



Ministry of Medical Services

Ministry of Public Health and Sanitation

OCCUPATIONAL SAFETY & HEALTH (OSH) RISK ASSESSMENT REPORT (OSH-RAR)

February 2013





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FOREWORD

The Occupational Safety and Health (OSH) Risk Assessment Report, is a product of extensive field work and consistent engagement by the National Occupational Safety and Health Committee. The Committee was strongly supported by the Capacity Kenya Project which is funded by the United States Agency for International Development. The report is expected to guide the Ministry of Health in the implementation of occupational health and safety in the public health facilities.

The assessment was guided and is consistent with the Occupational Safety and Health Act 2007 (OSH Act 2007). The recommendations of the OSH Risk Assessment Report will enable managers and health professionals to assess safety and health risks in hospitals; improve their capacity to address safety and health concerns; and assist in formulating actions for improvement. The overarching goal of the report's recommendations is to promote health worker safety.

Implementation of the OSH Act 2007 and the recommendations of this Report requires that health facilities at all levels consistently maintain safety standards in respect to building design and maintenance; basic safety including infection prevention and control; fire safety management; supply of basic personal protective equipment; and foster continuous employee safety awareness.

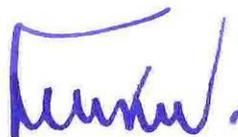
In addition, the Report recommends that workplace OSH guidelines should provide a minimum safety package and address OSH risks against the Report's findings.

We acknowledge the effort and time invested by the National OSH Committee and the research team representing the regional OSH Committees in preparing this Report. We are greatly indebted to the USAID and Capacity Kenya Project for financial and technical support.

This Report presents the OSH status in Kenya's public health facilities. It carries sound recommendations which, when fully implemented, will ensure that all public health workers remain safe as they provide health care services. Creating a safe and risk free environment in our public health facilities must remain a responsibility of all health workers. Together, we make it happen.



Mary W. Ngari, CBS
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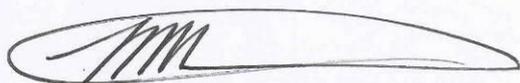
This report is the result of an Occupational Safety and Health Risk Assessment carried out by the Ministry of Public Health and Sanitation and the Ministry of Medical Services (the Ministries of Health), with support of IntraHealth International, Capacity Kenya project. The Health Ministries would like to thank everyone who participated in the OSH risk assessment. In particular, the health facility in-charges, for availing themselves to provide information on the state of implementation of Infection Prevention and Control (IPC) practices as they aim to mitigate occupational hazards in health facilities.

The Ministries also acknowledge inputs made by participants at the launch and establishment of the OSH committee, 2010; training of the OSH committee, 2010; workshop on review of OSH risk assessment approach, 2012; and the national OSH steering committee meeting, 2012. A special word of thanks goes to the OSH Committee, the technical working team that guided and facilitated the entire assessment; providing technical input at the tool development stage, oversight in data collection and review of drafts of the final report. Committee members were individuals with expertise in Infection Prevention & Control (IPC) and OSH from both Health Ministries.

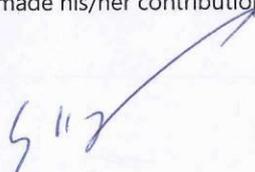
The development of this report would not have been possible without the application of generic guidelines by the International Labor Office (ILO), titled "*Guidelines on Occupational Safety and Health management systems*", from which the tools were developed. Finally, we would like to extend our gratitude to the Capacity Kenya project for generous financial and technical support acknowledging the following contributors:

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LIST OF ABBREVIATIONS

BBP	-	Blood Borne Pathogens
CBS	-	Central Bureau of Statistics
EMS	-	Environmental Management System
GCP	-	Good Clinical Practice
GoK	-	Government of Kenya
HCW	-	Health Care Worker
ILO	-	International Labor Organization
KEPH	-	Kenya Essential Package for Health
KII	-	Key Informant Interview
KNBS	-	Kenya National Bureau of Statistics
MOH	-	Ministry of Health
NGO	-	Non Governmental Organization
OHSG	-	Occupational Health and Safety Governance
OHSMS	-	Occupational Health and Safety Management System
OSH/OSH	-	Occupational Health and Safety
OSHA	-	Occupational Safety and Health Administration
OSHRAE	-	Occupational Safety and Health Risk Assessment Exercise
PPE	-	Personal Protective Equipment
SADT	-	Structured Analysis and Design Technique
SMS	-	Safety Management Systems
SOP	-	Standard Operating Procedures
SWOT	-	Strengths, Weaknesses, Opportunities and Threats
UN	-	United Nations
USAID	-	United States Agency for International Development
WHO	-	World Health Organization

EXECUTIVE SUMMARY

Background

Occupational Health and Safety (OSH) - a multi-disciplinary activity targeted at four basic issues namely; (1) the protection and promotion of the health of workers by preventing and controlling occupational diseases and accidents; (2) the development and promotion of healthy and safe work, work environments and work organizations; (3) enhancement of physical, mental and social well-being of workers; and (4) enabling workers to conduct socially and economically productive lives (WHO 2010). OSH has for decades dominated international agenda prompting continued support for the International Labor Organization (ILO) to execute their mandate on behalf of the international community through regional and national governments. Among these is the protection of workers against work-related sickness, disease and injury (WHO 2010). This position implies that disease and injury do not go with the job nor can poverty justify disregard for workers' safety and health and efforts to promote opportunities for people to obtain respectable and productive work in conditions of freedom, equity, security and human dignity (ILO 2010).

National governments in turn, design operational programs through which ILO recommendations are adopted and implemented with regards to OSH (ILO 2010). In Kenya, the status of OSH conditions has been an issue of growing importance over time (Nyakang'o 2005). Currently, the department of OSH is anchored in the Government of Kenya's (GoK) Ministry of Labor, (GOK 2010). Adoption and recognition of OSH dates back to the GoK Factories Act Cap 514, of 1951 (Nyakang'o 2005). This was a predominantly socio-economic act in nature focusing factory set up ignoring the health sector by and large (Nyakang'o 2005). In 2004, a big leap was made through a subsidiary legislation titled "Legal Notice No. 30", providing the basis for the formation of Safety Committees in factories and other workplaces. These committees were tasked with the responsibility for overseeing OSH issues, and performing safety audits (GOK 2010). However, shortfalls remained with reports that more than half of the work related accidents and injuries went unreported or unattended, necessitating the birth of Occupational Safety and Health Act (OSHA) 2007 intended to give a more elaborate approach to OSH issues (Nyakang'o 2005).

Enactment of the OSHA 2007 signified a new beginning with Ministry of Health (MOH) poised to play a more central role in OSH Administration among other key players such as Ministry of Labor; regulatory bodies and professional associations such as the Pharmacies and Poisons

Board (PPB); the Nursing Council of Kenya; Medical Practitioners and Dentists Board; Kenya Medical Laboratories Technicians and Technologists Board and other partners like donor agencies.

To respond to the call for improved implementation of OSHA 2007, several partners – both GOK and donors – have prioritized implementation of key aspects of OSH across various facilities. These include: waste management, infection control and sanitation. However, there remain challenges to mainstream OSH across the health sector (Paul K. Kimalu et al. 2004). In the health sector however, health workers continue to face many OSH hazards on a daily basis, particularly those involved in direct patient care or working in departments where they are potentially exposed to blood borne pathogens (BBP) and other respiratory, biological hazards, such as drug/ chemicals in the form of toxic reagents, waste anesthetic gas. In addition, some health workers also face ergonomic hazards from lifting and performing repetitive tasks, exposure to laser hazards, and workplace violence. According to a 2005 study finding, among sub-Saharan African countries, Kenya was found to be the country with the leading number of needlestick injuries and other related exposures (Sepkowitz & Eisenberg, 2005).

Literature suggests that OSH compliance is a problem that cuts across the public and private (for profit and not-for-profit) sectors. Consequences of non-compliance are enormous and can result in closure of non-compliant health facilities, and payment of fines. Moreover, spread of infection is increased with poor OSH standards.

To have a clearer picture of implementation of OSH policy and compliance in the health sector, a baseline OSH risk analysis assessment was carried out in health facilities across Kenya. The overall purpose of this assessment was to evaluate the standards of OSH implementation and recommend a working policy to fill the gap to the recommended National & International Standards.

Methods:

Based on the standard OSH hierarchy of controls methodology, a risk assessment tool (adopted from Minguillón and Yacuzzi 2009) and a questionnaire for determining the OSH indicators were employed for quantitative data and evaluating OSH at the ministry's health facilities and conclusion developed on the basis of analysis. 97 health facilities out of 3448 MOH-owned facilities across the nation were targeted for inclusion in the assessment.

The survey tool aimed to examine OSH implementation across 13 broad areas of a healthcare facility in the Kenya Essential Package for Health (KEPH) system, namely: Administration, Stores/supplies area, clinical services (including theatres), Kitchen, Emergency/Casualty area, Biomedical Engineering, housekeeping & Laundry, ICU, Laboratory, Pharmacy and Morgue. Risk ranking was done on a color coded scale of 0 to 5 showing; 0 = **Neutral/ Not Applicable** (process likely to present risk not undertaken in the facility); 1= **Green=Insignificant** (the risk is low/completely mitigated); 2=**Blue = Minor** (Acceptable risks exist in low quantities. Exposures possible but unlikely in large quantities); 3= **Yellow = Moderate** (Significant risk exists; action plans must be developed and reviewed frequently); 4=**Orange=Major/High** (Non-Compliance. Risk Serious enough to warrant urgent changes in day to day operations); 5= **Red=Severe/Extreme** (Catastrophic: Risk is serious enough to impact the facility's ability to meet commitments).

Findings:

MOH facilities were generally found to be at high OSH risk, with majority falling under the **Orange=Major/High** category. With the non-compliance status standing at near severe, OSH Risks at MOH health facilities KEPH Level 2-5 were serious enough to warrant urgent changes in day to day operations. The MOH lacks an all inclusive OSH Program and designated safety resource persons that would generate good safety culture at all levels. Results revealed the following key OSH risks: blood borne and related pathogens (BBP), equipment hazards, needle stick injuries (NSI), airborne & other communicable diseases, fire-related hazards, security related hazards, ergonomics related hazards and work related stress (overloads). With regards to non-compliance to universal and national OSH statutory recommendations, the worst case scenarios presented in KEPH Level 3, 5, 4 and 2 in that order *while* OSH red-spots/departments ranked of highest-to-lowest risks were; housekeeping, morgue, kitchen, laundry, administration and biomedical engineering. Laboratory and pharmacy recorded relatively low risk levels. KEPH Level 3 ranked highest in risk and non-compliance followed by level 5 and 4 then level 2 ranked least.

Conclusions & Recommendations

Whereas official law demands the highest safety standards, assessment findings show OSH hazards are noticeably present in the sampled health facilities, thus raising concerns with regards to compliance and preparedness. However, it is important to note that OSH Policy, complete with implementation guidelines, has been proposed for MOH as a long-term measure.

There is an urgent need for a shift in safety culture within the health ministries to help support OSH implementation. While it is ambitious to propose a one-week implementation of the recommendations in this report, it is critical that remedial measures are implemented with speed as some seemingly small hazards can have highly detrimental effects. Several measures comprising training and administrative controls have been proposed to inform the basis of the audit. More specifically, a step towards ISO's - (the International Organization for Standardization) ISO 14001:2000 and ISO 9001:2000 style International Standard for occupational health and safety management systems 18001 (OHSAS 18001) compliant organization is recommended to fill the gap by establishing a Ministry specific Occupational Health and Safety Management System (OHSMS). This is a seven step process comprising;

1. Establishing a policy
2. Assigning responsibility
3. Employee Involvement
4. Planning Assessment Process (Establishing Objectives and Action Plans)
5. Implementing Processes
6. Monitoring and Measurement, and
7. Management Review.

With an OHSMS in place, top risks among various departments can be contained by incorporating the ongoing efforts like infection control program without duplication of efforts. The findings from this risk assessment exercise consequently provide a suitable platform and foundation for implementing an OSH programs and other initiatives within the ministry of health in Kenya. Its implementation would not only make MOH a safe workplace, compliant with national and international standards, but a model/world class public health provision system.

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Most people especially the working population spend much of their time at work than they do at their homes (EU 2004). Like any other environment, the workplace is full of hazards and risks. Injuries and deaths from occupational health and related incidences are enormous in work environment (Wu Tsung-Chih et al. 2006). It is estimated that every day 6,300 people die as a result of occupational accidents or work-related diseases resulting in over 2.3 million deaths per year (ILO 2010). This is on the background of over 337 million on-the-job accidents annually resulting from poor occupational safety and health practices (ILO 2001). However, the rate of related injuries (both reported and non-reported) is believed to be much higher.

While the occupational health and safety (OSH), with implementation strategies such as the application of Occupational Health and Safety Management Governance (OHSNG) for effective safety management is a common phenomenon in industries, the same cannot be said of the hospital settings especially in many developing countries (Subhani 2010). The general feeling is that hospitals and health institutions are safe and are meant to “health” – considered a core objective of such institutions.

Previous studies have demonstrated that the state of OSH besides being a complex international problem is bound to remain a top priority. It is generally acknowledged that “OSH-based management systems not only reduce accidents and injury rates but also improves the business productivity of an organization” (Subhani 2010). Therefore repeated exposure to a critical value and its continued application reinforces its importance on an individual.

The 2nd National Human Resource for Health (HRH) Strategic Plan 2009-2012 clearly defines health and safety policies and procedures to reduce occupational hazards as a key strategy in improving work climate for health workers in Kenya. The OSH Act 2007 and the Work Injuries Benefits Act 2007 offer a comprehensive legal framework for implementing actions that are likely to improve safety and health at the workplace. All health facilities being places of work need to be compliant and abreast with the most basic safety requirements in respect to building design, maintenance and provision of basic safety equipment and safety principles in service provision since a healthy workplace is not only free of hazards, but also provides an environment that is stimulating and satisfying for those who work there.

1.2 PROBLEM STATEMENT

Health care workers face a plethora of safety and health hazards such as blood borne pathogens (BBP) and biological hazards, potential chemical and drug exposures, waste anesthetic gas exposures, respiratory hazards, ergonomic hazards from lifting and repetitive tasks, laser hazards, workplace violence, hazards associated with laboratories, and radioactive material and x-ray hazards (Okoth-Okelloh and Ouma 2012). Some of the serious potential chemical exposures include formaldehyde used for preservation of specimens for pathology; ethylene oxide, glutaraldehyde, and paracetic acid used for sterilization; and numerous other chemicals used in healthcare laboratories (OSHA 2011). Reports indicate that more workers are injured in the healthcare sector than any other. In the USA where surveillance is advanced, in 2010, the health care and social assistance industry reported more injury and illness cases than any other private industry sector– 653,900 cases; 152,000 more cases than the next industry sector: manufacturing (Kent A. Sepkowitz and Leon Eisenberg[†]).

To promote health, nations organize the healthcare delivery systems in such a way to maximize the benefits to her stakeholder. In Kenya, the government unveiled Kenya Essential Package for Health (KEPH), in which the healthcare delivery system is organized into levels 2, 3, 4, 5 and 6. Each level offers complementary package (Paul K. Kimalu et al. 2004). Kenya has also domesticated the ILO-OSHA requirements by enacting OSHA Law 2007 setting OSH compliance standards and penalties (Nyakang'o 2005). Whereas the law demands the highest safety standards, occupational incidences such as needle stick injuries, exposure to toxic gasses, fire, congestions, injuries and deaths continue being reported in Kenyan healthcare sector raising issues of compliance and preparedness. WHO international council of nurses reports that Kenya had over – “75% needle stick injuries per year (2-3 nsi/yr)” in a year. (Susan Q Wilburn and Gerry Eijkemans 2004)

In Kenya, the Ministry of Health (MoH) has made major strides on safety by implementing various safety programs like Infection Control Program (IPC) & waste management programs, involving professional bodies and associations. Some key examples of these include: the Pharmacies and Poisons Board (PPB), the Nursing Council of Kenya (NCK), Medical Practitioners and Dentists Board (MPDB), Kenya Medical Laboratories Technicians and Technologists Board (KMLTTB). In addition, the MoH has sought assistance of other partners like donor agencies in ensuring quality; the MOH is yet to develop safety and health policy and guidelines to be

adapted at the health facilities where the health worker is in constant safety and health risk. Consequently, the Capacity Kenya Project working in partnership with the Kenya's ministry of health sought to address this gap. A National Health and Safety committee was established to oversee interventions to implement the OSHA 2007 to improve health and safety practices at all levels of the health system. Naturally OSH Risk assessment exercise and a baseline risk survey is the foundation upon to build hence this initiative.

1.3 OVERALL PURPOSE

Generate a baseline OSH risk analysis report through an Integrated OSH` Risk Assessment Exercise on health facilities across the country, evaluate the current standards of OSH implementation in the health ministries and recommend a working policy to fill the gap to the recommended National & International OSH Standards.

1.4 SPECIFIC OBJECTIVES

1. Perform a health facility based OSH Risk Assessment Exercise in selected healthcare institutions across the country
2. Generate baseline data on OSH risks and risk levels in all departments of KEPH implementation scheme across the country
3. Propose a framework for formal tracking for OSH problems fill the gap to the recommended National & International OSH Standards.

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

The ILO–WHO Joint Committee on Occupational Health insinuated in 1950 that occupational health should “aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations” (ILO-WHO 1995). The realization of this aim demands a creation and sustainability of a culture – a safety culture. This realization not only requires risk assessment, but also an OSH management system as a fundamental component to a strategy of prevention via proactive and prediction approaches (Okoth-Okelloh and Ouma 2012).

2.2 OCCUPATIONAL HEALTH AND SAFETY (OSH)

According to WHO, Occupational Health and Safety (OSH) is considered a multi-disciplinary activity aiming at four basic issues namely; the protection and promotion of the health of workers by preventing and controlling occupational diseases and accidents and by eliminating occupational factors and conditions hazardous to health and safety at work; the development and promotion of healthy and safe work, work environments and work organizations; enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work; and enabling workers to conduct socially and economically productive lives and to contribute positively to sustainable development (Okoth-Okelloh and Ouma 2012; WHO 2010a).

Since 1837, OSH has grown as a key aspect in sustainable development and building of safe and civil society. OSH has incorporated both economic and ethical dimensions, while taking a keen interest in the essential tension between them and its resolution (Wade 1982). This growth has taken place alongside transition of society from pre-modernism to post-modernism to a profile of the socio-ethical domain in which OSH professionalism today operates. The status of OSH conditions in developing world is now an issue of concern and of growing importance to health professionals, labor rights organizations, local factory operators, multi-national corporations, consumers, and workers (Okoth-Okelloh and Ouma 2012). The significance of OSH has been expressed by the formation and continued funding of ILO. ILO with her collaborators such as

America's Centers for Disease Control and Prevention (CDC) - National Institute for Occupational Safety and Health (NIOSH), continue to represent the face of OSH worldwide. According to a recent report, the protection of workers against work-related sickness, disease and injury forms part of the historical mandate of the ILO (ILO 2010).

2.3 OCCUPATIONAL HEALTH AND SAFETY IN KENYA

Universally, occupational health and safety laws, regulations, and implementing agencies are struggling simply to keep up with the current explosive economic growth (O'Rourke and Brown 2003). Nationally, Kenya's population and industrial growth has expanded considerably in the last decade, bringing with it several OSH challenges.

However, the concept of safety in the workplace is not new in Kenya as the status of OSH conditions has been an issue of growing importance to the industrialists, practitioners, the government and consumers (GOK-MOH 2008), (Nyakang'o 2005). Furthermore, OSH is highlighted in the current government constitution and strongly anchored in the Ministry of Labor, as the department of Occupational Health and Safety (GOK 2010).

The history of OSH in Kenya dates back to the GoK Factories Act Cap 514, which came into operation on 1st September 1951, with a provision for the health, safety and welfare of persons employed in factories and other places of work (Nyakang'o 2005). A big leap was then made in the year 2004, when a subsidiary legislation - "Legal Notice No. 30" was enacted. While it provided for the formation of Safety Committees in factories and other workplaces tasked with the responsibility for all health and safety issues of enterprises including undertaking the much dreaded safety audits, the shortfalls remained with reports that more than half of the industrial accidents and injuries in Kenya went unreported (Nyakang'o 2005).

Such pitfalls gave rise to the GoK Occupational Safety and Health Act of 2007 – modeled alongside the American Occupational Safety and Health Administration (OSHA) and intended to give a more elaborate approach to OSH issues a rapid growing economy (Okoth-Okelloh and Ouma 2012). While this industrialization is just now beginning to receive rigorous and sustained examination in terms of its impact on environmental and occupational health, lack of research in key neglected areas remains a challenge - among them occupational health and safety hazards in the health care sector in which the government through MOH is a major stakeholder (Okoth-Okelloh and Ouma 2012).

2.4 HEALTH CARE PROVISION AND WORK

The term health care worker remains disputed especially when it comes to who really is a health care worker. While virtually everyone would agree that doctors and nurses are health care workers, they fail to include those who practice chiropractics and homeopathy, nursing aides and orderlies when we talk about nurses, hospital cleaners, laundry workers, cooks, file and appointment clerks, home care and personal support workers (Pat Armstrong et al. 2006). Yet these are all an essential and critical part of the health care team. Consequently, the term Health Care Worker (HCW) refers to all people delivering health care services at all levels, including students, trainees, laboratory staff and mortuary attendants, who have direct contact with patients or with a patient's blood or body substances (Flett 2007) and a health care facility is a workplace as well as a place for receiving and giving care (WHO 2010b). Health care facilities around the world employ over 59 million workers who are exposed to a complex variety of health and safety hazards every day. Such hazards include: biological hazards, such as TB, Hepatitis, HIV/AIDS, SARS; chemical hazards, such as, glutaraldehyde, ethylene oxide; physical hazards, such as noise, radiation, slips trips and falls; ergonomic hazards, such as heavy lifting; psychosocial hazards, such as shift work, violence and stress; fire and explosion hazards, such as using oxygen, alcohol sanitizing gels; and electrical hazards, such as frayed electrical cords (WHO 2010b).

OSH hazards in healthcare facilities can be grouped geographically or according to location or service offered. These include; 1] Clinical areas (with potential hazards being; Blood borne pathogens, Airborne pathogens, Ergonomic, Slips/trips/falls and Sharps); 2] Surgical Suite (BBP, Anesthetic gases, Compressed gases; Lasers, Ergonomic, Latex); 3] Laboratory/Lab Work (Infectious diseases, Chemical agents, formaldehyde, toluene, xylene, Ergonomic, Slips, trips, falls, Sharps); 4] Radiology (Radiation, Ergonomics, Airborne pathogens, Blood borne pathogens, Slips, trips, falls); 5] Physical Therapy (Ergonomics, Trips, falls, Equipment hazards, Blood borne pathogens), 6] Pharmacy (Drug absorption, Ergonomic, Slips, trips, falls, Latex), 7] Central Supply/Stores (Compressed gases, Anesthetic gases, Chemical agents, (sterilizers, cleaners), Ergonomic, Burns, cuts), 8] Laundry (Contaminated laundry, Noise, Heat, Lifting, Sharps, Slips, trips, falls, Fire hazard), 9] Housekeeping (Chemical agents, Contaminated objects, (infectious agents), Latex, Sharps, Lifting hazard, Slips, trips, falls), 10] Dietary/Kitchen (Food borne diseases, Heat, Moving machinery, Fire hazards, Slips, trips, falls, Electrical equipment). While it is generally accepted that HCWs need protection from these workplace hazards just as much as do

other workers, “because their job is to care for the sick and injured, HCWs are often viewed as “immune” to injury or illness. Their patients come first. They are often expected to sacrifice their own well-being for the sake of their patients” (WHO 2010b).

