PBL EAST AFRICA

Aalto University

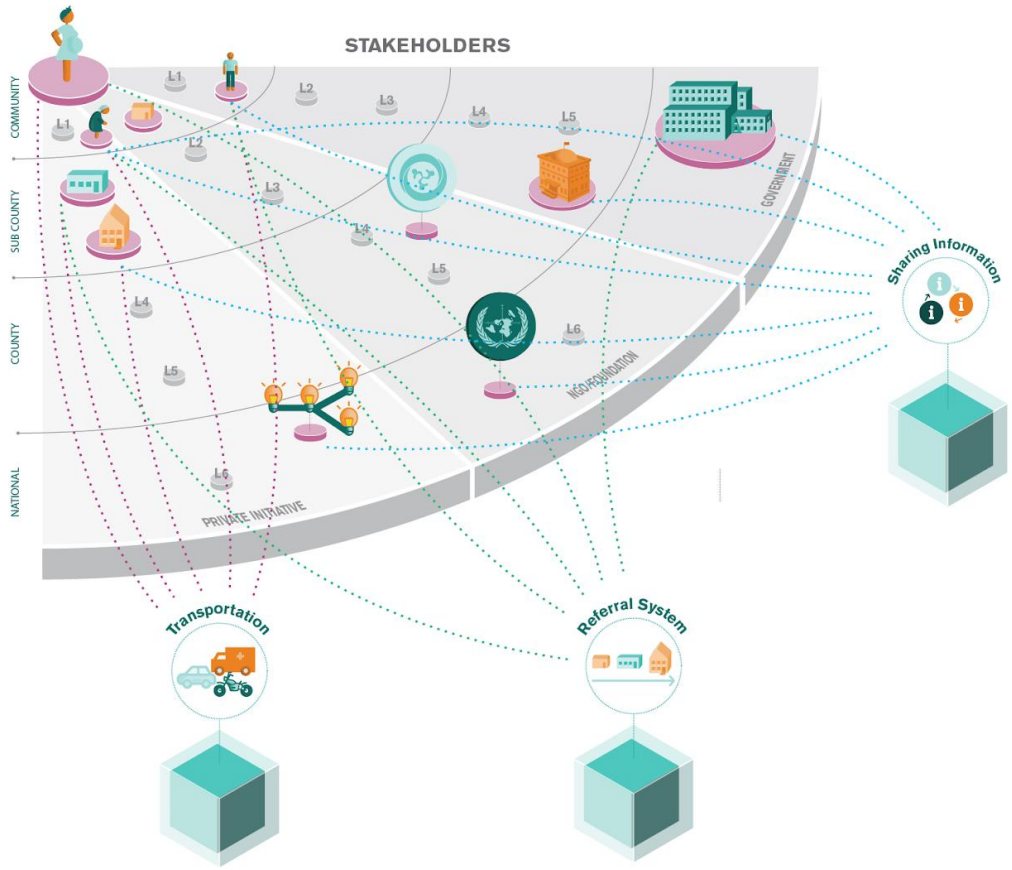
PROJECT REPORT

Aalto University | Helsinki | 30th March 2019

Executive Summary

Our findings in a nutshell

Findings (1/2)



BIG PICTURE ISSUES

In our research on maternal healthcare in Kenya we identified systemic issues in the areas of policy designs setting flawed incentives in patient care and of unsafe and unaffordable means of transportation that cause involuntary home deliveries. The biggest issues, however, we identified in the way patient information is handled across the system.

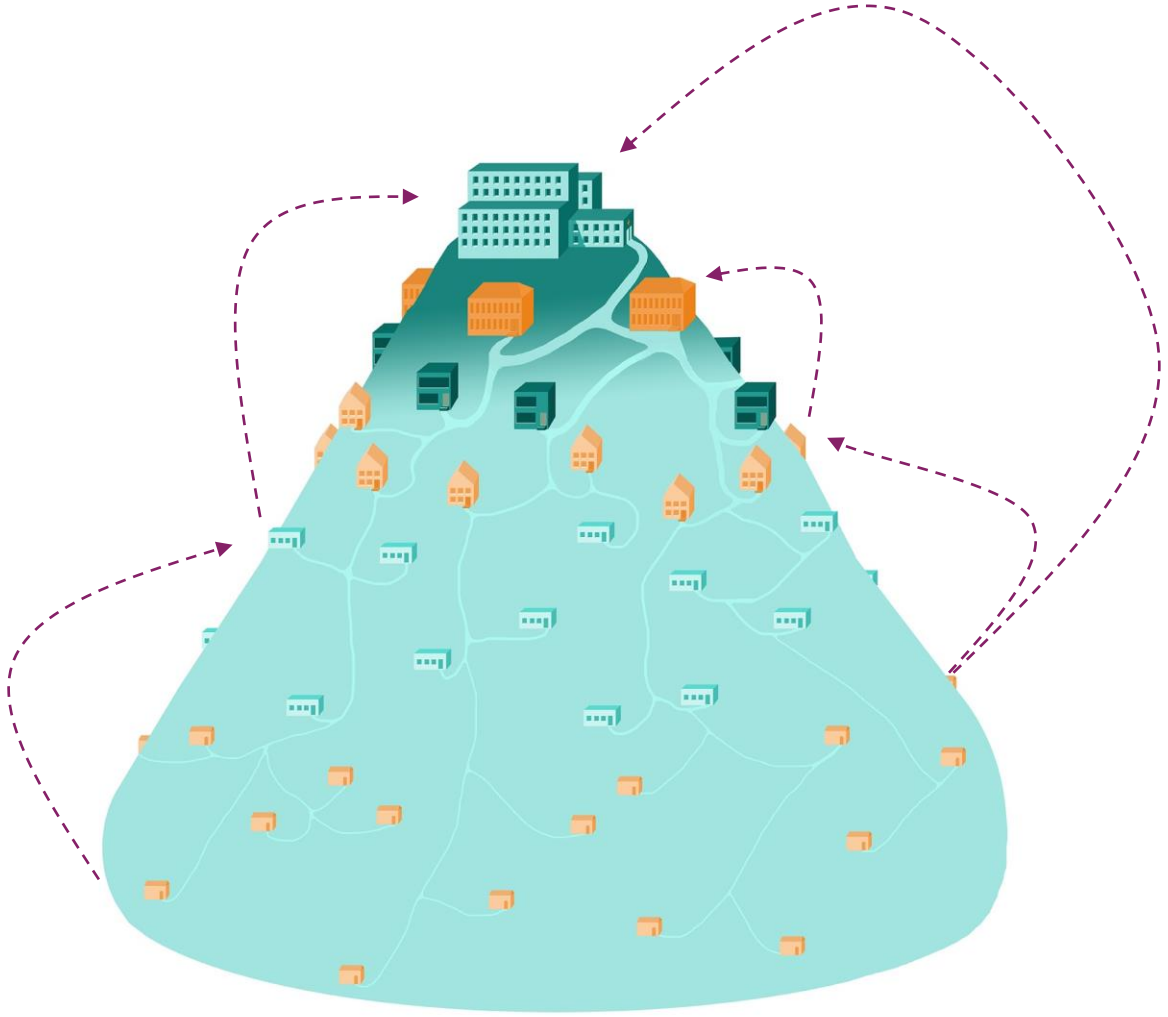
Currently, medical data in clinics and hospitals is generally recorded and stored in traditional paper-based reports, which are the main source of patients' clinical history. This information must be handed over to government authorities by medical facilities, requiring them to use scarce personnel to fill in the reports forms. Private clinics that are adopting digital solutions have to maintain manual copies to keep track of the required case files.

Findings (2/2)

PATIENT INFORMATION IS KEY

The Kenyan healthcare delivery system allocates facilities into six levels that are connected through a referral process designed to provide required medical services in accordance with a patient's diagnosis. However, the advancement of a pregnant woman through the system does often not occur according to the protocols, causing problems to both clients and healthcare staff.

On the one hand, the necessary patient information are not reliably transferred to the next facility to continue with assessment and treatment. Patients have little awareness and control over the maintenance of their medical data. On the other hand, since there is not a centralized system granting access to the clinical records of a patient, the system overall suffers from low efficiency, transparency and accountability.



Methodology

How we approach this project

Project Goals

APPROACHING THE PROJECT WITH A HIGHLY OPEN SCOPE

At the start of the project, the team established that the final deliverable shall represent a concept that attempts to systematically improve the situation of maternal health in Kenya or comparable regions, in a way that is scalable and, ideally, ready for implementation. The project will be approached with an open scope; thus the nature of the concept will be determined throughout the project, but viable outcomes would be a concept for a product in the field of medical technology, or a service for an improved availability of medical support.

Project Stages

The team decided to approach the project with a process that comprises of four different stages:

1. Planning this phase encompassed the first steps of the organization of the team and the project. More specifically, it included the practicalities to be covered before the field trip to Kenya.
2. Research & data analysis: this stage consisted of designing the research materials and organizing the activities needed to collect all the essential data that could help the team to understand the context of the problem.

Now

3. Concept development: during this phase the team will develop design directions to come up with a viable solution. At the end, one concept will be produced to address the problem, based on the insights and connections determined in the previous stages.
4. Presentation: finally, the concept idea will be presented during Aalto's IDBM Impact Gala, along with other projects. In addition, a more thoroughly and detailed presentation and a final report covering the project development will be done for the partnering institutions.

Research Approach

PREPARATORY DESK RESEARCH

This section explores background information concerning Kenya and its healthcare system, specifically with regards to maternal healthcare. The goal is to provide enough data to draw a broad picture of the context in the place of interest to facilitate a better understanding of the main problem areas, as well as developing awareness of social and cultural factors. Finally, this information helps to identify areas of opportunity to enable a more focused field research. The information is obtained from previous studies, literature, blogs, web pages from official sources, etc.

FIELD RESEARCH

Ethnographic research performed in the place of interest. The purpose of this type of research is to gather information and insights directly from the source (stakeholders) in order to overcome assumptions, while witnessing the real setting in which the problem has been identified. Field research enables reframing the initial problem statement as a result of establishing connections, spotting patterns and interpreting findings derived from perceptions, struggles, desires and behavior observed within individuals and the overarching system.

Preparatory Research

What we found out before going to Kenya

Research Streams

Understand pregnancy and the fetoscope as well as benchmarking other medical devices used in different countries to replace the fetoscope.

Understand what companies are working on social impact design projects and what types of projects have been successfully completed in Kenya.

1 Medical

2 System

Understand the healthcare system in Kenya, and identify the structure, stakeholders, challenges and pain points for users.

3 Design

4 Culture

Understand the cultural context and general views and beliefs held by Kenyan people.

1 Medical

Understanding pregnancy and medical devices

Introduction

SCOPE & MOTIVATION

In our first research stream, we analyzed the basic medical background of the issue at hand, trying to understand both harmless and harmful phenomena that can arise during the time of pregnancy. Additionally, we tried to get an idea of the activities of medical professionals and the way they integrate technical devices into their work.

DELIVERABLES

Being a developing country, the quality of maternal healthcare is much lower than in Finland, maternal deaths more frequent. The fetoscope is mainly used in developing regions, and serves as a simple and affordable tool to determine the fetal heart rate. In developed countries, technologically more advanced devices, such as the doppler ultrasound are applied. Antenatal care in Kenya suffers from scarce and unequally distributed resources as well as educational standards.

Pregnancy

Basics

As a biological phenomenon, pregnancy is a similar process all around the world. Culture and beliefs are the main factors why this natural incident may be seen and experienced very differently.

Pregnancy lasts 40 weeks on average. During this time, pregnant women are recommended by WHO to be offered a minimum of eight contacts to health care to prevent perinatal morbidity. The guidelines also suggest counselling on healthy habits and nutrition, in addition to providing the women with vaccinations and medical examinations. (WHO, 2016)

The checkups with health professionals consist of some vital measurements and tests, e.g. measuring the fetus' heartbeat.

Pregnancy is divided into three parts of which the last ends in labor, usually lasting 12 hours on average.

Challenges & Risks

WHO has published guidelines on antenatal care for a positive pregnancy experience. The guidelines aim at reducing the risk of stillbirths and pregnancy complications. In Kenya, the neonatal mortality rate is over 10 times higher than in Finland - 20.9 deaths per 1000 live births in Kenya compared to 1.8 per 1000 in Finland (Worldbank, 2017).

Medical Measures

In addition to measuring the heart rate of the fetus, the pregnant women are routinely tested for blood pressure and certain blood markers to spot pre-eclampsia.

In the developed world the women are also offered ultrasound and other more invasive tests to screen for possible developmental disorders of the fetus.

Fetoscope (1/2)

What is it?

