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# Examining healthcare systems: a market analysis for Kenya

Market  
analysis for  
Kenya

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## Abstract

**Purpose** – This paper aims to present a literature review of the health workforce, hospital and clinic systems, infrastructure, primary care, regulatory climate, the pharmaceutical industry and community health behavior of the Kenyan health-care system with the purpose of providing a thorough background on the health-care environment in Kenya.

**Design/methodology/approach** – A systematic literature review was conducted using Pub Med, searching for “Kenya” in the title of articles published from January 1, 2015 to February 24, 2016; this provided a broad overview of the type of research being conducted in Kenya. Other data provided by governmental agencies and non-governmental agencies was also reviewed to describe the current state of population health in Kenya.

**Findings** – An initial review of 615 Pubmed articles included 455 relevant articles. A complete review of these studies was conducted, resulting in a final sample of 389 articles. These articles were categorized into three main subject areas with 14 secondary subject areas (Figure 1).

**Research limitations/implications** – The narrow scope of the search parameters set for the systematic review was a necessary limitation to focus on the most relevant literature. The findings of this study provide a thorough background on health care in Kenya to researchers and practitioners.

**Originality/value** – This compilation of data specific to Kenya provides a detailed summary of both the country’s health-care services and health status, focusing on potential means of realizing increased quality and length of life.

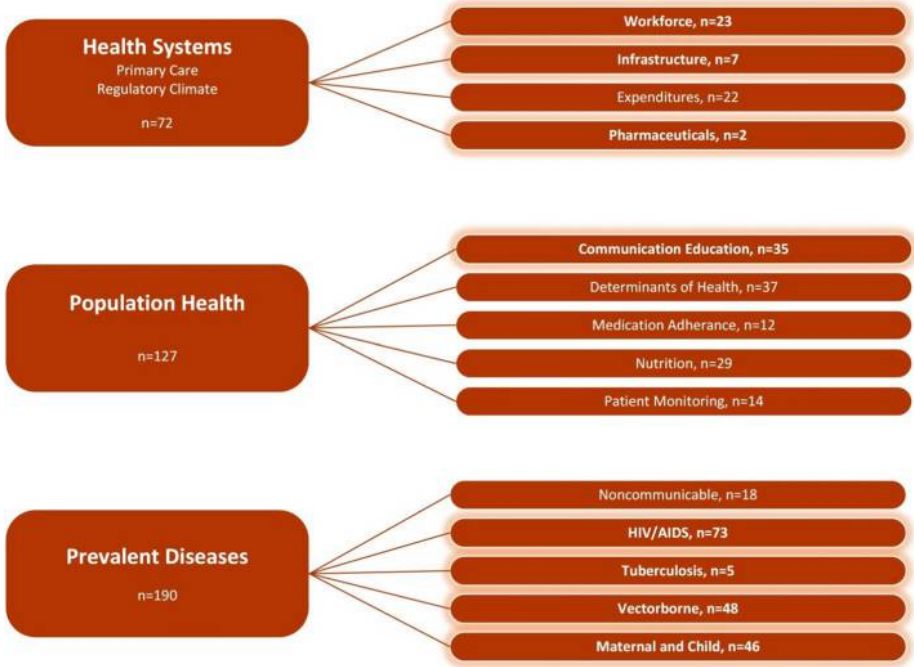
**Keywords** Innovation, Kenya, Infrastructure, Healthcare systems, Health workforce, Market analysis

**Paper type** Literature review



## Introduction

Health care in Kenya is currently provided through collaboration among the National Ministry for Health, County Health Management Teams, Sub-County Health Management



**Figure 1.** Categories of reviewed literature for Kenya

Teams and Community Units (Ministry of Health, 2013) (Figure 1). In 2008, the Kenyan Government developed Vision 2030 as a long-term development plan to accelerate the Millennium Development Goals (MDGs) (see Figure 2 for the full list of MDGs) (Ministry of Devolution and Planning, 2013). Since implementing Vision 2030, Kenya has made



**Figure 2.** Millennium Development Goals

Source: Ministry of Devolution and Planning (2013)

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significant progress towards the eradication of infectious diseases like malaria, HIV, and tuberculosis. The MDGs have been met for under-five mortality rate (decreased from over 90 deaths per 1,000 live births to fewer than 50 deaths per 1,000 live births between 1990 and, 2015). Since 1990, sanitation facilities have increased from 25 to 30 per cent in both urban and rural areas of the country. Additionally, 41 per cent of the country has access to improved drinking water, although quality of drinking water is plummeting in urban areas when compared to rural areas (Maternal, Newborn and Child Survival, 2015). Yet, the World Health Organization (WHO) states that:

[...] globalization is putting the social cohesion of many countries under stress, and health systems, as key constituents of the architecture of contemporary societies, are clearly not performing as well as they could and as they should (World Health Organization, 2008, p. 11).

In 2008, the population of Kenya was estimated to be approximately 38 million, and has continued to grow at a rate of almost 3 per cent per year. According to the World Factbook, just over 40 per cent of the Kenyan population are under the age of 15, almost 20 per cent of the population are between the ages of 15 and 24 years old and over 30 per cent of the population are between the ages of 25 and 54 years old (Central Intelligence Agency, 2015b). From this information, it is clear that the Kenyan population is relatively young, with nearly the entire population is under the age of 55. The population pyramid of Kenya, similar to pyramids of all developing countries, demonstrates a high birth rate and low life-expectancy. In total, 35 per cent of the population of Kenya reports health as a concern above any other (including financial, housing, and crime concerns) (World Health Organization, 2008).

