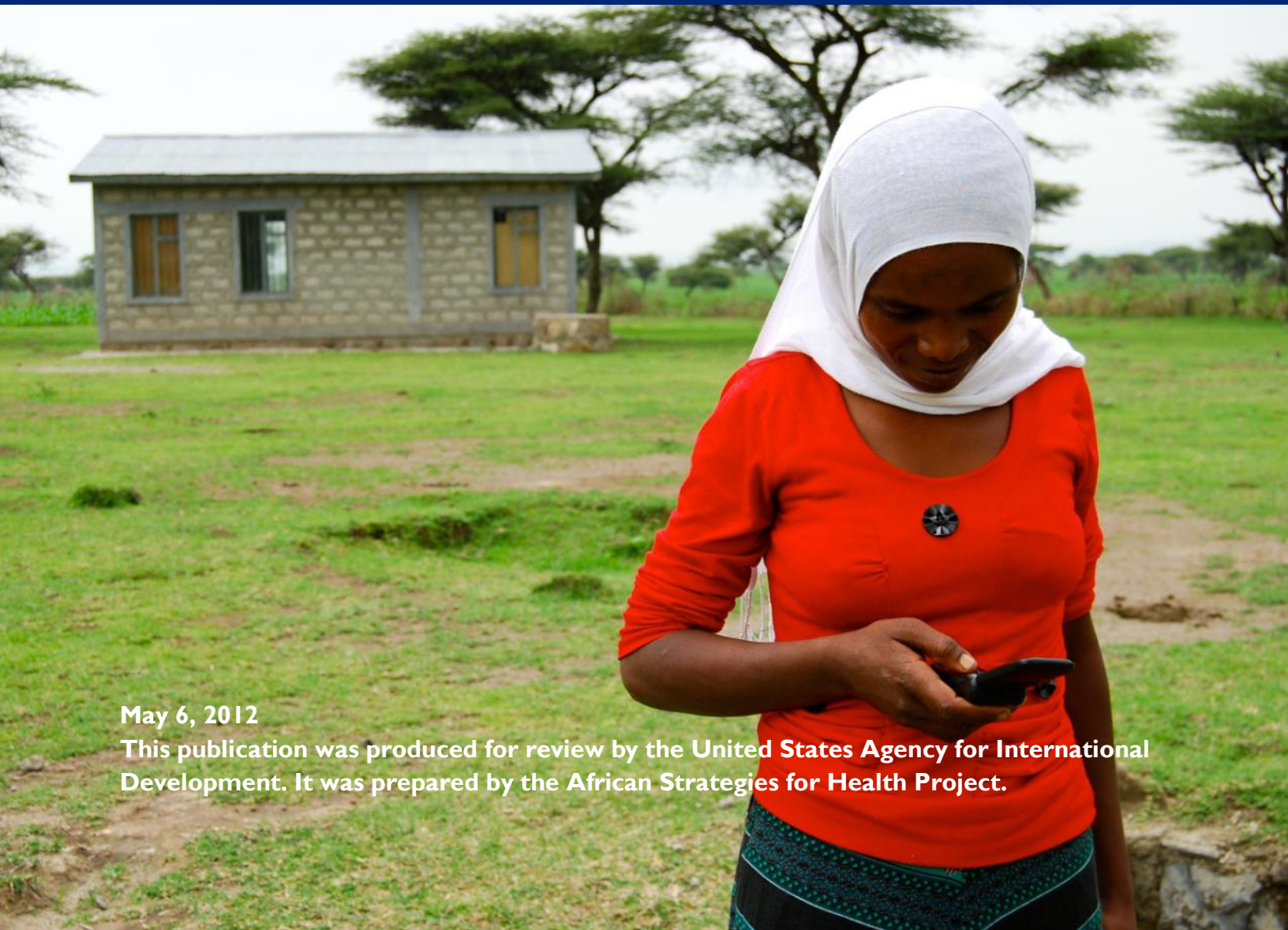




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# mHEALTH COMPENDIUM

VOLUME TWO | TECHNICAL REPORT



May 6, 2012

This publication was produced for review by the United States Agency for International Development. It was prepared by the African Strategies for Health Project.



# mHEALTH COMPENDIUM

## VOLUME TWO

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The African Strategies for Health (ASH) is a five-year contract funded by the United States Agency for International Development (USAID). ASH works to improve the health status of populations across Africa through identification of and advocacy for best practices, enhancing technical capacity, and engaging African regional institutions to address health issues in a sustainable manner. ASH provides information on trends and developments in the continent to USAID and other development partners to enhance decision making regarding investments in health .

### **May 2013**

For additional copies of this report, please email [info@as4h.org](mailto:info@as4h.org).

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Gayle Mendoza, Gwendolyn Morgan, Sarah Konopka, and Lungi Okoko all contributed to the production of this document. We extend our thanks to USAID, in particular, Senior Health Adviser Ishrat Z. Husain, and Program Analyst Kaitlyn Patierno from the Africa Bureau, as well IT/KM Advisor Peggy D'Adamo from the Global Health Bureau, Health Officer Daryl Martyris from the Uganda Mission, for their support and inputs.

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## ACRONYMS AND ABBREVIATIONS

<b>Acronym/ Abbreviation</b>	<b>Description</b>
ANC	antenatal care
CDC	Centers for Disease Control and Prevention
CIDA	Canadian International Development Agency
CHW	community health worker
DFID	UK's Department for International Development
HMIS	Health Management Information System
ICT	Information and Communication Technology
IDRC	Canada's International Development Research Centre
JHU-CCP	Johns Hopkins Bloomberg School of Public Health Center for Communication Programs
M&E	monitoring and evaluation
MCH	maternal and child health
MEDA	Mennonite Economic Development Associates
MNCH	maternal, neonatal and child health
MOH	Ministry of Health
NMCP	National Malaria Control Program
PEPFAR	The United States President's Emergency Plan for AIDS Relief
PMI	The President's Malaria Initiative
PMTCT	prevention of mother to child transmission of HIV/AIDS
SBCC	Strategic Behavior Change Communication
TB	tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization

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# EXECUTIVE SUMMARY

Mobile health (mHealth) is the provision of health services and information via mobile and wireless technologies. Within Africa the mobile phone has become ubiquitous, making mHealth applications an important tool with which to impact the health of Africans. When applied correctly, mHealth can make real contributions to improved health outcomes. mHealth has the potential to address and overcome: (1) disparities in access to health services; (2) inadequacies of the health infrastructure within countries; (3) shortage of human resources for health; (4) high cost of accessing health; and (5) limitations in the availability of financial resources.

This second volume of the mHealth compendium contains twenty-seven case studies which document a range of mHealth applications being implemented mainly throughout Africa, but also in other regions. In order to help USAID missions access relevant mHealth information, this compendium offers project descriptions, publication references, and contact information for making further inquiries. Each two-page case study includes: an introduction to the health area or problem; a description of the mHealth intervention highlighted; a description of any important results or evaluation findings; lessons learned; and conclusion. In addition, the first page includes a summary of the geographic coverage, implementation partners, donor name and contact, as well as contact information for the implementing partner. The case studies in this compendium have been organized within five programmatic areas: Behavior Change Communication, Data Collection, Finance, Logistics, and Service Delivery.

# WHAT IS mHEALTH?

## eHealth vs mHealth

eHealth is defined by the World Health Organization (WHO)<sup>1</sup> as the cost-effective and secure use of information and communications technologies in support of health and health related fields, including health care services, health surveillance, health literature, health education, knowledge and research. eHealth is a general term which includes four distinct, but related components.

- **Mobile Health (mHealth):** Provision of health services and information via mobile and wireless technologies.
- **Health Information Systems (HIS):** Systems to gather, aggregate, analyze and synthesize data from multiple sources to report on health; can include information related to patient records, disease surveillance, human resources, management of commodities, financial management, service delivery, and other data needed for reporting and planning purposes.
- **Telemedicine:** Provision of health care services at a distance; can be used for inter-professional communication, patient communication, and remote consultation.
- **Distance Learning (eLearning):** Education and training in electronic form for health professionals.

This compendium is focused solely on the mHealth component of eHealth. For the purposes of this paper mHealth includes mobile phones, Personal Digital Assistants (PDAs), tablets, mobile applications, and wireless medical devices.

