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Inequalities in Health Care Service Delivery in Kenya

Phares M. Kirii, David Muthaka and Grace Murithi

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Phares M. Kirii, David Muthaka and Grace Murithi
Social Sector Division

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Abstract

This study investigated inequalities in health care service delivery using the Service Delivery Indicators (SDI) survey 2012 conducted by KIPPRA on behalf of the Ministry of Health and the World Bank. The objective of this paper is to analyze inequality in health service delivery in Kenya. The study uses service delivery indicators for health inputs which attempt to measure availability of key infrastructure and inputs at the health facilities, as well as measure effort of the health providers. This is also used as proxy for the effort put in by health workers, and it is from this that levels of inequality in service provision are measured using the Gini coefficient. The study found that Kenya does relatively well on availability of key inputs such as infrastructure and medical equipment. On measures of case load by service providers, the results were less positive. Regarding the availability of drugs, there are some important gaps in that only two thirds of tracer drugs are available, and some gaps were identified especially in availability of tracer drugs for mothers and children. The greatest challenge is the provider effort which shows high levels of absenteeism of health care providers. The conclusion is that there is room for improvement in efficiency of spending on human development in the health system in Kenya. Shortage of medicines, uneven distribution of health services, and low availability of equipment, as well as lack of adequate guidelines must all be taken into account as part of basic service management. The study recommends that improvements in service delivery in the health sector should be accelerated through focused investments and coordinated actions that strengthen health systems and increase equitable access to effective health care.

Abbreviations and Acronyms

ESP	Economic Stimulus Package
EU	European Union
FBOs	Faith Based Organizations
GoK	Government of Kenya
HMIS	Health Management Information System
HRH	Human Resources for Health
KEMSA	Kenya Medical Supplies Agency
KEPH	Kenya Essential Package of Health
KHSSP	Kenya Health Sector Strategic Plan
KHP	Kenya Health Policy
LRTI	Lower Respiratory Tract Infections
MDGs	Millennium Development Goals
MoH	Ministry of Health
NGO	Non-Governmental Organization
NHA	National Health Accounts
OECD	Organization for Economic Cooperation and Development
PETS	Public Expenditure Tracking Survey
SDI	Service Delivery Indicator
WHO	World Health Organization

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1. Introduction

Health care service delivery and equality currently dominate policy agendas worldwide. Governments and international organizations recognize that equitable health systems are essential to achieving health-related Millennium Development Goals (MDGs); that service delivery indicators are critical for the performance of any health system and for achieving universal coverage. Consequently, many developing countries, including Kenya, are progressively reforming their health care systems in a way that promotes equity and efficiency.

The Kenya Health Policy (KHP) 2014–2030 gives direction to ensure significant improvements in the overall status of health in Kenya in line with the Constitution of Kenya, Vision 2030 and global commitments. The policy focuses on ensuring equity, people centeredness, participation, efficiency, social accountability and a multi-sectoral approach in the delivery of health services.

Service provision or delivery is an immediate output of the inputs into the health system, such as the health workforce, drugs and medical supplies, and financing. Increased inputs should lead to improved service delivery and enhanced access to services. Ensuring availability of health services that meet a minimum quality standard and securing access to them are key functions of the health system.

To enhance equality in health services provided, it is assumed that the government allocates health resources equitably and employs well trained health professionals such that every citizen irrespective of their place of residence enjoys similar level and quality of healthcare. Health services require qualified health professionals. One assumption is that most health professionals have undergone similar training in the same institutions and hence their knowledge and technical know-how is the same. Therefore, one would expect that irrespective of where any health professional is serving, the difference in quality and level of service should not be significant, *ceteris paribus*.

Besides financing, human resources for health and medical supplies, there are other institutions that serve as vehicles for service delivery, such that even when financial and human resources are availed the quality of the institutions impacts on service delivery. There are situations when financial resources are available but service providers may fail to work or when they do, their service is not to the level required for satisfaction of the people (Kimenyi, 2012). This implies that availability of resources does not guarantee that services will be provided. All the factors involved have to work simultaneously. For instance, finance, medical supplies, human resources, and proper management have to be present at all times. However, the systems involved in allocation of finances or distribution of drugs and supplies work

against these expectations. And this is manifested differently in different regions of the country, with the effect being differences in health outcomes.

A good example is how the allocation of public resources in the health sector in Kenya is mainly dictated by distribution and level of health facilities. The public health system consists of six levels; the tertiary hospitals (level 6); secondary referral hospitals (level 5); primary referral hospitals (level 4); primary care service units (health centers) (level 3); primary care service units (dispensaries) (level 2); and community units (level 1) which includes all non-facility based health and related services, classified as community services.

Whereas level 6 is independent in terms of budget allocations, levels 1-5 depend on what is allocated from the Ministry of Health (MoH). Secondly, levels 1-5 are allocated resources according to their functions. Thus, as levels 4-5 get specialized human resources, levels 2 and 3 can only get clinical officers and nurses. This has an implication on the level and quality of service delivery in a region. A region with more level 4 and 5 facilities would receive more specialized medical personnel than the one with levels 2-3, hence creating an inequality in services delivered. Drugs and medical supplies plus the drawing rights for accessing supplies from Kenya Medical Supplies Agency (KEMSA) are also allocated as per the level of a health facility. Levels 4-6 receive more than levels 2 and 3 despite the fact that these are the primary healthcare service units oriented to preventive than curative health care. Allocating more resources to levels 4-6 means that the country's focus remains curative because these are referral levels for conditions that failed to be tackled at the preventive levels.

Therefore, the National and County government face various supply-side constraints which restrict equitable provision of healthcare. These include: (i) inadequate health professionals, because one physician in Kenya is in charge of 6,000 people against the World Health Organization (WHO) recommendation of about 3,000 people; all the counties are experiencing health professionals' shortage; (ii) there is shortage of funds allocated to health, for instance, nationally, per capita allocation to health by government is about US dollars 13; (iii) there is inadequate infrastructure especially in Arid and Semi-Arid Lands (ASALs) leading to limited access and in other areas congestion in the existing ones. Limited facilities translate to fewer inpatient beds per population served; it also implies inadequate medical equipments; (iv) there is inadequate supply of essential drugs, leading to patients being forced to purchase them from private pharmacies. Given that the degree of these challenges differs by region and counties, there is a likelihood that the level of service delivery also differs, hence the different health outcomes posted by counties.

1.1 Context and Motivation of the Study

Too often, services fail poor people in access, in quantity, and in quality. But the fact that there are strong examples where services do work means governments and citizens can do better. Services do work by putting people at the centre of service provision: by enabling them monitor service providers, by amplifying their voice in policy making, and strengthening the incentives for providers to serve the poor.

The 2004 World Development Report, *Making Services Work for Poor People*, was visionary in focusing attention on frontline service providers and the relationships of accountability between providers, policy makers' clients/citizens (World Bank, 2004). As one of the most frequently cited World Development Reports, it pulled together technical work on service delivery and spurred further work on a variety of themes: institutions; accountability; quality of service provision; provider behaviour and incentives and consumer behaviour, voice and exit. It also provided a framework to look broadly at the ways in which public spending in developing countries fails to result in quality services for clients, including equitable allocation of resources; the leakage of funding between central ministries and frontline providers, and sub-optimal effectiveness of health providers, among others.

One may ask why services fail poor people. Or how do we know that these services are failing poor people? Governments devote a large proportion of their budgets on health with very little of it on poor people; that is on services poor people need to improve their health. Public spending on health is typically enjoyed by the non-poor. This is an indication that services are failing the poor. The World Bank (2004) notes that even when public spending is reallocated towards the poor people—say by shifting to clinics—the money does not always reach the frontline service provider. When the share of public spending on health is increased, service providers are put in a difficult situation. In a system where the incentives for effective service delivery are weak, wages may not be paid and corruption is rife. Highly trained doctors rarely wish to serve in remote rural areas. Since those who do serve there are rarely monitored, the penalties for not being at work are low and when they are present some service providers treat poor people badly. The high level of absenteeism by health workers is evident in many regions.

By no means do all health service providers behave this way. Many are often driven by intrinsic motivation to serve. Be it through professional pride or genuine commitment to the poor, many health workers deliver timely, efficient and courteous services, often in difficult circumstances – clinics without drugs, non-functioning equipment, lack of basic items such as gloves, faulty weighing machines for children or thermometers, etc. The challenge has always been to

reinforce this experience—to replicate the professional ethics, intrinsic motivation, and other incentives of these providers in the rest of the service work force. If this were to succeed, service delivery and health outcomes would significantly be the same countrywide.

The last way in which services fail poor people is the lack of demand. Poor people often do not send their children to health facilities when they are sick. Sometimes the reason is the poor quality of service – missing drugs, and absent health workers. At other times it is because they are poor. Even when the services are free, many poor rural families cannot afford the time to travel to the nearest medical facility. Whether this is the same for all counties in Kenya is an empirical question, part of which will be investigated in this study.

To date, there is no robust, standardized set of indicators to measure the quality of services as experienced by citizens in Africa. Existing indicators tend to be fragmented and focus either on final outcomes or inputs rather than on the underlying systems that help generate the outcomes or make use of the inputs. In fact, no set of indicators is available for measuring constraints associated with service delivery and the behaviour of health providers, both of which have a direct impact on the quality of services citizens are able to access equitably. Without consistent and accurate information on the quality of services, it is difficult for stakeholders in the health sector to assess how service providers are performing and to take corrective action.

In analyzing the inequalities in service delivery, the following research questions are worth answering. First, what factors influence service delivery? Second, how unequal are counties in terms of service delivery? Third, what are the causes/factors behind inequalities in service delivery?

1.2 Objectives

This paper is informed by the desire to understand inequalities in service delivery of health care in terms of infrastructure, human resources, and essential commodity supplies and equipment. The main objective of this study is therefore to examine the inequalities in health service delivery in Kenya. The specific objectives are to:

1. Examine and assess health service delivery indicators;
2. Examine and analyze inequalities in health service delivery by county;
3. Analyze the factors influencing inequalities in service delivery; and
4. Draw policy recommendations based on result findings.

1.3 Justification

The health sector is one of the key components of the social pillar of Kenya's Vision 2030. This long-term blueprint puts forth flagship projects aimed at ensuring equity in the health sector service delivery and outcomes. Key among these projects includes reforms to address inequality in terms of human resources, infrastructure and financial resources. As stated in Vision 2030, addressing these inequalities remains one of the key areas aimed at improving service delivery, health outcomes and governance through improved decision making at a decentralized level.

Questions on health care inequalities have been of continuing concern to health researchers, planners and policy makers. To answer such questions can be difficult, but nevertheless the issues affect formulation, resource allocation and perceptions of the fairness and compassion inherent in the institutions of government and society as a whole.

Kenya like most developing countries faces major challenges in promoting universal health care coverage (i.e. to all geographical areas and households). Income and geographical inequalities still predominate access and usage of health services, with low utilization of essential services among the poor. Health workers are unevenly distributed around the country, with greater numbers in hospitals and urban and non-arid areas. Further, there is a general decline in the number of health workers in Kenya. Although there is continuous recruitment of health workers to address the shortfall in human resources, many regions continue to be underserved and hence it is obvious that delivery of services is not the same as in well-served areas.

