of injection is about to be performed before entering data.

Please circle YES, NO, or N/A (not applicable/not observed) in the correct column. Use a single column below to record all of your observations for a given injection. The goal is to observe one injection of each type that is provided in each service unit that is included in the survey.

	INJECTION PRACTICES OBSERVED	**"A" VACCINATION**	**"B" THERAPEUTIC**	**"C" FAMILY PLANNING**	**"D" DENTAL**
Q201	Was the injection prepared on a visibly **clean, dedicated table or tray** where contamination of the equipment with blood, body fluids, or dirty swabs is unlikely?	YES NO	YES NO	YES NO	YES NO
Q202	Did the provider wash her/his hands before preparing an injection with **soap and running water?**	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q203	Did the provider cleanse her/his hands before preparing an injection by using **alcohol-based hand rub?**	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q204	Did any **patients bring their own syringe** and needle for the observed injection?	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q205	What **type of syringe** was used for the injection you observed? 1. Standard disposable 2. Auto-disable 3. Retractable 4. Other safety syringe 5. Sterilizable 6. Disposable—type unknown **IF 5 (STERILIZABLE), GO TO Q205A. OTHERS GO TO Q 206.**	1. 2. 3. 4. 5. 6.	1. 2. 3. 4. 5. 6.	1. 2. 3. 4. 5. 6.	1. 2. 3. 4. 5. 6.

	INJECTION PRACTICES OBSERVED	"A" VACCINATION	"B" THERAPEUTIC	"C" FAMILY PLANNING	"D" DENTAL
Q205A	Are needles sterilizable?			YES NO	
Q206	For this injection, was a **syringe and needle** taken from a **sterile, unopened packet or fitted with caps**?	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q207	For each injection given with a **sterilizable syringe** and needle, were they **taken from a sterilizer** *(or sterile packs)* **using sterile technique**?			YES NO N/A	
Q208	**For reconstitution**, was a syringe and needle each taken from a **sterile unopened packet or fitted with caps**? *Instructions: Code as NA if there was no reconstitution step.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q209	Is reconstitution of a powdered vaccine or medicine performed using **diluent from manufacturer**? *Instructions: Code YES if the diluent is water for therapeutic injections and as NA if use of the diluent is not observed.*	YES NO DONT KNOW N/A	YES NO N/A	YES NO	YES NO N/A
Q210	If a multidose vial was used, did the **provider clean the rubber cap** with antiseptic? *Instructions: Code as NA if no multidose vials were used for the injection you observed.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q210A	If a multidose vial was used, did the **provider clean the rubber cap** with dirty swab? *Instructions: Code as NA if no multidose vials were used for the injection you observed.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q211	If a multidose vial was used, was the **needle removed from the rubber cap of each multidose vial** after withdrawing each dose for administration? *Instructions: Code as NA if no multidose vials were used for the injection you observed.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A

	INJECTION PRACTICES OBSERVED	"A" VACCINATION	"B" THERAPEUTIC	"C" FAMILY PLANNING	"D" DENTAL
Q212	If **glass ampoules** are used, is a **clean barrier** (e.g., small gauze pad or cotton) used to protect fingers when breaking the top from the glass ampoule? *Instructions: If no glass ampoules were used, code as NA. If an unsafe procedure was used (e.g., such as forceps, knife, or scissors), code as NO.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q213	If using temperature-sensitive vaccines or medications, is the vial kept between 2°C - 8°C during the period of use? *Instructions: A vial that is in contact with a combination of ice and water will be between 2°C and 8°C. If no heat-sensitive vaccines and medication were used, code as N/A.*	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q214	Did the provider use a **new** pair of **gloves?** 1. New gloves used 2. Gloves not changed 3. No gloves used 4. Not observed	1. 2. 3. 4.	1. 2. 3. 4.	1. 2. 3. 4.	1. 2. 3. 4.
Q215	What was the **patient's skin cleaned** with before the injection was given? 1. Water or a clean, wet swab 2. An antiseptic 3. Dry cotton 4. A dirty swab 5. The skin was not cleaned and it's clean 6. The skin was not cleaned and it's dirty 7. Not observed *Instructions: Select the most appropriate response. If the provider used any unclean material to swab the skin, including any swab soaking in a liquid, circle "4. A dirty swab".*	1. 2. 3. 4. 5. 6. 7.	1. 2. 3. 4. 5. 6. 7.	1. 2. 3. 4. 5. 6. 7.	
Q216	Did the provider **recap** the used needle and syringe? 1. Yes, with one hand 2. Yes, with two hands 3. Not recapped 4. Not observed	1. 2. 3. 4.	1. 2. 3. 4.	1. 2. 3. 4.	1. 2. 3. 4.
Q217	Was a **needle remover** or needle destroyer used?	YES NO	YES NO	YES NO	YES NO

