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ENVIRONMENTAL COMPLIANCE:  
**HEALTH CARE WASTE  
MANAGEMENT IN KENYA**

August 17, 2012

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# ENVIRONMENTAL COMPLIANCE HEALTH CARE WASTE MANAGEMENT IN KENYA

August 17, 2012

## DISCLAIMER

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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Any shortcomings remain the responsibility of the principal authors and the Assessment Team.

# ACRONYMS

AT	Assessment Team
BoR	Boundary of Responsibility
CBA	Cost Benefit Analysis
CDC	Centers for Disease Control & Prevention
CEQ	Council on Environmental Quality
CPHO	Chief Public Health Officer
DOD	U.S. Department of Defense
dTS	Development & Training Services
EIA	Environmental Impact Assessment (process)
EA	Environmental Assessment (document)
EC	Environmental Compliance
E3	Economic Development, Education, and the Environment
EMCA	Environmental Management and Co-ordination Act No. 8 (1999)
EMMP	Environmental Monitoring & Mitigation Plan
HC	Health Care
HCW	Health Care Waste
HCWM	Health Care Waste Management
HCWM-BR	Health Care Waste Management Boundaries of Responsibility
HCWMS	Health Care Waste Management System
GOK	Government of Kenya
HCF	Health Care Facility
IC	The “In-Charge” at a HC facility, or a unit within a facility
IEE	Initial Environmental Examination
IP	Implementing Partner
KEMSA	Kenya Medical Supply Agency
KNHCWMP	Kenya National Health Care Waste Management Plan
KEMRI	Kenya Medical Research Institute
LPO	Local Purchase Orders
MI	Manageable Interests
M&E	Monitoring and Evaluation
MEO	Mission Environment Officer
MedSup	Chief Medical Officer In Charge
MOPHS	Ministry of Public Health Services
MMS	Ministry of Medical Services
MP	Mitigation Plan
MRV	Measurement, Reporting, Verification
NEMA	National Environmental Management Agency
NEPA	National Environmental Protection Act
OPH	Office of Population and Health
PACE	Performance, Analysis, Communications, Evaluation Project
PPP	Public Private Partnerships
QA&IC	Quality Assurance and Infection Control
Reg. 216	Title 22, Code of Federal Regulations, Part 216
RIG	Regional Inspector General

TORs	Terms of Reference
USAID	United States Agency for International Development
USAID/K	USAID/Kenya
USAID/W	USAID/Washington

# CONTENTS

- Acronyms ..... iii
- Contents ..... v
- Executive Summary ..... vi
  - Key Findings ..... vi
  - Assessment Conclusions ..... vii
  - Assessment Recommendations ..... viii
- Introduction ..... 1
  - Reg. 216 ..... 1
  - Survey Methodology and Data Analysis ..... 3
- Principal Findings ..... 5
  - Quantitative Findings ..... 5
  - Qualitative Findings ..... 7
  - Compliance with the GOK National HCWM Plan ..... 9
- Framework for a mitigation plan ..... 11
  - Underpinnings for the Court of Development Best Practice ..... 12
  - Mitigation Planning: Key Steps ..... 13
- Recommendations ..... 15
  - Short-term actions ..... 15
  - Medium term actions ..... 17
- Appendix A. Background to RIG audit & Present Assessment ..... i
- Appendix B. Timeline for the Key Steps to Improve USAID/Kenya HCWM Compliance in Kenya ..... iii
- Appendix C. List of Healthcare Facilities Surveyed ..... iv
- Appendix D. Assessment Survey Tool- Example ..... vii
- Appendix E. Aggregated Data of Principal Findings ..... xviii
- Appendix F. Statistical Analysis ..... xx
- Appendix G. Glossary of Terms ..... xxiv
- Appendix H. First Steps in Moving towards a Standardized EMMP for Implementing Partners in HCWM ..... xxvi
- Appendix I. Establishing USAID/Kenya Boundaries of Responsibility and Manageable Interests: Step One in the HCWM Mitigation Plan ..... xxx
- Appendix J. NEMA: Environmental Management and Co-ordination Act (ECMA) no. 8 (1999) ..... xxxi
- Appendix K. Photographic Evidence of Noncompliance ..... xxxii

# EXECUTIVE SUMMARY

The Healthcare Waste Management (HCWM) Assessment undertaken by the Kenya Performance, Analysis, Communication, and Evaluation (PACE) project for USAID/Kenya is the result of a USAID Regional Inspector General (RIG) Audit conducted in 2010. The audit identified concerns, based on a small sample of field site visits to healthcare facilities supported in some manner by USAID/Kenya. This report was supported by USAID/Kenya in response to the concerns raised by the RIG Audit report. Background to the audit can be found in Appendix A.

In response, the Assessment Team (AT) examined HCWM compliance across 111 facilities using a survey tool consisting of 175 variables (see Appendix D). To determine compliance, the AT identified five "deal breakers" – incineration (of waste), waste water (treatment and/or disposal), segregation (of waste), sharps (disposal), worker protective gear (PPE) – that a given facility must adhere to in order to be in full compliance (e.g. all five criteria had to be met). Beyond the "deal breakers", data was collected more broadly across 15 units in each health care facility visited. Two additional unit-specific variables were identified to determine compliance within each unit.

## KEY FINDINGS

The HCWM Assessment has determined that HCWM in GOK facilities supported by USAID is in noncompliance. The study which combined quantitative and qualitative analysis, found that compliance per The Code of Federal Regulations, 22 CFR 216 (hereafter Reg. 216), along with adherence to various GOK regulations and World Health Organization (WHO) guidelines, was absent to varying degrees from all 111 facilities surveyed for the principal components expected in HCWM.<sup>1</sup> Based upon the five deal breaker criteria, the AT found that all 111 sampled facilities were noncompliant. Noncompliance was also the overwhelming finding for each of the fifteen units across all facilities. Level 3 and 4 facilities in Kenya are perhaps the worst off, though level 5 facilities are non-compliant in HCWM, as well. Two Level 6 facilities surveyed in Nairobi and Eldoret were also found to be non-compliant. Overall, noncompliance holds true despite variations in geography, facility size, level and reputation, and donor.

As the RIG Audit report suspected, medical waste is often comingled with general waste in an open burn area as standard practice in facilities where incinerators are non-operative because of fuel shortages, or breakdowns; and where open pits are used, these are unlined and often receive infectious and potentially hazardous waste mixed with more general waste. Hazardous waste water including calcium hypochloride (referred to across Kenya as "jike"), phenol, or formaldehyde (formalin) disinfectants (both known carcinogens) are presently used as decontaminants in the absence of more sophisticated methods. They are finding their way into municipal sewerage systems from USAID/Kenya supported healthcare facilities across Kenya, in particular from laboratory units. "Fixer" (a chemical bath including silver, potassium sulphite, ammonium thicyanate) from the X ray unit is frequently disposed of into municipal sewerage systems where it is known that water treatment for potable water is often deficient. Hazardous medical waste in USG supported facilities (USAID, CDC and/or DOD) is also frequently reaching municipal dump sites where scavenging is widespread, bringing that socioeconomic group into contact with hazardous waste generated at USAID supported healthcare facilities (HCF).

The AT found that there is very little attempt by stakeholders to adhere to the established host country regulations covered under the Public Health Act, the National Environmental Management Agency's (NEMA) hazardous waste management regulations, and at lower levels, the management policies and procedures that govern medical facilities. Specific compliance with the Government of Kenya, Ministry of

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<sup>1</sup> See Appendix C for a full listing of all facilities assessed.

Health's key operational plan – *The National Health Care Waste Management Plan* – appears more aspirational than empirical. These findings are indicative of noncompliance with Reg. 216.

The AT did not find that a HCWM “system” currently exists in Kenya, since a system implies the existence of functionally-related elements, with organized and coordinated methods and procedures. Rather, the AT found that *a framework* for a system does exist, although components within the framework are not well coordinated and procedures that should have been followed were haphazardly applied. Monitoring and evaluation (M&E) oversight was limited, and systematic measurement, reporting and verification (MRV) of HCWM was wholly lacking. Moreover, the framework is often interpreted differently across facilities. In the current framework, facilities do not maintain designated line item budgets to implement HCWM. They maintain little if any oversight over HCWM practice at either the facility or higher levels of operations. They systematically do not receive needed supplies to implement HCWM comprehensively. They lack the ability to incinerate hazardous waste *in compliance* in the overwhelming majority of facilities due either to malfunctioning incinerators, or to incinerators that are not in compliance with Reg. 216 or the GOK regulations pertaining to incinerator siting.

The AT found multiple causes for noncompliance, however the most common and significant include: the absence of dedicated budget lines for HCWM in GOK and USAID supported programs and facilities; the absence of clearly defined roles and responsibilities among diverse HCWM actors; a lack of integrated planning among these actors and levels; and a lack of systematic oversight of HCWM activities among different actors and levels. Taken together, the result is that effective HCWM is constrained at all levels at which USAID and its partners currently operate in Kenya.

## **ASSESSMENT CONCLUSIONS**

The overall conclusion reached by the HCWM Assessment team is that the Regional Inspector General (RIG) for USAID was justified in questioning the adequacy of HCWM in USAID supported healthcare facilities in Kenya in late 2010 which served as the basis for initiating this HCWM Assessment of USAID and other USG supported facilities in Kenya. While the AT only sampled 111 facilities, the team suspects the data would not significantly demonstrate greater compliance were the sample size increased. Rather, the data would mostly likely suggest greater noncompliance as more peripheral, less well serviced facilities would be included in the population sampled.

The findings of the Assessment are alarming in that there are numerous negative public health implications from noncompliance in USAID supported healthcare facilities. These include public health costs from the release of dioxin and furan into the atmosphere in non-compliant-sited incinerators with non-working incinerators (92.8% of incinerators sampled); discharge of non-treated effluent into deficient municipal sewerage and treatment systems from the laboratories, X Ray units and maternity units of these facilities; potential abuses resulting from public access to poorly stored, expired pharmaceuticals or non-disposed wastes at facility level; off-site removal of mixed waste classes into municipal dumpsites where scavengers work professionally, individually and in communities.

These unaccounted for environmental costs enhance a range of public health risks, and to date have not been identified in USAID/Kenya program evaluations. Finally, the risks to thousands of health care workers due to sub-optimal access and/or use of protective gear (PPE), when coupled with inefficient segregation practices and lack of reliable supply chains for fundamental HCWM input (liners, bins, sharp boxes), cannot be underestimated.

One factor playing into the current situation is the apparent mistaken perception that HCWM training and capacity building can *primarily* address Reg. 216 compliance requirements. On the contrary, the AT determined that investments in training to date have *not* led to compliance under 22 CFR 216. Plant and supply chain deficiencies simply cannot be redressed through training, however well-intentioned and



extensive. To achieve Reg. 216 compliance a host of investments in plant and supplies must accompany capacity building. It is for this reason that the team concludes that the IEE process for HCWM should be reviewed to revise a framework where capacity building and training have become the principal inputs to achieve Reg. 216 compliance.

While it is impossible to predict with any certainty what the implications of failed compliance represent for USAID/Kenya, it is clear that U.S. federal authorities with oversight responsibility of USAID programs could determine that failure to achieve compliance will lead to mandatory requirements in the form of programming additions to deal with enhanced HCWM requirements or potential programming reductions. Yet it is difficult to envision any middle course where every facet of HCWM is not tackled in a systematic manner. At present HCWM suffers from the absence of line item budget support in USG and GoK-supported programs and facilities. In the absence of designated funding, it is impossible to foresee how compliance can be achieved in USAID/Kenya supported (or any other) healthcare facilities. More importantly, ensuring compliance will *certainly* require a new level of engagement by USAID/Kenya and its IPs, and GOK partners (MOPHS, MMS and NEMA). However, given that a framework for moving towards a viable a HCWM system does exist, this is a very achievable task *if* the political will and requisite resources are mobilized.

## **ASSESSMENT RECOMMENDATIONS**

The AT's principal recommendations for mitigating USAID/Kenya's HCWM shortcomings are based on a three pronged strategy that we refer to as "the three court test"; compliance with relevant law (court of law), compliance with development best practice (court of development practice), and compliance with socially accepted norms or values (court of public opinion). The test is fundamental to defining USAID/Kenya's HCWM "manageable interests" (MI) and "boundaries of responsibility" (BoR). MIs in HCWM are those involving activities which USAID has a vested interest in improving to achieve positive, Reg. 216-compliant outcomes. USAID/Kenya's BoR in HCWM must be established so as to include only those areas, and mitigation measures, where USAID/Kenya can and must involve itself to be compliant with "the three court test". The approach to defining the MI and setting the BoR is provided in the discussion of the Mitigation Plan below and in Appendices B, H and I. Overall, the AT recommends that USAID Kenya's HCWM programming strive to achieve a credible balance among the "three courts," as this will enhance USAID/Kenya's potential for passing any future RIG audits and enable USAID to promote development best practice. The Assessment Team also believes that this approach will provide the impetus to move from the current HCWM framework to a HCWM system.

**Key Recommendations** include the following:

1. USAID/Kenya must prioritize HCWM as a systems issue demanding consistent monitoring and mutual accountability among its IPs and key GOK partner agencies (MOPHS, MMS and NEMA), and implement and adaptively manage a revised HCWM strategy and MRV plan.
2. USAID/Kenya, with support from USAID/Washington, must systematically and comprehensively review all aspects of healthcare waste management practice associated with USAID supported healthcare programs. A new strategy for HCWM is needed, embodying a dedicated effort to create a new systemic approach to HCWM.
3. USAID/Kenya should consider establishing a clear BoR for supporting HCWM that is not only based on legal reasoning, but also reflects developmental and moral considerations ("the three court test"). Sufficient budgetary resources, consistent with WHO HCWM core principles, are needed to implement HCWM activities accordingly. Being responsive to "the three court test" is within

USAID/Kenya's MI, as the latter refers to choices the Mission can make based on its perceptions of costs, benefits and risks posed by compliance or noncompliance with Reg. 216.