Both equity and human rights' principles dictate the necessity to strive for equal opportunity for health for all people including the poor and marginalized groups. Unfortunately, lack of or inadequate access to health care services remains the most prominent factors behind the persistently and unacceptably high levels of mortality and morbidity, especially among the poor and marginalized regions. Huge disparities exist between the poor and the rich with respect to access to health care services as well as in the indicators of health status; for example, there are wide gaps in child mortality rates not only between counties, but also between individuals in the counties. However, it is not well established how big these disparities are. This study will therefore attempt to measure the levels of regional disparities using the Gini coefficient approach.

1.4 Organization of the Paper

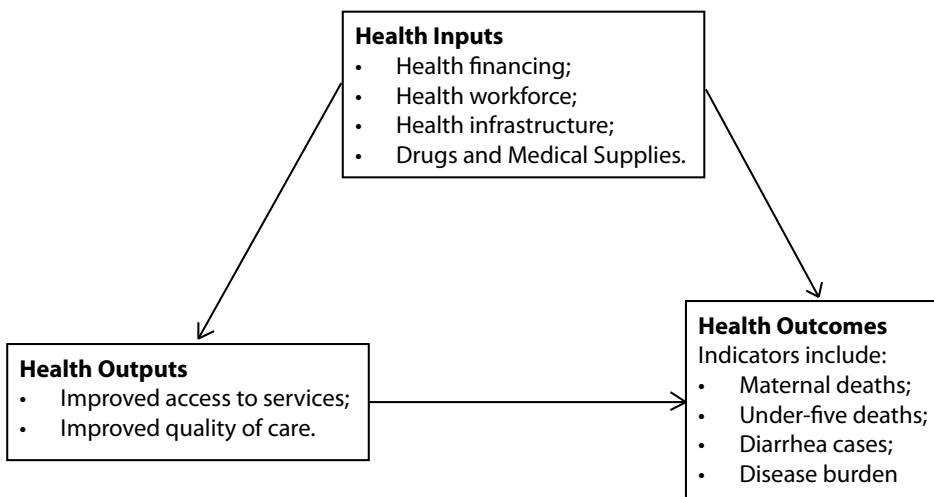
This paper is structured as follows: Section 2 outlines the regional disparities in health outcomes, section 3 reviews literature on health care service delivery and outlines the analytical underpinnings of the indicators and how they are categorized. Section 4 presents the methodology of measuring service delivery and inequality using the Gini coefficient. The results are presented in section 5. Section 6 concludes with summary of overall findings, conclusions and makes policy recommendations for Kenya. It also gives an indication of the limitations of the study and areas for further research.

2. Regional Disparities in Health Outcomes

2.1 Introduction

Literature on health recognizes the fact that health is produced from investments in healthcare (Grossman, 1972; Rosenzweig and Schultz, 1983; Mackenbach et al., 2007; Mwabu, 2007; and Muthaka, 2013). One of the investments and hence input into the health production process is medical care. When medical care is not provided equitably across different regions, it is expected that health outputs and health outcomes will be different. The provision of medical care involves finance, human resources, health infrastructure, drugs and medical supplies, and even health management systems. Figure 2.1 is an illustration of the relationships between health inputs, outputs and outcomes and the common indicators for the same.

Figure 2.1: Health inputs, outputs, and outcomes



Adopted and Amended from KIPPR (2014)

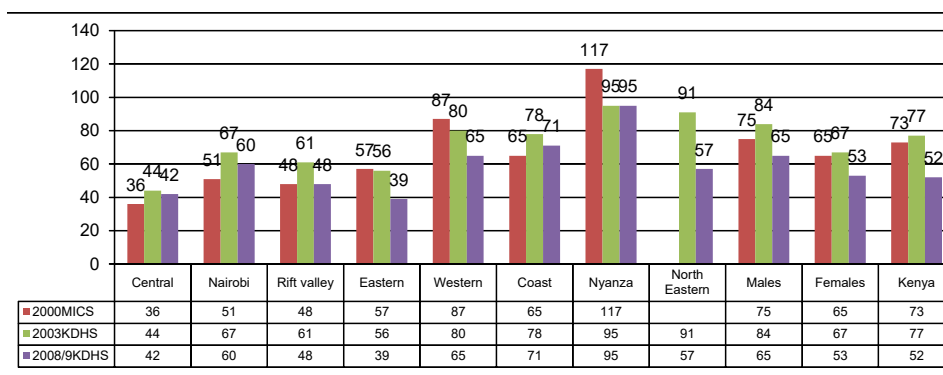
From Figure 2.1, health inputs are a necessary though not a sufficient condition for improving health outcomes. Adequacy of health inputs is reflected through the health outputs by way of improved access to services and quality of care, among other things. For outputs to lead to better health outcomes in terms of reduced disease burden, morbidity and mortality rates, the delivery of services has to be adequate. Service delivery depends more on the health workers and their facilitation to deliver high quality services. For this to happen, health workers need to be adequate in a region and with the right tools. For instance, health workers would be able to deliver high quality health care if in the first place

they are present at the facilities, they are adequately skilled, have equipment, and drugs and medical supplies are available. This, however, remains more theoretical than practical because many regions in the country are facing challenges related to human resources for health, inadequate finance, high burden and prevalence of diseases and mortality rates, among others. These challenges differ by region and there is likelihood that they reflect the differences in health care services delivered in these regions. The end result is the differences in health outcomes as discussed in the section that follows.

2.2 Health Outcomes

Some of the measures of health outcomes include disease burden and prevalence, morbidity levels, life expectancy and mortality rates. Different counties in the country have experienced different levels of health outcomes. For instance, from Figure 2.2, a child born in Central region has a higher probability of living than one born in Nyanza. This is because Central has among the lowest infant mortality rates whereas Nyanza has had the highest.

Figure 2.2: Trends in infant mortality rate by province (various years)



Source: Muthaka (2013)

Studies (Kimalu, 2002) have shown that infant mortality rate reflects the socio-economic, health and quality of life of a community. Thus, the higher the mortality rates, the lower the health conditions. The differences in infant mortalities reflect the inequalities in provision of health care. Further analysis of the regional health indicators reveal that there are disparities in health allocations, distribution of health facilities, distribution of health workers, availability of drugs and medical supplies especially for women and children, and immunization coverage, among others. For instance, as Table 2.1 shows, there is high correlation between the availability of health professionals (doctors, clinical officers, and nurses) and

deliveries at health facilities. Delivery at health facilities reduces the occurrence of both maternal and infant mortality.

Table 2.1: Correlation between selected health outputs and health workers

	Full Immunization Coverage (%)	Deliveries at facility	Malaria Cases	TB Cases	Nurses	Doctors	Clinical Officers
Full Immunization Coverage (%)	1.0000						
Deliveries at facility	0.6332	1.0000					
Malaria Cases	-0.7609	-0.7399	1.0000				
TB Cases	-0.2034	0.1124	0.2397	1.0000			
Nurses	0.5625	0.8822	-0.5241	0.1012	1.0000		
Doctors	0.2288	0.8049	-0.4662	0.3151	0.8605	1.0000	
Clinical Officers	0.0868	0.6342	-0.2266	0.1021	0.7832	0.8365	1.0000

Data Source: County Fact Sheets (2012)

The level of health indicators in different counties reflects the inequality in service delivery. Table 2.2 compares the Central and Nyanza region counties in terms of immunization coverage, deliveries at facility, TB and Malaria prevalence and health personnel. As noted earlier, the Central region has the lowest infant mortality levels while Nyanza region has the highest. One of the factors that are associated with low infant mortality is immunization and skilled births. Any difference in availability of immunization services and/or delivery at health facility will automatically result to inequalities in health outcomes. The average immunization rate for the Central counties is 82.5 per cent whereas that of Nyanza region counties is 74.1 per cent. This implies that children from Central are more protected from preventable diseases than those from Nyanza.

Table 2.2: Selected health indicators by county

County Name	Health personnel per 100,000						
	Full Immunization Coverage (%)	Deliveries at facility	Malaria Cases	TB Cases	Nurses	Doctors	Clinical Officers
Kirinyanga	98.5	75.5	6,723	110	66	6	8
Murang'a	93.0	55.6	2,824	77	47	4	5
Nyeri	92.8	96.2	543	82	106	15	11
Nyandarua	85.0	74.6	5,281	50	64	6	8
Kiambu	78.7	81.2	4,457	104	63	11	8
Nyamira	84.7	56.2	17,722	45	41	1	5

Kisii	81.6	54.6	23,205	23	59	6	9
Siaya	77.7	51.6	57,462	100	47	2	6
Migori	71.5	47.2	40,440	64	35	1	7
Kisumu	70.8	59.8	41,752	123	73	10	9
Homabay	58.4	40.5	44,668	105	21	4	7

Data Source: County Fact Sheets (2012)

The scenario shown in Table 2.2 replicates itself even for other health indicators across regions. There are disparities in the number of health personnel; availability of health infrastructure including water, electricity, communication equipment, and emergency services; availability of drugs and medical supplies; among others. Nyeri County, with 96.2 per cent of the deliveries being conducted at health facilities also boasts having the highest number of nurses (106), doctors (15) and clinical officers (11). This compares unfavourably with a county such as Homa Bay with 21 nurses, 4 doctors and 7 clinical officers, and hence a 40.5 per cent rate of deliveries in health facilities. Thus, the difference in availability of health inputs is associated with the inequalities in health service delivery and health outcomes in the counties.

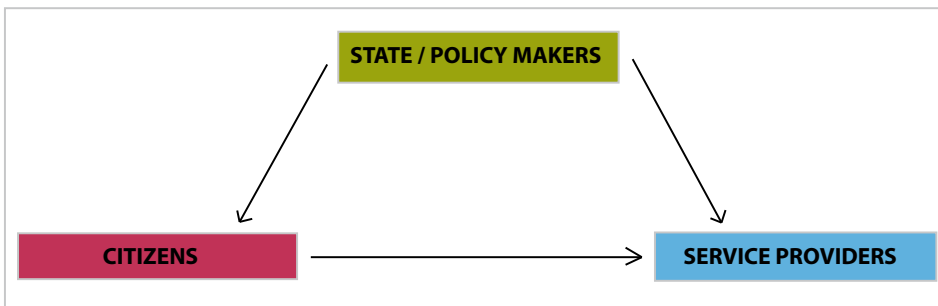
3. Literature Review

3.1 Theoretical Approach

The principal agent model perspective places emphasis more on the principal-agent relationships between citizens, politicians and service providers. Citizens (clients) who pay taxes delegate responsibilities to elected officials (state) to provide public services and pay taxes to fund them. The state in turn delegates service delivery to provider institutions/organizations by creating incentives and appropriating budgets. Citizens influence providers through health management committees. This network of principal-agent relationship presents numerous incentive problems. The model stipulates two layers of agency problems: between citizens and elected officials and service providers (Figure 3.1). The intermediary role played by the State in the principle agent relationship creates a situation where it is difficult for the citizens to evaluate and control the actions of the service provider.

To increase organizational efficiency and reduce the influence of private interests over the principal's goals, organizational activities tend to be coordinated through a set of institutional arrangements: rules, norms, standard operating procedures and hierarchical structures.

Figure 3.1: Client- government- service provider relationship



Source: World Bank (2003)

Bersey and Ghatak (2003) develop a theoretical framework to study public service provision focusing on issues of incentives and competition. They discuss their model in the context of public reforms in the UK and their analysis has been widely applicable. The study examines three components in the design of an organization providing a public service: the mission of the organization, the motivation of workers and matching between workers and organization's mission. The study emphasizes that public service provision often takes place in mission-oriented firms; that is, "in a culture that is widely shared and warmly endorsed by operators and managers alike" (Wilson, 1989).