Consequently, HCWs have a responsibility to be informed of the risks associated with contracting diseases in their workplaces the magnitude of the risks is so high that “The WHO Global Plan of Action on workers health calls on all member states to develop national programs for health worker occupational health... and for WHO to develop national campaigns for immunizing health workers against occupational diseases such as hepatitis B - one of the biggest threat to health workers resulting from occupational exposures (Okoth-Okelloh and Ouma 2012; WHO 2010b). A much more accurate estimate of risk is needed with the call for the support and protection of the health workforce echoed in the 2006 World Health Report Working Together for Health on human resources that reported a global shortage of health personnel which had reached crisis level in 57 countries. Protecting the occupational health of health workers is critical to having an adequate workforce of trained and healthy health personnel (WHO 2010b).

2.5 HEALTH CARE SECTOR IN KENYA

The healthcare system in Kenya today is a result of policies stretching from the early years of independence in the 1960s in a bid to reverse the adverse effects of colonial oppression summarized as a declaration of war on three common enemies, namely ignorance, poverty and disease (GOK-MOH 2008). The successive governments continued with expansion of health facilities in the country in a bid to eliminate “poverty, illiteracy and disease” resulting in rapid growth of public health facilities and medical personnel. The system at independence was largely a “three-tier health system in which the central government provided services at district, provincial and national levels; missionaries provided health services at sub-district levels; and local government provided services in urban areas until 1970 when the government established a system of comprehensive rural health services in which health centers became the focal points for comprehensive provision of preventive, promotive and curative services (GoK-MOH 2010).” (Paul K. Kimalu et al. 2004). Today, the government’s healthcare delivery system is pyramidal, with the national referral facilities at Kenyatta National Hospital (Nairobi) and Moi Teaching and Referral Hospital (Eldoret) and newly named referrals forming the peak at KEPH Level 6, followed by provincial general hospitals at KEPH Level 5, district and sub-district hospitals at level 4, with

health centers and dispensaries forming the base (Okoth-Okelloh and Ouma 2012; Paul K. Kimalu et al. 2004). Under the on-going health sector reforms, several referral hospitals have been created in a bid to achieve the health care sector's goal of health for all and the country's vision 2030 (GoK-MOH 2010).

3.0 METHODOLOGY

3.1 STUDY DESIGN

The exercise employed a descriptive study approach in investigating Occupational Health and Safety management practices in the health sector in Kenya. It included an OSH risk assessment survey and OSH program implementation survey. In order to achieve the study objectives, the research method was divided into three main parts. The primary component made use of literature, standards and guidelines on OSH, OHSO and requirements for their realization. The second part was the collection of quantitative data in form of risk assessment survey targeting section heads and health care workers and collection of observations on how the ministry works with OSH. The third part was the analysis of the Risk Assessment data to determine risk levels and gaps in OSH Programmatic implementation. Based on the outcome of the analysis, a recommendation of the remedial measures for best practice and a suitable standard and guidelines for implementing OSH in the Kenyan health sector as a means of domesticating OSHA 2007 within the health ministry in Kenya has been proposed.

3.2 STUDY SITE

The exercise was conducted at GOK healthcare facilities across the nation sampled from the master list of medical facilities across the nation listed as ministry of health owned (MOH-GOK 2011a). These fall into six categories based on the Kenya Essential Package for Health (KEPH) namely; KEPH level 2 to KEPH level 6. This comprises the provincial hospitals, district hospitals, sub-district hospitals, health centers and dispensaries for level 2 to level 5, while level 6 comprises teaching and special care institutions. The latter (level 6) were excluded from this study due to their lack of homogeneity with the rest of levels in terms of service and administrative structure. Consequently, the health institutions covered were sampled from a total number of 3,448 facilities classified as KEPH level 2 to KEPH level 5.

3.3 STUDY POPULATION

The study population was government owned health facilities classified as KEPH-Level 2 to KEPH Level 5 in the country dully registered and recognized as so by the ministry of health.

3.4 SAMPLING DESIGN, SAMPLE SIZE CALCULATION AND SAMPLING PROCEDURE

The sample size was determined from communities of health ministry namely the ILO's

Tripartism (ILO 2005) of employer, worker and government who have been authorized and have given informed consent to participate in the risk assessment survey. Stratified Random Sampling was used to determine individual healthcare facilities to be examined.

3.4.1 STRATIFIED RANDOM SAMPLING

Due to the homogeneous nature of health care system management classified under KEPH levels 2 to 5, client specific requirement and service provision in terms of sources of funding, administration, set up, operations and the intricate nature of this survey, a stratified random sampling was employed.

3.4.2 SAMPLE SIZE CALCULATION

To determine the number of GOK health facilities to be examined in the study, the simplified formula for calculating sample size for proportions by Yamane (1967:886) was used as below:

$$n = \frac{N}{1+N(e)^2}$$
$$n = \frac{3,448}{1+3,448(0.1)^2} = 97 \text{ facilities}$$

Where n is the sample size, N the total population, e the confidence level at 95% and P (e) (estimated proportion of the attribute that is present in the population) at of $\pm 10\%$. Consequently, the number of the facilities was 97. This formula was preferred given the homogeneity of the facilities in terms of mandate and processes.

3.4.3 SAMPLING PROCEDURE

A list of all government health facilities as outlined in GOK-Master Facility list (MOH-GOK 2011a) was identified into eight provinces namely Nyanza, Central, Coast, Western, Rift Valley, Eastern, North-Eastern and Nairobi. The population was then organized into strata comprising, KEPH level 2 to level 5. Out of the population of 3,448 subjected to the above formula at a level of precision of $\pm 10\%$ resulting in a representative sample of 97 and was proportionately distributed according to population strength of each level in each strata to ensure adequate representation per strata (province) and KEPH level. The number 97 corresponds to the Table for

Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data (Israel 1992).

A sample frame from the main excel database "eHealth Kenya Facilities 29_04_2011_415 - Master List" (MOH-GOK 2011b) of all health facilities stratified into various categories like, province, KEPH level, districts and physical locations was maintained in Excel due to its ability to generate random numbers from zero to one or from pre-selected number ranges, in this case, KEPH level 5 (University-of-Wisconsin 2011). By using this feature, a random number (for KEPH Level 5 facility in each province) was assigned to each row in the aforementioned set of data and sorted randomly using the formula "=RAND()" in the excel formula text box in respect to column A where the random numbers had been generated for each row (University-of-Wisconsin 2011).

3.4.4 OBSERVED FACTORS MET BY SELECTION CRITERIA

1. Representation for every province
2. Representation at every level of the health facilities i.e. the 5 KEPH levels
3. Special factors that cannot be left constant e.g. areas with high violence and crime rates, including gender related crime
 - Areas considered violent for reasons such as civil disputes. These areas include places like North Eastern, Mt Elgon etc
 - High crime areas such as cities i.e. Nairobi, Kisumu, Mombasa
 - Areas prone to have gender based violence such as Nyanza, Western, Rift Valley and Central (DHS- 2008/9)
4. Hard to reach areas such as: North Eastern specifically Lodwar, Marsabit, Moyale, Lamu
5. Organization of DOSH Dept: The department of occupational health and safety only has 7 Provincial occupational health officers (POHO) for 7 Provinces excluding North Eastern Province. Hence an audit of Garissa PGH was considered an added advantage.

3.5 PERMISSIONS AND ETHICAL CONSIDERATIONS

Clearance and any required permissions was obtained from the ministry of health through the MOH National OSH Committee. A letter of authorization from the director of medical services and director public health from the ministry was considered sufficient. Despite the clearance letters, informed consent of health facility heads and every section head and staff was sought and acceptance given before the survey. The respondents had an option to opt out of participating without being victimized or reported back to their superiors.

3.6 INSTRUMENTATION: RISK ASSESSMENT SURVEY TOOLS

An OSH risk assessment tool and a questionnaire for determining the OSH indicators and an OSH risk assessment checklist for health facilities adopted from (Okoth-Okelloh and Ouma 2012)) was employed for quantitative data and evaluating OSH at the facility level. The former was a self-designed risk assessment data extraction form on elements of OSH and OSH risk assessment, while the latter is a tool – questionnaire for determining OSH indicator for OSH implementation as adopted from (Minguillón and Yacuzzi 2009) for the Kenyan situation was employed and conclusion developed on the basis of analysis of the questionnaires and interviews.

3.6.1 TOOLS

Table 1: Instrumentation: Risk Assessment Survey Tools

Objectives	Methodology	Rational	Tools	Target population
Conduct an Integrated OSH Risk Assessment Exercise on health facilities across the country	Quantitative – Checklist administered via observation	The actual risk assessment to determine risk levels in each section of health facility operations	OSH Risk Assessment Tool (IntraHealth OSH -RISK ASS - 002)	Health Facility, Public Health Officer of Designate – while walking in the facility
Evaluating the standards of OSH implementation in the health ministry against the recommended National & International OSH Standards	Quantitative	Outcome would guide the design of OSH program and policy. The aim is to facilitate ownership and avoid reinventing the wheel	The Questionnaire for determining OHSMS indicators (Intrahealth – OSH RISK ASS – 003)	Health Facility Head or designate of a senior staff

3.7 DATA COLLECTION, ANALYSIS AND PRESENTATION

A study team of 27 comprising various cadres was proposed, recruited trained and utilised on the basis of professionalism and timeline within which the deliverables were to be achieved. The study instruments were tested and a pre-test carried out at Thika Level 5 hospital and Mbagathi District Hospital to test for validity and adjusted accordingly. The data was collected using both observation and structured interview schedule for participants in the study, a walk-through respondent facility on Risk Assessment administered using observation, tests and interviews for all the study respondents per facility.

3.7.1.1 DATA HANDLING- PROCEDURES

Each team comprised of 5 members namely, 2 coordinators (1 MOH OSH National Committee & 1 from Capacity Kenya), 1 data Quality Assurance (QA) and logistician and 2 Research Assistants (RA). The team leader 1 – Coordinator form MOH National OSH Committee, bearing a copy of the letter from the ministry would introduce the team, the purpose of the survey and seek informed consent. The study research assistants collected the data via aforementioned channels (see Appendix 1; Annex 2). The QA/Logistics officer would sign the study log-in sheet by filling in the front page with the details of the facility and get it signed by the supervisor and facility head. Two RAs would then administer the Risk Assessment tool while the QA officer would take pictures as per the instructions in the field manual. On Completion of Data Collection the team leader would cross check each and every entry with the team to ensure that it is a true reflection of the ground and sign at the end of the questionnaire and hand over to the QA officer. To ensure quality, the team did data entry into a pre-established data base at the end of every facility and hardcopy filled questionnaire kept for reference. Data cleaning was done under the supervision of the PI and the data analyst. The data was then assigned nominal values to enable analysis by the statistical package for social sciences (SPSS) computer program. Each of the variables was subjected to chi-square test at 5% level of significance to test for strength of association. The data obtained was presented in tables and figures.

3.8 REPORTING KEYS: RISK ASSESSMENT EVALUATION SCALE

The following keys were used for reporting results of the study:

Table 2: Risk Assessment Key (Scale)

Not Applicable 0	insignificant 1	Minor 2	Moderate 3	Major 4	Severe 5
Risk Assessment Key (Scale)					

1. **Neutral = Not Applicable.** The process likely to present risk not undertaken in the facility
2. **Green = Insignificant.** No risk or the risk is low completely mitigated
3. **Blue = Minor.** Risks exist in low quantities. Exposures possible but unlikely in large

quantities. Though processes may present some risks whose results could be felt as minor on exposure

4. **Yellow = Moderate.** Significant risk exists; action plans must be developed and reviewed frequently
5. **Orange=Major/High:** Non-Compliance. Risk Serious enough to warrant urgent changes in day to day operations. Exposure could be catastrophic. Any negligence would move to catastrophic stage
6. **Red=Severe/Extreme.** Catastrophic: Risk is serious enough to impact the Agency's ability to meet commitments; immediate intervention is required.

3.8.1 RISK ANALYSIS KEY AND SCALE: HIERARCHY OF CONTROLS FORMULA

Hierarchy of controls method was adopted for risk analysis and scoring direction. Ranking is done on the negative with a section having all the controls scoring zero, 1, 2, 3, 4, and 5 for the one that lack all the six on the "hierarchy of controls" as outlined below:

Order No.	Hierarchy of Control	Safety Rank Risk Level	Example
Firstly	Eliminate	0	Removing the hazard, e.g. taking a hazardous piece of equipment out of service.
Secondly	Substitute	1	Replacing a hazardous substance or process with a less hazardous one.
Thirdly	Isolation	2	Isolating the hazard from the person at risk, e.g. using a guard or barrier.
Fourthly	Engineering	3	Redesign a process or piece of equipment to make it less hazardous.
Fifthly	Administrative	4	Adopting safe work practices or providing appropriate training, instruction or information.
Sixthly	Personal Protective Equipment (PPE)	5	The use of personal protective equipment e.g. gloves, glasses, earmuffs, aprons, safety footwear, and dust masks. NB: This is a last resort control and should be for interim periods only, while higher level control is developed or implemented.

Figure 1: Risk Analysis Key And Scale: Hierarchy Of Controls Formula

3.9 STUDY LIMITATIONS, RISKS AND CHALLENGES

This survey carries with it some limitations worth noting. One limitation is that the survey was

cross-sectional inquiry, making the outcomes only relevant to the time during the study. Consequently, additional support in form of longitudinal research using the results as baseline data is required. Secondly, there were concerns that some members of senior management in the selected facilities could not have been seriously forthcoming with necessary information for fear of their institutions being painted in negatively. However, this was reduced by encouraging respondents to being more open during the assessment. However, the positive impact of the project on the Kenya's health sector at large and the nation on one hand and active involvement of the MOH officials at all levels of the study is considered a positive motivation for the study.

4.0 MOH OSH RISK BASELINE ASSESSMENT RESULTS

This section presents the results of the risk assessment survey from selected MOH healthcare institutions across the country in terms of the baseline compliance data (risk levels) in all departments of KEPH implementation scheme cumulated across the country, isolating top OSH risks in each section of facility OSH management and finally proposing framework for formal tracking for OSH problems to fill the gap to the recommended National & International OSH Standards.

4.1 OVERALL NATIONAL¹ OSH RISK STATUS BY SECTION/DEPARTMENT

4.1.1 ADMINISTRATION DEPARTMENT

Administration department is the engine and key to success or failure of a safety program. It handles all the logistics and facilitates each staff to do his/her duty by ensuring timely and appropriate provision and use of resources (equipment & supplies). By ensuring the link between; the worker-to-work; equipment-to-work; work-to-equipment and process-to-workforce is maintained, administration department facilitates and mirrors safety in every other section in the facility. The Occupational Safety and Health Risk Assessment Exercise (OSHRAE) sought to assess the OSH risk magnitude at the administrative departments KEPH level 2 to level 5 facilities sampled across the nation. The following critical areas were assessed: General House Keeping OSH Issues, Documented Participatory OSH Administration Program (POSHAP), Regulatory/Organizational Bodies and Professional Associations, Admissions and Records, workstations, employee rights and responsibility, Record Keeping/Employee surveillance Program, and Electrical Safety in all sections. All the facilities (n=95) had the administration department assessed.

The survey results from the building blocks/subscales were analyzed and summarized in figure 2 and table 3 below:

¹ "National" refers to government owned health facilities KEPH Level 2 - 5

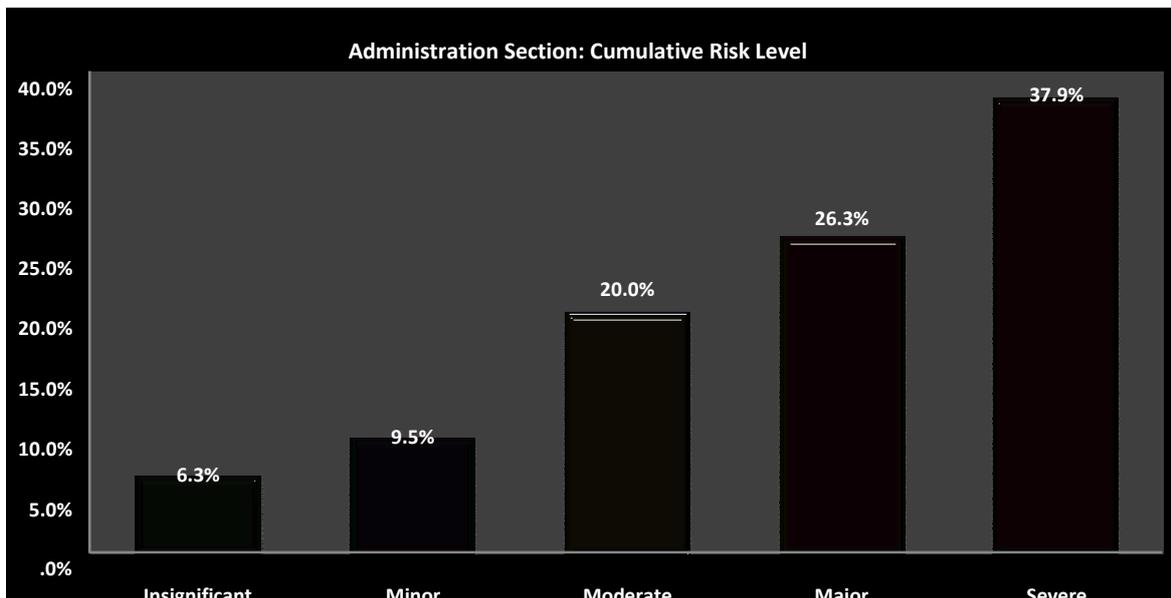


Figure 2: KEPH Level 2-5 Administration Department Cumulative Risk Level-Median

From the 95 facilities surveyed, 36 (38%) returned a severe risk level, 25 (26%) major risk level, 19 (20%) moderate, while 6, (6%) returned minor risk level. There was no "Neutral/Not-Applicable risk level" score since all the facilities had administration department.

The survey findings also showed that across the facilities surveyed, there was no written OSH policy or directive to that effect. Moreover, there were no structured guidelines on how OSH is communicated within the MOH system hence OSH performance is not monitored and does not form part of the monthly reports published by the facility despite being mentioned in performance contracts. While other Occupational Health Programs exists and employees engage in activities prescribed in schedule 1 under the Medical Examination Rules, 2005, the employees largely do not undergo medical examination (Factories and Other Places of Work (Medical Examination) Rules, GOK 2005).

Employee surveillance programs are also non-existent and there is no data on workplace accidents and occupational diseases (not even a general register synonymous with healthcare sector). There is limited use of Standard Operating Procedures (SOPs). While some SOPs for some key activities are in place, majority are neither updated nor readily available. The administrative system has no inventory published for the hazardous chemicals used in the facilities and there was no program for hazard communication. There was no evidence for "A permit to work system" being in place and neither was there evidence of a system of management of contractors and suppliers. The following table (table 3) shows an itemized

version of the OSHRAE results (cumulative medians) of variables assessed under administration department ranked on the hierarchy of controls scale.

Table 3: KEPH Level 2-5 Administration Department Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in Administration Section	Cumulative Safety Ranking on Hierarchy of controls scale
General Housekeeping Issues observed (orderliness and sanitized environment)	3
Presence and use of Documented Participatory OSH Administration Program (POSHAP)	4
Engagement of Regulatory Bodies & Professional Associations	2
Admissions and Records sections enhanced and user friendly	3
Workstations ergonomically established	4
Ventilation and Aerosols observed in terms of directional airflow and air changes	4
Employee surveillance Program firmly in place and Emergency Action Plan (EAP) in place and enforced	5
General Electrical Safety observed in all Sections	3
Overall Safety Risk Level (Admin)	4

The following table (table 4) is a cross-tabulation of risk below for the assessed OSH Risks in the administration department detailing the risk levels against the KEPH levels as outlines in the above sections.

Table 4: Cross-tabulation Administration Department - median

Administration -median		Insignificant	Minor	Moderate	Major	Severe	Total
KEPH level 2	Count	2	5	4	6	15	32
	% within KEPH LEVEL	6.3%	15.6%	12.5%	18.8%	46.9%	100%
	% within Administration	33.3%	55.6%	21.1%	24.0%	41.7%	33.7%
	% of Total	2.1%	5.3%	4.2%	6.3%	15.8%	33.7%
KEPH level 3	Count	3	1	2	7	14	27
	% within KEPH LEVEL	11.1%	3.7%	7.4%	25.9%	51.9%	100%
	% within Administration	50.0%	11.1%	10.5%	28.0%	38.9%	28.4%
	% of Total	3.2%	1.1%	2.1%	7.4%	14.7%	28.4%
KEPH level 4	Count	1	3	11	8	5	28
	% within KEPH LEVEL	3.6%	10.7%	39.3%	28.6%	17.9%	100%
	% within Administration	16.7%	33.3%	57.9%	32.0%	13.9%	29.5%
	% of Total	1.1%	3.2%	11.6%	8.4%	5.3%	29.5%
KEPH level 5	Count	0	0	2	4	2	8
	% within KEPH LEVEL	.0%	.0%	25.0%	50.0%	25.0%	100%
	% within Administration	.0%	.0%	10.5%	16.0%	5.6%	8.4%
	% of Total	.0%	.0%	2.1%	4.2%	2.1%	8.4%
Total	Count	6	9	19	25	36	95
	% of Total	6.3%	9.5%	20.0%	26.3%	37.9%	100%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was insignificant at 6.3%, minor 9.5%, moderate 20% major 26% while severe was 38%.

No facility in KEPH Level 2-5 had evidence of an existing or even updated Emergency Response Program (EAP) published and procedures to identify and respond to potential emergency situations. Fire safety audits in most cases had not been undertaken by fire safety auditor as required under the Fire Risk Reduction Rules, 2007. While a number of the facilities in level 4 and 5 had incinerators, majority were reported defective at the time of onsite activities and there were no measures to prevent spread of fire during the burning of waste. While the fire assembly points are designated in most facilities, the routes leading to the point were largely not marked and there were no provisions in place for alternative ventilation and lighting facilities in the escape routes in case of fire outbreak.

The state of housekeeping generally and specifically in the Kitchen, Laundry, Morgue, bio-

engineering and storage areas is not satisfactory, (see photos section for illustration). While there is no evidence of accumulation of wastes and receptacles site-wide, waste segregation was not practiced downstream the chain. In most cases, all sorts of wastes are mixed posing dangers of catastrophic magnitude to support staff and other end-chain waste handlers.

The pictorial presentation below is a simulation of OSH situation on the ground. Proper administrative controls e.g. use of SOP and Spot checks can mitigate the related OSH risks.



Figure 3: Waste Handling OSH Related Risks

In terms of ventilation, while the design of most of the facilities relied on natural ventilation (air flows), closed windows and poor infrastructural layout of the facility in some areas hindered circulation of fresh air by natural means. Equipment and supplies jam the corridors and at times piled past the high widows to the roof occupying vital workspace and making places stuffy (see pictures).



Figure 4: Ward converted to a storage area - Ololunga DH



Figure 5: Obstruction of the corridor - Ololunga DH

Staff welfare facilities provided in the workplace includes washing facilities, accommodation for clothing, sitting facilities, drinking water, and sanitary conveniences. Assessment of their condition, most were generally in acceptable but not satisfactory. While suitable, sufficient and separate sanitary conveniences are provided for both genders at the workplace, they are poorly maintained and most lacked basic supplies. Personal Protective Equipment (PPE) is issued and level of usage is satisfactory especially in clinical areas but not in housekeeping laundry and the bioengineering department. There was no objective evidence in relation with training of PPE users, no adequate and suitable accommodation for clothing not worn during working hours and disinfection of used uniforms and overalls before staff leaves the facility. Most staff launder their own uniforms at home and a majority wear them home posing pathogenic dangers to the oblivious public. The situation is way over the acceptable risk level in the administration department – the lifeline of the KEPH L2-L5 System. See the itemized graph and table below.