4. The first boundary of the BoR should take into consideration both direct and indirect impacts. Indirect impacts of USAID/Kenya actions are those that enable other impacts (per NEPA 40 CFR 1508).<sup>2</sup> These can be considered as cumulative impacts, which are covered under NEPA 40 CFR 1508 as well. They include the operation of incinerators and the generation of waste. Since these indirect impacts are associated with USAID/Kenya activities, they must also be mitigated. Further, USAID/Kenya must comply with host country laws and therefore has an obligation to meet NEMA requirements in EMCA (1999) (see Appendix J).
5. Closely related, USAID/Kenya must objectively assess the costs and benefits of different options for mitigation of toxic emissions due to incomplete combustion of hazardous wastes in facilities where USAID has already funded incinerator infrastructure and training in incineration, but where incinerators are either dysfunctional or not fully operational. This falls within the BoR under Reg. 216, as it clearly reflects on NEMA's EMCA (see Appendix J).
6. As a short-term objective, USAID/Kenya should specifically assess what its BoR is for meeting Reg. 216 wastewater removal compliance, particularly from facilities where it directly supports any laboratory operations through OPH programs. This falls within the BoR under Reg. 216, as it clearly reflects on NEMA's EMCA (see Appendix J).
7. A compliance unit within USAID/Kenya comprising OPH and MEO appointees, should be established to ensure that all USAID funded programs and IPs dealing with HCW are monitoring and adhering to Reg. 216 requirements, as well as coordinating with all key stakeholders including the GOK health facilities, NEMA, MOPHS, and municipal level authorities.
8. Monitoring and evaluation of HCWM must be elevated to priority status not only for USAID's IPs, but for USAID/Kenya OPH and Environment Officers. Here, technical support and oversight from USAID/EA and USAID/W will be essential in moving compliance forward.
9. USAID/Washington (including the Africa Bureau and E3) should (a) determine if the current HCWM compliance situation in Kenya is in fact replicated elsewhere in Africa, as anecdotal information and inference suggests; (b) review the adequacy of current best practice in drafting program and project IEEs and EMMPs<sup>3</sup> under the EIA process to avoid future situations where paperwork for Reg. 216 compliance appears in order, while on the ground realities differ significantly; (c) determine where, if anywhere, in the broader USAID global healthcare program, there is consistency between best practice to achieve Reg. 216 compliance and budgetary allocation enabling procurement of requisite supplies essential to HCWM compliance, infrastructure and training needed for HCWM Reg. 216 compliance, and empirically validated environmental compliance in HCWM based on verifiable indicators. If available, this can serve as a model for HCWM for USAID across its country programs.

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<sup>2</sup> The terminology of this part is uniform throughout the Federal Government. NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

<sup>3</sup> Appendix H presents a table for first steps in strengthening the EMMP process.

# INTRODUCTION

Health care waste (HCW) typically derives from two sources in developing countries: long term healthcare services or emergency relief donations that are leftover from international donor response to either a humanitarian crisis or a natural disaster. This Assessment is concerned exclusively with the first category of HCW, as it pertains to ongoing USAID/Kenya health care program compliance. These programs are held to environmental standards prevailing under various U.S. federal regulations, as well as host country regulations in Kenya. These regulations will be discussed throughout this report as applicable.

Healthcare services in general aim to reduce health problems and to prevent potential health risks for patients, the broader public, and workers within the system. In providing services, waste is inevitably generated. This waste can be potentially harmful to public health and the environment. In countries where health concerns often compete over very limited resources, as is true in Kenya, the management of HCW is subject to regulations that fall under national regulatory agencies such as the Ministry of Public Health Services (MOPHS), Ministry of Medical Services (MMS) and the National Environmental Management Agency (NEMA). Where donors provide resources into the HC system, as is the case with USAID in Kenya, U.S. Federal Regulations apply to how USAID manages its responsibilities in HCWM, most notably, under what is known as Title 22, Code of Federal Regulations, Part 216 (hereafter “Reg. 216”).<sup>4</sup>

## REG. 216

Reg. 216 was initially developed in 1975 subsequent to settlement of a lawsuit brought against USAID that same year. The Procedures are Federal Regulations and therefore, it is considered “imperative” that they be complied with in the development of Agency programs. As the recent Regional Inspector General Audit notes:

The Code of Federal Regulations (22 CFR 216) assigns USAID responsibility for assessing the foreseeable environmental impacts of the Agency’s actions, requires that environmental safeguards be incorporated into program planning and design, and directs that programs be continually monitored and modified when necessary to mitigate environmental impact. The CFR states that it is USAID policy to assist host countries with strengthening their capability to evaluate potential environmental effects of proposed projects, and to develop effective environmental programs. USAID’s Automated Directives System (ADS) 204, “Environmental Procedures,” provides policy directives and required procedures on how to apply 22 CFR 216. If properly implemented throughout the project cycle, 22 CFR 216 will result in the promotion of environmental policies consistent with USAID’s development mandate and environmentally sound activities.

In the latest version of Reg. 216, some additional interpretations and definitions were drawn from Executive Order No. 12114 of January 1979, on the application of the National Environmental Policy Act (NEPA) to extraterritorial situations. Some elements of the revised regulations on NEPA issued by the President’s Council on Environmental Quality have also been adopted and apply. Examples of these are: The definition of significant impact, the concept of scoping of issues to be examined in a formal analysis, and the elimination of certain USAID activities from the requirement for environmental review. These all factor into analysis and recommendations in the current HCWM Assessment.

In addition, Reg. 216 procedures are to address the following: 1) provide advance notice that certain types of projects will automatically require detailed environmental analysis such as Initial Environmental Examinations (IEEs), Environmental Monitoring and Mitigation Plans (EMMPs), or full blown Environmental Impact Assessments (EIAs) where warranted, thereby enabling early planning for detailed planning; 2) permit the use

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<sup>4</sup> See [http://transition.usaid.gov/our\\_work/environment/compliance/reg216.pdf](http://transition.usaid.gov/our_work/environment/compliance/reg216.pdf).

of specially prepared project design considerations or guidance to be substituted for environmental analysis in selected situations; 3) advocate the use of indigenous specialists to examine pre-defined issues during the project design stage; 4) clarify the role of the Bureau's Environmental Officer in the review and approval process, and 5) permit in certain circumstances, projects to go forward prior to completion of environmental analysis.

Areas of particular concern in HCWM practice and application of Reg. 216 involve how waste incineration and wastewater removal are treated, as both have broader impacts beyond the level of individual facilities. For example, the consequences of failing to burn hazardous waste at a high enough temperature can lead to the release of dioxins which are known to create serious adverse health effects.<sup>5</sup> When an organic substance is incinerated in the presence of chlorinated compounds, dioxins are generated unintentionally due to incomplete combustion, whatever the incinerated substance may be.

As dioxins are said by some to be "the deadliest poison of all", avoiding the release of dioxins in any context is crucial, no less so than in the health care sector. In the case of wastewaters, which in the HCWM context may include the release of untreated pathogens, carcinogens such as X ray unit fixer or laboratory reagents, or even radioactive materials from any unused X Ray units that may escape into municipal sewerage systems, the manner in which HCW is managed has environmental implications that extend beyond the facility that generates the waste. These may be, in turn, subject to meeting compliance requirements under Reg. 216 where potential positive determination of environmental impacts is suspected.

Compliance with Reg. 216 is mandatory. <sup>6</sup> While the Code does not specify the legal implications of noncompliance, and public domain data on noncompliance precedents is unavailable, injunctions to USAID programming at the Mission level are possible through Congressional intervention. Congress could potentially put a hold on the required Congressional Notifications to either enable, or disable, USAID programming in a given country mission context. Congress could also require that monies otherwise spent on development programming be mandated for compliance purposes. Just as important, reputational costs may prove more worrisome than legal costs to USAID. Disgruntled stakeholders could use HCWM issues to erode public confidence in USAID's abilities to deliver reliable development services without generating unintentional externalities. This could impact on a specific USAID Mission, or could impact on the Agency more broadly.

While guidance in best practice for HCWM has been available for many years now, establishing clear "boundaries of responsibility" (BoR) for different stakeholders in the HC system in given countries often proves challenging. Establishing the BoR for USAID responsibilities in Kenya has to date proven particularly challenging. This has led to questions as to whether a "gap" between best practice that is sought in HCWM, and practice on the ground when objectively measured.

This Assessment is meant to help USAID/Kenya better understand the current state of affairs overall in HCWM in Kenya, along with its BoR in HCWM given the nature of its programming, its obligations under Reg. 216., and other considerations such as development best practice and even public opinion fueled by moral considerations. The principal objective in the Assessment has been to provide an empirical basis for what prevails in HCWM in Kenya. The Assessment identifies where, if anywhere, there are apparent shortcomings, and recommend practical solutions to help USAID and its Implementing Partners (IPs) move forward to achieve greater compliance as required.

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<sup>5</sup> See <http://www.who.int/mediacentre/factsheets/fs281/en/index.html> which states: "In the last few years there has been growing controversy over the incineration of health-care waste. Under some circumstances, including when wastes are incinerated at low temperatures or when plastics that contain polyvinyl chloride (PVC) are incinerated, dioxins and furans and other toxic air pollutants may be produced as emissions and/or in bottom or fly ash (ash that is carried by air and exhaust gases up the incinerator stack). Exposure to dioxins, furans and co-planar PCBs may lead to adverse health effects."

<sup>6</sup> See the very useful power point produced by USAID at: [http://transition.usaid.gov/our\\_work/environment/compliance/anc/workshops/Afgh\\_Pak\\_2009/7\\_Reg216\\_Afg-Pkstm\\_8Apr09.pdf](http://transition.usaid.gov/our_work/environment/compliance/anc/workshops/Afgh_Pak_2009/7_Reg216_Afg-Pkstm_8Apr09.pdf).

# SURVEY METHODOLOGY AND DATA ANALYSIS

## SAMPLING DESIGN

The methodology employed in the HCWM Assessment was based on (a) basic analysis of what it would take to *credibly* answer whether a given HCF was, or was not, in environmental compliance with Reg. 216 and GOK compliance regulations (b) what it would take to extrapolate compliance with confidence from a sample of facilities to the total population of 1,600 USAID supported facilities in Kenya (c) what the HCWM team could maximally accomplish given human and logistical resources available, and within the time frame allotted for mobilization and survey tool preparation, data collection, analysis and report writing.

After consultations with USAID, the Assessment Team (AT) deployed a hybrid sampling strategy involving both targeted sampling at smaller health care facilities across Kenya (Levels 2-4)<sup>7</sup>, and comprehensive sampling of larger health care facilities (Levels 5 and 6) found in provincial capitals and in Nairobi. Purposive sampling was then conducted by balancing available survey time and human resources, within the context of the broader deliverables schedule available to the Assessment Team. The result was a survey design of 111 facilities representing 70% USAID facilities, 15% DOD facilities and 15% CDC facilities:

Total Facilities Sampled, by Level	
Level	Number of facilities
Level 2	21
Level 3	35
Level 4	46
Level 5	8
Level 6	1
<b>Total</b>	<b>111</b>

The Assessment conducted in 111 HCFs across Kenya in: Nairobi, Eastern, Western, Rift valley, Coast and Central. It should be noted that Kenyatta Hospital (Level 6) was also visited by not included in the dataset due to its unique nature.

## HCWM ASSESSMENT TOOLS

The AT deployed a quantitative survey tool (see Appendix D) comprised of a two-pronged approach including a simple framework based on a hypothesis that could be used as a springboard for discussions with senior level staff in healthcare facilities and other healthcare system officials at the provincial or national level. The working hypothesis was that the distribution of budgeted monies to HCWM in Levels 2-6 is insufficient to address HCWM needs in Kenya. The second prong was a checklist of additional specific issues to be discussed with the stakeholders. Finally, the ENCAP Visual Field Guide was also referenced at field sites by surveyors (see <http://www.encapafrika.org/sectors/medwaste.htm>).

Additionally, the AT designed and administered the HCWM Assessment tool generate highly detailed information at each site so that the HCWM system at a given facility level could be assessed and to enable the AT to speak fairly to the HCWM “system” at that site. The HCWM Assessment tool used was designed to highlight observable variables, registering simple ‘ticks’ of yes/no observables for each variable.

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<sup>7</sup> A degree of ambiguity pertained in identifying and disaggregating Level 1 from Level 2 sites. In the end, the Assessment focused on Level 2 sites as currently classed in Kenya.

The survey tool employed utilized 175 variables considering fifteen (15) units in each a facility (the 15<sup>th</sup> unit, the mortuary, was belatedly added with one variable, “oversubscription” (excess bodies) measured as a variable). For facilities that did not actually have all the units, only those applicable variables were actually measured. On average, full implementation took between 1-3 hours to complete depending on the size and complexity of the HCF. For level 5-6 hospital s, an average of 6 hours to one full day (Level 6) was needed.

To determine compliance, the AT identified five "deal breakers" – incineration (of waste), waste water (treatment and/or disposal), segregation (of waste), sharps (disposal), worker protective gear (PPE) – that a given facility must adhere to in order to be in full compliance (e.g. all five criteria had to be met).<sup>8</sup> Beyond the “deal breakers”, data was collected more broadly across 15 units in each health care facility visited. Two additional unit-specific variables were identified to determine compliance within each unit.

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<sup>8</sup> It terms of coding compliance on the questionnaire, the five criteria were represented as follows: Segregation was represented by question 1.23 in which a yes indicated compliance, no indicated noncompliance and n/a indicated that the facility did not have an in-patient ward. Sharps was indicated by question 2.34 in which a yes indicated noncompliance, no indicated compliance and n/a indicated that the facility did not have a VCT unit. Waste water was represented by question 4.22 in which a yes indicated noncompliance, no indicated compliance and n/a indicated that the facility did not have a laboratory. PPE compliance was represented by question 8.40 in which a yes indicated compliance, no indicated noncompliance and n/a indicated that the facility did not have an incinerator was not available and therefore the HCW handler could not be provided with a respirator. Incinerator compliance was represented by question 11.16 in which a yes indicated compliance, and both no and n/a indicated noncompliance because all the facilities had no evidence of outsourcing their incineration activities and therefore a n/a was an indicator of serious noncompliance.

# PRINCIPAL FINDINGS

## QUANTITATIVE FINDINGS

### TOTAL COMPLIANCE ACCORDING TO 5 DEAL BREAKERS

The report provides findings, analysis and recommendations from an Assessment of health care waste management (HCWM). The data presented in Table 1 below is for “deal breakers” across all 111 facilities sampled during the survey, and the data in Table 2 presents the distribution of varying levels of compliance across facilities:

**Table 1: The “Deal Breaker” Variables**

Percentage of Facilities Compliant By Deal Breaker (out of 111)				
Segregation	Sharps	Waste Water	Respirators (PPE)	Incineration
59.5%	96.3%	19.2%	29.0%	7.2%

**Table 2: The Distribution of Compliance Percentages**

Number and Percentage of Facility TOTAL Compliance (x out of 5)*		
% of Compliance	Number of Facilities	Percentage of Total Facilities
0% compliance	2	1.8%
20-25%	33	29.7%
33-40%	35	31.5%
50-60%	36	32.4%
80%	5	4.5%
100%	0	0.0%
*Note: Not all five deal breakers were applied to all 111 facilities, and there were 51 instances in which a given deal breaker was not applicable.		

As can be seen, there was not a single facility that exhibited a systematic, integrated approach to HCWM. In general, the overwhelming majority of facilities hovered around the 20%-60% level of compliance, which nonetheless translates into a noncompliance based upon the AT’s interpretation of Reg. 216. As such, the AT quickly concluded that HCWM systems in fact do not exist but rather, facilities are characterized by differing degrees of HCWM *frameworks*. HCWM frameworks employ the components of what normally are

considered in systems, only they do not function as viable subsystems at a facility level, and are not at all vertically well integrated into larger systems of mutual accountability.