The fetoscope is used in antenatal check-ups to point out risk-pregnancies early on. This traditional instrument has many variations in form and material but the basic function remains the same: the instrument is intended to work as an amplifier for the fetus' heartbeat. It is an essential tool to monitor labor in developing world settings. In the developing world the emphasis is on affordability and fail-safe functioning of the instrument in every condition.

Limitations

The instrument demands a lot of knowledge and experience from the person performing the inspection as there are possible faulty signals interfering with the interpretation of the results. Also, the economic and geographic conditions play an important role in how effectively the results of the fetoscope examination can be utilized to reduce neonatal mortality. Even though an experienced midwife would able to spot a risk-pregnancy by using the fetoscope, the expecting mother might still be quite distanced from quality health care for special medical conditions. (Tasa, 2019.)

A midwife determining the fetal heart rate using the fetoscope (Flickr, 2009)

Fetoscope (2/2)

Basic Use Case

Checking the heartbeat is a routine procedure in antenatal checkups, usually performed by a midwife or nurse.

During labor it provides a vital metric and gives medical personnel important information about the health of the fetus.

Common Alternatives

Based on the low reliability of the instrument and also the fact that there are more reliable and sophisticated tools available, the Pinard fetoscope is no longer used in the Western world.

Highly sophisticated electric ultrasound devices based on doppler phenomenon are used widely for monitoring the pregnancy and labor.

Antenatal Care (ANC)

ANC in Finland

The concept of Finnish antenatal care clinic was realised as early as in the 1920s. Today it is a free of charge service offered to every pregnant woman and her immediate family regardless of their social or economic standing. In 2014, almost every pregnant woman (99,4%) had contact with a maternity clinic. The pregnant women are offered at least 11 check-ups during the pregnancy (THL, 2019).

The contents of the check-ups vary based on the progress of the pregnancy, requiring certain medical examinations and tests at certain time periods. At every check-up the midwife or nurse performs basic measurements and tests: weighing the pregnant woman, measuring the heartbeats of both the woman and foetus, and taking blood tests to spot risk-pregnancies. In the check-ups the immediate family, most often the father-to-be, is also included. In addition to medical examinations, the family is provided with knowledge and emotional support about being pregnant, preparing to giving birth and finally becoming a parent. Nearly all babies are delivered in hospitals and the details of delivery care (e.g. means of labour and medication) are agreed with the expecting mother.

ANC in Kenya

In Kenya the Ministry of Health provides the guidelines for maternity care and specifies the responsibilities of midwives working in various socioeconomic and geographical settings, for example the roles of a community midwife. In rural settings the distances are long, health facilities and educated staff are scarce and the population belongs to the lowest segment both in economic and educational standards. Thus comparing the tasks of a Finnish midwife working in standardized Neuvola facilities with her colleague working in Kenia does not do any favour to the issue.

According to a recent study performed in Kenya in 2017, the quality of antenatal and delivery care is distributed unequally - in the most impoverished areas the quality being the lowest and increasing significantly with greater wealth. The assessment was done based on metrics derived from facility infrastructure and clinical quality of both antenatal care and delivery care. The study states that instead of concentrating in improving access to health care the low quality of care needs to be addressed to achieve the national targets of maternal and neonatal mortality reduction. (Sharma, 2017.)

Obstacles

Challenges to ANC Quality in Kenya

In addition to the economic and political reasons for not being able to provide country-wide quality antenatal care aside, more problematic reasons prevent pregnant women from accessing the already available care. According to the Kenya Service Provision Assessment Survey done in 2010, the main reasons for not accessing the ANC as described by mothers were based on their economic standing, beliefs and fears and the level of their knowledge about pregnancy. The economic barrier was related to transport costs and to the disinformation about true medical expenses. Beliefs and fears affected mostly very young and old pregnant women who felt not confident in letting the community know about their pregnancy. One important factor not to overlook is HIV related fears. As the pregnant women are tested for HIV in the ANC check-ups, some women decide not to attend because of the fear of test results. But promisingly, the more women were provided with knowledge, the more positive attitude they had towards preventive health care. (Ministry of Medical Services, 2010.)

2 System

Understanding the Kenyan policy and healthcare system

Introduction

SCOPE & MOTIVATION

As part of our second research stream, we are analyzing the Kenyan healthcare system to get a broader understanding of the overall environment of healthcare facilities and policies in the Kenyan society.

SUMMARY

Kenya's healthcare system follows a devolved government approach, under which 47 county governments are in charge of most operational responsibilities. Healthcare facilities are organized in a six-step service delivery model, with complex medical cases being referred to higher levels. While only parts of the population profit from insurance, there is a national reimbursement policy aimed at covering pregnancy related medical bills.

Political System

Constitution

In 2010, Kenya gave itself a new constitution; this year thus marks a pivotal point in the overall development of the political system in general, and the health care system in particular. Most notably, the constitution proclaims a right to healthcare services, including reproductive healthcare (43 (1)) (Ministry of Health, 2014).

Devolved Government

The constitution of 2010 also introduced the devolved government approach under which the country is organized as of today. In the devolved policy domains, which include health, the national government is accountable for the overarching strategy and policy development, whereas the county governments are responsible for policy implementation and the operational aspects of government (Ministry of Health, 2014).

County System

County System

Kenya as of now is divided into 47 counties, each of which is governed by its own county government.

As part of the team's field research activities (see next section), two counties where visited: the capital region, Nairobi, and the coastal region Kilifi (depicted in the image on the left).

Health Care Delivery Model

Six-step Referral System

Kenya's health care delivery model relies on a referral system with six levels. The principal idea is that complicated medical cases are referred to higher institutions with better treatment capacities.

In order to make this possible, communities are supported by voluntary health workers that serve as first-level support upon the encounter of medical issues. In contrast to the institutions of higher levels these workers are no medical professionals and only receive rudimentary training. Most facilities with trained medical staff in reach of rural communities would be dispensaries and health centers that are equipped to process medical checkups and non-complex procedures such as deliveries, whereas severe complications would be treated in hospitals (level 4 and higher), which typically are located in cities.

As explained above, most facilities are governed by the county, with the exception of national referral facilities, which deal with the most complicated cases.
(Ministry of Health, 2014)

6 Tertiary Referrals
Kenyatta National Hospital

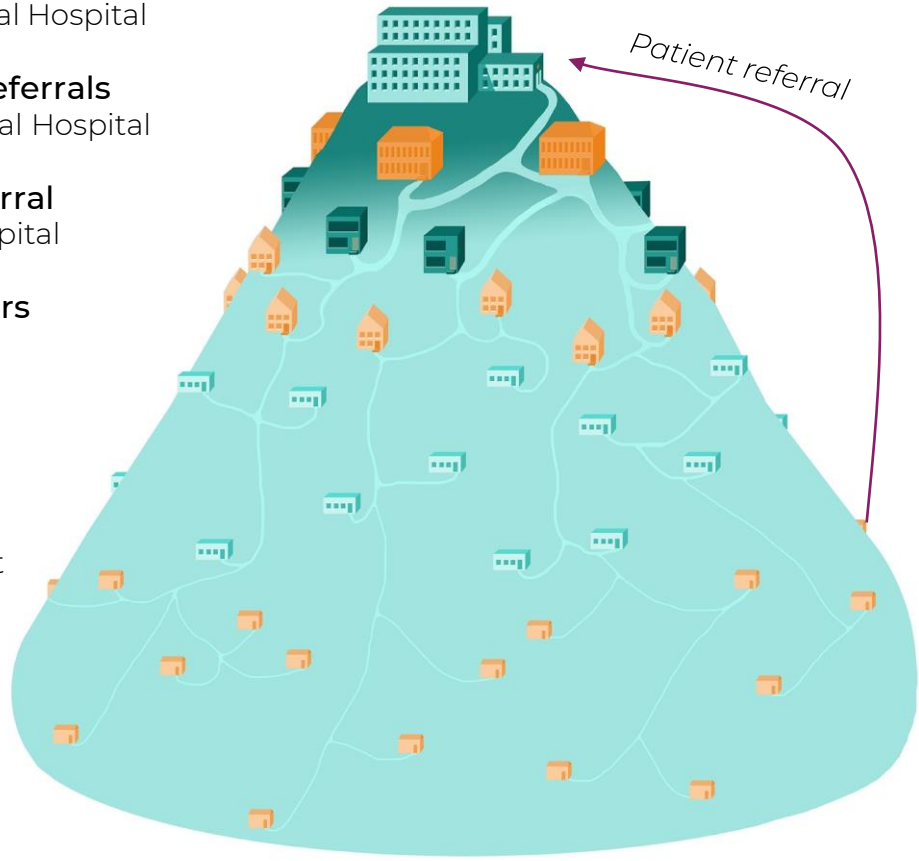
5 Secondary Referrals
Rift Valley General Hospital

4 Primary Referral
Kilifi County Hospital

3 Health Centers
Venoma Clinic

2 Dispensaries
Imani Clinic

1 Communities
Community Unit



Health Care System

National Level

The national government is mainly responsible for the country's overall health policy and regulation. Beyond this, it also governs the national referral facilities (level 6) and supports the county governments with capacity building and technical assistance.
(Ministry of Health, 2014)

County Level

Most operational responsibilities lie on the county level. Here, the county's respective health facilities and pharmacies as well as ambulance services are governed to promote primary healthcare to patients.
The county governments are also in charge of licensing and controlling undertakings that sell food to the public, and they govern adjoining facilities and services such as cemeteries, funeral parlors and crematoria as well as veterinary services. Beyond this, they are responsible for refuse removal, refuse dumps and solid waste disposal.
(Ministry of Health, 2014)

National Referral Services — Level 6

Highly specialized healthcare institutions as well as training and research services on issues of cross-county importance.

NATIONAL

County Referral Services — Level 4-5

Comprehensive in patient diagnostic, medical, surgical and rehabilitative care, including reproductive health services. Facilitate, and manage referrals from lower levels.

COUNTY

Primary Care Services — Level 2-3

Provide disease prevention and health promotion services. Offer basic outpatient diagnostic, medical surgical and rehabilitative services as well as ambulatory services. Take care of observations and normal delivery services;

SUB-COUNTY

Community Level — Level 1

Facilitate individuals, households and communities to embrace appropriate healthy behaviors and recognize signs and symptoms of conditions requiring referral.

Health Care Financing

Sources of Healthcare Funding

- General tax financing: There are a number of free healthcare services in public health facilities, including free maternity services.
- National Hospital Insurance Fund (NHIF): The NHIF is mandatory for formal sector workers, but is also open for the general population if they can afford it. It is the largest insurance scheme in Kenya.
- Private health Insurance: Even though the Kenyan private healthcare insurance sector has grown over the last twenty years, the sector is still quite small.
- Employer Self-Funded Schemes: Some employer offer self-insured in-house medical schemes that provide health benefits as incentives to their workers and dependents.
- Community based health financing (CBHF) schemes: These type of health financing schemes have increased over time and meet the needs of the lower income population who traditionally have been left out of the private insurance schemes and NHIF.
- Out-of-pocket health spending: The number of patients that pay their health services OOP in Kenya is very high. The OOP health spend is a big barrier for Kenyans accessing healthcare services as it drives the poorer households easily into poverty.
- Development partners & NGOs: Various development partners and NGOs have traditionally contributed significantly to healthcare financing and provision.

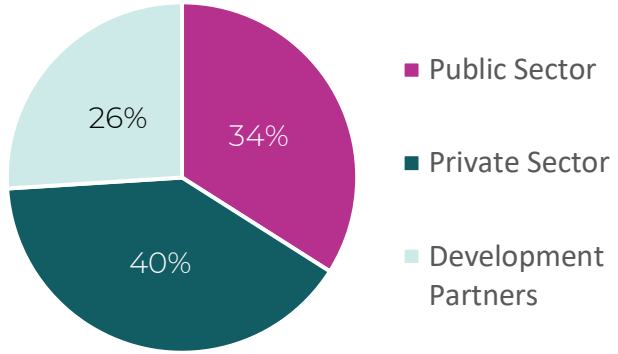
(Netherlands Enterprise Agency, 2016)

Key Figures

In 2016, with an estimated 6.6 million, the NHIF accounted for 85% of the insured population.

In 2012/13 about 40% of public health expenditure was funded on county level.

Expenditure 2012/13



Linda Mama

Linda Mama is a national policy aimed at covering pregnancy related medical expenses for all women in Kenya. It was introduced in 2013, and was first maintained by the Ministry of Health, before being transitioned to the National Health Insurance Fund (NHIF). Linda Mama serves as a blueprint for the country's wider ambitions to introduce universal healthcare for all its citizens.