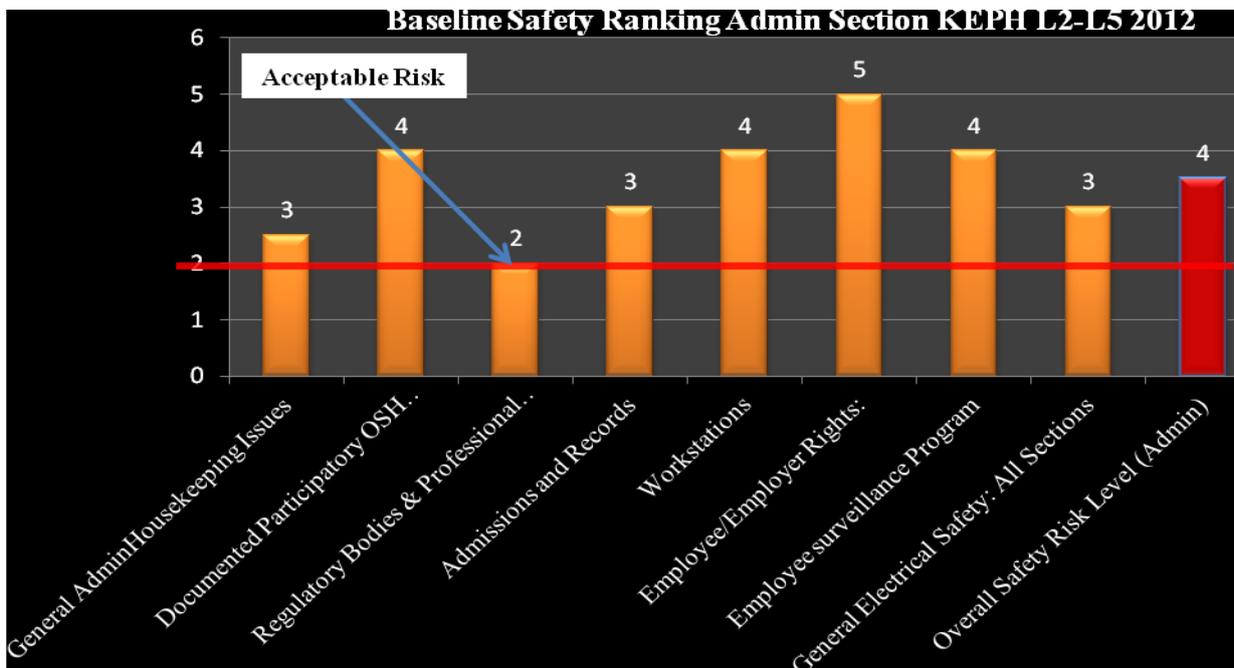


Figure 6: KEPH Level 2-5 Administration Department Cumulative Risk Level-Itemized.

As typified in the Fig 6 above, only one variable – the engagement of regulatory bodies and professional associations meets the acceptable OSH Risk Level of 2 on the hierarchy of control's scale. The rest of the variables are way above the acceptable risk level.

4.1.1.1 PICTORIAL PRESENTATION OF ADMINISTRATIVE FAILURE RESULTING IN A RISKY OSH SITUATION IN SELECTED FACILITIES



Photo 1: A risk assessment team member undertaking air flow measurement at the Laboratory at Nakuru PGH. A safety cabinet (SC) should be regularly serviced and tested to ensure continued safe performance.



Photo 2: The status of housekeeping at the Bio-engineering department was unsatisfactory. See fire exit completely blocked and unmarked. Good housekeeping is essential in a good OSH program, promotes OSH, production, and morale



Photo 3: Contractor employee without any PPE. Arrangements should be established and maintained for ensuring that the legal safety and health requirements are applied to contractors and their workers.



of the people.

Photo 4 Contractor employees engaged in renovation work. The institution should establish and maintain procedures for ensuring that the legal safety and health requirements are applied to contractors and their workers.



Photo 5: The cracked column supporting the store veranda roof at NPGH may potentially collapse due the structural failure (see red arrow). The masonry column may not be able to withstand tension caused by the horizontal push from the roof supported on it. Appropriate and timely action should be taken to prevent the potential collapse of the section of the veranda, which might cause harm to people working in the area.



Photo 6: Several gas cylinders in the gas cylinder storage facility at NPGH were not secured raising the possibility of injury or accidental discharge of the contents should they fall over. All gas cylinders should be firmly secured to prevent them falling over when in use or in storage. Combustible materials were kept inside the store, which is unsafe practice; should be removed immediately.



Photo 7: The danger to darkroom workers is through the inhalation of powders or vapors. The darkroom provides no safety equipment such as showers, eye washes or fire extinguishers. Air ventilation is non-existent, resulting in chemical levels well above acceptable standards.



Photo 8: Fire assembly point has been designated and signposted; however the escape routes have not been marked. Escape routes should be marked to ensure, as far as possible, that any person confronted by fire should be able to go directly to the fire assembly point.



Photo 9: The NPGH's ICU was observed to be clean and generally free from any accumulation of dust and refuse. The layout is suitable and ventilation was satisfactory.



Photo 10: Walkways at the NPGH' ICU obstructed (the red arrow). The walkways should at all times be free from any obstructions and an arrangement to ensure this is achieved should be implemented



Photo 11: Waste containment facilities are provided at the NPGH; Notice the red container with lid open!



Photo 12: PGH's ICU Workstation with none ergonomic chairs and inadequate working space; the minimum permissible being ten cubic meters per person.



Photo 13: Blocked Emergency Exit at Coast PGH



Photo 14: Blocked Emergency Exit at Coast PGH

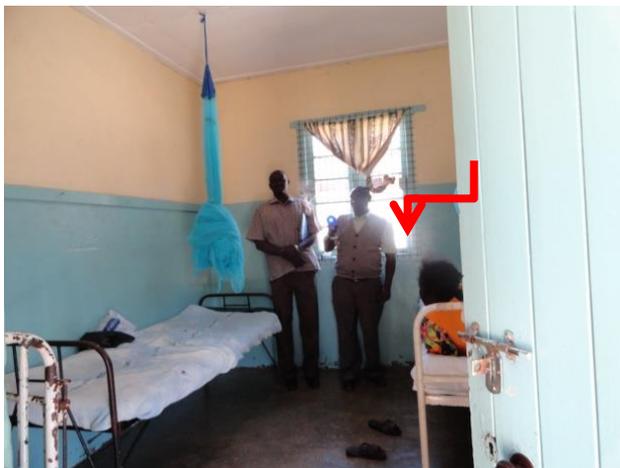


Photo 15: Isolation wards air changes per hour



Photo 16: Sheltered walkways are provided and

measurement. It was observed that the windows were shut and the patient's head was next to the door (air inlet). Signage was not posted.



Photo 17: TB Facility isolated from the other areas although it was noted that other patients use the facility.



Photo 19: The main theatre under renovation and construction work was ongoing.

signposted to locate each facility; however no signage has been posted to guide people to exit facilities in case an order to evacuate is issued.



Photo 18: TB facility; notice the personnel without respiratory protection, which is a key tool to prevent infection.



Photo 20: Laundry services; notice the unsatisfactory state of housekeeping and unsafe electrical condition – red arrow. It was established that there is no written policy on maintenance of equipment and electrical installations.

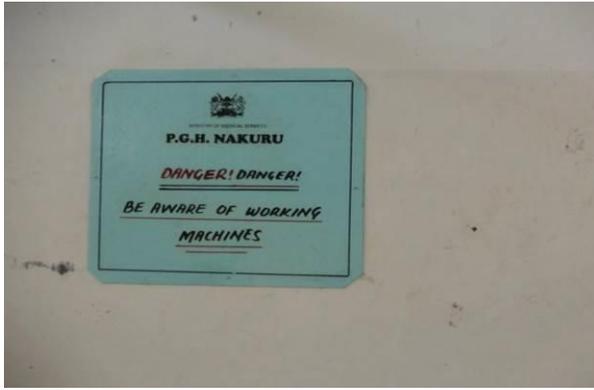


Photo 21: Safety notices have been posted in the laundry area to remind staff of the basic things they have to remember when working. This serves as a reminder to maintain their health and safety while at work. Safety notices posters help in prevention of accidents.



Photo 22: All electrical installation should comply with relevant regulations including IIE Regulations, the Factories and Other Places of Work (Fire Risk Reduction Rules), the Factories (Electrical Power) (Special) Rules, 1979 and permit to work requirements during installation and maintenance



Photo 23: The state of housekeeping at the NPGH Central Store is unsatisfactory; materials are stack to the ceiling. The material in the store must be arranged in such a manner that at least a gap of 80cm is maintained from the nearest fixed wall or ceiling or roof.



Photo 24: Aisles are obstructed and materials stacked to the ceiling. Develop a safe system of work that will integrate the people, materials and machinery within a safe and healthy working environment.



Photo 25: ICU – Waste should be placed inside (see arrow) the receptacle and removed frequently.



Photo 26: Obstruction of the corridor at the X-RAY centre. Walkways should be clear of any obstructions.



Photo 27: Staff at work in the kitchen at NGPH



Photo 28: Changing room for staff at NPGH



Photo 29: The X-ray department was observed



Photo 30: Minor theatre waste containment. It

to be clean and free from any accumulation of dust. was reported that the incinerator was defective.



Photo 31: The electrical panel in the kitchen was not locked allowing possible unauthorized access to live electrical circuitry. To prevent any potential uncontrolled access it is recommended to lock the cabinet. Access should be limited to trained and dedicated personnel (i.e. electrical technicians).



Photo 32: Appropriate signage to identify facilities have been provided site wide however signage for emergency exit in case of fire have not been posted. It was also established that adequate and suitable fire-fighting equip have not been distributed site wide. Fire exits/passages must be kept free from obstruction.

Figure 7: Pictorial Presentation Of Administrative Failure Resulting In A Risky OSH Situation In Selected Facilities

4.1.2 CENTRAL STORES/GENERAL STORAGE AREAS DEPARTMENT

The study's second target was the OSH risk level at the general stores departments of KEPH L2-L5 facilities sampled across the nation. Generally, a store is the first logistic and administrative link between the administration and technicians/staff in safe service provision. The following specific building blocks of OSH management developed from the hierarchy of controls we assessed: General House Keeping OSH Issues, Exposure to Ethylene Oxide, Mercury Exposure, Glutaraldehyde, Burns/Cuts, Ergonomics, Hazardous Chemicals, Slips/Trips/Falls, and Latex Allergy. The survey results from the building blocks/subscales were analyzed, summarized and presented in figures and tables below:

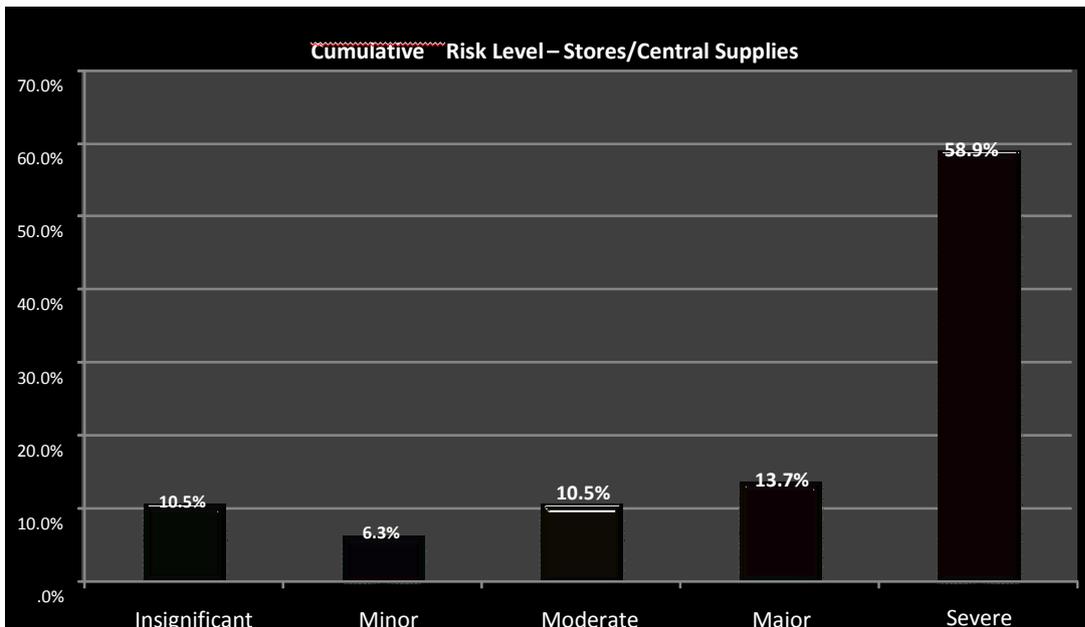


Figure 8: Cumulative Risk Central Stores/Supplies Department

The OSH risk variables itemized and ranked against the hierarchy of controls scale for stores. The results show that the general classification is "severe". Of 95 health facilities, 60% had a score of "severe" OSH risk rating, with 14% of facilities listed as having major risk, 11% moderate risk, 7 % minor risk, with 11% rated as insignificant.

Following review of additional survey findings, major areas of concern are; housekeeping issues, exposures to ethylene, glutaraldehyde and mercury, poor ergonomics among others. The stores are mostly characterized with overcrowding and possible respiratory complications for staff and other users due to exposures caused by poor airflow/minimal air changes. No work-aid equipment, PPE and stores standard. Most stores lack pellets and proper shelving leaving equipment and supplies stacked and mixed up disproportionately. The following table shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under stores/storage areas ranked on the hierarchy of controls scale. The areas are summarized in the Table 5.

Table 5: KEPH Level 2-5 General Storage Areas Department Cumulative Risk Level-Itemized

OSH Issue/Variable Assessed in Central Stores/Supply (General Storage Areas)	Cumulative Safety Ranking on Hierarchy of controls scale
General Housekeeping Issues observed (orderliness and sanitized environment)	5
Exposure to Ethylene Oxide, mercury & Glutaraldehyde	5
Crowding and poor stacking of supplies	5
Lack of fire equipment, exit routes and preparedness	5
Burns/Cuts & Slips/Trips/Falls	5
Ergonomics	5
Ventilation and Aerosols	4
Hazardous Chemicals	5
Latex Allergy	3
Overall Safety Risk Level (General Storage Area)	5

From the facilities surveyed, 56 (60%) returned a severe risk level, 13 (14%) major risk level, 10 (11%) moderate, 6,(6%) minor while 10, (11%) recorded insignificant risk. See cross tabulation in table 6 below for details.

Table 6: Cross-Tabulation: Central storage areas all sections-median

KEPH LEVEL		Insignificant	Minor	Moderate	Major	Severe	Total
level 2	Count	3	1	3	2	23	32
	% within KEPH LEVEL	9.4%	3.1%	9.4%	6.3%	71.9%	100.0%
	% of Total	3.2%	1.1%	3.2%	2.1%	24.2%	33.7%
level 3	Count	3	1	1	3	19	27
	% within KEPH LEVEL	11.1%	3.7%	3.7%	11.1%	70.4%	100.0%
	% of Total	3.2%	1.1%	1.1%	3.2%	20.0%	28.4%
level 4	Count	4	1	4	6	13	28
	% within KEPH LEVEL	14.3%	3.6%	14.3%	21.4%	46.4%	100.0%
	% of Total	4.2%	1.1%	4.2%	6.3%	13.7%	29.5%
level 5	Count	0	3	2	2	1	8
	% within KEPH LEVEL	.0%	37.5%	25.0%	25.0%	12.5%	100.0%
	% of Total	.0%	3.2%	2.1%	2.1%	1.1%	8.4%
Total	Count	10	6	10	13	56	95
	% of Total	10.5%	6.3%	10.5%	13.7%	58.9%	100.0%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was insignificant at 10.5%, minor

6.3%, moderate 10.5%, major 13.7% while severe was 58.9%. *Most facilities especially KEPH L2-4 relies on makeshift stores or rooms not initially designed as storage. Critical areas include provision of equipment and facilities e.g. staking racks, training of stores staff, provision of PPE, fire-fighting equipment and welfare services. See a pictorial presentation below.*



Photo 1: A crowded unorganized makeshift tent at Coast PGH Note: the staff with ordinary shoes instead of the stores specific PPE.



Photo 2: Ceiling used as a storage space



Photo 3: The state of housekeeping at the NPGH Central Store is unsatisfactory; materials are stack to the ceiling. Poor ventilation with minimal air-flow/changes. The material in the store must be arranged in such a manner that at least a gap of 80cm is maintained from the nearest fixed wall or ceiling or roof.



Photo 4: Aisles are obstructed and materials stacked to the ceiling. Develop a safe system of work that will integrate the t people, materials and machinery within a safe and healthy working environment.



Photo 5: Store Section Coast PGH



Photo 6: Stacking into the Ceiling



Photo 7: Handling and storage of chemicals in a DH Store OLOLUNGA DH



Photo 8: Poor housekeeping – Fire hazard



Photo 9: Storage Guidelines Complete with No-Entry Sign Covered by supplies and Ignored all together - Coast PGH



Photo 10: COAST PGH - Staff clinicians with PPE un-removed collecting supplies & spreading pathogens to unprotected Stores staff



Photo 10: Poor state of housekeeping in store – Chemolingot DH



Photo 11: Unsafe storage of LPG cylinders

Figure 9: Stores - Pictorial Presentation of OSH Issues

4.1.3 CLINICAL SERVICES (GENERAL CLINICAL SERVICES, SURGICAL SUITES, ICU & EMERGENCY DEPARTMENTS.

The survey's third target area was to assess the OSH risk levels at the clinical services departments of KEPH level 2 to level 5 facilities sampled across the nation. This included theatres/surgical suites, emergency departments and Intensive Care Units (ICU). The following 13 specific building blocks of OSH management developed from the hierarchy of controls we assessed: General House Keeping OSH Issues, Blood borne Pathogens (BBP), Clinical Ergonomics (All Clinical related Areas), Slips/Trips/Falls, Hazardous Chemicals, Equipment Hazards, Clinical Services Tuberculosis, Radiology Ergonomics, Radiology/X-ray Room: Radiation Exposure, Radiology area: Slips/Trips/Falls, Radiology Area BBP, Workplace Violence and Rehabilitation (physiotherapy, orthopedics, dental Unit). The survey results from the building blocks/subscales were analyzed and summarized in Figure 10 below:

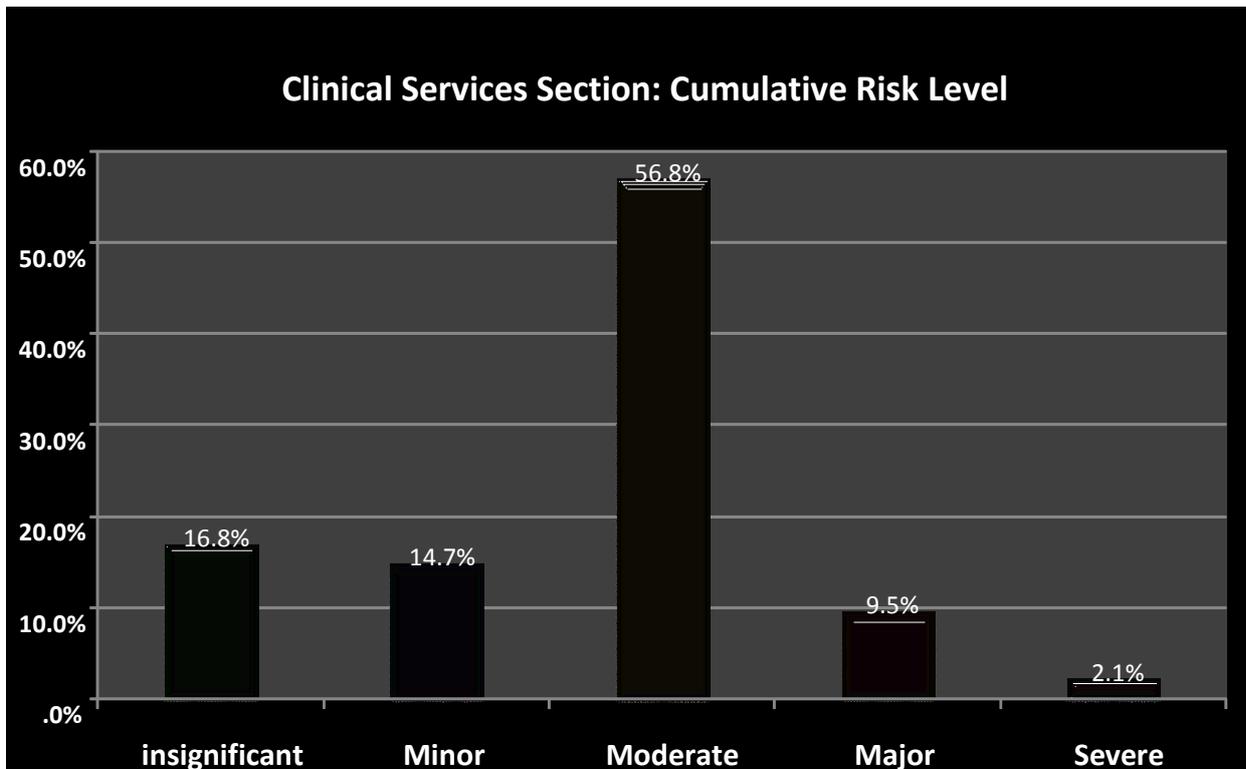


Figure 10: KEPH Level 2-5 Clinical Services Department Cumulative Risk Level-Median

The OSH risks in stores is classified as moderate with 60% of the facilities returning moderate OSH risk rating, 10% major, 2% severe, minor 15% while insignificant rating was 17%. Clinical activities are the nerve center of the KEPH facilities activities across the nation. The following table shows the contributing factors towards the risk levels being the itemized version of the OSHRAE results (cumulative medians) of variables assessed under clinical services departments and related areas ranked on the hierarchy of controls scale. The OSH risk variables/areas examined are summarized in the table 7 below;

Table 7: OSH Issues in Clinical Areas

OSH Issue/Variable Assessed in the Clinical Section	Cumulative Safety Ranking on Hierarchy of controls scale
General House Keeping OSH Issues	3
Blood borne Pathogens (BBP)	2
Clinical Ergonomics (All Clinical related Areas)	4
Slips/Trips/Falls	3
Hazardous Chemicals	5
Equipment Hazards	5
Tuberculosis and Radiation related exposures	3
Clinical Ergonomics	3
Ventilation and Aerosols	3
Workplace Violence:	4
Clinical Services - Rehabilitation (physiotherapy, orthopedic, dental Unit?)	5
Overall Safety Risk Level (Clinical Areas)	4

Major areas of concern are clinical ergonomics where several sets of equipment are not in good working conditions and staff has to make do with what is available. While the risk level cumulatively was at moderate level, this section was the main contributor to the high OSH risk levels as compared to other sectors particularly housekeeping, laundry and biomedical engineering departments. The clinical staffs do not adequately clean after their "mess". Within the safe confines of their PPE, the waste from the procedures is "safely" left behind for the other staff to deal with. However the cleaning after staff is often ill equipped and in most cases do not have the kind of PPE that the doctors are "entitled" to. Consequently, this leaves support staff overly exposed to BBP. While the results reveal clinical department as fairly safe, cumulatively it is the primary cause of the high risk in other sections. See the cross tabulations in Table 8:

Table 8: Cross-Tabulation: Clinical services cumulative-median

KEPH		Insignificant	Minor	moderate	Major	Severe	Total
level 2	Count	6	6	19	0	1	32
	% KEPH LEVEL	18.8%	18.8%	59.4%	.0%	3.1%	100.0%
	% of Total	6.3%	6.3%	20.0%	.0%	1.1%	33.7%
level 3	Count	6	3	18	0	0	27
	% KEPH LEVEL	22.2%	11.1%	66.7%	.0%	.0%	100.0%
	% of Total	6.3%	3.2%	18.9%	.0%	.0%	28.4%
level 4	Count	4	4	15	5	0	28
	% KEPH LEVEL	14.3%	14.3%	53.6%	17.9%	.0%	100.0%
	% of Total	4.2%	4.2%	15.8%	5.3%	.0%	29.5%
level 5	Count	0	1	2	4	1	8
	% KEPH LEVEL	.0%	12.5%	25.0%	50.0%	12.5%	100.0%
	% of Total	.0%	1.1%	2.1%	4.2%	1.1%	8.4%
Total	Count	16	14	54	9	2	95
	% KEPH LEVELS	16.8%	14.7%	56.8%	9.5%	2.1%	100.0%

The situation is aggravated by lack of standardized and all inclusive SOPs in KEPH levels. Most SOPs are section oriented as such would only apply to the clinicians while ignoring other cadres. As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was insignificant at 16.8%, minor 14.7%, moderate 56.8%, major 9.5% while severe was 2.1%. *In most facilities, clinical services department recorded a fairly low risk levels but the process results poses a great threat to other areas especially housekeeping and biomedical engineering sections departments that clean after and prepares before the procedures in clinical departments respectively.* See a pictorial presentation below.