Bersey and Ghatak (2003) underline that inefficiency in public production arises because service providers face limited incentives to improve quality since service users (citizens) are not viewed as customers as in the private sector where customer satisfaction is key to the provider's survival. Also, public service providers have no incentives to reduce costs because of the use of soft budget constraints in the sector. The study argues that decentralized organizational arrangements are in many contexts efficient systems of public service delivery that enhance consumer empowerment. Empowering consumers means that the nature of the principal agent relationship changes and that consumer's satisfaction becomes a priority for providers as shown in Figure 3.1.

The World Development Report 2004 "Making Services Work for Poor People" develops a conceptual framework that focuses on the accountability relationships between principles and agents in the service delivery system. A relation of accountability is defined as a principal-agent relationship comprising the following characteristics: delegation of responsibility, financing and enforcement on the part of the principal, and effort and information on the part of the agent. As World Bank (2003) maintains, there are two main layers of accountability relationships in the multi-level principal-agent relationship of service delivery. First, citizens have to hold politicians/policy makers accountable for allocating resources for service delivery and for providing appropriate incentives for performance. Second, policy makers have to hold provider organizations accountable for delivering the proper services. This sequential process of accountability has been referred to as the "long route" of accountability, as opposed to the "short route" which involves direct accountability of provider to clients, a situation typically encountered in the private competitive sector. Inadequate service delivery could therefore be associated with failures in one or both of the links ailing the "long route" of accountability, as well as with failures in the "short route" of accountability.

3.2 Empirical Approaches

Different empirical approaches have been used to study service delivery in developing countries, focusing either on the demand or supply sides. On the demand side, household's surveys have enhanced the understanding of relationships between service delivery and population outcomes. For instance, household survey data have been used to examine the impact of service usage as well as household education and health expenditures on education and health outcomes.

On the supply side of service delivery, one of the standard instruments used to evaluate public services is the expenditure/benefit incidence analysis which combines supply and demand sides' information.

Various theories have been proposed to explain why inequalities in healthcare services delivery occur, with majority of the theories revolving around ethics and social justice. Health has been recognized as a basic human right in many countries including Kenya. Proponents of health as a human right claim that individuals have a right to healthcare and a violation of the same is committed to them if they are denied this right for whatever reason. Response to this view can be seen in various efforts by governments, for instance efforts to build more health facilities within the communities, and efforts to deploy more skilled health workers in marginalized areas (Daniels, 1985).

In as much as individuals have the right to healthcare, the general consensus has been that not all healthcare services can be made accessible to all, and hence the “basic minimum package” has been used as the threshold of what services need to be made universal to all (Post, Blustein et al., 2007). The challenge with making all healthcare services throughout the entire healthcare system accessible to all is that the health needs of a country are often varied, some unpredictable and extremely expensive that it would be too burdensome on the part of the government to avail all the services to the entire population. The free market is inadequate to meet all the health needs of a country; therefore the society has an obligation to take part of the healthcare burden. Nevertheless, the societal obligation is limited by the balance of costs and benefits accruing to the population from a given intervention. In addition, societal obligation does not imply that every member of the community is entitled to an equal level/quality of healthcare.

The reasons as to why there exists inequalities in access to healthcare are largely founded on the Utilitarian theory which advocates for maximization of the common good. Utilitarianism supports government welfare programmes because they are seen to promote the overall good of the society. Utilitarians therefore believe that healthcare is a moral right as long as its provision contributes to the general well-being of the society. In a perfectly competitive market, utilitarians argue that individuals and firms have utility-maximizing tendency which leads to maximum economic efficiency and social well-being. For instance, skilled health workers prefer working in urban areas than rural areas because they derive more utility from the former than the latter. Utilitarian theory therefore fails to take equity as a primary concern and is often used to justify inequalities in healthcare services delivery. However, they argue that the question of “utility for whom?” should always be assessed and it is this issue that opponents of utilitarians use as criticism. Block (2006) wonders “is it justifiable to use community preferences to make healthcare decisions about individual cases or to use preferences of the well-off to prioritize services for the poor?”

3.3 Factors Influencing Service Delivery

The delivery of health services is influenced by a myriad of factors which can be categorized into non-monetary and monetary factors (Jacobs et al., 2011).

Non-monetary factors

Socio-economic hierarchies in societies: all societies suffer from unequal distribution of economic and social resources, including power and prestige which in turn affect the population's health and its distribution in the society (Marmot, 2007).

Availability of an essential health service package: given that the government cannot make all services available to all, a minimum package, otherwise known as an essential package of health services provides for a list of the most cost-effective and fundamental services that can be provided by the lower-level facilities. Such a package helps in ensuring that drugs and other medical supplies are available to majority of the population and can be administered by lower-cadre of health workers (Jacobs et al., 2011).

Regulation: regulation of health services is important in ensuring that the population has access to safe and affordable healthcare services.

Outreach services: outreach services entail services provided at the community level and on door-to-door basis by healthcare workers. This helps in addressing the geographical and distance-related barriers to healthcare access often faced by majority of the populations living in rural and remote areas (Jacobs et al., 2011).

Decentralization of services: decentralization entails management of health services at the local levels instead of at the central government. Decentralization has been found to have a positive impact on access to health services because the local government is in a better position to know and respond to unique local needs (Jacobs et al., 2011).

Monetary factors

The amount of money available for the health sector largely determines whether or not health services will be adequately delivered. But most importantly is the manner in which the available financial resources are allocated. Various approaches of resource allocation exist in the literature. One of them is pay for performance in which health workers enter into a contractual agreement with the government or other sources of finance to deliver health services of a certain level to the target population in exchange for financial remuneration (Jacobs et

al., 2011). Such a contractual agreement improves the quality of health services provided by motivating staff to abide by their contracts.

Secondly, needs-based financing has been praised as an efficient and effective approach of allocating financial resources. In this approach, the financial resources are allocated based on the needs of the region through a formula that incorporates three key components: the population size, age and sex profiles of the population, and the poverty level of the population (Pearson, 2002). Of these three components, the population size is the most important in determining the amount of financial resources to be allocated to an area. Areas with larger populations should ideally receive higher allocations and vice versa. Concerning the age and sex profiles, children and older persons have more health needs than the young population. Similarly, women have more health needs than men. Thus, areas that have more children, the old and women than the young and men as a proportion of total population should receive higher budgetary allocations. Lastly, the causal relationship between income and health implies that areas with higher poverty levels should receive higher budgetary allocations than wealthier regions.

Thirdly, user fees as a source of revenue for the health sector play a critical role in service delivery. Although on the demand side user fees have been found to have a negative relationship with service utilization, the opposite is true for the supply side (Jacobs et al., 2011). User fees provide health facilities with additional financial resources with which the facilities can use to provide more services, for instance to purchase drugs and medical supplies.

3.4 Inequalities in Service Delivery

3.4.1 Distribution of health facilities and infrastructure

The distribution of health facilities and infrastructure largely determines the health outcomes of a population. A lot of discussion on distribution of health facilities and infrastructure focuses on the rural-urban divide as well as on the type of facility and facility ownership; that is, whether facilities are owned by the government or the private sector. In general, urban areas have been more favoured compared to rural areas when it comes to availability of health facilities. This makes the distance travelled by residents to the nearest health facility shorter for urban residents than for rural residents (Adetunji, 2013).

In most countries, the lower-level health facilities (level 2 and 3) are more in number compared to level 4-6. At the same time, the lower-level facilities are mostly located in rural areas while hospitals are mostly found in urban areas (Adetunji, 2013). The urbanization process therefore has a key role to in the distribution of health facilities. The location of higher-level facilities in urban areas also has implications

for the referral system (Nengak and Osagbemi, 2011). The availability of healthcare and related services in facilities follows a hierarchical structure with higher-level facilities more likely to be adequately stocked and manned. It is therefore the case that lower-level facilities have more frequent stock-outs of drugs and suffer from dire shortage of health workers (Adetunji, 2013).

Rural residents who require the services offered by higher-level facilities must travel to the urban areas for treatment, which makes them compete with urban residents for these services. What this means is that even if urban residents have easier access to hospitals and other more specialized services, the utilization of such services is adversely affected by competition from rural residents (Muganzi and Obudho, 2013). In Kenya, for instance, the only two national referral hospitals are located in Nairobi and Eldoret towns, forcing majority of Kenyans residing in rural areas to travel long distances for specialized treatment thereby congesting these hospitals.

The ownership of health facility can also be used to analyze inequality in the distribution of the facilities. Areas which are considered as underserved by the government have higher likelihood of being served by the private for-profit or private not-for-profit organizations such as non-governmental and faith-based organizations (Muganzi and Obudho, 2013). Whereas majority of the private-run facilities are in urban areas, those owned by NGOs and FBOs are mostly found in rural and marginalized areas, and their services often cost much less than the private facilities. Due to their profit motive, private for-profit facilities often provide curative services whereas government, NGOs- and FBOs-run facilities tend to mainly focus on preventive and promotive services with the exception of hospitals which also provide curative services. In Nasarawa State of Nigeria, for instance, the government has been actively involved in establishing more primary healthcare facilities than secondary facilities whereas the private sector established more secondary facilities than primary facilities (Nengak and Osagbemi, 2011).

Atser and Akpan (2009) established that the Akwa Ibom State of Nigeria had 286 health facilities which were spread across the 31 Local Government Areas (LGAs). However, there was uneven distribution of these facilities across the LGAs with 15 of them lacking a general hospital, 3 LGAs having two general hospitals each, one LGA having three general hospitals, and one LGA having a teaching hospital. The study found that 40 per cent of the communities sampled had no healthcare facility of any type and that the private sector was the dominant player in the State, owning about 60 per cent of all the health facilities. The government only owned 30 per cent of the facilities and the mission organizations only 10 per cent (Atser and Akpan, 2009).

The profit-driven nature of the private sector implies that majority of the population in the State lack access to affordable health care. This is different from the Nasarawa

State where the government-run facilities are more than the private-run facilities although the latter have been increasing in number over the years. The implication of the nature of facility distribution in these two states is that although majority of the population in the Nasarawa State have been able to access healthcare services at an affordable rate, those in Akwa Ibom State have benefited from more specialized healthcare although access to such services is hampered by affordability.

Distribution of health facilities should ideally be determined by the population size hence the thresholds put in place for the various types of health facilities. In the Atser and Akpan (2009) study, however, it was revealed that population was not a determining factor in the distribution of facilities because although some communities met the threshold for a health centre, none existed. Some communities were over-served with general hospitals yet their population required only a health centre whereas other communities whose population required the presence of higher-level facilities were under-served with dispensaries or no facility at all.

The physical availability of health facilities has implications on a population's access to health services and much of the existing literature (Gwatkin et al., 2004) has looked at government services. Gwatkin et al. (2004) argue that "the growing attention paid to government services of developing countries over the past few years indicate clearly that such services usually favour the better-off," (p.1273, 2004). Although government-run services are meant for the poor and marginalized, in reality they are pro-rich.

For instance, a study conducted by Filmer (2004) in 21 African countries found that approximately 26 per cent of total government financial subsidies went to the wealthiest quintile of the population. In addition, the coverage rates for most of the health interventions including maternal and child health services were found to be regressive and favoured the wealthier populations than the poorer populations despite the fact that such interventions are usually intended for the poor and disadvantaged groups (Filmer, 2004).

Similar trends have been found for other healthcare services besides preventive care, including non-communicable diseases. In South Africa, Alberts et al. (2003) found that among hypertensive patients, the likelihood of receiving treatment for the population in the highest 30 per cent of the socio-economic status was twice higher than for the population in the lowest 40 per cent.