Services covered by Linda Mama

Linda Mama covers the cost of delivery for pregnant mothers, but not possible complications. The policy also provides an antenatal care package to its beneficiaries, including an antenatal profile and preventive services. It also includes services for the prevention of mother to child transmission (PMTCT).

After delivery, Linda Mama covers a post natal care package. It comprises of at least four focused personalized visits or assessments after birth to at least 6 months post-natal.

(NHIF, 2019)

Registration Requirements

Pregnant women of age 18 years and above are registered using their national identification cards and antenatal care records, while those under 18 years rely on their guardians' identification. Women without national identification cards or guardians can be registered using antenatal care records alone (NHIF, 2019).

3 Design

Understanding how to conduct social impact design projects

Introduction

SCOPE & MOTIVATION

Our research relating to Design is motivated by the need to better understand and benchmark the current solutions, products and innovations other social impact design organizations have created, prototyped, tested and launched in the maternal healthcare sector. By analyzing the work of design agencies working in East Africa, we seek to also better understand the human needs as reported in their projects.

SUMMARY

Our research found four main streams or areas for which design agencies are pursuing solutions to tackle maternal health and infant mortality. These are in the areas of Connectivity & Data, Self Care, Community & Awareness and Education & Management. Design agencies solutions include self-birthing kits, education apps and technological solutions to assist patient record keeping. In order to develop these solutions core enablers must be present, such as data & connectivity, government support, sufficient infrastructure in the healthcare facilities.

Solution Trends

Connectivity & Data Availability

Technology enabled services for better communication, decision making and data capture is a prominent area in which solutions are being created, particularly regarding the transfer for patient data. There are several key areas that present opportunities for technological solutions:

- Electronic medical records and reporting
- Labour and care processes documentation
- Labour monitoring and timely decision making support
- Referrals
- Data collection and quality of care measurement
- Solutions for security and call for help. (M4ID, 2019)

Community & Awareness

Many organizations also focus on solving maternal health issues through community initiatives, which engage all members of the community to increase sensitization around maternal healthcare and infant mortality. (Ornella et al, 2006)

Solution Trends

Self Care

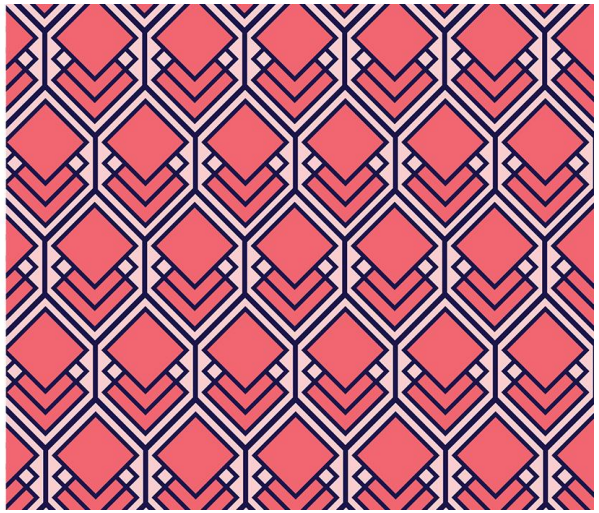
It is not uncommon to give birth at home in Kenya. Sometimes this is by choice or otherwise due to the fact that it is difficult to access a health facility, particularly if you are located in rural areas. Rather than change practices and try to convince mothers to give birth in the hospital, many organizations, including the World Health Organization are looking to reduce barriers to antenatal care and provide a dignified and sterile way to give birth at home. (Unicef, 2010 & Ayzh, 2019).

Education & Management

Educating the community and women about their health is also a popular solution. We see this achieved generally through mobilising local champions or via apps which educate and provide employment opportunities to women. (Living Goods, 2019)

Reference Projects (1/3)

Lab.our Ward



Family & Supporter Pass

"Comprised of two wearable passes for the woman and her supporter, and is designed to communicate their preferences and key information during their stay in the health facility." (M4ID, 2019)

Pregnancy Purse

"The Pregnancy Purse is a folder containing interactive materials for women and their companions to provide information during pregnancy and prepare them for childbirth. The purse can be placed visibly in the home as a stand or it can be hung on the wall. It has handles to carry it along and the size is designed to fit into a woman's handbag, which was communicated as an important requirement by the women participating in the design process." (M4ID, 2019)

Lab.Our Ward

The Lab.Our Ward project led by Finnish design firm M4ID (2019) was an in-depth human-centered design project sponsored by the Bill & Melinda Gates Foundation which presented solutions aligned to the "Arrival, Admission, Labor, Delivery and Postpartum stages in the care journey."(Reference book) The service design outcomes included along with a set of recommendations also a set of tools and new medical products, which M4ID is currently prototyping in India. Below are three of the solutions, which were of particular interest to us for means of benchmarking.

Reference Projects (2/3)

Ayzh Kits

In rural areas, it is not uncommon for women to give birth at home. To solve issues around giving birth at home, without sterile tools, a doctor, nurse or midwife, Ayzh, created The Clean Birth Kit. The kit is designed to prevent infection and the time of childbirth and costs just $3 and provides mothers with necessary tools like sterile wipes, gloves, soap, surgical scalpel, blood-absorbent underpad, umbilical cord clamp, and baby wiping cloth. (Ayzh, 2019)

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iDeliver

Technology innovation initiative iDeliver, is developing a tablet based service tool to support skilled birth attendants with data capture and documentation while providing decision support during the intrapartum care period. The tool aims to improve workflow and task management of hospitals and administrative staff and also enables smoother, faster and better communication between hospitals and client. http://m4id.fi/project/ideliver/

Mobile devices in iDeliver are connected on Local Area Networks and powered by grid or sun electricity. The client files and entered delivery data can be later transferred to the network through satellite or cable connections. The initiative is lead by Merck for Mothers. http://m4id.fi/project/ideliver/

Reference Projects (3/3)

Living Goods product presentation (Living Goods, 2019)

Living Goods

This is an example of how apps are being used to empower women in communities to take responsibility for maternal healthcare. The Living Goods app is aimed at recruiting, training, equipping ad managing a network of primarily female health entrepreneurs, referred to as Community Health Promoters. These women attend homes in their community and assist treating common illnesses such as malaria, pneumonia and sell

Living Goods equips every Community Health Promoter with a cloud-based app that enables them to accurately assess, diagnose, treat, and follow up with families. Community Health Promoters do not work as volunteers or salaried staff. This is an example of solutions which not only promote healthcare but also provide a stream of income to women thereby supporting their financial independence.

4 Culture

Understanding Kenyan culture and traditions

Introduction

SCOPE & MOTIVATION

Aligned with the project's human-centered design approach, this stream seeked to raise awareness regarding social and cultural characteristics of the region (Kenya) where problems around maternal healthcare were researched and identified.

DELIVERABLES

The Kenyan constitution proclaims a right to quality healthcare, including maternal healthcare. It forbids abortion in any cases that are not medical emergencies including life preserving measures. There is a high number of teenage pregnancies with unmet family planning needs.

The Law of Health

Basic Rights

The Constitution of Kenya (2010) guarantees all citizens access to healthcare. It states: “Every person has the right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care”. (Const. of Kenya, 2010)

Article 25 asserts that “Motherhood and childhood are to be entitled to special care and assistance and children born out of wedlock are to enjoy the same protection”. (Const. of Kenya, 2010)

Concerning the baby, the law adopts a pro-life approach by treating the fetus as a human being, with intrinsic rights from the time of its conception. Therefore, abortion is not allowed according to the constitution of the country. However, there is an exception if the pregnancy case satisfies one of the following criteria:

1) In the opinion of a trained health professional there is a need for emergency treatment
2) The life or health of the mother is in danger
3) If permitted by any other written law (Latif, 2013)

Penal Code

Aligned with the Constitution, the Penal Code (1970) prosecutes any attempt to procure abortion by an external person as well as a pregnant woman. It considers any person who either administrates any poison or other noxious thing or supplies with instruments to procure miscarriage as guilty of a felony and as liable to imprisonment. This regulation considers a child as a person when it has completely proceeded in a living state from the body of its mother. (Penal Code, 2008)

Other Legal Provisions

As a strategy to prevent maternal mortality and protect the right of unborn children, other regulations and protocols have been created:

- The Maputo Plan of Action on Sexual and Reproductive Health and Rights of operationalization of the Continental Policy framework on Sexual and Reproductive Health and Rights (2006)
- The African Health Strategy (2007-2015)
- -Campaign on Accelerated Reduction of Maternal Mortality in Africa (CARMMA) (2009)

Teenage Pregnancy (1/2)

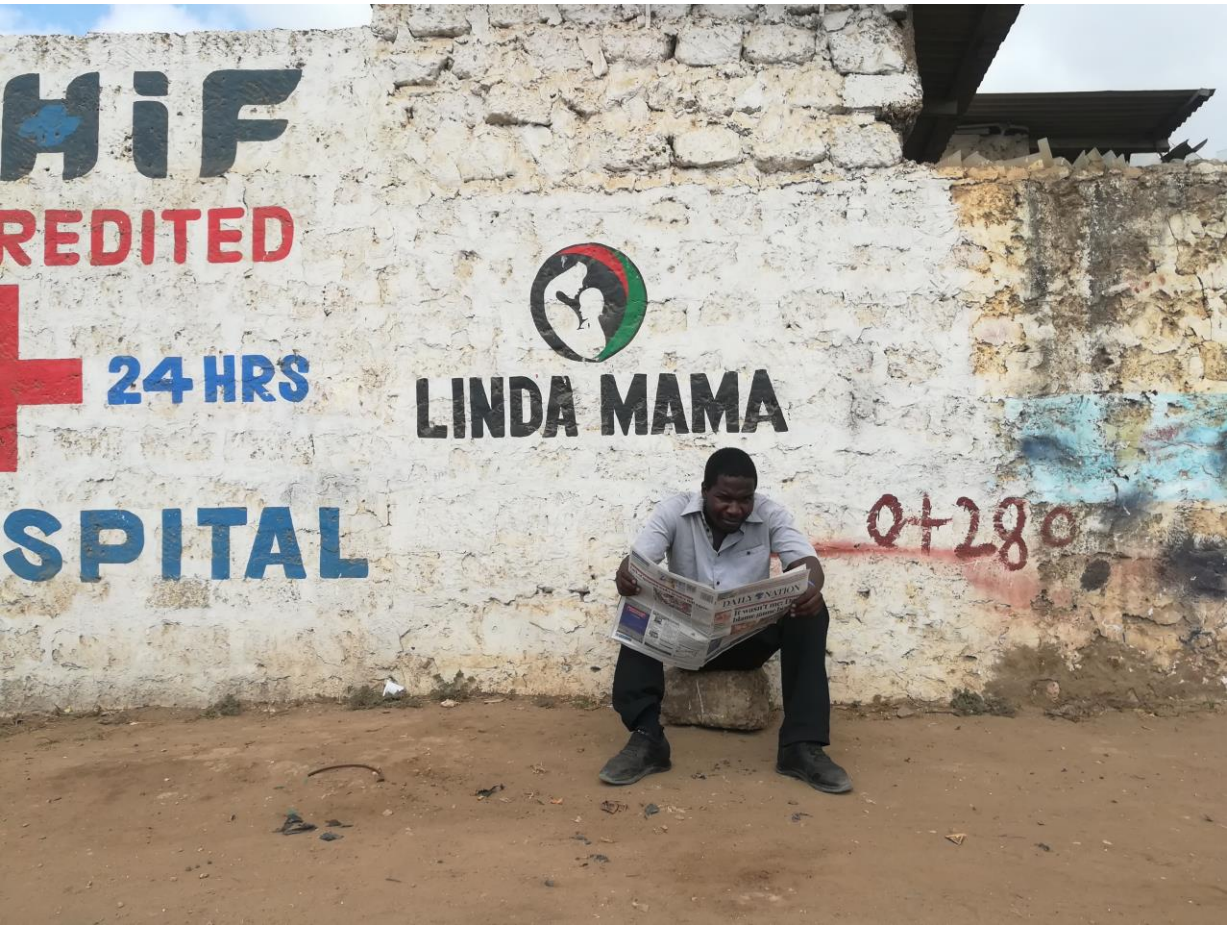
Root Causes

Adolescent pregnancy is common in Kenya. Almost a quarter of Kenyan women has given birth by the age of 18, and by the age of 20, almost half. According to Kenya Demographic and Health Survey (2014), 23% of adolescent girls aged 15–19 have an unmet family planning need. This means girls do not have the information needed, nor the supplies or services to prevent pregnancy.