Photo 1: A crowded desk; notice the books and reagents



Photo 2: Contaminated equipment several days after use

	
<p>Photo 3: Un-segregated waste left behind by a clinician after procedure. Notice body tissue, syringes, needles, papers etc all in one container</p>	<p>Photo 4: An injection room typifying most KEPH L3-4 facilities</p>
	
<p>Photo 5: Actual Waste Containers at Ngao District Hospital- up-close. Note Mixture of swabs, blood vipes etc</p>	<p>Photo 6: A dirty ward. Notice used needles and dust under the bed</p>

Figure 11: Pictorial Presentation of Clinical Area Hazards

Likewise, emergency department section is faced with a myriad of challenges such as space and security putting both the staff and patients at risk. The OSH risk variables/areas examined are summarized in the table 9 below;

Table 9: OSH Issue/Variable Assessed in the Casualty/Emergency Department of the Clinical Section

OSH Issue/Variable Assessed in the Casualty/Emergency Department of the Clinical Section	Cumulative Safety Ranking on Hierarchy of controls scale
General House Keeping OSH Issues	5
Blood borne Pathogens (BBP)	2
Slips/Trips/Falls	3
Hazardous Chemicals	5
Equipment Hazards	5
Tuberculosis and Radiation related exposures	3
Clinical Ergonomics	3
Ventilation and Aerosols	3
Workplace stress (overloads)	4
Workplace Violence:	4
Overall Safety Risk Level (Casualty/Emergency Dept)	4

The survey results from the building blocks/subscales were analyzed and summarized below:

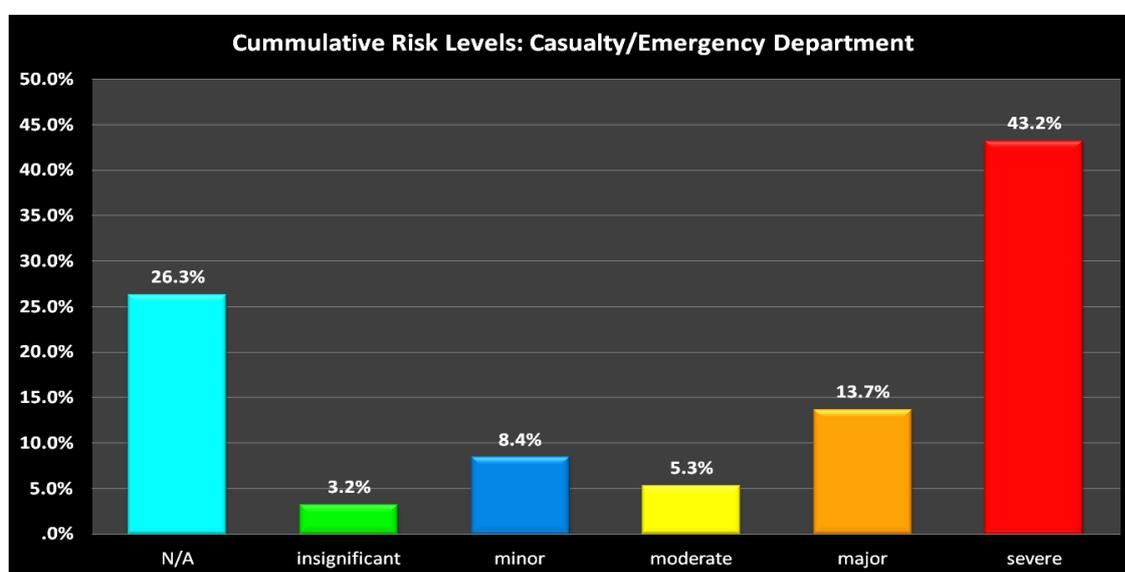


Figure 12: KEPH Level 2-5 Casualty/Emergency Department Cumulative Risk Level-Median

The worst affected area in clinical department is casualty. OSH risks in casualty department is classified as severe with 43% of the facilities returning severe OSH risk rating, 14% major, 5% moderate, minor 8% while insignificant rating was 3%. 26% of the facilities surveyed did not have casualty department established as such. The major areas of concern are; housekeeping issues, exposures to ethylene, glutaraldehyde and mercury, poor ergonomics among others. The major OSH issues here included housekeeping issues largely lack of administrative controls such

lack of functional SOPs (5), BBP (2), hazardous chemicals (4), Slips/Trips/Falls (3), Equipment Hazards (5), Tuberculosis (5), and Workplace Stress (4). The cross tabulation is presented in table 10 below.

Table 10: Crosstabulation Emergency Dept casualty cumulative-MEDIAN

KEPH		N/A	Insignificant	Minor	moderate	Major	Severe	Total
LEVEL 2	Count	25	0	4	2	0	1	32
	% KEPH LEVEL	78.1%	.0%	12.5%	6.3%	.0%	3.1%	100.0%
	% of Total	26.3%	.0%	4.2%	2.1%	.0%	1.1%	33.7%
LEVEL 3	Count	0	1	0	0	4	22	27
	% KEPH LEVEL	.0%	3.7%	.0%	.0%	14.8%	81.5%	100.0%
	% of Total	.0%	1.1%	.0%	.0%	4.2%	23.2%	28.4%
LEVEL 4	Count	0	2	0	2	7	17	28
	% KEPH LEVEL	.0%	7.1%	.0%	7.1%	25.0%	60.7%	100.0%
	% of Total	.0%	2.1%	.0%	2.1%	7.4%	17.9%	29.5%
LEVEL 5	Count	0	0	4	1	2	1	8
	% KEPH LEVEL	.0%	.0%	50.0%	12.5%	25.0%	12.5%	100.0%
	% of Total	.0%	.0%	4.2%	1.1%	2.1%	1.1%	8.4%
Total	Count	25	3	8	5	13	41	95
	% KEPH LEVEL	26.3%	3.2%	8.4%	5.3%	13.7%	43.2%	100.0%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was N/A (not applicable²) at 26.3%, insignificant at 3.2%, minor 8.4%, moderate 5.3%, major 13.7% while severe was 43.2%.

On the other hand the Intensive Care Unit (ICU) and surgical suites departments are generally within the OSH acceptable risk level. The main areas of concern are; housekeeping issues mainly, sanitation, orderliness and maintenance. Domestication of SOPs that establishes work practices in dealing with BBPs and Other Potentially Infectious Materials (OPIM), equipment hazards where there is need for a program complete with SOP in place that routinely monitors the condition of equipment and addresses work practices and workplace violence where there is a need for training provided to staff to identify, recognize, and diffuse potentially violent situations and patients. There were no plans and SOP in place to deal with difficult patients. In theaters/surgical suites, the following specific OSH management issues were prominent, general House Keeping OSH Issues – in particular lack of Good Clinical Practice (GCP), Engineering

² Facilities that do not run the service (Emergency Department)

Controls, Blood Borne Pathogens, Waste Anesthetic Gases, Latex Allergy, Compressed Gases, Static and Awkward Postures, Hazardous Chemicals, Equipment Hazards and Slips/Trips/Falls. The survey results from the building blocks/subscales were analyzed and summarized in figure 13 below:

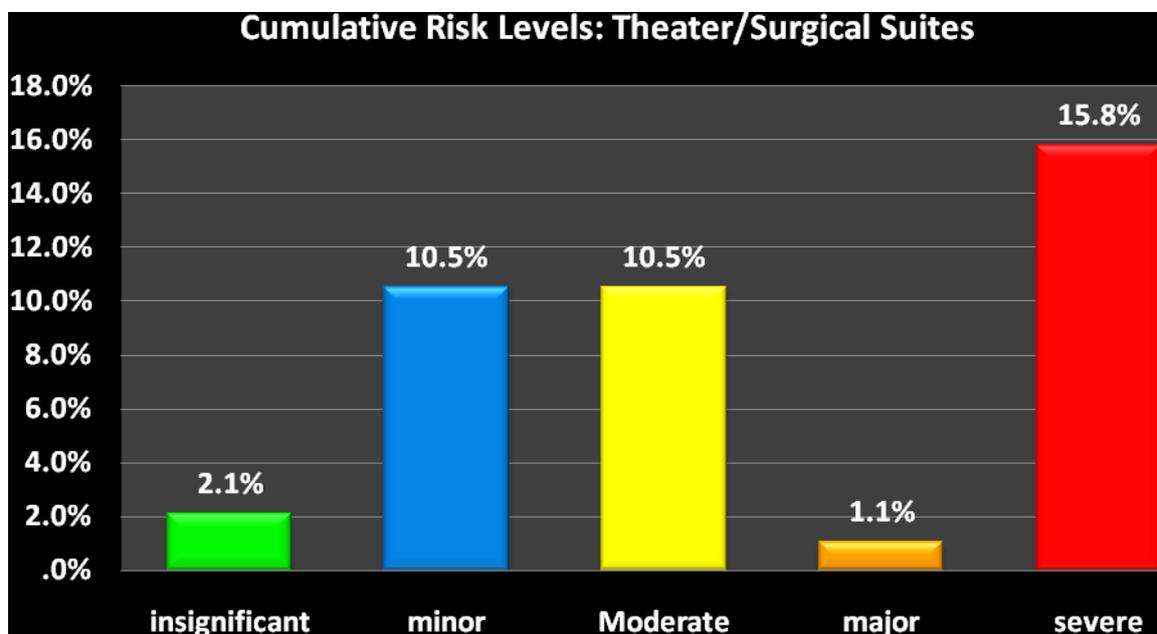


Figure 13: KEPH Level 2-5 Theater/Surgical Suites Department Cumulative-Median

The results show that the general classification is "severe". Of 95 health facilities, 57 (60%) were withdrawn/not included as they posted "Not applicable" – did not have theaters. 16% had a score of "severe" OSH risk rating, with 1.1% of facilities listed as having major risk, 11% moderate risk, 11% minor risk, while 2.1% rated as insignificant.

The results were largely attributed to most equipment being poorly maintained due to lack of updated maintenance and operations manual. The frequent breakdowns of machines pose danger to other staff especially biomedical section staffs that are often called in "mid-action to save the situation". Another major OSH concern is GCP regime that creates a safety culture of top-notch management and equipment maintenance.



Photo 1a-b: A well designed and clean theater – Notice the malfunctioning equipment posing agronomical challenge for the users. On the right un-assorted waste from Theater – Makindu DH



Photo 2a-b: A theater – notice the state of equipment and broken floor. No provision for wires and tubing forcing staff to route wires on the floor

Figure 14: Pictorial presentations of hazards at Makindu District Hospital

4.1.4 KITCHEN/DIETARY DEPARTMENT

The survey's fourth target was to assess the OSH risk magnitude at the kitchen/dietary departments of KEPH level 2 to level 5 facilities sampled across the nation. The following specific building blocks of OSH management developed from the hierarchy of controls we assessed: General House Keeping OSH Issues, Kitchen Ergonomics, Kitchen Equipment Safety, Fire Safety, Hazardous Chemicals, Machine Guarding, Food borne Disease, Slips/Trips/Falls and Electrical Safety. The survey results from the building blocks/subscales were analyzed and summarized below:

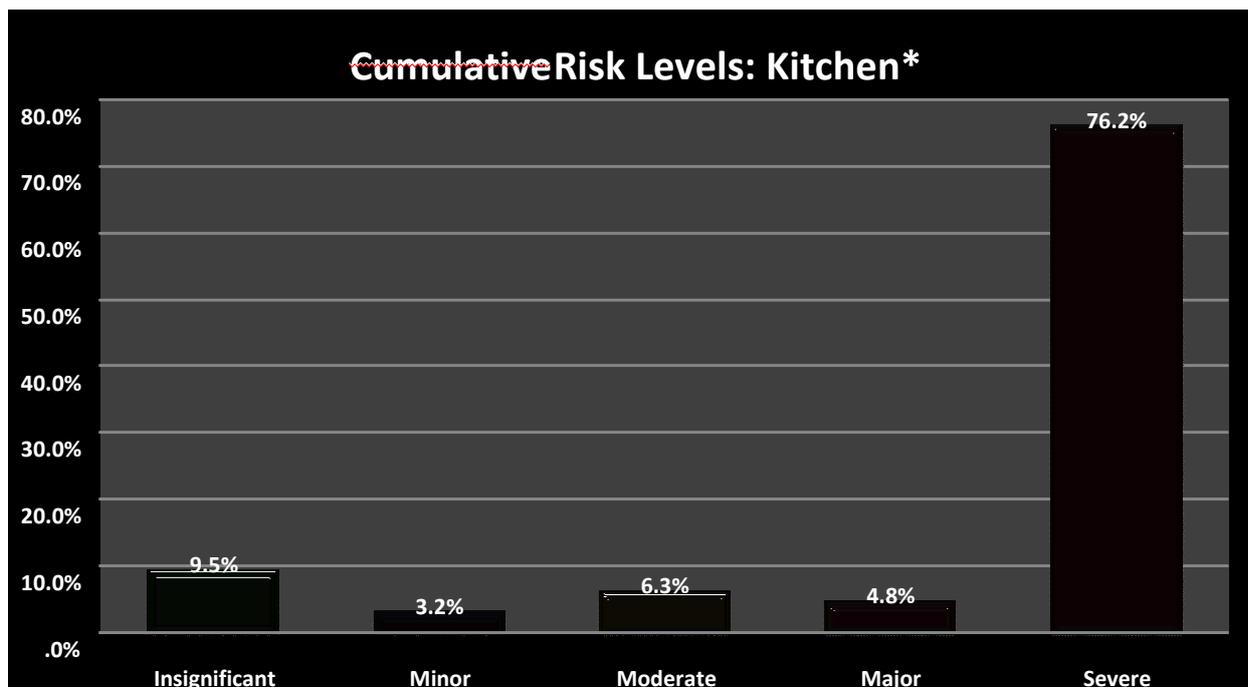


Figure 15: KEPH Level 2-5 Kitchen/Dietary Department Cumulative Risk Level-Median

The OSH risks in the kitchen was classified as severe with 80% of the facilities returning severe OSH risk rating, 5% major, 6% moderate, minor 3% while insignificant rating was 10%. The major areas of concern are; General House Keeping OSH Issues, Kitchen Ergonomics, Kitchen Equipment Safety, Fire Safety, Hazardous Chemicals, Machine Guarding, Food borne Disease, Slips/Trips/Falls and Electrical Safety and poor ergonomics among others. The cross tabulation (table 11) below gives a more detailed view.

Table 11: Cross-Tabulation Kitchen-Dietary-median

KEPH		Insignificant	Minor	Moderate	Major	Severe	Total
level 3	Count	2	2	3	2	18	27
	% KEPH LEVEL	7.4%	7.4%	11.1%	7.4%	66.7%	100%
	% of Total	3.2%	3.2%	4.8%	3.2%	28.6%	42.9%
level 4	Count	2	6	14	4	2	28
	% KEPH LEVEL	7.1%	21.4%	50.0%	14.3%	7.1%	100%
	% of Total	3.2%	9.5%	22.2%	6.3%	3.2%	44.4%
level 5	Count	0	5	2	1	0	8
	% KEPH LEVEL	.0%	62.5%	25.0%	12.5%	.0%	100%
	% of Total	.0%	7.9%	3.2%	1.6%	.0%	12.7%
Total	Count	4	13	19	7	20	63
	% KEPH LEVEL	6.3%	20.6%	30.2%	11.1%	31.7%	100%

As outlined in the cross tabulation above, a total (n) of 63 facilities were analyzed; 8 level 5, 28 level 4 and 27 level 3. It should be noted that KEPH level 2 did not have designated Kitchen/dietary section. The overall risk levels returned was insignificant at 6.3%, minor 20.6%, moderate 30.2% major 11.1% while severe was 32%.

Generally, from KEPH Level 2 upwards kitchens are largely ignored. The main contributing factors are; General House Keeping OSH Issues with OSH risk level of 4, Kitchen Ergonomics 3, Kitchen Equipment 5, Fire Safety 4, Hazardous Chemicals 2, Machine Guarding, 1, Food borne Disease 2, Slips/Trips/Falls 4, Electrical Safety5, Isolation Rooms 5. Most kitchens are run down with outdated equipment often ill maintained and breaking down often. The staff lacks PPE and exposed to fire and electrical shock hazards. The following Table (12) is a summary of the variables assessed and cumulative ranking for the kitchen section:

Table 12: OSH Issue/Variable Assessed in the Kitchen/Dietary Section

OSH Issue/Variable Assessed in the Kitchen/Dietary Section	Cumulative Ranking on Hierarchy of controls scale	Safety
General House Keeping OSH Issues	4	
Kitchen Ergonomics, Slips/Trips/Falls	3	
Kitchen Equipment, Machine Guarding & related hazards	4	
Fire Safety	5	
Handling Hazardous Chemicals	4	
Cold rooms & Isolation facility	2	
Ventilation and Aerosols	5	
Food borne Disease	3	
Electrical Safety	2	
Overall Safety Risk Level (Kitchen/Dietary Section)	4	

A more vivid presentation of the OSH risks in the kitchen section is given in the pictorial presentation below.



Photo 1: The open drainage presents tripping hazard at NPGH's Kitchen. It is recommended that arrangement of these trenches should be covered etc so they do not create a tripping hazard to persons working in the kitchen. The kitchen hood which is an invaluable tool for ventilation should be placed on maintenance program.



Photo 2: The electrical cabinet in the NPGH's kitchen cold room was not locked allowing possible unauthorized access to live electrical circuitry. To prevent any potential uncontrolled access it is recommended to lock the cabinet. Access should be limited to trained and dedicated personnel (i.e. electrical technicians).



Photo 3: Unguarded burner/cooker at Coast PGH



Photo 4: A Kitchen staff without appropriate PPE (shoes)



Photo 5: Kitchen cooking equipment, poor state at Nyanza PGH



Photo 6: Defective switch at Kabarnet DH

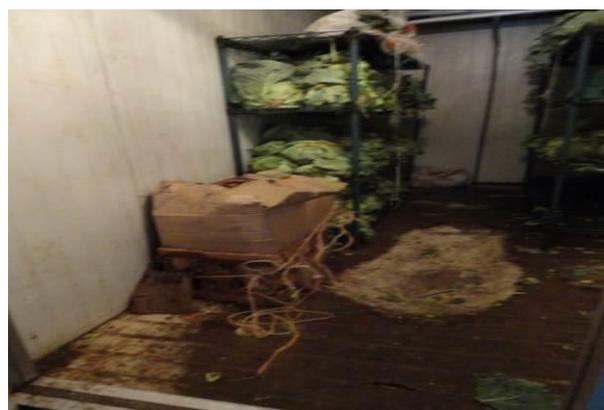
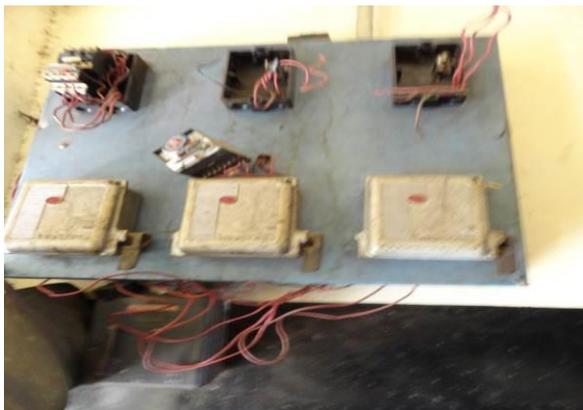


Photo 7: Unsafe electrical condition in kitchen at Nyanza PGH **Photo 8:** Fresh vegetable storage at Coast PGH.

Figure 16: Pictorial presentation of OSH risks in the kitchen section of some facilities

4.1.5 BIOMEDICAL ENGINEERING DEPARTMENT

The survey's fifth target was to assess the OSH risk level/magnitude at the biomedical Engineering departments of KEPH level 2 to level 5 facilities sampled across the nation. The following specific building blocks/variables of OSH management developed from the hierarchy of controls we assessed: General House Keeping OSH Issues – Industrial Hygiene, Machine Guarding, Hazardous Chemicals in Engineering Section, Nosocomial Diseases, and Fire safety, Lockout/Tagout, Asbestos Exposure, Electric Shock, Mercury Exposure and Welding Fumes.

The following table (table 13) shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under administration department ranked on the hierarchy of controls scale. The overall safety risk level in the biomedical engineering department was high; with a score of 5 which is above the acceptable safety level of 2.