# WHERE IS THE EVIDENCE FOR mHEALTH?

With more than 6 billion mobile phone subscribers in the world—including 433 million of those users in Africa—health sector actors are excited about the opportunities offered by mHealth in terms of improving the quality of care, access to health services, and health outcomes. Although still limited, the amount of evidence about the effectiveness or efficacy of mHealth interventions has recently begun to increase. In recent years, there has been an significant upsurge in mHealth focused health outcomes research—including a few studies published in the *Lancet*—and reviews that aimed to synthesize the evidence. Some reviews of mHealth studies, such as the February 2013 article by Tomlinson et al. and a 2011 World Bank report point to the lack of high quality and peer reviewed randomized trials to conclude that little is known of the impacts of mHealth interventions.<sup>2,3</sup>

However, the mHealth research landscape is evolving rapidly. Of the 215 unique registered studies found by a recent review of mHealth research projects on the US Government federal clinical trials tracking system,<sup>4</sup> “40 new studies were added to this database in the 6-month period between May and November 2012 alone.”<sup>5</sup> The mHealth Alliance’s *mHealth and MNCH: State of the Evidence* report concludes that the increase in rigorous mHealth research has been remarkable, calls for greater investment of resources in studying the effect mHealth interventions have on health outcomes, and emphasizes the need to view gaps in the mHealth evidence as opportunities for future research.<sup>6</sup>

# KEY FACTORS FOR mHEALTH SUCCESS

The potential for mHealth interventions to capitalize on mobile technology to improve the quality of programs, extend the reach of services, and strengthen health information systems is great. However, the roll out of mHealth interventions takes time and significant investment in human, technical and physical infrastructure. Continuous capacity strengthening at multiple levels in the use of mobile technology devices, information dissemination, data collection, and monitoring and evaluation must be factored into project design. Through compilation of this compendium, a range of factors that are critical to successful mHealth interventions were identified.

## Country Ownership and Leadership

National ownership and full government participation is critical to long term project sustainability. Active engagement ensures the integration of mHealth into existing national and local health sector plans, strategies, and systems. National governments also play a central role in the creation and maintenance of an enabling environment for mHealth to thrive through the development and implementation of mHealth friendly policies. Ensuring that new mHealth interventions align with the country's national eHealth strategy can provide opportunities for addressing important organizational development issues, such as of governance, infrastructure, architecture, workforce capacity, policy and financing.

## Partnerships

Strong public-private partnerships are key to the success of mHealth initiatives. Across the projects and products profiled in this compendium, prominent partnerships include those with governments, technology software development companies, management consulting firms, international and local non-governmental organizations, mobile network service providers, health service providers, and their clients. Partnerships with different actors may vary at each stage of the process in order to leverage and capitalize on the necessary expertise.

## Coordination

The efforts of all partners need to be properly coordinated, ideally through the leadership of the government. One approach is to establish a technical working group consisting of partner representatives. Collaboration at the level of implementing partners is critical, as well, to ensure that systems are interoperable.<sup>7</sup>

# THE IMPORTANCE OF STANDARDS IN mHEALTH

One of the most promising aspects of mHealth is its potential for enhancing the smart integration of health services and the continuity of care across provider, place and time by making information available at the right place and the right time. Strengthening patient management and health systems in this fashion can only be achieved if the various mHealth and HIS platforms have sufficient common ground to reliably exchange messages in a way that minimizes errors and misunderstandings. Known as interoperability, this ability of diverse systems and organizations to

communicate and work together (inter-operate) requires the establishment of and adherence to standards. Much like speaking a common language enables communication, using common standards for how data is structured and exchanged enables mHealth platforms and HIS to share data.

mHealth interventions are significantly more powerful when health sector actors make their information systems interoperable. Through close cooperation, governments, donors and private healthcare providers can achieve interoperability by applying to the same standards. Donors can champion interoperability by requiring it as a condition of their funding for mHealth interventions.. These actions will maximize the power of mHealth as a tool for coordinating individual, patient-level services and public health programs.<sup>8,9</sup>

## HOW TO USE THE mHEALTH COMPENDIUM

This second volume of the mHealth compendium contains twenty-seven case studies which document a range of mHealth applications being implemented throughout Africa and, in some exceptional cases, in other regions. While there are a number of existing databases with information on the many pilots being undertaken worldwide, these are often cumbersome and sometimes difficult to navigate. The authors envision that a compendium like this one is particularly needed with regard to mHealth where there is a plethora of activities being funded at the country level. In order to help USAID missions access relevant mHealth information, this compendium describes some of the major mHealth applications being utilized in Africa and elsewhere in the world.

Each two-page case study includes: an introduction to the health area or problem; a description of the mHealth intervention highlighted; a description of any important results or evaluation findings; lessons learned; and conclusion. In addition, the first page includes a summary of the geographic coverage, implementation partners, donor name and contact, as well as contact information for the implementing partner. While this two-page document does not offer an exhaustive description of all aspects of each application, it does offer enough information for those interested in learning further about innovative mHealth applications in the region.

The case studies in this compendium fall under five programmatic areas: Behavior Change Communication, Data Collection, Finance, Logistics, and Service Delivery. While it is acknowledged that some of these interventions can be classified into more than one area, the authors of the compendium have tried to highlight the range and versatility of mHealth as a tool in improving health and well-being. Each of these five programmatic areas is briefly described below.

### **Behavior Change Communication (BCC)**

mHealth interventions are frequently utilized for community mobilization, awareness raising, education, and demand creation. It has been reported that mHealth BCC interventions are the most predominant of all mHealth interventions and also the most successful. This is because current interventions center on the use of low-cost SMS texts to reach various audiences. Important short term behavior changes have been observed, though modest.<sup>10</sup>

Most of the currently implemented mHealth applications are stand-alone interventions that use a single channel such as the SMS text to send out information to clients or potential clients or a hotline into which clients can call with

questions. These interventions can reach both the general population or specific populations including adolescents, those most at risk, or people living in hard to reach areas. Only a few BCC mHealth interventions have been linked with other channels of communication such as radio or TV programs. However, this is changing with the increase in use of mobile phones. Other relatively new BCC mHealth applications include those which help the user monitor their own health, such as those which track menstruation cycles to help with family planning.

## **Data Collection**

Data collection and surveillance can be enhanced by utilizing mobile communication and personal data devices. Instead of sending paper forms, data can be sent more quickly and reliably through electronic methods. This has been shown to increase reliability, make data more readily available (especially data from remote areas), and enhance the quality of the data submitted. Throughout Africa, mHealth applications have been used for a variety of data collection activities, from routine reporting to large national surveys.

## **Finance**

Mobile money applications are increasingly used in Africa to facilitate payment for health services and other expenses associated with seeking care for both private patients and clients enrolled in various community health programs. These mobile money applications allow registered users to load money into their accounts, make transfers to other users (both registered or not), and withdraw money. While registration for these services is almost always free, transactions have a predetermined fee which is often covered by the specific health program or implementing partner supporting the intervention. Examples of how mHealth applications have been utilized include provision of vouchers for family planning clients to access counseling and services, as well as antenatal services, delivery, and postnatal services at participating hospitals.

## **Logistics**

Availability of high quality logistics data has been one of the greatest challenges facing the health care system. Without this data, decision makers cannot adequately manage the supply chain, risking the possibility that patients won't receive the medicines they need. Increasingly, mHealth applications are being utilized to address this issue. Most of these applications allow a lower-level health facility to transmit information regarding their supply of essential medicines to the higher-level facility or warehouse which then provides the commodities. In some cases, these applications have even been utilized by community health workers to ensure they have the basic supplies needed.

## **Service Delivery**

Mobile phones have been used to improve the quality of and access to health care service delivery in a myriad of ways. Applications have been developed that assist health care workers in diagnosing and treating patients, such as the use of phone-based treatment algorithms and SMS reminders to follow up on clients' laboratory results and other services. mHealth has been successfully used to train and retrain health workers. Phone-based applications have also been developed to promote adherence to medications, provide notification of results, and remind patients to keep appointments.

