Mobile Health Projects in Uganda -
Narrative Report

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inSCALE – Innovations at Scale for Community Access and Lasting Effects

The inSCALE programme, a collaboration between Malaria Consortium, London School of Hygiene and Tropical Medicine (LSHTM) and University College of London (UCL), aims to increase coverage of integrated community case management (ICCM) of children with diarrhoea, pneumonia and malaria in Uganda and Mozambique. inSCALE is funded by Bill & Melinda Gates Foundation and sets out to better understand community based agent (CBA) motivation and attrition, and to find feasible and acceptable solutions to CBA retention and performance which are vital for successful implementation of ICCM at scale.

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Preface

This document was prepared by Uganda Chartered Healthnet for an internal meeting of the inSCALE project. This document is not an official inSCALE publication but rather an internal working document.

Discussions about the content of this document are welcomed.

Contents

Introduction

The convergence of mobile technology and public or population health has led to what is now known as mhealth i.e. the provision of health related services via mobile communications (Consulting 2009). The most common and distinct applications of mhealth interventions are categorized as: Education and Awareness; Remote Data Collection /transmission; Remote Monitoring; Communication and Training for Healthcare Workers; Disease and Epidemic Outbreak Tracking; and Diagnostics and Treatment Support (Blynn 2009). Several initiatives have come up especially in the developed world and Uganda in particular to meet the health information needs of health practitioners.

This review was conducted to identify concepts and strategies which can better inform the design of innovative interventions to improve the quality and coverage of Integrated Community Case Management (iCCM) approach to disease management program by the iNSCALE Malaria Consortium project. First we start with a basic description of the key issues identified for review:

1. **Thematic/Application Area:** The specific areas needs in the delivery of health care distinctly categorized as education and awareness; remote data collection/transmission; remote monitoring of drug adherence; communication and training of health workers; disease and epidemic tracking of disease outbreaks; diagnostic and treatment support; and lastly health administrative systems.

2. **Innovation/Concept:** An innovation is understood as an activity, approach or underlying concept which may contribute to the performance and retention of Community Health workers AKA Community Based Agents (CBAs). An innovation may: be promising in practice; promising theory; have been used before in Uganda or elsewhere but not in the way proposed or in the way originally designed; or has been used effectively in other geographic locations and / or sectors.

3. **Program/theoretical source of innovation:** This issue deals with the unmet needs or requirement of a beneficiary group or program to which the innovation responds.

4. **Targeted beneficiaries:** This refers to the benefiting group either as consumers of health services or providers of the health services.

5. **Status of implementation –** refers to whether the project's implementation is ongoing, completed or yet to start.

6. **Geographical location of implementation** – the physical location where the project is operated.

7. **Outcome/measurable indicators:** a measure of the project's success at the outcome level.

8. **Cost** – the total project budget for the procurement of key inputs.

9. Barriers/challenges: these are factors challenging or hindering the successful implementation of the project in terms of scalability, acceptability, and feasibility.

10. Facilitators: these are the factors supporting the successful implementation of the project in terms of scalability, acceptability, and feasibility.

Methodology

The review took the Rapid Appraisal approach so as to gain a preliminary qualitative understanding of the status of mhealth projects in Uganda(Beebe 1995). The approach was sequenced in a 2-step process involving a review of documents; and Holding interviews with key informants related to the m-health projects.

Limitations

Due to the time constraint, the methodology chosen was the Rapid Appraisal approach which deemed appropriate for the task. As such, extensive detailed data collection was not possible on every aspect of the study. Additionally, the time to identify and conduct interviews with key respondents was inadequate with several respondents indicating interest to be interviewed but at the same time unable due to time constraints. Secondly, and probably due to the time limitation, this study has been affected by a high non-response rate. Nearly 50% of all identified key informants did not respond to the interview guide prepared and sent in advance of the requested interview. These factors affected the accuracy and timely delivery of this report.

Results and discussion

The findings are organized and presented according to the thematic areas above described. In the last section, they are presented according to their geographical locations and coverage. Out of the 31 projects we were only able to conduct eleven (11) key informant interviews. The thirty one (31) mhealth projects are or have been deployed in 27 districts of Uganda. The majority of them are over-lapping in the specific areas of Remote Data collection; and education and awareness. Annex 2: mHealth review table provides the project details about the concept, goal and objectives; scope, cost, implementation status, etc.