Maternal mortality rates are twice as high among girls aged 15-19 when compared to adult women. Complications during pregnancy are the second cause of death for 15 to 19 year-old girls globally and the leading cause of death within this age group in Kenya (Laboso, 2018)

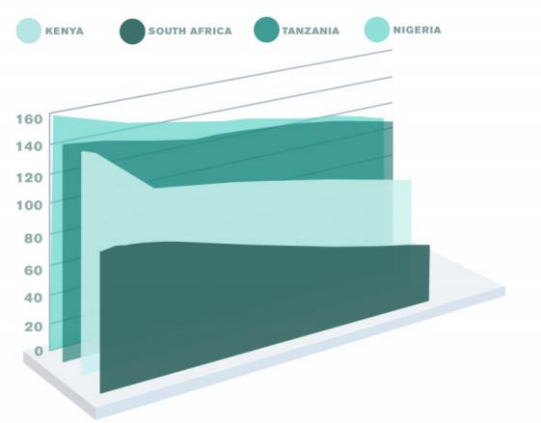
Poverty is also a contributing factor of teen pregnancies. With most families struggling to make ends meet, exploitative men who can meet the girls' needs demand for sex in exchange. According to (PMA) 2020 Kenya survey, poverty increases the risk of teenage pregnancy. Girls from poor households had a 26% chance of beginning childbearing earlier compared to their counterparts from richer households who are at 10% risk. (Waweru, 2018)

Teenage Pregnancy (2/2)



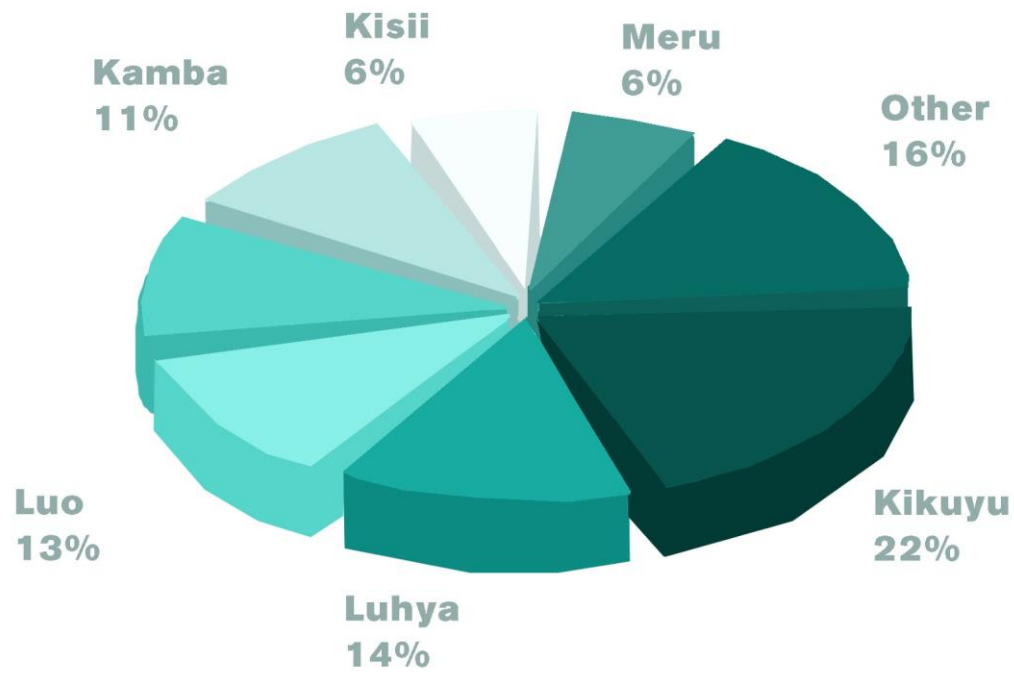
Recent Development

According to the UN Population Fund (UNFPA), which uses Kenyan health survey data, the rate for births among women aged 15 to 19 was 96 per 1,000 women in 2014. But this data also clearly shows a significant falling trend in pregnancy rates, from a high of 153 per 1,000 in 1989 - a drop of one-third. This can be attributed to sex education in schools, better awareness of contraceptives and improved prosecution of perpetrators. (Reality Check, 2018)



Ethnic Groups (1/3)

Major Ethnic Groups in Kenya



Tribes

Kenya is a multiethnic society, in which 42 major tribes coexist, most of the time peacefully. An individual's tribe plays an important part in their life, and defines their customs as well as their social and cultural environment.

Ethnicity also draws the line between different political faction, which has lead to issues of ethnic-based violence during elections. The most prominent recent example for a violence outbreak are the general elections of 2007, which lead to the killing of several hundred Kenyans, and to the displacement of up to 600,000 (Wikipedia, 2019).

Ethnic Groups (2/3)

Luhya Overview

Luhya consists of 18 tribes with 5.3 million people. In earlier days, the society was entirely patriarchal: women were present not only as child-bearers but also as an indication of status. In addition, the practice of polygamy meant more hands to work the fields, an advantage in a society founded on agriculture.

Today, things have changed, and once common practices such as polygamy are only practiced by few people, usually if the man marries under traditional African law or Muslim law. (Revolvy, 2015.)

Luhya Family Structure

Daughters had no permanent position in Luhya families as they would eventually become other men's wives. They did not inherit property and were excluded from decision-making meetings within the family. Today, girls are allowed to inherit property, in accordance with Kenyan law. First marriages are typically between men aged 18–20, and women about age 16. There were two types of first-time marriage: arranged marriages and enforced eloping. Arranged marriage sand this is still quite common.

Modern day Luhyas do not practice some of the traditional customs as most have adopted a Christian way of life. Many Luhyas live in towns and cities for most of their lives and only return to settle in the rural areas after retirement or the death of parents there. (Revolvy, 2015.)

Tribe Culture

The traditions of almost all ethnic groups in Kenya involve the belief in an eternal, omnipotent creator envisaged as remote from men. Many indigenous religions also recognize spiritual forces at work in the world that are closer to the living and more involved in their daily affairs.

Beliefs in sorcery and witchcraft play important roles in many indigenous belief systems and often persist after conversion to Christianity or Islam even when other elements of traditional religions have faded.

Ethnic Groups (3/3)

Kikuyu

The Kikuyu is the largest ethnic group in Kenya with population of 6.6 million people (22% of whole population in Kenya). Kikuyu nation was divided into nine clans and they are economically farmers. Girls are made to work in farming, take care of children and help their mothers, while boys work with animals. Both girls and boys go through circumcision.

Circumcision is considered as a type of rite of becoming an adult. After the mutilation, the daughter is in the care of her grandmother, she is responsible for the girl to become a good wife and a mother. (Organisation for Social Science Research in Eastern and Southern Africa, 2008)

Miiljkenda

The Mijikenda culture revolves around clans and age-sets. A Mijikenda clan consists of several family groups with a common patriarchal ancestor. Traditionally, each clan lives in one fortified village built in a cleared area of the forested ridges. Each village is lead by the eldest generation, who are responsible for such varied tasks as solving disputes, providing rain, and managing the kaya forests.

Like other Kenyan tribes today, Mijikenda people have assimilated to modern cultural practices, resulting in the disappearance of many of their traditional customs. Most Mijikenda people are now either Christians or Muslims; however, some still practice their traditional culture or a mixture of Christianity or Islam with their traditional religion. (Kenya Information Guide, 2015.)

Religion (1/2)

Religious Groups

Christian missionaries
Churches were founded in the 1920s and 1930s, especially in areas where Kikuyu, Luo, and Luhya predominated.

Protestant Christianity (47.7%)
The missionaries brought education and modern healthcare. Many schools and hospitals have been built by the church.

Roman Catholic Christianity (23.4%)
The Catholic Church in Kenya is one of the biggest owners of land and property in the country. It is active in providing education, health, and other social services.

Tensions in the country between Christians and Muslims have heightened in recent years due to the rise of Islamist radicalization, and terrorist attacks in the country orchestrated by Al-Shabaab, a Somali-based Islamist terror group (Elisha, 2017).

Religion (2/2)

Beliefs in Culture

Kenyans are deeply religious, religion is pivotal for upbringing and socialization.

Roughly a quarter or more of the population say they believe in the protective power of juju (charms or amulets), shrines and other sacred objects.

According to the research done by Pew Forum on Religion & Public Life (2010), in 14 of the 19 African countries surveyed, more than three-in-ten people say they sometimes consult traditional healers when someone in their household is sick.

Findings show that religion and ethnicity have no impact in family planning, the most significant factors are level of education and knowledge about the benefits of FP for the mother. FP interventions ought to include strategies aimed at enhancing women's knowledge about the positive impacts of family planning (Bakibinga, et al., 2015)

Traditions

Challenges through superstitious beliefs

In the Luhya Community, difficulty in labor or delay in delivery (obstructed labor) is believed to be punishment for marital infidelity. This practice inflicts great mental cruelty in addition to psychological trauma suffered by the woman, the practices further delays her being taken to the hospital. Older female relatives might assist at uncomplicated births but midwives are called for complicated deliveries.

Cultural practices including nutrition taboos ensure that pregnant women are deprived of essential nutrients and as a result they suffer from iron and protein deficiencies.

After a child is born, the new mother and baby stay indoors at home for 40 days, a time period known as afatanbah. After delivery, for about 2 weeks, the new mother stayed in the home resting, feeding the baby. Other ladies, sisters-in-law, neighboring friends helped with cooking, fetching firewood and water (Otieno, Miyienda, Wanjuri & Nthenya, 2013).

The more educated a pregnant woman, the more likely she timely initiated antenatal visits and attended at least four clinics throughout her pregnancy. A mother with more children was less likely to begin clinic early and sought less than the recommended four visits for skilled care during pregnancy. Multiple studies have highlighted the importance of addressing socio-cultural barriers and community norms to improve the uptake of essential MNCH services (Mberu, B., Muindi, K. & Elungata, P., 2017)

Field Research

What we found out on our trip to Kenya

Introduction (1/2)

This section summarizes the most relevant data collected during the field research, which took place in Kenya from February 25th to March 8th. For two weeks the PBL East Africa team, comprised of students from the partnering institutions, University of Nairobi (Kenya) and Aalto University (Finland), worked together to address the following topics:

1. Identify the main problems healthcare personnel face regarding the use of the fetoscope

2. Identify the main challenges relating to maternal healthcare in Kenya in general

In this endeavor, the Aalto team focused on the second area, with a wider approach to understand the problems and their context, whilst the Kenyan students worked on the former one as per their client's (Makerspace) request.

Introduction (2/2)

In order to organize and design the second part of the research, two initial problem statements created after desk research were used to guide the content of the interactions (interviews and observations) on site. These problem statements were questioned and reframed during the two-week process due to discoveries and insights identified after conversations with users and visits to clinics at different levels, finalizing with the identification of concrete opportunity areas to develop solutions.

Our field research ended with an ideation workshop which helped both teams to conclude their activities and make a first round of exploration with local people considering a more defined problem statement. This Co-Creation Workshop brought together stakeholders and the PBL team to collaborate and create ideas for the two aforementioned topics and its results are presented below.

Field Research Goal

Field research based on ethnographic methods has as general objective to overcome the assumptions of designers or researchers by developing empathy through diverse tools aimed at understanding users' perspective. Bearing this in mind, the main goal we are pursuing is presented on the right.

Locations

The Aalto team located in Finland traveled to meet the students from the partnering institution in Kenya with the purpose of collaborating to collect data from the field. Two locations were defined to accomplish their respective goals:

1) Nairobi, (capital of the country) as the destination of main interest for the client, with access to clinics, startups, governmental organizations, and the university.

2) Kilifi County (southeast county), with access to clinics and stakeholders on the community level.

Gather relevant information concerning maternal healthcare in Kenya based on experiences and insights from stakeholders and users,
in order to better understand the systemic context and identify opportunity areas which can guide the design and possible implementation of an innovative solution to improve the system.

Methodology

Based on the principles of Human Centered Design (HCD), three main tools to collect information from diverse users and stakeholders were used as part of the field research activities:

Interviews

Questionnaires were designed to perform in-depth interviews to get insight into the areas of interest. These interactions lasted approximately one hour, being audio recorded (when possible) and reported through note-taking by capturing general impressions, personal quotes and relevant data.

Short interviews with patients and users took place when visiting clinics. They were reported through note-taking.

Observations

Clinics allocated at different levels of the healthcare system and community facilities in Kenya were visited.

Access to operational facilities as well as to medical equipment and records was possible in some cases, in which photography and note-taking were the main sources to report findings.

Co-Creation Workshop

A series of activities for concept development were facilitated by the team with the purpose of addressing the problems in a collaboration between stakeholders, users and designers/researchers.

Different frameworks were implemented to trigger discussion and lead different teams to elaborate on ideas for future solutions based on their experience within the field.