# FOR MORE INFORMATION ON mHEALTH PROJECTS

This compendium is not meant to be a comprehensive source of information related to mHealth projects in low and middle income countries. The three resources listed below provide much more extensive information for individuals interested in learning more about mHealth interventions in various countries:

- The mHealth Alliance’s Repository of Projects and Programs <[www.healthunbound.org/resources/program](http://www.healthunbound.org/resources/program)>
- The Royal Tropic Institute’s mHealth Database <[www.mhealthinfo.org](http://www.mhealthinfo.org)>
- The mHealth Working Group—an international community of over 1100 members representing more than 350 organizations in 48 countries, and which aims to build capacity, encourage collaboration and share knowledge <[www.mhealthworkinggroup.org](http://www.mhealthworkinggroup.org)>

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  10. Ibid





# COMPENDIUM CASE STUDIES

# BEHAVIOR CHANGE COMMUNICATION (BCC)



# COMMCARE FOR ANTENATAL CARE SERVICES IN NIGERIA



## BRIEF OVERVIEW

Maternal mortality is very high in Nigeria with maternal mortality rate (MMR) ranging from approximately 545 to 840 deaths per 100,000 live births in Nigeria. In Nigeria, 62% of births occur at home and only 39% are attended by skilled health personnel. Only 58% of women receive some form of antenatal care (ANC) from a skilled provider, and this varies greatly by geographic area. While 45% of women had the four or more recommended ANC visits, only 16% has had an ANC visit before their fourth month of pregnancy (Nigeria DHS, 2008).

As a result of high maternal mortality and the need to improve the quality of ANC services to increase demand for services, Pathfinder decided to integrate the use of mobile technology to support health workers. Community health extension workers (CHEWs) in addition to nurses and midwives provide antenatal care services in primary health centers in Nigeria. CHEWs are lower level of education and job aids to support effective clinical decision making are lacking at sites. In order to improve the quality of ANC services provided by CHEWs, Pathfinder International, in collaboration with Dimagi, Inc is implementing CommCare in 20 primary health facilities in Abuja and Nasarawa state.

Pathfinder launched the project in November 2013, coupled with a rigorous evaluation of the effect of CommCare on the quality of ANC services. CHEWs use CommCare to record client data and track ANC clients over time. CHEWs also use multimedia audio counseling clips during group health talks that prompt them to have continued conversations about health behaviors.

## ABOUT COMMCARE

With over 5,000 registered mobile users across 30 countries in its cloud environment and over 1 million forms submitted to date, CommCare is one of the most widely adopted, technically advanced, and evidence-based mobile platforms for FLWs in developing countries.

CommCare is an easily customizable mHealth platform for health workers that tracks and supports their interactions with patients. CommCare replaces the conventional practice of a community health worker (CHW) manually tracking their work via paper registers and carrying large patient education flipcharts. Instead, each CHW is equipped with a midrange phone running open-source and low-literate-friendly software. The CHW registers clients using customized electronic forms. CommCare automatically submits visit data in 'real-time' to a central cloud server, CommCareHQ. Data on this server is privacy-protected, backed up, and accessible to supervisors and program managers around the world.

In Nigeria, CommCare applications are being used by Community health extension workers (CHEWs) to record client data and track ante natal care (ANC) clients over time.

## EVALUATION AND RESULTS

In Nigeria, there are currently over 150 CHEWs in 20 primary health centers are using the CommCare application to track ANC clients (10 primary health centers in Abuja and 10 primary health centers in Nasarawa state). Since December 2012, over 2,400 pregnant women are now registered and are tracked



## BEHAVIOR CHANGE COMMUNICATION

through CommCare. A rigorous research study is being conducted to assess the effect of implementing CommCare on the quality of ANC care. Baseline data was collected in January 2013, and the endline will be completed by September 2013. The analysis and write up will be ready by December 2013.

Globally, collective findings from 14 published papers about CommCare, six important grey literature studies, and four papers on closely related systems are encouraging. They demonstrate the potential for organizations to use CommCare to improve a wide range of aspects within their community health program (s). The findings also support the hypothesis that CommCare can be used to increase the timeliness, accuracy, and relevance of essential information delivered to clients. It is, however, important to note that CommCare by itself will not improve the behavior of CHWs, but can only amplify an organization's efforts to improve their community health program. Organizations must continually support their CHWs and utilize the information delivered by CommCare in order to realize the potential benefits of introducing an mHealth system for their CHWs.

### LESSONS LEARNED

- Active engagement of the NPHCDA in the Ministry of health from the start of the project is critical in order to foster ownership. This project complements the Nigerian government's commitment to using mHealth solutions for addressing maternal health, as seen through their partnership with the mHealth Alliance.
- Primary health centers with varying client loads use CommCare very differently (for decision support, client tracking and data reporting). The implementation approach thus has to be adjusted to fit the needs of smaller and bigger implementation sites.
- The need to create a single solution for both high-performing and low-performing frontline workforces is complex.
- Design processes to support and improve CHW

service delivery based on evidence.

### CONCLUSION

Mounting evidence indicates that properly using CommCare to support CHW programs can improve access, quality, experience, and accountability of the care provided by community health workers. After a successful pilot phase, Pathfinder is planning to scale up the use of CommCare in Nigeria to support the reduction of maternal mortality and improve the quality of ANC care. Dimagi, Inc. is also gathering evidence and refining its approach in order to provide sufficient evidence this tool can support maternal and child health services in Nigeria.

### GEOGRAPHIC COVERAGE

Nigeria (Abuja and Nasarawa state). CommCare is also implemented in 13 other African countries: Benin, Sudan, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Senegal, Sierra Leone, South Africa, Tanzania, Togo, and Zambia

### IMPLEMENTATION PARTNERS

The Nigerian National Primary Healthcare and Development Agency (NPHCDA); Pathfinder International; Dimagi, Inc.

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# JUSTTESTED: SMS-BASED SUPPORT AND INFORMATION FOR HIV TESTING AND COUNSELING CLIENTS

## BRIEF OVERVIEW

HIV testing and counseling is an important step for people to protect themselves and to prevent infecting others. Knowledge of one's HIV status is also a critical factor in the decision to seek treatment. In 2011, only 24.7% of adults in South Africa aged 15 to 49 had tested for HIV, while approximately 5.6 million, or 17.3%, of South Africans currently live with HIV.

The JustTested program aims to supplement HIV testing and counseling (HCT) services by giving support and information to people who would have just tested, regardless of whether they test HIV positive or negative. Subscribers choose between the JustTested negative or positive free short message service (SMS), both available in Afrikaans, English and isiXhosa. The service sends 39 messages over the course of three months on the topics of healthy living and addressing HIV and AIDS related issues.

JustTested began in May 2012. It is currently active in parts of the Overberg district of the Western Cape and the Nelson Mandela Metro District in the Eastern Cape.

## ABOUT JUSTTESTED

SMSs were developed in line with the Health Belief Model, which states that a person's belief in a personal threat of an illness or disease together with a person's belief in the effectiveness of the recommended health behavior or action will predict the likelihood he or she will adopt the behavior. Communicate, Cell-Life's web-based software, is used to

automate the signing in and opting out of subscribers into the program as well as the sending of SMSs. Individuals learn of the program through posters and pamphlets placed in participating healthcare facilities. Additionally, during counseling sessions, HCT counselors explain the program. Subscribers can sign up and opt out by sending a please-call-me (PCM) to mobile phone numbers given to them.



## EVALUATION AND RESULTS

An evaluation of the pilot phase was conducted. An approximate ten-fold increase was observed when counselors were actively recruiting subscribers, suggesting that counselors are key to the recruitment process (as opposed to relying on sign-ups through posters and pamphlets). Twenty percent of the subscribers sent an opt-out PCM. Based on interviews with 17 subscribers that sent an opt-out PCM, 88% sent the PCM by mistake. Almost all the interviewed exiting subscribers reported that they found the SMSs acceptable and easy to understand. Most subscribers also reported that they learnt new information from the SMSs and that the SMSs improved their outlook on life. Most subscribers suggested that the SMSs should last for at least 6 months.

## LESSONS LEARNED

- Translators that utilize simple language are preferred
- SMSs should have a clearly

## BEHAVIOR CHANGE COMMUNICATION

identifiable brand name so users know who is sending them

- Subscribers who mistakenly opt out of the program should be allowed to automatically resume messaging
- Getting permission from provincial departments of health can be time consuming
- Users need reassurance that the SMSs are free and that their mobile phone numbers will be kept private
- Lay-counselors could also benefit from an educational and support SMS program
- Recruitment rates could be improved by having the option of SMS messaging to clients be part of the standard of care, and advertising the program outside of healthcare facilities
- Periodic reviewing and editing of SMSs is required based on feedback from subscribers and lay-counselors to keep the SMS content relevant

### CONCLUSION

This JustTested program has the potential to enhance HCT services in South Africa. The evaluation of the pilot phase shows it is feasible and acceptable to both counselors and subscribers while also being cost-effective and easy to implement.

