

# Treated but not healed: a look at Nairobi's healthcare system

Opportunities for the private sector

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## Executive summary

Nairobi is the center of economic production in Kenya, within over 20% of Kenya's GDP generated within its 700 square kilometers. The county's investment in healthcare is equally as impressive with 32% of the country's doctors based in the county and upto its spending on disease programs upto 13 times higher than other counties.

Health outcomes in the county do not match, however. Maternal mortality, tuberculosis rates and malaria prevalence rates are worse than the national average. This is despite the county having the third highest care utilization rates in the county as well as the highest rate of skilled birth attendance across the nation.

The county's healthcare system is plagued with high costs for patient care, weak technical awareness on the patients, low drug availability and weak healthcare staff quality. Some of the underlying causes for these issues are a) **principal-agent incentive misalignment between doctors and patients**, b) **inadequate supply of skilled labor in the healthcare sector**, c) **low investment and training in health management information systems** and d) **weak drug price discovery channels**.

This paper is an attempt to investigate possible niches that could be taken to create better partial equilibria in the county's health system. Health is a complex system and while a lot of the interventions proposed here work in parts of the system, a lasting shift in the general equilibrium would also need a thrust via health and non-health factors such as infrastructure, sanitation and economic opportunity growth (McKeown 1979)

The analysis lays out possibilities for a for-profit social enterprise to intervene in the county's healthcare system to cause change. Two options are offered: a consumer-facing drug group purchasing organization and a digital technical supervision toolkit with public ranking of hospitals. Taking advantages of the constitutional requirement for mandatory supervision of health facilities as well as the amendment of the Kenya Medical Supplies Act to allow public facilities to buy from private suppliers, afyakit stands a good chance to use technology along

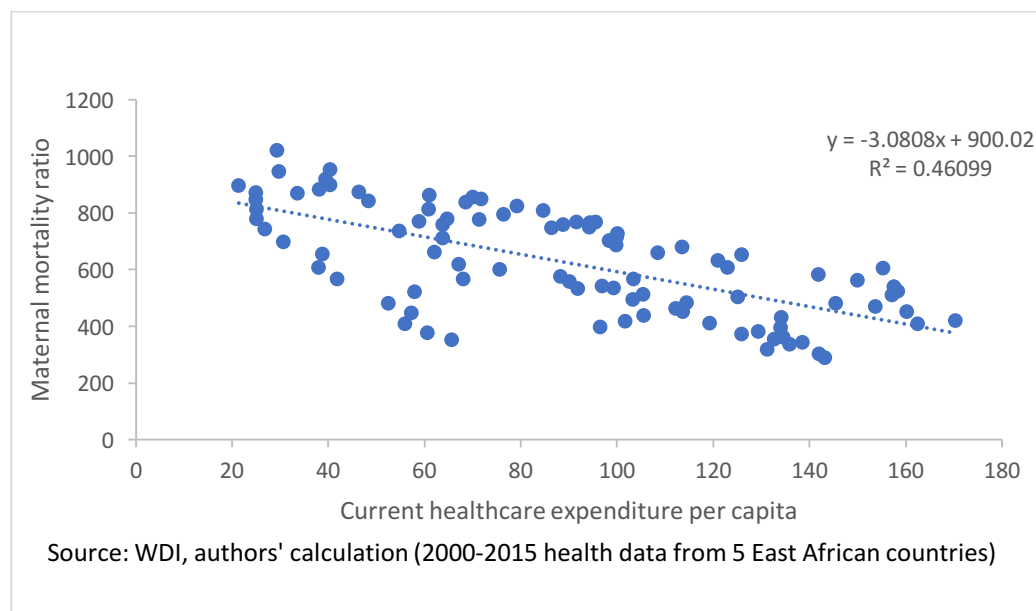
with leveraging the existing ecosystem of county health management teams and health facility managers to drive change.

### Motivation

Poor countries tend to be unhealthy, and unhealthy countries tend to be poor. Across the world, improvements in health have corresponded with increases with income. Health is a kind of human capital and goes into producing other forms of human capital. The ability to productively work as well as the incentive to invest in other forms of human capital such as education are largely affected by how healthy one feels and is. Shastry and Weil (2003) note that accounting for health differences across countries increases by one-third the explanatory power of human capital for differences in per-capita income.

Investment in healthcare supply are crucial for healthcare outcomes. Much like the question about health being a determinant of income, the jury could be said to be out on whether quality supply of healthcare influences health outcomes or is it necessarily a demand-driven phenomenon. That said it would be tough to ignore evidence of how healthcare supply interventions such as the provision of health services like hospitals and clinics have allowed for the population to access care that they need and off that, better health outcomes have been realized. The author's calculations show that an increase of a dollar in per capita healthcare expenditure results in a drop of 3 maternal deaths per 100,000 population.

Figure 1: Investment in healthcare is associated with better health outcomes<sup>1</sup>



**Nairobi is East Africa's bastion of economic success. With a population of close over 4 million**, the city's contribution to Kenya's GDP is estimated at 20% of the national gross product<sup>2</sup>, with its metropolitan region around it accounting for up to 60% of the country's gross product.<sup>3</sup> On the back of technology innovation and a fast-growing, well-educated population, Nairobi is rightfully dubbed the "Silicon Savannah".

**The county invests significantly a lot of resources in healthcare compared to other counties in Kenya.** The average healthcare spending per capita is 1745 Kenya Shillings compared to the national average of 1585 Kenya Shillings.<sup>4</sup> The city additionally has 14 doctors per 100,000 people compared to 10 for the rest of the country. 32% of all doctors in Kenya work in Nairobi.<sup>5</sup> The county's healthcare insurance coverage is at 35.2% way higher than the national average of 26.7%.<sup>6</sup> For all the resources invested in the county, it remains unknown what could be inhibiting the production of good health outcomes.

<sup>1</sup> The outcomes are yearly observations by countries in the region between 2000 and 2015.

<sup>2</sup> Tom Bundervoet, Laban Maiyo, and Apurva Sanghi, *Bright Lights, Big Cities: Measuring National and Subnational Economic Growth in Africa from Outer Space, with an Application to Kenya and Rwanda*, Policy Research Working Papers (The World Bank, 2015), <https://doi.org/10.1596/1813-9450-7461>.

<sup>3</sup> *ibid*

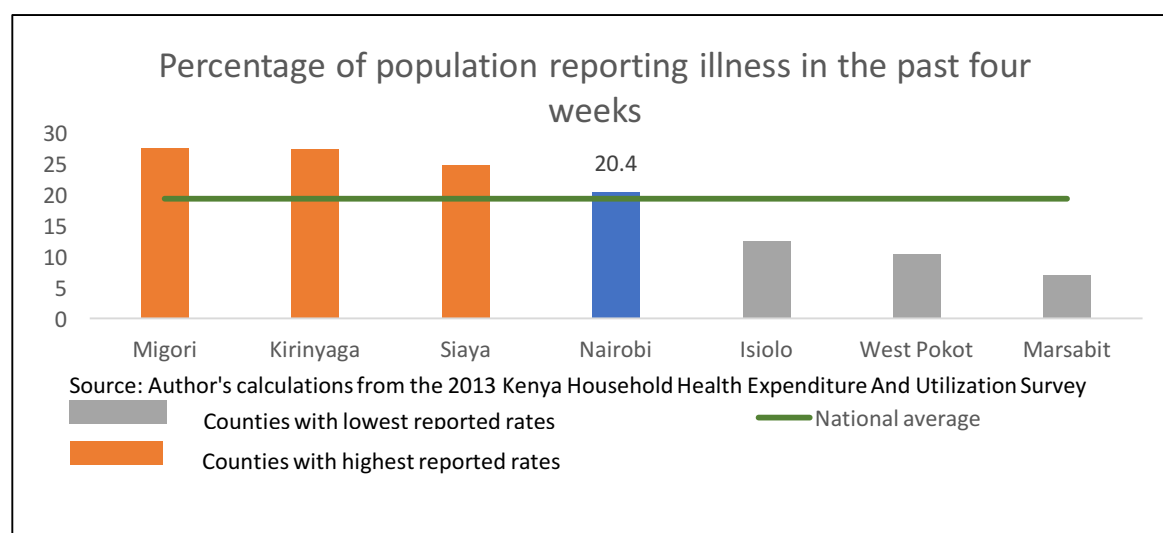
<sup>4</sup> Nairobi County expenditures books 2014/2015

<sup>5</sup> Kenya Health Workforce Report: The Status of Healthcare Professionals in Kenya, 2015

<sup>6</sup> NHIF; current (2014) projections based on 2012 data

Under this veneer of economic success, is the picture of a city that ails badly. Looking through the lens of health outcomes, Nairobi is hardly distinguishable from far less impoverished and resource-poor counties in Kenya. Pneumonia, cancer and tuberculosis account for close to 20% of all deaths in Kenya's largest metropolis.<sup>7</sup> Tuberculosis, for example, is a major disease which the Kenyan government is working hard to eliminate. The tuberculosis prevalence in the county is at 405 persons per 100,000 people, twice as high as the national average and perhaps more seriously the rate of new TB cases annually per 100,000 population is at 156, compared to 79 nationally.<sup>8</sup>

Figure 2: Nairobi has average health outcomes compared to other counties in Kenya

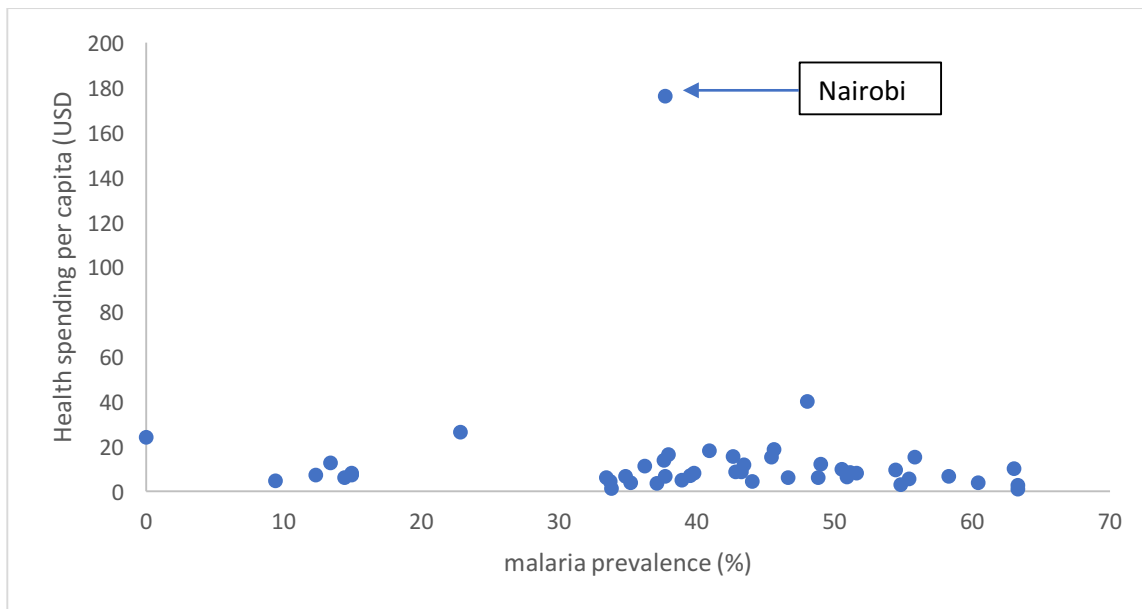


<sup>7</sup> County Statistical Abstract, Nairobi 2015

<sup>8</sup> Kenya National TB, Leprosy and Lung Disease Unit Annual Report, 2013

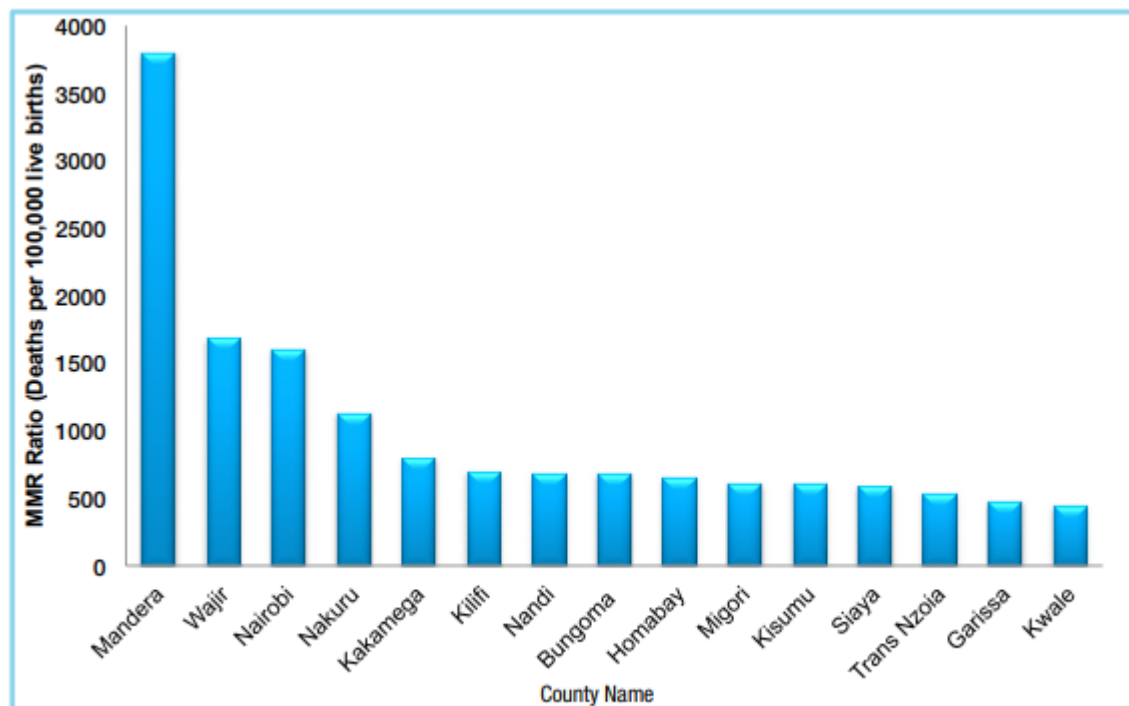


Figure 3: Nairobi spends over 13 times the national average on malaria, but the malaria prevalence rates are average compared to counties spending 10 - 15 times less.