Expert Advice from M4ID

Interview Summary

Before developing material for field research, the PBL team had a conversation with one design agency allocated in Finland which has been developing healthcare projects in collaboration with local organizations in Sub Saharan Africa, M4ID. The goal of the interview was to get insights into factors and particularities of the African culture which could be useful to guide the team members when carrying out interviews and observations in Kenya.
Nicolas von Fetter, product design lead at M4ID, explained that the following points were the most relevant for the aim of our future research:
People in Africa are not used to compensations for their participation, but a gesture of acknowledgement, such as providing refreshments or offering to pay their transportation to reach the place, is well received.
In East Africa, people are generally talkative and open. When possible, make use of visual tools such as diagrams and props to help them understand a question and get the best insights.
More importantly, he recommended to develop 2-3 ideas which could be presented or even prototyped locally in order to get feedback from local people, making most of the time spend there and having opportunity to test an idea in real context.
In the healthcare field it is important to keep in mind that medical staff take their job seriously, so being mindful of the words and language use is crucial. In addition, one should strive for never going overtime. Healthcare systems are already understaffed and any time spent by a nurse is time they could use to help a patient.
Finally, he advised to find a local 'champion' who gets excited about our concept, because they will then help to push it along.

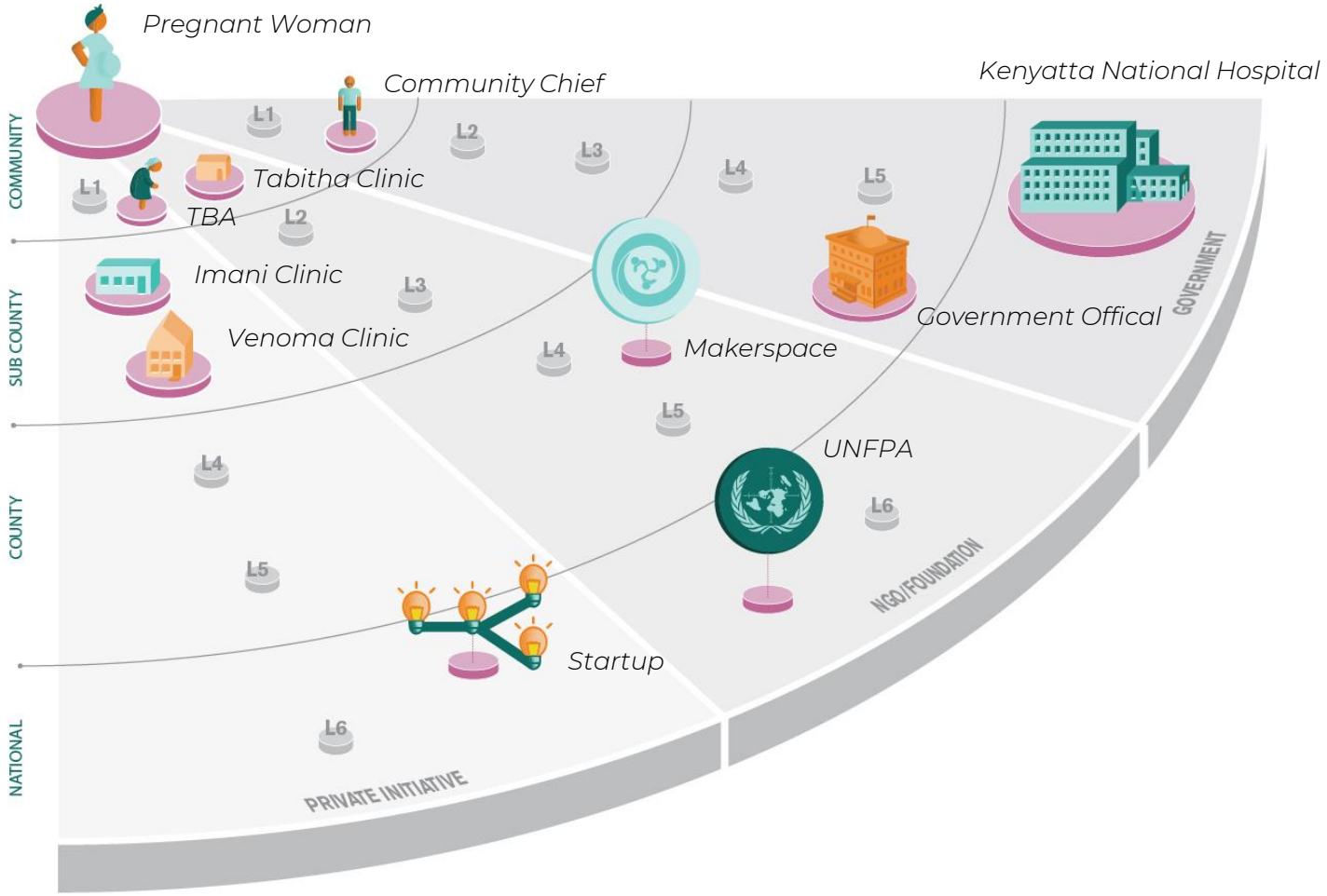
Nicolas von Fetter
Product Design Lead

"The most valuable thing we can do is test concepts as opposed to just got there for 'context' and come back to Finland and test"

"If you want to implement and push further a project, you should find a champion in the community"

Helsinki, Finland

Stakeholder Map



Interactions

According to the desk research and the initial problem statements, the PBL team reached out to stakeholders allocated at different levels of the healthcare system. This approach enabled the team to analyze the big picture of maternal healthcare in Kenya. In total, 25 interactions were performed.

Medical Professional (Nurse,Midwife)	6
Traditional Birth Attendant (TBA)	2
Pregnant Woman/Mother	3
Clinic/Hospital Management	3
Technician	2
Startup	2
Government Official	4
NGO-Foundation	3

Stakeholder Description (1/3)

Community Level

Pregnant Woman
Patient who receives services from different stakeholders, being the focal point of the research as the main beneficiary of the project.

Traditional Birth Attendant
A traditional birth attendant (TBA) is a community member who helps pregnant women during the pregnancy period. Currently, the majority of them is not part of the official healthcare system, but their presence is still strong.

Imani Medical Services
Private clinic which offers services to pregnant women in Kilifi County, Malindi. It is allocated at level 2 of the healthcare referral system.

Venoma Medical Clinic
Private clinic which offers services to pregnant women in Kilifi County, Malindi. It is allocated in level 3 of the healthcare referral system.

Community Leader
People who are in charge of taking decisions about matters concerning a community. They solve conflicts between members of the community.

Stakeholder Description (2/3)

Regional Level

Startup Ecosystem
It comprises of startups and hubs (incubators) that strive to offer alternative services to the ones currently available in the market.

Carolina for Kibera (Tabitha Medical Clinic)
Located in Kibera, the biggest slum in Kenya, this foundation aims to improve the living condition of their inhabitants by addressing basic needs as nutrition and healthcare.

Maker Space
Client of the Kenyan time that works as a link between the university and other organizations. They are currently interested in the development of medical equipments with special attention on innovation and cost effectiveness. They are collaborating with Phillips Foundation and the University of Nairobi on the Kenyan team's project to design a new fetoscope.

Stakeholder Description (3/3)

National Level

Kenyatta National Hospital
A referral healthcare facility in the public healthcare system. Being a tertiary referral facility, the hospital is located on level 6 and receives the most urgent cases from different counties and clinics.

Management: Personnel in charge of administrative decisions, procurement of medical technology and communication with other areas of the hospital.

Medical Professionals: Comprises of nurses and midwives who are in direct contact with patients (pregnant women) and are key in the referral process through the system.

United Nations (UNFPA)
Intergovernmental organization whose objective is to maintain international peace and security, protecting human rights, promoting sustainable development and upholding international law.

Government Official
Officials in charge of coordinating supervision of medical facilities and addressing challenges concerning public services and quality as well as affordability of healthcare in the county of Kilifi.

Stakeholder Groups

Agents that mostly interact within the reach of a community of familiar individuals and locations

Agents that have significant networks and reach, allowing them to connect to and influence stakeholders throughout an entire county

1 Community

2 Sub-County

3 County

4 National

Agents that act across different communities, but still on a scale that is regionally highly focused

Agents that connect to and influence individuals and institutions across the entire country

1 Community Level

Stakeholders that stay within their community

Pregnant Women

Night Transportation

Transportation is hard to find at night; patients use the Tuk-Tuk if they can afford it, or deliver at home.

Private Hospitals

offer better services than public ones, or TBAs, all in one place.

Referral System

In emergency, patient will simply try to reach the closest facility.

Interview Summary

From the interviews we found out that patients have different perceptions of TBA's work and hospitals, depending on their personal experience. On the one hand, with regards to clinics it is appreciated to find all services in one place, including training sessions, and they are regarded as a low-risk opportunity for treatment, although in public institutions medical professional are less easily available. On the other hand, TBAs are easier to reach, because hospitals sometimes are located far from the community. We encountered women who went through complications, up to loss of child, and attributed these to poor treatment performed by TBAs; naturally, they reported negative sentiments.

In addition, it was mentioned during the conversation that the Tuk-Tuk was used to travel from their village to the closest hospital, although it is not recommended for pregnant woman. Yet is the most accessible means of transportation, as sometimes members of the same community are owners (drivers) of the vehicle. During night times transport was reported to be drastically more expensive, leading to involuntary home deliveries.

Pregnant Women

'I gave birth at home twice since the labor time was really short and the transportation could not come quick enough"

'I would rather give birth at the hospital because it is safer and the hospital doesn't value people who have delivered at home"

'I took the Tuk-Tuk to get to hospital and it was overwhelming. The pain is more than you can ever imagine."

Kilifi, Malindi. March 1st 2019

Traditional Birth Attendants

Referral

In emergencies, patients simply try to reach the closest hospital or clinic.

Transportation

Pregnant women use the Tuk-tuk to travel.

Patient Information

TBA has to give information about the patient to healthcare personnel.

Interview Summary

TBAs assist pregnant women not only from their own community, but also from others. They stated that their "knowledge" was simply acquired or a natural skill they were meant to use (by God), transferring this know-how through apprenticeship. Concerning hospitals and clinics, they claimed to recommend or approach them in case of underaged patients or emergencies, selecting the facility nearest to the village. In this regard, they mentioned that phone calls are the main means of communication with patients and clinics.

In addition, TBA usually join the pregnant woman on her ride to the hospital, sometimes accompanied by her mother or mother-in-law. Upon arrival, doctors demand information about the patient's condition from the TBA.

Finally, they said that Tuk-Tuks and Boda-Bodas are used to travel to the hospital because they can access the community easily.

TBAs

"When a woman uses Tuk-Tuk, she lays down to reduce the pain"

TBA, 20 years experience

"If there is an emergency, I take her directly to hospital"

Mama Mubomu, TBA, 30 years experience

Kilifi, Malindi. March 1st 2019

Carolina for Kibera (NGO)

Enabling Factor

Integrating community-building activities in their work.

Education

To enable change in behavior, education is the best tool.

Incentives

Communicate benefits and provide tangible incentives to convince individuals to join services.

Interview Summary

Carolina for Kibera is an NGO initiated by individuals from both Nairobi and the University of South Carolina aiming to improve the healthcare level and to drive behavior change with regards to education and health in Kenya's biggest Slum, Kibera.

It was mentioned that one of the biggest challenges was to keep beneficiaries, because their lifestyle keeps them from attending the NGO's activities. Therefore, the NGO uses incentives, such as "baby packs" to attract and encourage them.

Regarding enabling factors, CFK has integrated members of the community to collaborate in their pursue, for instance, local teachers and community leaders, as well as patient that had concluded the program and are willing to share their personal journeys. In addition, they explained that some patient have faced problems with insurance programs, such as Linda Mama and NHFS, because either there is not notification they are registered or they got lost in the system due to corruption issues.

Ann & Team
Impact Manager

"There are a lot of expectations from the community. They ask 'How I am going to benefit?'".

"Knowledge is a first resource first of all'".

"You need to first bring the community, gather them and explain them."

"[With incentives] they also feel part of the program."

Kibera, Nairobi. March 5th 2019

Community Chiefs

Transportation
Pregnant women use Tuk-tuk to travel

Referral System
Giving birth at night complicates the travel to the next open clinic.

Digital Infrastructure
Predominance of use of basic cellphones (Nokia)

Interview Summary

According to the interviewees' experience, delivery in hospital is being encouraged among pregnant woman of the community, because delivery at home assisted, assisted by a TBA, is perceived as a high risk and a practice of the past.

Moreover, they mentioned that most births occur at night, but unfortunately the local dispenser is not open 24 hrs. Therefore, patients must travel to the closest hospital, using the Tuk-Tuk as transportation (with a fee that increases almost 1o times during night shifts) by calling them via cellphone. In this regard, they commented people usually own basic Nokia models and not smartphones.