It is also noteworthy to mention that the majority of the projects did not have formal project documents such as proposals and reports that could be accessed for public consumption.

Thematic area

As mentioned earlier, the common distinct thematic areas identified were: Education and Awareness; Remote Data Collection /transmission; Remote Monitoring; Communication and Training for Healthcare Workers; Disease and Epidemic Outbreak Tracking; and Diagnostics and Treatment Support.

For this study, 2 other categories were identified to include: health administrative systems; and other.

Education and awareness

In this area, mobile devices especially mobile phones are used for spreading health information and awareness campaigns about HIV, TB and other topical diseases. Sending SMS txt messages to users' phones is common and popular amongst the youth and middle age groups as it is cost-effective and scalable. The following projects were classified in this:

1. Health in Hand
2. Innovations for Poverty Actions
3. Question Box
4. War Child
5. Text to ChangeSMS quizzes
6. Freedom HIV/AIDS Game
7. eMOCHA (electronic Mobile Open-Source Comprehensive Health Application)

Remote Data Collection and Disease Outbreak surveillance

Applications in this category are mainly for remote collection and transmission of health and medical data mainly using cellphones.The following projects were found in this category:

1. TB Monitoring platform
2. Infectious Disease Surveillance and Reporting
3. Community Vulnerability Surveillance Program- integrated Community Health.
4. Community Health Worker Data Management
5. Frontline SMS Health
6. Healthy Child
7. Malaria Monitoring Platform
8. Ministry of Health - Malaria Monitoring Platform Uganda
9. Community Vulnerability Surveillance Program
10. Results SMS
11. Open X Data (formerly Epi-handy)
12. MobileHRS

13. Uganda Health Information Network
14. Open Mobile Electronic Vaccine Trials

Remote Monitoring of Drug Adherence

Applications in this category are used for supporting community health workers ensure adherence to treatment regimens for critical health conditions such as diabetes, TB, and HIV AIDS. Only 1 project was found in this application i.e. Wireless Measurement of Adherence to HIV Antiretroviral Therapy.

Diagnostic and Treatment Support

Interventions in this category are developed to provide community health workers with support and recommendations for diagnosis and treatment of given health conditions. Three projects were identified in this category, namely:

1. Mobile microscopy for automated malaria diagnosis in field conditions
2. Reproductive Health Voucher
3. Rural Connection to Health facilities through SMS

Health administrative Systems

The Health Administrative System category includes all those applications used by medical and health personnel to improve productivity in the delivery of health care. The following projects are identified in this area, namely:

1. eHMIS
2. PDA Assisted Health Supervision
3. SURE (Securing Ugandan Rights for Essential Medicines)
4. OpenMRS
5. ICT4MPower
6. Service Availability Mapping

Others

This category is for any other applications that are not covered in the above-mentioned areas. No project was found fitting for inclusion in this group.

Innovation (Concept)

Five (5) distinct innovation/concepts were seen across the 32 projects.SMS/Text messaging using ordinary phones was the most widely used - 16 projects in total. PC/Laptop/PDA Based Forms/Content tied with WAP (Wireless based applications) at nine (9) projects each. Phones using voice was one project while Interactive Voice recognition (IVR) had two (2) projects while Web Based Applications garnered six (6) projects. The table below illustrates the different concepts and the associated projects.

Programme/ Theoretical Source of Information:

Generally, the conception of mhealth projects is driven by the unmet health information needs in the health sector. The sector has different players with diverse needs including policy makers and planners, health care givers and consumers. The Ministry of Health has come up with a national Health Information Strategy which contains the core requirements for health information systems and how mhealth projects can address them (Health 2009).

- **ICT4Mpower:** The lack of national IDs which hinders tracking of data about disease history or changes and this has led to mishandling of patients.

- **Rapid SMS:** UNICEF wanted a tool that would allow it to quickly contact its teams in the field via SMS to relay important messages and notify them in case of emergencies

- **Wise pill:** Current adherence assessments typically detect missed doses long after they occur. In order to prevent virologic rebounding and treatment failure, wise pill was innovatively thought of.