Future work includes exploring additional forms of marketing to increase recruitment rate, as well as finding ways to optimize implementation and investigate effectiveness of the program in changing and improving health behaviors. Upcoming iterations will examine tailoring content to gender-specific messaging and making the program more interactive by including two-way communication.

### GEOGRAPHIC COVERAGE

South Africa

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#### Information was excerpted from:

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# MAMA BANGLADESH

## BRIEF OVERVIEW

Bangladesh has made significant progress in health care; however, maternal, neonatal and child health statistics are still staggering: one woman dies every hour due to pregnancy related complications, only 23% of pregnant women attend more than four antenatal care visits, 27% of live births are attended by a skilled health personnel, and 43% of infants under six months of age exclusively breastfeed. Many of these shortcomings are due to the lack of information and knowledge about maternal neonatal and child health (MNCH).

“Aponjon” (meaning dear one in Bangla) is the Mobile Alliance for Maternal Action’s (MAMA) program in Bangladesh aimed at reducing maternal and child mortality using the power of mobile communication technology. USAID catalyzed a public-private sector coalition to support the scale up of a commercially viable mobile phone service that delivers weekly stage-based messages to pregnant women, new mothers and their families. Designed to enable the absorption of multiple sources of revenue, MAMA Bangladesh is one of the first mHealth direct-to-consumer services to get beyond the pilot by focusing on sustainable impact at scale.

After a year of user testing, feedback and iteration, MAMA Bangladesh was launched nationally by local social enterprise D.Net in partnership with the Government of Bangladesh Ministry of Health and Family Welfare in December 2012.



## ABOUT MAMA BANGLADESH

MAMA Bangladesh is implementing a “freemium” model that provides free basic services to the poorest 20% of mothers. The free services are subsidized by premium paid services targeted to higher income market segments. MAMA Bangladesh has also brokered revenue -sharing agreements with the five largest telecommunications operators in the country, an important precursor to achieving scale. By applying commercial strategies to improve MNCH, D.Net generates multiple streams of revenue through low user fees, advertisements, corporate partnerships and an individual giving campaign to sponsor mothers to receive their messages, thereby decreasing long term dependency on philanthropic capital.

Aponjon costs 2 taka (about \$0.025 USD) per message. Messages are delivered twice weekly in either short message service (SMS) or interactive voice response (IVR) format. The voice messages are entertaining and educational, formatted as ‘mini-skits’, with actors playing out real-life scenarios as characters, including a pregnant woman, doctor, husband and mother-in-law. MAMA Bangladesh has also created a unique service specifically for husbands, which reinforces messages provided to their wives and encourages their involvement in decision-making on pregnancy, birth and infant care.

## EVALUATION AND RESULTS

Prior to the national launch in December 2012, MAMA Bangladesh conducted detailed formative research in 13 locations across 4 districts (Dhaka, Chittagong, Sylhet and Gaibandha) among approximately 1,000 subscribers. Results indicated that almost 60% of women who subscribed to the service had their own phone, with the remaining women enrolling in services through gatekeeper or family member phones. Messages directed to household decision makers enabled improved household practices with respect to nutrition, antenatal care visits, and preparation for delivery.

Pilot stage research also indicated that the willingness to pay for the service was low, yet poor subscribers were willing to pay more than high income



## BEHAVIOR CHANGE COMMUNICATION

subscribers. Additionally, household decision makers were willing to pay more for the service than women.

Seventy-eight percent of users who subscribed to the service through community health worker outreach selected to receive messages through IVR, while women living in urban areas or those with high levels of education chose to receive the messages through SMS.

Following the national launch, the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) began conducting an impact evaluation that will measure the effectiveness of the mobile phone based behavior change communication messages.

To date, over 52,000 mothers and guardians have subscribed to Aponjon and 1,500 community health workers have been trained to register subscribers across the country. MAMA Bangladesh is projected to reach two million subscribers in its first three years through voice IVR and SMS messages and achieve sustained improvements in health knowledge, behaviors and outcomes. Seventeen percent of subscribers who live below the poverty line are receiving the service for free.

### LESSONS LEARNED

- Designing for scale from the beginning is critical to the eventual uptake and adoption of the mHealth program nationwide
- Strategic partnerships that leverage the unique value-add of outreach, government, nonprofit, technology and mobile network operator partners strengthen local ownership and sustainability in the long term
- To reach economies of scale, mHealth programs may have to consider expansion of services and products such as website interface, higher-end clients, and mobile applications
- Household decision-maker input, feedback and targeted involvement is critical to ensure the mother gets the necessary support and access to the information

- Customization of local content and knowing the client is key to sustainability and scale

### CONCLUSION

Research indicates that the MAMA Bangladesh service is acceptable, useful and valuable to end users. Subscriber testimonials show that the information provided often fills important gaps in knowledge and leads to women seeking care for themselves and their babies that they might not otherwise know to seek.

### GEOGRAPHIC COVERAGE

Bangladesh

### IMPLEMENTATION PARTNERS

D.Net; The Ministry of Health and Family Welfare is the official government partner of MAMA Bangladesh, in collaboration with the Government of Bangladesh and the Prime Minister's Office. Outreach partners: BRAC, Smiling Sun Franchise Program, MaMoni and Info Lady

### FUNDER

USAID, Johnson & Johnson, BabyCenter, the United Nations Foundation and the mHealth Alliance

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# MAMA SOUTH AFRICA

## BRIEF OVERVIEW

MAMA South Africa provides information to mothers that promotes earlier antenatal care, supports HIV-positive mothers and helps them understand how to prevent transmission to their babies, and encourages exclusive breastfeeding for all mothers.

Through the use of mobile phones, the program is able to inform and empower mothers to adopt healthy behaviors and to access maternal and child health services. It currently consists of a free SMS program offered through two inner-city clinics in Hillbrow, Johannesburg, a dynamic community portal at [www.askmama.mobi](http://www.askmama.mobi), and a USSD-based interactive quiz service. MAMA South Africa aims to expand to include voice services for mothers with low literacy, and a portal on Mxit - a popular mobile social network.

MAMA provides support and information to South African pregnant women and new mothers through three current mobile channels and two future channels:

1. SMS text messaging twice a week from a mother's fifth week of pregnancy until her baby is one year old. Women can choose to receive messages in one of five local languages and can opt in to receive additional information specifically designed for HIV+ mothers.
2. Mobile web-based community portal ([askmama.mobi](http://askmama.mobi)) that includes stories from real mothers, polls, articles and life guides. By registering with her due date or her baby's birth date, a mother receives personalized information relevant to her and her child.
3. Unstructured Supplementary Service Data (USSD) interactive quizzes twice a week.
4. An educational portal through the Mxit social networking platform that will provide young men and women access to vital health information regarding pregnancy and parenting.
5. Pre-recorded weekly voicemail messages pushed to the registered user's phone.



MAMA South Africa was officially launched in May 2013.

## ABOUT MAMA SOUTH AFRICA

## EVALUATION AND RESULTS

The MAMA South Africa program has conducted detailed user testing over a period of two months with a test group of 22 pregnant women and new mothers to investigate message comprehension and acceptability as well as service design and usability.

Eighty percent of these mothers reported that the service gave them new knowledge on how to care for

## BEHAVIOR CHANGE COMMUNICATION

their child such as when to introduce solid foods, how to monitor developmental milestones, never to leave the child unattended on a bed or couch, and when to vaccinate. Pregnant mothers reported learning about the signs of labor, the importance of a facility-based delivery to reduce the risk of HIV transmission, warning signs of illness, improved nutrition, and the relief of common complaints such as swollen feet.

All mothers reported sharing the information with others in the community while some used the messages to correct those who were giving poor advice or to help them negotiate with a partner around issues such as the use of condoms while pregnant.

As of April 2013, over 17,500 women have used the service. A forthcoming formal evaluation of more than 2,000 women will assess the health impact of the messaging regarding the adoption of healthy behaviors and uptake of health services, particularly around drug regimens for the prevention of mother-to-child transmission of HIV. This evaluation includes a review of medical records to compare user-reported data with actual uptake of health services.

### LESSONS LEARNED

- Targeting health information to the user's gestational age or the age of her child markedly increases acceptability of the service and user retention
- Mothers appreciate the opportunity to connect with other mothers and feel empowered by the feeling of belonging to a community
- Project implementation is best done through a consortium of partners including those with technical and content expertise, access to clinical services, and experience in monitoring and evaluation
- Mobile network operator negotiations require focused attention and significant time
- Integration with an operator platform is essential to avoid the need for ongoing marketing

### CONCLUSION

The MAMA South Africa service has been well accepted by users and early data suggests that the convenient and discreet mobile medium works very well for educating mothers on the value of healthy behaviors and the uptake of health services. Mothers report feeling informed, validated and empowered and have changed their behavior as a result of mobile messaging.