Source: Kenya National Bureau of Statistics 2014

Figure 4: Nairobi has the third worst maternal statistics of all counties in Kenya



Source: [http://countryoffice.unfpa.org/kenya/2014/08/13/10333/counties with the highest burden of maternal mortality/](http://countryoffice.unfpa.org/kenya/2014/08/13/10333/counties%20with%20the%20highest%20burden%20of%20maternal%20mortality/)  
Kenya's maternal mortality rate of 362 deaths per 100,000 live births remains well above the global rate of 210 and the Country's MDG target of 147 per 100,000.

There is strong healthcare demand in the county characterized by high care-seeking behavior. 89.1% of births in the county are attended by a skilled professional (nurse, midwife or doctor) and the rate of institutional birth delivery is at 88.7%. the national average for both indicators is 61.8% and 61.2%. 71.6% of mothers seek postnatal care 2 days within 2 days of delivery. Care utilization is high – the county has 59 admissions per 1000 people (2<sup>nd</sup> highest in the country) and inpatient care spending per capita of KES 980 (highest in the country).

*Table 1: Nairobi's maternal care utilization rates are high*

Maternity care	Nairobi	Kenya total
Pregnant women who received antenatal care from a skilled provider (%)	98	96
Pregnant women who received 4+ ANC visits (%)	73	58
Births assisted by a skilled provider (%)	89	62
Births delivered in a health facility (%)	89	61

Source: KDHS 2014

*Table 2: Nairobi residents have higher levels of health awareness*

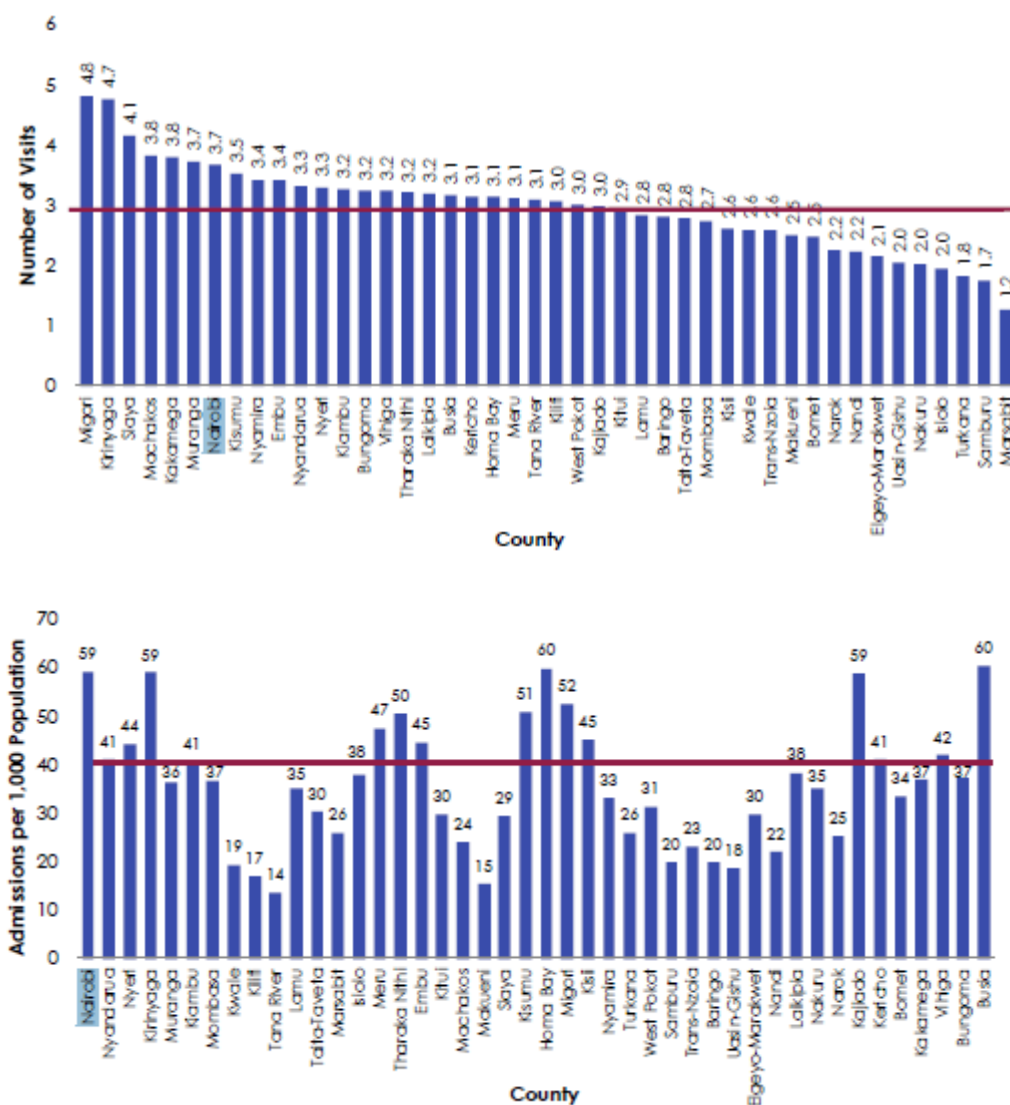
HIV/AIDS awareness	Nairobi	Kenya Total
Women 15-49 who know that HIV can be prevented by using condoms and limiting sex to one uninfected partner	84	77
Men 15-49 who know that HIV can be prevented by using condoms and limiting sex to one uninfected partner (%)	90	85
Women 15-49 who have been tested for HIV in the past 12 months and received the results of the last test (%)	60	53
Men 15-49 who have been tested for HIV in the past 12 months and received the results of the last test	58	46

Source: KDHS 2014

Nairobi has among the highest health services utilization rates in Kenya. The 2013 Kenya Household Healthcare Expenditure and Utilization Survey shows that the county has the 7th

highest outpatient utilization rate of all counties in Kenya. Only 9.2% of persons reporting being ill did not seek treatment.<sup>9</sup>

Figure 5: Nairobi has high healthcare service utilization rate



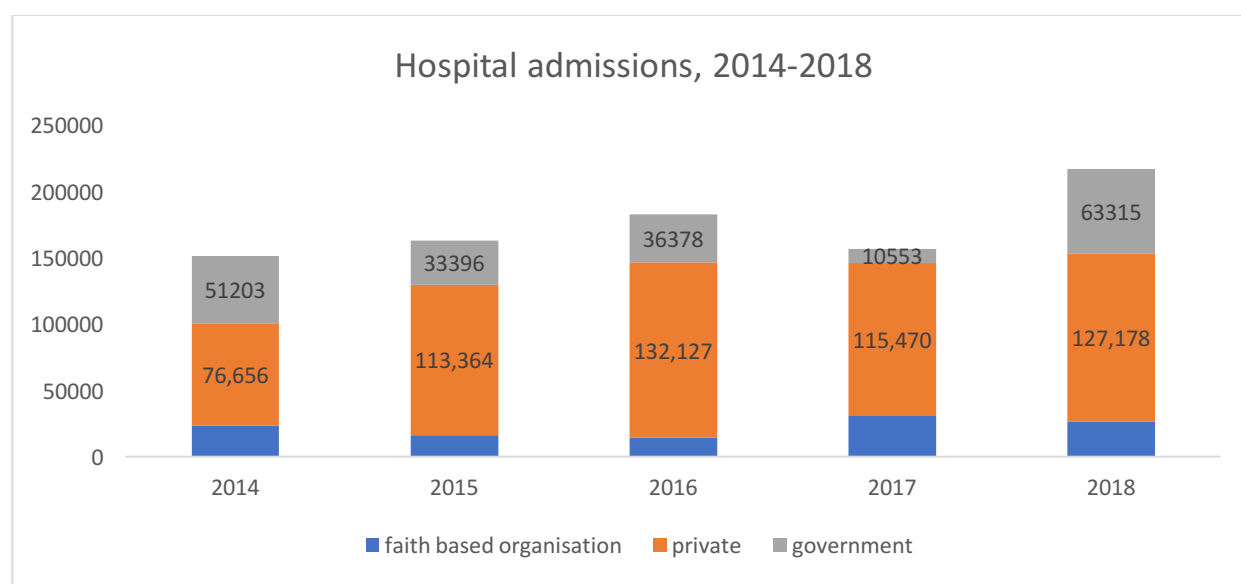
Adapted from KDHS 2014 Report

Government facilities on average has a much lower admission rate than private hospitals. The number of outpatient visits and inpatient admissions in the county grew between 2014 and 2018 at an annual rate of 12.3% and 12.7% respectively; private hospitals accounted for

<sup>9</sup> Kenya Household Health Expenditure and Utilisation Survey 2013

77% of that growth. Government facilities have 60% of private hospitals' bed capacity, but service significantly less admissions proportionally (33%). Part of the reason for this is the huge difference in average length of stay between private and public facilities - private hospitals' average length of stay (ALOS) in 2018 was 0.54 compared to 8.2 in government hospitals<sup>10</sup>. On average private hospitals have a narrower range of care which allows for more of such efficiency however even controlling for range of care, public facilities are still underperforming<sup>11</sup>.

*Figure 6,7: High average lengths of stay in government hospitals greatly impedes admission capability*



Source: Kenya Health Information System, (DHIS2)

<sup>10</sup> Kenya Health Information System (DHIS2)

<sup>11</sup> "Evaluation of the Level of Quality Health Care Accorded to Patients in Selected Public and Private Hospitals in Kiambu and Nairobi Counties in Kenya | OMICS International," accessed March 18, 2019, <https://www.omicsonline.org/open-access/evaluation-of-the-level-of-quality-health-care-accorded-to-patients-in-selected-public-and-private-hospitals-in-kiambu-and-nairobi-counties-in-kenya-2167-1079.1000129.php?aid=12328>.

## Problem statement

**The state of care delivery in Nairobi is dire.** Maternal and infant mortality are 1.5 times higher than the national average while TB prevalence in the county is almost twice as high as the national prevalence rate. This is despite having some of the best health coverage in the country in terms of physicians and spending per capita as well as strong healthcare demand. The under-performing system faces challenges for the reasons listed below:

### Demand side: variable cost of care and low awareness of technical quality of care offered

- a) **Variable cost of care has skewed demand allocation:** The government has a free maternity policy at all public health centers although there are ancillary fees incurred which are largely administrative. Private and some mission hospitals have high fees - all non-public facilities levy charges ranging from 2,000–30,000 KES (20–300 USD) and 3,000–50,000 KES (30–500 USD) per night stay in the mission and private sectors, respectively. This is quite costly given the minimum monthly wages in Nairobi is KES 13,572 (USD 136). A few studies show a utilization differential driven by cost. A study looking at 28 facilities (four public, six mission and 18 private), providing an estimated 98.7% of inpatient neonatal care in the county found that 71% of neonatal admissions in the county are accounted by 5 health facilities all of which are low-cost or cost-free (Murphy 2018). Additionally, 65% of slum dwellers seek maternal care at public health centers (Cohen 2017).
  
- b) **Nairobians have low awareness on technical quality of care:** Consumers' perception of technical quality is low such as drugs usage and following of medical procedures by healthcare staff (Cohen 2017). This issue persists even when cost of care is relaxed as a possible barrier to good quality care. Many highly value nontechnical quality of care (respectfulness and communication skills) of healthcare workers.

### Supply side: staff quality, staff motivation, weak drug supply networks

- a) **The quality of staff is low:** While the county has a higher than average physician density, it has lower average for nurse and clinical officer densities. These two cadres

are the most important frontline staffers in the care delivery business. Against the recommended 1 nurse per 2 sick babies, the ratios in Nairobi can be as high as 1 nurse per 15 babies.<sup>12</sup> The management personnel of most hospitals and other health facilities is not trained in management.<sup>13</sup> Most are physicians who eventually transition to management without core training on resources management, workflow development and capacity improvement.