Kenya spends less than 5 per cent of their total gross domestic product (GDP) as an expenditure on health, a decrease from 2006 when Kenya was spending over 7 per cent of their expenditure on health (Hasan and Wanyanga, 2010). Kenya's expenditure on health is less than a third of what the USA is spending (i.e. 17.1 per cent of GDP) on health, and just over half of South Africa's spending (i.e. 8.9 per cent of GDP) (Hasan and Wanyanga, 2010; World Health Organization, 2006; World Health Organization, 2008).

With over 70 ethnic groups throughout the country, unique traditions and attitudes shape the way people think about politics, religion and health care. Different ethnic groups have different levels of and access to education and health care based on their urban or rural location (Alwy and Schech, 2004). Nearly 75 per cent of the country lives in rural areas, and the remaining 25 per cent lives in one of four major cities: Nairobi, Mombasa, Kisumu and Nakuru (National Bureau of Statistics, 2015). Cultural differences make unilateral health-care solutions nearly impossible. Groups in rural Kenya subscribe to traditional health-care practices, and tend to avoid modern western medicinal techniques. In fact, upwards of 80 per cent of patients in developing countries consult a traditional healer before consulting a trained physician or nurse (Kigen *et al.*, 2013). In the Kenyan tribal culture, children and adults have high rates of malnutrition, as their tribal culture demands a diet of mostly cereals. Additionally, infants and children are given milk, blood, and herbs from animals instead of human breast milk which has important nutrients for development (Kenyatta, 2015). Women lack the ability to negotiate prevention practices for themselves or their children, or to negotiate how those prevention services are utilized because, in accordance with traditional medicinal beliefs, Kenyan culture traditionally accepts the man as the head of household (Singh *et al.*, 2013).

HIV/AIDS is the leading cause of death in Kenya, closely followed by infant mortality, tuberculosis, and malaria (Table 1) (World Health Organization, 2008). While prevalence of infectious diseases has decreased in recent years, it is important not to ignore communicable

Causes of death			Causes of DALY's		
Rank	Disease or injury	% total deaths	Rank	Disease or injury	% total DALY's
1	HIV/AIDS	29.3	1	HIV/AIDS	24.2
2	Conditions arising during the peri-natal period	9.0	2	Conditions arising during the peri-natal period	10.7
3	Lower respiratory infections	8.1	3	Malaria	7.2
4	Tuberculosis	6.3	4	Lower respiratory infections	7.1
5	Diarrheal diseases	6.0	5	Diarrheal diseases	6.0
6	Malaria	5.8	6	Tuberculosis	4.8
7	Cerebral-vascular disease	3.3	7	Road traffic accidents	2.0
8	Ischemic heart disease	2.8	8	Congenital anomalies	1.7
9	Road traffic accidents	1.9	9	Violence	1.6
10	Violence	1.6	10	Uni-polar depressive disorders	1.5

**Table I.**  
Leading causes of deaths and DALY's in Kenya

**Notes:** DALY's = Disability adjusted life years

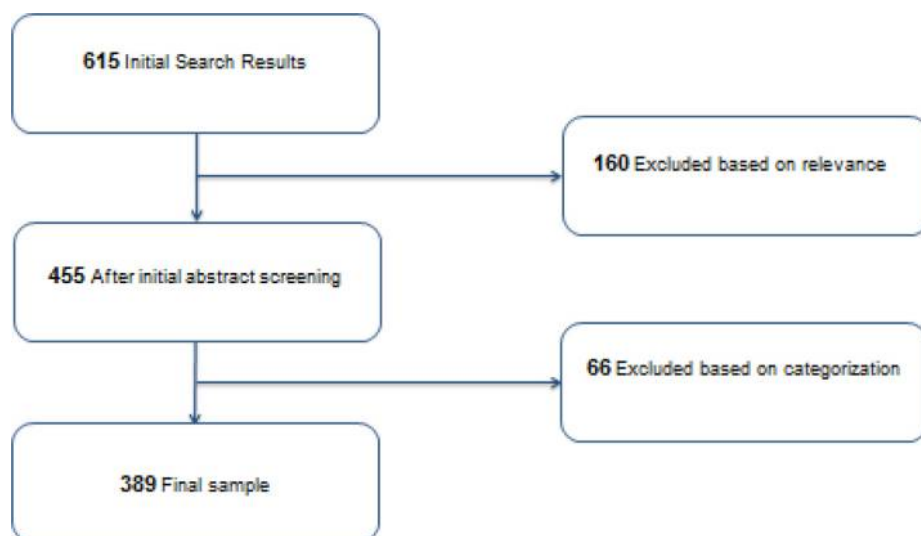
disease as they are quick to spread in low-income settings. Additionally, an increasing incidence of non-communicable diseases reveals the immediate need for improvements in health workforce, in clinic resources and availability, in health infrastructure, and in the pharmaceutical industry in Kenya. This literature review covers both well-known and recently studied issues that relate to the Kenyan health-care system, in addition to a summary of recent accomplishments within the system itself and in the health of the people of Kenya. By exploring patient adherence, determinants of health in middle to low-income settings; chronic disease, chronic disease management and patient monitoring; health education, health behavior and perceptions of health services; expenditures on health by patients and providers; health systems, the health workforce, infrastructure and pharmaceutical industry; HIV/AIDS; tuberculosis; maternal and child health; and vector-borne diseases, this analysis provides a foundation on the current state of the health-care industry in Kenya, informing organizations working within the country.