3.4.2 Distribution of human resources for health

Of all the health inequalities domains, none has attracted the attention of more researchers than the inequality in the distribution of health workers. Sousa et al. (2012) point to the geographic mal-distribution of various cadres of health

workers. In a study conducted in Brazil by Sousa et al. (2012), the authors inferred that poorer states fared worse than wealthier states as far as having skilled health workers was concerned. The skilled health workers such as physicians and nurse professionals tended to be more available in richer states than poorer states whereas less-skilled and less-educated health workers such as nurse associates were found more in poorer states. Distribution of physicians and nurse professionals was the most unequal of all the different cadres of health workers. Similarly, urban areas attracted more skilled workers than rural areas. The study used the Gini coefficient, and the Theil T indices with the advantage of the latter being that it can further be decomposed within and across regions to identify the sources of the inequalities in a country.

The Government of Japan introduced a new policy of addressing the shortage of doctors by increasing the number of medical students and medical schools in the 1970s. In light of this policy, Yakaki (1992) analyzed its impact not only on the number of physicians but also on their distribution for the period 1980 and 1990. The study used the Gini coefficient to measure the degree of inequality for the two years and then compared their trends to determine whether distribution of the physicians had improved during the period under investigation. The study found inequalities in the distribution of physicians by population, age of physicians, and location. Specifically, physicians were more concentrated in urban areas, and more populous municipal bodies were better off than scarcely populated areas. Younger physicians also tended to be more concentrated in urban areas compared to older one. The reasons given for this age-related mal-distribution include the fact that urban areas offer better educational opportunities and benefits for the families and that rural practice is financially unrewarding. The Gini coefficients of 0.331 and 0.340 for 1980 and 1990, respectively, indicated lack of improvement in geographical distribution of physicians and, in fact, there was tendency for deterioration.

Tanihara et al. (2011) also evaluated the impact of the Japanese government human resources policy on distribution of physicians. Their study covered six time points in 1998, 2000, 2002, 2004, 2006, and 2008. The unit of analysis for the study was the secondary tier of medical care (STM) for which the study analyzed trends in geographic disparities in population and the distribution of physicians using the Gini coefficient, number of physicians per population and ratios of top quartile and third quartile. The study points out that while number of physicians per population is a commonly used indicator for disparities in the allocation of physicians, its disadvantage is that it assumes that patients seek care only in their counties/municipalities hence it ignores patient flows from their regions to other regions. The top quartile/third quartile ratio for 1998 to 2008 was 1.47 and 1.51 respectively, with no particular direction whereas the Gini coefficient ranged

between 0.21 and 0.22 for the period studied, hence it had no significant variation.

Tanihara et al. (2011) found that there was no change in the unequal distribution of the physicians during the period investigated, and that the STMS with smaller populations experienced an increase in the number of practicing physicians per population. The latter finding contradicts Yakaki (1992) who found that regions with larger populations were better equipped with health workers than small-sized regions. The difference, however, could be in the differences in unit of analysis. Tanihara et al. (2011) further suggested that the equity and efficiency of a healthcare system would be better measured by calculating the caseloads of physicians and the travel time/distance to the nearest physician.

Other inequality studies conducted in Japan include Tanumura and Shima (2011) and Ono et al. (2010). The Tanumura and Shima's study sought to analyze the scarcity of pediatricians in six secondary medical service areas despite the fact that these specialists have increased in absolute number during the decade. The study hypothesized that the shortage could be as a result of unbalanced geographical distribution and used the mean travel time as an indicator of inequality. The study found a positive correlation between the number of pediatric facilities and the size of children clusters. The mean travel time varied greatly among the medical service areas indicating inequality in accessing pediatric care.

Ono et al. (2010) analyzed the impact of the introduction of a postgraduate training programme on geographical distribution of ophthalmologists in Japan for the time points 1996 and 2006. The study made use of the Lorenz curve from which they computed the Gini coefficients, income inequality measure and 95% confidence intervals. The study found that there had been an increase in the absolute number of ophthalmologists from 10,982 to 12,362 during the study period. The Gini coefficients for the two time points were 0.405 and 0.353, respectively. The implication was that the geographical distribution of ophthalmologists had improved during the decade, although such an improvement could not be statistically attributed to the postgraduate training programme.

A similar study conducted in the United States by Rosenthal et al. (2005) also sought to examine whether physicians are geographically mal-distributed in the face of debate that the country is training too many physicians. The study used various geographical access measures in 23 states that had low physician-population ratios between 1979 and 1999. The researchers argued that physician-to-patient ratios by county are an imprecise measure of access because some patients may be closer to a physician in an adjacent county than the closest physician in their counties an argument that is supported by Tanihara et al. (2011). In place of physician-to-patient ratios, Rosenthal et al. (2005) calculated the distance from the resident population location to the closest physician and reported the population-weighted

average distances to a physician for the residents of each rural-urban continuum category. Caseloads of physicians in each rural-urban continuum category were also calculated as a measure of inequality.

The study found an improvement in the geographic access to physicians during the two-decade period under investigation. However, some specialists continued to be more concentrated in urban areas than rural areas. Of the inequalities measures used, the physician-to-patient ratios revealed the greatest degree of geographical inequalities, although these ratios were smaller for rural areas that were adjacent to metropolitan areas compared to those that were not. The distance-traveled and caseload measures showed less inequality but also showed that patients in isolated rural areas had less access to physicians than patients living in counties located near metropolitan areas.

3.4.3 Inequalities in health budgetary allocations

Budgetary allocations in the health sector should reflect the relative needs of the population based on: population size, sex and age profile of population, and poverty level (Pearson, 2002). However, evidence from Pearson (2002) shows that this is rarely the case, especially with regard to the poverty criterion. Poor people carry the greatest burden of ill-health and diseases but in most cases do not receive as much share of financial resources as the wealthy. For instance, morbidity and mortality (Diderichsen (2004), show higher morbidity and mortality rates among populations of lower income quintiles, and at the same time lower coverage rates of health programmes such as immunization. Diderichsen (2004) found that child morbidity in the poorest quintile was 2.5 times higher than that in the richest quintile. But the richest quintile received 2.5 times higher allocations than the poorest. In order to achieve equity in budgetary allocations, Diderichsen (2004) proposed a shift of more than 25 per cent of the healthcare budget from the rich to the poor quintiles.

Other evidence of the criteria for resource allocation not being used is the study by Kruk and Prescott (2012) on professional delivery attendance by women in low- and middle-income countries. The study found that poorer women, women from large and populous countries, and urban women had lower odds of having skilled attendance at birth compared to wealthier women, women from smaller-sized countries and rural-based women (Kruk and Prescott, 2012). Such inequitable allocation of health resources not only hinders less-privileged populations from accessing healthcare but it also pushes them deeper into the poor health-poverty cycle.

3.5 Overview of Literature

The review of the literature revealed that in most countries, health care services are inequitably distributed. Although the population is the ideal determining factor, most healthcare centres and majority of health workers tend to favour urban areas due to availability of support services. The implication is that rural residents have to travel longer distances to access these services whereas urban residents face competition from their rural counterparts which leads to congestion of health facilities, particularly hospitals, in urban centres.

The literature shows the importance of adequate financing, infrastructure, human resources, material and equipment need to be made available, while the institutions and governance structures provide incentives for the service providers to perform. Health professionals are invaluable in determining the quality of health services. While seemingly obvious, it is surprising how little health systems literature does make the links between system investments and the performance of providers and functioning of facilities being the ultimate objective of the effectiveness of investments in systems.

Much of the literature on health inequalities focuses on the utilization aspect (the demand side) with very few studies looking at the supply side. Among the few existing studies on inequalities in service delivery, a lot of focus has been given to health workers, thereby neglecting other equally important components of healthcare system such as medical drugs and supplies, infrastructure, and financial allocation. This study is an attempt to fill the void in literature that focuses on inequalities in healthcare service delivery. The study will examine how health workers, drugs and medical supplies, and health infrastructure are distributed among the different counties of Kenya.

4. Methodology and Data

4.1 Service Delivery Production Function

We consider a service delivery production function, f , which maps physical inputs, χ , the effort put in by the service provider e , to deliver quality services into individual outcomes, y . The effort variable e could be thought of as multidimensional and thus include effort (broadly defined) of other actors in the service delivery system. As noted above, outcomes of this production process are not only affected by the service delivery unit, but also by the actions and behaviours of households, which is denoted by ε . We can therefore write:

$$Y = f(\chi, e) + \varepsilon \quad (1)$$

To access the quality of services provided, one should ideally measure $f(\chi, e)$. In the health system, the distribution of physical inputs (infrastructure, medical supplies, health workers) χ , and the effort put in by the service provider (case load) e , are not equally distributed in the real world leading into inequality in service delivery of health care. In the next sub-section, we tackle indicator categories and selection criteria.

4.2 Service Delivery Outcomes and Perspectives of Indicators

As mentioned in section 3, service delivery outcomes are determined by the relationships of accountability between policy makers, service providers and citizens. Health outcomes are the result of interactions between various actors in the multi-step service delivery system and depend on the characteristics and behaviour of individuals and households. While delivery of quality health care is contingent foremost on what happens in clinics, a combination of several basic elements have to be present for quality services to be accessible and produced by health personnel at the health facilities, which depend on the overall service delivery system and supply chain. Adequate financing, infrastructure, human resources, material and equipment need to be made available while the institutions and governance structure provide incentives for the service providers to perform.

4.2.1 Indicator categories and selection criteria

Measuring inequality in health care service delivery in this study entails three steps: (1) defining when a health distribution becomes inequitable; (2) measurement strategies to operationalize equality (core indicators); and (3) quantifying health inequality information. Steps one and two entail extracting information on health care service delivery from the health system in the country. Quantifying the extent

of health inequality by means of a single number (step three) is a strategy to facilitate examination, comparison and understanding of the health care service delivery inequality.

Step 1: Defining health inequality

Health inequality as an indicator of general injustice in society emphasizes relations between health and other important goods. Multiple factors directly or in complex combination determine health. It is therefore an ultimate outcome of how society distributes multiple determinants of health. We regard health inequality as an indicator of general injustice in society.

Step 2: Core indicators

Table 4.1 defines service delivery indicators, which was used in the PETS/SDI 2012 study. The indicators were grouped into two; those which capture ‘inputs’ and those that capture ‘provider effort’.

Inputs

This refers to the physical presence of delivery of services. Inputs comprise health infrastructure (clean water, electricity and toilet), number of health work force and medicines, medical equipment, emergency transport and communication equipment. The study developed 4 composite indicators for basic health facility Infrastructure (water, electricity and adequate sanitation), Medical equipment (adult, child and infant weighting scales, stethoscope, sphygmometer and thermometer), and Drugs Availability (essential medicines for mothers and children); and finally for Communication Equipment (radio, phone and computer)

Provider effort

Provider effort refers to the efforts that service provider (health workers) put in delivery of healthcare which is measured through caseload per provider (which is the number of outpatient visits per clinician per day) and absence rate (which is the average share of staff not in the facilities as observed during one unannounced visit). This includes authorized (sanctioned) and unauthorized (unsanctioned) absence.