- b) **Weak drug supply networks impede care delivery** Drug prices are high and availability low. The availability is low across public and private health facilities. Internal processes show that health facilities have prompt procurement practices, but the delivery of drugs is weak.
- c) **Low staff motivation**: even in settings where there is adequate staff, there is low innovation and improvement of processes because of lack of incentives for such behavior. Flat wages, strict rule-based delivery and perennial shortages of resources dampen staff morale at the frontline (Mugo et al 2018). Nurses cite the lack of a progression to more lucrative positions in the healthcare space as being deterrent for effort.<sup>14</sup> Additionally, there is the inherent tension between doctors and nurses, where while nurses do most of the patient management and unit coordination (at times managing doctors' schedules and resources), they cannot progress into higher management roles such as medical superintendent roles at hospitals.

#### afyakit: the client

afyakit™ is a healthtech startup, which delivers right-level analytics to hospital managers and government health supervisors on the state of operations within health facilities in order to enable data-driven decision making, which would lead to better care delivery, resource allocation and ultimately better health outcomes. The company is a for-profit social

<sup>12</sup> Georgina A. V. Murphy et al., "What Capacity Exists to Provide Essential Inpatient Care to Small and Sick Newborns in a High Mortality Urban Setting? - A Cross-Sectional Study in Nairobi City County, Kenya," *PLOS ONE* 13, no. 4 (April 27, 2018): e0196585, <https://doi.org/10.1371/journal.pone.0196585>.

<sup>13</sup> Interviews with Sub-County Health Management – Embakasi East, Nairobi

<sup>14</sup> Interview with Melvine Ouyo, MC/MPA candidate. Was a nurse in the Kenyan healthcare system.

enterprise which co-develops and deploys assessment tools with counterparts in government and hospital management via mobile technology.

The startup's key intervention strategy is to ease the conducting of periodic supervision exercises. The exercises are conducted by public health officials and are done in conjunction with in-facility teams. This is a major exercise mandated which afyakit seeks to improve. Afyakit's product is a mobile and web-based platform which replaces the current paper-based tools used by public health officials which do not lend themselves to easy data analysis and presentation of reports. Reports of supervisions will be available in real-time off the analysis of data points from the platform and offer the supervision team an opportunity to not only give targeted feedback but also document next steps more comprehensively and immutably.

The success for afyakit is two-fold. First, the startup is looking to partner with as many county health management teams as possible and the national health quality assurance team at the Ministry of Health. Other partners for the startup are the country's healthcare financiers (donors) and pharmaceuticals to drive efficient allocation of resources. Secondly, the company looks to ultimately bring the level of health disparities in partner facilities down to the lowest level – the target being a 15-percentage point decrease from current in-patient mortality and morbidity rates. The author's role in the organization is the product lead/owner liaising with afyakit's counterparts in government and in hospitals to ensure the product speaks to their needs, is suited for their usage environments and ultimately delivers on the value proposition mentioned above.

The success of afyakit is intertwined with the ability for county health management teams and the health facility staff to find the insights helpful and for efficiency at their facilities to increase and thus lead to better health outcomes. After an analysis of the problem space from both supply and demand sides, the paper will propose solutions that tap into afyakit's capabilities and potential to impact the healthcare space.

Client Values (Existing)	Outcomes of interest	Problem Frame
<p>Mission: improve quality of care by providing healthcare managers with actionable operational data</p> <p>Values: Integrity, collaboration, innovation,</p>	<p>Data-driven operations in hospitals and other health facilities</p> <p>Levels of technical efficiency</p> <p>Misuse of health resources</p> <p>Inpatient mortality</p>	<p>Increasing the ability of hospitals to deliver care without compromising quality or substantially burdening the system with additional costs</p>

### Institutional context

In Nairobi's context, there are various distinct stakeholders in the healthcare sector. Off Matt Andrews' classification of management structures<sup>15</sup>, it would be fair to classify Nairobi County's healthcare sector as a professional bureaucracy with linkages to the national health ministry. The list of stakeholders is given below:

National government	County government	Other stakeholders	Hospitals
<ul style="list-style-type: none"> <li>• Cabinet Secretary</li> <li>• Director of Medical Services</li> <li>• Standards and quality assurance team at the Ministry of Health</li> </ul>	<ul style="list-style-type: none"> <li>• County health executive</li> <li>• County governor</li> <li>• County legislative assembly</li> <li>• County health management teams</li> </ul>	<ul style="list-style-type: none"> <li>• Donors</li> <li>• Credentialing associations (Medical Practitioners and Dentists Board)</li> </ul>	<ul style="list-style-type: none"> <li>• Hospital managers</li> </ul>

In the country, the Ministry of Health (MOH) is responsible for guiding and regulating the health sector in Kenya and county health ministries have a lot of autonomy over the administration of health services. Besides this, the MOH is also in charge of the overall

<sup>15</sup> MLD 102 Lecture – Getting Things Done



(national-level) management of public health services in the country. The table below gives a breakdown of responsibilities under the two units.

National	County
Health policy	<u>County health facilities.</u>
Financing	Ambulance services.
National referral hospitals	<u>Promotion of primary health care.</u>
<u>Quality assurance and standards</u>	Licensing and regulation of entities that sell food to the public.
<u>Health information, communication and technology</u>	<u>Disease surveillance and response.</u>
National public health laboratories	Veterinary services (excluding regulation of veterinary professionals).
Public-private partnerships	Cemeteries, funeral homes, crematoria, refuse dumps, solid waste disposal.
<u>Monitoring and evaluation</u>	Drug Rehabilitation services.
Planning and budgeting for national health services	Disaster management.
Services provided by Kenya Medical Supplies Agency (KEMSA), National Hospital Insurance Fund (NHIF), Kenya Medical Training College (KMTC) and Kenya Medical Research Institute (KEMRI)	<u>Public health and sanitation.</u>
Ports, borders and trans-boundary areas	
<u>Major disease control (malaria, TB, leprosy)</u>	

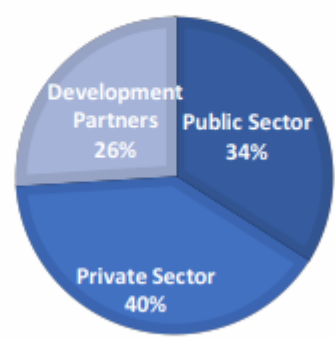
In general, the health agenda is set at two levels: the national level and at the county level. The national thrust is predicated by the ruling party's manifesto. For instance, the current administration's health policy is targeted towards ensuring universal healthcare coverage<sup>16</sup> and a massive drive towards building and upgrading of health infrastructure and equipment. The other key policy agenda setter (or influencer) are the set of donors and development partners active in the country. The key policy setting activities carried out by donors fall under funding of target programs as well as knowledge generation activities. Their scale of

<sup>16</sup> "Kenya Rolls out Universal Health Coverage," WHO | Regional Office for Africa, accessed March 17, 2019, <https://www.afro.who.int/news/kenya-rolls-out-universal-health-coverage>.

action covers both the national and county levels, with some donors funding national initiatives as well as county-specific programs.

### KENYA TOTAL HEALTH EXPENDITURE 2012/2013

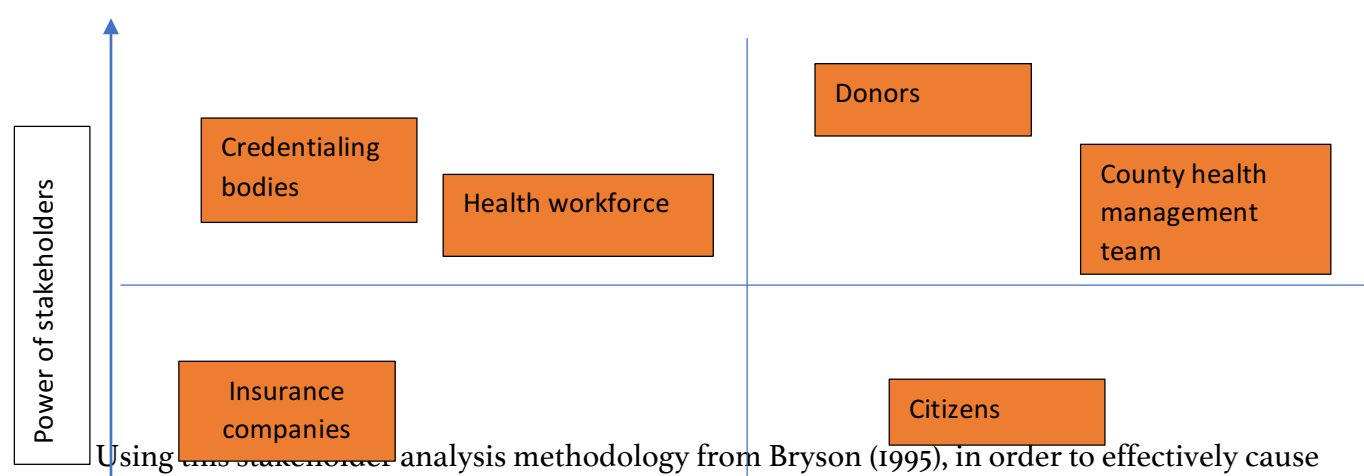
■ Public Sector ■ Private Sector ■ Development Partners



Graph 1: Kenya Total Health Expenditure 2012/2013

Afyakit’s interaction space with the above actors is still emerging with its key connections being with the county health management team in Nairobi. It has been able to leverage the linkage with the county health management team to gain capillarity. That said, a lot more lays in wait to be done in order to fully activate the startup’s potential.

#### Interest-power graph of stakeholders



Using the stakeholder analysis methodology from Bryson (1995), in order to effectively cause change, afyakit needs to be part in the top right quadrant since they are the key players, meet th in the top left quadrant, and

consider the needs of the players in the bottom right quadrant. At this juncture, it is crucial to note that any interventions or causal organizational/behavioral narratives which this paper discusses ride on top of rather powerful (but broader and less observable) demographic and social forces – these forces are encoded in the influence that stakeholders such as development partners wield in setting health priorities through mechanisms such as funding and knowledge generation. The effect is the reorientation of time, talent and attention towards health concerns which might not always align with the needs of the population in question. As a result, afyakit’s success will have inevitably, at least in part, be made in the image of the “invisible hands” that function at the supranational level.

## Methodology: Quantitative and Qualitative Research

### Quantitative research

In the analysis of pain points that exist on both demand and supply sides, the paper uses a quantitative approach, consisting of descriptive statistics, correlations and regressions although sparingly.

We analyze the

- *DHIS2*, a health information database which has a host of health outcome data at the health facility level. The database is maintained by the Ministry of Health, includes indicators such as HIV prevalence, in-patient mortality and morbidity data.
- 2013 Kenya Healthcare Expenditure and Utilization survey data -- these contain demand-side indicators for health including expenditure on healthcare, usage of maternal healthcare services and such indicators.
- Other relevant datasets including National Treasury budget data, expenditure data from the World Bank in Kenya.

Since the county-level data in Kenya particularly on health is not as deep, we also rely heavily on literature as part of the research.

### Qualitative approach

Our qualitative approach consists of interviews with the main stakeholders in the Nairobi healthcare space. These include hospital managers and nurses, sub-county public health

management teams and representatives of healthcare support institutions like PharmAccess. Those interviews help us understand further the institutional context, the regulation, as well as the incentive structures that exist within the space.

## Findings

Nairobi's low health outcome equilibrium is happening amid seemingly contradictory conditions: the population is aware of how important health is and is actively seeking it and the county remains one of the richest resource pots for healthcare in the country. Quite surprisingly, this is not unusual. Skinner (2011) found that areas in the United States that spend more on healthcare have similar or poorer outcomes than areas that do not. Fisher (2003) went as far as suggesting that medical spending can be reduced without adversely affecting health outcomes. In this section, I delve into the characterization of the healthcare system in Nairobi.

**Maternal and reproductive health are the main reasons for patient admission in Nairobi.** Malaria and respiratory illnesses are also key illnesses which patients get treated for. Maternal health cases account for a third of all inpatient admissions and 32.7% of all inpatient cases in public hospitals. The breakdown is similar for private facilities.

**In general, Nairobi residents marginally prefer public hospitals to private hospitals, but the preference for private facilities grows with increase in household wealth and age of care seekers as well as gender (female).** Women on average are 0.87 times less likely to go to public hospitals than men are. Individuals over 65 years old are twice as likely to go to private hospitals than people between 25-34 years old. Across wealth quintiles, the odds of attending a private hospital increased by over 1.1 times as patients move from one wealth quintile to another. That said, 60% of its population live in slums (IRIN, 2013) and in relative poverty meaning that a lot of health demand is met in public health facilities.