- **Health In Hand:** Inadequate or lack of access to health and medical information
- **Results SMS:** Many medical test results in the developing world are never received by patients and not acted on by healthcare providers. This negatively impacts on both patient care and research efforts that rely on effective data collection to draw meaningful conclusions.
- **Question Box:** The fact that some people are illiterate, some people are too poor to afford even a mobile phone and some people (often times women) is shut out from communicating with certain people or information sources.

- **Mobile Microscopy for automated Malaria;** The most reliable test for malaria is
- Microscopic examination of blood films for presence of the parasite. The problem with this is that it requires equipment, and an expert on-site to use it. Some researchers have recently indicated the promise of combining microscopy with mobile phones, in order to mitigate the requirement for an expert to be physically present

- **Community Health Worker Data Management**: Need for accurate and timely reporting of disease data.

Targeted Beneficiaries:

- **Village Health Teams/ Community Health Workers**: ICCM, Frontline SMS, Rapid SMS, Community Health Workers Data Management, eMocha

- **District Health Offices/Ministry of Health:** Gatherdata, UHIN, ICT4Mpower, Rapid SMS, PDA Assisted Health Supervision.

- **Health Workers:** Frontline SMS, UHIN, ICT4Mpower, Rapid SMS, eMOCHA, HiH, Reproductive health Voucher.

- **Patients:** Frontline SMS, ICT4Mpower,eHMIS, Wise pill, Results SMS, Reproductive health Voucher, Mobile Microscopy for automated Malaria, TB monitoring Platform, Malaria Monitoring platform

- **Children:** Child Count
- **Researchers:** Results SMS
- **Open to general population:** Text to Change, Google SMS, Health Child, and Question Box, Freedom HIV/AIDS, Rural Connection to Health Facilities through SMS, SAM

Status of implementation:

Active Projects:
1. Frontline SMS Medic
2. ICT4Mpower
3. Rapid SMS
4. Wise pill
5. eMOCHA
6. SURE
7. eHMIS
8. Google SMS
9. Mobile Microscopy for automated Malaria Diagnosis
10. Freedom HIV/AIDS
11. OpenXdata

Completed Projects

1. Infectious Disease Surveillance and Reporting (Gather Data)
2. UHIN
3. Text To Change
4. PDA Assisted health Supervision
5. Health in Hand
6. Question Box
7. Community Health Workers phone Reporting

Projects with **Unknown** implementation status

1. Child Count+
2. OpenMRS
3. Results SMS
4. TB monitoring platform
5. Malaria Monitoring platform
6. Reproductive Health Voucher
7. Rural Connection to health facilities through SMS
8. SAM
9. Epi Surveyor
10. Innovations for Poverty Actions

Geographical Location

mHealth projects were found to be implemented in majorly 27 districts of Uganda distributed as follows:

East:

1. Kamuli,
2. Mbale,
3. Manafwa,
4. Bududa,
5. Tororo,
6. Iganga

West:

1. Kabwohe,
2. Bushenyi,
3. Mbarara,
4. Isingiro,
5. Kabale

5. Lyantonde,
6. Kibale,
7. Buliisa,
8. Masindi,
9. Kampala

Central:

1. Kiboga,
2. Hoima,
3. Masaka,
4. Rakai,

North:

1. Pader,
2. Amuru,

3. Lira,
4. Gulu,
5. Kitgum,
6. Nakapipirit,

7. Apac

Only 2 projects were found deployed throughout the country i.e. the Service availability mapping, and the Freedom HIV game universally available to anyone for downloading onto a cellphone from the Internet,

Measurable indicators:

Fifteen (15) projects responded to this question as follows:

Reproductive Health Voucher# of SMS, Payment notifications, announcements received; queries about payments, Requests for claim books; number of e-mail; Photo attachments for queries about client treatment, etc

Community health Worker data Management: Reports by VHTs on number of patients seen, diagnosed, and treated for fever/malaria, pneumonia and diarrhea.

Question Box: Number of asked and answered questions.