Table 13: KEPH Level 3-5 Biomedical Department Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in Biomedical Engineering Section	Cumulative Safety Ranking on Hierarchy of controls scale
General Housekeeping Issues observed (Industrial Hygiene)	4
Machine Guarding	4
Presence and use of Documented Participatory OSH Administration Program (POSHAP) or EAP	5
Hazardous Chemicals in Engineering Section	5
Nosocomical Diseases	5
Mercury Exposure and Welding Fumes	5
Ventilation and Aerosols observed in terms of directional airflow and air changes	4
Asbestos Exposure	5
General Electrical Safety observed	4
Fire safety and Lockout/Tagout program,	5
Overall Safety Risk Level	5

Detailed survey results from the building blocks/subscales were analyzed and summarized below:

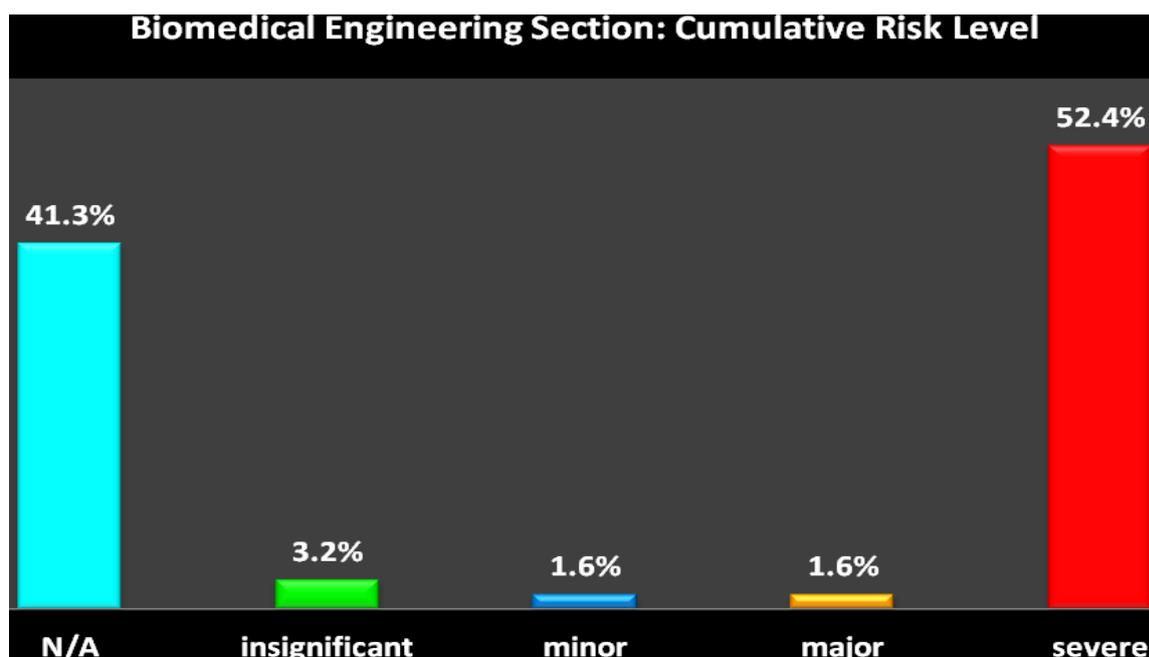


Figure 17: KEPH Level 2-5 Biomedical Engineering Department Cumulative-Median

The OSH risks in the biomedical section is classified as severe with 52% of the facilities returning severe OSH risk rating, 2% major, 2% minor, insignificant 3% while 41% of the facilities did not

have this crucial section. Key areas of concern include potential nosocomial diseases from water systems which are un-cleaned and non-disinfected and lack of SOP on prevention of nosocomial infections; exposure from hazardous chemicals as there is no written program based on Hazard Communication Standard to provide for worker training, warning labels, and access to Material Safety Data Sheets (MSDS) in place and implemented, lack of appropriate PPE: (e.g. gloves, goggles, splash aprons); poor fire safety measure as there are NO fire action plans in place (emergency action plan (EAP), and a fire prevention plan (FPP). Most fire equipment are not up-to-date. Machine safety is a critical area of concern as most machines are not properly guarded to protect the operator and other employees in the machine area from hazards. There are no operations and maintenance schedule for most machines. Other risks include asbestos exposure as there are no SOPs on following permissible exposure limits (PELs) including exposure monitoring, hygiene facilities and practices present; electric shock due to poor maintenance (extension cords are used in place of permanent wiring; running through walls, ceilings, doors; equipped with proper plugs; 3-conductor cable used; mostly damaged/taped cords and daisy-chained) mercury exposure and welding fumes. The following cross tabulation (table 14) presents a more detailed cumulative summary.

Table 14: Cross tabulations; Biomedical Engineering Sections

		Cross tabulations; Biomedical Engineering					Total
KEPH		N/A	insignificant	Minor	major	severe	
LEVEL 3	Count	26	1	0	0	0	27
	% KEPH Level	96.3%	3.7%	.0%	.0%	.0%	100%
	% of Total	41.3%	1.6%	.0%	.0%	.0%	42.9%
LEVEL 4	Count	0	1	0	1	26	28
	% KEPH Level	.0%	3.6%	.0%	3.6%	92.9%	100%
	% of Total	.0%	1.6%	.0%	1.6%	41.3%	44.4%
LEVEL 5	Count	0	0	1	0	7	8
	% KEPH Level	.0%	.0%	12.5%	.0%	87.5%	100%
	% of Total	.0%	.0%	1.6%	.0%	11.1%	12.7%
Total	Count	26	2	1	1	33	63
	% KEPH Level	41.3%	3.2%	1.6%	1.6%	52.4%	100%

As outlined in the cross tabulation above, a total (n) of 63 facilities were analyzed; 8 level 5, 28 level 4 and 27 level 3. This service was however not found to be offered in KEPH level 2 facilities. Consequently, the overall risk levels returned was N/A (not applicable) at 41%, insignificant at

3.2%, minor 1.6%, major 1.6% while severe was 52%. A more graphical presentation is given in the pictorial below (fig 18).



Photo 1a-b: Biomedical Engineering Department at the Coast PGH. Right, the status of housekeeping at the Bio-engineering department was unsatisfactory. Good housekeeping is essential in a good OSH program, promotes OSH, production, and morale of the people.



Photo 2a-b: Left, the cables for testing at the Bio-engineering are exposed at the ends and are not fitted with Earth Fault Circuit Interrupter (EFCI) to protect staff. The wiring should be corrected to ensure primary insulator coverage over the full length of the electrical cord and prevent contact at the connection points, and EFCI should be fitted to protect staff from electrocution. Right, the bench grinder at the Bio-engineering was not fitted grinding wheels. Once fitted by a competent person, the wheels should have guards and the work rest should be adjusted to within 3 mm from the grinding face of the wheel, and a means to ensure this requirement is checked prior to use of the grinder should be implemented.



Photo 3a-b: Biomedical Department at the Coast PGH bearing a safety caution, in the background a staff with no safety gear and un-tagged machines. Left. Bioengineering; poor housekeeping at Kabarnet DH. Notice no guards and PPE for staff



Photo 4a-b: Outdated, Unmarked and malfunctioning fire extinguisher at Nyanza PGH last serviced in 1980. Right. A compliant electrical installation. All electrical installation should comply with relevant regulations including IIE Regulations, the Factories and Other Places of Work (Fire Risk Reduction Rules), the Factories (Electrical Power) (Special) Rules, 1979 and permit to work requirements during installation and maintenance.

Figure 18: Pictorial Presentation of Risks in Biomedical departments

4.1.6 HOUSE KEEPING & LAUNDRY DEPARTMENTS

The survey's sixth target for OSHRAE was the House Keeping and laundry. This involved the cleaning and maintenance departments of KEPH level 2 to level 5 facilities sampled across the nation. The following specific building blocks of OSH management developed from the hierarchy of controls we assessed: General House Keeping OSH Issues, Contaminated Work Environment, Use of Appropriate Disinfectants, Contaminated Equipment, Contaminated Laundry, Sharps Container, Hazardous Chemicals, Latex Allergy and Slips/trips/falls.

The following table (table 15) shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under the department ranked on the hierarchy of controls scale.

Table 15: KEPH Level 2-5 Housekeeping and Laundry Departments Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in housekeeping and Laundry Sections	Cumulative Safety Ranking on Hierarchy of controls scale
General Housekeeping Issues observed	4
Procedures observed in contaminated Work Environment	4
Presence and use of Documented Participatory OSH Administration Program (POSHAP) or EAP	5
Use of Appropriate Disinfectants	5
Procedures observed in working with Contaminated Equipment,	5
Safety of work with Contaminated Laundry	5
Ventilation and Aerosols observed in terms of directional airflow and air changes	4
Handling of stray sharps/Sharps Container	5
General Electrical and fire Safety observed	4
Procedures on work with Hazardous Chemicals	5
Slips/trips/falls	4
Latex Allergy (provision of alternatives)	5
Overall Safety Risk Level	5

The survey results from the building blocks/subscales were analyzed and summarized in fig 16 below. The main OSH issues in these sections are provision of training on personal safety, provision of PPE and guidance through administrative controls especially the generation and use of relevant and updated Standard Operating Procedures (SOP). Most staffs were not trained and not aware both of the provisions of the law on their personal safety at work and of what actions to take so as to be secure at work. In most cases, PPE is not provided and in some cases where provisions are made, the staff either ignore their use or use them wrongly especially in among the laundry staff. The results give a worse situation in the laundry section of the housekeeping department. See figure 19 below.

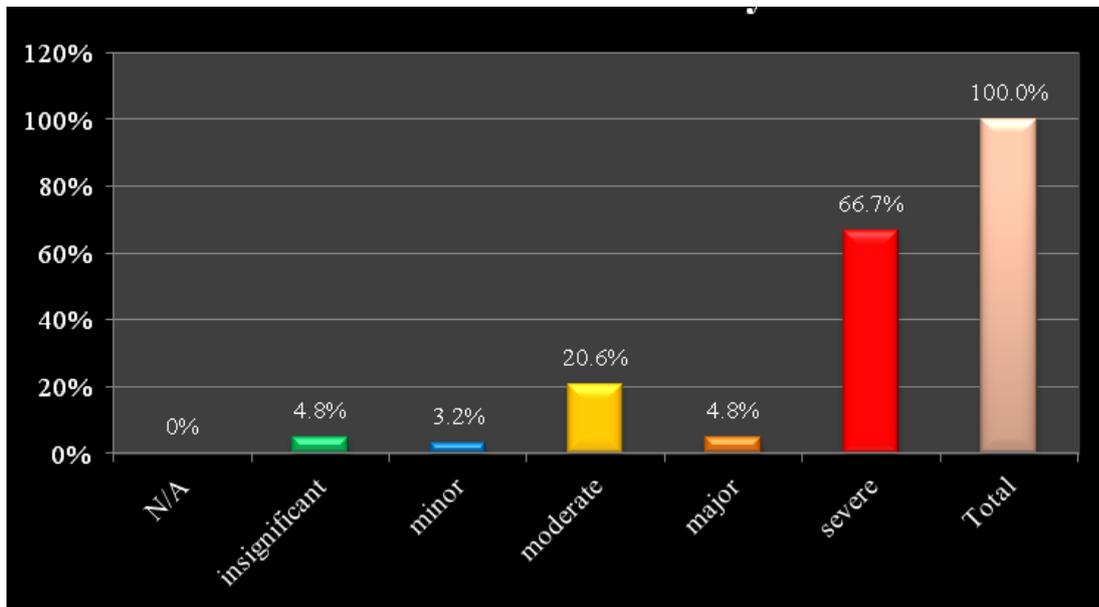


Figure 19: Laundry & Housekeeping- Cumulative Risk Levels

As outlined in the figure 18 above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. Consequently, the overall risk levels returned was insignificant at 4.8%, minor 3.2%, moderate 20.6%, major 4.8% while severe was 68%. A more detailed presentation for the entire housekeeping section is given in the cross tabulation below (table 16).

Table 16: Crosstab-House Keeping Cumulative Median

		Crosstab: House Keeping Cumulative Median						Total
KEPH		N/A	Insignificant	Minor	Moderate	Major	Severe	
LEVEL 2	Count	0	5	4	13	8	2	32
	% KEPH LEVEL	.0%	15.6%	12.5%	40.6%	25.0%	6.3%	100%
	% of Total	.0%	5.3%	4.2%	13.7%	8.4%	2.1%	33.7%
LEVEL 3	Count	1	3	3	11	7	2	27
	% KEPH LEVEL	3.7%	11.1%	11.1%	40.7%	25.9%	7.4%	100%
	% of Total	1.1%	3.2%	3.2%	11.6%	7.4%	2.1%	28.4%
LEVEL 4	Count	0	1	4	16	6	1	28
	% KEPH LEVEL	.0%	3.6%	14.3%	57.1%	21.4%	3.6%	100%
	% of Total	.0%	1.1%	4.2%	16.8%	6.3%	1.1%	29.5%
LEVEL 5	Count	0	0	3	4	1	0	8
	% KEPH LEVEL	.0%	.0%	37.5%	50.0%	12.5%	.0%	100%
	% of Total	.0%	.0%	3.2%	4.2%	1.1%	.0%	8.4%
Total	Count	1	9	14	44	22	5	95
	% KEPH LEVEL	1.1%	9.5%	14.7%	46.3%	23.2%	5.3%	100%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was insignificant at 9.5%, minor 14.7%, moderate 56.3%, major 23.2% while severe was 5.3%. A more graphical presentation is given in the pictorial section below.



Photo 1a-b: (Left) Staff performing Manual task without appropriate PPE as the case on the right (Coast PGH)



Photo 2a-b: Laundry Assorted for cleaning – Notice Fresh blood stains on the right (Risk for BBP)



Photo 3a-b: Staff sorting potential contaminated laundry without gloves or boots

as part of PPE



Photo 4a-b: Part of contaminated laundry being sought and left – Needles found in the contaminated laundry (No PPE used)



Photo 5a-b: Laundry equipment & services; notice the unsatisfactory state of housekeeping and unsafe electrical condition – red arrow. It was established that there is no written policy on maintenance of equipment and electrical installations. The laundry was poorly ventilated with 1-2 air changes per hour making it stuffy and unsafe.



Photo 6: A maintenance staff bare feet at work & without appropriate PPE oblivious of the dangers present

Figure 20: Pictorial presentation of the Housekeeping and Laundry Hazards

4.1.7 LABORATORY DEPARTMENT

The survey's seventh target was to assess the OSH risk levels at the laboratories of KEPH level 2 to level 5 facilities sampled across the nation. The specific building blocks of laboratory bio-safety management and GCP were assessed.

The following table (table 17) shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under the department ranked on the hierarchy of controls scale.

Table 17: KEPH Level 2-5 Laboratory Department Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in Laboratory Sections	Cumulative Safety Ranking on Hierarchy of controls scale
Chemical Hygiene Plan	5
Standard Operating Procedures (SOP's)	4
Hazardous Materials (Chemical Controls, Acutely Hazardous Substances, Radioactive Materials)	5
Chemical Waste Storage	5
Labeling & MSDS	4
Bio-hazardous Waste Storage Labeling Treatment	4
Personal Health & Safety -Food and Drink Standard Practices	5
Health & Safety Equipment -Safety Showers and Eye Washes, Personal Protective Equipment	5
Use of Laboratory Fume Hoods/Biological Safety Cabinet (i.e. Laminar flow hoods)	5

Compressed Gas Cylinders	4
Airflow/Air Pollution Control Equipment	5
Housekeeping & Miscellaneous Laboratory Safety	4
Electrical Safety	5
Basic Safety (chemical shelves, secured cabinets, minimal overhead storage and secured heavy equipment)	4
Respiratory Protection	
Laser Safety (where applicable)	5
Non-Ionizing Radiation (NIR) Source (warning systems)	5
Emergency Planning & Procedures	5
Fire Prevention	4
Exits & Width of Exits	4
Overall Safety Risk Level	5

The survey results from the building blocks/subscales were analyzed and summarized below:

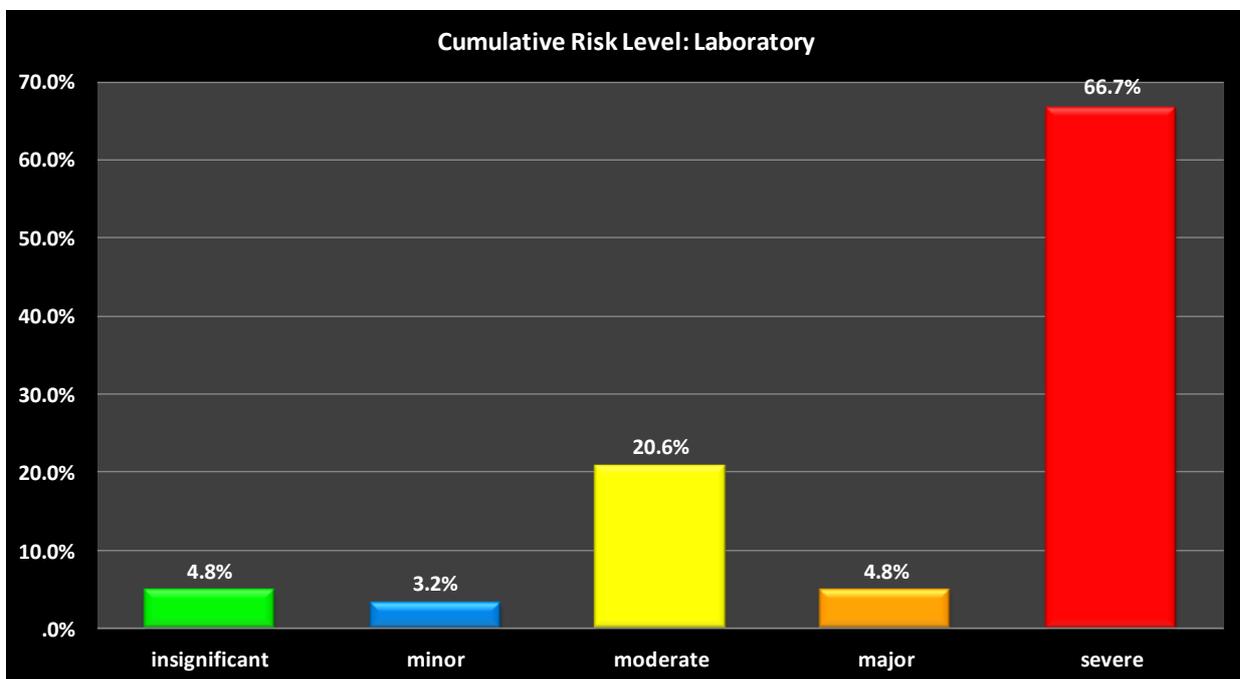


Figure 21: KEPH Level 2-5 Laboratory Department Cumulative-Median

The results show that the general classification is "severe". Of 95 health facilities, 66.7% had a score of "severe" OSH risk rating, with 4.8% of facilities listed as having major risk, 20.6% moderate risk, 3.2% minor risk, with 4.8% rated as insignificant.

The major OSH concern at the laboratory was risk of exposure to Blood borne Pathogens (BBP) due to lack of proper engineering operational and administrative controls. The laboratories generally operating at bio-safety level (BSL) 2 and TB enhanced systems for KEPH level 5 have

numerous concerns; Most laboratories especially in KEPH level 2-4 do not have a written Chemical Hygiene Plan developed as part of the laboratory's program which addresses all aspects of the Laboratory Standards. No appropriate PPE provided for protection on the use of formaldehyde and its exposure. The commonest PPE is latex gloves. There lacks implementation of a written program that meets the requirements of the Hazard Communication Standard (HCS) to provide for worker training, warning labels, and access to Material Safety Data Sheets (MSDSs).

Generally the facilities lack acceptable eyewash facilities provided within the immediate work area for emergency use and staff has to rely on sinks often a distant away. Most facilities lacked Blood borne Pathogens Standard requirements domesticated in form of SOP and posted.

There are lots of improvisations with minimum employment of engineering controls such as: splatter guards to prevent splashing from reaching employee, (e.g., plexiglass barriers), sensor-controlled automatic sinks or foot, knee, or elbow controls are available on sinks to operate hand-washing facilities without using hands. In some cases biological safety cabinets (hoods) are available for use but often not fit tested and malfunctioned on trials. Below (table 18) is a more detailed presentation of the OSH situation at the Lab across the board.

Table 18: Cross tabulation Laboratory

Crosstab Laboratory								Total
KEPH		N/A	insignificant	minor	moderate	major	Severe	
level 2	Count	16	3	5	2	6	0	32
	% KEPH Level	50.0%	9.4%	15.6%	6.3%	18.8%	.0%	100%
	% of Total	16.8%	3.2%	5.3%	2.1%	6.3%	.0%	33.7%
level 3	Count	0	0	4	2	14	7	27
	% KEPH Level	.0%	.0%	14.8%	7.4%	51.9%	25.9%	100%
	% of Total	.0%	.0%	4.2%	2.1%	14.7%	7.4%	28.4%
level 4	Count	0	0	3	4	17	4	28
	% KEPH Level	.0%	.0%	10.7%	14.3%	60.7%	14.3%	100%
	% of Total	.0%	.0%	3.2%	4.2%	17.9%	4.2%	29.5%
level 5	Count	0	0	1	5	2	0	8
	% KEPH Level	.0%	.0%	12.5%	62.5%	25.0%	.0%	100%
	% of Total	.0%	.0%	1.1%	5.3%	2.1%	.0%	8.4%
Total	Count	16	3	13	13	39	11	95
	% KEPH Level	16.8%	3.2%	13.7%	13.7%	41.1%	11.6%	100%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. The overall risk levels returned was: 66.7% a score of "severe"

OSH risk rating, with 4.8% of facilities listed as having major risk, 20.6% moderate risk, 3.2% minor risk, with 4.8% rated as insignificant. About 17% (16) of the facilities did not offer laboratory services hence the N/A (not applicable) value. Below is a more graphical presentation of the OSH issues at the laboratory.



Photo 1a-b: Left, a replica typifying laboratories across KEPH Level 2-4 and right, a staff cleaning after a lab staining procedure, Note the SOPs on the wall detailing the PPE and safety precautions disregarded by the staff.



Photo 2a-b: Reagents stored in the shelves in the lab. No MSDS. On the right, a lab staff on procedure without PPE. The SOPs on the same are on the wall in front of him.



Photo 3a-b: Left. A traditional lab-chamber/hood area turned into storage forcing the lab staff to squeeze experiments on the sink area (right)

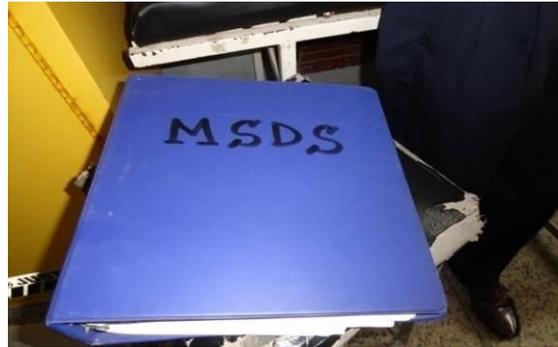


Photo 4a-b: Overcrowded laboratory. Notice the laboratory attendant (arms folded) and the patient (in white shirt) getting results explained. Right. Material Safety Data Sheet file hangs precariously on a broken chair under a laboratory sink.

Figure 22: Laboratory Section Pictorial Presentation

4.1.8 MORGUES DEPARTMENT

The survey then targeted OSH risk magnitude at the morgues of KEPH level 2 to level 5 facilities sampled across the nation. The following specific building blocks of OSH management developed from the hierarchy of controls were assessed: General House Keeping OSH Issues - GCP, Engineering Controls, Ergonomics, Equipment Use and Safety, Contaminated Environment, Contaminated Materials & Equipment, Infectious Substances and Waste Handling, Latex Allergy and Slip/trips/falls. The following table (table 19) shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under the department ranked on the hierarchy of controls scale.