**Most patients choose health facilities based on the non-technical quality of care.** Care seekers are unable to tell the technical quality of care (Cohen 2017). The key reasons why a patient would choose a public facility over a private facility are cost (cheaper or don't have to

pay). For private facilities, patients prefer them because they are cleaner, the waiting times are shorter, the staff have better attitudes and there is more privacy (see appendix).

**Healthcare staff quality is low. There exist significant gaps in knowledge among healthcare providers.** According to the World Bank<sup>17</sup>, only 58% of public healthcare providers could diagnose correctly 4 out of 5 of the most common health conditions (including diarrhea, anemia, malaria). There are also serious staff shortages (103 nurses per 100,000, compared to the recommended 250 per 100,000). The issues are made worse by the fact that only the providers followed less than 44% of necessary treatment action for maternal/neonatal care. The quality is rather equalized across public and private facilities. Adherence to medical guidelines is also almost non-distinguishable between private and urban public facilities (48% vs 52%).

**The distribution of incentives across medical staff cadres is uneven with medical officers enjoying the bulk of monetary incentives.** Support staff in the structure such as lab scientists and social workers, are usually paid from the hospitals' own resources hence the higher percentage of them that receive salary supplements. Nurses and clinical officers shoulder a large load of the care delivery process – handling both patient management and unit coordination<sup>18</sup>. Medical officers and specialists are usually responsible for surgery and prescription post-evaluation by nurses. Clinical officers are also authorized to prescribe medication. That said, most nurses and clinical officers do not have upward mobility within the hospital structure as medical officers and specialists do. Although across board all medical staff note the need for training and better compensation, there is lack of coordination in agitating for the benefits. Over the last 5 years, medical staff countrywide has participated in strikes at least 20 strikes demanding better benefits and working conditions. There have been more than two dozen strikes since the devolution of health services in 2013. One of the most severe was a 100-day strike by doctors that began at the end of 2016 and ended in March 2017. Nurses then had a 5-month strike between June and November 2017 over non-implementation of their collective bargaining agreement.<sup>19</sup>

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<sup>17</sup> Gayle H. Martin and Obert Pimhidzai, "Service Delivery Indicators : Kenya" (The World Bank, July 1, 2013), <http://documents.worldbank.org/curated/en/106261468285022553/Service-delivery-indicators-Kenya>.

<sup>18</sup> Staff interviews

<sup>19</sup> An Assessment of Healthcare Delivery in Kenya under the Devolved System (2018). KIPRA

**There is weak follow-through after supervision exercises.** Over 93% of the health facilities received an outside supervision in the preceding 6 months. However, the supervisions are ineffectual in improving the quality of care especially adherence to guidelines of care delivery. The proportion of facilities with observed and complete guidelines for the management of malaria, TB, HIV/AIDS and maternal/neonatal care is low. Interviews with hospital staff reveal that records of the supervisions are not readily available to hospital unit managers and additionally, from the managers, 52% of them do not utilize the data from such supervisions to improve care delivery.<sup>20</sup> Part of the key issues are the lack of transferability of data from paper tools used in supervisions to actionable decision points.

**A strong duopoly between the Kenya Medical Supplies Authority and the Mission for Essential Drugs and Supplies has led to high drug prices, particularly in private facilities and availability is low across board.** Afyakit data from a sample of 9 health facilities in Nairobi (6 public, 3 private) shows on average that health facilities experience stockouts in at least 13 essential commodities each quarter. Across board, the drug availability is on average at about 68%<sup>21</sup> across all different levels of care delivery (public, private and mission). In general, public and private hospitals source drugs from the Kenya Medical Supplies Authority and the Mission for Essential Drugs and Supplies (MEDS) respectively – both organizations source medical products at usually lower than internationally referenced prices and sell them at a multiple – the ratio can be rather large<sup>22</sup>. The margins range from 217% to 376% for locally produced medical products. There are no direct policy or legal restrictions on the margins that either organization can charge over and above procurement prices, with their profit function looking to be optimized across reach. It is also thought that part of the margin is built in to cushion the risk of late payments, an issue that has been particularly recurrent in recent times.<sup>23</sup>

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<sup>20</sup> Afyakit survey data 2017

<sup>21</sup> Margaret Ewen and Dorothy Juma Okemo, "Prices and Availability of Locally Produced and Imported Medicines in Kenya," *Health Action International* (blog), accessed February 10, 2019, <http://haiweb.org/publication/prices-and-availability-of-locally-produced-and-imported-medicines-in-kenya/>.

<sup>22</sup> There is no stipulation in the KEMSA Act that gives a ceiling on prices.

<sup>23</sup> <https://www.nation.co.ke/news/Patients-suffer-as-drug-shortage-bites-counties/1056-4696596-g8vqgwz/index.html>

**Health infrastructure in hospitals continues to be weak.** 54% of health facilities do not have regular water supply and 75% of the facilities do not have electricity available at regular service hours nor do they have a backup generator with fuel available.<sup>24</sup> Bed capacity has grown at an annual CAGR of 7.5% between 2014 and 2018 while admissions have been growing at 12.7%. This has resulted in pressure on existing resources.

## Causal Diagnostics

This section looks to map the structural issues identified in the findings section to possible causal pathways driving the low health outcomes. The section identifies voids which are affecting the healthcare sector in Nairobi, leading to weak health outcomes.

The main causal pathways we have identified are a) **principal-agent incentive misalignment between doctors and patients**, b) **inadequate supply of skilled labor in the healthcare sector**, c) **low investment and training in health management information systems** and d) **weak drug price discovery channels**.

### Principal-agent issues – misalignment of incentives

Principal-agent relationships manifest in doctor-patient interactions where the patient is the principal seeking services from the doctor, the agent. The healthcare professional's motivation might not be aligned with the patients and as such could lead to inflated costs through incorrect treatment offered and/or multiple referrals in the system (Mooney 1993).

Given that referrals are a major reason for patients seeking care across different health centers in Nairobi, this would be indicative of resource misallocation since their outcomes are not getting better yet resources are utilized in the process of care-seeking. There already exists a power dynamic between the patient and the doctor where the doctor by virtue of

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<sup>24</sup> Quality of Care Indicators, USAID. Data from Service Provision Assessment Surveys. <https://dhsprogram.com/pubs/pdf/OF24/OF24.pdf>

being more knowledgeable than the patient will be able to dictate the interaction with the patient. Deep asymmetry of knowledge and patient vulnerability exists precisely because a patient cannot observe the doctor's efforts (or quality of medical advice) in real-time to determine if the treatment administered is appropriate, until much later when they are not feeling better. This inherently means that proponents of value need to focus on quality with the optimal solution being a patient-funded effort for quality ratings on health providers to solve for the need of information on quality. The need to generate such information by private means is however weak as government-enforced licensing and certification supplied by physician-sponsored groups such as the Medical Practitioners and Dentists Board or the Nursing Council of Kenya reduces the vigor with which private means of information generation are pursued. Since there are inherent issues with the quality of supervision from government and professional bodies then the information gotten from these institutions almost always fails the patients.

Any intervention to improve quality of signaling for patients would be a game changer in terms of enabling market efficiency. From the analysis on factors that influence choice of facilities that patients go to, more information for patients from a trusted source would be an important differentiator in terms of hospital choice.

### Inadequate supply of skilled labor

The limited supply of talent in the healthcare field drives up the demand for such talent and with it, the cost as well. The physician density in Nairobi is slightly higher than the rest of the country's but still quite low. The nurse and clinical officer density are lower than the national average. However there exists a rather inelastic wage-skill relationship in the sector which distorts the labor market. Since promotion is largely determined by educational qualifications and seniority, with less emphasis for performance-based pay, the incentive structures for staff in the healthcare sector will therefore discourage effort. Their ability to extract rents in their places of employment is quite low and is also a key driving force for incessant industrial action in Kenya as noted in previous sections.



An observed consequence of the distortion is high levels of absenteeism – close of a third of public health providers and about a fifth of providers in private facilities were found to be absent in a World Bank study.<sup>25</sup> Given the higher caseload in urban facilities (15.3 cases per provider per day) compared to 7.8 in rural facilities, it could be a factor contributing to health workers feeling overworked (observed above) but also potentially compromise quality of care delivered. It also sheds light on the finding that staff desire training over and above monetary compensation since training leads to better qualifications which help secure promotion. From interviews conducted with healthcare staff in Kenya, the reality is that there are very few vehicles both in the public and private sector to assist healthcare staff get better training aside from donor-sponsored training programs.

#### Low investment in acquisition and training on health management information systems (HMIS).

Weak data collection and analytical capacity at the hospital level and county level impedes the ability to make informed decisions regarding operational issues such as drug availability, patient management and financing. Evidence shows that health information management systems can be a critical factor in delivering high quality care<sup>26</sup>. The use of advanced analytics in healthcare is associated with fewer patients having a prolonged length of stay as well as readmissions, both of which cause resource wastage and drive up costs of care delivery.<sup>27</sup> Drops of between 26% and 33% in readmissions at the 30-day and 60-day periods have been recorded as a result to health information technology interventions.<sup>28</sup> Additionally, the use of information communication technologies has a positive impact on the quality of management in hospitals<sup>29</sup>.

Akhlaq (2016) shows that the key barriers to HIT adoption in low- and middle-income counties are the lack of importance given to data in decision making, corruption and

<sup>25</sup> Martin and Pimhidzai, “Service Delivery Indicators.”

<sup>26</sup> Ghazaleh Samandari et al., “Implementation of Legal Abortion in Nepal: A Model for Rapid Scale-up of High-Quality Care,” *Reproductive Health* 9, no. 1 (April 4, 2012): 7, <https://doi.org/10.1186/1742-4755-9-7>.

<sup>27</sup> “Impact of Health Information Technology on the Quality of Patient Care,” HIMSS, November 1, 2015, <https://www.himss.org/impact-health-information-technology-quality-patient-care>.

<sup>28</sup> Kathryn H. Bowles et al., “Impact of Discharge Planning Decision Support on Time to Readmission Among Older Adult Medical Patients,” *Professional Case Management* 19, no. 1 (2014): 29–38, <https://doi.org/10.1097/01.PCAMA.0000438971.79801.7a>.

<sup>29</sup> “(Analysis of Service Quality and Organizational Performance of Private Healthcare Facilities in Nairobi County, Kenya,” ResearchGate, accessed January 18, 2019, <http://dx.doi.org/10.20908/ijarsijmca.v2i5.6716>.

insecurity, lack of training and poor infrastructure. These issues are then alleviated by clear policy direction with investment in technology adoption, improving the communication ties and ultimately training the health workforce on usage.

Only 10% of health facilities in Nairobi have formal HMIS training programs<sup>30</sup> instituted. Most HMIS systems in hospitals do not actually house most patient data and a lot of the investment in IT systems is focused on billing and procurement as opposed to healthcare information<sup>31</sup>. Few hospital managers have access or training in using HMIS for operations or healthcare decisions. A lot of data still sits in manual patient registers and paper reports from supervision exercises. Conversations with the health facility managers show that a lot of recommendations are usually delivered verbally, and the record of such conversations do not exist. Additionally, afyakit's analysis shows that over half of health facility managers do not use data at all for decision making.

There are very few and weak punitive consequences for not investing in HMIS systems and although literature shows that internal and external supervisions are mechanisms for increasing performance of hospitals<sup>32</sup>, the enforcement mechanisms are weak. Very few hospitals lose accreditation for not complying with health standards. As one of my interviewees said, "It is hard to open a hospital...it is harder to close it." There are also no efforts either to recognize positive deviants as a motivating channel particularly for private hospitals.

#### Weak drug price information channels

Drug prices and supply are key ingredients to quality of care off two channels. Workload at health facilities (demand) is positively correlated with lack of drugs, because there is excess demand for available supplies.<sup>33</sup> It is not trivial that such drug shortages and high drug prices disrupt patient management, making care delivery weak.

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<sup>30</sup> Service Provision Assessment Survey 2010

<sup>31</sup> Elesban Kihuba et al., "Assessing the Ability of Health Information Systems in Hospitals to Support Evidence-Informed Decisions in Kenya," *Global Health Action* 7, no. 1 (December 1, 2014): 24859, <https://doi.org/10.3402/gha.v7.24859>.

<sup>32</sup> Francis Mwilhwa et al., "Technical Efficiency in Public Hospitals in Kenya: A Two-Stage Data Envelopment Analysis," *International Journal of Economics and Finance* 10, no. 6 (May 9, 2018): p141, <https://doi.org/10.5539/ijef.v10n6p141>.

<sup>33</sup> Germano Mwabu, Martha Ainsworth, and Andrew Nyamete, "Quality of Medical Care and Choice of Medical Treatment in Kenya: An Empirical Analysis," *The Journal of Human Resources* 28, no. 4 (1993): 838–62, <https://doi.org/10.2307/146295>.