### Methods

A systematic literature review was conducted using Pub Med, searching for "Kenya" in the title of articles published from January 1, 2015 to February 24, 2016; this provided a broad overview of the type of research being conducted in Kenya. Other data provided by governmental agencies and non-governmental agencies was used also reviewed to describe the current state of population health in Kenya. Targeted searches were conducted using additional search engines (e.g. Google, Google Scholar); the significance of completing a systematic literature review in addition to targeted searches was that doing so provided assurance of the completeness of the health-care topics relevant to Kenya that his review covers.

### Findings

After reviewing abstracts for the 615 Pubmed articles found from the initial search, 455 were included. These articles were pulled for complete review, during which, a categorization of current research was developed based on the frequency of study. Final inclusion was determined based on this categorization, resulting in a final sample of 389 articles (Figure 3).



**Figure 3.**  
Search results

There are three main subject areas (i.e. health systems, population health and prevalent diseases) with 14 secondary subject areas (Figure 1). The subsequent sections summarize current research by the above stated categorization.

### *Health systems*

There is an uneven distribution of hospitals and clinics throughout Kenya (Noor *et al.*, 2004). 82 per cent of the country has some form of health service within five kilometers, or 3.1 miles of their home. The 18 per cent of the country's population that is more than five kilometers from health services experiences lack of access to health care because of distance and lack of available transportation, or inability to afford transportation. However, the time and money for travel is hard for patients to spend when only 20 per cent of facilities are fully functional (Ministry of Health, 2013).

Health systems in Kenya struggle with most public health interventions. Some programs have been implemented to support people who are living with or who are at risk of contracting HIV/AIDS, including reaching every district (RED) for Prevention of Mother to Child Transmission, pre-exposure prophylaxis (PrEP) programs, and family planning access programs. These programs are lacking in terms of management and planning, sufficient personnel, supportive supervision, task sharing, essential training, proper method selection, technological progress, infrastructure, service delivery, and stigma awareness (Mack *et al.*, 2015; Kanyuuru *et al.*, 2015; Aduda *et al.*, 2015; Tumlinson *et al.*, 2015a; Tumlinson *et al.*, 2015b). Given these insufficiencies, appointments and necessary procedures are easily delayed, increasing the delayed burden of disease across Kenya (Poenaru *et al.*, 2015a). Management and leadership administration is arguably an important aspect within hospital and clinic systems which could help to address these factors.

The infant mortality rate stands at 64 deaths per 1,000 births in Kenya, while the world average is only 32 deaths per 1,000 births (Muchukuri and Grenier, 2009). In 2003, two in 20 children did not live long enough to see their fifth birthday. Just over a decade later in 2014, that number had decreased by half with one in 20 children dying before the age of five

(National Bureau of Statistics, 2015). While this is a significant decline in mortality, a continued focus on pediatric care could further decrease mortality rates. A study of inpatient pediatric care performance in 14 hospitals and in 13 districts in Kenya showed considerable variation in the statistics for inpatient pediatric mortality. However, patient records are missing important information, such as confirmation of HIV/AIDS diagnosis and lack of basic definitions (English *et al.*, 2004). Symptomatic severity of common diseases such as malaria is inconsistently documented, and severity of diseases are undocumented (English *et al.*, 2004). Because of lack of documentation and loss of case records and medical histories, patients have a low prognosis when they enter clinics. Clinics using the Kenya Health Workforce Information System (KHWIS) improves access to electronic health records and may be likely to improve prognosis and overall health of patients.

Among Kenyan hospitals, only 8 of 22 facilities have 75 per cent or more availability of essential resources (e.g. pregnancy testing) for pediatric health (Gathara *et al.*, 2015). Mothers are unlikely to adhere with early attendance for prenatal care because of distance to clinics, cost of travel and health services, and basic education about prenatal care. Additionally, lack of prenatal care resources such as pregnancy testing or ultrasound machines cause health providers to be uncertain about gestational age and potential complications with pregnancy (Oluoch *et al.*, 2015). Severely malnourished children are not frequently fed appropriately in quantity or quality, and are given incorrect dosages of medications (English, 2013). Only 10 per cent of newborns in Kenya are given proper vitamins and nutrients during their first week of life, while the remaining newborns could be given inappropriate nutrients (too much, too little, or none at all), or inappropriate dosage of antibiotics when they present with infections (Gathara *et al.*, 2011). Generally, Kenyan systems do not have access to resources such as parenteral nutrition (Poenaru *et al.*, 2015b). Incorrect drug dosage or incorrect drug choice is common among Kenyan health facilities (i.e. overloading of quinine dose, a common antibiotic for malaria) and could stem from improper training of health workers, or from lack of patient health records (Mwinga *et al.*, 2015; Gathara *et al.*, 2015). The inconsistencies in drug use within health facilities in Kenya are detrimental to pediatric and community health.

Some programs have been found to improve health service delivery in Kenya. Pay for performance incentives in combination with service training are more effective than training alone (Menya *et al.*, 2015). Quality management systems (QMS) improve efficiency of laboratory and service delivery and allow clinics to identify opportunities for improvement (Musau *et al.*, 2015).

### *Primary care*

Care in Kenya is divided up into a pyramid of six levels. Level 1 cares for the community, villages, households, families and individuals; Level 2 is focused on dispensaries and clinics; Level 3 is focused on health centers, maternity wards, and nursing; Level 4 focuses on primary hospitals; Level 5 focuses on secondary hospitals; and Level 6 is focused on tertiary hospitals (Mostert *et al.*, 2015). Currently, 60 per cent of health products are consumed at the primary care level (level 2), which includes consumption of vaccines, family planning, essential medicines and supplies, anti-retroviral medicine, laboratory commodities, among others (Ministry of Health, 2013) (Figure 4).