Finally, they showed a lack of understanding about the importance and goal of family planning, and they were not aware of Linda Mama.

Community Chiefs

We met with the community chiefs at their regular meeting spot outside the village, as part of our visits to the local communities around Malindi.

""Tuk-Tuk fee is 50 KSH during day time, but around 500 KSH during night time"

Kilifi, Malindi. March 1st 2019

2 Sub-County Level

Stakeholders that are bound to a specific region

Imani Clinic (Private)

Transportation
Use of private car or outsourced ambulance.

Referral System
Medical professional will escort patient to next level.

Patients Information
Some patients might not be able to read and understand forms.

Interview Summary

Imani clinic has implemented a local server-based web solution to record their patients' data. Yet, traditional forms (paper-based) have to be filled in with the same information in order to forward it to Ministry of Health.

In addition, the interviewee states illiteracy is a problem among some clients, because they do not know how to fill information or read a prescription. It was discussed pregnant women are not consistent with the scheduled check-ups and when they come for the first time with symptoms, sometimes patients have to be convinced about their pregnancy status.

Concerning the referral process, he added that one staff member generally goes with the patient to the next level facility, using their own transportation (car) or an ambulance from the Red Cross.

Clinical Officer

We visited Imani Clinic as part of our visits to the local communities around Malindi.

"We must copy the information to paper to deliver it to MOH [the Ministry of Health]"

Kilifi, Malindi. February 28th 2019

Venoma Clinic (Private)

Transportation

Most patients deliver during night so it is difficult to get transport.

Digital system

Online data system is coming in June.

Policy

To get NHFS coverage, a patient needs a national ID.

Interview Summary

Venoma Medical and RHS Centre is a private clinic in Malindi. When they wanted to register a clinic, they had to ask a permission from sub-county, which overall took two years.

Most of their clients are women of low income and that's why they give them free t-shirts and transportation, which function as incentives to convince patients to come to the clinic. The introduction of provided transportation has generated more clients for the clinic. Furthermore, family planning and vaccinations are free for patients, as per national reimbursement policies. The clinic manager confirmed that there is an incentive to keep hold of pregnant women until delivery, whereas possible complications pose a financial issue, as they are not covered and patients cannot always pay for their costs (the clinic manager claimed that these women were treated nonetheless).

The clinic reports patient records directly to the county, but they keep original records of them. They have also created their own booklet, a Mother and Child Health Booklet, to record all patient data from pregnant women and mothers.

Clinic Manager

"My main complaint is the referral system and how mothers move through the system."

"Some patients don't want free products or medicines because they don't trust the quality of the free stuff."

Malindi, February 28th 2019

3 County Level

Stakeholders that operate within an entire county

County Officials

Poverty
is the biggest healthcare challenge.

A digital system
for patients would be appreciated, but the county does not have the capacity to implement one.

Integration of TBAs
through a community strategy to incentivize agents from outside to join the official healthcare system.

Interview Summary

The county follows a community strategy that relies on community health volunteers; these can also be recruited from traditional birth attendants. The intention is create incentives for agents from outside the official healthcare system to migrate into the system, most notably by offering a referral fee. The experiences with the referral system differ depending on the density of facilities in the county's seven sub-counties. The county currently has nine ambulances that are located strategically to process referrals. As per Dr. Ibrahim, the referral system is mostly adhered to, with only emergencies being referred directly to high level facilities.

Outside of policy matters, there is only minimal collaboration between the national and the county government.
The county would appreciate a centralized digital patient information system, but does not have the capacity to implement one. Patient data can be obtained by private organizations, given patient agreement, but data collected by the government will not be shared with them.
Not more than 10% of the patients are covered by insurance, mostly through NHIF.

Dr. Alio Ibrahim
County Chief Officer Health

We met Dr. Ibrahim, together with Dr. Bilali Mazoya, county chief officer health for medical services, in the lobby of a hotel in Nairobi.

"When we [were] at school, most of the [healthcare] issue was revolving around culture. But now, for me, I see it from a different angle. The whole barrier in healthcare, I can say that 90% depends on poverty. That is the whole issue."

Nairobi, 26th February, 2019

4 National Level

Stakeholders that operate nation-wide

Kenyatta Nation. Hospital (1/2)

Medical History
Patients have limited awareness of their own health.

Confidentiality
A patient might lie about their own medical history, e.g. they may fail to report past pregnancies after a change of partner.

Education
Public health workers are not well educated in all clinics.

Interview Summary

Kenyatta National hospital (KNH) is the highest level hospital in Kenya. We visited KNH two times and had the chance to inspect the labor ward as well as other departments, such as the procurement and maintenance of medical devices.

If a patient has severe complications, other clinics refer them to the KNH. In practice, this process is often not adhered to, as patients may just directly frequent KNH. KNH also has ambulances, but patients don't order them because they don't know where to call and what it would cost.

If a mother has a delivery, but she hasn't reported her pregnancy, it may be difficult to register the baby. It is also difficult to register babies that are born at home.

Mothers, who have delivered at home, can get free vaccinations from the nearest health care center. Some patients might lie about their medical history because they don't want to be judged. For example mothers who have new husbands, might not want to give information about a previous pregnancy.

Labor Ward
Team Lead

"We are not contact with patients after they have had deliver."

Teresa, Clinical Instructor

"We do not refer patients to lower level hospitals/clinics"

Rachel, Head Midwife

Nairobi, February 26th & March 4th 2019

Kenyatta Nation. Hospital (2/2)

Referral System

Lack of patient information when referred results in slower treatment.

Linda Mama

Incentives within reimbursement policies need to be reassessed, particularly relating to Linda Mama.

Education

People lack the information and education to understand the importance of the medical health.

Interview Summary

It was evident that hospitals at all levels are severely understaffed. The triage system also takes time as many mothers are either referred to or attend Kenyatta without their medical histories.. This means midwives must spend more time assessing history before attending to the mother.

It was also interesting to discover more about the policy-driven incentives relating to Linda Mama, which pays clinics a fee for each child delivered. What this means is that clinics hold sick pregnant women until they deliver and then only refer them to Kenyatta at the final stages of their complications. This increases Kenyatta's maternal death rates.

A lack of resources was also evident, with Kenyatta Hospital only owning one ultrasound and one doppler machine, used only in cases of confirmation checks or emergencies.

There was also a discussion relating to patients' lack of education on the importance of knowing their medical history and reporting it accurately.

Midwives & Nurses

Labor Ward

While visiting the labor ward, there were deliveries in progress, in adjacent rooms. Curiously, no screams of delivering mothers were heard. As the nurses pointed out this was because they gave special attention to calming patients down before deivery.

"KNH will receive them [patients] because other clinics want to avoid the problem"

"I don't know if my patients have been received in other clinic, they

Nairobi, February 26th & March 4th 2019

iHub (Startup Hub)

Funding
is one of the biggest challenge for startups in Kenya.

A digital system
for patient information would be a big step forward, because it would create accountability for doctors.

Inequality
A vast majority of startups target metropolitan areas of Kenya, with only few aiming at rural areas.

Interview Summary

The iHub supports its startup members mostly with facilitating contacts to influential stakeholders, such as high ranking individuals from politics and business, and with providing infrastructure and trainings. The iHub has worked with over 355 startups that raised over 43m dollars investment.
The biggest challenge for startups in Kenya overall is to obtain funding. Many startups find their funding outside of traditional financers. The biggest share of solutions (more than 20%) provide financial solutions. Health and tech are more difficult, as it's hard to gain access to the required experts. Successful health solutions have been catered towards community hospitals who then recommend these to higher levels, rather than to patients.
The government has proclaimed an ambition to make Kenya a startup country, but this yet has to materialize in concrete policies. Generally, however, it is easy to found a company.
The cultural and economic diversity in Kenya heavily impacts the professionalism of a startup and the way it communicates its value proposition.
A vast majority of concepts are targeted to the metropolitan areas of Kenya, with only few aiming at rural areas, such as startups that provide internet or agriculture trading solutions.

Benson
Community Manager

We talked with Benson on the terrace of the iHub's co-working space in Nairobi.

"There is always a need for an incentive, always."

"Kenyans are definitely open to healthcare innovations. Especially when you think of how much money is spent on typical community hospitals that are buying expensive equipment from abroad. Why are we buying surgical razors from abroad? I mean, we can make them here."

Nairobi, 6th March 2019

United Nations (UNFPA)

Access to healthcare
and quality of care remains an issue in marginalized communities

A digital system
for patient information would be within the framework of the referral strategy and the healthcare sector strategic plan.

Linda Mama's
reimbursement system does not take complications and follow-up services into account.

Interview Summary

Quality of care and access to healthcare services remains an issue in marginalized communities, such as the northern regions, which leads to many deliveries at home. Despite clear standards being provided, it is difficult to monitor if they are adhered to in practice.
Complications during pregnancy are now majorly tackled with a community health strategy that relies voluntary health workers and retired or unemployed midwives to monitor pregnant women and provide access to healthcare.
A general digital patient information system would be within the framework of the referral strategy and the healthcare sector strategic plan. Some countries are experimenting with systems for referral networks that rely on GIS mapping, to map out facilities, manage referrals, and even tracking patients. As per the team, manually delivering the data forces professionals to close facilities at certain hours.
Linda Mama's reimbursement system does not take complications and follow-up services into account. The program's funds would be sufficient for this, but the policy design is not made for it. There should be a way for hospitals to claim reimbursements for such services.
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Korir Kigen & Team
Programme Officer

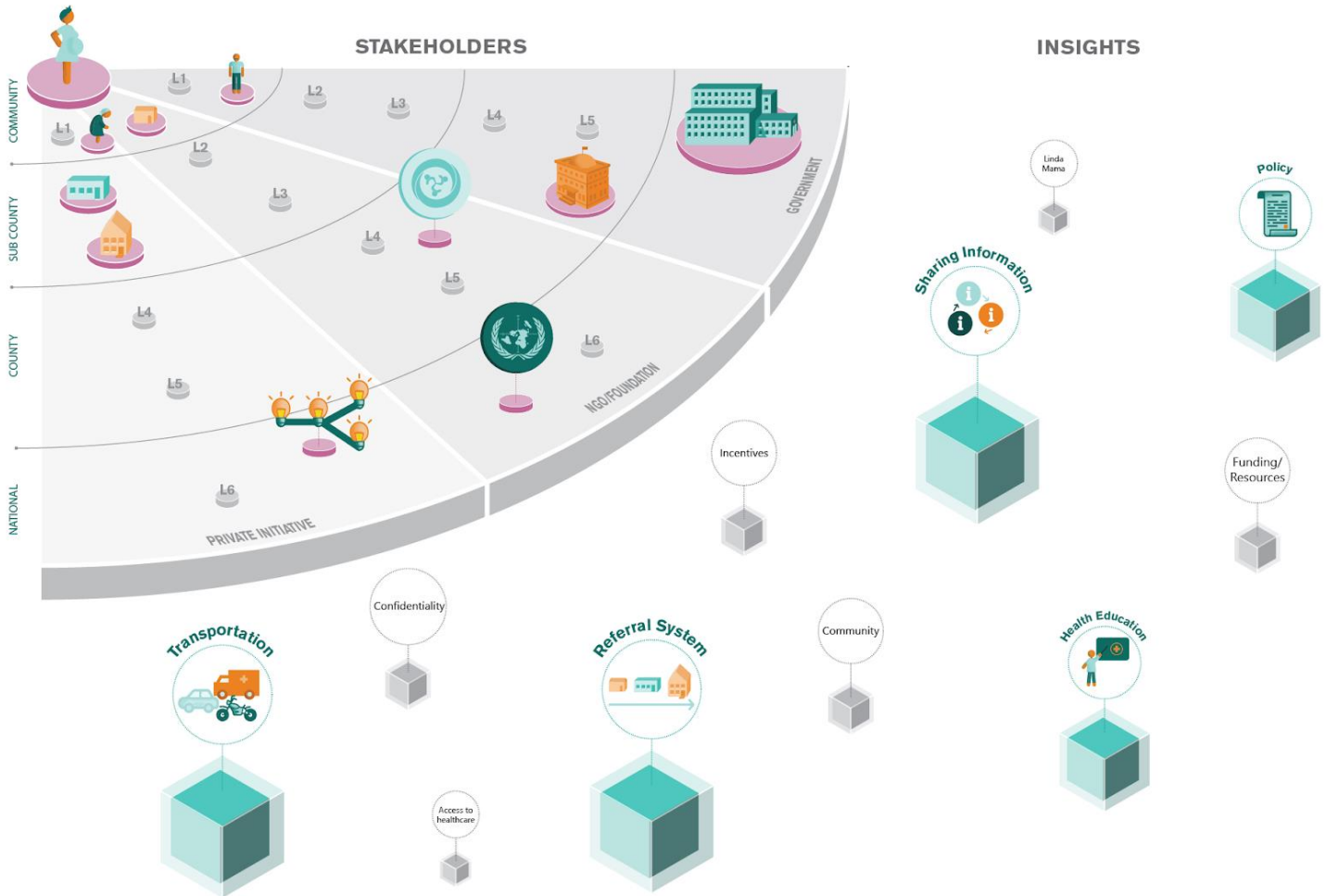
"The long-term vision is that Linda Mama, being just a small program, is to be merged with the bigger funding in the sector [to provide universal healthcare], so we hope that by that point [facilities can claim services beyond deliveries, such as complications]. But we don't know when that will happen, maybe by 2025."