KEMSA and MEDS are the two major suppliers of medicines to facilities. In the current structure, they are positioned as group purchasing organizations for most of the health facilities, getting low drug prices off bargains with local and foreign drug suppliers. The Kenya Medical Supplies Authority Act (until November 2018) made it mandatory for national and county public hospitals to obtain drugs and medical equipment from Kemsas, while MEDS services the private market, with pharmacovigilance being the core value for both, to ensure hospitals get quality medicines. The price regulation mechanism outside these two bodies is weak at best. The absence of price controls in drug prices (such as a Recommended Retail Prices) means that onward sellers such as hospitals and chemists can charge exorbitant prices to consumers. An amendment in 2018 enabled public hospitals to do price comparisons with private suppliers. In a move that would possibly characterize a Cournot competition scenario, prices are expected to drop. The market demand is well known to the suppliers and similarly the cost structures of drug procurement and so across time, the expectation would be that suppliers would reduce margins in order to capture a higher market share upto the extent that they make decent margins. The WHO's recommended markup is 25% and so we can assume this would be a reference margin. The real issue is however is whether there will be tradeoffs in drug quality with potentially unscrupulous drug suppliers undercutting the two main suppliers with low prices and substandard products. Additionally, there exists a market dualism between the cost of branded medicines and branded generics<sup>34</sup> - and retailers earn between two to sixteen times in margins for the former compared to 25% - 40% for the latter.

For consumers, this distinction is non-trivial and true price discovery would necessitate 1) the delineation of branding from quality, 2) an information system for drug availability and 3) the cost of drugs.

## Options for afyakit

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<sup>34</sup> G.L. Singal, Arun Nanda, and Anita Kotwani, "A Comparative Evaluation of Price and Quality of Some Branded versus Branded-Generic Medicines of the Same Manufacturer in India," *Indian Journal of Pharmacology* 43, no. 2 (April 2011): 131-36, <https://doi.org/10.4103/0253-7613-77344>.

This section proposes two options, which could provide suitable intervention pathways for afyakit. One of the options intervenes in the drug market, while the other intervenes in the healthcare provider space. The options are aligned with the various causal issues that they would address, together with an analysis of the potential institutions that they would interact with. Finally, the section will give operational structures for each option as well as a business model.

The two options proposed in this section are: a consumer-facing drug group purchasing organization which has a public release of drug prices and a digital supervision toolkit with a public release of hospital rankings by technical competency areas. The former will be geared towards providing the government health facilities and individual consumers with the aim of ease the constraints around drug supply and price transparency. The second option is targeted at the county health management team supervisors and unit managers in the hospitals with the aim to correct principal-agent incentive misalignment.

The chart below gives the options, constraints addressed, technical correctness of each option. The section thereafter details the intervention.

Option	Constraints	Ability to address constraints (out of 5)
Consumer facing drug group purchasing organization with public information portal for drug prices	a) Weak drug price information channels b) Lowly competitive drug markets	4
Digital supervision toolkit with public release of hospital rankings by competency areas	a) Principal-agent incentive misalignment	3.5

### Consumer facing drug group purchasing organization with public price information portal

The GPO option serves the government as a buyer of drugs for hospitals, individual consumers who purchase drugs out-of-pocket and insurance companies who settle healthcare claims for clients. On a first order, it is targeted to reduce cost of drugs for customers who directly purchase the drugs from the platform. Second-order effects will be the rationalization

of drug prices in the market through the provision of recommended drug retail prices, generating consumer surplus. Operationally, the business would have two operating sides: a logistics/fulfilment operation which would buy drugs and ship drugs cheaply to consumers, and a price information portal which would be a drug directory with e-commerce functionality.

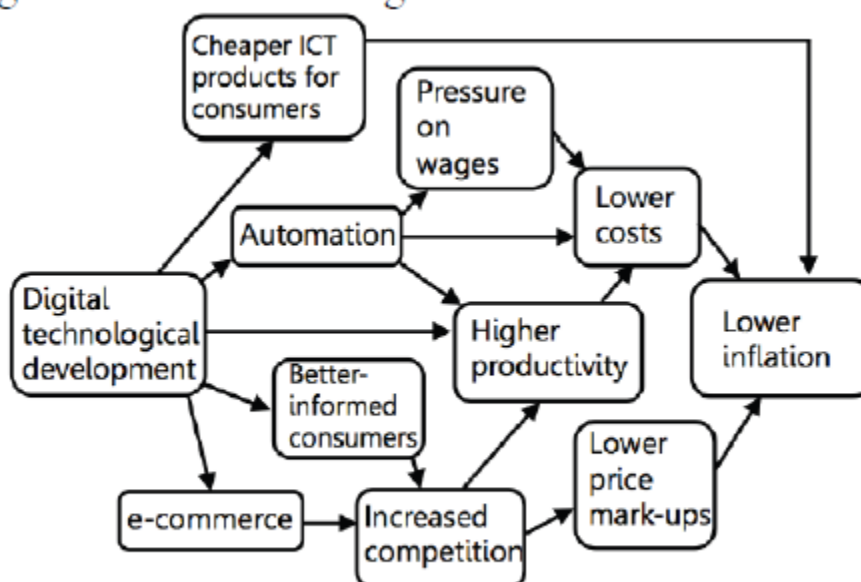
The fulfilment/logistics operation would enable afyakit to intervene in the drug supply market, with the goal being to increase availability of drugs (which is low now), while ensuring pharmacovigilance. The operation would have to enroll manufacturers and initiate bulk orders off the needs of consumers and develop a delivery network within the city, either leveraging relationships with supermarkets and local delivery startups such as Sendy<sup>35</sup>. It would then take orders from consumers via web or text. The use of technology (supply chain/warehouse management and order tracking) will be key to driving efficiencies. Consumers would key in the type of drug they are looking for, and the platform would give the prices, delivery points as well as payment details. In addition to the direct cost benefits, another value proposition for corporate customers such as hospitals and governments, would be basic analytics on drug stocks and forecast capabilities on demand.

Underlying Cause	Program Feature (Addressing underlying cause)	Theory of Change (In words or using arrows)
Weak information channels	Program Feature # 1: Provision of drug price information on SMS/smartphones	Clients query price information about drugs they need without incurring an exploratory travel cost → get price quote and payment/delivery options → Revise their priors regarding how much they need to buy drugs and seek to purchase drugs at lower cost and have better health outcomes → Market players adjust prices downward to remain competitive.
Weak market structure enabling poor service	Program Feature # 2: Drug purchase and delivery solution	Clients get better drug prices from GPO → Clients order drugs from the GPO → Drugs are supplied on time → Patients have better health outcomes

<sup>35</sup> <https://www.sendyit.com/>

The price information portal which will be deployed on social media as well as via radio and SMS will seek to address the ecosystem challenges on pricing. It is foreseeable that it will cause an external effect on the market by helping educate consumers on drug prices and availability. The below chart adapted from an IMF study<sup>36</sup> which also noted that the use of internet technology for business has established disinflationary effects in the short term with possible long-term inflationary effect through added productivity and higher wages being off set by better and increased competition in markets.

Figure 1: Channels of digitalization effects on inflation



*Source: Riksbank*

#### Digital supervision toolkit with public ranking of hospitals by technical performance

This option serves county health managers, the public and the hospital managers. It would intervene to increase transparency in service delivery at the health facilities and to address the principal-agent issues that currently dog the system. Afyakit would develop a technology data collection product which would house the county's inspection checklist and use analytical

<sup>36</sup> <https://www.imf.org/~/media/Files/Conferences/2017-stats-forum/session-3-coffinet.ashx>

capabilities to process the data to provide easy-to-understand indicators for both sets of clients.

The value for county health managers is quickly map operational issues within facilities which need deployment of resources. For hospital managers, it forms the basis for making the case resource mobilization both with the county government but also other support programs by development partners. For the public, the ranking allows them to effectively allocate their resources in the search for quality. It will be paramount to align care delivery with the data collection bit of the platform. To that end, the product would need to be easily deployable – preferably on a smartphone which a county health manager or a facility manager could quickly whip out to key in data as they conduct clinical duties or other supervisory duties.

Underlying Cause	Program Feature (Addressing underlying cause)	Theory of Change (In words or using arrows)
Learning Failures	Program Feature # 1: Low cost operational diagnosis/ provision of processed information on care delivery	County health managers and facility managers receive information about their operations at a small upfront cost → gaps identified via analytics served → managers apply corrective measures on resource allocation and care delivery → Patients get better care and have better health outcomes
Principal-agent issues	Program Feature # 2: Public ranking of facilities by technical competencies.	Patients are given information on which health care center is suited to their specific condition → Patients are redirected to the right doctor at the right facility at right time → Patients seek appropriate (possibly preventive) help earlier and have better health outcomes

The capabilities that afyakit would need here are quite like what it has currently although it would involve considerable stakeholder engagement to align incentives.

### Evaluation of possible options for afyakit

While a typical analysis would warrant the tackling of the most salient causes, in this situation, afyakit's capabilities and the potential entrepreneurial opportunities would be the

lens from which to evaluate the adoption of various solutions. There are three main evaluation criteria:

- a) The first is total return as measured through the potential for value creation determined by the strength of the solution in addressing the healthcare issues in Nairobi, and in intervening across demand, inputs and staffing spaces, as well as the potential for value capture for afyakit.
- b) Secondly, the implementation capability measured by afyakit's internal capacity to adopt the execution model to become the best-placed player that finds addresses the voids in the system.
- c) Third will be the interest and buy-in from afyakit's founders and institutional appetite from the County of Nairobi health management team.

To this end, two solutions stand out as possible positions that afyakit could adopt: first, a **digitized supervision toolkit** that would be deployed to governments and professional bodies to analyze the effort and adherence to guidelines by healthcare staff and use it to clear the signal regarding practitioner quality and second, **an e-marketplace for hospital inputs targeting public hospitals**.

### Digitized supervision toolkit and public ranking of hospitals by competency areas

#### Rationale:

Supervisions, be they internal or external, have been shown to improve the operational efficiency of health facilities<sup>37</sup>. Additionally, the use of ICT as part of that process has been shown to improve the organizational performance in hospitals<sup>38</sup>. Ranking hospitals using operational measures from the supervision exercises is a useful way to help the public understand the quality of care that health facilities offer and to incentivize better healthcare delivery by the providers. There have been a lot of conversation on how best to do the

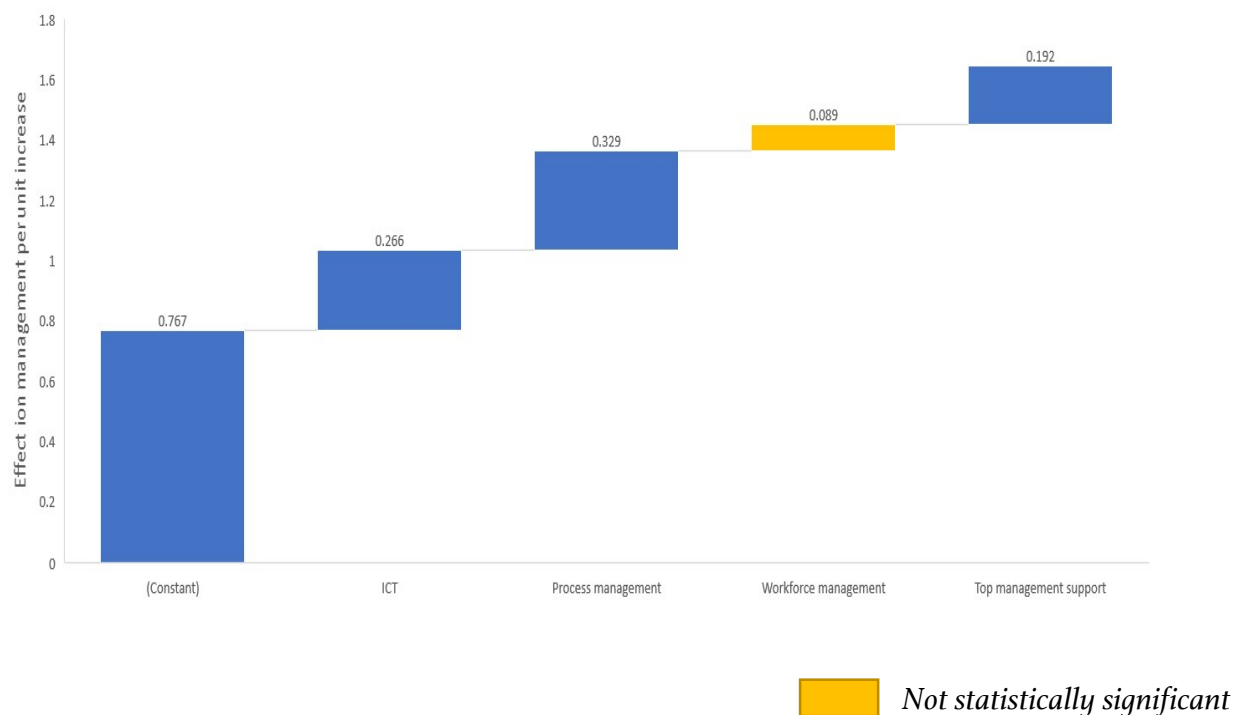
<sup>37</sup> Francis Kimani Mwhia et al., "Technical Efficiency in Public Hospitals in Kenya: A Two –Stage Data Envelopment Analysis," *International Journal of Economics and Finance* 10, no. 6 (May 2018), <https://doi.org/10.5539/ijef.v10n6p141>.