The one deal breaker with 96.3% compliance– presence of sharps in the black bin – does suggest that there is a comparatively reasonable job being done with upstream management of sharps at the ward level, where much of the training of HC workers responsible for the initial stages of HCWM occurs. That said, even low levels of noncompliance are serious matters as needles found in general waste present *extremely* serious risks for the numerous HC workers that may come in contact with the needles – i.e. those working in the wards, transport handlers, and incinerator operators who more often than not are poorly equipped with industrial gloves. Additionally, our observations of sharps in general waste was based solely on opening the lid of a bin (either with foot pedal or via hand lifting for the many bins without pedals that were examined) and observing the top layer of waste only. Digging deeper would have increased the risk that the AT themselves might be punctured. The noncompliance levels for sharps in general waste is therefore likely to be higher than what the AT actually captured.

The two variables with the most impact on public health from the perspective of surrounding communities and the broader public – incineration and waste water treatment – are abysmally low at 7.2% and 19.2%, respectively. These two areas have the highest potential to become explosive issues if, say, a media outlet decided connect them to, say, increasing cancer rates. Indeed, the AT found that numerous health care professionals were beginning to question whether a potential correlation, as yet unverified, could exist between poor incineration and inadequate wastewater disposal practices and other public health woes.

#### Compliance within Facilities across 15 Units

The principal findings for each of the 15 units assessed across 111 facilities are presented in Table 3 below. They are based upon the key indicators for compliance (or conversely, noncompliance) for assessing HCWM in Kenya. They do *not* present the full range of variables collected, but do cover each of the principal 15 “units.”

**Table 3: Noncompliance rate for agreed prioritized variables for every unit of the facility**

NO	UNIT	VARIABLE	% NONCOMPLIANCE
1	MORGUE	Oversubscription of the morgue	59.0
2	VCT	Presence of Sharps in the black box	31.6
		Labeling of bins as highly infectious	92.7
3	LAB	Mixing of waste water with other water before disposal into common drain	80.6
		Provision of bio-safety hood	57.7
4	LABOUR WARD	Pretreatment of waste water	97.0
		Tilting of floor towards sluice room	68.0
5	IN-PATIENT WARD	Presence of three segregation bins	39.1



		Presence of sharps in the black bin	5.5
6	INCINERATOR	Presence of temperature gauge	93.7
		Presence of incinerator log	92.6
7	X-RAY	Presence of brown bag 80.6%	80.6
		Labeling of radioactive wastes	81.5
8	PHARMACY	Presence of expired drugs	29.0
		Presence of storage store? for expired drugs	76.4
9	STORES/Procurement	Presence of LPOs	52.3
		Reported adequate budget	90.1
10	OPD/Treatment	Three segregation bins provided	67.7
		Segregation posters provided	78.8
		Standard operating procedures present	79.1
11	HCW STORAGE AREA	Presence of lockable door	91.3
		Labeling of storage area	97.3
12	HCW TRANSPORT	Transport trolley available	92.7
		Mixing of different types of waste	28.0
13	HW HANDLER	Presence of respirator for HCW handler	72.1
		Presence of industrial gloves for HCW handler	37.8
14	THEATRE	Presence of sluice room	29.79
		Use of disinfectant after every spill	22.9
15	MCH	Presence of three segregation bins	59.8
		Adequate supply of safety boxes	9.0

There was surprising consistency for high levels of noncompliance in the survey data regardless of the key variables considered, and across all different size facilities. Moreover, statistical analyses of the means across different regions and provinces, different levels of facilities and different donors were all “insignificant” in that differences could be attributed to selection error (See Appendix F).

## QUALITATIVE FINDINGS

Qualitative discussions held across the 111 facilities the HCWM Assessment team visited were used to complement the quantitative data collected, and highlighted challenges and deficiencies that HC workers and

those tasked with HCWM perceived to be most constraining. Overall, the qualitative data collected simply reinforced the quantitative findings, reinforcing the sense that the HCWM system was not functioning in respect to processes, accountability, and efficacy of key components in HCWM.

Qualitative findings revealed:

- (a) *Incineration failure.* With more than 93% noncompliance at the level of the incinerator unit across facilities, the treatment of HCW is actually *more dangerous* than not treating at all. This is because dioxins and furans are released from incomplete combustion processes that characterize low temperature burning of hazardous wastes that are known to contain carcinogenic materials such as various plastics. Thus, persistent organic pollutants (PoPs), acidic and corrosive fumes are released which are inhaled by adjacent populations to HCFs, who themselves are unaware of the ill respiratory effects of the smoke plumes. Additionally, the release of pathogens from incomplete combustion poses other public health risks. See Appendix K for photographs of poor incineration processes evidenced.
- (b) *Incinerators management issues.* Incinerator management, which *should be* at the pinnacle of a HCWM program in any given facility, is treated cavalierly. Incinerators are manned by casual laborers (often not well educated), even though operating the incinerators properly, keeping records on temperature levels attained, weighing and recording the waste by segregated category (extremely hazardous, hazardous, or general) is fundamental to being able to speak coherently about HCWM in a given facility. This is an important job that requires dedicated effort of a well trained professional, and the assumption that this activity pivotal to public health is manageable through casual labor is worthy of correction.
- (c) *Lack of segregation.* Segregation represents the essential first step in HCWM. With poor segregation, HCWM is particularly brought to naught by highly inefficient waste transport (use of wheelbarrows) which the survey found deficient more than 87% of the time. This leads to mixing of already poorly segregated waste. Exacerbating the segregation problem further is the repeated lack of appropriate storage areas for waste.
- (d) *Equal opportunity in noncompliance.* Teaching facilities, model sites, and some units within facilities arguably exhibit a degree of greater compliance for some key indicators relative to the least compliant, but are also themselves noncompliant. Level 3 and 4 facilities perhaps worse off, though many level 5's are severely noncompliant in all aspects of HCWM.
- (e) *X Ray Units.* Pervasive noncompliance in X ray unit waste management was observed in all level facilities. X ray film/image processing baths are inappropriately handled (no use of brown disposal bags) and the wastes that emanate from the X ray units are simply flushed down the drain. Most of the chemicals in the x ray unit are known toxic agents which are labeled 'marine pollutants' by the manufacturers. "Fixer" meanwhile is a known carcinogen.
- (f) *Budgetary constraints.* 100% of the facilities reported having an inadequate budget for HCWM. This therefore makes it difficult for them to comply with the high environmental standards as required by the GoK or the IG of the US. All facilities relied on government-approved FIF funds, which in all cases were considered highly insufficient to meet the extent of HCWM needs in facilities.

- (g) *Waste handlers protective gear (PPE)*. Waste handlers are largely underequipped across all levels of facilities and lack appropriate gear for waste handling. Lack of respirators and appropriate gloves in 71% & 58% of them is quite alarming. This means they are not adequately protected against TB, needle stick accidents or even other aerosols from the waste unit. Their personal safety is further compromised by non-working incinerators which are an additional occupational hazard.
- (h) *Cultural irrelevance*. The AT found that the culture within HCFs tends to value doctors and high prestige activities like vaccination or HIV/AIDS programs, along with the Theater units, but clearly undervalues HCWM in all respects. While it is not surprising that waste management is a secondary priority in hospitals, it nonetheless is an important function to the core business of any facility. HCWM is currently a low status occupation in Kenyan HC facilities. Again, with no line item budget for HCWM, with HCWM at best treated (inappropriately) as a subset of infectious disease control through Infection Control committees (ICCS), HCWM is *de facto* treated as the poor cousin to higher priority “family members” – i.e. theater operations, vaccination programs, HIV programs, etc.
- (i) *Poor coordination and absence of clear authority*. While the MOPHS is technically responsible for HCWM in all facilities, in levels 4-6 any budgetary outlays for the components of HCWM function come through the MMS. So too, for incinerator siting and certification, NEMA is the responsible agency. This leads to a degree of marginalization of MOPHS staff within MMS run facilities. In both cases, the inability of NEMA to oversee compliance for incinerator siting is a striking deficiency in environmental compliance, as is NEMA oversight (or mitigation planning) for wastewater disposal into municipal drainage systems, or for the disposal of hazardous medical wastes into municipal dump sites as happens in many level 5 and 6 facilities in their respective municipal dump sites.<sup>9</sup>
- (j) *Lack of HCWM budgets*. The explanation for consistency in the data across all USAID-supported facilities is best explained by the fact that HCWM does not benefit from a dedicated line item budget from GOK, USAID, USAID IPs, or other donors. This relegates HCWM to non-priority status, with the added disadvantage that M&E of HCWM has not been anyone’s priority up to now.
- (k) *Lack of Fuel*. The CA team found several facilities which faced fuel shortages to operating incinerators. Challenges were related to (a) securing funding for fuel purchases enabling regular (daily in cases) operations of new incinerators (b) identifying a sustainability plan for fuel procurement that is “fail safe.”

## COMPLIANCE WITH THE GOK NATIONAL HCWM PLAN

As with Reg. 216, there are a noticeable disconnects between HCWM practices and results on the ground with GOK laws, regulations, policies and guidelines to regulate HCWM. Although policies and regulations appear adequate, putting them into practice to achieve verifiable results and positive impacts remains a challenge. Reasons for the disconnect include:

1. A mismatch between HCWM resource allocation and the actual scope of HCWM needs at the facility level.
2. Despite the prevailing “polluter pays principle” whereby HCFs are responsible for safe management of waste in Kenya, HCFs do not have the means to achieve this under current budgetary allocations through a combination of Ministry funds and FIF funds. The latter must be approved by MOPHS or

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<sup>9</sup> While this was only seen by the HCWM team to be the case at Coast Provincial General Hospital in Mombasa, indications are that this phenomenon exists in other major hospitals in Kenya.

MMS, depending on the facility level. Reliance on donor contributions to “top off”, were seen to be lacking.

3. A sociocultural dimension appears to prevail in which HCWM is not perceived as a priority activity in the health care system compared to other higher status concerns in medical facilities.
4. There is a lack of clear enforcement procedures and systematic evaluation of the efficacy of policies made from upper level public administration in the GoK to the level 3 facilities.
5. There is a lack of regulatory clarity between the two government agencies-NEMA & MOPHS as to who is responsible for HCWM, particularly from a budgetary and oversight perspective, in HCFs.
6. The question of whether those implementing HCWM can also successfully self-regulate remains reasonable to pose.
7. While policies on paper appear sound, lack of a clear implementation plan of the policies and regulations already developed remains. For example, the *National Guidelines for Safe Management of Health Care Waste* (2011) by the Ministry of Medical Services and MOPHS is an impressive document that is in large measure consistent with best practice available through ENCAP, WHO and other sources on HCWM. Despite the document, the empirical reality of HCWM practice on the ground notes in the Assessment illustrates the gap between theory and practice.
8. Identifying who is best placed to take the lead role to implement HCWM at facility levels remains a challenge, despite the fact that delineation of authority is clear at Levels 4-6 (MMS) and Levels 1-3 (MOPHS). Even though MMS is responsible at Levels 4-6, MOPHS staff actually implements HCWM at these facility levels. Similarly, the key role NEMA plays in overseeing incinerator siting and function remains more aspirational than effective, based on the poor datum for incineration performance. The same is true for NEMA’s oversight of wastewater disposal at the interface with municipal sewerage infrastructure.

# FRAMEWORK FOR A MITIGATION PLAN

The data that underpins the Assessment, its analysis, recommendations and the proposed framework for a mitigation plan is summarized in tabular and graphic form in Appendices E and F. The following section includes initial recommendations for building an appropriate mitigation plan (MP) to move towards HCWM compliance with Reg. 216. It is imperative to point out that the successful implementation plan cannot be finalized by an external consultant team or USAID/Washington if the plan is to accurately reflect USAID/Kenya's interpretation of "The Three Courts" in establishing its MI and BoRs for 22 CFR 216 and its bearing on setting USAID/Kenya's boundary of responsibility (BoR) and "manageable interests" (MI) in HCWM.

22 CFR 216.1b2 states that it is USAID policy to assist developing countries to strengthen their capabilities to appreciate and effectively evaluate the potential environmental effect of proposed development strategies and projects and to select, implement, and manage effective environmental programs. The basis for operationalizing this guidance begins with clarity as to what USAID's "manageable interests" are, along with the Agency's specific "boundaries of responsibility" which are a function of manageable interests.

Both "manageable interests" (MI) and "boundary of responsibility" (BoR) are constructs that involve subjective and objective considerations. Formulae do not exist for arriving at either, save for the allocation of required time and the involvement of key stakeholders in the decision making process. Astute judgment is key to arriving at both. Appendix I provides the steps the AT proposes for arriving at the MI and the BoR.

At its most basic, MI poses two fundamental questions concerning HCWM in Kenya that must first be answered to enable boundary setting:

- 1. What can USAID/Kenya manage to do given available human and financial resources, and in consideration of Reg. 216 requirements?*
- 2. What can USAID afford to risk and conversely, not afford to risk, in its approach to HCWM in Kenya?*

Once internal consensus is reached on the answer to these questions, USAID's BoR can be set based on its perception of its MI in light of the risks for future audit findings of noncompliance, and potential rewards from compliance.

The BoRs must answer to "The Three Court Test" comprising the court of law, the court of development best practice, and the court of public opinion. For USAID/Kenya to be compliant with the capacity building implications of Reg. 216, USAID/Kenya will have to be responsive to what it is doing to enable the GOK to be fully compliant with its own regulations. The regulations pertaining to NEMA, MMS and MOPHS authorities are impressively rigorous on paper in all aspects of HCWM, for which the GOK deserves recognition. All these will factor into HCWM BoR setting for USAID/Kenya.

The first boundary must be set with direct and indirect impacts considered. Indirect impacts of USAID/Kenya's actions are those that enable other impacts (per 40 CFR 1508). Those include the operation of incinerators and the generation of waste. Since these indirect impacts are associated with USAID supported activity, they must be mitigated. Further, as noted, USAID must comply with host country laws and regulations and therefore has an obligation to meet the NEMA requirements under Reg. 216.

The second boundary is defined according to the requirements under Reg. 216 for capacity building. If through the Court of Development Best Practice we learn of systematic noncompliance with best practice as established by USAID/ENCAP, WHO, GOK/MMS, GOK/MOPHS, and GOK/NEMA, poor development practices and issues associated with USAID *could* be interpreted as detrimental to the broader public in countries where USAID operates. The possibility for this was repeatedly noted in this Assessment. This in turn will undermine the USAID/Kenya mission in that health and disease prevention are undermined by the public health threat of unmanaged health care waste. Therefore, USAID/Kenya is compelled to take capacity building action. The MP must therefore factor this into account.

Further, the third boundary of public opinion also could prove detrimental in the execution of USAID/Kenya, and overall Agency program goals. Should a USAID branded activity be involved in any negative impact from mismanaged medical waste, regardless of USAID's direct or indirect role in the management of that waste, the ability of that program to achieve its goals will be impacted and the Agency runs the risk of damage to its reputation.

While compliance with Reg. 216 and “the court of law” establishes a minimum compliance standard, it is the importance of the “Court of Development Best Practice” and the “Court of Public Opinion” should not be underestimated. Both have potential to impact USAID/Kenya programming. Application of principles from both will mitigate risks USAID/Kenya may face in future RIG audits. Hence, the standard considered in making decisions regarding USAID/Kenya interventions in its MP should be to address the challenges posed by “The Three Courts”, which will lead to compliance with Reg. 216, while mitigating diverse risks that are hard to fully predict.