Innovations for Poverty Actions: tips on sexual & reproductive health (family planning, maternal & child health, HIV/AIDS, STI/STDs, sexuality)

eMOCHA: # of forms designed # of Clinical algorithms and checklists created
# of links to webcasts, # of clinical support tools, # of video files to demonstrate clinical procedures.

Wise pill: number of times the pill container is opened to retrieve drugs, pill counts, pharmacy refill, viral loads measurement.

PDA Assisted Health: EPI, IDSR indicators; 91 of 194 health units in Masaka region and 292, health units and 661 health workers supervised in Mbale region.

Rapid SMS: Regularity of reports, Epi and nutritional data, Individual case data, weekly aggregates, etc.

Child Count: Number of Child and Pregnancy registration, birth and death reports; number of visits made by community Health workers, CHW management and performance indicators.

Frontline SMS Medic: number of patients tracked, referred, time saved.

Gatherdata: weekly, monthly and annual surveillance reports for the ministry and the districts.

ICCM: Reports by CHWs on number of patients they have seen, diagnosed, and treated for fever/malaria, pneumonia and diarrhea; quizzes and knowledge tests for VHT; SMS reminders from supervisors.

UHIN: data base size, weekly broadcasts of health information sent over the network, routine reports sent to MOH

Cost

This question got only 7 responses:

1. Frontline SMS: $ 8000
2. UHIN: $600,000
3. ICT4Mpower; $2,000,000
4. Rapid SMS- $200,000
5. HiH: $10,000
6. Mobile Microscopy $25,000
7. Gatherdata: $12,000

Barriers/Challenges:

- **Wise pill:** battery life of the container was too short, Signal transmission interruptions, intentional non use of the wise pill for example storing pills in another container.

- Rapid SMS: requires strong technical skills to install and configure; lacks an SMS cost estimator; access to accurate data; sustainability after programs end (this involves costs of airtime, etc.
- Lack of real policies E health and M Health resulting into many and similar pilots without a common target that are operating under the radar of the Government.
- Lack of local capacity i.e. shortage of good programmers and management.
- Translation to local languages is a problem.
- Creation and finding out who is behind a telephone number in the database is a challenge
- Technophobia on the side of the health workers.
- Unreliable electric power.
- Phone operates on android platform which makes it expensive.
- Unavailability of local specific content(medical Literature)
- High costs of SMS,
- Monopolizing the innovations.

- Cost of Smartphone is still high -$ 500,
- A procedure for procurement of equipment takes long and spreads out into project proposed time.

Barriers to scalability:

- **Wise pill:** Scalability is really limited by the ability to monitor the devices for technical problems.

Barriers to feasibility

- **Gatherdata:** At that time the GPRS service was only being provided by one telecom provider so people who were working in clinics with low mobile coverage had to wait until they were in a better place to upload data.
- **Frontline SMS medic:** GSM signal at one site (KCRC).
- **ICT4Mpower:** Several partners to coordinate
- **Rapid SMS;** Training CHW on different devices
- **Question Box:** Required a network of on the ground field staff. Alternative would be to advertise the hotline directly

Barriers to Acceptability

- **ICT4 Mpower:** Education levels on the ground
- **Rapid SMS;** Less training and weak turn over for training
- **Question Box:** Users required a few good experiences in order to trust the service

Barriers to replicability

- **GatherData:** The phones need credit to send the data. A sustainable solution to provide this support may be an issue.
- **Frontline SMS medic:** Lightweight tools, local ownership
- **ICT4Mpower:** Costs although most of the development is seen as a one time input.
- **Question Box:** Highly replicable if there is a local partner to implement and oversee the service.

A few other challenges have been observed, especially in regard to credit for the phones the case of two-way communication – when users need to SMS back. The biggest drawback however is obviously the number of characters you are able to enter using SMS. PC/Laptop/PDA Based Forms/Content and WAP (Wireless based applications) are mostly intertwined. Input and display is mainly carried out using these platforms

Facilitators

Facilitators to scalability:

- **Gather data:** To scale, all it takes is extra phones – or installing the application on existing phones so long as they meet the minimum application requirements.
- **Frontline SMS medic:** Implemented in existing CHW program.
- **Text To Change:** Network coverage is broadly spread and mobile phone handsets are now a necessity to humans.
- **Rapid SMS:** Basic information can be received on an ordinary phone.
- **Question Box:** Field agents built person-to-person trust. Live conversation with our Operators meant that service was helpful to women, children, and illiterate.
- **Freedom HIV/AIDS:** partnering with various organizations like hospitals, research centers, medical associations, NGOs, CBOs, and Corporate from different parts of the **w**orld to fight diseases and health related problems