Table 19: KEPH Level 3-5 Morgue Department Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in Morgue Sections	Cumulative Safety Ranking on Hierarchy of controls scale
Housekeeping & Miscellaneous Morgue Safety	5
Standard Operating Procedures (SOP's) (Contaminated Materials & Equipment, Infectious Substances and Waste Handling)	5
HAZARDOUS MATERIALS (Chemical Controls, Acutely Hazardous Substances & Materials)	5
Chemical Waste Storage, Labeling & MSDS	5
BIOHAZARDOUS WASTE Storage Labeling Treatment	4
PERSONAL HEALTH AND SAFETY Food and Drink Standard Practices	5
HEALTH AND SAFETY EQUIPMENT Safety Showers and Eye Washes Personal Protective Equipment	5

Airflow/Air Pollution Control Equipment	5
Electrical Safety & Fire Prevention	5
Basic Safety (chemical shelves, secured cabinets, minimal overhead storage and secured heavy equipment)	4
Respiratory Protection	
Engineering Controls, Ergonomics and Standard Morgue Equipment Use	5
Emergency Planning & Procedures	5
Latex Allergy and Slip/trips/falls.	4
Overall Safety Risk Level	5

The mortuary department was several times described by the workers as the “forgotten department” in terms of OSH. The facility is run down with no supplies, equipment and PPE. Most morgues are full of stench despite the use of formaldehyde. The staff have to make do with provisional and improvised equipment such as axes and butcher knives. No administrative controls or SOPs exist. Training program for the mortuary staff is non-existent, staff morale low and work taken as some kind of occupational punishment for the worker. The survey results from the building blocks/subscales were analyzed and summarized in figure 23 below:

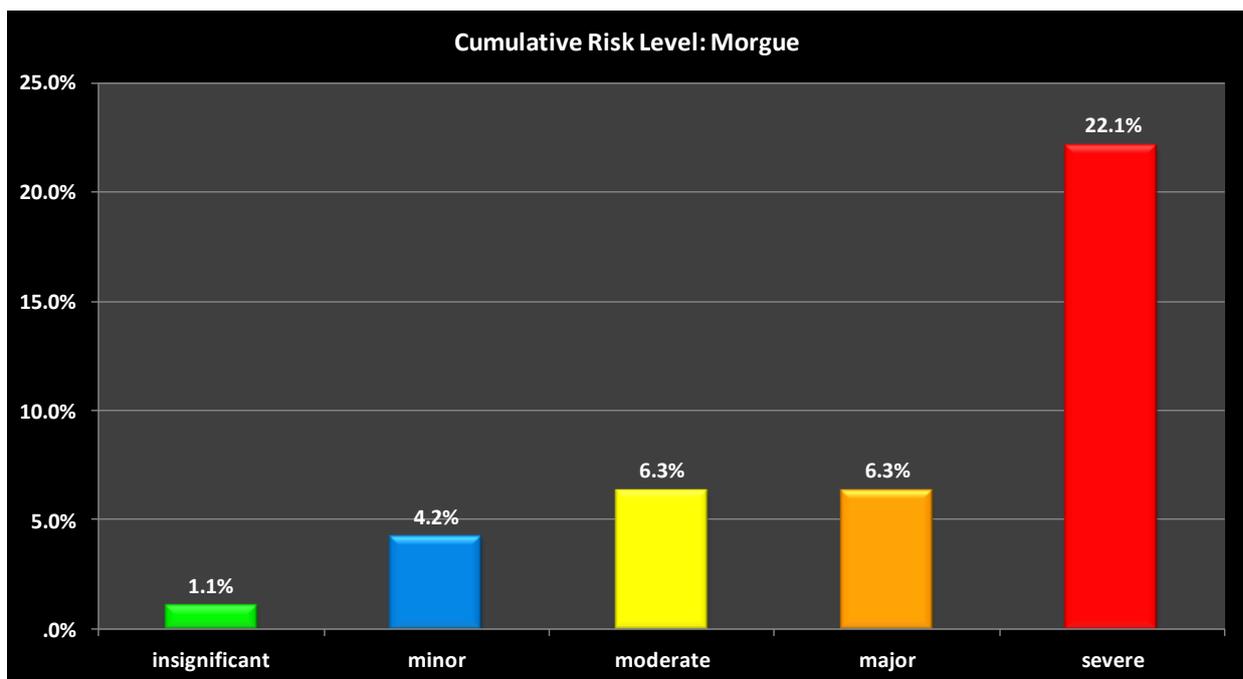


Figure 23: KEPH Level 2-5 Morgue Department Cumulative-Median

The results show that the general classification is “severe”. While 31 of 95 health facilities surveyed did not offer this facility hence the N/A value of 57 (see cross tabulation table 15 below), 22.1% had a score of “severe” OSH risk rating, with 6.3% of facilities listed as having

major risk, 6.3% moderate risk, 4.2% minor risk, with 41.1% rated as insignificant.

Issues of concern were the employment of engineering controls in place such as provision of appropriate ventilation systems (e.g. downdraft tables that capture the air around the cadaver) are largely non-functional. Instead the staff relies on permanent built autopsy areas where workers are potentially exposed to hazards including infection and manual handling risks incurred while transporting bodies, chemical hazards, physical hazards and social hazards. Local vacuum systems for power saws in the morgues are non-existent and where they are – ceased to function long ago. Appropriate surgical equipment for autopsy and corpse preparation are not in place and workers have to improvise. PPE shields are not provided where significant splash hazards are anticipated and appropriate PPE e.g. gloves, goggles, and gowns are not available. Stench and formaldehyde effects are prominent with no meaningful efforts to minimize them. Universal precautions as required by the Blood borne Pathogens Standards are not in place and the use of additional PPE if blood exposure is anticipated during autopsies or orthopedic surgery such as: surgical caps or hoods and/or shoe covers or boots in instances when gross contamination can reasonably be anticipated is rare to come by. In terms of ergonomics, supportive comfortable chairs that include foot-rests are not provided despite the same being provided in other departments. Ergonomically recommended adjustable cadaver tray is not available in most cases. The following (table 20) is a more detailed version of the findings.

Table 20: Crosstabulation for Morgue Cumulative Risk Level

Crosstab: Morgue Cumulative Risk Level								Total
KEPH		N/A	Insignificant	minor	Moderate	major	severe	
Level 2	Count	31	0	0	1	0	0	32
	% KEPH Level	96.9%	.0%	.0%	3.1%	.0%	.0%	100%
	% Cumulative	54.4%	.0%	.0%	16.7%	.0%	.0%	33.7%
	% of Total	32.6%	.0%	.0%	1.1%	.0%	.0%	33.7%
Level 3	Count	26	1	0	0	0	0	27
	% KEPH Level	96.3%	3.7%	.0%	.0%	.0%	.0%	100%
	% Cumulative	45.6%	100.0%	.0%	.0%	.0%	.0%	28.4%
	% of Total	27.4%	1.1%	.0%	.0%	.0%	.0%	28.4%
Level 4	Count	0	0	1	4	4	19	28
	% KEPH Level	.0%	.0%	3.6%	14.3%	14.3%	67.9%	100%
	% Cumulative	.0%	.0%	25.0%	66.7%	66.7%	90.5%	29.5%
	% of Total	.0%	.0%	1.1%	4.2%	4.2%	20.0%	29.5%
Level 5	Count	0	0	3	1	2	2	8
	% KEPH Level	.0%	.0%	37.5%	12.5%	25.0%	25.0%	100%
	% Cumulative	.0%	.0%	75.0%	16.7%	33.3%	9.5%	8.4%

	% of Total	.0%	.0%	3.2%	1.1%	2.1%	2.1%	8.4%
Total	Count	57	1	4	6	6	21	95
	% KEPH Level	60.0%	1.1%	4.2%	6.3%	6.3%	22.1%	100%
	% of Total	60.0%	1.1%	4.2%	6.3%	6.3%	22.1%	100%

As outlined in the cross tabulation above, a total (n) of 95 facilities were analyzed; 8 level 5, 28 level 4, 27 level 3 and 32 level 2. Out of the 40% (38) that offered the morgue services, the overall risk levels returned was “severe” at 22.1%, Major 6.3%, moderate 6.3%, minor 4.2%, and insignificant 1.1%. Below (figure 24) is a more graphic pictorial presentation of OSH risks at the morgue.



Photo 1: Clean work environment at the morgue; however special features and standards are desirable to protect the safety of mortuary employees.



Photo 2: Autopsy area; workers are potentially exposed to hazards including Infection, Manual handling risks incurred while transporting bodies (ergonomics), chemical hazards, physical hazards and social hazards.



Photo 3: A typical morgue autopsy table. Notice a body lying next – Handling Cadavers is a big challenge in the morgues

Figure 24: Pictorial Presentation of Morgue

4.1.9 THE PHARMACY

The OSH risk magnitude at the pharmacy departments of KEPH level 2 to level 5 facilities sampled across the nation focused on the following specific building blocks of OSH management developed from the hierarchy of controls; General House Keeping OSH Issues - GCP, Engineering Controls, Ergonomics, Equipment Use and Safety, Hazard Communication Standard, Hazardous Drugs during Storage, Latex Allergy, Workplace violence and Slip/trips/falls. The following table (table 21) shows an itemized version of the OSHRAE results (cumulative medians) of variables assessed under the department ranked on the hierarchy of controls scale.

Table 21: KEPH Level 2-5 Pharmacy Departments Cumulative Risk Level Median-Itemized (Showing OSH variable assessed)

OSH Issue/Variable Assessed in housekeeping and Laundry Sections	Cumulative Safety Ranking on Hierarchy of controls scale
General House Keeping OSH Issues – GCP in the pharmacy,	4
Presence and use of Documented Participatory OSH Administration Program (POSHAP) or EAP	5
Use of Appropriate Engineering Controls	3
Hazard Communication Standard	4
Hazardous Drugs; Storage, Use and disposal	5
Ventilation and Aerosols observed in terms of directional airflow and air changes	4
Ergonomics, Equipment Use and Safety	5
General Electrical and fire Safety observed	4
Workplace violence (restrictions and security)	2
Slips/trips/falls	3
Latex Allergy (provision of alternatives)	3
Overall Safety Risk Level	4

The survey results from the building blocks/subscales analyzed for the pharmacy section were summarized in figure 25 below:

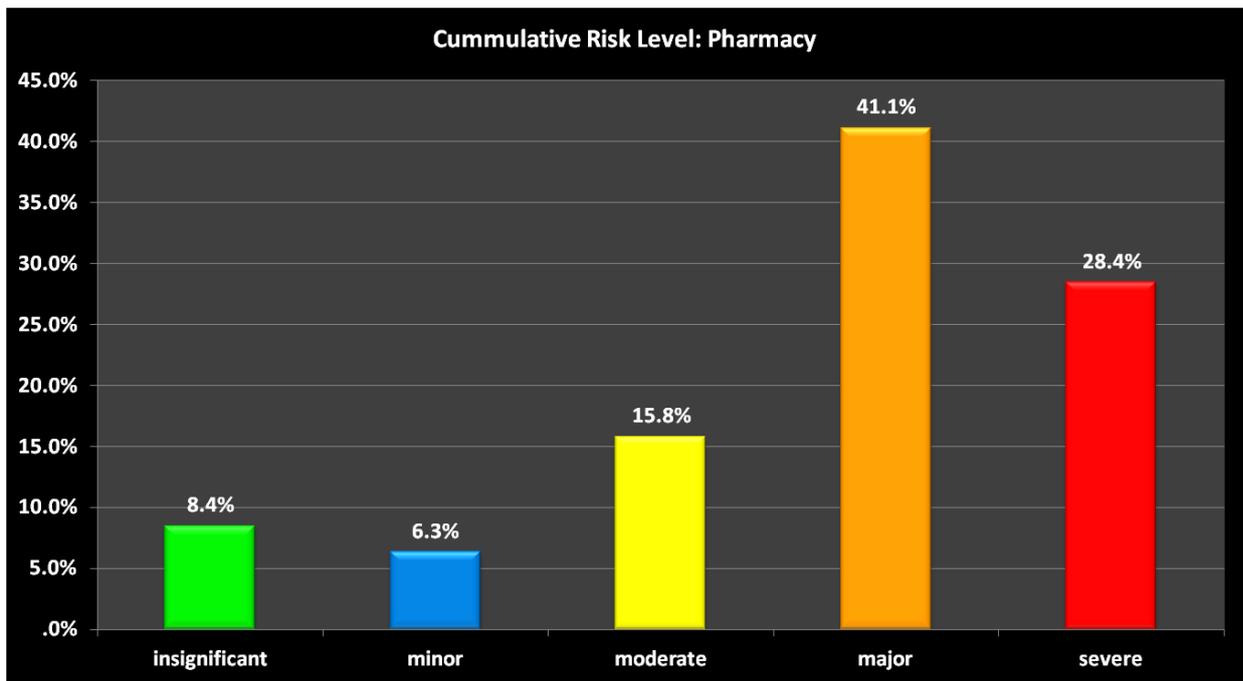


Figure 25: KEPH Level 2-5 Pharmacy Department Cumulative-Median

The results show that the general classification is “major”. Of 95 health facilities, 41.1% had a score of “major” OSH risk rating, with 28.4% of facilities listed as having severe risk, 15.8% moderate risk, 6.3 % minor risk, with 8.4% rated as insignificant.

While the pharmacies are generally in clean and have restricted access in most facilities, other areas are yet to be OSH compliant. The OSH risks in the pharmacy is classified as major. Key concerns include, restricted access to areas where hazardous drugs are prepared and stored limited only to authorized personnel with signs restricting entry Hazard Communication Standard. The sections lack a written OSH program complete with an SOP with HAZCOM (hazard communication) standard provided. Signage and labeling are generally lacking. The section lacks warning labels and standardized access to Material Safety Data Sheets (MSDSs), PPE and how employees can obtain and use the appropriate hazard information, spill kits where hazardous drugs are administered, emergency skin and eye decontamination kits, a list of drugs covered by hazardous drug policies and information on spill and emergency contact procedures posted or easily available to employees.

In terms of administrative controls, the following were noticed; lack of safety labels on all syringes and IV bags containing hazardous drugs showing a warning such as: “Special Handling/Disposal Precautions”, SOP for safe handling of hazardous drugs during

administration, SOP for storage and safe handling of hazardous drugs during storage, SOP for safe handling of hazardous drugs during care giving and SOP for safe disposal of hazardous drugs. The following (table 22) provides a more detailed presentation of the findings across the KEPH levels.

Table 252: Cross tabulation Pharmacy Section Cumulative Median

KEPH		Insignificant	Minor	Moderate	Major	Severe	Total
Level 2	Count	4	1	1	3	23	32
	% KEPH Level	12.5%	3.1%	3.1%	9.4%	71.9%	100%
	% of Total	4.2%	1.1%	1.1%	3.2%	24.2%	33.7%
Level 3	Count	4	0	0	1	22	27
	% KEPH Level	14.8%	.0%	.0%	3.7%	81.5%	100%
	% of Total	4.2%	.0%	.0%	1.1%	23.2%	28.4%
Level 4	Count	4	1	3	5	15	28
	% KEPH Level	14.3%	3.6%	10.7%	17.9%	53.6%	100%
	% of Total	4.2%	1.1%	3.2%	5.3%	15.8%	29.5%
Level 5	Count	0	1	2	2	3	8
	% KEPH Level	.0%	12.5%	25.0%	25.0%	37.5%	100%
	% of Total	.0%	1.1%	2.1%	2.1%	3.2%	8.4%
Total	Count	12	3	6	11	63	95
	% of Total	12.6%	3.2%	6.3%	11.6%	66.3%	100%

As outlined in the cross tabulation above, a total (n) of 95 health facilities, 41.1% had a score of “major” OSH risk rating, with 28.4% of facilities listed as having severe risk, 15.8% moderate risk, 6.3 % minor risk, with 8.4% rated as insignificant. The following (figure 26) is a graphical presentation of the pharmacy sections.





Photo 2a-b: A crowded pharmacy? Or just poorly arranged? Notice haphazard arrangement on the right and below



Photo 3a-b: Crowded pharmacy. Note (right) the lack of space forcing a staff to pile supplies and files on a table.



Photo 4a-b: Expired Drugs on a shelf. (Right) the fresh supply of drugs stacked on the shelves below the expired drugs

Figure 26: Pictorial Pharmacy Sections

5.0 DISCUSSION

Health sector is critical to any country's development. In Kenya, the health sector has been guided by the Kenya Health Policy Framework, KHPF 1994 – 2010. This policy framework paper is based on an analysis of the health situation in 1994 and aimed at providing guidance on the policy objectives the sector needs to achieve for it to attain the goal of complete physical, mental and social wellbeing of the people in Kenya. It is notable that "people of Kenya" is an inclusive term covering the health care workers. The KHPF 1994 – 2010 had, as its strategic theme 'Investing in health'. Its overall stated goal is *'To promote and improve the health of all Kenyans through the deliberate restructuring of the health sector to make all health services more effective, accessible and affordable'*. This theme resonates well with OSH and specifically with OHSAS 18001 – The international standard serving as a yard stick for successful OSH implementation. The goal of KHPF 1994 – 2010 can only be achieved by first targeting the health sector itself through HCWs who in turn would target the rest of the population. Currently the OSH situation in Kenya's health ministry as presented above is in dire need of intervention.

While risks abound in the health care facilities in Kenya, the following OSH risks ranked 4 (high) and 5 (severe) cumulatively across the survey both at facility levels and KEPH levels presents a challenge to all stakeholders. This is because an individual working for MOH in any capacity is therefore most likely to be exposed to the following OSH risks; BBP (5), Equipment Hazards (4), Needle stick Injuries (5), Fire related hazards (5), Security Related Hazards (3), airborne and other communicable diseases (4) among others. Based on the hierarchy of controls formula used above. The medians of all the variables (likely risks presented) were ranked using SPSS to generate the top risks in the MOH facilities. These levels were higher than the acceptable safety risk level of 2. The following table summarizes the OSH risks for MOH (KEPH Level 2-5) that cumulatively ranked.

Table 23: TOP OSH RISKS AT GOK MOH HEALTH FACILITIES

OSH Risks	KEPH L5	KEPH L4	KEPH L3	KEPH L2	Overall MOH Facility Baseline
	Risk Ranking on Hierarchy of Controls Scale				
Blood Born and related Pathogens	5 Severe	5 Severe	5 Severe	5 Severe	HIGH 4
Equipment Hazards	4 HIGH	3 MEDIUM	4 HIGH	3 MEDIUM	
Needle Stick Injuries (All Levels)	5 Severe	5 Severe	5 Severe	5 Severe	
Fire Related Hazards	5 Severe	4 HIGH	5 Severe	5 Severe	
Security Related Hazards	4 HIGH	1 LOW	4 HIGH	1 LOW	
Ergonomics Related Hazards	3 MEDIUM	4 HIGH	4 HIGH	1 LOW	
Airborne and Other Communicable Diseases (TB)	4 HIGH	3 MEDIUM	4 HIGH	3 MEDIUM	
Work Related Stress (over loads)	5 Severe	5 Severe	5 Severe	5 Severe	
Health and Safety Universal Conditions	4 HIGH	3 MEDIUM	4 HIGH	4 HIGH	
Statutory Compliance Notices	5 Severe	5 Severe	5 Severe	5 Severe	

On the other hand, OSH risks do not present themselves in a vacuum, but within work processes and sections where the actual work takes place. Consequently, this risk assessment classified the presenting risks based on the source (OHSAS 18001). Work in the MOH is compartmentalized by area of specialization and nature of service hence the thirteen key sections namely, administration, stores, clinical services, housekeeping, laboratory, pharmacy, morgue, biomedical engineering, etc. when OSH risks are ranked section wise, the following areas are considered as “OSH Red-spots” hence need urgent attention at all levels. These are; morgue, housekeeping, laundry, administration, kitchen, biomedical engineering and clinical services.

The ranking of needle stick injuries and Blood borne Pathogens (BBP) as some of the most critical hazards is in line with the findings of Kent A. Sepkowitz (2005) that identified Kenya and sub-saharan Africa as one of the countries with leading number of needle stick injuries and

related exposures. The following table summarizes the OSH risks for MOH (KEPH Level 2-5) that ranked 4 (high) and 5 (severe) cumulatively across the survey.

Table 24: TOP OSH RED-SPOTS/DEPARTMENTS AT MOH FACILITIES

OSH Risks	KEPH LEVEL 2 -5				Overall Baseline Ranking
	BBP	Equipment Hazards	Needle Stick Injuries	Other OSH Risks (cumulative)	
House Keeping	5 Severe	5 Severe	5 Severe	4 HIGH	HIGH 4
Administration	4 HIGH	4 HIGH	3 MEDIUM	3 MEDIUM	
Biomedical	5 Severe	5 Severe	5 Severe	4 HIGH	
Laundry	5 Severe	5 Severe	5 Severe	4 HIGH	
Clinical Services	5 Severe	4 HIGH	5 Severe	5 Severe	
Laboratory/Pharmacy	1 LOW	3 MEDIUM	1 LOW	4 HIGH	
Kitchen/Dietary	5 Severe	5 Severe	5 Severe	4 HIGH	
Morgue	5 Severe	5 Severe	5 Severe	5 Severe	

5.1 THE CONCEPT AND SPIRIT OF ACCEPTABLE RISK

While the sections and hazards presenting are not out of the ordinary given a typical health sector environment, the magnitude of the risk (levels) is alarming. According to Lee Clark (1991), while risks abound in all processes, risks need to be contained to an “acceptable level”. That level in which reasonable minimum risk that could occur would not result in severe harm ((Clarke 1991). In terms of hierarchy of controls, this level is classified as **Minor** – where risks exist in low quantities. Exposures are possible but unlikely in large quantities and though processes may present some risks whose results could be felt as minor on exposure (Lawrence 2012). It is this concept and its spirit that is lacking in the GoK MOH facilities.

Internationally, the yardstick for OHSMS is OHSAS 18001 – the internationally recognized model for Occupational Health and Safety Assessment Series (OHSAS) for management systems (Lawrence 2012) which is compatible with ISO 9001:1994 (Quality) and ISO 14001:1996

(Environmental) management systems standards; ISO 9001:2000 which is based on the ISO 14001:1996 model which integrating QEH&S MS and is intended to address OSH for employees, temporary employees, contractors, visitors and other personnel on-site (Henderson 2012). Nationally, while numerous documents exist such as Infection Control Manual, HIV Post Exposure Prophylaxis Guidelines, the OHSMS compliance yardstick is OSHA 2007. Both authorities require that;

1. A Health and Safety Management System be established and maintained
2. Instructions and procedures to ensure the health and safety of all personnel in compliance with relevant national and international regulations.

The steps towards OHSAS 18001 Compliant Organization is by establishing Occupational Health and Safety Management Systems (Henderson 2012); (Lawrence 2012). This is an eight step process comprising;

1. Establishing a policy
2. Assigning responsibility
3. Employee involvement
4. Planning assessment process
5. Establishing objectives and action plans
6. Implementing processes
7. Monitoring and measurement, and
8. Management review.

With this kind of system in place, the top risks and their sources (departments) can be contained by incorporating the ongoing efforts like infection control program without duplication of duties (Lawrence 2012).

6.0 CONCLUSIONS

The overall objective of this survey was to generate a baseline OSH risk analysis report through an Integrated OSH` Risk Assessment Exercise on health facilities across the country, evaluate the current standards of OSH implementation in the health ministry against the OSH HIRAC (Hazard Identification, Risk Assessment and Control) hierarchy of controls, and recommend a working policy to fill the gap to the recommended National & International OSH Standards.

Generally, MOH facilities were found to bear high risk, with majority falling under the Orange=**Major/High** category. With the non-compliance status standing almost at the severe level, OSH Risks at MOH health facilities KEPH Level 2-5 are serious enough to warrant urgent changes in day to day operations. Any negligence would move to catastrophic stage with repercussions in other sectors.

The current OSH status at MOH is largely attributed to lack of institutionalized all inclusive OSH Program and a safety culture fueled by two major factors; (one) lack of institutional Occupational Health and Safety Policy complete with a manual/guide where in all regulatory measures and strategies for compliance are taken into account and (two) lack of a designated safety resource persons who would spearhead the OSH policy implementation at the facility level. Based on the risk analysis, an OSH Policy complete with an implementation manual has been proposed for implementation by MOH as a long term measure while a raft of adjustments proposed for immediate implementation to forestall any safety crisis at the facility level. To reverse the **HIGH/ORANGE/4** safety risk rating, there is an urgent need for a rigorous safety culture transformation within MOH to go hand in hand with the recommended intervention, lest the infrastructure/training and human resource investment on safety fail to achieve desired results. MOH has a critical mandate, efficient structure and latent potential. While it would be irrational to propose a one-week implementation of the recommendations in this report, it is critical that the remedial measures be implemented with speed to avert any further deterioration to the severe state. Currently, a small incidence like an "a silent exposure to a virus by a member of staff" would trigger a situation of an unimaginable proportion within and outside the facility.