## **UNDERPINNINGS FOR THE COURT OF DEVELOPMENT BEST PRACTICE**

The standard for the addressing The Court of Development Best Practice is drawn from the World Health Organization's core principles for donor participation in HCWM.<sup>10</sup> The WHO's view of government, donor and private sector stakeholders in HCWM is summarized as follows:

The WHO core principles (developed during the International Health Care Waste meeting hosted by WHO in Geneva on June 20 - 22, 2007) require that all associated with financing and supporting health-care activities should provide for the costs of managing health-care waste. This is the duty of care. Manufacturers also share a responsibility to take waste management into account in the development and sale of their products and services. The establishment and sustained maintenance of sound systems for health-care waste management depend on the availability of resources. Therefore, in keeping with the WHO's core principles, WHO recommends that:

### **Governments:**

- allocate a budget to cover the costs of establishment and maintenance of sound health-care waste management systems;
- request donors, partners and other sources of external financing to include an adequate contribution towards the management of waste associated with their interventions; and
- implement and monitor sound health-care waste management systems, support capacity building, and ensure worker and community health.

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<sup>10</sup> Available at: [http://www.who.int/water\\_sanitation\\_health/medicalwaste/hcwprinciples/en/index.html](http://www.who.int/water_sanitation_health/medicalwaste/hcwprinciples/en/index.html).

## Donors and partners:

- include a provision in their health program assistance to cover the costs of sound healthcare waste management systems.

The AT recommends that to mitigate for current Reg. 216 noncompliance of “deal breaker” indicators, USAID/Kenya squarely address capacity building which falls under the Court of Development Best Practice.

In addition, the “Court of Public Opinion” represents a “wild card” whose risk to and impact on USAID/Kenya programming is harder to predict. Insofar as USAID/Kenya is in the position to credibly argue that its capacity building program is geared to the range of U.S. Federal Regulations that could *potentially* be invoked by complainants including national or international NGOs, interests groups such as tourism associations or human rights groups, or even community level groups, the wild card risk will likely be mitigated. Given trends with increased politicization of NGOs and community level groups in developing countries, coupled with ever-improving access to IT technology, this particular class of risk should not be underestimated.

Thus, while 22 CFR 216 is clearly the principal area of concern for USAID/Kenya compliance, reference to the BoR should also at least acknowledge how NEPA’s 40 CFR 1508 <sup>11</sup> and EO12114 come into play. Doing so will successfully reduce risk from both the court of development best practice and the court of public opinion. Appendix I provides steps for proceeding with defining USAID/Kenya’s MI and its BoR.

## MITIGATION PLANNING: KEY STEPS

The following lays out key steps in the short-, medium- and long-term that USAID/Kenya may consider when developing its MP. The action steps and timeline is presented in Appendix B. It covers what is needed to “kick off” the shift from the current HCWM framework towards a HCWM system. These will be reiterated in the Recommendation section which covers the *comprehensive* set of issues and options that USAID/Kenya may address in order to achieve compliance with Reg. 216.

### Short-term

1. **Establish consensus within USAID/Kenya** on whether the proposed “Three Court” strategy is acceptable, whether each “Court” should be equally balanced in framing the mission’s new strategic approach to HCWM, or whether adoption of the strategy is not within the Mission’s perceived manageable interests (MI). **The activity should be facilitated by an external facilitator.**
2. **Work iteratively to establish the BoRs for HCWM along with the MIs** as a facilitated activity to be accomplished in the next three months with the MEO, OPH and Mission Counsel jointly taking the lead and with the eventual consensus of USAID/Kenya Mission Director and other program staff as appropriate.
3. **Apply the HCWM Assessment survey tool to all current USAID IPs working in the healthcare sector.** Request that they provide a plan for full implementation of the Assessment tool in all facilities they currently work in over the next six months, and begin implementation. They should allocate one – one and a half hours for level 2 or 3 facilities, two to two and a half hours for level 4 facilities, four hours for a level 5 facility (with the exception of Northeastern Province these

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<sup>11</sup> While NEPA only applies as it is written for activities on US property (US states, territories etc), this does not mean that at some point in the future, other stakeholders may wish to invoke its applicability more broadly in international contexts. If so, this represents a possible risk to USAID that the Mission should at least consider in establishing its BoR and a strategy for HCWM.

have all been assessed), and as applicable, one full day for level 6 facilities (which Already have been assessed). **The MEO should take the lead in this activity.**

4. **Begin coordination with partner GOK agencies** – MOPHS, MMS and NEMA – to arrive at a plan for improved transparency in HCWM activities, joint planning, and joint oversight. **The Deputy Mission Director of USAID/K should take the lead in this activity.**
5. **Create a joint HCWM panel with GOK and donor partners**, along with USAID and IPs, for joint evaluation of agreed upon indicators that the group establishes to monitor the transition from the current HCWM framework to a system. **The OPH and MEO should designate one individual each to represent USAID in this activity.**
6. **Revise the prevailing EMMPs** currently used by USAID/Kenya's IPs in light of the recommendations set forth in this Assessment report so that a progressive move to compliance with Reg. 216 is both credible and verifiable. **The MEO should take the lead in this activity, in consultation with Mission Counsel.**

#### Medium-term

1. **Implement coordinated activities with partner GOK agencies** – MOPHS, MMS and NEMA – to arrive at a plan for improved transparency in HCWM activities, joint planning, joint oversight and improved MRV in HCWM in Kenya. **The lead for this activity can be identified by consensus within USAID/K.**
2. USAID/W and USAID/K jointly assess **how well revised EMMPs are being implemented**, with M&E on indicators for improved compliance noted and reported on to the RIG. **The MEO should take the lead on this activity.**
3. IPs begin implementing revised HCWM EMMPs. **IPs will designate a person to report to USAID/Kenya.**
4. **Indicators for improved HCWM “deal breakers” should be *comprehensively* collected** at all USAID/IP supported facilities through biannual use of the applicable sections of the overall Assessment tool (see Appendix D), and reported back to the USAID BEO as evidence of improved compliance with Reg. 216. **The MEO should lead this activity.**
5. **Identify and adapt as necessary management structures and procedures** to implement the new HCWM MP. **The OPH and MEO should designate one individual each to represent USAID in this activity.**

#### Long-term

1. USAID/W uses the USAID/K experience in improved HCWM compliance as a model to roll out across its Africa and global programs, adapting and implementing the data collection tool to non-Kenyan national circumstances as needed. **USAID/BEO lead.**
2. The GOK, USAID, its IP partners and other donors supporting HCWM collaborate on a joint analysis of the state of HCWM in Kenya, focusing on how well deal breaker issues in particular are being dealt with under the new approach to HCWM. **GOK/MOPHS lead.**
3. **USAID/W and USAID/ K evaluate the adequacy of USAID IEEs and EMMPs and the overall EIA process for HCWM**, along y with IP contracting mechanisms, to assess if and what modifications are needed to further enhance compliance with Reg. 216. **MEO and Counsel lead.**



# RECOMMENDATIONS

The following recommendations are divided into two types: urgent, short-term actions (within six months); and medium-term actions (1-2 year time frame). Longer term actions are identified as part of a strategy to help USAID encourage the transition from the current HCWM “framework” in Kenya to an actual HCWM “system” with interdependent functions, clearly defined roles and responsibilities, and accountable procedures.

## SHORT-TERM ACTIONS

1. The survey tool developed and implemented under this Assessment should be implemented by USAID/Kenya IPs across *all* 1,600 USAID-supported healthcare facilities in Kenya to establish a baseline against which all future HCWM monitoring and assessments can measure progress. This can begin immediately and rolled out progressively over a 6-12 month period.
2. As a corollary to this recommendation, USAID/K should strategize with its principal partners in the healthcare sector – the GOK’s MOPHS and MMS, along with the CDC and DOD - as to how this survey can be scaled up and implemented across all healthcare facilities operating in Kenya within 18 months. This can be credited as a USAID capacity building component under Reg. 216.
3. USAID/W should immediately review the adequacy of current IEE, EMMP, and EIA requirements for HCWM with specific attention to whether IEE and EMMP requirements are (a) falling short of framing what is needed to be compliant under Reg. 216; (b) whether the IEEs and EMMP framework is adequate for HCWM at the facility level, or whether the problem resides with Mission staff interpretation of these Reg. 216 requirements; or (c) whether the problem relates to policy shortcomings related to budget allocation for Reg. 216 compliance (e.g. the importance of Reg. 216 compliance is duly noted, but the financing means to achieve it is not provided).
4. USAID/Kenya should immediately require all IPs to submit revised EMMPs that are realistic and feasible and that lead to progressive compliance with Reg. 216. In the absence of supplementary funding, this likely will require a degree of budget reallocation that may impact the scope of healthcare programming.
5. As a short- and medium-term objective in the Mitigation Plan, USAID/Kenya should objectively assess the costs and benefits of different options for mitigation of toxic emissions due to incomplete combustion of hazardous wastes in facilities where USAID has already funded incinerator infrastructure and training in incineration, but where incinerators are either dysfunctional or not fully operational due. This analysis should consider (a) what it will take to reach 1200°C to achieve full combustion in facilities with new incinerators; (b) what it will take to properly site incinerators that have been cited in breach of reg. 216 and GOK requirements; and (c) an optimal plan to address the thousands of facilities without proper incineration infrastructure that are currently burning unsegregated waste in open, unlined pits in breach of Reg. 216 and GOK requirements.
6. As a short-term objective, USAID/Kenya should specifically assess what its boundary of responsibility BoR is for meeting Reg. 216 wastewater removal compliance, particularly in facilities where it directly supports any laboratory operations through OPH programming. The study should objectively assess the public health effects of disinfectants-calcium hypochlorite, phenol – along with potential untreated lab specimen residues being dumped into municipal sewerage systems from USG

supported facilities. This will serve as the scientific basis for the specific waste water mitigation strategy developed under the Mitigation Plan. As part of the capacity building component under Reg. 216, consideration should be given to ways that USAID/Kenya can directly strengthen NEMA capacities to work with municipalities in MRV related to wastewater disposal into municipal systems, as well as ways to leverage financing to improve municipal water treatment capacity as feasible (this is a function of MI analysis).

7. USAID/Kenya should undertake a strategic assessment of how it can best comply with Reg. 216 under differing GOK collaborative scenarios involving the MOPHS, MMS and NEMA.
8. USAID/Kenya should undertake a strategic assessment of how USAID can best comply with Reg. 216 requirements to develop a logical, feasible and implementable HCWM Policy and Operational Strategy for different levels of facilities that take into consideration IP and healthcare facility capacities.
9. The inability of KEMSA to supply healthcare facilities at all levels in Kenya in a reliable and timely manner negatively impacts segregation and HCWM across the country. It is recommended that USAID determine if the GOK will be willing to engage in a collaborative assessment of the KEMSA supply chain, its impact on noncompliance in HCWM, and mitigation measures for enhanced supply chain performance. This may involve advocacy, bilateral negotiations between USAID and the GOK, or alternative courses of action.
10. With the agreement of the GOK's MOPHS and MMS, conduct a joint assessment of the impact of deficiencies of the KEMSA HCWM supply chain. The objective will be to determine what remedial actions to take regarding segregation practices. This will be credited towards USAID/Kenya's fulfillment of capacity building under Reg. 216.
11. USAID/Kenya should discuss internally within the OPH and Environment Offices how to structure a credible, fair penalty & incentive structure for the diverse components of HCWM *at the IP level* to serve as the basis for development of a feasible and accountable HCWM system among implementing partners.
12. USAID/Kenya should begin to monitor IP performance in HCWM on a systematic basis. As a first step, each IP should progressively implement the HCWM survey (Appendix D) in each of the facilities it is implementing USAID-funded healthcare activities. This will serve as the baseline against which future HCWM monitoring and evaluation activities will be measured and is the first step in developing and implementing a viable HCWM Mitigation Plan. This activity should be written into the revised EMMP governing IP HCWM compliance under Reg. 216.
13. To mitigate USAID/Kenya's level risk for noncompliance with Reg. 216 related to HCWM and its consequences, USAID/Kenya should obtain legal consultation from an independent legal expert with proven experience in Reg. 216 compliance and other relevant Federal regulations (EO 12114 along with CEQ guidance) to (a) assess any potential legal liability due to hazardous medical waste from USAID supported facilities that is dumped into municipal sites and (b) assess the USAID boundary of responsibility logically associated with dumping HCW into municipal landfills from both a legal and developmental perspective. This information will feed into the MI and BoR process.

14. USAID/Kenya should incorporate conditionality requirements for performance-based HCWM M&E in implementing partner grant agreements/contracts, with EMMPs adjusted accordingly.
15. USAID/Kenya should institute a collaborative program for M&E in HCWM with *both* the MOPHS (levels 2-3 facilities) and MMS (levels 4-6 facilities), along with NEMA for the specific task of compliance with GOK regulations in wastewater and incinerator management. USAID should consider making the collaboration and related capacity building a condition for future financial support to the MOPHS and MMS.

## MEDIUM TERM ACTIONS

A number of recommended medium-term actions will contribute to the longer term objective of developing a functional and sustainable HCWM system that includes ‘life cycle’ or “cradle to grave” processes that are implemented, monitored, and adaptively managed. “Medium-term” refers to the startup of the activity within one year, with implementation completed within 24 months. Recommended mid-term activities are highlighted below.

- (1) **M&E.** USAID/Kenya must develop a credible HCWM M&E program at the IP level that monitors IP and healthcare facility compliance with Reg. 216 as applicable.
- (2) **HCWM parity.** The push for stronger M&E in HCWM must accommodate a push for greater parity of HCWM with other higher profile issues or activities such as Malaria, vaccinations, HIV programming, etc., which currently take precedence within the Kenyan healthcare culture. USAID/Kenya should initiate a verifiable policy dialogue, awareness raising, and collaborative programming with the GOK and IPs. This will be credited as part of capacity building under reg. 216.
- (3) **Budgeting.** Once the MI and BORs are clearly established USAID Kenya should undertake to:
  - a. Incorporate HCWM logistical and equipment requirements into program agreements with dedicated budget support secured by reallocating existing funds or additional funding.
  - b. Ensure to the extent possible that HCW transport and logistical requirements are budget line items in the general hospital procurement list.
- (4) **KEMSA supply chain reliability.** It is essential to assess if and how the current unreliable HCWM commodity supply chain through KEMSA can be made reliable.

Short-term actions identified in the preceding section recommend that USAID/Kenya assess its MI and BoR regarding key HCWM commodity procurement.

This activity falls under USAID/Kenya Reg. 216 capacity building responsibilities if not handled directly through a budget line item in the USAID supported facilities. In any case, dedicated budget line items at facility levels are required to satisfy the sustained need for supplies and predictable supply chains essential to HCWM compliance. The following recommendations apply to USAID supported facilities.