Nairobi, 6th March 2019

Insights

What we found out through our field research activities

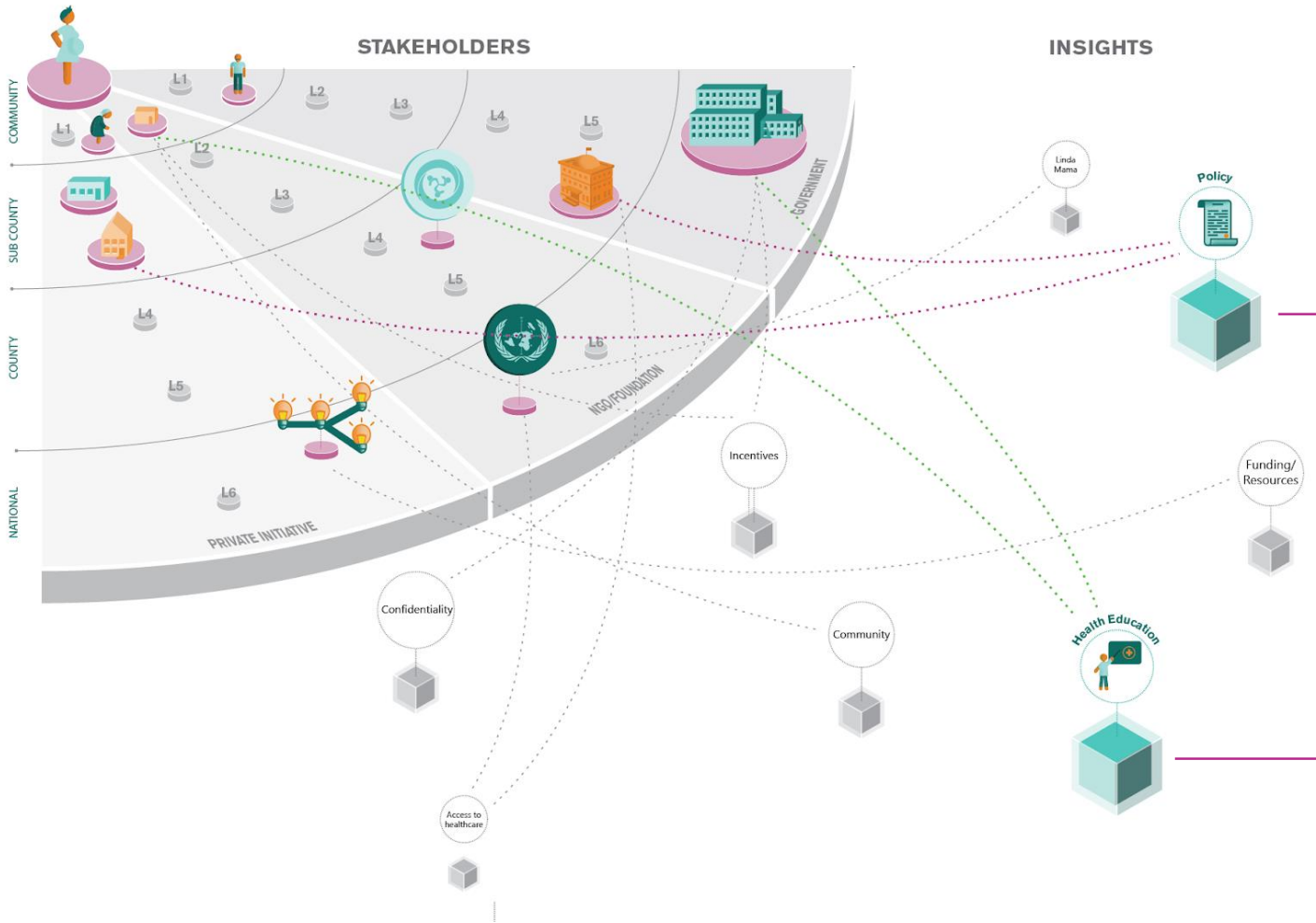
Relevant Findings



This graphic shows the different insights identified during the field research based on observations and interviews with stakeholders.

The findings have been different box sizes, according to their relevance and frequency. The intention is to identify the areas that have consistently be revealed as major concerns by different stakeholder groups, thus picturing the overarching context of issues within maternal healthcare in Kenya.

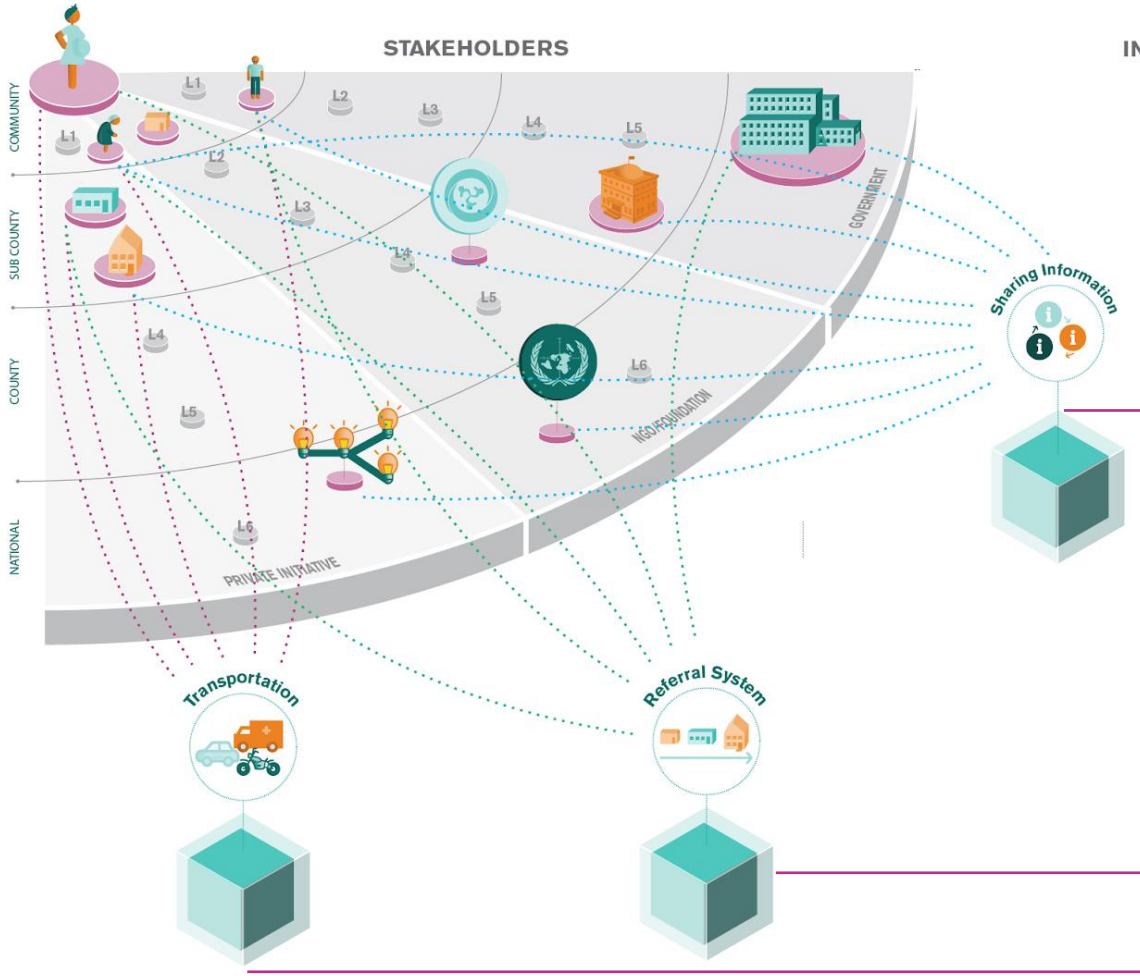
Secondary Insights



Supporting Claims

- Incentives for TBAs to migrate into the official system
- To get NHFS coverage a patient needs a national ID
- False incentives in Linda Mama prevent optimal referrals
- To enable change in behavior, education is the best tool
- Public health workers are not well educated in all clinics.
- People lack education to understand importance of medical health

Main Insights (1/2)



Some patients might not be able to read or understand forms

Use of basic cellphones (Nokia) to communicate

Centralized digital system for patients would be appreciated,

Digital patient information system would be a big step forward

Digital system is within framework of the referral strategy

TBA has to provide information about the patient

Lack of patient information results in slower treatment

In emergency, patient will reach closest facility

Medical professional will escort patient to next level

Many Patients do not adhere to system, but go directly where they want

Transportation is hard to find and afford at night.

Pregnant women use the tuk-tuk to travel

Use of private car or outsourced ambulance.

Most patients deliver during night so it is difficult to get transport.

Main Insights (2/2)

On of the main challenges present at all levels of healthcare and across all stakeholder groups is the referral process, which is not always working efficiently. Patients visit clinics/hospital based on proximity and availability, crowding units that either are not capable to provide the required services or that are overqualified for it. Medical professionals complain about not being able to track and follow the advancement of a patient throughout the system based on protocols and proper diagnoses.

Storing and sharing patients' information was a consistent issue witnessed by different stakeholders. Traditional paper-based reports are predominant to keep records, although they have proved to be ineffective to communicate data to patients, other clinics and the Ministry of Health. This situation has lead private institutions to adopt to their own digital solutions. However, the lack of a centralized system doesn't allow transferring reliable and accurate data concerning patient clinical history. In this regard, patients are not able to communicate their own information properly to medical professionals.

Transportation was a problem found at community and sub-county level. Patients struggle with finding means to travel from their villages to the closest clinic or hospital. These in turn do not have enough available means of transportation to refer patients to the next level of healthcare. Therefore, they make use of local transportation such as Tuk-Tuks and Boda-Bodas (motorbikes), even though these represent a risk for the patient's safety. Motorbikes can access communities more easily and are more available during nights. However, fees are sometimes not affordable for patients, which leads to involuntary home deliveries.

Problem Framing

What we believe to be the biggest issues

Problem Statements

Linda Mama's reimbursement policy sets flawed incentives for clinics to hold on to patients until delivery and then refer them to higher facilities once complications ensue.

1 Policy Issues

2 Transport

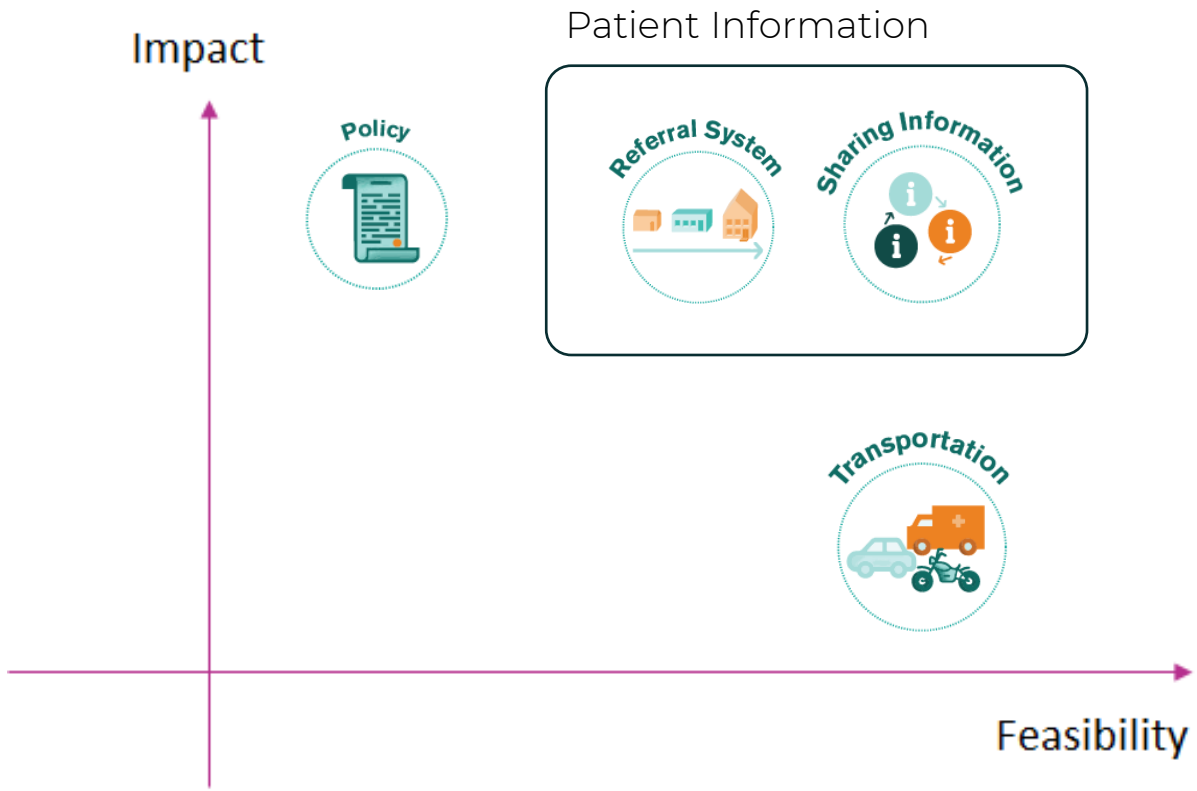
The missing availability of safe and affordable means of transport, especially at night times, drives mothers in rural areas to deliver their babies at home.