Table 4.1: Nomenclature and definition of health service delivery indicators

Core indicators	Definition
Inputs	
Infrastructure	Infrastructure aggregate: (Electricity, Water and Sanitation) Communication equipment (Radio, Phone and Computer) Emergency transport
Equipment availability	Medical equipment aggregate - Share of facilities with thermometer, stethoscope and weighing scale, refrigerator and sterilization equipment
Drug availability	a) Priority medicines for mothers observed and non-expired: Oxytocin (injectable), Sodium chloride (saline solution), Calcium gluconate (injectable), Magnesium sulfate (injectable), Ampicillin powder (for injection), Gentamicin injectable, Metronidazole injectable, Iron supplements cap/tab, Misoprostol cap/tab, Azithromycin (cap tab or oral liquid), Cefixime cap/ tab, Benzathinebenzylpenicillin powder (for injection), Betamethasone or dexamethasone (injectable), Nifedipine cap tab, medroxyprogesterone acetate, Folic acid supplements (cap/tab) b) Priority medicines for children observed and non expired: Amoxicillin (syrup/suspension), Ampicillin (powder for injection), Ceftriaxone (powder for injection), Gentamicin (injectable), Benzylpenicillin, oral rehydration salts (ORS sachets), Zinc (tablets), Artemisinin Combination Therapy (ACT), Artusunate (rectal or injectable), vitamin A (capsules)
Health workers availability	Number and distribution of health workers in a health facilities
Provider Effort	
Caseload per clinician per day	The number of outpatient visit records in the three months prior to the survey divided by the number of days the facility was opened during the three month period and the number of health workers who conduct patient consultations (i.e. excluding cadre type such as public health nurses and outreach workers)
Absence rate	Number of health workers that are not off duty who are absent from the facility on an announced visit as a share of ten randomly sampled health workers. Health workers doing field work (mainly community and public health workers) were counted as present. The absence indicator was not estimated for hospitals because of the complex arrangements of off duty, inter-departmental shifts, among others

Source: PETS/SDI (2012)

Step 3: Measuring inequality in health care service delivery

To measure and quantify the degree of inequality, this study uses the Gini index that has been applied in a variety of situations from country level income distribution to health care. The Gini coefficient is a commonly used measure that varies between 0 reflecting complete equality and 1 indicating complete inequality. The Gini coefficient is based on the Lorenz curve, which compares the distribution across the entire population of an area. It is useful since it incorporates all the information from a particular area.

The Gini Coefficient is given by:

$$G = 1 + \left(\frac{1}{N}\right) - \left[\frac{2}{m \cdot N^2}\right] \left[\sum_{i=0}^n (N - i + 1) y_i\right] \dots\dots\dots(2)$$

Where health facilities are ranked in ascending order of y_i .

G = Gini Coefficient (GC)

N = Number of Health Facilities

m = Arithmetic Mean

y = Inputs/Provider effort

i = Health Facility

$0 \leq G \leq 1$

We use equation 2 to calculate the Gini index for inputs and provider effort.

4.2 Description of Data

In order to analyze the inequalities in health care service delivery, the study used the 2012 PETS/SDI survey which is a nationally representative survey of health facilities in Kenya's primary health care system. While the PETS/SDI sample was intended to be nationally representative sample, selected geographic areas were excluded due to inaccessibility for security-related reasons (North Eastern Province). In the survey, 15 counties of the 47 counties were chosen. Nairobi and Mombasa as the two most populous cities, and the capital (in the case of Nairobi), were pre-selected for their specific importance; three others (Nyandarua, Nyamira and Siaya) were pre-selected as case studies because of their baseline poverty rates and service delivery outcomes. The remaining 10 counties were selected by first dividing the counties into groups of approximately equal target population, then sampling the counties randomly from among the strata. The selected counties are shown in Table 4.2 while the sample characteristics are shown in Table 4.3.

Table 4.2: Selected counties

	Province	County		Province	County
1	Western	Bungoma	9	Rift Valley	Nakuru
2	Nyanza	Homa Bay	10	Nyanza	Nyamira
3	Coast	Kilifi	11	Central	Nyandarua
4	Central	Kirinyaga	12	Nyanza	Siaya
5	Eastern	Kitui	13	Rift Valley	Trans Nzoia
6	Eastern	Makueni	14	Rift Valley	Uasin Gishu
7	Coast	Mombasa	15	Rift Valley	West Pokot
8	Nairobi	Nairobi			

Source: PETS/SDI (2012)

According to the PETS/SDI survey, a total of 294 facilities were selected for interviewing. The results presented in the paper are based on inverse probability weights constructed to factor the sampling strategy, while all the Standard Errors (SE) and Standard Deviations (StdDev) are based on clustering at the county level.

Table 4.3: Sample characteristics

Category	Number	%	Weighted distribution	National distribution
Sample size	294	100	100	100
Location				
Rural	207	70.4	85.4	-
Urban	87	29.6	14.6	-
Facility type				
Dispensary	102	34.7	78.6	76.6
Health centre	147	50.0	15.2	17.0
Hospitals	45	15.3	6.2	6.4

Source: PETS/SDI (2012)

5. Results and Discussions

5.1 Inputs

Infrastructure availability

Service delivery is enhanced significantly by the availability of health infrastructure. This includes source of power, clean water and improved toilet. In the study, availability of infrastructure means a facility has electricity (any source), clean water and improved toilet. An improved toilet is defined as having a functioning flush toilet, VIP latrine or pit latrine covered with slabs. Clean water includes piped water to the facility, unrestricted includes borehole water and water from tanks. An alternative measure of electricity takes into account regular supply (no more than 1 blackout of more than 2 hours long per fortnight).

As mentioned in sector 4, the study developed a composite indicator of the basic health facility infrastructure which includes access to electricity, clean water and toilet facilities. Access to clean water and sanitation (toilets) is important for containing the spread of disease in health facilities, but their availability also provides implicit public health education for the community to emulate.

Table 5.1a: Infrastructure availability at the national level

Category	Mean (%)	Std. Dev. (%)	GINI	95% Conf. interval (%)	
All	46.8	7.8	0.50	30.1	63.6
Private	74.9	6.3	0.36	61.3	88.5
Public	39.3	8.3	0.56	21.5	57.1
Rural	43.4	8.9	0.59	24.2	62.6
Urban	66.9	8.7	0.44	48.2	85.7
Dispensary	38.8	9.3	0.59	18.8	58.8
Health Centre	68.1	5.7	0.22	55.9	80.3
Hospitals	97.0	2.3	0.00	92.0	102.0

Data Source: PETS/SDI (2012)

Analysis by facility type shows that two thirds (68.1%) of health centres and nearly all hospitals (97.0%) meet the minimum infrastructure requirements. This implies that 97 per cent of hospitals had electricity, water and adequate sanitation compared to 68.1 per cent of health centres. While the average estimates of infrastructure availability are relatively positive, when we assess the availability of inputs at the same time in the same facility, we find that only 46.8 per cent of facilities have minimum infrastructure. In terms of ownership, 74.9 per cent of private health facilities compared to 39.3 per cent of public health facilities meet minimum infrastructure requirements. At the county level, Nyandarua

(91%), Kilifi (84%) and Uasin Gishu (80%) counties lead the counties that meet the minimum infrastructure requirements.

The national Gini Coefficient is estimated at 0.50. This reflects a high level of inequality. The Gini Coefficient in rural areas is 0.59 while in urban areas it is 0.44. Thus, while inequality in rural areas is higher to that in urban areas, rural areas have a disproportionately higher population at 67.7 per cent compared with 32.3 per cent in urban areas according to the 2009 Population and Housing census. The Gini coefficient for public health institutions is 0.56 while in private health institutions it is 0.36. This shows that private health institutions are doing better compared to the counterparts in the public sector.

Table 5.1b: Infrastructure availability at the County level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	53	51	0.22
Homa Bay	25	45	0.46
Kilifi	84	38	0.17
Kirinyaga	64	49	0.20
Kitui	14	36	0.50
Makueni	50	51	0.38
Mombasa	49	51	0.31
Nairobi	65	48	0.24
Nakuru	49	51	0.26
Nyamira	6	25	0.67
Nyandarua	91	29	0.19
Siaya	30	47	0.13
Trans Nzoia	35	49	0.11
Uasin Gishu	80	41	0.15
West Pokot	16	37	0.59

Data Source: PETS/SDI (2012)

At the County level, there is a relatively high level of inequality as shown in Table 5.1b. From the above findings and given the increases in population and demand for services, most county's health facilities do not meet minimum infrastructure requirements.

Water

Provision of clean water and sanitation leads to better living conditions, hence reduce incidences of vector-borne and other communicable diseases, resulting in better health for all. Overall, 56.7 per cent of health facilities have access to clean water. Analysis by facility ownership shows that in public health facilities, water is an important infrastructure constrain. But only 49.26 per cent of public facilities have a clean source of water. This was significantly different from private facilities where 84.4 per cent of the facilities had access to clean water source. Urban health facilities outdo the rural counterparts by about 45 per cent points.

Table 5.2a: Facilities with access to clean water at the national level

Category	Mean (%)	SE (%)	GINI	CI-Low (%)	CI-Upper (%)
All	56.67	8.20	0.20	39.09	74.25
Private	84.38	6.00	0.02	71.51	97.26%
Public	49.26	9.08	0.19	29.78	68.74
Rural	50.01	8.67	0.19	31.41	68.60
Urban	95.70	1.67	0.04	92.12	99.27
Dispensary	49.41	9.65	0.19	28.71	70.10
Health Centre	77.46	5.68	0.22	65.28	89.65
Hospitals	98.02	2.09	0.00	93.54	102.50

Data Source: PETS/SDI (2012)

Nearly all hospitals in the country (98.0%) have access to clean water compared to 77.5 per cent of health centres and 49.1 per cent of dispensaries. Provision of clean water is crucial in delivering health services as it ensures a healthy population. The government should therefore move quickly to ensure that nearly all health facilities have access to clean water to be able to contain incidences of vector-borne and communicable diseases.

Table 5.2b: Facilities with access to clean water at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	53.40	51.25	0.22
Homa Bay	25.06	44.52	0.26
Kilifi	84.00	37.79	0.07
Kirinyaga	69.35	47.37	0.41
Kitui	36.92	49.58	0.05
Makueni	54.65	51.15	0.38
Mombasa	98.02	14.31	0.21

Nairobi	97.98	14.30	0.24
Nakuru	50.50	51.45	0.36
Nyamira	6.25	24.91	0.47
Nyandarua	96.73	18.26	0.09
Siaya	94.70	23.02	0.13
Trans Nzoia	37.85	49.99	0.11
Uasin Gishu	82.04	39.50	0.15
West Pokot	18.36	39.84	0.25

Data Source: PETS/SDI (2012)

6.25 per cent of facilities in Nyamira County reported to have access to clean water compared to Mombasa County with 98.0 per cent as the county reporting to have access to clean water. Counties that are urban in nature reported to have access to clean water than rural counties.

Adequate sanitation

Sanitation is an important infrastructural requirement for health facilities to enable them carry out their mandate without running the risk of spreading diseases and infections. The study found the average availability of toilets across all facilities to be high at 95%, the private sector's 97% being two per cent points above the public health facilities.

Table 5.3a: Facilities with adequate sanitation at the national level

Category	Mean (%)	SE (%)	GINI	CI-Low (%)	CI-Upper (%)
All	95.28	3.03	0.20	88.78	101.77
Private	97.17	1.90	0.06	93.11	101.24
Public	94.77	3.54	0.19	87.18	102.36
Rural	98.91	0.75	0.19	97.30	100.53
Urban	73.98	8.60	0.24	55.53	92.42
Dispensary	95.42	3.34	0.19	88.26	102.58
Health Centre	93.03	3.10	0.22	86.37	99.68
Hospitals	99.01	1.01	0.00	96.84	101.19

Data Source: PETS/SDI (2012)

Nearly all hospitals in the country (99.0%) have access to adequate sanitation compared to 93.0 per cent of health centres and 95.4 per cent of dispensaries. Generally, the country does well in provision of adequate sanitation in all types of facilities.