- (i) Ensure to the extent possible that GOK obligations for reliable supply of commodities normally procured through KEMSA is satisfactorily met, or facilitate identification of

alternative supply sources, since this is a fundamental constraint to Reg. 216 compliance across all levels of HC facilities currently in Kenya.

- (ii) Ensure facilities obtain *colored bins* and liners consistent with the required color coding based on Kenyan national guidelines for HCWM.
- (iii) Ensure correct labeling of the infectious and highly infectious waste bins (the latter with the international infectious waste symbol) should be used to improve waste segregation.
- (iv) Ensure the procurement of an adequate number of *transport bins and trolleys* across all facilities in order to prevent accidents from carrying waste in bags.
- (v) Ensure that segregation posters and stickers are procured and distributed.
- (vi) Ensure that segregation quality is regularly supervised through random spot checks by both USAID/Kenya staff, IPs, and GOK partner agencies, to improve monitoring of this key, readily measurable component of HCWM.

**(5) Larger facility issues.** The Assessment Team recommends that a HCWM strengthening strategy be developed specifically for the larger hospitals with a particular focus on introducing new management structures at all levels.

**(6) Dedicated staff TORs.** A person should be designated within each facility to assume responsibility for HCWM activities. The terms of reference (TORs) should include, but may not be limited to:

- (i) collaborate with the infectious control team;
- (ii) provide HCWM leadership across all facility units;
- (iii) plan and conduct of regular HCWM trainings;
- (iv) organize and monitor the operation and maintenance of the incinerator;
- (v) monitor and supervise any HCW transport within and outside of the facility;
- (vi) supervise and monitor internal waste management processes;
- (vii) update facility HCWM policies and SOPs;
- (viii) support of contracting, licensing of offsite incinerators;
- (ix) serve as information link and liaison with hospital management;
- (x) provide HCWM improvement strategies;
- (xi) audit and monitor the HCWM system, serving as an accountable link to higher levels of authority within the facility on all key HCWM issues.

**(7) QA&IC.** Each healthcare facility should establish a Committee for Quality Assurance and Infection Control (QA&IC). USAID/Kenya can decide if it wishes to fund these directly or comply with Reg. 216 through its capacity building obligations. The QA&IC will cover:

- (i) Infection Control;
- (ii) Quality Assurance;
- (iii) Healthcare Waste Management;
- (iv) Integration of the three components; and
- (v) MRV to GOK, USAID and other donors as needed.

**(8) Agency collaboration.** USAID/Kenya should initiate collaboration with National Environment Management Authority (NEMA) in enforcement, supervision and monitoring of waste management in hospitals pertaining to all NEMA obligations under GOK Acts.

**(9) Public Private Partnerships (PPP) in HCWM.** This modality should be explored as a potential longer term option for improving HCWM delivery on a more sustainable basis in Kenya. Whether this would work on the basis of the “polluter pays principle” or another option, a first step would be

for USAID/Kenya to support an assessment of options and tradeoffs for PPP in different aspects of HCWM. The assessment could explore the feasibility and potential modality for involving private investors in management of specific HCWM services such as incineration and waste transport.

Social marketing. Social marketing may be used as a tool to improve attitudes and behaviors among healthcare and HCWM workers in Kenya. USAID/Kenya should consider supporting a social marketing approach to 1) raise awareness among healthcare practitioners and the public at large about the risks from waste generated by healthcare facilities at the site and/or found in municipal dumpsites; and (2) shaping attitudes among HCWM workers to safeguard the general public from risks associated with healthcare waste.

## **APPENDIX A. BACKGROUND TO RIG AUDIT & PRESENT ASSESSMENT**

This Assessment was necessitated by the findings in the report from the office of the USAID Regional Inspector General (RIG) in 2010. An audit was conducted by USAID's Office of Inspector General of USAID/Kenya's efforts to mitigate environmental impact in its project portfolio. One of the findings of the audit was that USAID/Kenya "develop a plan with milestones to implement its responsibilities in relation to healthcare waste generated by its HIV/AIDS service providers, including the revision of all relevant program documents and agreements." These were to be based on 22 CFR 216 (Reg. 216).

USAID/Kenya requires all of its implementing partners whose programs may generate potential negative environmental impacts to have complete environmental mitigation and monitoring plans and reports. These plans determine criteria for monitoring the measures' implementation and effectiveness, and lay out who is responsible for mitigation and monitoring, as well as the frequency with which mitigation and monitoring data will be reported to mission staff.

The expectations and requirements for Reg. 216 were summed up in the RIG audit Report:

The Code of Federal Regulations (22 CFR 216) assigns USAID responsibility for assessing the foreseeable environmental impacts of the Agency's actions, requires that environmental safeguards be incorporated into program planning and design, and directs that programs be continually monitored and modified when necessary to mitigate environmental impact. The CFR states that it is USAID policy to assist host countries with strengthening their capability to evaluate potential environmental effects of proposed projects, and to develop effective environmental programs. USAID's Automated Directives System (ADS) 204, "Environmental Procedures," provides policy directives and required procedures on how to apply 22 CFR 216. If properly implemented throughout the project cycle, 22 CFR 216 will result in the promotion of environmental policies consistent with USAID's development mandate and environmentally sound activities.

This mission sought to ascertain the current HCWM practices in USG supported (USAID, DOD and CDC) and GoK funded facilities in Kenya in terms of how consistent actual practices are with Reg. 216. The purpose of the field assessment undertaken from June 19 to July 25 2012 was to:

1. Conduct an assessment of the status of healthcare programs funded by USAID, the Government of Kenya (GOK), and other donors, vis-a-vis compliance with environmental regulations including the Code of Federal Regulations (22 CFR 216), and also considering the GoK's/NEMA Waste Management Regulation 2006, MPHS & MMS National Guidelines on Safe HCWM 2011, the Environment Management Coordination Act of 1999, along with World Health Organization (WHO) health care waste management guidelines, in order to examine their approaches to HCWM and the roles and responsibilities of stakeholders; and
2. Examine information from a Phase One survey so as to provide a set of options to the Mission on how to improve HCWM in Kenya as needed, at sites assisted by USAID.

These options should ideally be responsive to the findings in the RIG Audit<sup>1</sup> noted below (Audit Report page numbers are noted in parentheses):

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<sup>1</sup> The RIG Audit is authored by the Office of Inspector General, Pretoria, South Africa, and is entitled: "Audit of USAID/Kenya's efforts to mitigate environmental impact in its project portfolio", Audit Report no. 4-615-10-008-P, September 29, 2010.

- Determining the extent of USAID’s environmental responsibilities for disposing of health-care waste generated by service providers’ activities and developing a plan to carry out those responsibilities (page 7).
- Conducting water tests and establishing a plan to ensure future water testing (page 10).
- Developing a mission order to delineate responsibilities for environmental compliance (page 11).
- Providing adequate resources and environmental training to appropriate staff and implementing partners (pages 11 and 12).
- Establishing a plan to ensure that environmental assessment and expertise requirements are incorporated into solicitations and signed awards (page 13).
- Establishing a plan to ensure that environmental documentation is completed and maintained (page 15).
- Establishing procedures to ensure that required environmental oversight is being performed during site visits (page 16).
- Notifying mission personnel and implementing partners about the Agency’s free resources to aid environmental monitoring (page 17).

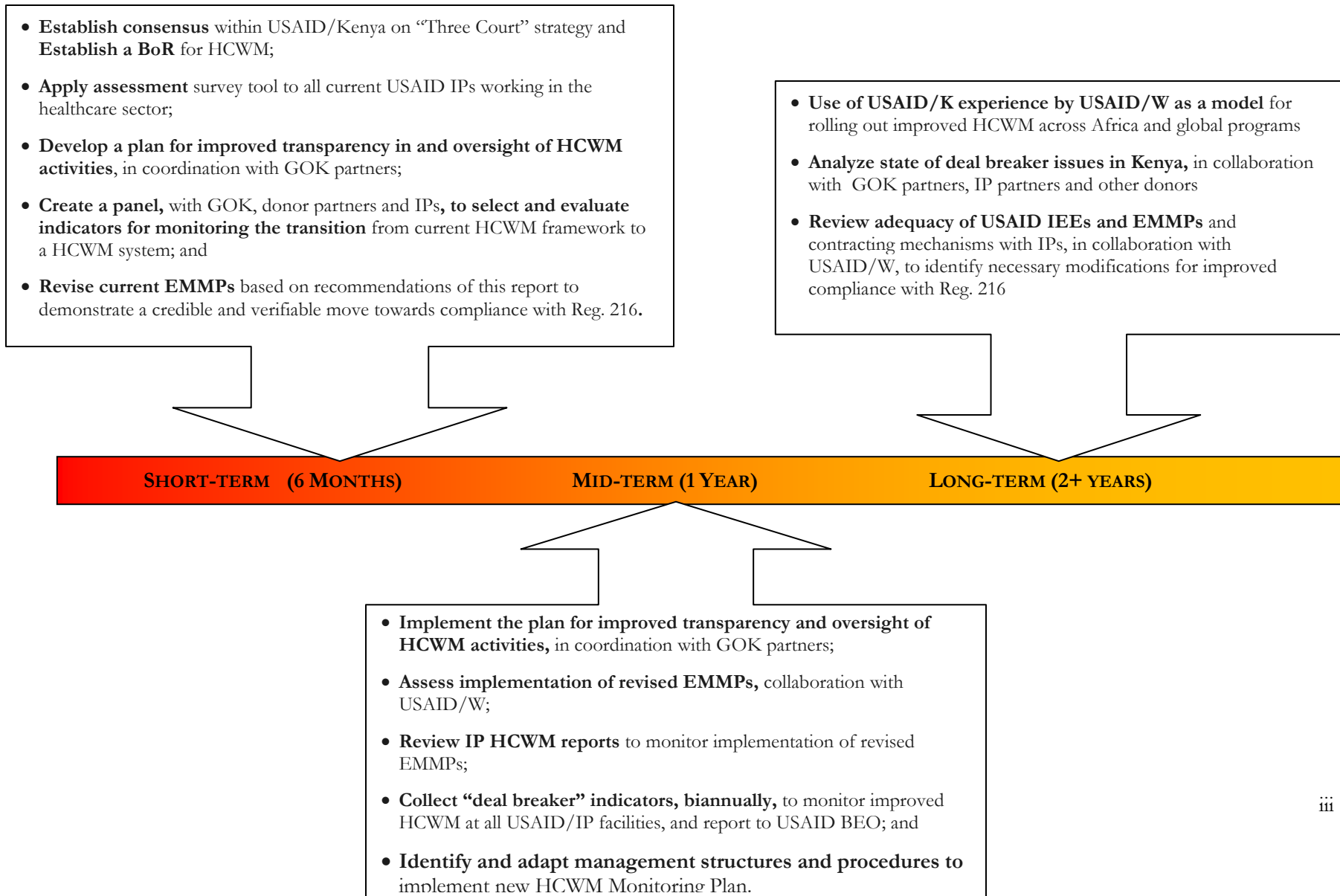
The report was to provide recommendations for how USAID/Kenya can best:

- a. Ensure compliance with Title 22, Chapter II, Part 216 of the Code of Federal Regulations (22CFR216), USAID Automated Directive System Series 200 Chapter 4 (ADS 204), and all other associated USAID guidance on healthcare waste management;
- b. Align with the Government of Kenya and World Health Organization (WHO) requirements, procedures and regulations on healthcare waste management; and
- c. Monitor and manage healthcare waste generated from all Mission-funded programs, including indicators and timelines.

The Government of Kenya (GOK) has a variety of regulations, policies and guidelines that stipulate how HCWM is regulated in Kenya. As Reg. 216 requires alignment of USAID and its IPs with GOK policies and regulations, these are relevant and consistent with the RIG Audit requirements.

For example, enforcement of existing Regulations is spelled out in the 2008 – 2012 Kenya National Health Care Waste Management Plan (KNHCWMP). The plan offers a detailed log frame and budget that also spells out what priority actions need to be undertaken. Their full implementation would also contribute to satisfying Reg. 216 Part 161. The 2012 end date of the current plan offers an opportunity to review, improve, and develop a new strategy to support full implementation of plan provisions. The EMCA (1999) recognizes waste that is considered hazardous (4th and 5th Schedule of the Waste Mgt Regulations of 2006). Enforcement to date has been lacking. Some of the Health Programs can support training of a few Environmental Inspectors from the National Environmental Agency who will specialize in enforcement of HCWM regulations, together with Public Health counterparts.

## APPENDIX B. TIMELINE FOR THE KEY STEPS TO IMPROVE USAID/KENYA HCWM COMPLIANCE IN KENYA





## APPENDIX C. LIST OF HEALTHCARE FACILITIES SURVEYED

Number	Name of Health Facility	Level of Health Facility	Province	Implementing Partner
1	Gachege Health Centre	Level 3	Central	USAID
2	Gatundu District Hospital	Level 4	Central	USAID
3	Mangu Dispensary	Level 2	Central	USAID
4	Igegania District Hospital	Level 3	Central	USAID
5	JKUAT Hospital	Level 3	Central	USAID
6	Kabale Health Centre	Level 3	Central	USAID
7	Kiamutugu Health Centre	Level 3	Central	USAID
8	Kianyaga Sub-District Hospital	Level 3	Central	USAID
9	Kutus Dispensary	Level 2	Central	USAID
10	Mount Kenya District Hospital	Level 4	Central	USAID
11	Mukurweini District Hospital	Level 4	Central	USAID
12	Ngoliba Health Centre	Level 3	Central	USAID
13	Njokini Dispensary	Level 2	Central	USAID
14	Nyeri Provincial General Hospital	Level 5	Central	USAID
15	Ruiru District Hospital	Level 4	Central	USAID
16	Sabasaba Health Centre	Level 3	Central	USAID
17	Sagana Health Centre	Level 3	Central	USAID
18	Thika District Hospital	Level 5	Central	USAID
19	Katangi Dispensary	Level 4	Eastern	USAID
20	Machakos Level 5 Hospital	Level 4	Eastern	USAID
21	Matuu District Hospital	Level 4	Eastern	USAID
22	Matuu Mission Hospital	Level 4	Eastern	USAID
23	Kitui District Hospital	Level 5	Eastern	USAID
24	Kauwi Sub-District Hospital	Level 3	Eastern	USAID
25	Kwa Vonza Dispensary	Level 2	Eastern	USAID
26	Matinyani Dispensary	Level 2	Eastern	USAID
27	Consolata Kyeni Hospital	Level 4	Eastern	CDC
28	Kiamuringa Dispensary	Level 2	Eastern	CDC
29	Mbeere District Hospital	Level 2	Eastern	CDC
30	ACEF Ena Health Centre	Level 3	Eastern	CDC
31	Embu Provincial General Hospital	Level 5	Eastern	CDC
32	Chuka District Hospital	Level 4	Eastern	CDC
33	Muthambi Health Centre	Level 4	Eastern	CDC
34	PCEA Chogoria Hospital	Level 5	Eastern	CDC
35	Kanyakine Health Centre	Level 3	Eastern	CDC
36	Kogero Dispensary	Level 2	Nyanza	CDC