<sup>38</sup> "(Analysis of Service Quality and Organizational Performance of Private Healthcare Facilities in Nairobi County, Kenya.)"



rankings<sup>39</sup>, but in general it is agreed that it is useful as a signal clearing mechanism for the public, especially in areas such as Nairobi, where the level of technical awareness is low<sup>40</sup> and the use of consumer perspectives might indeed leave to more confusion than clarity<sup>41</sup>.

Figure 7: ICT and process innovations improve the organizational performance of hospitals



Adapted from Dinda et al. (2016). “Analysis of Service Quality and Organizational Performance of Private Healthcare Facilities in Nairobi County, Kenya.”

**Design:** This option would primarily serve 3 players: hospital managers, government health facility supervisors and the county’s health management team. The county health management team and supervising teams have the constitutional mandate to oversee health care delivery. The use of paper tools in the supervision of health facilities severely impedes information flow from the supervision process through to the decision-making chambers in

<sup>39</sup> “Does The Hospital Compare 5-Star Rating Promote Public Health? | Health Affairs,” accessed February 25, 2019, <https://www.healthaffairs.org/doi/10.1377/hblog20160908.056393/full/>.

<sup>40</sup> CATHERINE D. DeANGELIS, “How Helpful Are Hospital Rankings and Ratings for the Public’s Health?,” *The Milbank Quarterly* 94, no. 4 (December 2016): 729–32, <https://doi.org/10.1111/1468-0009.12227>.

<sup>41</sup> Michael B. Rothberg et al., “Choosing The Best Hospital: The Limitations Of Public Quality Reporting,” *Health Affairs* 27, no. 6 (November 1, 2008): 1680–87, <https://doi.org/10.1377/hlthaff.27.6.1680>.

city hall. Inadvertently, the solution would replace the paper tools, digitizing them. Hospitals once supervised using the platform would receive operational analytics and information on compliance with government health standards. Government health teams would get data on compliance and changes in implementation across time.

*Table 3: Summarized change narrative for a digital supervision toolkit*

Option	Hypotheses on constraints	Incentive engineering points
Digital supervision dashboard with accreditation badges	<ol style="list-style-type: none"> <li>1. Information flow on hospital operations is weak               <ol style="list-style-type: none"> <li>1. Demand                   <ol style="list-style-type: none"> <li>1. There are inherent incentive compatibility issues with unblock information flow among hospital managers, exposing information on effort and rent-seeking tendencies</li> <li>2. There is little use for operational data over and above generating adversarial relationships with county government. Management decisions made outside that framework</li> </ol> </li> <li>2. Supply                   <ol style="list-style-type: none"> <li>1. Paper-based systems do not lend themselves to easy analysis and transferability of insights</li> </ol> </li> </ol> </li> </ol>	<p>Health facility managers: Tie assessment scores to improvement across logged indicators. Align rewards such as admission to dedicated resource programs with governments and donors as well as performance incentives</p> <p>Health supervisors: Automated reports from the platform post-supervision which enabled easy relaying of reports (pay is tied to reports submitted). Opportunities to train other system supervisors on uses for the platform.</p> <p>County health management teams: Upward flow of information which enables tracking of metrics for the county governor's health agenda. County governments would like the assessment dashboards to present results for investment in county health facilities. Highly supportable by donors as part of health systems strengthening agenda</p>

The digitization of the government's supervision toolkit is an intervention targeted at the information asymmetry issues about the quality of service delivery. The goal of the intervention would be to align incentives between providers and patients in two ways: first, it would be providing audit capabilities on adherence to guidelines, availability of medical commodities and equipment and secondly, over the course of time track openness to feedback and execution capability off the recommendations proposed from the supervisions.

Afyakit will develop an assessment score based on improvement and readiness to deliver essential health services.

Incentives to the health facility managers would be better connections to resources from the government to improve care delivery and recognition opportunities for the improving facilities and well-performing health providers. For private facilities which do not directly receive government support, the recognition will be useful for generating revenue. This list will give a better pulse to patients looking to understand which facilities present them with the best opportunity to get good quality care across different health areas, hence tackling the issue of low technical awareness of care among patients.

Through the development of an assessment score, afyakit would look to engineer incentives decision support for resource providers in the health ecosystem. The company would need to identify and source commodity suppliers and financiers (development partners and government) who while producing quality products might have struggled with insight into ways they can intervene due to the opacity of health facility operations as well as government and donor resource pools targeted at improving delivery in target health areas. This triaging of healthcare resources would lead to better allocation within the city's healthcare system.

*Table 4: Administrative feasibility chart for a digital supervision kit*

Tasks for implementation	Hypothesis on implementation capabilities	Connection between current stakeholder landscape and implementation capability
<ul style="list-style-type: none"> <li>- Development of the digital supervision platform</li> <li>- Needs assessment and process mapping of current supervision practices</li> <li>- Developing funding allocation for the digital platform</li> </ul>	<p>Medium</p> <ul style="list-style-type: none"> <li>- upward feedback loops with county executive and downward loops with hospital managers.</li> <li>- adaptive management of the supervision toolkit to</li> </ul>	<ul style="list-style-type: none"> <li>- The county has an existing supervision process so this will be a direct upgrade of that process. There is the threat of incentive incompatibility if the system builds checks and balances which reinforce transparency and block potential rent-seeking opportunities especially around resource allocation. It would be interesting to</li> </ul>

<ul style="list-style-type: none"> <li>- Inclusion of different stakeholders in the data dissemination process.</li> <li>- Agreement on a schedule for incentives and constraints needed to ensure the added transparency also benefits the hospitals to improve operations (keep it incentive compatible)</li> </ul>	<p>reflect unique circumstances of the hospitals</p> <ul style="list-style-type: none"> <li>- development of relevant dashboards for stakeholders.</li> </ul>	<p>see how that links to the county's health scorecard.</p> <ul style="list-style-type: none"> <li>- The Kenya health informatics association could provide pro-bono help with training hospital managers and county officers on how the system works technically.</li> </ul>
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Key implementation challenges in this model are that it is dependent on accurate data collection (by government supervisors) and will indeed suffer the risks associated with any rating system which include gaming and the possibility of adverse incentives with health providers gravitating towards improving the measurable aspects of service delivery (which they will be assessed on) rather than the less quantifiable aspects such as customer orientation. This effect has been documented before where the use of HIT has improved operational indicators such as length of stay but not considerably improved patient satisfaction<sup>42</sup>. It is also dependent on the ability of afyakit to mobilize a network of heavy hitters in the health resources space if not develop internal capability to plug in some of the needs identified by the supervision toolkit.

The tools in question would cover the following health intervention areas: HIV, TB, maternal and child health and non-communicable diseases (NCDs). There are additional opportunities to co-develop general hospital-level assessment tools but to deliver most value, it would be imperative to focus on these key areas first as testing grounds for the operation.

Fit for afyakit:

- a) Return – the potential for afyakit to create social value is immense in this option. The ability to infuse technical efficiency across multiple levels of the health system in Nairobi is huge coupled with the signal clearing information that patients would have access to. The ability to capture private return on the investment will be low at the beginning.

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<sup>42</sup> "Impact of Health Information Technology on the Quality of Patient Care."

From interviews with potential clients, the author found that the unit subscription cost which supervisors are willing to incur for the ability to get insights is on the level of \$2/month. This is in line with pricing models for similar data collection platforms such as Dimagi.<sup>43</sup> The ability of afyakit to monetize the toolkit further and deeper would be dependent on enrolling huge numbers of supervisors with a view to build add-on data products for government and health value chain players like drug manufacturers and medical device manufacturers. The process of value creation for afyakit requires flexibility and patience to experiment with different products. It will be a test for the company's ability to identify quick wins and capitalize on those to raise patient funding to enable better honing of the products they will build on top of the assessment toolkit.

- b) Implementation capability – afyakit has core technology development capabilities ranging from software development capabilities and internal healthcare expertise necessary to build out the toolkit. This tool lies squarely in afyakit's skillset domain.
- c) Interest and buy-in from afyakit's founders and the County of Nairobi – the shared background in health care across the founding team has lent itself to a team that's mission-driven around the delivery of better care. The interest on the part of the founders is clear but might be tested in light of the potential lead up to financial sustainability.

### A consumer-facing group purchasing organization for drugs and equipment augmented by a clear drug prices transparency campaign

#### Rationale:

Multiple studies have shown that group purchasing organizations save hospitals a lot in supply chain costs – the savings are driven by price discounts, purchasing efficiencies, and other benefits offered by group purchasing organizations.<sup>44,45,46</sup> The existing pricing margins in the drug and equipment markets are indicative of underlying market weaknesses – the

<sup>43</sup> - CommCare, is a similar product in the data collection space - <https://www.dimagi.com/commcare/pricing/> - the pricing is between \$1-\$2 per user with value add-on services.

<sup>44</sup> RevCycleIntelligence, "Group Purchasing Saves Hospitals Up to 18% of Supply Chain Costs," RevCycleIntelligence, August 23, 2018, <https://revcycleintelligence.com/news/group-purchasing-saves-hospitals-up-to-18-of-supply-chain-costs>.

<sup>45</sup> ".@HSCA's Todd Ebert: Year after Year, GPOs Find Innovative Ways to Help Providers Save Money While Enhancing the Quality of Care They Provide.," Modern Healthcare, accessed February 21, 2019, <https://www.modernhealthcare.com/article/20181110/NEWS/181109918>.

<sup>46</sup> "(PDF) The Value of Group Purchasing in the Health Care Supply Chain," ResearchGate, accessed February 21, 2019, [https://www.researchgate.net/publication/265358047\\_The\\_Value\\_of\\_Group\\_Purchasing\\_in\\_the\\_Health\\_Care\\_Supply\\_Chain](https://www.researchgate.net/publication/265358047_The_Value_of_Group_Purchasing_in_the_Health_Care_Supply_Chain).

markup on prices is driven largely at the retail and wholesale levels both of which account for between 56 and 69 percent of final patient prices.<sup>47</sup> This weakness was caused by a law which effectively handed KEMSA a monopoly over public health facilities. However, in 2018, the Health Laws Bill was amended to permit public hospitals to form drug supply partnerships with private market players to procure drugs, easing a key market acquisition constraint for the intervention. Our intervention would tackle cost at both the supplier and consumer levels, particularly noting that another GPO that does not target consumers directly will not address the issue of ridiculous markup prices in hospitals.

Design: Group purchasing adheres to the mentality of “power in numbers.” In essence, groups of buyers come together and leverage their size to gain access to large discounts on products or services. Group purchasing is used widely across many industries to purchase raw materials and supplies. The funding model for this group purchasing organization (GPO) would be contract administrative fees paid by the vendors and manufacturers of drugs with the GPO to conduct business and to whom GPOs provide a market for products. These fees can be set as a percentage of the total purchase or as an annual flat rate. The demand side for the GPO would include individual consumers, hospitals and insurance companies – all of whom are responsible for drug payments.

Members of the GPO participate based on their purchasing needs and their level of confidence in what should be competitive pricing negotiated by the GPO. The GPO is optional for buyers; the end buyer is never forced to use the GPO contract, but often finds it to be a better deal than one negotiated individually with the manufacturer or other player in the marketplace.

Taking advantage of penetration in smartphone penetration and internet usage as well as the prevalence of social media in Kenya, the GPO would disseminate information on drug prices by disease type as well as the types of drugs on offer to consumers. The information dissemination campaign would mirror attempts by fintech companies such as Wave which has lowered transaction costs for remittances simply by offering comparator costs and using technology to reduce the latency of remittance transactions.<sup>48</sup> Regarding revenue, the GPO would pursue a model similar to Groupon’s where the consumer pays the GPO for the

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<sup>47</sup> Ewen and Okemo, “Prices and Availability of Locally Produced and Imported Medicines in Kenya.”

<sup>48</sup> <http://africanbusinessmagazine.com/african-banker/fintech-can-cut-remittance-costs-fraction/>

medicines they want. The GPO then pays the manufacturer after taking an administrative fee, typically a 10%-20% share of the revenue generated by the product. Consumers then get local fulfilment options either at a local supermarket or collection point.

This fulfilment model draws inspiration from telcos and banks which have used the agency model for building capillarity across Kenya particularly in poor regions. In this model, the GPO enrolls local businesses as endpoints of a distribution network where the consumers get their medicines sent to local businesses near them for easy collection.

Key implementation challenges include the need to build out a distribution network for the fulfilment of medical orders, as well as potential resistance from pharmacist lobbies in the country. There is also the possibility of detrimental general equilibrium effects with multiple small chemist shops going out of business if indeed consumer habits are shifted to the GPO at a large clip.