According to health providers across Sub-Saharan Africa, it is important to keep a trained family physician within hospitals and to keep at least one trained family physician per primary health clinic (Moosa *et al.*, 2014; World Health Organization, 2008). Family physicians have the value of “improving quality of clinical care, improving the early management of health problems, and providing more appropriate care while reducing



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**Figure 4.**  
Pyramid of health  
care in Kenya

inappropriate referrals, as known in the literature”, and the WHO confirms the providers position that each primary health clinic should have one family physician (Moosa *et al.*, 2014, pp.7; World Health Organization, 2008). There is disconnect between health policies and the provision of care in Kenya. Generally, those expected to take responsibility for health leadership have not taken ownership of their position, whether it be because of poor preparation or poor equipment, poor systematic support, or lack of information that would help with monitoring or understanding service delivery practice and outcomes (English, 2013).

#### *Regulatory climate*

Health care in Kenya is distributed throughout the country and provided by governmental agencies (through the Ministry of Health), faith-based organizations (FBOs), non-governmental organizations (NGOs) and private health-care systems. The majority of facilities (including dispensaries, health centers, medical clinics, maternity homes, nursing homes, county and national hospitals) are governmental (50.75 per cent) or private (34.02 per cent) (Ministry of Health, 2013). The private sector of health-care in Kenya is made up of individuals who privately own health facilities, clinics, and hospitals owned by private employers, FBOs and NGOs. Data on quality of care provided, as well as perception of the quality of care provided in facilities, are inconsistent. It is typically assumed by community members that private providers of health care will provide a higher quality of care than public sector providers. Women seeking contraceptive services ( $n = 61$ ) in Mathare Valley, an informal settlement in Nairobi, prefer private facilities to public because of convenience and timeliness of services, and avoided public facilities because of previous long waits and disrespectful providers. However, these same women felt that public facilities had better funding and higher quality medical machines and resources, as well as more effective counseling on medical decisions, as private facilities are more concerned with personal profit (Keesara *et al.*, 2015). Regardless of the care provided, there is a tendency to refer to most health workers as “Doctor”, including nurses and pharmacists. Workers in private clinics can lack the proper training to tend to patients with the same ability that a physician

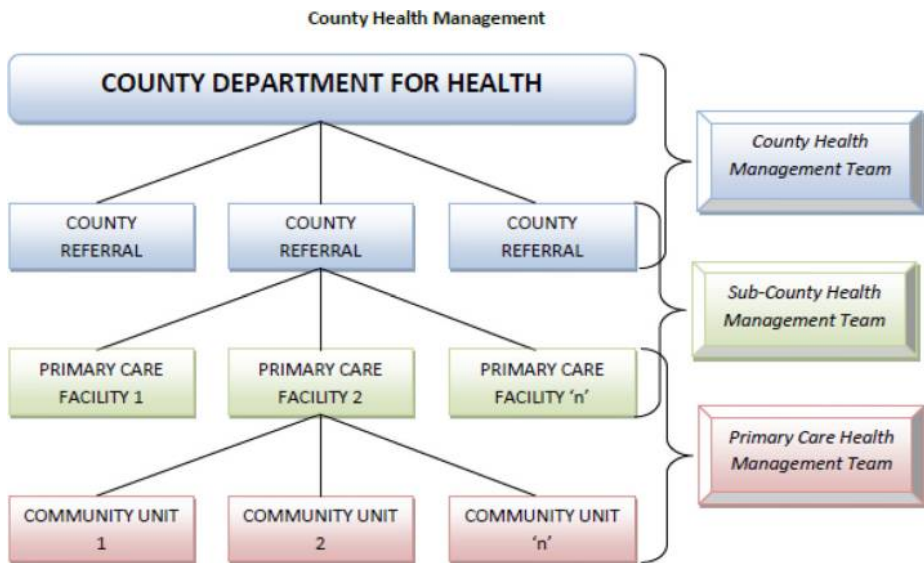


working for a public health care center would have because of governmental regulations of public facilities (Muthaka *et al.*, 2004).

The public sector of health care in Kenya is regulated by the Ministry of Health, which controls County Health Departments (one in each of 47 counties). Primary care facilities are under the direction of the County Department for Health and have a defined area of responsibility for delivery of health care services. It is important that each primary care facility remains within their defined area of responsibility, and that management teams communicate between primary care facilities and between county management health teams. Figure 5 shows the Health Management organization for each county (Ministry of Health, 2013). Unlike the private sector, the public sector is frequently monitored and evaluated, so the Ministry of Health is fully aware of health-care practices and quality of care being provided in each county in Kenya. Regular monitoring and evaluation of public care facilities also allows for extensive research and clinical trials, and thus the government is aware of the health status of their citizens and is able to implement proper programs and interventions to further improve the health of the people (Ministry of Health, 2013).