Table 5.3b: Facilities with adequate sanitation at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	100.00	0.00	0.00
Homa Bay	100.00	0.00	0.00
Kilifi	100.00	0.00	0.00
Kirinyaga	100.00	0.00	0.00
Kitui	100.00	0.00	0.00
Makueni	97.70	15.39	0.01
Mombasa	56.44	50.94	0.21
Nairobi	66.42	47.94	0.24
Nakuru	98.71	11.61	0.02
Nyamira	64.47	49.17	0.17
Nyandarua	100.00	0.00	0.00
Siaya	100.00	0.00	0.00
Trans Nzoia	100.00	0.00	0.00
Uasin Gishu	97.56	15.88	0.05
West Pokot	100.00	0.00	0.00

Data Source: PETS/SDI (2012)

A regional analysis of facilities at the county level shows that counties that are considered urban in nature do not have adequate sanitation. The worst performing counties are Mombasa 56.4 per cent, Nyamira 64.5 per cent and Nairobi 66.4 per cent.

Electricity

Access to electricity improves service delivery of health facilities by both increasing service delivery hours and also widening the scope of services that can be offered. About 73 per cent of health facilities reported to have access to electricity as the main source of power, meaning 27 per cent did not have electricity at the national level. In terms of facility ownership, 89.0 per cent of private health facilities have access to electricity compared to 68 per cent of public health facilities. Urban facilities with 95 per cent out-matched rural facilities with 69 per cent reporting to have access to electricity. This implies that urban facilities are likely to open for longer hours thereby increasing service delivery hours than rural facilities.

Table 5.4a: Facilities with access to electricity at the national level

Category	Mean	SE	Gini	CI-Low	CI-Upper
All	73%	5%	0.20	62%	84%
Private	89%	4%	0.06	81%	97%
Public	68%	6%	0.19	55%	82%
Rural	69%	5%	0.19	57%	81%
Urban	95%	1%	0.04	93%	98%
Dispensary	67%	6%	0.19	54%	80%
Health Centre	94%	2%	0.02	89%	99%
Hospitals	100%	0%	0.00	-	-

Data Source: PETS/SDI (2012)

All hospitals have access to electricity, thereby increasing service delivery hours compared to 6 per cent of health centers that do not have electricity and 38 per cent of dispensaries that need to improve on the service delivery hours.

Table 5.4b: Facilities with access to electricity at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	100.00	0.00	0.00
Homa Bay	100.00	0.00	0.00
Kilifi	100.00	0.00	0.00
Kirinyaga	100.00	0.00	0.00
Kitui	100.00	0.00	0.00
Makueni	97.70	15.39	0.01
Mombasa	56.44	50.94	0.21
Nairobi	66.42	47.94	0.24
Nakuru	98.71	11.61	0.02
Nyamira	64.47	49.17	0.17
Nyandarua	100.00	0.00	0.00
Siaya	100.00	0.00	0.00
Trans Nzoia	100.00	0.00	0.00
Uasin Gishu	97.56	15.88	0.05
West Pokot	100.00	0.00	0.00

Data Source: PETS/SDI (2012)

All health facilities in Uasin Gishu County have access to electricity compared to Siaya and Trans Nzioa counties which have 35.6 per cent and 41.7 per cent that reported to have access to electricity at the regional level.

Medical equipment

The Kenya Medical Supplies Agency (KEMSA) is responsible for the procurement, distribution and proper use of medical supplies and medicines in public health facilities. However, the greatest challenge relates to the shortage of essential medicines and non-pharmaceuticals due to supply chain management.

As mentioned in section 3, medical equipment is the medical supplies indicator which focuses on the availability of minimum equipment expected at a facility. This means the facility has all of the following equipment functioning and were observed: adult, child and infant weighting scales, stethoscope, sphygmometer and thermometer. Alternatively, a facility has to have a child or an infant scale, adult scale, thermometer, sphygmometer, sterilizing equipment and refrigerator.

Table 5.5a: Minimum medical equipment at the national level

Category	All six items				Plus sterilizing equipment and refrigerator			
	Mean (%)	SE (%)	95% Conf. interval (%)		Mean (%)	SE (%)	95% Conf. interval (%)	
All	46.8	7.8	30.1	63.6	22.8	4.9	12.3	33.3
Private	74.9	6.3	61.3	88.5	33.7	9.6	13.1	54.2
Public	39.3	8.3	21.5	57.1	19.8	5.4	8.2	31.4
Rural	43.4	8.9	24.2	62.6	19.0	5.1	8.1	29.9
Urban	66.9	8.7	48.2	85.7	44.4	7.9	27.6	61.3
Dispensary	38.8	9.3	18.8	58.8	13.9	4.7	3.8	24.1
Health Center	68.1	5.7	55.9	80.3	47.1	7.1	31.9	62.3
Hospitals	97.0	2.3	92.0	102.0	70.7	5.9	58.0	83.3

Data Source: PETS/SDI (2012)

Nationally, 46.8 per cent of health facilities meet the minimum medical equipment requirement, meaning that 53.2 per cent are not capable of measuring important human biometrics (temperature, weight, heart beat and heart rate) therefore affecting the likely diagnosis the health workers prescribe. The situation is compounded when we add sterilizing equipment and refrigerator which shows that 77.2 per cent do not meet minimum medical equipment requirement.

There is a significant difference in the aggregate equipment indicator between public and private health facilities as shown in Table 5.5a. The availability of sterilization equipment is the most constraining piece of equipment comprising the aggregate indicator. Hospitals outperformed other types of health facilities with 97.0 per cent having all six items compared to health centres 68.1 per cent and dispensaries 38.8 per cent.

Regional analysis shows that urban facilities out-matched rural facilities by 23.5 per cent. In terms of service delivery and equity one is likely to have the correct diagnosis arrived at in urban health facilities compared to rural health facilities based on equipment availability. At the county level, Kilifi (95%) and Trans Nzoia (79%) lead the counties that meet the minimum equipment expected in a facility. From a service delivery and equality point of view, it means that proper diagnosis is likely to be arrived at in these counties compared to Siaya 10 per cent, Nyamira 11 per cent and West Pokot 12 per cent that do not have minimum medical equipment.

Table 5.5b: Minimum medical equipment at the County levels

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	35	49	0.46
Homa Bay	57	51	0.35
Kilifi	95	22	0.09
Kirinyaga	49	51	0.51
Kitui	66	49	0.44
Makueni	50	51	0.50
Mombasa	37	50	0.32
Nairobi	41	50	0.39
Nakuru	54	51	0.54
Nyamira	11	32	0.39
Nyandarua	18	39	0.56
Siaya	10	31	0.42
Trans Nzoia	79	42	0.20
Uasin Gishu	14	36	0.44
West Pokot	12	33	0.57

Data Source: PETS/SDI (2012)

Drug availability

Drug supplies are distributed to health facilities under the KEMSA pull system. Previously, KEMSA used two mechanisms: the Push system and the Pull system. Under the push system, the agency pre-packaged supplies in structured universal drug kits, which were delivered to facilities against their drugs budget allocation of drawing rights. In the pull system, health facilities requisition specific supplies which are checked off against their budget allocation.

On average, health facilities had 50.8 per cent of tracer drugs available. Given the national concern about infant and maternal mortality, this finding is very

disappointing. The tracer drugs were relatively high in hospitals, 66.9 per cent compared to health centres 54.4 per cent and dispensaries 48.8 per cent. It is commonly reported that rural facilities suffer severe drug shortages compared to their urban counterparts. There is evidence to support this. In fact, it is only 50.1 per cent of rural health facilities compared to 54.9 per cent of urban health facilities that have all tracer drugs. Private health facilities performed slightly better than public facilities, with 56.2 per cent of tracer drugs available compared to public facilities which had 49.4 per cent of drugs available.

Table 5.6a: Tracer drug (all) availability at the national level

Category	Mean (%)	Std. Dev. (%)	GINI	95% Conf. interval (%)	
All	50.8	1.3	0.12	48.0	53.6
Private	56.2	1.9	0.13	52.1	60.2
Public	49.4	1.5	0.11	46.1	52.6
Rural	50.1	1.4	0.11	47.0	53.2
Urban	54.9	2.5	0.16	49.6	60.3
Dispensary	48.8	1.6	0.10	45.3	52.3
Health Centre	54.4	1.6	0.13	50.9	57.9
Hospitals	66.9	2.4	0.11	61.7	72.1

Data Source: PETS/SDI (2012)

From service delivery and equality perspective, not a single health facility – including first level hospitals – had all the tracer drugs for children and women. The result at the national level is also a reflection of what is happening at the County level as show in the Table 5.6b. Most counties reported to have over 50 per cent of all tracer drugs except Siaya 42 per cent, Kitui 44 per cent Nairobi 45 per cent, Kirinyaga 47 per cent and Trans Nzoia 49 per cent.

Table 5.6b: Tracer drug (all) availability at the County level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	50	15	0.15
Homa Bay	50	9	0.09
Kilifi	56	11	0.06
Kirinyaga	47	9	0.08
Kitui	44	7	0.06
Makueni	50	10	0.11
Mombasa	53	13	0.12
Nairobi	45	18	0.23
Nakuru	50	13	0.13

Nyamira	58	9	0.08
Nyandarua	51	11	0.10
Siaya	42	12	0.13
Trans Nzoia	49	12	0.11
Uasin Gishu	56	7	0.06
West Pokot	55	9	0.08

Data Source: PETS/SDI (2012)

Communication equipment

Communication equipment enables health facilities to communicate with other health facilities and the outside world in cases of emergency, information transmission, among others. As mentioned in section 3, the study explored the availability of a composite set of functioning office equipment (radio; phone; computer) and found 79 per cent of the facilities to have communication equipment. All hospitals had communication equipment compared to 76 per cent of the dispensaries. Additionally surprising was that rural facilities outperformed the urban facilities, and that public facilities also outperformed private facilities by 20 per cent points. The distribution of office equipment across facility types shows that hospitals are better equipped.

Table 5.7a: Facilities with communication equipment at the national level

Category	Mean (%)	Std. Dev. (%)	GINI	CI-Low (%)	CI-Upper (%)
All	79.09	5.95	0.20	66.33	91.84
Private	65.23	8.84	0.26	46.28	84.19
Public	82.79	6.64	0.19	68.55	97.03
Rural	79.82	6.34	0.19	66.22	93.42
Urban	74.78	12.19	0.24	48.65	100.92
Dispensary	75.56	7.69	0.19	59.06	92.07
Health Centre	88.82	3.15	0.22	82.07	95.56
Hospitals	100.00	0.00	0.00	-	-

Data Source: PETS/SDI (2012)

Regionally, Homa Bay 28.8 per cent, Bungoma 28.9 per cent and Nyamira 31.8 per cent have the least facilities with communication equipment. From the service delivery and equality perspective, few facilities in these counties are able to communicate and get information from the outside world.