37	Madiany District Hospital	Level 4	Nyanza	CDC
38	Siaya District Hospital	Level 4	Nyanza	CDC
39	Chulaimbo District Hospital	Level 4	Nyanza	CDC
40	Bondo District Hospital	Level 4	Nyanza	CDC
41	Nyamaiya Health Centre	Level 3	Nyanza	USAID
42	Nyamira District Hospital	Level 4	Nyanza	USAID
43	Ekerenyo Sub-District Hospital	Level 4	Nyanza	USAID
44	Rachuonyo District Hospital	Level 4	Nyanza	CDC
45	Ober Health Centre	Level 3	Nyanza	USAID
46	Rabuor Health Centre	Level 3	Nyanza	CDC
47	Kisii Level 5 Hospital	Level 5	Nyanza	CDC
48	Nyagoro Health Centre	Level 3	Nyanza	USAID
49	Marindi Health Centre	Level 3	Nyanza	USAID
50	Migori District Hospital	Level 4	Nyanza	CDC
51	Gucha District Hospital	Level 4	Nyanza	CDC
52	Nyansakia Health Centre	Level 3	Nyanza	CDC
53	Nyakach District Hospital	Level 4	Nyanza	CDC
54	Gem Rae Dispensary	Level 2	Nyanza	CDC
55	New Nyanza Provincial G. Hospital	Level 5	Nyanza	DOD
56	Kabiyet Health Centre	Level 3	Rift Valley	USAID
57	Kapsabet District Hospital	Level 4	Rift Valley	DOD
58	Huruma District Hospital	Level 4	Rift Valley	USAID
59	Uasin Gishu District Hospital	Level 4	Rift Valley	USAID
60	Mai Mahiu Health Centre	Level 3	Rift Valley	USAID
61	Subukia Health Centre	Level 3	Rift Valley	USAID
62	Nakuru Provincial General Hospital	Level 5	Rift Valley	USAID
63	Narok District Hospital	Level 4	Rift Valley	USAID
64	Karbarnet District Hospital	Level 4	Rift Valley	USAID
65	Kapsara District Hospital	Level 4	Rift Valley	USAID
66	Nandi Hills District Hospital	Level 4	Rift Valley	CDC
67	Kabrtonjo District Hospital	Level 4	Rift Valley	USAID
68	Chepterwai Sub-District Hospital	Level 4	Rift Valley	DOD
69	Iten District Hospital	Level 4	Rift Valley	DOD
70	Rongai Health Centre	Level 3	Rift Valley	USAID
71	Moi Teaching and Referral Hospital	Level 6	Rift Valley	USAID
72	Kabarak Health Centre	Level 3	Rift Valley	USAID
73	Kipsaraman Dispensary	Level 2	Rift Valley	USAID
74	Bamburi Health Centre	Level 3	Coast	USAID
75	Kongowea Health Centre	Level 3	Coast	USAID
76	Likoni District Hospital	Level 4	Coast	USAID

77	Mikindani Catholic Dispensary	Level 2	Coast	CDC
78	Kilifi District Hospital	Level 4	Coast	USAID
79	Waa Dispensary	Level 2	Coast	USAID
80	Ngerenya Dispensary	Level 2	Coast	USAID
81	Misumarini Dispensary	Level 2	Coast	USAID
82	Bomu Medical Centre	Level 3	Coast	CDC
83	Port Reitz District Hospital	Level 4	Coast	USAID
84	Mtwapa Health Centre	Level 3	Coast	USAID
85	Tudor District Hospital	Level 4	Coast	USAID
86	Junju Dispensary	Level 2	Coast	USAID
87	Coast Provincial General Hospital	Level 5	Coast	USAID
88	Msambweni District Hospital	Level 4	Coast	USAID
89	Tiwi Health Centre	Level 3	Coast	USAID
90	Diani Health Centre	Level 3	Coast	USAID
91	Butere District Hospital	Level 4	Western	USAID
92	Shibinga Health Centre	Level 3	Western	USAID
93	Mumias Modern District Hospital	Level 4	Western	USAID
94	Ekwanda Health Centre	Level 3	Western	USAID
95	Esiarambatsi Health Centre	Level 3	Western	USAID
96	Kakamega Provincial G.Hospital	Level 4	Western	USAID
97	Musitinyi Dispensary	Level 2	Western	USAID
98	Vihiga District Hospital	Level 4	Western	USAID
99	Bungoma District Hospital	Level 4	Western	USAID
100	Vihiga Health Centre	Level 3	Western	USAID
101	Iguhu District Hospital	Level 4	Western	USAID
102	Chwele Health Centre	Level 3	Western	USAID
103	Malaba Dispensary	Level 2	Western	USAID
104	Lukoris Health Centre	Level 3	Western	USAID
105	Emuhaya Sub-District Hospital	Level 4	Western	USAID
106	Kwhisero Health Centre	Level 3	Western	USAID
107	Karen Health Centre	Level 3	Nairobi	CDC
108	Mathare North Health Centre	Level 3	Nairobi	USAID
109	Ngong Road Health Centre	Level 3	Nairobi	USAID
110	Mbagathi District Hospital	Level 4	Nairobi	USAID
111	Kayole Health Centre	Level 3	Nairobi	USAID
112	Kenyatta National and Referral Hospital	Level 6	Nairobi	CDC/USAID

## APPENDIX D. ASSESSMENT SURVEY TOOL- EXAMPLE

The following is one example of the 111 samples collected under this HCWM Assessment. The data presented below has been copied from the hard copy paper field sheet and transferred onto an Excel spreadsheet where it was coded with the numbers 1 or 2; 1 connoting 'yes', and 2 connoting 'no'. This data in turn was then transferred into SPSS for final processing and analysis. The data presented in the Findings section of the report reflects the full collection, transposing and final processing through these three stages.

Name of Facility: New Nyanza Provincial General Hospital	Data Collector's Name: Omondi Gamaliel	Date:	July 4 2012
	Name of Facility: Karen Health Center	District:	Kisumu East

1.Treatment room/Dressing room/ Unit			
1	Are three segregation bins provided?	1	
1.1	Are they color coded?		2
1.2	Are the following colors provided?		
1.21	· Red		2
1.22	· Yellow		2
1.23	· Black		2
1.3	Are the bins provided with a foot pedal?		2
1.31	If yes for question 2 above, step on pedal and look inside. DO YOU SEE ANY Sharps ( i.e. blades, syringe , needles,etc) in the;		
1.32	· Red bin		2
1.33	· Yellow bin		2
1.34	· Black bin		2
1.4	Are the bins labeled correctly as indicated below?		
1.41	· Red (highly infectious waste )		2
1.42	· Yellow ( infectious waste )		2
1.42	· Black ( general waste )		2
1.5	Are safety boxes provided?	1	
1.51	If yes above were they three quarters full[also above 3/4 full applies]	1	
1.6	Do you see a container with disinfectant in the room?	1	

1.7	Do you see Standard Operating procedures for handling blood/waste spillages? in the room?	1	
1.71	Do you see segregation posters?	1	
<b>Voluntary Counseling &amp; Treatment [VCT]Unit</b>			
2	Are two Segregation bins provided?		
2.1	Are they color coded?		
2.2	Are the following colors provided?		
2.21	· Red		
2.22	· Yellow		
2.23	· Black		
2.3	Are the bins provided with a foot pedal/alternative lid technology?		
2.31	If yes for question 2 above, step on pedal and look inside. Do you see any Sharps ( i.e. blades, syringe , needles, etc) in the;		
2.32	· Red bin		
2.33	· Yellow bin		
2.34	· Black bin		
2.4	Are the bins labeled correctly as indicated below?		
2.41	· Red (highly infectious waste )		
2.42	· Yellow ( infectious waste )		
2.42	· Black ( general waste )		
2.5	Are safety boxes provided?		
2.6	If yes above are they three quarters full?[also above 3/4 full applies]		
2.61	Do you see segregation posters?		
<b>Immunization unit</b>			
3	Are two Segregation bins provided?	1	
3.1	Are they color coded?	1	
3.2	Are the following colors provided?		
3.21	· Yellow	1	
3.22	· Black		2

3.23	Are the bins provided with a foot pedal/ alternative lid technology?		2
3.3	If yes for question 2 above, step on pedal and look inside. DO YOU SEE ANY Sharps ( i.e. blades, syringe , needles, etc) in the;		
3.31	· Red bin		2
3.32	· Yellow bin		2
3.33	· Black bin		2
3.34	Are the bins labeled correctly as indicated below?		
3.4	· Red (highly infectious waste )		2
3.41	· Yellow ( infectious waste )	1	
3.42	· Black ( general waste )		2
3.42	Are safety boxes provided?	1	
3.5	If yes above are they three quarters full[also above 3/4 full applies]		2
3.51	Do you see segregation posters?		2
<b>Laboratory unit</b>			
4	Do you do cultures and sensitivity tests?	1	
4.2	If yes do you autoclave highly infectious waste?		2
4.21	For waste water disposal in the lab, Ask following questions:		
4.22	Is Waste water mixed with other waste water into one common drain	1	
4.23	· Is waste water Pretreated prior to release into to the common drain		2
4.3	· Is another method used?		2
4.31	Is a bio-safety hood/cabinet provided?	1	
4.32	Is the hood functioning?	1	
4.33	Are safety boxes provided?	1	
4.34	If yes above were they three quarters full [also above 3/4 full applies]		2

4.35	Are the bins provided with a foot pedal/ alternative lid technology?		2
4.4	Where do you dispose the samples in the lab[ blood, urine, sputum etc];		
4.41	· Red bin	1	
4.42	· Yellow bin	1	
4.43	· Black bin		2
4.5	Are the bins labeled correctly as indicated below?		
4.51	· Red (highly infectious waste )	1	
4.52	· Yellow ( infectious waste )	1	
4.6	Do you see a container with disinfectant	1	
4.61	Do you see Standard Operating procedures for handling blood/waste spillages?	1	
4.62	Do you see segregation posters?		2
<b>Labor unit</b>			
5.1	Are placentas disposed in Placenta pit? [Ask to see the pit]		2
5.11	Are placentas Macerated?	1	
5.12	If maceration is used, is pretreatment done before disposal?		2
5.13	Is another disposal method used to dispose placentas?		2
5.2	If placenta pit is used, ask to see it and observe the following;		
5.21	· Does it have a concrete slab covering it?		
5.22	· Does it have a lid on the slab?		
5.23	· Does the lid have a lock?		
5.3	Is the floor of the labor room tilting towards the sluice room?		
5.31	Do you see a drainage pipe from maternity that links the sluice room?		
5.4	Go to the delivery room.		
5.41	· Are there Health Care Workers in the	1	

	delivery room?		
5.42	Are there any ongoing activities in the delivery room?	1	
5.43	Are they provided with boots/ Aprons?	1	
5.44	If yes are health care workers wearing boots & boots?	1	
5.5	Do you see sluice room?	1	
5.6	Do you see a container with disinfectant in the labor room	1	
5.61	Do you see a container with disinfectant in the Sluice room?	1	
5.62	If yes is the container adequate in size?	1	
5.7	Do you see Standard Operating procedures for handling blood /fluids spillages?	1	
5.8	On a monthly basis, do you have adequate disinfectant to treat your medical waste e.g. soiled/bloodied linen or spillages on the floor?	1	
5.81	Do you see segregation posters?	1	
<b>Minor/Major Theatre unit [for PHT/Theatre Nurse]</b>			
5.9	Do you see a container with disinfectant in the room or in storage cabinets (for example, Calcium hypochlorite; povidone Iodine; etc.).	1	
5.91	Is there disinfection of waste e.g. soiled/bloodied linen in theater?	1	
5.92	Is disinfectant used after each spillage or after each surgical procedure?	1	
5.93	Is a written Standard Operating Procedures (SOP) for handling blood/waste spillages? available in room?	1	
5.94	On a monthly basis, do you have adequate disinfectant to treat your medical waste e.g. soiled/bloodied linen or spillages on the floor?	1	
5.95	Are they provided with boots/ Aprons	1	



5.96	Are the health care workers wearing boots and mackintosh	1	
5.97	Do you see sluice room	1	
5.97	Do you see a container with disinfectant	1	
5.98	Do you see Standard Operating procedures for handling blood/ body fluid spillages in the room?	1	
5.99	Do you see segregation bins?	1	
<b>X- Ray unit</b>			
6	Is imaging processing waste/liquid available	1	
6.1	Is the image processing waste/ liquid stored in a recommended brown plastic container with a tight cap?		2
6.2	For radiological waste (RW)disposal, are RW disposed through:		
6.3	Radiation Board ( ask for evidence – documentation)		2
6.4	Recycling		2
6.5	Other		2
6.6	Do you observe radiological waste labels on the container holding the RW		2
6.7	Does the x ray operator have the radiation monitoring badge?	1	
6.8			
<b>Inpatient /Wards Unit</b>			
6.9	Are Segregation bins provided?	1	
6.91	Are they color coded?	1	
6.92	Are the following colors provided?		
6.92	· Red	1	
6.92	· Yellow	1	
6.92	· Black	1	
6.92	Are the bins provided with a foot pedal?		2
6.93	If yes for question 2 above, step on pedal and look inside. Do you see any Sharps ( i.e. blades, syringe , needles, etc.) in the;		
6.93	· Red bin		2

6.93	· Yellow bin		2
6.93	· Black bin		2
6.93	Are the bins labeled correctly as indicated below?		
6.93	· Red (highly infectious waste)		2
6.93	· Yellow (infectious waste)		2
6.93	· Black (general waste)		2
6.93	Are safety boxes provided?		2
6.93	If yes above are they three quarters full [also above 3/4 full applies]	1	
6.94	Do you see segregation posters?		2
<b>Pharmacy [ Ask the responsible person in the pharmacy]</b>			
7.1	Is there a system for expired pharmaceutical waste disposal? Tick appropriately	1	
7.2	Are there records kept for expired medicines/products and broken/spilled drugs?	1	
7.3	Do you see a locked cabinet where expired products are kept? If no ask to see where expired products are kept.		2
7.4	Request the cabinet be opened. Do you see expired products in the cabinet?	1	
7.5	If no, does the documentation/records show when expired pharmaceuticals were last collected? Fill in the last date shown..... .....		2
7.6	Does the pharmacy incinerate its pharmaceutical waste?	1	
<b>Health Care Waste Handler</b>			
8	For the health care Waste handler working in the incineration unit, is she/he wearing:		
8.1	Boots?	1	
8.2	Helmets?		2
8.3	Gloves?	1	