*Health workforce*

Clinics in Kenya are in need of nurses with sufficient experience and training; there are 5 health workers (including nurses, doctors, service providers, and health management workers) per 10,000 population in Kenya (Ministry of Health, 2013). There were 16,371 nurses in the public non-tertiary sector in Kenya; 76 per cent are women, 53 per cent are registered nurses and 35 per cent are between the ages of 40 and 49 (Wakaba *et al.*, 2014). Because the average life expectancy in Kenya is 53, there will be an even more serious shortage of nurses in Kenya within the next decade (World Health Organization and United Nations, 2015). Expanding the human workforce in Kenya is a step toward improving the overall performance of health systems. The WHO estimated that a 140 per cent increase in skilled health workers is necessary to meet the basic and essential health needs of the Kenyan people (World Health Organization, 2006). Only 42 per cent of births in Kenya are



**Figure 5.** County health management in Kenya

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attended by skilled health personnel, which is below the regional average of 47 per cent, while the Americas and Europe have a regional average of 95 per cent. Nurses attend births in Kenya because of the shortage of physicians, but attendance by nurses should be increased to ensure successful birth events ([World Health Organization, 2010](#)).

Health training institutions in Kenya require advancement, as the quality of curricula development is low. A recent study found that, while Kenyan health workers are under the impression that their curricula covers national health needs, students come out of health education programs feeling unprepared to work in different settings. The study also suggests that the quality of education is inadequate to prepare them for clinical practice ([Gross \*et al.\*, 2010](#); [Mumbo and Kinaro, 2015](#)). Thus, it is important to implement the development of training institutions, especially when considering the health worker shortage. Establishing some specialization programs for nurses and health staff has proven effective in improving the health of patients (such as those on anti-retroviral treatment [ART], maternal and child health and patients with chronic disease), but workers should be training regularly and consistently, as knowledge of specialized subjects will quickly return to baseline without knowledge and skills workshops ([Richard \*et al.\*, 2015](#); [Hill \*et al.\*, 2015](#)). It is important that task sharing is established with specialization programs, so that, for example, not just one doctor is performing all pediatric tasks in a hospital ([Poenaru \*et al.\*, 2015b](#)).

When programs are implemented to improve the education system, it is important to avoid large-scale emigration and retain health workers in Kenya after completing their education. Currently, emigration is an issue in Kenya, with 68 per cent of physicians trained in Sub-Saharan African countries working in the USA ([Wakaba \*et al.\*, 2014](#)). On average, Kenya loses US\$517,931 per doctor or US\$338,868 per nurse that leaves the country (over an estimated career of 32 years) ([Kirigia \*et al.\*, 2006](#)). A reason for migrating abroad includes the desire to avoid unattractive working conditions, such as increased risk of occupational exposure and political violence ([Goetz \*et al.\*, 2015](#)).

Health information systems (HIS) are possible solutions to address the health workforce shortages while increasing the quality of care provided by health workforce. By monitoring shortages, skill imbalances and geographic maldistribution, the Kenya Health Workforce Information System (KHWIS) has improved health worker regulations, human resource management, and workforce policy, thus, improving the quality of patient care ([Waters \*et al.\*, 2013](#)). KHWIS makes an honest attempt at ensuring equal distribution of health workers and health clinics across the country, and thus allows Kenyans equal access to quality care. KHWIS is working to ensure doctors and nurses are able to make proper use of HIS. Yet, HIS education is lacking and it will take Kenya many years before becoming a strong leader in the field. Cross-sectional research by Kiilu and colleagues among health facilities in Meru County, Kenya found that as little as 10 per cent of health workers had received formal classroom training on HIS, and only 9.1 per cent of health workers had received information management training ([Kiilu \*et al.\*, 2015](#)). HIS education should remain a focus in Kenya to increase the familiarity of the workforce with this technology.

With the implementation of new policies and regulations, Kenyan health facilities should focus on properly motivating its health workforce. In recent years, physicians have been replaced by clinical officers so that similar work is done for a lower cost. Clinical officers may have less reason to remain enthusiastic and motivated to improve the health of patients, given low extrinsic reward, poor career advancement opportunities, and limited career options associated with their position when compared to physicians ([Mostert \*et al.\*, 2015](#)). In fact, 66 per cent of health workers (in a study including registered nurses, enrolled nurses, lab technicians, clinical officers, nutritionists, medical officers, counselors,

pharmacists, and support staff) in Kenya would leave their job to take a job outside health facilities if given the chance (Ojaka *et al.*, 2014). Reasons for leaving may be related to the inherent risk associated with working in the health-care industry; a 2013 cross-sectional survey among health workers and school workers shows that health workers have higher prevalence of infectious disease. Compared to school workers, health-care workers are at a higher risk of TB infection, and also have a higher prevalence of HIV infection. Increased years of employment and time on the job were associated with increased odds of TB or HIV infection (Agaya *et al.*, 2015). Another risk associated with the health profession includes missing salaries, which can negatively affect the health of health workers and their families. Health workers in Mombasa County went on strike during the month of August 2014 because of non-payment of salaries (Njuguna, 2015). The noncompliance of health workers severely affected the health of surrounding communities for several months following events such as the strike of August 2014.

Health workers are seeking a supportive environment that provides fair compensation as well as quality resources for workers so that patients can access high quality care. Goetz and colleagues used data from the integrated QMS (IQMS) for the health sector in Kenya to find that some staff are highly satisfied with physical working condition, the freedom to choose methods of work, personal commitment and colleague commitment to quality work, recognition for work, supervision and support of work, as well as collaboration between facility and community health workers and traditional birth attendants (2015). Essentially, health workers surveyed in IQMS were satisfied with all aspects of their jobs, but they were not satisfied with the materials and equipment available and felt unable to provide proper, high quality care to patients. In public facilities, a Kenyan policy states that all women are to receive free maternal health services. While this policy is helping to improve the health of mothers and infants in Kenya, it puts an unnecessary amount of stress on health workers who feel that they do not have the proper resources, supplies, or staff to provide quality services (Lang'at and Mwanri, 2015). Data presented here clarify that there are inconsistencies across Kenya in terms of health workers' job satisfaction. County governments can put in place mechanisms to ensure health workforce satisfaction, while the national government can ensure consistent funding to the counties for salary and for necessary materials and equipment to clinics (Njuguna, 2015).