*Table 5: Summarized change narrative for a consumer-facing GPO*

Option	Hypotheses on constraints	Incentive engineering points
Consumer GPO	<p>Demand</p> <ol style="list-style-type: none"> <li>1. Consumers (hospitals and individuals) have very little information on drug prices.</li> <li>2. Low information access on drug quality inhibits monitoring and ability to buy safe and effective medication</li> </ol> <p>Supply</p> <ol style="list-style-type: none"> <li>1) Manufacturers and drug vendors unable to build capillarity among consumers due to contracts with hospitals and pharmacies.</li> </ol>	<ol style="list-style-type: none"> <li>1) Drug price information dissemination on social media to educate the public on costs</li> <li>2) Information on drug quality related to disease areas that matter most to clients enable cost savings for the patients, making the resource allocation process efficient.</li> </ol>

*Table 6: Administrative feasibility chart for a consumer-facing GPO*

Tasks for implementation	Hypothesis on implementation capabilities	Connection between current stakeholder landscape and implementation capability
<ul style="list-style-type: none"> <li>- Development of the commerce platform for drugs</li> <li>- Building connections with manufacturers, insurance companies and hospitals</li> <li>- Building out a fulfilment network for drugs</li> <li>- Recruitment of pharmacists and pharmacy technicians.</li> <li>- Product design for the marginalized customer's journey to use the platform to purchase drugs</li> </ul>	<p>Medium</p> <ul style="list-style-type: none"> <li>- adaptive management of the drug purchase platform to reflect unique circumstances of the marginalized consumers (capabilities in human-centered design)</li> <li>- development of relevant contracts for different stakeholders e.g. contract differentiation for hospitals and manufacturers.</li> </ul>	<ul style="list-style-type: none"> <li>- The 2018 amendment to the Health Laws Bill permits public hospitals to form drug supply partnerships with private market players to procure drugs, easing a key market acquisition constraint.</li> <li>- The community health worker network would be an asset to build capillarity for the product's reach since it gives the community health workers an opportunity to earn.</li> </ul>

### Fit for afyakit

- a) **Return** – the potential to create social return with the product is large. The ability to drive better resource allocation because of better pricing information in the drug purchasing market could be huge. Given that the recommended retail markup is 25%<sup>49</sup>, the potential first-order savings from such an intervention<sup>50</sup> could amount to about \$250 million. Accrued with the improvement to patient welfare, it is not unremarkable what a difference the intervention could cause. Afyakit's ability to capture private return is at best defined by how much market share the GPO can capture. As a first mover in the space, there's the possibility that the GPO could garner significant market share. There is however considerable risk of failure – the startup success probability in the region is 10%<sup>51</sup>. Coupled with an optimistic prospect of controlling 15% of the market, it is sufficient to assume the expected value of the enterprise will be about \$7.5

<sup>49</sup> 3<sup>rd</sup> International PPRI Conference: Pharmaceutical Pricing and Reimbursement Policies, Challenges Beyond the Financial Crisis. <http://apps.who.int/medicinedocs/documents/s22238en/s22238en.pdf>, Accessed February 26, 2019

<sup>50</sup> Assuming that the current retail markup is 200% of procurement prices and that the intervention drives markups to an average of 50% above procurement prices.

<sup>51</sup> "The Ultimate Startup Failure Rate Infographic [2018]," accessed February 26, 2019, <https://www.failory.com/blog/startup-failure-rate>.



million. The competition in the space would come from ecommerce companies such as Jumia and Rupu – both of which could adapt their business models to enter the space after the cost discovery efforts of afyakit or concurrently. It would be worthwhile to realize also that afyakit stands to learn a lot from the experiences of Jumia and Rupu as far as consolidating consumer loyalty through social media.

**b) Implementation capability**

The implementation capabilities for the platform would essentially be in the logistics, distribution and financing space. While the core team at afyakit have developed and run enterprises in the past, the skillset domain needed in this venture would have to be learned. The capital requirement as well would be significant particularly to manage fulfilment and storage of commodities.

**c) Interest and buy-in from stakeholders**

The current legal landscape provides an enabling environment for a consumer-facing GPO to work collaboratively with public hospitals which cater for a significant majority of Nairobi care-seeking individuals. That said, the incentive structure for the various stakeholders might be rather difficult to navigate. Demand aggregation platforms have faced a lot of opposition traditionally from worker unions and trade associations for example Uber in recent times<sup>52,53</sup>. Across the government technostucture, the incentive to support the GPO at the expense of KEMSA, would be low. Both KEMSA and MEDS are non-profit organizations and the prospect of having a for-profit entity pushing for significant market share might raise concerns for price manipulation especially if further along the way the cost structure changes significantly. The chart below gives a summary of what a potential stakeholder incentive structure would look like.

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<sup>52</sup> "Uber Cabs Cause Controversy in Kenya," BBC News, accessed February 26, 2019, <https://www.bbc.com/news/av/world-africa-35975457/uber-cabs-cause-controversy-in-kenya>.

<sup>53</sup> "As Uber Expands in Africa, Protests Mount," accessed February 26, 2019, <https://www.usatoday.com/story/news/world/2016/03/28/uber-africa-ride-sharing-app-kenya-abuja-nigeria/82337190/>.

Stakeholder	Incentive
<b>National Director of Medical Services</b>	The secretary's incentive is high because of the need to execute the President's Big Four agenda which include universal health coverage (expansion of health insurance and equipment/facility infrastructure). The alignment is compelling especially with the 2018 Health Laws Amendment.
<b>County health executive</b>	The health executive's incentive is ambivalent -- there is a wider focus across county health finance initiatives to directly impact service delivery and the GPO could be used to streamline drug supply operations but at the same time be a threat to rent-seeking opportunities through the publishing of drug prices to the public. The executive is also under pressure from pre-existing drug cartels and this information could serve as a lightning rod.
<b>Medical Practitioners Board</b>	The board's role as a sanctioning body for pharmacists and pharmacy technicians stands threatened to a small extent if their members are unhappy with the platform drawing business away from them and/or their relevance is diminished.
<b>County Health Management Teams/Cabinet Secretary</b>	They are moderately incentivized because the GPO would provide crucial information on drug usage and prices which would allow them to better service delivery. Personal incentive incompatibility because of potential linkages with drug cartels in the county that manipulate drug prices
<b>Hospital managers</b>	Incentive compatible since driving down the cost of drugs benefits their operational profitability.
<b>Industry associations (pharmaceutical suppliers)</b>	Less incentives -- if the GPO gains traction and the county has indeed better price transparency, current margins stand threatened. Additionally, most pharmaceutical suppliers are really cartels; the competition threatens market share.
<b>Civil society</b>	Highly incentivized due to alignment with advocacy around delivery of low-cost care

## Recommendations and Conclusion

Considering the above noted criteria, the recommendation for afyakit would be to pursue the digital supervision toolkit model. While it does have as much immediate value capture opportunities, it does meet a key objective of the enterprise which is to generate social return.

Further down the line the trade-off between value creation and capture will be less antagonizing as the enterprise develops a database from which it could develop high-value data products. Secondly, the analytics space is an underserved space unlike the drug market which has entrenched interests and potentially strong market lobby capabilities. Third, the digital toolkit provides opportunities to experiment rapidly and adaptively develop a product that speaks to the needs of health managers (both county and health facility) as well as the public. This flexibility is not as guaranteed with a drug logistics operation where a lot more certainty is needed for the deployment of capital and technical expertise.

This is not to say that the drug GPO option is moot – with added capabilities, afyakit could consider partnerships which would leverage its expertise in technology and analytics to drive change in the space either through this model or another hybrid.

In conclusion, the healthcare system in Nairobi suffers from inefficiencies which this paper documents and identifies the underlying causes which plague care delivery. The analysis also provides options which a small for-profit social enterprise, afyakit, could pursue to intervene in the market.

Two options are suggested: a consumer-facing drug group purchasing organization with a publicly released drug inquiry app and a digital supervision toolkit coupled with a public ranking of hospitals by technical competency areas. Of the two, the latter is recommended as the optimal intervention pathway for afyakit.

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## Appendix I: stakeholder analysis

*Table 7: Norms and incentive structure of the national health stakeholders*

Stakeholder	Norms/Practices
Cabinet Secretary	Need to endorse president's agenda to secure office: President's current agenda is universal health coverage and building of physical health infrastructure as well as major disease control (TB, maternal mortality, HIV/Aids, and malaria) Mandates DMS to oversee policy design
Director of Medical Services	Career civil servant: promotion on seniority (eyes on CS role) and alignment with CS's agenda. Manages gov't interaction with donor agencies who are key funders. Defacto policy chief.
Standards and Quality at MoH	Flat salary; incentives from donor programs (per diem culture), promotion on seniority, performance also counts here.
Industry associations	Practices: lobby major donors and county health management teams, and have access to the cabinet secretary Incentives: open up opportunities in the health sector
Donors	Norms: Legitimacy from funding capabilities; alignment with national government health strategy is a key source of power Practices: Coordination with Director of Medical Services and county health management teams to pursue health agenda (might not be completely aligned with gov't but the funding nudges things along)

*Table 8: Norms and incentives of healthcare stakeholders at the county level*

Stakeholder	Norms/Practices

MCAs and Governor	<p>Norms: Individualistic politics (need to harness resources for office-seeking)</p> <p>Norms: Individualistic politics - ethnicity and gender are major mobilization points</p>
County Health Management Teams	<p>Norms: promotion on performance, seniority</p> <p>Practices: Close relations with donors, and hospital managers</p>
Medical Practitioners Board	<p>Norms: close relations with doctors, hospital managers, pharmacists.</p> <p>Practices: they provide certification for hospitals to function. Will try to consolidate that position and any standards intervention might be considered a threat</p>
County Executive	<p>Norms: seeking to consolidate power by advancing governor's health agenda. Practices: Will make political tradeoffs and favors with MCAs to consolidate support for governor. Advocate to Cabinet Secretary on fiscal support. Clear personal rent-seeking incentives either politically or financially -- a lot of procurement in the county is run by cartels which go all the way up to the governor and his county ministry executives.</p>

## Appendix 2: State of healthcare in Nairobi

The production of health outcomes is a confluence of patient characteristics and care-seeking behavior, provider quality and environmental variables. Romley and Sood (2013) consider the below production function for health outcomes:

*Equation 1: Healthcare Production Function (Romley and Sood, 2013)*

$$\bar{H} = E(H|I, S, s, A, a) = f(I, S, s, A, a)$$

Where  $H$  is health, and  $\bar{H}$  is the conditional expectation.

$I$  is the intensity of medical and non-medical inputs,  $S$  is the severity of illness observed and  $s$  is the unobserved health status while  $A$  and  $a$  are the measured and unobserved measures of provider heterogeneity.

For my analysis, I explore measures of  $I$ ,  $S$  and  $A$ . For  $S$ , I look at patient characteristics (and find an exogenous source of variation for illness). For  $A$ , I analyze care processes in health facilities as a proxy for provider heterogeneity. For  $I$ , there are non-medical inputs like health-seeking behavior as well as lifestyle habits and environments that Nairobians live. There are also medical inputs such as infrastructure, supplies, equipment and staff which I analyze from the Service Provision Assessment data.

### Appendix 3: Patient healthcare demand trends

#### Key illnesses

Table 9: Breakdown of cases handled at private health facilities

Illness	Percentage of cases
Maternal care/delivery	33.33
Malaria/fever	9.33
Diseases of Respiratory including pneumonia	8
Accidents and injuries	4
Eye infections	2.67
TB	1.33
Diabetes	1.33
Diarrhoea	1.33

Source: Author's calculation

Table 10: Public facilities: illness breakdown



Illness	Percentage of cases
Maternal care/deliveries	32.69
Diseases of Respiratory including pneumonia	7.69
TB	1.92
Diarrhoea	3.85
Intestinal worms	1.92
Accidents and injuries	5.77
Other (Specify)	32.69
Other Services	3.85

### Use of public vs private hospitals

I use the 2013 National healthcare utilization 2013 dataset filtered for inpatients from which I exploit the distance to the health facility as a exogenous source of variation for intensity of care<sup>54</sup>. I create a variable for observations from Nairobi County and interact it with the wealth quintile variable as the effects of the two variables is not necessarily additive (Nairobi residents tend to be wealthier than populations from other counties)

- 1) Likelihood of attending a public hospital given wealth

$$\begin{aligned}
 Public = & \alpha + \beta wealth_{quintile} + \gamma household_{size} + \delta expenditure_{quintile} \\
 & + \varepsilon Nairobi + \theta Nairobi * wealth_{quintile} + \vartheta Nairobi \\
 & * expenditure_{quintile}
 \end{aligned}$$

- 2) Likelihood of attending a public hospital given intensity of care

$$\begin{aligned}
 Public = & \alpha + \beta wealth_{quintile} + \gamma household_{size} + \delta expenditure_{quintile} \\
 & + \varepsilon Nairobi + \theta Nairobi * wealth_{quintile} + \vartheta Nairobi \\
 & * expenditure_{quintile} + \mu Distance\ of\ health\ facility
 \end{aligned}$$

<sup>54</sup> Gautam Gowrisankaran and Robert J. Town, "Estimating the Quality of Care in Hospitals Using Instrumental Variables," *Journal of Health Economics* 18, no. 6 (December 1999): 747–67, [https://doi.org/10.1016/S0167-6296\(99\)00022-3](https://doi.org/10.1016/S0167-6296(99)00022-3).