8.4	Respirator?		2
8.5	Industrial Gloves		2
8.6	Apron/Overall?	1	
<b>Health Care Waste storage Area</b>			
9	Please observe the presence /absence of the following:		
9.1	Are all doors locked?		2
9.2	Holes in the walls?		2
9.3	Vents?	1	
9.4	Leakage from roofing?		2
9.5	Pot holes?		2
9.6	Tilting floor toward the door?		2
9.7	Is the designated area labeled:		
9.71	· Highly infectious Waste?		2
9.72	· Infectious waste?		2
9.73	· Sharps waste?		2
9.74	· General waste		2
9.8	Is a record book available?		2
9.81	Are records for waste received at the storage unit visible for each of the last 7 days?		2
<b>Procurement Department</b>			
10	For each of the last four (4) quarters full, are there Local Purchase Orders (LPOs) requests for the following supplies:		
10.1	· Liner Bags	1	
10.1	· Disinfectants	1	
10.1	· Sharps Container (Boxes)	1	
10.1	· Proof Of Incineration Service (If Facility Does Not Incinerate On Premises)		2
10.1	· Waste Transport(See Documentation)		2
10.1	[Ask the head of procurement unit]Is the budget for HCWM commodities sufficient to procure waste management items throughout the year?		2

10.2	Go to Supplies Department (if separate from Procurement. It may jointly operate with Procurement). Ask if there are records for the last three (3) months for supply /distribution of the following from Procurement to:		
10.2	Theater:		
	(1) liner bags	1	
	(2) disinfectants	1	
	(3) Sharps container /Safety boxes		2
10.2	Maternity:		
	(1) liner bags	1	
	(2) disinfectants	1	
	(3) Sharps container (boxes)		2
10.2	OPD:		
	1) liner bags	1	
	(2) disinfectants	1	
	(3) Sharps container (boxes)		2
10.2	Laboratory:		
	(1) liner bags	1	
	(2) disinfectants	1	
	(3) Sharps container (boxes)		2
10.3	Pharmacy -Liner bags		2
10.3	VCT- Sharps Containers/Safety Boxes & Liner bags		2
10.3	Immunization- Sharps container/Safety boxes.		2
<b>Incinerator/Waste treatment area</b>			
11	Do you see an incinerator?	1	
11.1	If no, ask to see records for HCW disposal that is outsourced.	n/a	
11.1	If outsourced, are there records proving outsourcing at least for the past 4 weeks?	1	
11.1	Do you see an incinerator shed?	1	
11.1	If there is an incinerator, is the incinerator area fenced?		2
11.2	Is the incinerator door locked?		2

11.2	Do you see at least 4 temperature readings recorded for the last 6 weeks?		2
11.2	Is there a Standard Operating Procedure document available within the incineration unit?		2
11.2	Is there an incineration log? (Last 4 weeks/at least once per week)		2
11.9	Go to records preceding the month of January. Do you see entries for incinerator use that week?		2
11.9	Go to the preceding month of June. Do you see at least four entries for incineration?		2
11.9	Is there an ash pit visible in the vicinity?	1	
11.9	Do you see a concrete slab covering the ash pit?		2
11.9	Is the distance between the principal incinerator and the community greater than 30 meters?	1	
12	Is the distance between the principal incinerator and any patient ward greater than 30 meters?	1	
12	Is there any cropping within 300metres of the incinerator?	1	
<b>Waste Transport Unit</b>			
13	Are waste transport trolleys with bins provided?		2
13.1	Are they color coded?		2
13.2	Are the following colors provided?		
13.2	· Red		2
13.2	· Yellow		2
13.2	· Black		2
13.3	(Ask the person)Is the floor smooth enough to transport the waste from generation to disposal without spillage?		2
13.6	Is Health Care waste transported by mixing all types of wastes together[red, yellow, black]	1	

13.6	Is each type of waste transported separately to the waste storage room		2
<b>Mortuary</b>			
14	Is your morgue facility oversubscribed?	1	
14.1	Is it over subscribed by a factor of more than 2?	1	

## APPENDIX E. AGGREGATED DATA OF PRINCIPAL FINDINGS

### 1. Theatre Unit

- 1.1. **Presence of a Sluice Room:** The facilities that had a theatre and reported not having a sluice room were 62.5 % while 37.5 % of them reported not having a sluice room. 61 % of the facilities did not have a theatre.)
- 1.2. **Use of a disinfectant after every spill** was reported in 73.5% of the facilities that had a theatre while 26.5 % of them did not disinfect after every spill.

### 2. X-Ray Unit

- 2.1. **Brown Bag** of all the(37) facilities that had an x-ray 83.8%(31)reported not having the recommended brown bag for disposal of radioactive wastes only 16.2 %(6) reported having the recommended brown bag.
- 2.2. **Labeling** only 19%(7) of the facilities visited reported labeling their radioactive waste the rest 81%(30) did not label their radioactive as such None of the 53.8% having X ray equipment maintained the correct labeling of radioactive wastes.

### 3. Mother Child Health (MCH ) /Immunization Unit

- 3.1. **Segregation** in three color coded bins was only done in 39.9% (43) of the facilities and in 60.9 % (67) there was no segregation.
- 3.2. **Safety Boxes** adequate supply of safety boxes was reported in 90 % (99) facilities while the remaining 11(10%) did not have adequate number of safety boxes and had to improvise.

### 4. In-Patient

- 4.1. **Segregation** was at 39.1% (43) against a whopping 60.9% (67)who did not practice segregation
- 4.2. **Presence of Sharps in the Black Bin** was observed in only 6(5.5%) of the facilities sampled the remaining 104 (94.5%) had no presence of sharps in the black bin.

### 5. Incinerator/Waste Treatment Unit

- 5.1. **Presence of Temperature Gauge** was observed in only 7(6.4%), 87(79.1%) facilities did not have a working temperature gauge .16(14.5%) did not have incinerators.
- 5.2. **Presence of An Incineration Activities Log Book:** Only 8(7.3%) facilities have a logbook for recording incineration activities the rest 86(78.2%) facilities don't have the logbook. As indicated above 16 (14.5%) did not have incinerators.

### 6. Laboratory Unit

- 6.1. **Mixed Waste Water:** 6(5.8%) of all facilities sampled did not have a laboratory. Of the facilities which had laboratories an incomprehensible 85(77.3%) mixed and disposed of their waste water without pretreatment into one common drain the rest 19(17.2%) facilities disposed their waste water after treatment.
- 6.2. **Biosafety Hood:** Of the facilities which had laboratories 55(50.0%) did not have a biosafety hood, with the other 50% not having one.

### 7. Labor Ward Unit

- 7.1. **Pretreatment Of Waste Water From Labor Ward** 96 (87.3%) facilities in the sample did not pretreat their waste water before disposal. 2(1.8%) of the facilities pretreated waste water prior to disposal. 12(10.9%) did not have a maternity unit so the variable did not apply to them.
- 7.2. **Tilting Floors:** 78.6 % reported not having their floor tilting towards the sluice room (leading to waste water stagnation). The rest, 21.4 % did not have a sluice room despite having a maternity. In effect, there was 100% noncompliance for this particular variable.

### 8. Pharmacy Unit

- 8.1. **Presence of Expired Pharmaceutical Products:** 31(28.2%) of the facilities reported having expired pharmaceutical products on their premises while 79(71.8%) did not have expired pharmaceutical products.

8.2. **Presence of Storage For Safekeeping Of Expired Pharmaceutical Products** 85(77.3%) did not have a cabinet for safekeeping of expired pharmaceutical products, while 25(22.7%) of the facilities reported having a cabinet for safekeeping of expired pharmaceutical products while

## 9. Procurement/ Stores Unit

9.1. **Local Purchase of HCWM Commodities:** 52.7 % (58) of the facilities reported having LPOs for purchase of HCW management materials (an indication that, most of the facilities purchase most of their HCWM materials locally, rather than receiving key HCWM supplies through KEMSA as would be anticipated). The remaining 47.2% (52) did not have LPOs for purchase of HCW management materials.

9.2. **Adequate Budget:** only 2(1.8%) of the facilities sampled reported having adequate budget for HCWM the rest 108 (98.2%) do not have an adequate budget for HCWM.

## 10. Health Care Waste Transport Unit

10.1. **Transport Trolley:** 8 (7.3%) facilities reported having the health waste care transport trolley the rest 102 (92.7%) reported not having a transport trolley.

10.2. **Mixing of Types of Healthcare Waste During Transport:** 87.3% (96) facilities mix all types of healthcare waste during transport, while 12.7% (14) do not mix their wastes during transport.

## 11. Health Care Waste Handler Unit

11.1. **Presence of Respirator For HCW Handler:** 3.6 % (4) of the facilities provide respirators for their HCW handlers while only 96.4 % (106) facilities provide their HCW handlers with respirators.

11.2. **Presence of Industrial Gloves For HCW Handler:** among the sampled facilities 41.8% (46) provide their HCW handlers with industrial gloves for handling wastes the rest 58.2% (64) do not provide their HCW handlers with industrial gloves for handling wastes.

## 12. Voluntary Counseling & Treatment/Comprehensive Care Centre Unit

12.1. **Sharps in the Black Bin.** 5.5% (6) of all the facilities visited had sharps in the black bin while 80.9% (89) facilities did not have sharps in their black bins and the rest 13.9% (15) did not have a VCT center.

12.2. **Labeling Of Bins As Infectious Material** Of all facilities that had a VCT unit, labeling of bins as containing infectious material was done in only 11.8 % (13) facilities, the rest 74.5% (82) facilities did not label the bins as containing infectious material. As indicated above the remaining 13.9% (15) facilities do not have a VCT center.

## 13. Treatment Room / Dressing Room Unit

13.1. **The Three Segregation Bins:** of all the facilities 71% (78) did not have the three segregation bins while 29.0% (32) did.

13.2. **Segregation Posters:** 79.1% (87) did not have segregation posters, while 20.9% (23) of all the facilities sampled did.

13.3. **Standard Operating Procedures (SOPs) On Healthcare Waste:** Among the facilities sampled 88.2% (97) did not have standard operating procedures on healthcare waste management, while 11.8% (13) facilities did have standard operating procedures.

## 14. Morgue

14.1 **Oversubscription:** 63.6% (70) of the facilities sampled did not have a morgue. Among the facilities which had a morgue, 52% (21) facilities had oversubscribed while 48% (19) had not oversubscribed. Oversubscription in some instances exceeded 3.5 times capacity.

## 15. Healthcare Waste Storage Area

15.1 **Presence of A Lockable Door:** remaining 88 (80%) facilities did not have a waste storage area. 10.9% (12) did not have a lockable door leading to healthcare waste storage area. 9.1% (10) of all the facilities sampled had a lockable door leading to the waste storage area;

15.2 **Labeling of the Storage Area** 19 (17.3%) facilities have not labeled their storage area. : Among the facilities sampled only 3 (2.7%) facilities have labeled the storage area, while the remaining 88 (80%) as mentioned earlier do not have a healthcare waste storage area at all.



## APPENDIX F. STATISTICAL ANALYSIS

A statistician was hired to carry out data analysis for the Health Care Waste Management. The statistician was provided with the HCWM dataset and tasked to conduct an analysis of means using statistical methods across the five ‘Deal Breakers’:

- a) Presence of sharps in black coded bins
- b) Disposal of waste water into common drain
- c) Provision of waste segregation bins
- d) Provision of respirator to waste handlers
- e) Presence of a working incinerator

The objective of the analysis was to find out whether there was any significant difference in means across the five variables (deal breakers) among the provinces, level of health care facilities and implementing partners surveyed. However, DOD was excluded from the analysis because less than 10 DOD facilities were surveyed. The results of the analysis are captured in the two sections below, but can be summarized as finding that there are no significant differences in compliance levels that can be attributed to geography, donor or facility level.

### A: USAID

The first variable covered under the analysis was the presence of sharps in black coded bins. Thus, the question was: **‘Do you see any Sharps (i.e. Blades, Syringes, Needles, etc.) in the Black Bin?’** The results for this variable indicated that there was no significant difference in the means between the provinces. The response across the provinces was generally the same. However, at the level of health care facility, the significance of means was borderline at only 0.052 (Table 1.1).

**Table 1.1: Presence of sharps in Black coded bins**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	0.172	67	0.864	0.254	1.474	-2.688	3.196
Level	0.085	67	0.932	0.052	0.614	-1.173	1.278

The second variable analyzed was on mixing of waste water with other water before being disposed into common drain. Thus, **‘Is Waste water mixed with other waste water before disposed into one common drain?’** The results indicated that the mean difference across the provinces was insignificant, meaning that the response was generally the same across the provinces (Table 1.2). There was also no significant difference of means across the health facility levels. Most responses from the provinces and health care facility levels indicated that waste water was mixed with other water before being disposed into common drain.

**Table 1.2: Mixing of waste water with other water before disposal into common drain**

	t	df	Sig. (2-	Mean	Std. Error	95% Confidence
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			tailed)	Difference	Difference	Interval of the Difference	
						Lower	Upper
Province	1.676	74	0.098	0.951	0.567	-0.180	2.081
Level	1.636	74	0.106	0.391	0.239	-0.085	0.868

The third variable analyzed was on provision of segregation bins. Thus, **‘Are Segregation bins provided? (Are separate bins provided)?** The results for this variable indicated that there was no significant difference of means across the provinces. However, there was significance difference in means across the health care facility levels, meaning that segregation bins are found in health care facility depending on the level of the facility (Table 1.3).

**Table 1.3: Provision of waste segregation bins**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	0.789	50	0.434	0.462	0.585	-0.714	1.637
Level	2.770	50	0.008	0.577	0.208	0.159	0.995

The fourth variable analyzed was provision of respirator to waste handler. Thus, **‘Is the healthcare waste handler wearing a respirator?’** The results for this variable indicated that there was no significant difference in means across provinces, meaning that availability and use of a respirator depends on the level of health care facility (Table 1.4).

**Table 1.4: Provision of respirator to waste handler**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	-1.771	75	0.081	-0.930	0.525	-1.976	0.116
Level	4.220	75	0.000	0.897	0.213	0.474	1.321

The fifth variable analyzed was the presence of a working incinerator. Thus, **‘Do you see at least four (4) temperature readings recorded for the last 6 weeks?’** The results indicated that there was no significant difference in means across provinces. However, there was a significant difference in means across the health care facility levels, meaning that that availability of working incinerator was dependent on the level of health care facility (Table 1.5).

**Table 1.5: Presence of a working incinerator**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
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						Lower	Upper
Province	-1.114	64	0.269	-1.177	1.057	-3.288	0.934
Level	3.190	64	0.002	1.331	0.417	0.497	2.164

### **B: CDC**

CDC accounted for about 25 percent of total Healthcare Facilities (HCF) surveyed in the seven provinces. The results indicated that there was no significant difference in means for the five variables (deal breakers) across all seven provinces and health care facility levels surveyed under CDC, meaning that there was consistency in response in all deal breakers across the provinces and health care facility levels. In other words, there were no variations across either province or level (Tables 2.1 – 2.5).