Since the country's patient care and referral system is still paper-based, not digital, there is a lack of transparency, accountability and efficiency in the overall treatment of patients.

3 Patient Information

Evaluation

Problem Mapping



This graphic shows the result of our assessment of the different problems identified. As per our project goals, it is our ambition to find solutions to problems that are severe, but also leave room for improvement with innovative solutions.

The transfer of patient information throughout the referral process is a crucial feature of the healthcare system that, improvements in this area can be expected to drastically increase the system's efficiency, transparency, and accountability.

Co-Creation Workshop

Bringing stakeholders together to generate ideas

Overview (1/2)

As a final method to understand users' perspective and conclude the face-to-face collaboration between both universities, a series of exercises were designed to bring together users and interested parties in a hands-on experience to generate solutions.

To guide the discussion towards our topic the following problem statement was used as a trigger:

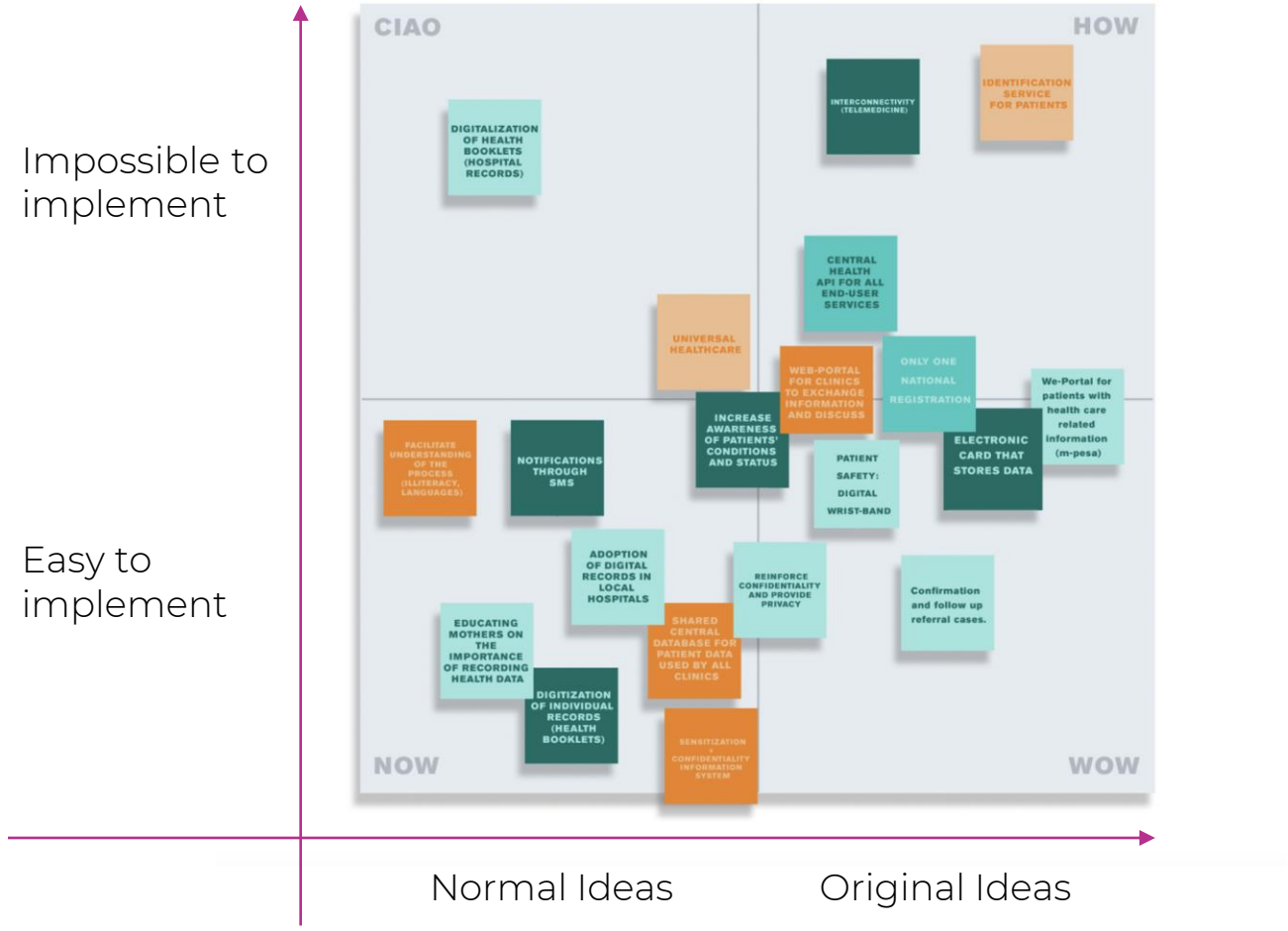
> *How might we communicate patient data between health facilities during the referral process and encourage patients to take responsibility for communicating their medical history?*

Overview (2/2)

Through a series of facilitated activities, participants were encouraged to foster critical thinking and creativity to come up with ideas to address and give an answer to this question.

The goal of this practical activity was to create useful, usable and desirable solutions to improve maternal healthcare processes and discuss about their possible implications by implementing a research-based method to get instant feedback from the experts in different fields.

Mapping Ideas



Results

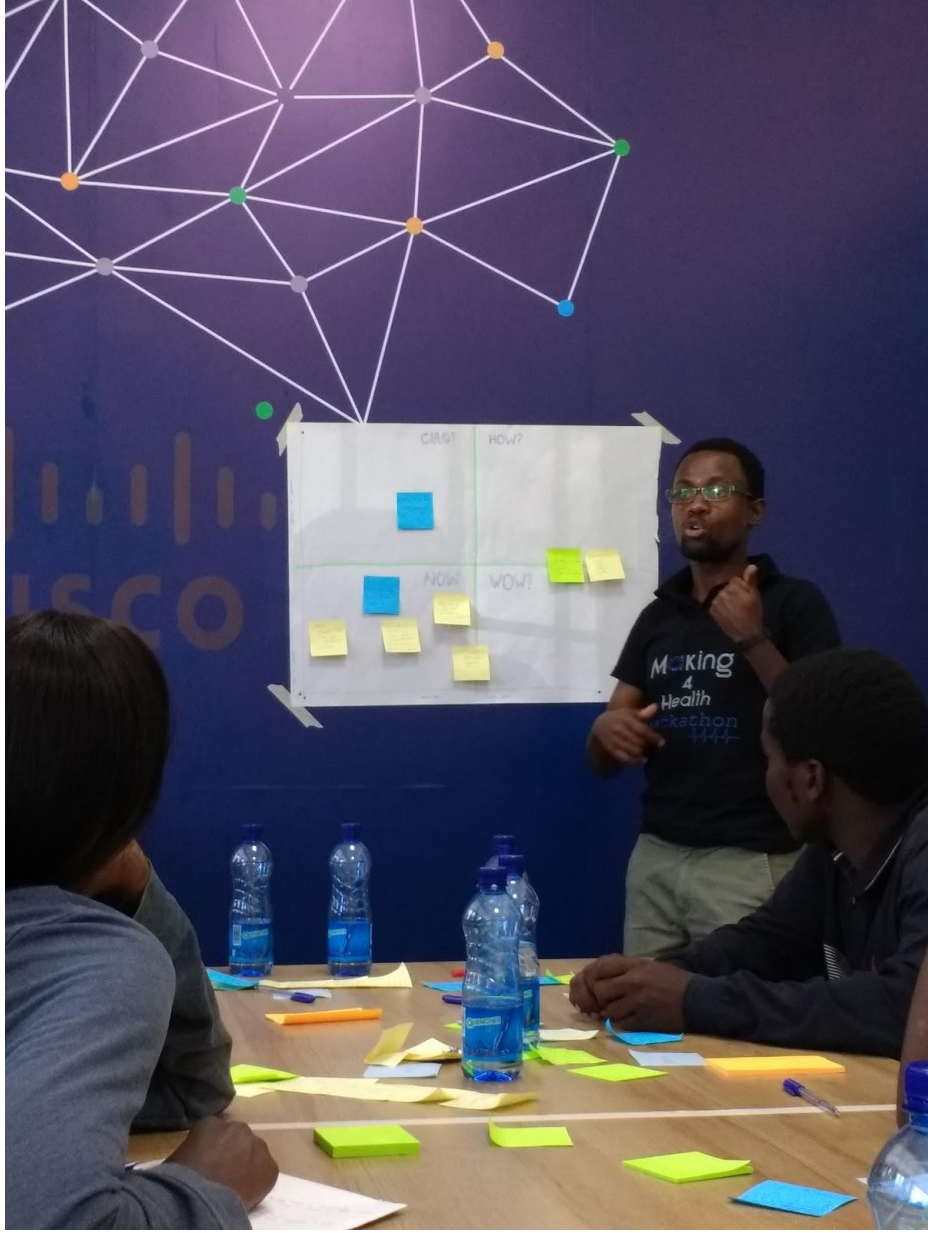
Summary

It is always eye-opening to see the results of co-creation in action. The ideas generated when varying stakeholders collaborate are much more rich and pertinent to the needs of real users. Our participants included academic professors, midwives and nurses, heads of medical devices for Kenyatta Hospital and the Kenyan team's client, Makerspace.

All participants agreed that the current issues regarding patient data and its transfer is a key challenge to be overcome. Some of the ideas included:

- Wristband, which patients present to the hospital and which stores their medical history, blood type, HIV status and other crucial information;
- Establishing a centralized system or database which all clinics could use to access patient history;
- An electronic healthcare card that stores patient data;
- Simple solutions like introducing digital records to hospitals;
- A quick carbon copy referral pad, which the referral hospital uses when referring patients;
- Education programs for expectant mothers, so they understand the importance of their medical data and their future child's;
- Sensitization programs on confidentiality and information services.

With these ideas, the team will now analyze, reframe the problem and delve into our design directions.



Involved Institutions (1/2)

FINLAND

PBL East Africa

This project is part of a larger collaboration project between Aalto University and Makerere University, University of Dar es Salaam and Nairobi University. The focus is on Problem Based Learning (PBL) and an essential element is the collaboration among the students from the two institutions.

Aalto University

Aalto University brings together research and teaching from the field of Arts and Design, Business and Engineering. The team consists of students studying in the Masters Program of International Design Business Management (IDBM). The project is part of their course called IDBM Industry Project where ten student groups work with industry actors to co-create design solutions for the future.

Aalto Global Impact

The PBL project is facilitated by Aalto Global Impact, which promotes the research and education of the university for societal impact.

Involved Institutions (2/2)

KENYA

C4D Lab

C4DLab is an R&D and Startup Incubation hub at the University of Nairobi. The lab aims at contributing towards building the Silicon Savannah, leveraging on the large University community.

University of Nairobi

The Kenyan team is comprised of students from the University of Nairobi (UoN). The University of Nairobi is one of the largest universities in Kenya, and facilities innovative projects in various areas of human development through a network of partnerships within the region and beyond. The university sustains a variety of collaborations with different partners; in the healthcare field it cooperates among others with Kenyatta National Hospital.

Makerspace

The client of the Kenyan team is Makerspace, a lab at the University of Nairobi that focuses on developing innovative technological solutions in the medical field with the aim to foster local startups and industries and reduce the cost of healthcare in Kenyan facilities.

Thanks!