	INJECTION PRACTICES OBSERVED	"A" VACCINATION	"B" THERAPEUTIC	"C" FAMILY PLANNING	"D" DENTAL
Q218	If disposable or safety syringe was used, after the injection did the provider **immediately dispose** of the needles and syringes used for the injection (and reconstitution, if applicable) in an appropriate sharps container?	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A
Q219	If **sterilizable equipment** was used, immediately after the injection was the equipment **disassembled and immersed** in a container of water?	YES NO N/A	YES NO N/A	YES NO N/A	YES NO N/A

APPENDIX VII: GUIDE FOR IN-DEPTH INTERVIEW WITH GOVERNMENT STAKEHOLDERS (TOOL 07)

Introduction

Thank you for taking the time to meet with me today. My name is ..... and I am part of a team carrying out a study for AIDSFree Nigeria project on health care waste generation and management issues. This assessment is broadly aimed at helping us understand the situation of health care waste management in health facilities. The study is expected to provide insights to policy makers and other stakeholders as to the way forward in enabling sustainable health care waste management. The interview should take less than an hour. I will be taping the session because I don't want to miss any of your comments. Although I will be taking some notes, I can't possibly write fast enough to get it all down. Because we're on tape, I will appreciate it if you can speak up so that we don't miss your comments.

All responses will be kept confidential. This means that your interview responses will be shared only with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Please note, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are there any questions about what I have just explained? Are you willing to participate in this interview?

Interviewer: Please start by asking the individual to mention his/her name, and his official position: please record the same on tape and in writing.

1. How important do you consider the issue of HCWM?

   Probe: Why did you say so? *Probe about diseases that can result from poor HCWM practices.*

   .....

   .....

   .....

   .....

   .....

   .....

2. How big is the challenge of HCWM in your area of jurisdiction (state or LGA)?

.....

.....

.....

.....

3. To what extent do you think that the government in this state/LGA is giving attention to HCWM? *Probe*: What specifically has the government done or is doing with regards to the following, among others:

    a. Legislation and regulations
    b. Establishment/availability of relevant agencies
    c. Oversight of health facilities with regards to HCWM
    d. Availability of equipment and infrastructure
    e. Provision of resources and funding of agencies
    f. Provision of direct support/services to health facilities
    g. Involvement of private sector in HCWM

.....

.....

.....

.....

.....

.....

4. What is the focus of your organization with regards to HCW generation and management?

.....

.....

.....

.....

5. In what ways is your organization supporting health facilities in HCWM?

.....

.....

.....

.....

6. What are the sources and level of your funding? *Probe for:*

    a. Government funding (adequacy and regularity of release; proportion of overall fund)

    b. Private for-profit sector funding and support (mention the organizations that have supported you in the last three years and the type of support given)

    c. Civil society organizations' funding and support (mention the organizations that have supported you in the last three years and the type of support given)

    d. International development organizations' funding and support (mention the organizations that have supported you in the last three years and the type of support given)

    e. Individuals (mention them and the type of support you have received in last three years)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

7. What is the extent of public–private partnerships and involvement in HCWM in your state/LGA?
   Probe for:

    a. The effectiveness of private sector involvement in HCWM—how do they organize, manage and dispose health care waste?

    b. The degree to which the private sectors are well equipped for HCWM (e.g., what equipment, facilities, and infrastructure do they have)?

    c. What protocols do private sector operatives use in HCWM?

    d. What are the advantages of private sector involvement in HCWM in the state?

    e. What are the disadvantages of private sector involvement in HCWM in the state?

.....

.....

.....

.....

.....

.....

.....

.....

8. What constraints/challenges exist for private sector's effective involvement in HCWM in the state/LGA?

.....

.....

.....

.....

.....

.....

9. How can private sector involvement in HCWM be improved?

.....

.....

.....

.....

.....

.....

10. How can HCWM in the state/LGA be strengthened further?

.....

.....

.....

.....

11. Is there anything more you would like to add?

.....

.....

.....

THANK YOU FOR YOUR TIME!

AIDSFree Nigeria
JSI Research & Training Institute, Inc.
Health Care Waste Management Project
Gwandal Center - Plot 1015 Fria Close off Coree Bay Crescent - Wuse II
Abuja, FCT
aidsfree.usaid.gov