Table 5.7b: Facilities with communication equipment at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	28.91	46.58	0.22
Homa Bay	28.80	46.52	0.26
Kilifi	96.00	20.20	0.07
Kirinyaga	82.42	39.11	0.10
Kitui	97.23	16.86	0.05
Makueni	95.52	21.25	0.28
Mombasa	49.50	51.37	0.21
Nairobi	92.50	26.75	0.24
Nakuru	91.67	28.44	0.26
Nyamira	31.80	47.85	0.17
Nyandarua	96.73	18.26	0.09
Siaya	57.58	50.78	0.13
Trans Nzoia	97.70	15.46	0.11
Uasin Gishu	76.87	43.39	0.15
West Pokot	93.36	25.62	0.25

Data Source: PETS/SDI (2012)

Emergency transport

A referral system as provided by the Kenya Essential Package for Health (KEPH) framework expects that patient cases that cannot be handled by lower level facilities be referred up the service delivery pyramid, making the availability of ambulance services critical. The finding of the study shows that 13 per cent of the facilities had a vehicle designated for emergency transportation. The study found that within the referral system, hospitals lead in facilities that have emergency transport. This is consistent with the Ministry of Health's policy to station ambulances at hospitals, which lower level facilities – health centres and dispensaries – can call upon on the basis of need in the case for public health facilities. This explains why 92.4 per cent of hospitals have emergency transport compared to 19.5 per cent of health centres and 5.7 per cent of dispensaries.

In terms of ownership 30.6 per cent of private health facilities have access to emergency transport compared to 8.5 per cent of public health facilities.

Table 5.8a: Facilities with emergency transport at the national level

Category	Mean (%)	Std. Dev. (%)	CI-Low (%)	CI-Upper (%)
All	13.12	2.47	7.82	18.42
Private	30.55	10.29	8.49	52.62
Public	8.46	1.39	5.46	11.45
Rural	8.90	2.05	4.51	13.29
Urban	37.86	3.57	30.22	45.51
Dispensary	5.67	2.42	0.48	10.85
Health Centre	19.50	3.81	11.34	27.66
Hospitals	92.36	3.38	85.10	99.62

Data Source: PETS/SDI (2012)

Urban counties - Nairobi, Mombasa and Nakuru - lead in facilities that have emergency transport due to their population densities and good road networks. 37.9 per cent of urban facilities have access to emergency transport compared to 8.9 per cent in the rural areas.

Table 5.8b: Facilities with emergency transport at the county level

County	Mean (%)	Std. Dev. (%)
Bungoma	12.48	33.96
Homa Bay	11.11	32.29
Kilifi	7.00	26.30
Kirinyaga	6.72	25.72
Kitui	9.57	30.23
Makueni	9.18	29.67
Mombasa	32.67	48.19
Nairobi	32.22	47.45
Nakuru	30.26	47.27
Nyamira	5.70	23.82
Nyandarua	10.24	31.15
Siaya	12.63	34.12
Trans Nzoia	10.23	31.24
Uasin Gishu	14.66	36.39
West Pokot	7.77	27.54

Data Source: PETS/SDI (2012)

Number of health workers

The health sector is a labour-intensive sector. The distribution of health workers at the national level shows that there are more health workers in hospitals compared to lower levels of healthcare which is implied by policy. Private health facilities have an average of 7 health workers; one -more than public health facilities which have an average of 6 health workers. From service delivery point of view, this implies that public health institutions are less likely to deliver quality services.

Table 5.9a: Distribution of health workers at the national level

Category	Mean	Std. Dev.	Gini	95% Conf. interval	
All	5.87	0.70	0.55	4.37	7.38
Private	6.71	1.06	0.52	4.45	8.98
Public	5.65	0.70	0.55	4.15	7.15
Rural	4.49	0.47	0.50	3.49	5.49
Urban	13.97	1.90	0.47	9.88	18.05
Dispensary	3.31	0.51	0.38	2.21	4.40
Health Centre	9.33	0.98	0.36	7.23	11.43
Hospitals	30.01	3.29	0.26	22.95	37.07

Data Source: PETS/SDI (2012)

Health worker distribution at the County level shows that the average number of health workers is high in Nairobi and Mombasa counties with an average of 16 and 11, respectively. Kitui and West Pokot counties reported the least average number of health workers of 3 and 4 health workers, respectively, implying there is a severe shortage in certain counties in Kenya.

The national Gini Coefficient is estimated at 0.55. This reflects a high level of inequality. The Gini Coefficient in rural areas is 0.50 while in urban areas it is 0.47. Thus, while inequality in urban areas appears lower to that in rural areas, rural areas have a disproportionately higher population at 67.7 per cent compared with 32.3 per cent in urban areas, according to the 2009 Population and Housing census. The Gini coefficient for public health institutions is 0.55 while in private health institutions 0.52. Thus, while inequality in private institutions appears similar to that of public health institutions, there is room for improvement.

Table 5.9b: Distribution of health workers at the County level

County	Mean	Std. Dev.	GINI
Bungoma	8.97	10.43	0.46
Homa Bay	5.58	5.00	0.35
Kilifi	6.70	12.54	0.59
Kirinyaga	5.75	9.42	0.51
Kitui	3.12	4.40	0.44
Makueni	3.80	4.97	0.50
Mombasa	10.66	7.35	0.32
Nairobi	15.93	11.55	0.39
Nakuru	4.91	5.96	0.54
Nyamira	3.75	4.12	0.39
Nyandarua	5.27	8.74	0.56
Siaya	4.95	4.58	0.42
Trans Nzoia	9.77	10.28	0.40
Uasin Gishu	4.26	5.27	0.44
WEST POKOT	3.59	7.61	0.57

Data Source: PETS/SDI (2012)

The national profile presented here shows that there are an average of 6 health workers in Kenya, distributed unequally between counties. They are found predominantly in counties that are more urbanized.

Kilifi, West Pokot, Nyandarua and Nakuru counties with Gini Coefficients of 0.59, 0.57, 0.56 and 0.54, respectively, have the highest levels of inequality compared to the others. These inequalities at the national level have a negative impact on the sector's capacity to deliver services in the counties. Due to this challenge, the health outcomes are likely to be different, the provision for health as a basic human right as enshrined in the 2010 constitution will require fundamental transformation to signify the change in the health sector, with major implications for human resources for health.

5.2 Provider Effort

Caseload per clinician per day

The term case load rather than work load is used to acknowledge the fact that the full workload of a health provider includes work that is not captured in this measure, such as administrative work. From a perspective of a patient visiting

a health facility, caseload is arguably the critical important measure of service delivery.

This is usually of concern because a shortage of health workers may cause case load to rise and potentially compromise the service delivery quality. The outpatient caseload indicator as previously defined is the number of outpatient visits (recorded in outpatient records) in the three months prior to the survey, divided by the number of days the facility was open during the three months, divided by the number of days the facility was open during the period and the number of health workers who conduct patient consultations.

The findings show that the country average case load is 9.0 patients per provider per day, and the case load for dispensaries was higher at 9 caseloads compared to 7 caseloads per day at health centres. The average caseload among private providers was 10.4 patients per provider per day, slightly higher than the average in public facilities (8.7 per provider per day), although the difference was not statistically significant. The distribution of this variable was quite skewed, and the median caseload in public facilities was even lower. The caseload for 50 per cent of health providers was 7 patients per day or less. Case load across facility types may vary; therefore, it is worth looking at comparisons by level of facility. The highest caseload was found in hospitals and dispensaries.

Table 5.10a: Caseload per clinician per day at the national level

Category	Mean	Std. Dev.	GINI	95% Conf. interval	
All	9.0	0.95	0.38	7.0	11.1
Private	10.4	1.69	0.47	6.7	14.0
Public	8.7	0.9	0.35	6.7	10.6
Rural	8.8	0.98	0.35	6.7	10.9
Urban	10.2	2.51	0.52	4.8	15.6
Dispensary	9.3	1.11	0.35	6.9	11.7
Health Centre	7.3	0.98	0.46	5.2	9.4
Hospitals	10.1	1.31	0.42	7.30	13.0

Data Source: PETS/SDI (2012)

The finding suggests that a large share of health providers, especially those in moderately sized facilities have very low case load levels. It is worth noting that the caseload indicator did not take into account the staff absence rates. This may explain why health workers who are present at work seem to show that their true workload is higher than these numbers suggest.

Providers at some counties, however, have higher caseloads. For example, the average caseloads at the County levels show that Nairobi, Nakuru and Kilifi

counties have 20, 16 and 14 case loads per day, respectively, while Siaya, Homa Bay and Bungoma counties reported the least number of case loads of 5 per day.

The national Gini Coefficient of caseload per clinician per day is 0.38. The Gini Coefficient in private health facilities is 0.47 while in public health facilities it is 0.35. Inequality in public facilities is lower than that of private health facilities.

The Gini coefficient for urban areas is 0.52, reflecting a high level of inequality while in rural areas the Gini is 0.35. This shows that the case load for health workers per day working in urban areas is very unequal compared to those in the rural areas. Providers at facilities in urban areas have higher case loads. For a large share of health providers, especially those in health centres which account for half of the facilities in the country, there are high levels of inequalities with a Gini index of 0.46 compared to a Gini index of 0.35 for dispensaries. Comparisons of findings between counties provide some context: inequalities in case loads per day in Nairobi and Mombasa are very high compared to other counties due to population density per square kilometre as shown in Table 5.10b.

Table 5.10b: Caseload per clinician per day at the County level

County	Mean	Std. Dev.	GINI
Bungoma	5.38	2.71	0.19
Homa Bay	5.33	3.17	0.26
Kilifi	13.55	4.64	0.14
Kirinyaga	9.17	5.08	0.27
Kitui	10.59	4.02	0.18
Makueni	5.88	3.10	0.24
Mombasa	7.06	11.32	0.49
Nairobi	19.18	17.53	0.48
Nakuru	16.35	13.09	0.38
Nyamira	7.49	4.11	0.29
Nyandarua	7.48	3.21	0.21
Siaya	5.26	2.98	0.29
Trans Nzoia	5.55	4.54	0.31
Uasin Gishu	7.80	3.95	0.26
West Pokot	7.19	7.08	0.27

Data Source: PETS/SDI (2012)

For a large share of health providers, there are very low case load levels of about 7 patients per provider. One may ask why do health workers who are present for work feel that their true caseload is higher than these numbers suggest? Or why in some counties is the true caseload higher than these numbers suggest? This is

partly because of the relatively high absence rate, causing the burden of work to fall on a smaller number of staff than necessary.

Absence from the health facility

Absenteeism is based on unannounced visits. This is the average rate of absenteeism at a facility measured from the presence of at most 10 random selected health workers at a facility during the unannounced visit. The main indicator restricts this to workers who are supposed to be on duty only. Health workers at hospitals were not included, while health workers in the field (mainly community and public health workers) were counted as present. The absence indicator for hospitals was not estimated for hospitals because of the complex off-duty arrangements and inter-departmental shifts.

Close to a third (29.2%) of public health providers were found to be absent, compared to a fifth (20.9%) among private health providers. Absence was particularly high in urban facilities where 31.2 per cent were absent compared to 26.9 per cent in rural areas.