7.0 RECOMMENDATIONS

7.1 MITIGATING THE OSH RISKS AT MOH: GENERAL RECOMMENDATIONS

Mitigation of hazards and risks is dependent on Hazard Identification Risk Assessment and Control (HIRAC) process. This document section presents mitigation proposals for addressing OSH risks in KEPH level 2-5 based on the results of the risk assessment survey from selected healthcare institutions across the country. It is based on the baseline compliance data (risk levels) in KEPH levels across the country isolating top risks in each section of facility OSH management and consolidating them into strategic framework for tracking and filling the gap to the recommended OSH Standards.

It is recommended that MOH urgently implement a Participatory OSH Administration Program (POSHAP). The package is based on the risk control method known as the hierarchy of controls³ - an approach with the primary emphasis on controlling the hazard at the source. For a risk that is assessed as "high", steps should be taken immediately to minimize risk of injury. POSHAP as a program is currently generated and implemented using a simultaneously Top-Bottom and Bottom-Up approach. Its backbone is management backed by SOPs (standard operating procedures) where operations staff at the lowest level are facilitated to generate their own sections relevant SOPs and the management leads the implementation through administrative controls. Being a participatory program, POSHAP is flexible and provides a perfect forum for the growth of good safety culture within a workplace. In the health sector where both new and experienced staff gets new assignments regularly, POSHAP provides an opportunity for staff to share experiences and "fit in" their new work places with minimum supervision on safety issues. See details of the proposed Safety program in the appendices.

³ The method was adopted for risk analysis and scoring direction. Ranking is done on the reverse with a section having all the controls scoring zero, 1, 2, 3, 4, and 5 for the one that lack all the six on the "hierarchy of controls"

7.2 PRIORITY RISK CONTROL & MITIGATION RECOMMENDATIONS

The primary emphasis of this approach is managing the risk by controlling the hazards at source. For a risk that is assessed as “high”: steps should be taken immediately to effectively minimize risk of injury by employing the aforementioned “hierarchy of controls”

Table 25: Risk Control: Summary Proposals for Mitigating the Top Ranking OSH Risks at GoK MOH

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Administration Department	The staff in this section are in-charge of core administration and operations largely facilitating other medical and technical staff to do their work better.	Risk of non-compliance with the regulations particularly OSHA 2007 and Universal Safety Precautions.	<ol style="list-style-type: none"> 1. Administration departments ought to have as a bare minimum a Documented Participatory Occupational Safety and Health Program POSHAP complete with SOPs for dealing and associating with; <ol style="list-style-type: none"> 1. Regulatory/organizational bodies and professional associations 2. Staff and patients admissions and records storage 3. Installation and maintenance of workstations 4. Employee/employer rights 5. Recordkeeping: Employee surveillance program 2. Develop or mainstream <u>GoK-MOH Guidelines for Protecting the Safety and Health of Health Care Workers – Manual for Developing Hospital Safety and Health Programs</u> 3. Develop an OSH Indication program for new staff

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Central Stores/General Storage Areas	The staff in this section are a key linking the worker and supplies/equipment and vice versa	Main risk include exposures due to non General stores House Keeping OSH Issues, Exposure to Ethylene Oxide, Mercury Exposure, Glutaraldehyde, Burns/Cuts, Ergonomics, Hazardous Chemicals, Slips/Trips/Falls, and Latex Allergy	<ol style="list-style-type: none"> 1. SOP on general OSH housekeeping issues in a health facility store/supplies storage areas. This should be scaled and tailored for each level. A proposal is made for a National guideline and KEPH Specific guideline e.g. KEPH Level 2. The SOP should include; General House Keeping OSH Issues, Exposure to Ethylene Oxide, Mercury Exposure, Glutaraldehyde, Burns/Cuts, Ergonomics, Hazardous Chemicals, Slips/Trips/Falls, and Latex Allergy. 3. Redesign stores air-quality system to include ventilators especially for KEPH level 3, 4 and 5. (see Appendix A – Proposed Engineering Controls – Structural Designs for KEPH L 3-5 storage areas.)

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Clinical Services Department, Theater/Surgical Suites and Intensive Care Units	This is the area bearing the core mandate of the MOH Facilities	Processes and Process generated products, by-products and wastes exposes the staff to Blood borne Pathogens (BBP), Poor Clinical Ergonomics related complications, Slips/Trips/Falls, Hazardous Chemicals, Equipment Hazards, Tuberculosis and Radiation Exposure and Workplace Violence	<ol style="list-style-type: none"> 1. SOP on General House Keeping OSH Issues in Clinical Areas, SOP based on Universal Precautions for Blood borne Pathogens (BBP), Clinical Ergonomics Slips/Trips/Falls, Hazardous Chemicals, Equipment Hazards, Clinical Services Tuberculosis, Radiology/X-ray Room: Radiation Exposure, Equipment handling, Waste Management and Workplace Violence. 2. Waste Pit and Recycle containers designed for KEPH Level 2-3 based on the Universal Safety Precaution on Medical waste Management

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Kitchen/Dietary Department	Exposing other staff, Self and Patients to Botulism; Exposure to Musculoskeletal disorder MSD due to performing many lifting, reaching, and repetitive tasks as part of job duties and being exposed to constant Heat.	General House Keeping OSH Issues, Kitchen Ergonomics, Kitchen Equipment Safety, Fire Safety, Hazardous Chemicals, Machine Guarding, Food borne Disease, Slips/Trips/Falls and Electrical Safety.	<ol style="list-style-type: none"> 1. Specific Kitchen Operations Guidelines designed for each KEPH Level in which Kitchen use is applicable complete with an SOP considering; General House Keeping OSH Issues in a hospital facility, Kitchen Ergonomics, Kitchen Equipment Safety, Fire Safety, Hazardous Chemicals, Machine Guarding, Food borne Disease, Slips/Trips/Falls and Electrical Safety. 2. Provide necessary PPE like cypro gloves and heat resistant gloves for the Kitchen staff 3. Redesign kitchens air-quality system to include ventilators especially for KEPH level 3, 4 and 5. (see Appendix B – Broan Interior Wall Fans - Square installed in interior walls to help balance room temperature Proposed Engineering Controls – Structural Designs for KEPH L 3-5 Kitchen Areas.) 4. Additional Safety Measures for Kitchen should include Guidelines Demanding; Tasks assessment to identify potential worksite hazards and provide and ensure employee use of appropriate Personal Protective Equipment (PPE). <ol style="list-style-type: none"> a) The employer should demand that employees uses appropriate hand protection when hands are exposed to hazards such as cuts, lacerations, and thermal burns e.g. the use of oven mitts when handling hot items, and steel mesh or Kevlar gloves when cutting. b) Ensure that cold rooms and walk-in freezers are fitted with a panic bar or other means of exit on the inside of freezers to prevent trapping workers inside. c) Ensure that electrical equipment are free from recognized hazards and that <u>Electrical Safety Guidelines</u> is followed.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Kitchen/Dietary Department Cont.			<ol style="list-style-type: none"> 1. Good work practices include: <ol style="list-style-type: none"> a. The safe handling, use, and storage of knives and other sharp utensils. Cutlery should be kept sharpened and in good condition: dull knives tend to slip and may cause injuries. The direction of the cut should always be away from the body. b. Knives, saws, and cleavers should be kept in a designated storage area when not in use. The blades should not be stored with the cutting edge exposed. c. Knife holders should be installed on work tables to prevent worker injury. d. Knives and other sharp objects should not be put into sinks between periods of use. e. Newly purchased knives should be equipped with blade guards and knuckle guards that protect the hand from slipping onto the blade. f. The wheels of food carts should be large, low rolling, low resistance wheels that can roll easily over mixed flooring as well as gaps between steps, stairs and hallways. g. Use appropriate PPE and training to avoid steam burns when working with hot equipment or substances. h. Hold the cover to deflect steam from the face when uncovering a container of steaming materials. i. The handles of cooking utensils should be turned away from the front of the stove.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Casualty/Emergency Department	Staff in this section are often called in from other sections hence "import" and "export" related OSH Complications	Common OSH risks identified are Blood, OPIM, Blood borne Pathogens, Hazardous Chemicals, Slips/Trips/Falls, Tuberculosis, Latex Allergy, Equipment Hazards, Workplace Violence, Workplace Stress, Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA) and Terrorism	<ol style="list-style-type: none"> 1. Develop an ED specific <u>Blood borne Pathogens Standard</u> with precautions when dealing with blood and other potentially infectious materials and providing for: <ol style="list-style-type: none"> a) Engineering and Work Practice Controls <ul style="list-style-type: none"> ▪ Engineering and work practice controls must be the primary means to eliminate or minimize exposure to blood borne pathogens. Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used, and changes to the Exposure Control Plan (ECP) must include these engineering controls and WHO universal standard. 2) MOH as an Employer: <ul style="list-style-type: none"> ▪ Ensure employees wear appropriate PPE, gloves, gowns, face masks, when anticipating blood or other potentially infectious materials exposure – develop an SOP and Safety Good Practices Posters. ▪ Ensure employees discard contaminated needles and other sharp instruments immediately or as soon as feasible after use into appropriate containers. ▪ Provide in their exposure control plan documentation of consideration and implementation of appropriate commercially available and effective engineering controls designed to eliminate or minimize exposure to blood and OPIM. ▪ Practice Universal Precautions: Treat all blood and other potentially infectious body fluids as if they are infected and take appropriate precautions to avoid contact with these materials.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Casualty/Emergency Department Cont			<ul style="list-style-type: none"> ▪ The Blood borne Pathogens Standard does allow hospitals to practice acceptable alternatives to <u>Universal Precautions such as Standard Precautions or Body Substance Isolation.</u> ▪ Needle stick/sharps injuries recorded on a Sharps Injury Log. The sharps injury log must be established and maintained and the confidentiality of the injured employee must be protected. ▪ Follow-up area for needle stick injuries and/or exposure incidents: the employer to make immediately available a confidential medical evaluation and follow-up to an employee reporting an exposure incident. This follow-up often occurs in the emergency department.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Biomedical Engineering Department	The staff in this section is charged with installation and maintaining equipment within the facilities	Risk include exposure to contaminated equipment and environment given adverse General House Keeping OSH Issues – Industrial Hygiene, Machine Guarding, Hazardous Chemicals in Engineering Section, Nosocomial Diseases, Fire safety, Lockout/Tagout, Asbestos Exposure, Electric Shock, Mercury Exposure and Welding Fumes.	<p>1. Generate and Implement a written program which meets the requirements of the <u>Hazard Communication Standard (HCS)</u> to provide for worker training, warning labels, and access to Material Safety Data Sheets (MSDS). The Hazard Communication Standard ensures employee awareness of the hazardous chemicals they are exposed to in the workplace.</p> <ul style="list-style-type: none"> ▪ All hazardous chemicals such as those found in some soaps, disinfectants, pesticides, must be clearly labeled as hazardous. ▪ Provide PPE (e.g., gloves, goggles, splash aprons) as appropriate when handling hazardous cleaning agents and chemicals. ▪ Include Nosocomial Diseases, Fire safety, Lockout/Tagout, Asbestos Exposure, Electric Shock, Mercury Exposure and Welding Fumes. <p>Other Recommended Good Work Practices:</p> <ul style="list-style-type: none"> ▪ MOH as the employer need to be aware that paints, adhesives, solvents, and cleaners may give off toxic vapors, and special ventilation and air monitoring practices may be needed. ▪ Never mix ammonia and chlorine in a cleaning solution and never pour both down a drain together. When mixed, these chemical form a deadly gas. ▪ Provide milk and water to employees in such areas during duty hours. Improved ventilation systems curtesy of Engineering Controls <p>See Appendix C – Proposed Remote-mounted In-line Fan Proposed for Pharmacies and biomedical Engineering Departments in KEPH L3-5</p>

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
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FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
House Keeping and Laundry Departments	The staffs in this section are in-charge of core operations largely facilitating other medical and technical staff to do their work better and cleaning after them.	Staff not trained and not aware both of provisions of the law on personal safety at work and of what actions to take so as to be secure. PPE is not provided, and when provided staff tend to either ignore or use wrongly. There are outdated SOPs in place	<ol style="list-style-type: none"> 1. Generate SOP complete with guidelines compatible with WHO & OSHA requirements that work surfaces be cleaned with an "appropriate disinfectant." Appropriate disinfectants include a diluted bleach solution and KPPB-registered antimicrobial products such as tuberculocides, sterilants and <u>Sterilants/ High Level Disinfectants</u> for equipment sterilization. <ul style="list-style-type: none"> ▪ Fresh solutions of diluted household bleach e.g. Jik made up every 24 hours are also considered appropriate for disinfection of environmental surfaces and for decontamination of sites. Contact time for bleach is generally considered to be the time it takes the product to air dry. ▪ NOTE: Products registered as HIV effective are not necessarily effective against tuberculosis (tuberculocidal) or against the hepatitis B virus (HBV). 2. Generate and Implement Guidelines on Hazardous Waste Management complete with SOPs for each Section <ul style="list-style-type: none"> • Apply the use of: <ul style="list-style-type: none"> • personal protection devices for the worker performing the task; • All the blood must be cleaned thoroughly before applying the disinfectant. • The disposal of the infectious waste is in accordance with National and/or local regulations • The surface is left wet with the disinfectant for 30 seconds for HIV-1 and 10 minutes for HBV.

FACILITY SECTION LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
			<p>3. Ensure enforcement Procedures for the Occupational Exposure to Blood borne Pathogens. Refer⁴</p> <ul style="list-style-type: none"> ▪ Surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the work shift if the surface may have become contaminated since the last cleaning. (Cleaning SOP posted) ▪ Contaminated equipment, such as IV poles labeled or tagged "Biohazard" identifying which portions of the equipment are contaminated. ▪ Sinks available for cleaning some equipment, if grossly contaminated with a soap and water solution prior to decontamination ▪ Post signs at the entrance to work areas with the BIOHAZARD legend: ▪ SOP on BBP posted.
<p>⁴ WHO and OSHA has commented on disinfectants in the following interpretation letters and documents:</p> <ol style="list-style-type: none"> 1. Disinfectants claiming efficacy against the Hepatitis B virus. (1997, April 1). 2. OSHA's policy regarding the use of EPA-registered disinfectants. (1999, July 15). 			

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Laboratory	Common safety and health issues in the lab include: Blood borne Pathogens (BBPs), Tuberculosis (TB), OSHA Laboratory Standard, Formaldehyde Exposure, Toluene, Xylene, or Acryl Amide Exposure, Needle stick/Sharps Injuries, Work Practices and Behaviors, Engineering Controls, Latex Allergy Slips/Trips/Falls and Ergonomics	Exposures related to processes and products from Blood borne Pathogens (BBPs), Tuberculosis (TB), OSHA Laboratory Standard, Formaldehyde Exposure, Toluene, Xylene, or Acryl Amide Exposure, Needle stick/Sharps Injuries, Work Practices and Behaviors, Engineering Controls, Latex Allergy Slips/Trips/Falls and Ergonomics	<ol style="list-style-type: none"> Adoption and mainstreaming Laboratory Bio-safety Ideals for Bio-safety Level 2 and 3 for KEPH Level 3-5. These should be developed into SOPs and staff (lab and administrative) trained and certified in the same. Specifics should include: <ul style="list-style-type: none"> Provision of Autoclaves: all waste to be autoclaved before leaving the lab Provision for Certified Incinerators: All regulated waste should either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy blood borne pathogens. Contaminated materials that are to be decontaminated at a site away from the work area should be placed in a durable, leak proof, labeled or color-coded container that is closed before being removed from the work area. Restricted and Regulate Access Labels & Signage: Engineering Controls and Work Practice⁵: All activities involving other potentially infectious materials should be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials should be conducted on the open bench.

⁵ [Biosafety in Microbiological and Biomedical Laboratories \(BMBL\), 5th Edition](#). Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), (2009, December). Also available as a 4 MB [PDF](#), 438 pages.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
			<ol style="list-style-type: none"> 4. Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators, centrifuge safety cups, sealed centrifuge rotors...should be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills, or aerosols. 5. Each work area should contain a sink for washing hands and a readily available eye wash facility. <ul style="list-style-type: none"> • The sink should be foot, elbow, or automatically operated and located near the exit door of the work area. 6. Each laboratory should contain a facility for hand washing and an eye wash facility which is readily available within the work area. <ul style="list-style-type: none"> ✓ Tuberculosis (TB): Adopt guidelines on TB and related issues. ✓ Controlled access, anterooms, sealed windows, directional airflow, preventing recirculation of laboratory exhaust air, filtration of exhaust air before discharge to the outside, and thimble exhaust connections for biological safety. See Appendix D for Ventilation System and Door and Appendix E – Proposed Engineering Control Systems for the Laboratory KEPH L3-5

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Pharmacy	<p>Common OSH issues include:</p> <p>Hazardous Drugs During Preparation, Handling Practices, Hazardous Drugs During Administration, Hazardous Drugs During Care Giving, Disposal of Hazardous Drugs, Hazardous Drugs During Storage, Latex Allergy, Ergonomics and Workplace Violence</p>	<p>Lack of OSH program complete with an SOP with HAZCOM (Hazard communication) standards. Signage and labeling lacking. Lack of safety label on all syringes and IV bags containing hazardous drugs</p>	<p>1. Design and Implement a written program complete with an SOP which:</p> <ul style="list-style-type: none"> a. Meets the requirements of the <u>Hazard Communication Standard</u> for employees handling or otherwise exposed to chemicals, including drugs that represent a health hazard to employees. b. Provides for worker training, c. Warning labels, and d. Access to Material Safety Data Sheets (MSDSs). e. Employees must be informed of the requirements of the Hazard Communication Standard including: <ul style="list-style-type: none"> ✓ Personal protective equipment, and the details of the hazard communication program including an explanation of the labeling system and the MSDS, and how employees can obtain and use the appropriate hazard information. <p><u>Other Recommended Good Work Practice:</u></p> <ul style="list-style-type: none"> ✓ Develop, implement and maintain a written hazardous drug safety and health plan to protect those employees who handle or are otherwise exposed to drugs that pose a health hazard to them. ✓ Nursing stations on floors where hazardous drugs will be administered should have spill and emergency skin and eye decontamination kits available and relevant MSDSs for guidance.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
			<ul style="list-style-type: none"> ✓ A list of drugs covered by hazardous drug policies and information on spill and emergency contact procedures should be posted or easily available to employees. ➤ PPE: assess potential hazards and then select and ensure the use of appropriate PPE to protect employees from hazardous chemicals, including hazardous drugs as defined by the <u>Hazard Communication Standard</u> ➤ Employ Effective use of gloves and gowns when working with Hazardous Drugs. <ul style="list-style-type: none"> • SOP for safe handling of hazardous drugs during administration • Restricted Access to areas where Hazardous Drugs are prepared and stored limited only to authorized personnel with signs restricting entry • Specially designed Bins or shelves where Hazardous Drugs are stored designed to prevent breakage and to limit contamination in the event of leakage, with bins with barrier fronts, or other design features that reduce the chance of drug containers falling to the floor. ➤ Hazardous drugs requiring refrigeration stored separately from non-hazardous drugs in individual bins designed to prevent breakage and contain leakage.

FACILITY SECTION KEPH LEVEL 2-5	Rationale for Risks/Potential of Exposure	Hazard/Risk	Recommendation Package for Risk Mitigation
Morgues	<p>The most neglected section in the MOH KEPH Level 2-5 system the risks include employee exposure to infectious diseases and agents, (e.g., staph, strep, TB, HIV, HBV), and chemicals such as <u>Formaldehyde</u> from contact with cadavers. Other potential hazards in the morgue include:</p> <ul style="list-style-type: none"> ✓ Latex allergy from wearing latex gloves. ✓ slips/trips/falls <p>Ergonomics and supply of equipment for lifting and handling cadavers</p>	<p>Lack of Basic Equipment forcing the staff to improvise and use outdated equipment such as hammer, axe and butchers knife</p>	<ol style="list-style-type: none"> 1. Immediate provision of equipment for Morgue use and training of staff. 2. Circular and guidelines on GCP in the Morgues and support system. 3. Provision and Use of engineering controls such as: <ul style="list-style-type: none"> ✓ Provide appropriate ventilation systems (e.g., downdraft tables that capture the air around the cadaver). ✓ Place local vacuum systems for power saws in the morgue. Shields should be in place when significant splash hazards are anticipated. 4. Use <u>Universal Precautions</u> as required by the Blood borne Pathogens Standards. 5. Wear appropriate PPE e.g. gloves, goggles, gowns. <ol style="list-style-type: none"> a. Use additional PPE if blood exposure is anticipated during autopsies or orthopedic surgery such as: Surgical caps or hoods and/or shoe covers or boots in instances when gross contamination can reasonably be anticipated. 6. For Latex Allergy: See the Latex Allergy Section. 7. For slips/trips/falls: see the slips/trips/falls section.

APPENDIX 1. – ANNEXES

ANNEX 1. PROPORTIONATE SAMPLE PER FACILITY LEVEL BASED ON THE POPULATION DISTRIBUTION

Table 26: Proportionate sample per Facility Level based on the population distribution

Province	Govt Owned Health Facilities	National Representation	Proportionate Sample
Nairobi	26	0.8%	1
Nyanza	557	16.2%	16
Western	278	8.1%	8
Rift Valley	1063	30.8%	30
Eastern	692	20.1%	19
North-Eastern	182	5.3%	5
Coast	274	7.9%	8
Central	376	10.9%	11
Total	3448	100%	97

ANNEX 2. OSHRAE EXERCISE: STAFFING AND DATA MANAGEMENT PLAN

COMPOSITION AND RECRUITMENT OF THE STUDY TEAM

A study team of 27 was proposed and utilised on the basis of professionalism and timeline within which the deliverables were to be achieved.

The study team comprised the following cadres who were recruited and trained on all aspects of the study.