**Table 2.1: Presence of sharps in Black coded bins**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	-0.532	22	0.600	-0.455	0.855	-2.227	1.318
Level	0.841	22	0.409	0.636	0.757	-0.933	2.206

**Table 2.2: Mixing of waste water with other water before disposal into common drain**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	1.256	22	0.222	0.758	0.604	-0.494	2.010
Level	0.764	22	0.453	0.379	0.496	-0.650	1.408

**Table 2.3: Provision of waste segregation bins**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	0.770	16	0.453	0.357	0.464	-0.626	1.341
Level	-0.693	16	0.498	-0.357	0.515	-1.449	0.735

**Table 2.4: Provision of respirator to waste handler**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	-0.339	24	0.737	-0.163	0.479	-1.150	0.825

Level	0.308	24	0.760	0.125	0.405	-0.711	0.961
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**Table 2.5: Presence of a working incinerator**

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Province	1.220	23	0.235	1.043	0.855	-0.726	2.813
Level	0.790	23	0.437	0.565	0.715	-0.914	2.045

## APPENDIX G. GLOSSARY OF TERMS

### Glossary of terms

SN	TERM	DESCRIPTION
1	INCINERATOR	High temperature equipment for treating medical and other hazardous waste in a controlled high temperature furnace where the right parameters are observed.
2	INCINERATION	A process that causes organic medical /hazardous waste to reduce to ash in high temperature, especially in an incinerator.
3	SHARPS	A class of sharp implements involving needles, syringes, and other cutting instruments that have the potential of puncturing the skin and causing exposure to pathogens and infection, including HIV.
4	SHARP CONTAINERS	Special vessels made for packaging and storing sharps at health care facilities before transport or incineration.
5	SEGREGATION	Categorization of different types of waste as per the legislation in Health Care Waste Management Guidelines.
6	PROTECTIVE GEAR (PPE).	Personal protective equipment for incineration, waste transport, etc.
7	DEAL BREAKERS	Variables measured in the HCWM Assessment that signifies noncompliance of a particular unit or activity in a health care facility.
8	TOR	Terms of reference
9	HIGHLY INFECTIOUS WASTES	Waste which has the greatest potential of causing infection due to high microbial load e.g. laboratory cultures, sputum.
10	INFECTIOUS WASTES	Waste category that can cause infection e.g. swabs.
11	GENERAL WASTES	Household category of waste, e.g. waste papers, flowers, food, etc.
12	SEGREGATION POSTERS	Information, education, and communication materials that are pasted on the wall to assist users in proper segregation.
13	HEALTH CARE WASTES	Waste that is generated in a healthcare facility during the process of carrying out clinical and related services.
14	LINER BAGS	Special polythene bags that are placed inside the waste bins for effective management of waste.

<b>15</b>	INCINERATOR LOG	A book detailing the incineration activities e.g. temperature, residence time etc.
<b>16</b>	ASH PIT	A specially designed and engineered hole or burrow placed that receives and contains incineration ash.
<b>17</b>	COLOUR CODE	The designated colors that are used for different categories of waste for management and eventual removal.
<b>18</b>	CULTURE AND SENSITIVITY TESTS	Tests done to show how potent different drugs are to a specific pathogen. A microbe would be more sensitive to the most potent drug/disc in the disc supplied.
<b>19</b>	PLACENTA PIT	A special burrow constructed for handling placentas from the labor/delivery room.
<b>20</b>	MACERATOR	Equipment that shreds and reduces placentas to unrecognizable shapes before being washed down the drain after disinfection.
<b>21</b>	SLUICE ROOM	Special room in a hospital unit for handling dirty linen and equipment, e.g. in the operating theatre or labor room.
<b>22</b>	IMAGE PROCESSING LIQUID	Special type of bath that contains chemicals that process images in an x-ray unit.
<b>23</b>	RADIOLOGICAL WASTES	Waste which do have radioactive activities.
<b>24</b>	RADIOLOGICAL WASTES LABEL	Labels used for marking and identifying radiological waste.
<b>25</b>	RADIATION MONITORING BADGE	Special badge used by radiologists to assess leakage/exposure in their working environment.
<b>26</b>	PHARMACEUTICAL WASTES	Wastes that have medicinal content and usually originate from the pharmacy e.g. expired/spilt drugs.
<b>27</b>	RESPIRATOR	Gadget worn over the nose to protect a worker against inhaling hazardous aerosols.
<b>28</b>	INDUSTRIAL GLOVES	Heavy duty gloves
<b>29</b>	OVERSUBSCRIBED MORGUE	Morgue that has exceeded its storage capacity

## APPENDIX H. FIRST STEPS IN MOVING TOWARDS A STANDARDIZED EMMP FOR IMPLEMENTING PARTNERS IN HCWM

Implementing Partner Activity	Action Required	Monitoring Required	Evaluation	Notes
<p>Training in an activity that promotes the use of pharmaceuticals or the generation of medical waste</p>	<p>Train recipient on processes and procedures for medical waste and pharmaceutical management that are compliant with Reg. 216 and all pertinent GOK regulations including in particular NEMA Environmental Management and Coordination Act (EMCA) of 1999, Section 118 of the Public Health ACT CAP 254 LOK</p> <p>Special training provided in dealing with expired pharmaceuticals, both in terms of administrative steps needed to dispose of them, and practical steps to safeguard them from easy access</p>	<p>Visit sites and use checklist survey in Appendix D to assess compliance</p> <p>Focus on “deal breakers</p> <p>Monthly joint inspection by IP-facility staff re: compliance for sharps disposal</p>	<p>Biannually. Focus on “deal breakers”</p>	<p>Submit monitoring results to single USAID POC who can compile them</p> <p>Collaborative MMS/MOPHS/NEMA Assessment missions (to be organized)</p>
<p>Activities that supply laboratory equipment</p>	<p>Ensure that IP recipients understand the procedures for compliant management and disposal of pathogenic waste including blood, sputum, etc.</p> <p>Ensure disinfectant or other appropriate waste management tools are delivered with supplies and equipment</p>	<p>Periodic random testing of waste water leaving respective health care facilities</p> <p>Periodic random testing of municipal water supplies (pre-treatment and post treatment)</p>	<p>Biannual</p>	<p>Collaboration with NEMA and municipal authorities responsible for water supply safety is imperative</p>

	<p>Work with GoK POC to ensure the sustainability of disposal practices (this may require management through a separate USAID initiative) such as funding of disinfectants, autoclave repair etc.</p> <p>Coordinate with municipal authorities to describe and periodically test water arriving at treatment facilities, along with water leaving treatment facilities for discharge into municipal water supplies.</p>			
<p>Activities that supply sharps, lancets etc.</p>	<p>Supply sharps boxes in a quantity that can hold the entire quantity of sharps delivered.</p> <p>Train staff in the use of the sharps containers</p> <p>Evaluate the recipients capabilities to ensure safe disposal of sharps (report this to USAID).</p> <p>Ensure that sharps remain segregated from general and very hazardous waste.</p> <p>As part of the agreement with the recipient, establish conditions that ensure implementation of required procedures.</p> <p>Establish a timeline for</p>	<p>Daily inspection and record keeping for propriety of sharps containers and integrity of segregation by IP trained staff.</p> <p>Monthly joint inspection by IP-facility staff of compliance for sharps disposal.</p>	<p>Monthly</p>	



	those improvements and the consequences of failing to make those improvements.			
Clinical services	<p>Ensure that the recipient can manage body parts, has an operational incinerator inclusive of fuel.</p> <p>Ensure that morgue is not “oversubscribed” and if it is, that there are administrative steps for reducing overflow.</p>			
Vaccinations	<p>Ensure adequate sharps containers are delivered with needles.</p> <p>Provide general, infectious and highly infectious waste containers and liners with syringes and vaccines.</p> <p>Ensure an operational plan is in place for the disinfection and destruction of sharps.</p> <p>Monitor the recipient implementation of requirements.</p> <p>Train on sharps waste management.</p>	Monthly joint inspection by IP-facility staff re: compliance for sharps disposal.		
Incinerator operation and new incinerator	Assess current status of USAID-supported	Immediate Monthly joint	Evaluation of incinerators should	The initial inventory of the current incineration plant

<p>construction.</p>	<p>facilities for incinerator function.</p> <p>Ensure construction meets the international standards.</p> <p>Monitor implementation.</p> <p>Feasibility screening of site with environmental professional recognized or certified by NEMA prior to construction.</p> <p>Obtain and validate NEMA compliance with siting.</p>	<p>inspection by IP-facility staff re: compliance for incineration.</p> <p>Check record keeping for temperature, quantity of waste arriving for incineration.</p> <p>Annual incinerator validation by NEMA.</p>	<p>be a joint mission of the IP responsible for a facility under current agreement with USAID and a recognized technical expert in incinerator operation.</p>	<p>across USAID supported facilities is crucial to identify status, needs, and options for moving forward at each individual facility level, and overall for all the HCFs USAID supports.</p> <p>Demand that in Year One notes be kept and reported back to HCF authorities on (a) anomalies in segregation practices of waste arriving at incinerator; (b) incinerator functioning (upper limit temperatures obtained; liner cracking etc.); (c) exhaust venting; (d) complaints from adjacent community etc.</p>
<p>Staffing</p>	<p>Do not place staff in an unsafe environment such as one where medical waste is unmanaged, or uncontained.</p> <p>Ensure proper PPE is consistently available to staff (gloves, work clothes, masks, boots if necessary) and that this is used.</p> <p>Ensure proper vaccination of staff.</p> <p>Ensure staff understand to report back when breaches to their safety have occurred</p>	<p>Weekly checks of PPE use in Year One.</p>	<p>Documentation of weekly PPE checks.</p>	<p>Bi-annual reports in Year One from health care workers on safety issues encountered during the six month period should be used to adaptively manage improvements to health care worker safety at facility levels.</p>

## APPENDIX I. ESTABLISHING USAID/KENYA BOUNDARIES OF RESPONSIBILITY AND MANAGEABLE INTERESTS: STEP ONE IN THE HCWM MITIGATION PLAN

Manageable Interests	Boundary of Responsibility
1. Reach internal consensus on: (a) who must be involved in decision-making in USAID/K and USAID/W; (b) a timeline for fixing consensus; (c) who will facilitate the process; (d) what further information (if any) beyond that identified in step 2 below for reaching consensus will be needed from within USAID and external to USAID; (e) identify who will take the lead in the given activity; and (f) gain concurrence from the USAID/K Mission Director and USAID/W BEO to approach establishing the MI and BoR as outlined.	1. Reach internal consensus on: (a) who must be involved in decision-making in USAID/K and USAID/W; (b) a timeline for fixing consensus; (c) who will facilitate the process; (d) what information (if any) beyond that identified in step 2 below for reaching consensus will be needed from within USAID and external to USAID; (e) identify who will take the lead in the given activity; (f) implement the Assessment Survey Tool (Appendix D) to establish a baseline against which all Assessment of USAID and its IP performance in HCWM will be measured; and (g) gain concurrence from the USAID/K Mission Director and USAID/W BEO to approach establishing the MI and BoR as outlined.
2. Undertake a cost assessment for different levels of HCWM coverage that considers at a minimum (a) infrastructure (incinerators built with USAID funding); (b) capacity building for wastewater removal and compliance with existing NEMA standards for incinerator emissions controls; and (c) all steps fundamental to compliant HCW segregation.	2. Seek internal consensus to determine <i>if</i> USAID/K wishes to operate under a compliance strategy for HCWM that is based on “the three courts test” (to optimize compliance and minimize future audit risks). 2b. Through facilitated sessions with all stakeholders key to Reg. 216 compliance, establish BoRs based on mutually accepted compliance strategy. 2c. Identify implications for all parties for future noncompliance with Reg. 216 (program financial, legal, etc.) and any noncompliance with mutually agreed upon BoRs.
3. Assess how complementarities with other donors and GoK partners (NEMA, MOPHS, MMS) can be leveraged to optimize HCWM compliance and cost savings.	3. Assess whether modifications to IEEs, EMMPs, existing cooperative agreements and other contracting mechanisms will be needed to enhance Reg. 216 compliance, and how this will be achieved.
4. To assess other unforeseen risks that could be brought to bear by third parties, confirm that NEPA’s 40 CFR 1508 and EO12114 are in fact unlikely sources of potential regulatory risk to USAID/K’s HCWM program and BoR.	4. Assess what modifications to USAID and its IP agreements will be needed so that compliance / reconciliation with GOK Public Health Act CAP242 LOK and NEMA’s EMCA No. 8 (1999) are reached as part of Reg. 216 requirements.
5. For future RIG audit purposes, put into policy USAID’s position on its Manageable Interests in HCWM.	5. For future RIG audit purposes, put into policy USAID’s position on its BoR in HCWM.
6. Annually review whether circumstances impacting the MI have changed, and revise MI policy accordingly.	6. Implement adjustments to HCWM strategy and programming as they emerge.
	7. Monitor, evaluate and adaptively manage HCWM activities in compliance with Reg. 216, and to demonstrate the transition from a HCWM framework to a system.

## **APPENDIX J. NEMA: ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT (EMCA) NO. 8 (1999)**

The National Environmental Management and Co-ordination Act is very clear about the handling of biomedical waste. In particular, EMCA, Part V stipulates that:

- a) no person shall own or operate any institution that generates bio-medical waste without a valid environmental impact assessment license issued by the authority under the provisions of the Act.
- b) every waste generator of biomedical waste shall ensure that the generating facility has been approved by the appropriate lead agency and the relevant local authority.
- c) every waste generator of biomedical waste shall at the point of generation and at all stages thereafter segregate the waste in accordance with the categories specified in the seventh schedule to the EMCA regulations.
- d) all biomedical waste shall be securely packaged in biohazard containers which shall be labeled with the symbols set out in part i and ii in the eighth schedule of the EMCA regulations
- e) every waste generator shall treat or cause to be treated all biomedical waste in the manner set out in the ninth schedule to the EMCA regulations, before such biomedical waste is stored or disposed of.
- f) the relevant lead agency shall monitor the treatment of all biomedical waste to ensure that such waste are treated in a manner that will not adversely affect public health and the environment.
- g) no person shall store biomedical waste at a temperature above 0° c for more than seven days without the written approval of the relevant lead agency, provided that untreated pathological waste shall be disposed of within 48 hours.
- h) no person shall transport biomedical waste without a valid permit issued by the relevant lead agency in consultation with the relevant local authority.
- i) no person shall transport or allow to be transported biomedical waste save in a specially designed vehicles or other means of conveyance so as to prevent spillage, leakage or scattering of such waste.

## APPENDIX K. PHOTOGRAPHIC EVIDENCE OF NONCOMPLIANCE

Release of low-temperature burn hazardous wastes into farm fields, thoroughfare, and adjacent residential



housing creates unintended public health risks from exposure to dioxins, furans and pathogens







One hazardous waste storage area 2 of 3 incinerators in Nyahruru



5 yrs of expired drugs spilling



Waste burn by Kiambu pediatric ward



Poor segregation and storage at a Level 5 facility

**Non-compliant Incinerator siting is an issue with country wide repercussions for adjacent communities – Wundanyi where community activists succeeded in closing incinerator**



a  
issue  
Ocean



potential  
for the Indian  
tourist  
industry





**Non-compliant removal of hazardous medical wastes to municipal dump sites occurs in USAID supported HCFs**



Full sharp boxes left in hallway of Obama Ward, Nyanza Provincial General Hospital



**Health Care Waste Management at Level 5 Facility in Mombasa, Indian Ocean in Background**