Table 5.11a: Absence from health facility at the national level

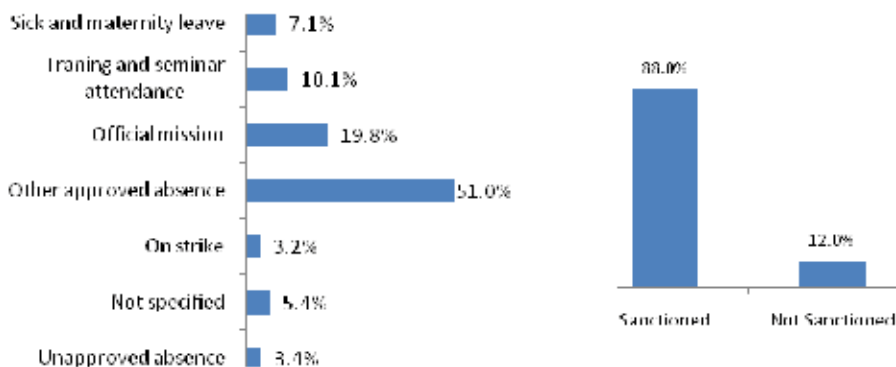
Category	Mean (%)	SE (%)	GINI	95% Conf. interval (%)	
All	27.5	4.7	0.20	17.4	37.6
Private	20.9	4.2	0.26	12.0	29.8
Public	29.2	5.7	0.19	16.9	41.5
Rural	26.9	5.1	0.19	15.9	37.9
Urban	31.2	2.1	0.24	26.7	35.8
Dispensary	25.5	5.5	0.19	13.8	37.2
Health Centre	37.5	3.8	0.22	29.3	45.7
Hospitals	10.1	1.31	0.42	7.30	13.0

Data Source: PETS/SDI (2012)

The national Gini Coefficient on absenteeism of health workers in Kenya is 0.20, which is relatively low. The Gini Coefficient in private health facilities is 0.26 while in public health facilities it is 0.19. Thus, while inequality in public facilities appears lower to that of private health facilities, most health workers in private health facilities have more case loads compared to their counterparts in private health facilities who work in shifts at different times of the day compared to public health workers who work full time. The Gini coefficient for absenteeism in urban areas is 0.24, while in rural areas the Gini is 0.19. This shows that absenteeism in urban areas is relatively more unequal compared to the rural areas.

In any workplace, absence may be sanctioned or not sanctioned. But, from the consumer’s perspective, the health providers are not available to deliver services-whether sanctioned or not. This suggests that health facility management improvement and better organization and health worker management can potentially improve the availability of staff service delivery.

Figure 5.1: Reasons for absence



Data Source: PETS/SDI (2012)

The findings show that 88 per cent who were absent at the time of the unannounced visit were sanctioned by the health facility management. This varied from 51 per cent who were on other approved absence to 3.2 per cent of health workers who were on strike as shown in Figure 5.1.

The caseload and absence of health workers is to some degree influenced by service utilization and demand-side factors. This may be a contributor to lower caseload in some counties but we also see that absence in some counties is quite high, for example, in Trans Nzoia, Siaya, and Kilifi counties which recorded the highest rate of absenteeism of 69, 54 and 52 per cent, respectively with West Pokot reporting the least level of absenteeism at 8 per cent. At the County level, the findings show that absenteeism is more unequal in Makueni, Nakuru, West Pokot, and Homa Bay than Kitui, Trans Nzoia and Siaya which have the least levels of inequality as shown in Table 5.11b.

Table 5.11b: Absence from health facilities at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	36	19	0.22
Homa Bay	36	24	0.26
Kilifi	52	28	0.07
Kirinyaga	37	22	0.10
Kitui	36	23	0.05
Makueni	17	30	0.28
Mombasa	41	18	0.21
Nairobi	36	20	0.24
Nakuru	27	33	0.26
Nyamira	52	21	0.17
Nyandarua	39	22	0.09
Siaya	54	16	0.13
Trans Nzoia	69	27	0.11
Uasin Gishu	49	17	0.15
West Pokot	8	21	0.25

Data Source: PETS/SDI (2012)

Taken together, the findings on absence and caseload suggest that there is an urgent need to improve the management of health facilities. Workers need to be supervised and to be accountable to the time they spend in health facilities.

6. Summary, Conclusion and Policy Recommendations

6.1 Summary

The four most important inputs to a health care system are finance, infrastructure, human resources, and drugs and medical supplies. Service delivery monitoring has immediate relevance for the management of health services, which distinguishes this area from other health systems building blocks. Shortage of medicines, uneven distribution of health services, and the low availability of equipment or guidelines must all be taken into account as part of basic service management.

The service delivery indicators show that the country does relatively well on the availability of key inputs such as infrastructure and medical equipment. On measures of case loads by providers, the results were less positive. Regarding the availability of drugs, there are some important gaps: only two thirds of tracer drugs are available, and some gaps remain especially in the availability of tracer drugs for mothers and children. The greatest challenge is in the area of provider effort as shown by absenteeism data. This shows that there is room for improvement in efficiency of spending on human development, and is a reflection of systemic problems.

Despite impressive achievements, the health sector is faced with various challenges. Essential infrastructure and the provision of health services remain uneven and the sector continues to face the challenge in geographical distribution. Many health facilities are not adequately equipped according to best practice norm and standards. Inadequate financing of the sector for infrastructure, human resources and health commodities is another challenges, as well as existence of regional disparities in the distribution of existing workers.

The delivery of improved health care at the local level is one of the biggest challenges facing the County governments. There are high expectations from citizens, given that basic rights are enshrined in the Constitution, and yet higher challenges to attract and retain staff needed to deliver better health services in the areas that require the most. There are certain advantages and disadvantages to devolving responsibility for healthcare to the County governments that should be taken into consideration if the County governments are to deliver on healthcare.

6.2 Conclusion

The service delivery indicators have shown that the country is doing relatively well on the availability of key inputs such as infrastructure and medical equipment which have low Gini Coefficients. On measures of productivity and efficiency, the results are less positive and whave high Gini Coefficients. Regarding the availability

of drugs, there are some important gaps: only two thirds of the tracer drugs are available, and some gaps remain especially in the availability of tracer drugs for mothers. The greatest challenge is in the area of provider effort (evidenced by provider absence data). High provider absence leading to high case loads for those in health facilities suggests room for improvement in efficiency of spending on human development and reflects systemic problems. It is also important to note that some counties are consistent in performing well in almost all the indicators analyzed; these include: Uasin Gishu and Kilifi, while on the other hand counties such as West Pokot and Homa Bay are persistently recording poor performance in nearly all indicators.

The average percentage of tracer drugs for women available in public facilities remains low at 40 per cent. It is commonly reported that rural health facilities suffer severe drug shortages compared to their urban counterparts. In Kenya, the Service Delivery Indicators results did not support this. The two areas where the public sector did not perform well on the availability of inputs – clean water source and tracer drugs for women – was where the public-private differences were noted the most. The share of private facilities with a clean water source was 35 per cent more than public facilities. In private facilities, the average tracer drugs for women was 30 per cent higher compared to public facilities.

On measures of provider effort, the results were less positive. The average case load in public health facilities is low at 9 patients per provider per day, and the case load for half of health providers was less than 7 patients per day. Close to two thirds (29.2%) of providers in public facilities were found to be absent on an announced visit.

6.3 Recommendations

Making adequate health care services universally available has always called for striking of a delicate balance between population's health needs and available resources. It also requires equitable and efficient allocation and use of those resources. The following recommendations are important when aiming to improve equitable service delivery in healthcare provision:

- Improve on provider effort especially in supervision of health professionals. Service provider absenteeism is a widespread problem in the country and the health sector needs to address this problem urgently to improve equality and service delivery in the sector. High levels of absenteeism lead to high case loads for health workers left at the health facility, therefore influencing service delivery and equality in areas that absenteeism is rampant.

- Establish sustainable long term solutions for health service delivery, County and National governments need to take coordinated actions towards strengthening health systems and increasing equitable access to effective healthcare.
- On essential medicines for mothers and children, the government should revisit the existing centralized procurement and distribution arrangements in light of the ongoing devolution, ensuring that counties have autonomy to order essential medicines based on their needs and have alternative options to do so while ensuring principles of economy, quality and rational use.
- Repair and maintain existing infrastructure and equipment. The country health infrastructure and equipment needs regular routine maintenance of key installations, equipments and infrastructure that have not exhausted their usefulness.

6.4 Limitation of the Study and Areas for Further Research

Indicators of service availability cannot, of course, accurately reflect access to services. True indicators of access need to measure the proportion of the population living within a specified travel time and/or distance from a health facility.

This paper profiles four instruments used for health facility assessment, and specifies their management utility and samples 15 of the 47 counties in Kenya. The instruments included are service provision assessment, facility audit of service quality, health facility census and service availability mapping. It focuses particularly on the physical availability of services, which serves as a starting point for determination of methods of service delivery. Further research on general service readiness could build in the service delivery literature, specifically on standard precautions for prevention of infections and laboratory tracer items. Further research could also be informed by including analysis in counties in the northern frontier which have historically been disadvantaged in the provision of services and allocation of resources.

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Appendix

Appendix 1: Tracer drugs for mothers

Table 1a: Tracer drugs (for mothers) availability at the National level

Category	Mean (%)	SE (%)	GINI	CI-Low (%)	CI-Upper (%)
All	40.78	1.35	0.17	37.87	43.68
Private	46.13	2.07	0.17	41.69	50.57
Public	39.33	1.81	0.17	35.45	43.21
Rural	39.61	1.49	0.16	36.41	42.81
Urban	47.63	2.63	0.20	42.00	53.27
Dispensary	38.41	1.62	0.15	34.94	41.87
Health Centre	45.07	2.31	0.19	40.12	50.03
Hospitals	60.44	3.33	0.15	53.30	67.59

Data Source: PETS/SDI (2012)

Table 1b: Tracer dugs (for mothers) availability at the County level

County	Mean (%)	Std. Dev.	GINI
Bungoma	39	17	0.23
Homa Bay	37	9	0.09
Kilifi	49	12	0.08
Kirinyaga	40	11	0.13
Kitui	33	9	0.11
Makueni	37	13	0.18
Mombasa	46	16	0.18
Nairobi	38	18	0.26
Nakuru	40	19	0.24
Nyamira	47	10	0.11
Nyandarua	39	13	0.16
Siaya	29	14	0.23
Trans Nzoia	38	13	0.15
Uasin Gishu	45	9	0.10
West Pokot	44	8	0.09

Data Source: PETS/SDI (2012)

Appendix 2: Tracer drugs for children

Table 2a: Tracer drugs (for children) availability at the National level

Category	Mean (%)	SE (%)	GINI	CI-Low (%)	CI-Upper (%)
All	70.55	1.90	0.10	66.46	74.63
Private	74.81	2.34	0.12	69.80	79.82
Public	69.40	2.09	0.09	64.91	73.88
Rural	70.73	2.11	0.10	66.20	75.27
Urban	69.45	2.54	0.14	64.01	74.88
Dispensary	69.34	2.37	0.10	64.26	74.43
Health Centre	72.96	1.42	0.11	69.90	76.01
Hospitals	79.95	2.29	0.09	75.04	84.85

Data Source: PETS/SDI (2012)

Table 2b: Findings on tracer dugs (for children) availability at the county level

County	Mean (%)	Std. Dev. (%)	GINI
Bungoma	71.07	10.54	0.07
Homa Bay	75.18	14.10	0.10
Kilifi	68.69	14.88	0.08
Kirinyaga	62.17	13.33	0.11
Kitui	66.63	9.64	0.07
Makueni	73.97	11.93	0.07
Mombasa	67.20	13.45	0.09
Nairobi	60.62	24.44	0.22
Nakuru	70.98	10.69	0.07
Nyamira	80.95	8.54	0.05
Nyandarua	75.34	9.56	0.06
Siaya	68.66	11.23	0.08
Trans Nzoia	70.81	14.17	0.10
Uasin Gishu	77.37	8.08	0.03
West Pokot	77.40	13.60	0.09

Data Source: PETS/SDI (2012)

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