Where *Public* is a binary variable for the hospital visited by the inpatient.

In general, Nairobi residents marginally prefer public hospitals to private hospitals especially for severe illnesses (odds = 1.2). However, the odds of visiting a public hospital in Nairobi get smaller as households get wealthier.

Income quintile	Odds of visiting a public hospital vs a private hospital
Poorest	
Second	0.976
Middle	0.959
Fourth	0.686***
Fifth	0.504***

\*\* -  $p < 0.01$

Wealthier households tend to admit their sick in private hospitals but the intensity of care which they receive is a non-factor in predicting whether a patient is admitted in a public or private hospital. Households in the fourth and fifth wealth quintiles frequent private hospitals more than public hospitals. This is not exactly unusual as we would expect that healthcare is a normal good. That said, it is not clear if this is because private facilities necessarily provide better care than public hospitals.

	Odds of visiting a public vs private hospital
Fourth wealth quintile	0.50***
Fifth wealth quintile	0.35***
Household size (per additional member)	1.11*

\*\*\* -  $p < 0.01$ , \* -  $p < 0.1$

## Appendix 4: Satisfaction and selection of healthcare services

Reason for choosing health facility	Percentage
Staff are qualified	21.4
Was referred	11.4
Staff give good advice	8.6
Less costly	8.6
Good staff attitude	8.2
Medicine available	6.8
Less waiting time	5.5
Community Based Insurance	4.6
Close to home	4.1
Do not have to pay	4.1
Knew someone in the facility	2.3
Cleaner facility	1.8

Source: Author's calculation (Kenya Healthcare Expenditure and Utilization Survey 2013)

## Appendix 3: Staff quality and motivation

Type of facility	Met MOH staffing requirements
Dispensaries	48%
Health centers/nursing homes	17%

Source: Kenya Nursing Workforce Report: The Status of Nursing in Kenya, 2012

Table II: Incentives by staff cadre

technical qualification of provider	Percentage who received a monetary supplement	Percentage who received non-monetary incentives
specialist	13.3%	28.9%
medical officer	32.1%	64.3%

clinical officer	15.8%	38.4%
BSN nurse	18.2%	60.6%
Registered nurse	12.8%	50.6%
registered midwife	8.8%	41.2%
enrolled nurse	10.6%	48.8%
enrolled midwife	7.4%	39.3%
nurse aide	18.2%	63.6%
lab scientist	31.3%	43.8%
lab technologist	11.9%	38.9%
lab tech/ assistant	11.3%	33.3%
nutritionist	0.0%	50.0%
social worker	36.4%	63.6%
hiv counselor/ lay counsellor	21.0%	43.6%
public health officer	50.0%	50.0%
public health technician	12.5%	0.0%
other	12.9%	51.6%

Source: Kenya Service Provision Assessments 2010

Table 12: Hours worked on average by healthcare professionals

Technical qualification of provider	Government	NGO/Private nonprofit	Private for profit	Mission
specialist	45.3	40.0	41.4	44.2
medical officer	51.6	56.7	44.9	53.6
clinical officer	43.7	47.3	49.4	44.1
BSN nurse	40.2	41.0	47.8	42.7
Registered nurse	43.7	48.8	47.4	43.3

registered midwife	41.3		49.4	41.7
enrolled nurse	43.2	45.1	46.4	42.5
enrolled midwife	41.2	.	46.5	43.1
nurse aide	42.8	40.0	51.2	48.3
lab scientist	40.0	40.0	33.3	40.0
lab technologist	43.4	39.7	50.8	44.4
lab tech/ assistant	42.7	44.4	46.6	45.0
nutritionist	43.3	.	.	40.0
social worker	43.3	40.0	36.0	42.5
hiv counselor/ lay counsellor	39.3	39.1	39.3	41.0
public health officer	40.0	.	.	.
public health technician	48.5	.	.	.
no technical qualific	.	.	54.0	40.0
other	39.7	40.0	44.0	42.5

Desired Improvements	Percentage of Staff
More Training	61.0%
More Incentives	57.0%
More Staff	48.0%
Better Quality Equip/Supplies	39.0%
More Supplies/Stock	21.0%
Better Facility Infrastructure	21.0%
Other	9.0%
Better Working Hours	8.0%
Transport For Referred Patients	3.0%
Emotional Staff Support	3.0%
Providing Art	2.0%
More Independence	2.0%

Increased Security	1.0%
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Source: Kenya Service Provision Assessment

Table 13: Distribution of healthcare staff across health facilities

	NGO/Non-Profit			
	Govt	Private	Private	Mission
specialist	8.9%	2.2%	77.8%	11.1%
medical officer	23.8%	3.6%	48.8%	23.8%
clinical officer	62.5%	3.4%	16.5%	17.6%
BSN nurse	60.6%	6.1%	24.2%	9.1%
Registered nurse	60.2%	4.9%	16.7%	18.2%
registered midwife	55.9%	0.0%	26.5%	17.6%
enrolled nurse	63.6%	3.4%	16.7%	16.3%
enrolled midwife	62.3%	0.0%	18.0%	19.7%
nurse aide	30.3%	6.1%	51.5%	12.1%
lab scientist	56.3%	6.3%	18.8%	18.8%
lab technologist	52.4%	3.2%	31.2%	13.2%
lab tech/ assistant	42.6%	3.5%	26.2%	27.7%
nutritionist	75.0%	0.0%	0.0%	25.0%
social worker	36.4%	18.2%	27.3%	18.2%
hiv counselor/ lay counsellor	47.5%	16.6%	16.6%	19.3%
public health officer	100.0%	0.0%	0.0%	0.0%
public health technician	100.0%	0.0%	0.0%	0.0%
no technical qualific	0.0%	0.0%	50.0%	50.0%
other	51.6%	3.2%	32.3%	12.9%

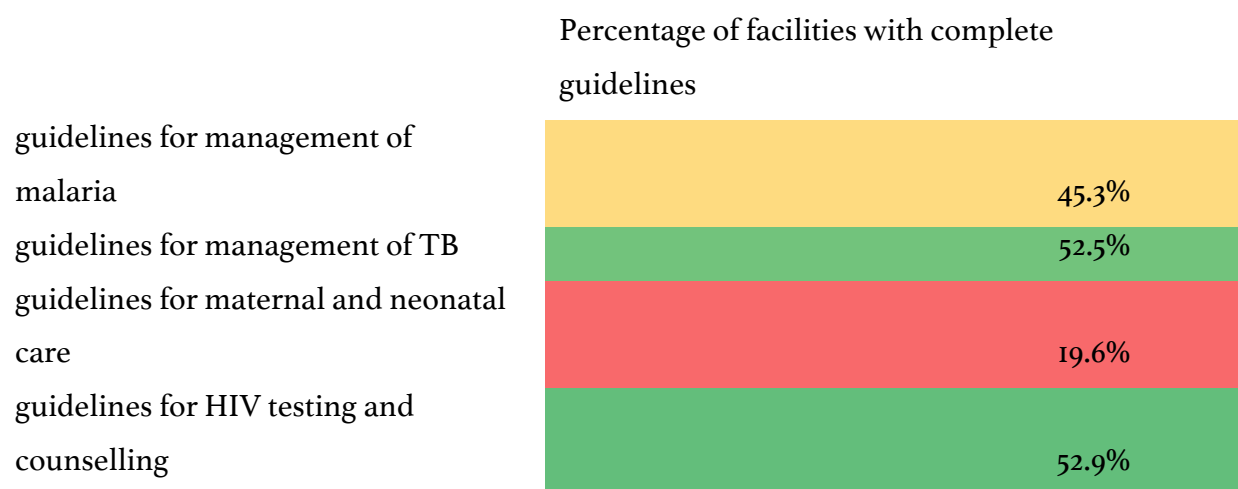
Source: Kenya Service Provision Assessment

Table 14: state of service delivery in health facilities in Kenya

	All	Public	Private	Rural Public	Urban Public
Caseload	9.02	8.67	10.37	8.47	10.3
Absence from facility	28%	29%	21%	28%	38%
Diagnostic Accuracy	72%	74%	75%	73%	79%
Adherence to clinical Guidelines	44%	43%	48%	42%	52%
Management of maternal /neonatal complications	45%	44%	46%	43%	49%
Drug availability (all)	54%	52%	62%	53%	49%
Drug availability (children)	70%	69%	75%	71%	57%
Drug availability (mothers)	44%	41%	54%	41%	44%
Equipment availability	78%	77%	80%	76%	81%
Infrastructure availability	47%	39%	75%	37%	59%

Source: Service Delivery Indicators – Kenya, World Bank (2013)

Table 15: Facilities show low levels of guideline observation



Source: Service Provision Assessment

#### Appendix 5: Drugs: high cost and weak drug delivery

Table 16: The cost of drugs is highly inflated especially for locally produced drugs

Ratio between Public sector Patient Price MPR	Ratio between Mission sector Patient Price MPR
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	and Public Sector Procurement Price MPR	and Mission Sector Procurement Price MPR
Locally produced products	2.17	3.76
Imported products	0.4	2.28

Table 17: The cost of drugs for patients is differentiated along facility ownership type and invariably costly across board

	Public sector patient prices MPR	Mission sector patient prices MPR
Locally produced products	1.58	3.26
Imported products	1.59	4.32

Adapted from, Ewen and Okemo, “Prices and Availability of Locally Produced and Imported Medicines in Kenya.” 2018

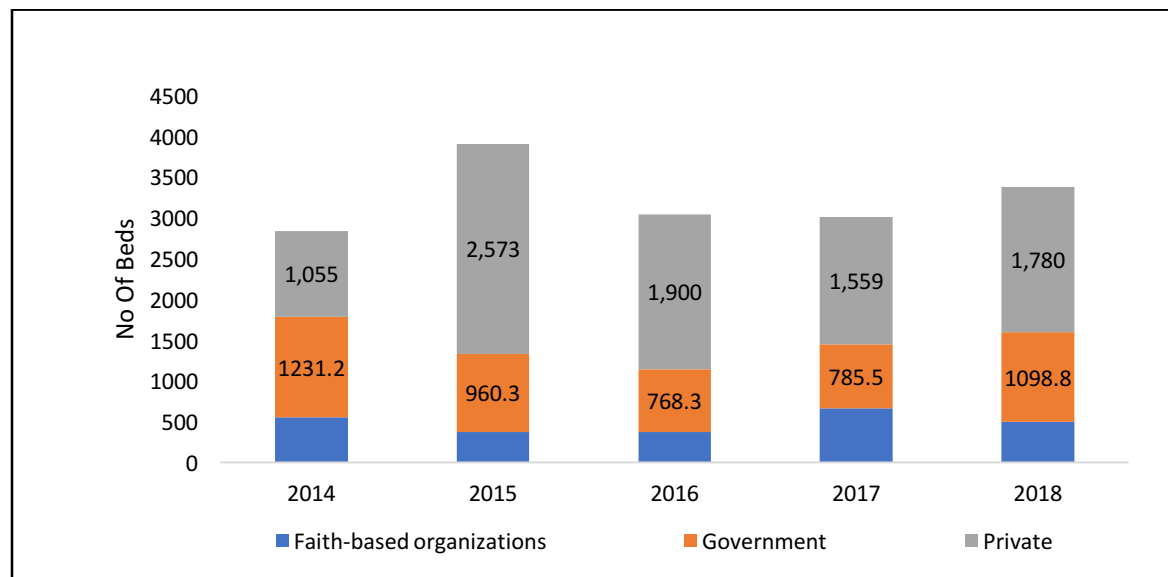
Prices are expressed as median price ratios (MPR). An MPR is the ratio of the median price in local currency (Kenyan Shilling, KSh) divided by an international reference price converted to KSh.

Facilities	Q1	Q2	Q3	Q4
Embakasi Health Centre	16	0	14	18
Reinha Rosary Medical Clinic (githunguri)	20	18	0	15
Patanisho Maternity And Nursing Home	21	20	22	19
Mukuru Health Centre		10	10	17
Komarock Morden Medical Care		20	21	21
Alice Nursing Home		18	0	17
Kayole Ii Sub-district Hospital		15	14	19
Kayole I Health Centre		15	14	18
Mama Lucy Kibaki Hospital - Embakasi		18	18	19
Average stockouts per facility	19	15	13	18

Source: Afyakit data (Q1 2018 – Q4 2018)



Figure 8: Bed Capacity in Health Facilities in Nairobi



Source: Kenya Health Information System (DHIS2)