### GEOGRAPHIC COVERAGE

South Africa

### IMPLEMENTATION PARTNERS

Praekelt Foundation, Cell-Life, Wits Reproductive Health & HIV Institute (WRHI)

### FUNDER

USAID, Johnson & Johnson, BabyCenter, the United Nations Foundation, and the mHealth Alliance

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# TOBACCO KILLS: SAY NO & SAVE LIVES



The Tobacco Kills: Say No & Save Lives campaign was launched in January 2013.

## ABOUT TOBACCO KILLS

Campaign participants are able to take action via one of four ways:

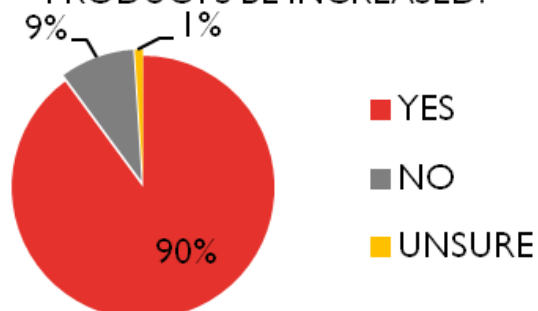
1. Join social media channels on Twitter or Facebook. Participants can contribute to the discussion and join nearby events.
2. Tune into the edutainment drama featured in six languages across the country. The edu-drama follows the characters as they share how their day-to-day lives are affected by tobacco. Listeners can express their views and comments on what they learn from each episode online or via SMS.
3. Sign the petition that shows community support for the Tobacco Control Bill via SMS or online.
4. If the participant is an organization such as a restaurant, bar or hotel, it can declare their space as smoke-free, protect workers and patrons from secondhand smoke, and be part of Uganda's 1st smoke-free map

## BRIEF OVERVIEW

According to the World Health Organization's 2011 Report on the Global Tobacco Epidemic, tobacco is the leading preventable cause of death in the world. It is expected to cause approximately eight million deaths per year by 2030, 80% of those in low- and middle-income countries. Additionally, the 2011 Uganda Demographic Health Survey states 15% of adult males and 3% of adult females smoke, and tobacco is responsible for 2% of all non-communicable diseases in the country.

Text to Change (TTC) is working on Uganda's first nationwide anti-tobacco campaign utilizing mobile technology and social media. Entitled Tobacco Kills: Say No & Save Lives, the one-year campaign is designed to bring Ugandans awareness of the harms of tobacco. It will also support the proposed comprehensive Tobacco Control Bill that aims to introduce a law in 2013 to regulate the manufacture, sale, promotion, advertising, sponsorship, distribution and public use of tobacco products.

### SHOULD TAXES ON TOBACCO PRODUCTS BE INCREASED?





## BEHAVIOR CHANGE COMMUNICATION

The campaign also conducted an opinion poll via SMS to assess public attitudes towards raising revenue through increasing tax on tobacco products. Over 500 responses were received and results were used to support the economics paper on increasing tobacco tax. Both were submitted together to the Ugandan Parliament.

Google Hangouts are organized on Google+ to have face-to-face group interaction to discuss related topics such as top tips to quit smoking

### EVALUATION AND RESULTS

On launch day, #tobaccokills was mentioned 853 times on Twitter and became the number one trending hashtag in Uganda, earning thirty followers and 119 tweets.

As of March 2013, the campaign has earned a total of 1,558 fans on Facebook and a weekly reach of 147,262 people. The fan growth rate is at 1.378% and fans respond actively to 30% of the campaign's posts. Overall, fans are most active between 8am to 11am and 2pm to 5pm. Tuesday is the most active day, followed by Wednesday, and Sunday is the least engaging

### LESSONS LEARNED

- New media can be used aside traditional media to increase the interactivity and engagement of the audience
- Establish ongoing M&E and regular community management of online channels, value the importance of strong support, and ensure sufficient resources
- Creativity is key. Combine social media with offline activities, and understand that some trial and error will be part of determining the best content that appeal to local audiences and that will produce a strong call to action.

- Building partnerships is vital for public awareness and advocacy efforts, and contributes to ensuring the cause's sustainability

### CONCLUSION

In the upcoming months, the campaign will continue to use social media for promotional activities. Participants will be speaking to schools on youths' opinions and knowledge about tobacco control, as well as promoting the signing of the petition, which will be shared with the MPs leading up to the hopeful passage of the Tobacco Control Bill.

#### GEOGRAPHIC COVERAGE

Uganda

#### IMPLEMENTATION PARTNERS

Text to Change; Partners: Campaign for Tobacco-Free Kids, Uganda Health Communication Alliance (UHCA), Parliamentary Forum for Non-Communicable Diseases (PFNCD) and Uganda National Health Consumers Organization (UNHCO)

#### FUNDER

Campaign for Tobacco-Free Kids

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# WAZAZI NIPENDENI (PARENTS, LOVE ME): mHEALTH INITIATIVE TO SUPPORT MATERNAL CARE IN TANZANIA

## BRIEF OVERVIEW

While maternal, new born and child health (MNCH) has seen improvements in Tanzania in the last few decades, Tanzanian women still face an unacceptably high risk of preventable morbidity and mortality during their reproductive years. Tanzania's maternal mortality ratio remains high at 454 deaths per 100,000 live births, as does its infant mortality rate at 51 deaths per 1,000 live births.

As part of the Wazazi Nipendeni (Parents, Love Me) project—a national, multi-media Strategic Behavior Change Communication (SBCC) campaign that operationalizes Tanzania's Campaign on Accelerated Reduction of Maternal Mortality (CARMMA TZ)—Text to Change developed and is implementing an SMS-based service that seeks to empower pregnant women and their partners to take the steps necessary for a healthy pregnancy and safe delivery. The service is an integral part of the overall Wazazi Nipendeni campaign developed by the Johns Hopkins Bloomberg School of Public Health Center for Communication Programs and led by the Ministry of Health and Social Welfare (MOHSW). The campaign integrates all safe motherhood areas, including early and complete ANC attendance, malaria prevention, PMTCT, individual birth planning, and safe delivery.

The Tanzania MOHSW launched Wazazi Nipendeni in November 2012.

## ABOUT WAZAZI NIPENDENI

A unique mobile phone text messaging (SMS) component is an integral part of the Wazazi Nipendeni campaign. Pregnant women, mothers with babies up to 16 weeks and their supporters can send the word



“mtoto” (‘child’ in Swahili) to the short code 15001 free of charge. After registering, users receive a text messages covering a comprehensive range of safe pregnancy and early child care information. The MOHSW approved all messages and schedules them to specific months or weeks of pregnancy or age of the baby. The service offers the message registrants time sensitive reminders for ANC visits and SP doses for prevention of malaria, as well as information on testing for HIV, nutrition, and individual birth planning.

As the lead technology partner, Text to Change (TTC) designed and implemented the technology for Wazazi Nipendeni. The text messaging service uses an open-source platform called Vusion which is developed in a partnership between the Praekelt Foundation and Text to Change. Its scalability and flexibility make it a unique platform which can

be operated in all countries around the world. The platform has been designed to enable campaign managers to configure complex SMS text messaging programs without the requirement for code changes or development support, allowing campaigns to be set up within several hours or days.

## EVALUATION AND RESULTS

By March 2013, the Wazazi Nipendeni text message service has been able to reach 100,000 active registrants. Since its launch, more than four million text messages have been sent to those who signed up for the free healthy pregnancy and safe motherhood information.

## LESSONS LEARNED

- The success of the program relied heavily on the involvement and commitment of the stakeholders

## BEHAVIOR CHANGE COMMUNICATION

within the mHealth Tanzania Partnership, also ensuring the campaign design was in line with the existing healthcare system

- Encourage collaboration and ownership through a government-led initiative. Tanzania registers the highest average number of text messages sent per month per subscriber in East Africa. The mobile technology is therefore recognized by the ministry as a useful tool to offer crucial healthy pregnancy and safe motherhood information to even the most remote pregnant woman and her supporters.
- Focusing on technologies that work on basic feature phones will allow an mHealth project to reach scale
- mHealth programs must be designed with the end user in mind
- mHealth campaigns work best in combination with traditional media as part of a multimedia approach

### CONCLUSION

The Wazazi Nipendeni clearly shows that with the right partners, the right communication mix and relevant content, it is possible to reach scale in mHealth. The high uptake of subscribers demonstrates that there was a strong need for people to obtain easy access to healthy pregnancy information. Overall, the Wazazi Nipendeni information-sharing model is an effective and affordable service that can be replicated in Tanzania and other parts of sub-Saharan Africa.