Facilitators to feasibility:

- **Gatherdata:** GPRS enabled mobile network. Project was addressing a real problem user originally had to walk along distance or take public transport to report the data, now they could do it from the comfort of their living room over the phone.
- **Frontline SMS medic:** Data managers on-site, generally good network coverage
- **Texttochange:** Its feasible because for health communication, you reach people in full anonymity more so if the topic is sensitive
- **Rapid SMS:** it is web-based, open source and so multiple users are able to access the system remotely at the same time. It stores and records audio voice responses which is **a**lso a feature for non-literate users, and is ideal for gathering content that can be redistributed locally via community radio.
- **Wise pill:** A lot of acceptability data collection in our studies is included (mostly
- qualitative, although we'll be moving to quantitative measures as we scale up
- **Health Child:** Its feasible because for health communication, you reach people in full anonymity more so if the topic is sensitive

Facilitators to Acceptability:

- **Gatherdata:** Technology was based round a mobile phone which was a common tool of **usage for th**e users

- **Frontline SMS Medic;** Buy-in from clinical staff and community health workers, familiar technology
- **ICT4Mpower:** Adoption of simple concepts like the health book with hopefully an interface **si**milar to that of the mobile phone.
- **Texttochange:** All Basic phones receive SMS so the community will accept the texts if they come with little or no cost.
- **Rapid SMS:** it is designed for "mass-scale" monitoring and data collection (both
- Qualitative and quantitative). It handles unlimited forms aggregating all data from incoming text messages that come with the proper keyword and parameter format. Data for the forms can be edited through the RapidSMS interface, exported to Excel or displayed with a built-in graphing tool.
- **Wise pill:** it's easy and convenient to use because the wise pill attracts attention but attention does not bother monitored patients primarily because it does not look like the traditional container that comes with stigma.
- **Question Box:** Uses the mobile phone networks, with wide coverage.

Facilitators to replicability:

- **Gatherdata:** Training on usage of the system was not too complicated and there was less user support
- **ICT4Mpower:** Concept of a health care system designed for a country as opposed to scaling up another system
- **Wisepill:** Getting reliable and valid data
- **Question Box:** Organizations can use their existing field staff and information resources to replicate **t**his.
- So far in large multi center teams time spent in communication initially is worth it. More so if the communication results in procedural and clear scope document is acceptable to all.
- Team selection in the beginning is critical.
- The most valuable and relevant lessons can be impacted by local staff .
- There was hardly any issue with maintenance of the mobile phones since the users could also use it for their personal activities.

Lessons learned:

- The SAM can provide a snapshot of service availability for key interventions such as HIV/AIDS, MCH, TB and other services.
- Procurement process of equipment takes long and spreads out into project proposed time.

- **Question box:** The information needs demand is quite strong despite some

initial difficulty in communicating the concept of an information service as such to its users; Mobile phones are still more in the hands of men, these needs to be taken into account when designing the message, use messages to continue sensitizing / educating young mothers; intensive infield testing for novel technologies. Keen follow up of service providers to provide clear prepayment plans so that they do not cut off services without the project's prior knowledge; we have also learned that people (at least so far) really like the system. People are often concerned about "big brother" watching, but most people appreciate someone taking the time to look after them.

- Solicit incentives like recognition for level of effort and not monetary.

Conclusions

Five thematic areas represent the major best practices of mhealth projects. The majority of mhealth projects are within the remote data collection/transmission area. There are several innovations even with a given thematic area. In the remote data collection/transmission area, the text messaging service platform is predominantly used here to collect and send patient and disease data. In fact, the SMS based applications have had the most uptake in the country mostly because of their ubiquitous use of phones and the low minimum infrastructure (both hardware and software) requirements. All phones have the ability to use the SMS function – so projects using this function do not have to invest in hardware. They only need to customize the SMS functionality to their own use.