One way to address the workforce shortage and to help reach the MDGs in Kenya is the utilization of Community Health Workers (CHWs). CHWs require less training than a doctor or nurse and remain productive in a low-resource setting. However, the reporting rate, health knowledge, and average number of households covered by CHWs were low (Kawakatsu *et al.*, 2015). Kawakatsu and colleagues suggest that increased interactions between CHWs and their supervisors would improve quality of work. Oliver and colleagues point out that all CHWs work differently, and that the individual style of each CHW is what makes community health interventions successful (Oliver *et al.*, 2015).

In theory, CHWs are able to deliver human health resources and essential interventions to those most in need, which is why they are successful in low-, middle- and high-income countries. CHWs have become prevalent in Kenya, and while there is no question of whether CHWs can improve health, there is some work to be done in order for CHWs to realize their full potential (Oliver *et al.*, 2015). Two-thirds of women in a cross-sectional study in Western Kenya did not approve of modern family planning services delivered by CHWs (Juma *et al.*, 2015a, 2015b). Additionally, community members among six counties in Kenya doubted the skill-level and ability of CHWs when dealing with various health problems, specifically management of childhood illness (Juma *et al.*, 2015a, 2015b).

### Infrastructure

The health infrastructure in Kenya is severely lacking capacity for the population it serves and will serve in the future. Per 10,000 population, there are 1.5 health facilities, and there are 50 hospital beds per 10,000 population. Of facilities in Kenya, 25 per cent are equipped as per norms (Ministry of Health, 2013). Eight per cent of the time, clinics are out of Essential Medicines and Medical Supplies (EMMS) (Ministry of Health, 2013). In fact, poor infrastructural development in sub-Saharan Africa is the main contributor to poor progress of several of the MDGs (Essendi *et al.*, 2015). Investments in infrastructure maintenance and sustainability are necessary to improve the health of Kenya. While there are significant ongoing projects to establish clinics and hospitals, there is limited investment in the maintenance of physical infrastructure. The same is true for medical equipment found in selected hospitals, as there is lack of maintenance or lack of resources for maintenance of medical equipment, and most facilities do not have equipment such as dialysis machines, imaging equipment, laundry machines or theater equipment (Ministry of Health, 2013).

Facilities involved in clinical trials often see infrastructural benefits and equipment upgrades, as well as access to essential drugs, ambulatory vehicles and additional qualified staff (Angwenyi *et al.*, 2015). Angwenyi and colleagues found several benefits from the involvement in a clinical trial, such as physical infrastructure (clinic renovations, addition of off-road vehicles, water tanks, generators, beds, etc.), medical care support (diagnostic machines, oxygen tanks, stethoscopes and thermometers, scales and improved radiology services) and human resources (extra project staff, Ministry of Health staff, communication and research staff, extension of facility hours, improved disease surveillance) (2015). Clearly, the benefits from clinical trials are immensely helpful to the infrastructure of clinics in Kenya, and could be used as a tool to improve the quality of health services from struggling clinics. The human resources provided by clinical trials are beneficial to maternal and child health in Kenya. However, participating in clinical trials is not a sustainable form of infrastructural development and funding for such projects is limited (Nafukho, 2013).

Qualified doctors and nurses are lacking, and round-the-clock services are uncommon, even in hospitals where patients often require round-the-clock care. Without provision of night services in clinics and hospitals, many women are encouraged to see untrained traditional birth attendants, and the low-qualified nurses that staff clinics in Kenya who are forced to work long hours in poor infrastructural conditions with limited medical tools. These nurses are also responsible for the health of entire communities (Essendi *et al.*, 2015). The Ministry of Health may be an important player in deciding which structures are most in need of advancements.

In addition to caring for the infrastructure of health facilities, taking notice of the infrastructure of roads and housing designs could greatly increase the health of the people. By improving roads to facilities, ease of travel and patient safety during travel would improve. Increased investment in ambulances and ensuring that vehicles are available for emergency travel would increase patient trust and quality of patient care (Ministry of Health, 2013). Likewise, having mobile clinics or ensuring that clinics are accessible in each county would diminish the burden of long distance travel for receipt of care services. Housing designs would ideally always include mosquito nets as a health precaution to avoid contracting malaria, Rift Valley fever, chikungunya, dengue fever, yellow fever, or other vector-borne diseases (Central Intelligence Agency, 2015a). In urban areas, inhabitants may have access to screened windows to protect them from mosquitos, but in rural areas, it is important to include insecticide-treated nets (ITN) as a form of infrastructure. The distribution of ITNs has improved the protection of children from malaria in Kenya, and the WHO attributes this protection to the support by “a national initiative with strong political

commitment, social marketing and national support for supply and logistics” (World Health Organization, 2008, p. 64). Between 2004 and 2006, ITN coverage in Kenya increased from 7 to 67 per cent (Fegan *et al.*, 2007). A recent coverage of ITN ownership by county in Kenya. The greatest need remains in rural and low-income areas (National Bureau of Statistics, 2015).