### GEOGRAPHIC COVERAGE

Tanzania

### IMPLEMENTATION PARTNERS

Tanzania MOHSW Reproductive and Child Health Section, Johns Hopkins Bloomberg School of Public Health Center for Communication Programs (JHU•CCP), Text to Change; Partners: National Malaria Control Program (NMCP), National AIDS Control Program (NACP), Health Promotion and Education Section, and mHealth Tanzania Public Private Partnership, Jhpiego, Elizabeth Glaser Pediatric AIDS Foundation, Mwanzo Bora Program, CCBRT, Tunajali project, PLAN International, Aga Khan Foundation

### FUNDER

USAID, PMI, PEPFAR, and the CDC Foundation. On the ground support is also provided by the US Government, Aga Khan Health Services, and Canadian International Development Agency (CIDA)

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# DATA COLLECTION









# COMMUNITY-BASED HEALTH PROMOTION FOR SAFE MOTHERHOOD USING MHEALTH

## BRIEF OVERVIEW

The first five years of a baby's life are the most precarious. Challenges from birth, early nutrition, infections and other illnesses result in 6.9 million child deaths every year, most of them from preventable causes. Additionally, the majority of maternal deaths occur in developing countries. One in 110 women in Pakistan and one in 300 women in the Philippines die from pregnancy related complications.

The Ministry of Health in Pakistan, Molave Development Foundation Inc, Philippines, and the department of Health in Roxas, Philippines, with support from the Aga Khan University and Canada's International Development Research Centre (IDRC), piloted a mobile

Health (mHealth) project among pregnant women to examine the effectiveness of using mobile phone-based text messages to influence maternal health behaviors. The project was part of the PAN Asian Collaboration for Evidence-based eHealth Adoption and Application (PANACeA) network which supported collaborative research to generate evidence on eHealth and its influence on health outcomes.

The Community-based eHealth Promotion for Safe Motherhood using mHealth program was implemented in 2009 to 2012.

## ABOUT SAFE MOTHERHOOD USING mHEALTH

The software application FrontlineSMS was customized and implemented to allow community-based healthcare professionals to efficiently register pregnant women for antenatal care and deliveries and the newborns for better care in the early part of life. Lady Health Workers (LHWs) were provided with JAVA-enabled cell phones and trained to use the phones for data entry.

The data was transferred to the server, where it integrated with the free and open source community-based medical record system, OpenMRS. The integration was essential in ensuring continuity of care as well as generating personalized SMS messages for women on health promotion or any investigations and appointments needed to better care for themselves and their babies.

## EVALUATION AND RESULTS

The project conducted a community-based intervention study, identifying a case and a control site. Data from Pakistan suggests in one year, the project registered 347 mothers, of which 97.7% received awareness messages on a regular basis. Message content focused on development of the baby, problems during pregnancy, and associated risks with delivery.

*Increase in the number of deliveries at the health facilities:*  
The study showed that Safe Motherhood using mHealth



reduced the ratio of delivery- and pregnancy-related misconceptions in the community. It also helped increase the rate of deliveries at health facilities from 35% to 55%.

*Increase in community contact with health providers:* Pregnant women were shown to have more contacts with the healthcare providers in each trimester, compared to the baseline and the control group. The average number of contacts with LHWs in the case group increased from 4.1 per trimester to 4.7, whereas the same number increased from 4.1 to 4.2 in the control group ( $p=0.07$ ). Similarly, the average number of contacts with the doctors in the case group increased from 1.2 per trimester to 2.2, whereas the same number increased from 1.3 to 1.4 in the control group ( $p<0.001$ ).

*Increase in antenatal visits:* The frequency of antenatal visits to health facilities was significantly increased in the intervention group compared to the control group. The percentage of mothers making four or more antenatal visits went up from 43% to 66%, compared to the control group where antenatal visits went down from 66% to 57% ( $p<0.05$ ).

### LESSONS LEARNED

- The project improved health-seeking behaviors among pregnant women, achieving the objectives of the Safe Motherhood program
- Simple, low-cost mobile technologies can improve communication between patients and health providers
- The mHealth technology was acceptable for health providers and patients
- Partners are required to bring the cost down for patients and the health system

### CONCLUSION

Safe Motherhood using mHealth demonstrated a scalable and replicable low-cost solution, which can be used for improving maternal and child health, and other similar applications. The integration of SMS-solution with the community-based medical record system shows an innovation with significant impact on improving health behavior of individuals and the community.

### GEOGRAPHIC COVERAGE

Pakistan, Philippines

### IMPLEMENTATION PARTNERS

Ministry of Health in Khyber Pakhtoonkhwa, Pakistan; Molave Development Foundation Inc, Philippines; Department of Health in Roxas, Philippines; Aga Khan University (AKU) Karachi, Pakistan

### FUNDER

Canada's International Development Research Centre (IDRC)

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# DATA WINNERS PLATFORM

## BRIEF OVERVIEW

DataWinners is an award-winning, online, do-it-yourself data collection service for development professionals developed by Human Network International (HNI), a Washington-based nonprofit. Organizations use DataWinners to transform paper forms into digital questionnaires. Staff then submit data in seconds using any combination of SMS, Smartphone and Web with the equipment they already have. Account administrators can access and monitor this data in real-time and rapidly react with informed decisions.

Unlike alternative platforms, DataWinners offers a low-cost, all-in-one approach that encompasses every aspect of data collection and reporting, from an easy-to-use questionnaire builder, to SMS deadlines and reminders, to a cloud-based database ready for export in a single click. DataWinners is designed to be used by anyone, regardless of technical background – no software installation, no local servers, and no maintenance required. For one low monthly fee, partners can collect an unlimited amount of data with as many questionnaires, devices, users and submissions as needed. More than 400 public sector and governmental partners in over 70 countries use DataWinners to collect data across all sectors, including public health.

In the health sector, DataWinners has been used to collect patient health information, track medical supply stock, and modernize reporting by community health workers. It has also been used to monitor large-scale health projects such as nationwide mosquito net distributions, disaster response activities, and behavioral change campaigns.

The screenshot shows the '2. Questions' interface of the DataWinners platform. At the top, there is a field for 'SMS Questionnaire Code' with the value '001' and a 'Preview' section with icons for 'SMS', 'Smartphone', and 'Web'. The main area is titled 'Questions' and contains a list of seven questions. The third question, 'How many mosquito nets?', is highlighted. To the right of this question, there is a 'Question' field containing the text 'How many mosquito nets?'. Below this is an 'Answer Type' section with radio buttons for 'Word', 'Number' (selected), 'Date', 'List of Choices', and 'GPS Coordinates'. Further down, there is a 'Set Criteria' section with 'Min.' and 'Max.' fields, both containing the value '0'. To the right of this is an 'SMS Preview' section showing a Nokia phone screen with the text '001 answer1 answer2 answer3 answer4 answer5 answer6 answer7'. At the bottom, there is an 'Instructions' section with the text 'Answer must be a number between 0-1000.' Handwritten annotations include 'Ask your question' pointing to the question field, 'Select answer type' pointing to the 'Number' radio button, and 'Set Criteria' pointing to the 'Min.' and 'Max.' fields.

**2. Questions**

SMS Questionnaire Code: 001

Preview: SMS Smartphone Web

**Questions**

1. What is the identification number of your clinic?
2. What month and year are you reporting on?
3. How many mosquito nets?
4. How many rapid test kits?
5. How many malaria treatment doses?
6. Any suspected cases of cholera?
7. Any other stock outs?

**Question**

How many mosquito nets?

**Answer Type**

Select what kind of answer you want from your Data Senders.

- ☐ Word
- ☒ Number
- ☐ Date
- ☐ List of Choices
- ☐ GPS Coordinates

**Set Criteria**

Min: 0

Max: 1000

**Instructions**

Answer must be a number between 0-1000.