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Appendices:

Annex 1: mhealth Review Interview Guide
mHealth Interview Guide

1. What is the innovation/concept?

2. When will/did the project start and end?

3. What is the scope of the project?

   a) Where is the project located?
   b) Who are the project beneficiaries?

4. What is the cost of the project?

   a) What is the project budget? i.e. cost of key inputs e.g. equipment, software, training, etc.

5. What are/were the barriers to:

   a) Feasibility
   b) Acceptability
   c) Replicability
   d) Scalability

6. What are/were the facilitators to:

   a) Feasibility
   b) Acceptability
   c) Replicability
   d) Scalability

7. What are/were the key measurable indicators?

8. What are/were the key lessons learnt?

Annex 2: mhealth Projects Table

Category	Innovation[1]	Source[2]	Methodology[3]			Policy context[4]	Effects on motivation of health workers[5]	Unintended consequences[6]
			Approach	Tools[7]	Evidence[8]			
1. Education & Awareness: 1. Health in Hand 2. Innovations for Poverty Actions 3. Question Box 4. Text To Change 5. Freedom HIV/AIDS	1. Creation of medical/health repositories of information on portable and mobile devices that can be referenced at the point of care. 2. Use of Google SMS engine by Cell phones to				# of PDAs distributed			

[1] Innovation here refers to an activity, approach or underlying concept which may contribute to the performance and retention of CBAs.

[2] Program or theoretical source of innovation

[3] The methodological approach that has been used and the type of evidence that is available

[4] Describe whether the innovation fit under the current in-country policy context

[5] Describe if and how the innovation had an effect on health worker motivation

[6] Describe any unintended consequences observed/documented from introducing the innovation

[7] The specific tools used for the measurement of the innovation

[8] The available evidence for the impact of the innovation

Game 6. eMOCHA (electronic Mobile Open-Source Comprehensive Health Application)	get relevant and actionable information on sexual & reproductive health and clinic locations. 3. Creation of a repository of information on cell phones that can be searched by users regardless of location. 4. Improving HIV/AIDS awareness via SMS txt message. 5. Improving HIV/AIDS awareness through games played on cell phones 6. Connection of wireless devices with local server-based clinical training and patient care support services for the purpose of accessing patient records, educational content; providing communication amongst health workers.						

2. Remote monitoring of drug adherence: Wireless Measurement of Adherence to HIV Antiretroviral Therapy	To monitor drug adherence through a drug container equipped with a cellular transmitter that sends a signal whenever it is opened.							
3. Remote data collection and or transmission: 1. TB Monitoring platform 2. GatherData 3. Community Vulnerability Surveillance Program-	• Transmission of Laboratory data and receipt of results via SMS • Use of Open Source platform for structured data collection especially for handling larger (longer)							

integrated Community Health. 4. Community Health Worker Data Management 5. Frontline SMS 6. Health child 7. Malaria Monitoring Program 8. Results SMS 9. OpenX Data 10. Uganda Health Information Network (UHIN) 11. Open Mobile Electronic Vaccine Trials	forms and integrated data analysis and transmission. • To create a light weight, routine reporting mechanism to provide data on trendable indicators focusing on community vulnerability. • Use of WAP-based application for users to log in and submit data using their phones. • Collection and transmission of bulk SMS for storage on a local computer. • Use Cellphone SMS for sending emergency alerts, requisitioning for supplies in support of iCCM activities. • Use of SMS by clinics to send weekly disease and malaria data. • Systems to allow clinics send in their weekly disease and malaria data via a multi-SMS report. This involves replacing the MOH form with a "SMS-able" paper							

		version. Web dashboard provides overview of disease burden, including specific malaria treatment and diagnosis data and ACT drug levels to help report stock outs.							
		• Use SMS platform for collection and reporting disease data by field health work teams							
		• To send medical test results through sms and or email to patients, healthcare providers and researchers as they become available.							
		• It is a generic data collection tool for mobile phones. It utilizes the new mobile technology to improve data collection and handling processes							
		• Open source tool for collecting data using PDAs							
		• Collect and transmit routine health data from health facilities via district up to ministry of Health; and provide access to health information using mobile							

	computing devices							
	• To develop a complete secure electronic system for data collection and management in vaccine trials; handle data from source to publication using mobile devices in compliance with international standards							
3. Health/ Administrative Systems: 1. eHMIS 2. PDA Assisted Health Supervision 3. SURE (Securing Ugandan Rights for Essential Medicines) 4. OpenMRS 5. ICT4MPower	• Remote patient management over the Internet web • Supervision and integration of health interventions using PDAs.							