Investments in communication and Information Communication Technology (ICT) are vital for the infrastructure of Kenya’s health-care systems. Important aspects of this infrastructure are two-way radios for use in clinics and hospitals, phones to communicate with other facilities, and internet connectivity to readily share patient records between facilities (Ministry of Health, 2013). Indeed, the WHO reports that “in western Kenya, electronic health records integrated with laboratory, drug procurement and reporting systems have drastically reduced clerical labour [sic] and errors, and have improved follow-up care” (World Health Organization, 2008, p. 51).

The Health Infrastructure distribution is skewed similarly to the distribution of the health workforce and of clinics throughout the country, as only a small number of clinics have the appropriate resources to care for patients. The government has implemented norms for health facilities to fulfill – which include suggestions on the physical infrastructure, communication, transport and equipment for units for completion by 2030 (Ministry of Health, 2013). The norms defined by the government for health infrastructure, if completed, will meet the minimum equitable availability of health. Once the norms are achieved, there should be additional funds committed to further expansion of health infrastructure.

#### *The pharmaceutical industry in Kenya*

Low-level health-care clinics are notorious for medicinal stock-out in developing countries. When patients present to clinics who reveal shortages of essential medicines, there is an inevitable low perceived quality of health facilities by members of the community. In 2006, Kenya implemented a policy change for unaccompanied malaria to be treated with artemether-lumefantrine (AL), but two years after, the government required a switch in treatment, a cross-sectional study by Kangwana and colleagues revealed that 25.6 per cent of surveyed Kenyan facilities (including 115 dispensaries, 30 health centers, and 19 hospitals) had none of the AL treatments in stock, and 75 per cent of surveyed facilities had incomplete AL treatments in stock (2009). Facilities had been in this state for a median of 52 days (Kangwana *et al.*, 2009). Yet, availability of essential medicines has increased in Kenya, and the major problem of shortage remains in low-level health clinics (Masters *et al.*, 2014). Masters and colleagues found that having a lab on site significantly increases the availability of drugs, and that private medical service providers faced low stock-out of drugs compared to public service providers (2014). Currently, there are five pharmacists per 100,000 population (the government’s requirement is to have 1 per 10,000 population), and placing more pharmacists in low-level clinics may increase medicinal coverage to communities (Odhon’g and Omolo, 2015). In all, 20 per cent of the Total Health Expenditure goes towards pharmaceuticals in Kenya (Ministry of Health, 2013).

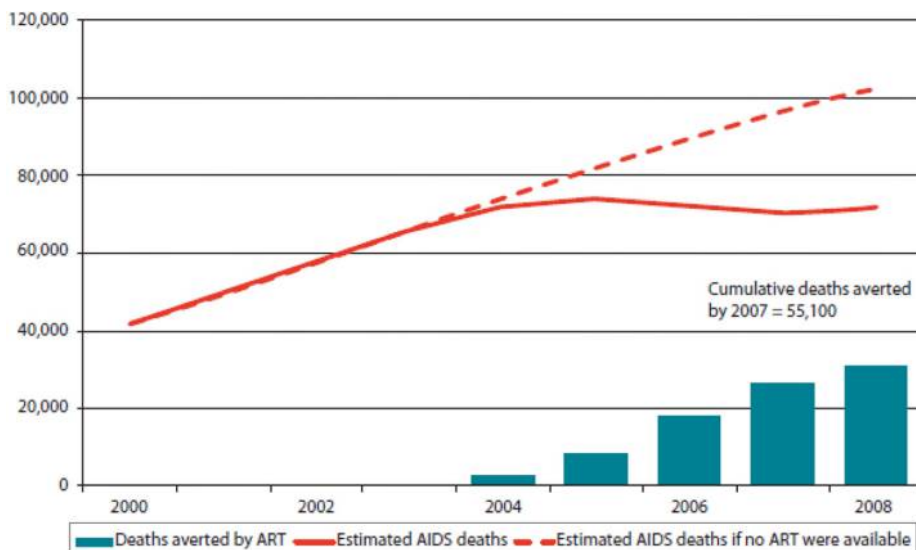
As of 2014, there were approximately 1.4 million Kenyans living with HIV (Maina *et al.*, 2014). Kenya relies on the USA (President’s Emergency Plan for AIDS Relief, USA Agency for International Development, Center for Disease Control and Prevention) to contribute over 80 per cent of funding for HIV/AIDS control. HIV/AIDS spending accounts for 17 per cent of the health expenditure in Kenya, and of this, just under 40 per cent goes towards treatment and care, specifically with anti-retroviral drugs. With an increase of HIV/AIDS in the late twentieth century came an increase in demand for ART. To treat the entire HIV population

in Kenya, it would cost US\$237m annually. Kenya's goal to achieve nationwide access to (ART) reached 11,000 people in 2003 and increased to 250,000 by early 2009 (Hasan and Wanyanga, 2010). Figure 6 shows the cumulative deaths averted by use of ART. This trend could continue to increase if the pharmaceutical industry is able to stabilize the cost of production. Even with increased access to ART, over half a million people are in need of ART, and close to a quarter of a million people have an unsatisfied demand of ART (Hasan and Wanyanga, 2010).

Unlicensed pharmacy attendants base their influence of drug sales on the cost of drugs, duration of drugs in the market, and aggressiveness in marketing by the drug manufacturer, leading to improper administration of drugs and potentially harmful effects on children and adults. This is especially problematic when pharmaceutical companies in and around Kenya produce drugs that have harmful chemicals (Kigen *et al.*, 2015).