**SMS Preview**

46 / 160 characters used (1 SMS)

Nokia

001 answer1  
answer2 answer3  
answer4 answer5  
answer6 answer7

**Ask your question**

**Select answer type**

**Set Criteria**

## ABOUT DATA WINNERS

DataWinners is a mobile data collection service that empowers partners across all sectors to shorten the time between collection and decision-making. Digital questionnaires can be created in minutes by starting from scratch or choosing a template. Users add questions, select answer types and set criteria to increase accuracy. After creating a questionnaire, DataWinners automatically generates the printable SMS questionnaire, Smartphone questionnaire, and Web form needed for training staff as Data Senders.

Questionnaires can easily be edited as needs change. Any combination of SMS, Smartphone and Web can be used to collect data and no special handset or SIM is required. The DataWinners Smartphone App can also collect data offline. As staff send in data to DataWinners, administrators view data in real-time as it is submitted with maps, graphs and charts.

Data can also be filtered and exported to Excel in a single click or automatically transferred to an external database for sharing. DataWinners speeds up the collection of cleaned data by assigning unique ID numbers to patients, clinics, community health workers, or any other subjects. Once recorded, this subject data can be collected over time, and GPS coordinates can be recorded to display these subjects on a map. The application also opens new lines of communication with staff, partners and beneficiaries, as automatic confirmation and error messages improve data accuracy, and deadlines and reminders can be set to ensure data is received on time.

A local telephone number is linked to the DataWinners so that communication costs are reduced by 80% when field staff SMS their data to a local number rather than an international line. DataWinners decreases the costs of data collection by enabling unlimited data collection for one low monthly fee -- as many users, devices, questionnaires, submissions and data senders as needed. There are no equipment costs as staff use their existing devices.

Recurring communication costs are limited to SMS message fees to a local telephone number (roughly \$0.02 – \$0.03 per SMS depending on local rates).

With timely and accurate data, organizations reduce inefficiency and increase their impact by allocating limited resources where they're needed most.

## EVALUATION AND RESULTS

Since its launch in 2011, partners across the world have used DataWinners to reduce the costs of data collection while improving the quality of their data. Even the best managed paper-based systems rarely achieve a participation rate greater than 50%, generating additional indirect costs due to productivity loss and poor decision-making. DataWinners partners, however, routinely see participation rates as high as 90% to 100% and largely eliminate the indirect costs of inaccurate, incomplete and untimely data.

## LESSONS LEARNED

- The primary obstacles that organizations face when transitioning to mobile data collection are the large costs associated with the development and installations of a new platform as well as the strong technical expertise required to manage such a system. As a cloud application, DataWinners enables partners to undertake unlimited data collection with minimal start-up costs with safe and secure data storage that is accessible 24/7.
- Typically, a single, one-day training is sufficient to train staff on SMS submission (and this initial training only needs to be done once regardless of the number of data collection projects to be carried out).

## CONCLUSION

DataWinners is a comprehensive solution for shortening the time between data collection and better decision-making. It is easy to use, reduces costs by taking advantage of staff's existing equipment, can collect data offline and in areas without internet access, and allows seamless integration of collection activities via SMS, Smartphone and Web.

### GEOGRAPHIC COVERAGE

Over 70 countries across Africa, Asia, Europe, Latin America, and North America

### IMPLEMENTATION PARTNERS

Human Network International

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# iHRIS AND MOBILE REFERENCE DICTIONARY



## BRIEF OVERVIEW

Within Uganda, steps are being taken to strengthen the capacity of the Ministry of Health (MOH), districts and professional councils to effectively and efficiently manage their human resources for the delivery of health and HIV/AIDS services. In 2007, through the five-year Uganda Capacity Project (UCP), a new, integrated electronic Human Resources Information System (iHRIS) was developed to assist with this task. Its goal is to contribute to better management of the country's health workforce, ensure an adequate number of health workers were hired, and certify they have the capacity and competence to deliver quality health services where needed. iHRIS is built on free, open source software distributed under the General Public License (GPL) and links all human resource data from the time professionals enter pre-service training to when they leave the workforce.

The national Mobile Telephone Reference Dictionary was developed to protect patients from individuals posing as health professionals, placing patients at a high risk of untreated or mistreated illness or injury resulting in death. People can easily verify whether their providers are licensed.

The Mobile Telephone Reference Directory was launched in 2012.

## ABOUT iHRIS AND THE MOBILE REFERENCE DICTIONARY

The iHRIS system consists of electronic databases for storing information, software for entering and updating data and reporting, and analysis tools. iHRIS databases have been established at various institutions including four health professional councils. The districts can access and use professional council databases to verify registration and licenses of applicants, essentially screening applicants and thus identifying forgery cases and health workers who are not in good standing with the professional councils. The data from iHRIS databases is also used to verify payroll data to eliminate ghost workers.

The iHRIS' Mobile Reference Directory allows members of the public to easily and affordably verify that a clinic and/or a medical professional is registered and licensed to practice by sending an SMS message with the doctor's or clinic's name to a widely publicized shortcode. The directory contains information on 3,877 doctors and dentists as well as 3,500 facilities.

A reply is received with the doctor's full name, registration number, qualification and license status. If it is a clinic, a response with the clinic licensure status plus the supervising doctor's name is received. If the "doctor" is determined to be unregistered, the registrar undertakes the necessary action to prevent the practice from continuing.

## EVALUATION AND RESULTS

Over the past twelve months (from October 2011 to September 2012), 3,172 inquiries were made on doctors and 457 on private clinics. The Registrar of the Medical Council researched 58 frequently asked about doctors and 31 private clinics.

Two of the doctors were found to be herbalists and

the concerned clients were alerted. Two other doctors (one from Ntungamo and one from Kabale) were arrested and taken to court for illegal practice. Three others are still at large.

### LESSONS LEARNED

- iHRIS' Mobile Reference Directory has played a role in improving the timely availability of accurate and up-to-date human resources for health (HRH) data for policy, planning and management use
- The advocacy behind the recent Government of Uganda (GOU) budget approval to increase recruitment of additional health personnel was strengthened by the availability of accurate data on staffing gaps, disaggregated by health worker cadre

### CONCLUSION

A strong HRIS enables leaders to quickly answer key policy and management questions affecting health services delivery, and is contributing to more effective deployment of doctors and dentists. The Mobile Telephone Reference Directory is protecting patients from unlicensed doctors. UCP plans to implement the same mobile directory service for other health professions, such as nurses and midwives, in the near future.



#### GEOGRAPHIC COVERAGE

Uganda

#### IMPLEMENTATION PARTNERS

IntraHealth International

#### FUNDER

USAID

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Information was excerpted from:

"Voices #12." CapacityPlus IntraHealth International, Inc. January 2013. Newsletter.

# iPHONES FOR MALARIA INDICATOR SURVEY



## BRIEF OVERVIEW

Malaria is endemic in Sierra Leone, with stable and perennial transmission in all parts of the country. As such, the entire population is at risk of developing the disease. Malaria accounts for about 50% of outpatient morbidity and is presently the leading cause of morbidity and mortality among children under five years of age, with a mortality attributed to malaria estimated to be 38% among this age group and 25% for all ages (Outpatient morbidity statistics, MoHS, 2009, MIS 2010).

Catholic Relief Services (CRS) and the Ministry of Health and Sanitation (MoHS) of Sierra Leone are co-implementing a Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) Round 10 grant for Malaria. The overall goal of the Global Fund Round 10 Malaria program is to achieve the malaria-related Millennium Development Goals (MDGs) by 2015, not only nationally, but also among the poorest groups across Sierra Leone.

In order to track progress and impact, CRS led the implementation of a Malaria Indicator Survey (MIS) from

January 31 to March 8 of 2013, covering 6,720 households throughout the country. Despite the great surge of mobile technologies to accelerate data collection, all surveys prior to this were using paper-based systems in Sierra Leone. The 2013 MIS used Apple 3GS iPhones to collect data via the iFormBuilder platform, a software as services application with a companion app for mobile devices allowing for timely data collection, monitoring, and analysis.

## ABOUT iFORMBUILDER FOR SURVEYS

Network coverage in Sierra Leone has greatly improved over the past decade, and although coverage can be intermittent in many rural areas, network connection can generally be found in at least a few areas in each village. This was an important consideration prior to deciding to use iPhones for data collection through the iFormBuilder platform.

In designing the data collection program, CRS and partners developed three main forms: 1) a household questionnaire; 2) a women's questionnaire; and 3) a biomarker testing form for eligible children via their consenting mothers. Within each of these forms, other sub-forms were created. Skip logic and validation were programmed in order to facilitate consistent and complete data entry.