4. Diagnostic and treatment support: 1. Mobile Microscopy for automated malaria diagnosis in field conditions 2. Reproductive Health Voucher 3. Rural Connection to Health facilities through SMS									
Other mApplications (e.g. data analysis)									

Annex 3: Concepts Table

Concept	mHealth Project
1. Education and Awareness: a. Creation of medical/health repositories of information on portable and mobile devices that can be referenced at the point of care. b. Use of Google SMS engine by Cell phones to get relevant and actionable information on sexual & reproductive health and clinic locations. c. Creation of a repository of information on cell phones that can be searched by users regardless of location. d. Improving HIV/AIDS awareness via SMS txt message. e. Improving HIV/AIDS awareness through games played on cell phones f. Connection of wireless devices with local server-based clinical training and patient care support services for the purpose of accessing patient records, educational content; providing communication amongst health workers.	Health in Hand Innovations for Poverty Actions Question Box Text To Change Freedom HIV/AIDS Game eMOCHA (electronic Mobile Open-Source Comprehensive Health Application)

2. Data Collection and Disease Outbreak surveillance:	
a. Collection and transmission of Laboratory data to specialized laboratory personnel for expert interpretation of lab specimens; and receipt of results via SMS by patients.	TB Monitoring platform
b. Creation of a diverse end-user devices platform for structured data collection especially for handling larger (longer) forms and integrated data analysis and transmission.	Gatherdata
c. Creation of a light weight data collection and transmission application for routine reporting on trendable indicators focusing on community vulnerability.	Community Vulnerability Surveillance Program-integrated Community Health.
d. Use of WAP-based application for users to log in and submit data using their phones.	Community Health Worker Data Management
e. Collection and transmission of bulk text messages using the SMS platform using a local computer.	Frontline SMS
f. Use Cell phone SMS for sending emergency alerts; and requisitioning for supplies.	Health child
g. Use of SMS by clinics to send weekly disease and	

malaria data.	Malaria Monitoring Program
h. Transmission of medical test results through sms and or email to patients, healthcare providers and researchers as they become available.	Results SMS
i. Creation of PDA-based data collection forms from a web based application.	OpenX Data
j. Collect and transmit routine health data using PDAs and Smart phones over the cellular and Internet networks from the lowest heath facilities via the district to the Ministry of Health; and provide access to health information using the same mobile computing devices.	Uganda Health Information Network (UHIN)
k. To develop a complete secure electronic system for data collection and management in vaccine trials; handle data from source to publication using mobile devices in compliance with international standards.	Open Mobile Electronic Vaccine Trials
3. Remote Monitoring of drug adherence	
a. To monitor drug adherence through a drug container equipped with a cellular transmitter that sends a signal whenever it is opened.	Wireless Measurement of Adherence to HIV Antiretroviral Therapy

4. **Diagnostic and Treatment Support**	
a. Use of cell phones by non-medical experts to carry out microscopic examinations for the malaria parasite.	Mobile Microscopy for automated malaria diagnosis in field conditions
b. Use of text messaging service by mothers or STI infected clients as payment vouchers for medical/health services.	Reproductive Health Voucher
c. Transmission of SMS text messages by patients to health facilities/personnel about health symptoms and get feedback from medical personnel.	Rural Connection to Health facilities through SMS
5. **Health Administrative Systems**	
a. To manage patient Information via the web	eHMIS
b. To use PDAs in strengthening supervision and integration of health interventions at all levels.	PDA Assisted Health Supervision
c. To minimize waste and drug stock-outs by managing drug supply chain using mobile technologies.	SURE (Securing Ugandan Rights for Essential Medicines)
d. To develop Open source applications for management of medical records	OpenMRS
e. To develop an electronic records & referral system based on a unique client Identifier; provide eLearning and tele-consultation using ICTs.	ICT4MPower

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