The Kenya Medical Supplies Agency (KEMSA) is a state corporation under the Ministry of Health, and was established with a goal to procure, warehouse, and distribute drugs and medical supplies while also establishing a network of distribution facilities throughout the country (Ministry of Health, 2013). Under the Ministry of Health, KEMSA controls approximately 30 per cent of all prescription drugs in the market with funding totaling US \$49.5m from both the government and from Rural Health Facilities. Another bulk-producer of medicines is Mission for Essential Drugs and Supplies (MEDS), which procures medicines primarily for FBOs (Hasan and Wanyanga, 2010).

About half of exported pharmaceuticals are to Tanzania and Uganda, and Kenya has strong potential for further export growth in the coming years as demand is expanding in these two countries. While this is a solid source of income for the government of Kenya, it is



**Source:** The Kenya 2007 HIV and AIDS Estimates And interim projected HIV prevalence and incidence trends for 2008 to 2015: Report Prepared by National AIDS Control Council (NACC) and the National AIDS and STD Control Programme (NAS COP) July, 2009 Hasan and Wanyanga (2010)

**Figure 6.**  
Number of AIDS  
deaths avoided by  
ART

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important to consider the shortage of certain pharmaceuticals within the country. With an increase in health insurance coverage (the National Health Insurance Fund hoped to provide coverage to 60 per cent of the population by 2015), the demand for medicine will rise, although it is hard to estimate future demand. In addition, Kenya spends an estimate of between US\$65m to US\$130m on illegitimate drugs per year (estimated to be imported pharmaceuticals). By supporting government-distributed drugs, like ones coming from KEMSA or those from MEDS, the problem with counterfeit drugs could be substantially decreased. However, bulk-producers such as KEMSA work at a fraction of their potential; there is a considerable amount of competition between producers and importers. To reduce competition and stop the demand for potentially illegitimate imported drugs, industry members need investments from firms which will increase plant resources and equipment, and quality of personnel (Hasan and Wanyanga, 2010).

*Community health behavior, education, and perceptions of health care*

With the extensive ethnic and cultural background found in Kenya, health behaviors and perceptions and access to health education in Kenya varies widely. As the leading cause of death in Kenya, HIV/AIDS limits behaviors of those living with HIV and those at risk of contracting HIV because of stigma from health-care providers and community members living without HIV. Post-disclosure experiences of persons living with HIV include acceptance of illness, societal misconceptions (with stigma and discrimination), sexual awareness and contraception strategies. Providing social support and encouraging social support from the community is a helpful tool and coping mechanism for a positive HIV diagnosis, and is also a strong predictor of improved maternal health (Gachanja, 2015; Osur *et al.*, 2015). In many low-income communities, there are people who believe that HIV-discordant couples should refrain from having children. These views call for safe contraception strategies (access to quality methods), education (how to use methods and when) and information (knowledge of potential side effects and where to access methods).

The Green Belt Movement, a Kenyan-based NGO devoted to community development, found that presenting information to men and women together is effective in opening up the conversation about safe contraception and family planning. Men in Kenya have only recently started to accept family planning as a viable option, so educating men about family planning and contraception is vital for the empowerment of women, for maternal health, and for the health of the family overall (Breitnauer *et al.*, 2015; Hoke *et al.*, 2015; Okigbo *et al.*, 2015; Onono *et al.*, 2015; Withers *et al.*, 2015). Contraception strategies should emphasize that both HIV-discordant couples and HIV negative couples should practice family planning, and that utilizing family planning methods or safe contraception does not necessarily mean a couple is infected with HIV (Beguy and Mberu, 2015). In a study consisting of persons living with HIV in Kisii County, over 50 per cent of people strongly agree that condoms are effective strategies in preventing the spread of HIV, while close to 80 per cent of the participants used a condom during their last sexual experience (Emmanuel *et al.*, 2015).

Educating the entire community has been shown to improve overall health. With free primary education in Kenya, children are offered opportunities for further success. For young girls, education not only empowers women but also reduces birth rate and improves maternal and child health. For women of childbearing age, maternal education is an important predictor of child health (Duflo *et al.*, 2014; Onsomu *et al.*, 2015). Primary school enrollment and attendance levels in Kenya remain low. Some factors contributing to absenteeism among children in Bwaliro village are malaria, menstruation, and lack of disposable income (students

must pay for uniforms to attend classes). Female students are disproportionately impacted by the determinants of primary school absenteeism (King *et al.*, 2015; Duflo *et al.*, 2014).

## Discussion

Availability and distribution of health services, whether it is health workers, clinic location or reach of pharmaceutical distribution, are unequal in Kenya. Focus on creating a uniform health-care system is necessary to improve the health of the people of Kenya. Substantial progress has been made in the past few decades, which would not be possible without the government's drive to make health-care services accessible and affordable (Muthaka *et al.*, 2004; World Health Organization, 2008). Continued support from the government, both through financial resources and leadership will improve the health of the population. In addition, the private health sector can work to integrate with the public sector to create a network of support, similar to that of the public health sector. The government should utilize a greater amount of the GDP for health expenditures, and also implement new programs for health education and training of health professionals to be evenly distributed throughout the country. This way, the government can be more confident in future improvements in health of the country, including quality of life and length of life of the entire population. There should be great emphasis, or even incentives to retain doctors and nurses in Kenya after training. Providing work opportunities for health workers and allowing for economic growth is essential to the production of health in the country. Additionally, work opportunities should support and encourage quality work, so that both health workers and patients feel comfortable and are able to achieve the highest quality of health for themselves and their families.

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