POSITION/TITLE	No	Role	Responsibility	Qualification
Principal Investigator (PI)	1	Lead the Risk Assessment Exercise (RAE)	Responsible for all the deliverables	
CO-PI	1	Oversee the RA project	In charge of overall administrative aspects	
Data Supervisors Team Coordinator: (Category 1)	6	Entry point into the facility	<ul style="list-style-type: none"> • The main link persons and “entry-level” into the facilities • Introduction of RAE data team • In charge of overall administrative aspects within facilities • Lead the logistics within the provinces and facilities • Feedback the facility heads on substantive Risk Assessment Results (RAR) 	<ul style="list-style-type: none"> • Background in MOH ministry and facility experiences. • Accomplished study coordinator with experience in data supervision, coordinating a study, and supervising data entry process.
Co-Data Supervisors Team Coordinator: (Category 2)	6	Oversee the data collection process	<ul style="list-style-type: none"> • Responsible for all the deliverables within the facility. • To work hand in hand with MOH national team leads. • Team coordinators for actual 	<ul style="list-style-type: none"> • Accomplished study coordinator with experience in data supervision, coordinating a study, and supervising data entry process.. • Hands on experience in Research data process supervision essential.

		within each facility. Compliment the Data Supervisor	<p>data collection process to provide daily on-site oversight of all study related activities.</p> <ul style="list-style-type: none"> • Coordinate data collection teams on the ground and • Be the custodians for the data collection process and the data in the field. • In charge of “on-the-field” logistics and link person with the PIs 	<ul style="list-style-type: none"> • Minimum qualifications Bachelors degree in social sciences preferably HR – Masters Degree preferred but not critical.
Data Q.A & Logistics Team	6	Ensure data quality	<ul style="list-style-type: none"> • Perform data entry and reviewing under the supervision of the study coordinator. • Work hand in hand with the research assistants. • Be the data custodians at the end of data collection. 	<ul style="list-style-type: none"> • Accomplished individuals with experience in data collection and entry process. • Hands on experience in data processing and QA essential. Minimum qualifications Bachelors degree in social sciences with bias to research work
Research Assistants (RA)	6	Data collection and risk assessment	<ul style="list-style-type: none"> • Under the guidance of supervisors, the individuals will carry out the actual data collection process. • The research assistants will be the data collectors and risk assessment officers. • To work hand in hand with the QA team in administering questionnaires and actual data collection. 	<ul style="list-style-type: none"> • Data collection personnel with a background in social research. • To be drawn from offers e.g. PHOs, and other cadres from the ministry.
Data Analyst/Manager	1	Data Analysis	<ul style="list-style-type: none"> • To be the custodian of data after field collection. 	<ul style="list-style-type: none"> • Statistician with background in designing and implementing data gathering,

			<ul style="list-style-type: none"> • Work with the PIs in particular data analysis and entry process • Designing data management and Operations System. • Performing Statistical Programming for Study Data. • Providing Summaries and report for studies. • Performing Questionnaire Design and Analysis • Supervision and Training of Field and Office Based data Management & Data entry Staff 	<p>processing and interpretation processes.</p> <ul style="list-style-type: none"> • Minimum qualifications BSc. Statistics with minimum 3 years experience
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APPENDIX 2. PRIORITY RISK CONTROL & MITIGATION RECOMMENDATIONS - EXECUTIVE SUMMARY VERSION

PRIORITY RISK CONTROL & MITIGATION RECOMMENDATIONS

RISK CONTROL: PROPOSAL FOR MITIGATING THE TOP RANKING OSH RISKS

The primary emphasis of this approach is managing the risk by controlling the hazards at source. For a risk that is assessed as “high”: steps should be taken immediately to effectively minimize risk of injury by employing the aforementioned “hierarchy of controls”

Table 27: Risk Control: Summary Proposals for Mitigating the Top Ranking OSH Risks at GoK MOH

Risks	Hazard/Cause	Most Critical	
		Immediate (Short-term)	Long Term
Infections from BBP	Poor Handling Procedures, Untrained staff Over loads	1. Circulars warning on surveillance and administrative control (top-down) 2. Advocacy/campaigns 3. On the job surveillance	SOPs generated and implemented Bottom-Up (Trickle up) approach (engage the users as actual
Injuries and infections from	Staff injuries due to lack of adequate PPE	Provide basic PPE for staff in all cadres and levels (house keeping staff most at risk (manual handling staff)	

No-Personal Protective Equipment (PPE)		Leather gloves for manual handling staff Workshop overalls Respirators Hardhats
Risks	Hazard/Cause	(MOH FACILITIES WIDE)
In House Emergency (Including Fire Protection Measures & Equipment)	Assorted	Generation of Emergency Action Plan (EAP) incorporating a Fire Action Plan for each facility Inspect/Repair and Install the portable firefighting equipment currently mostly un-functional Train Key/Sampled staff as fire wardens to hold brief for long term measures Design and install signage
Personal Protective Equipment (PPE)	Staff injuries due to lack of adequate PPE	Incorporate PPE budget in priority MOH FACILITIES internal purchases list.
Health and Safety Universal Conditions and Local Statutory compliance	Infections due to absence of a Hazard communication Program Accidents due to poor Electrical, wiring designs and maintenance methods	Design and implement an Occupational Health and safety Manual/Policy for MOH FACILITIES based on GOK OSHA 2007 Implement the proposed MOH FACILITIES OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYTEM Engage an Occupational health and safety (OSH) technical advisor to spearhead the implementation of the MOH FACILITIES OSH MANUAL/POLICY and the

	<p>Open workspace Guarding SOPs, Exits & Signage Fire Safety Alarm & Monitoring System Personal Protective Equipment for Manual handling staff and others Respiratory protection program Lockout/tag out. Portable fire extinguishers Risk Assessment & Training Available Pest Control Program</p>	<p>PROPOSED MOH FACILITIES OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYTEM on a BOT basis.</p> <p>Develop a crush program (45 days LOE) to generate statutory compliance program to develop statutory messages namely:</p> <p>Health & Safety Information & Training Program – Eventually web-based</p> <p>Safety signs (first aid, fire points, exits)</p> <p>Emergency Evacuation Program signage</p> <p>Electric Shock Signs</p> <p>Identify a board member as a safety champion to spearhead occupational health and safety needs advocacy in the board.</p> <p>Identify a safety champion among the members of the board of directors (PHMT, DHMTs, etc to spearhead safety program implementation within MOH FACILITIES.</p>
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APPENDIX 3 – OSH AT MOH WAY FORWARD- PROPOSED MOH OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM (OHSMS)

GoK MOH OHSMS: The Health & Safety Representatives (HSR) Approach

The OHSMS proposed for MOH is an HSR System. Every department at every level as currently constituted would have a health and safety representative. The system is designed to take care of employee representation, compliance with regulation, ownership and relevance in dealing with special departmental safety needs.

Background

The Occupational Safety and Health Act 2007 require that employers, in consultation with their employees, break up their workforce into groups (Designated Work Groups – DWGs) and appoint a Health and Safety Representative (HSR) for that group. The Act gives Health and Safety Representatives specific functions and powers.

PROPOSED MOH OHSMS ORGANIZATIONAL CHART

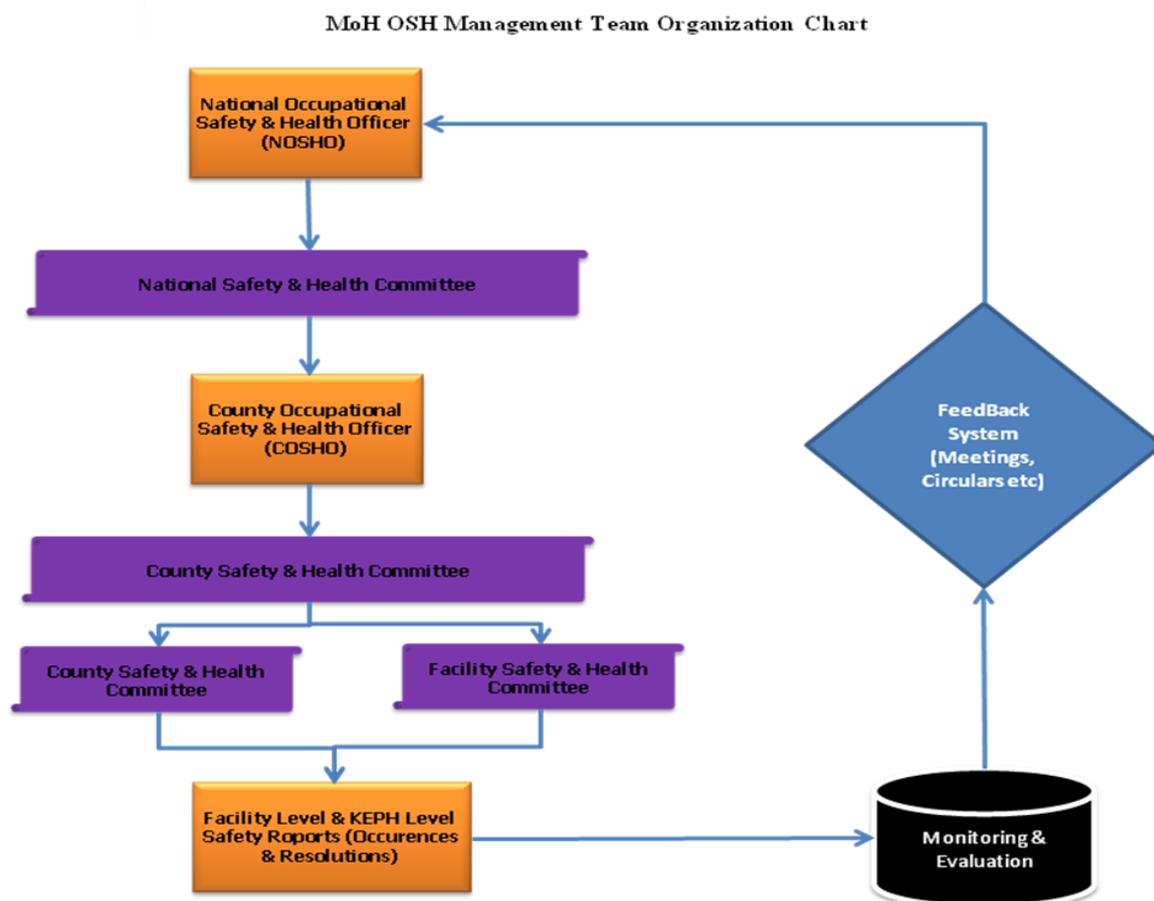


Figure 27: Proposed MOH OHSMS Organizational Chart

GoK MOH OHSMS: EMPLOYEE REPRESENTATION AND CONSULTATION

Purpose

To define all relevant aspects of the health and safety committee and teams that must operate within MOH.

Scope

This policy applies to all employees and other members of MOH.

Definitions

"[Health and Safety Representative](#)" (or "[Representative](#)"): a GoK-MOH employee who has been appointed to the position of Representative in accordance with needs of the program.

"[Designated Work Group](#)": a group of line employees e.g. warehouse staff constituted on account of their duty in accordance with project safety needs and represented by a single Representative.

Policy Statement

Objective

To support its approach to the provision of a safe working and learning environment, it is proposed that MOH have three levels of teams to address health and safety issues. These are:

MOH Health & Safety Policy Committee (National Level with representation from the ground);

Departments' Health & Safety Coordinating Teams

Health Facility (KEPH Level) Health and Safety Teams

MOH Health & Safety Policy Committee (HSPC)

Terms of Reference

Comprising of each department's Health and Safety Representative, Reporting to the respective directors though the TA/Safety Officer, the role of the HSPC is to consider and make recommendations for compliance and improvement on MOH Ministry-wide health and safety matters relating to:

The prevention of injuries and illnesses among staff, contractors, clients and visitors of MOH;

Employee consultation regarding health and safety issues and workplace change;

The management of incidents and emergencies arising in the context of MOH Program-endorsed activities;

The rehabilitation and compensation of injured MOH employees;

Legislative compliance, auditing programs and monitoring the implementation of actions incorporated in Health and Safety Plans; and

The performance of MOH in relation to health and safety.

Membership of MOH HSPC

The HSPC is chaired by the Permanent Secretary or a representative (preferably the Director), and is made up of equal Management and Health and Safety Representatives (HSRs) heads. They represent the department's operations of the MOH Activities. The HSPC seeks input from departments' health and safety representatives on behalf of the general staff.

Role	Member(s)
Chair (1)	the CEO or a representative (preferably the Director who is automatic member of this committee)
Members (10)(voting)	Each department's is represented by one senior officer and one HSR. All members of the HSPC are required to attend specific health and safety training. Representatives of each Department's should be appointed on the committee for a period of 1 or 2 years, and the role should be rotated among the Heads of departments and HSRs within each Department's.
Administration Support (1)(non-voting)	Technical Advisor/Health & Safety Manager - Risk, Health and Safety
Invited Representatives (2)(non-voting)	Any of the line directors e.g. Finance & Admin whose participation is crucial in implementation of decision agreed on

Note: Non-voting members do not have full member status.

Meetings

Held once every quarter

Composition

Departmental & Facility Level Health & Safety Coordinating Teams (DHSCTs)⁶

Terms of Reference

Reporting to the HSPC, the role of the DHSCTs is to coordinate the relevant Department's compliance with, and improvement in relation to, health and safety operational and policy matters. In doing so, the teams must:

Monitor that Departments are implementing all relevant elements of the health and safety management systems in compliance with the planning and reporting cycle;

Monitor the implementation of actions incorporated in Department's health and safety Plans;

Coordinate the provision of assistance and support to Departments regarding health and safety improvements;

Share information arising from one Department that is relevant to others and act as a consultative forum; and

Make submissions to the HSPC for amendments or additions to the MOH's health and safety management systems, for MOH-wide initiatives, etc.

Focus on the practical identification of hazards and the elimination/reduction of risks in Department's activities by conducting HIRAC reviews, monitoring the implementation of corrective actions after incidents, planning for local incidents and emergencies, etc.

Membership

Each DHSCT is chaired by the Safety Manager or relevant Section/Departmental Head and convened by the Safety Manager. The membership of the DHSCTs consists of the relevant Heads of Departments and the HSRs of all Designated Work Groups within the relevant Department.

⁶ Given the organizational structure of the MOH, the department safety committees is considered the best in order to decentralize the safety management and create program ownership.

Role	Member(s)
Chair	Safety Manager or Department Head
Members	Each Department is represented by the relevant Head and by the HSRs for the relevant Designated Work Groups.
Administration Support	Department's administration support

Meetings

The DHSCTs must meet every 4-6 weeks and or towards the end of every calendar quarter to coincide with the health and safety planning and reporting cycle. Department Heads may choose to hold special meetings or integrate the operation of their DHSCT into a pre-existing forum. DHSCTs may make submissions to the HSPC. The quorum for DHSCT meetings is achieved when 50 percent or more of members attend. Written notes of DHSCT meetings must be taken and circulated to all members and copied to the Safety and Space Officer.

Legislative Context

Occupational Safety and Health Act 2007 (GOK) and subordinate regulations.

Employee Representation

Purpose

To describe the structures in place at MOH for giving all employees adequate representation and consultation in relation to the health and safety issues that affect them at work.

To specify the responsibilities of various groups within the MOH Program's workforce in relation to employee representation and consultation for health and safety.

Scope

This procedure applies to all employees of the MOH Program. It applies to all warehouses, buildings and grounds of MOH and to all activities associated with the work of employees.

Policy Statement

All employees of the MOH have a right to effective representation on the health and safety aspects of their work. The MOH not only recognizes that right, but promotes effective representation as an integral part of its commitment to occupational health and safety. MOH will:

Make time available for representatives, from all the Departments to:

Attend health and safety training sessions; prepare for and attend Health and Safety Team meetings;

Consult with the employees they represent, and other Representatives if necessary;

Inspect their workplace;

Participate in accident investigations and the follow up of corrective actions; and

Accompany Safety Officers who visit their Designated Work Group.

Put in place health and safety consultative structures at Department level

Develop and implement a procedure for the resolution of health and safety issues;

Develop and implement a procedure for consultation with the Representatives of employees whose health or safety may be affected by proposed changes to the workplace;

Ensure that appropriate allowances are made in the budgets of Departments and Sections for expenses related to the resolution of health and safety issues that may arise in those Departments and Sections and to the activities of the H&S Improvement Teams; and

Monitor, in consultation with Representatives, the suitability and effectiveness of Designated Work Groups, and make changes as required.

Responsibility

The MOH CEO (Cabinet Secretary) is ultimately responsible for the policy, and is accountable for the performance of the MOH in relation to this policy.

Technical Advisor/Safety Manager - Workplace is responsible for:

- developing, publishing and maintaining MOH-wide procedures as required under this policy;
- informing the MOH community of the policy and related procedures;
- conducting training sessions to enable Managers and Representatives to fulfill the roles assigned to them by this policy and related procedures;
- providing advice to Managers and Representatives as requested; and
- Maintaining a current list of Representatives and their Designated Work Groups.

Heads of Departments and of Sections are responsible for creating H&S Improvement Teams, whether at their own initiative or in response to a request from a Health and Safety Representative.

Supervisors and Managers are responsible for:

- attending training sessions related to the implementation of this policy and related procedures;
- publicizing, promoting and enforcing the policy and procedures among the staff they supervise (including new staff);
- implementing the measures required for Representatives to fulfill their role, including the creation of Department- and Section-based H&S Improvement Teams; and
- Complying with the policy and related procedures.

Health and Safety Representatives are responsible for:

Consulting with the employees they serve, and accurately representing their views.

The MOH Health and Safety Policy Committee are responsible for monitoring the performance of all Departments and Sections in relation to the policy and related procedures.

Legislative Context

GoK Occupational Safety and Health Act 2007

APPENDIX A – PROPOSED ENGINEERING CONTROLS – STRUCTURAL DESIGNS FOR KEPH L 3-5 STORAGE AREAS

AREAS

REMOTE-MOUNTED MULTIPOINT FAN - PROPOSED FOR KEPH L 3-5 STORAGE AREAS

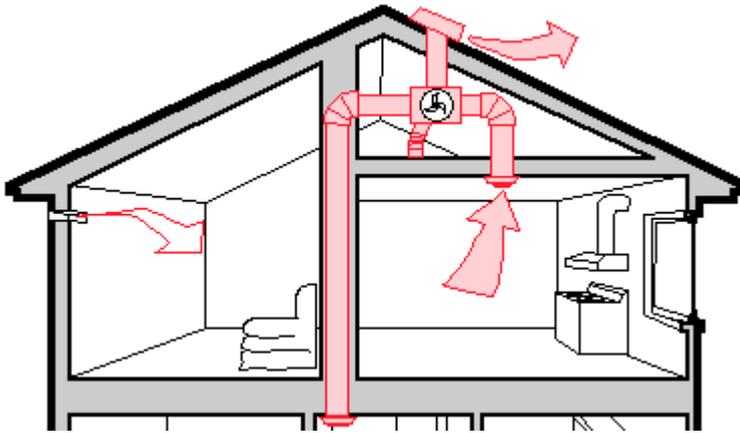


Figure 28: Remote-Mounted Multiport fans - Proposed for Stores

SPECIFICATION AND COSTING: REMOTE-MOUNTED MULTIPOINT FAN

The generator house can be ventilated by a single multiport fan. The unit should accept a duct from the range hood and operate at two or more speeds. A complete kit should come with all the ducts and accessories as the kits simplify installation. Other specifications:

1. Noise Rating: not applicable
2. Locations: basement, attic or crawlspace
3. Air Flow Capacity: 100-400 cfm
4. Heat Recovery: none
5. House Pressure: negative
6. Makeup Air: passive inlets
7. Multispeed Operation: optional

Equipment Cost: Approximately USD 2000-2500

APPENDIX B – PROPOSED ENGINEERING CONTROLS: INTERIOR WALL FANS - INSTALLED TO HELP BALANCE ROOM TEMPERATURE – STRUCTURAL DESIGNS FOR KEPH L 3-5 KITCHEN AREAS.

The Broan Fans proposed to be installed in interior walls to help balance room temperatures are great for moving wood stove heat to an adjacent room, or making rooms without adequate ducting more comfortable. The fan adjusts for 3" to 5.5" wall thickness. The grills are a paintable white plastic. A speed control is normally included.

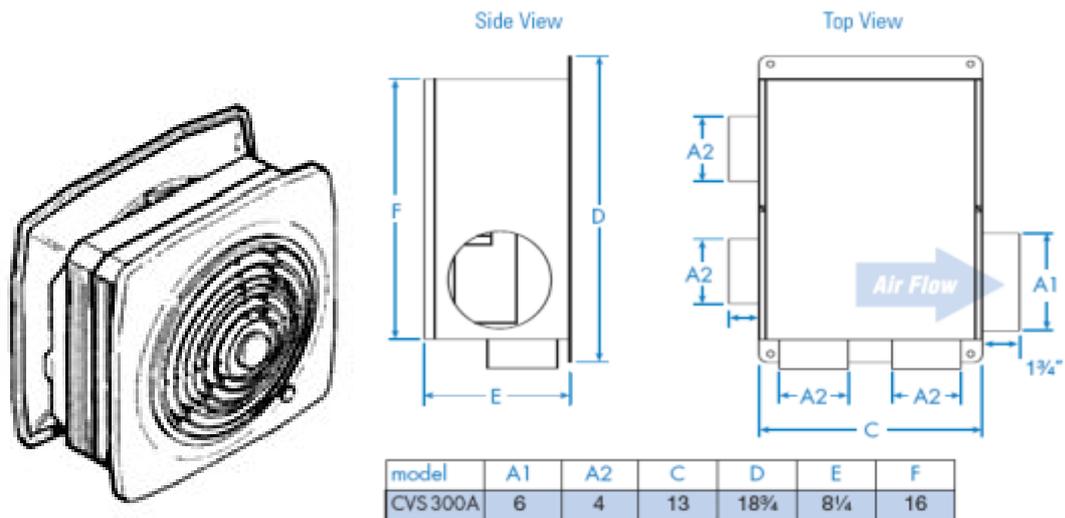


Figure 29: Proposed Engineering Controls: Interior Wall Fans - installed to help balance room temperature – Structural Designs for KEPH L 3-5 Kitchen Areas

APPENDIX C – PROPOSED REMOTE-MOUNTED IN-LINE FAN PROPOSED FOR PHARMACIES AND BIOMEDICAL ENGINEERING DEPARTMENTS IN KEPH L3-5

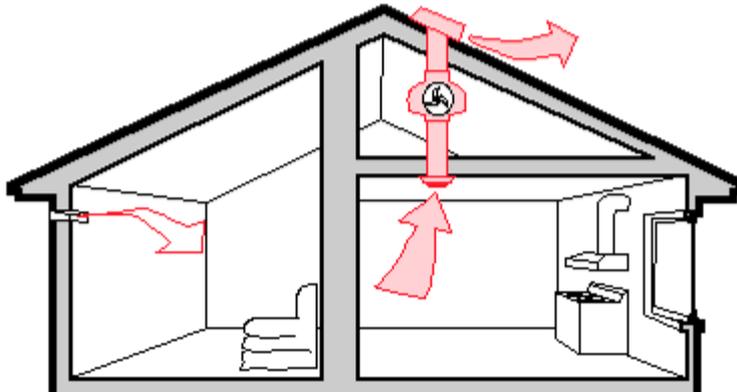


Figure 30: Remote-mounted In-line Fan Proposed for Pharmacies & Biomedical Eng Dept in KEPH L 3-5

SPECIFICATION AND COSTING: REMOTE-MOUNTED IN-LINE FAN

The generator house can be ventilated by a single multiport fan. The unit should accept a duct from the range hood and operate at two or more speeds. A complete kit should come with all the ducts and accessories as the kits simplify installation. Other specifications:

1. Noise Rating: not applicable
2. Locations: basement, attic or crawlspace
3. Air Flow Capacity: 100-400 cfm
4. Heat Recovery: none
5. House Pressure: negative
6. Makeup Air: passive inlets
7. Multispeed Operation: optional

Equipment Cost: Approximately USD 1000-2000

**APPENDIX D – PROPOSED REMOTE-MOUNTED IN-LINE FAN AND DOOR PROPOSED FOR LABORATORIES
KEPH L3-5**

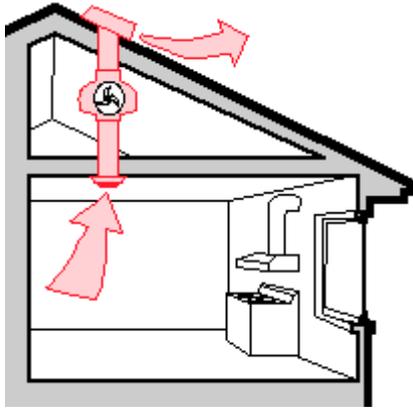


Figure 31: Remote-mounted In-line Fan Proposed for Pharmacies in KEPH L 3-5

SPECIFICATION AND COSTING: REMOTE-MOUNTED IN-LINE FAN

The generator house can be ventilated by a single multiport fan. The unit should accept a duct from the range hood and operate at two or more speeds. A complete kit should come with all the ducts and accessories as the kits simplify installation. Other specifications:

1. Noise Rating: not applicable
 2. Locations: basement, attic or crawlspace
 3. Air Flow Capacity: 100-400 cfm
 4. Heat Recovery: none
 5. House Pressure: negative
 6. Makeup Air: passive inlets
 7. Multispeed Operation: optional
- Equipment Cost: Approximately USD 1000-2000

APPENDIX E – PROPOSED ENGINEERING CONTROL SYSTEMS FOR THE LABORATORIES

Figure 32: Engineering Controls (KEPH L3-5)



Photo 1: Splatter Guard



Photo 2: Biological Safety Cabinet



Photo 3: Foot-operated Sink

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