For the purposes of the household schedule and to facilitate data entry at the time of the interview, all household names, village, district, and GPS location were recorded into the iPhones. Each individual was also assigned a unique identification code at the time of questionnaire administration to ensure confidentiality during subsequent data analysis.

On completing all three forms (and their respective sub-forms), data collection team supervisors were trained to check for accuracy, electronically sign their name, and ensure that a unique identifier was present for the household, before synching completed questionnaires to a cloud-based database via the local network. Since this unique identifier was included in all three main



questionnaires it allowed for the CRS Freetown-based support center staff to immediately extract, view, and make a quick analysis of data on the iFormBuilder platform to make sure that all information was correctly recorded. If CRS staff noticed any irregularities, such as missing forms for household members who were eligible for women's interviews or blood testing, a call could be made and problems rectified immediately.

### EVALUATION AND RESULTS

Under a similar Global Fund Malaria program in The Gambia, CRS had experience supporting the Ministry of Health in conducting a paper-based MIS. It took over two years for results to be compiled, cleaned, and analyzed. With the iPhone technology, CRS in Sierra Leone was able to have a clean dataset close to the end of data collection, allowing preliminary results to be available within two months of the end of the survey.

### LESSONS LEARNED

- Planning sufficient time to transform the paper-based questionnaire into an electronic format: It took three rounds of approximately three weeks each of intense programming and testing, over the course of a 10-month period, to program the MIS questionnaire into the iFormBuilder platform.
- Giving the program enough time for pre-testing the tool: The tool was pre-tested in 100 households in both rural and urban areas of Bo District three months prior to the MIS data collection.
- Spending enough time on training data collectors and biomarkers prior to data collection: Data collection training for the 28 teams lasted for three weeks, which was necessary to ensure that all individuals undertaking the MIS data collection fully understood the questions, the functioning of the iPhones, and the sequencing of the questionnaires, especially with respect to the anemia and malaria testing.
- Having a technical support center throughout the survey data collection: Throughout the survey data

collection, a CRS Freetown-based team was available 16 hours a day to respond to phone calls from the field teams, especially during the first 10 days of fieldwork.

### CONCLUSION

The iPhone/iFormBuilder technology eliminated the need for paper transcribing, allowing for quicker data tabulation, and facilitated faster interviewing through skip patterns. Also, the fact that survey teams and central data managers were able to view completed questionnaires in real time allowed for instantaneous mistake identification, and consequently data cleaning, in addition to ameliorating the data accuracy and completeness of each field team from one enumeration area to the next.

#### GEOGRAPHIC COVERAGE

Sierra Leone (nationwide coverage; 14 districts)

#### IMPLEMENTATION PARTNERS

Catholic Relief Services is leading a team of partners which include Sierra Leone Ministry of Health and Sanitation, University of Sierra Leone College of Medicine and Applied Health Sciences, Statistics Sierra Leone, ICF International, and World Health Organization

#### FUNDER

Global Fund to Fight AIDS, Tuberculosis, and Malaria

#### CONTACT INFORMATION

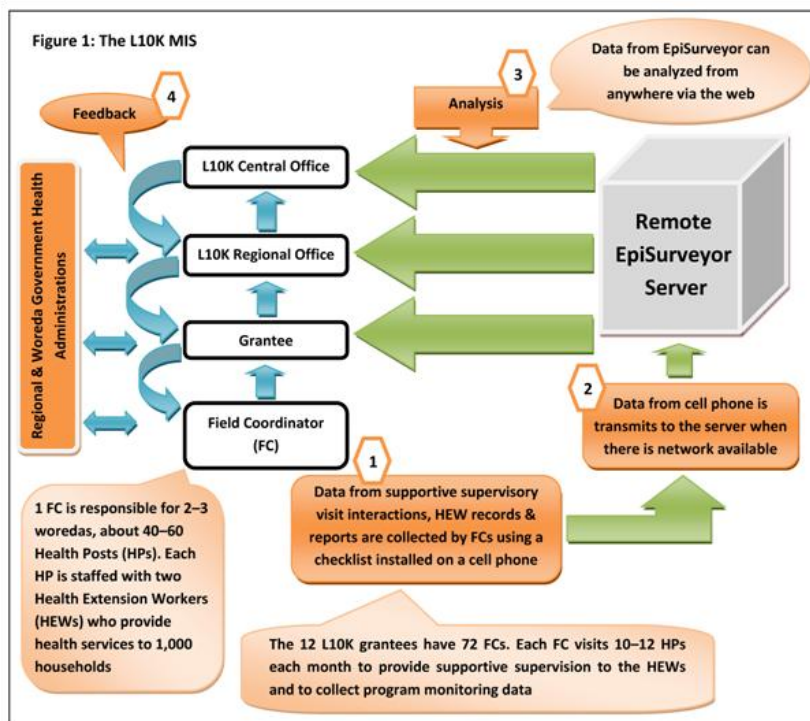
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# THE LAST 10 KILOMETERS: WHAT IT TAKES TO IMPROVE HEALTH OUTCOMES IN RURAL ETHIOPIA



## BRIEF OVERVIEW

Ethiopia is the second most-populous country in sub-Saharan Africa, with an estimated population of 77.9 million, 85% of whom live in rural areas. Ethiopia has achieved major strides in child survival. Recent estimates indicate the country is on track towards achieving its target for MDG 4 – reduce under-5 mortality rate to 68 deaths per 1,000 live births by 2015. However, similar to many other low-income countries, the reduction in neonatal mortality over the past decade has slowed down while the maternal mortality ratio during the same period remained relatively unchanged. At 37 deaths per 1,000 live births, neonatal deaths now account for 63 percent of all infant deaths and 42 percent of all under-5 deaths. The maternal mortality ratio in Ethiopia has remained at 676 deaths per 100 thousand live births which leads to 19,000 maternal deaths annually. Because approximately 90% of births occur in the home, a community-based approach to maternal and newborn care is essential.

Funded by the Bill & Melinda Gates Foundation, the “Last 10 Kilometers (L10K): What it Takes to Improve

Health Outcomes in Rural Ethiopia” project implements and tests innovative community-based strategies to strengthen the link between the Primary Health Care Unit (PHCU) and its beneficiaries in order to improve reproductive, maternal, newborn and child health (RMNCH) in rural Ethiopia, at scale.

To achieve its objectives, L10K provides grants and technical support to 12 regional-level civil society organizations (CSOs) in 115 districts in four of the most populous regions of Ethiopia. Using the mobile phone-based data collection platform MagPi to monitor the implementation of L10K community strategies, 80 field coordinators (FCs) from the CSO implementing partner agencies routinely conduct supportive supervisory visits to the health posts. They also observe and obtain vital information on program performance output and outcome indicators. The data gathered from the supportive supervisory visits are aggregated to monitor and evaluate program performance, thus creating the backbone of the L10K management information system (MIS).

The Last 10 Kilometers was implemented in 2008.

## ABOUT L10K

In order to improve the data quality and the efficiency of its MIS for data-based decision-making, L10K is implementing mobile phone technology called MagPi (formerly EpiSurveyor), developed by DataDyne. The supportive supervision checklist is transformed into a web-based data collection instrument. The data collection tool is downloaded to mobile phones which are used by field officers to collect data during supportive supervision visits. The data collection is done offline and when mobile network is available, the data are uploaded to the MagPi website where it is archived, compiled, and analyzed to give feedback (Figure 1). Currently, this mobile phone-based data collection is being implemented in all of the project’s 115 districts.

## EVALUATION AND RESULTS

The system allows data collection via smart phones which is transmitted to a remote server via web, allowing data-based decision making as soon as the data

## DATA COLLECTION



are being collected (Figure 1).

To ensure the quality of the MIS data, the L10K M&E Officers are randomly revisiting at least five health posts each month to validate the data obtained and transmitted by the FCs. Since June of 2012, the L10K MIS is processing data from more than 700 supportive supervisory visits each month to

provide program performance status and gap updates to the L10K and grantee (CSO) program managers. The system improved the capacity and efficiency of the central, regional, zonal, and district-level program managers to make data-based decision making. The decision making cycle was reduced from every three months to every month or less.

This mHealth strategy identified program coverage gaps which were unnoticed before, improved the capacity of the grantees to conduct M&E, and improved the technical support provided by L10K to the grantee staff.

The major cost to the project was purchasing the smart phones; training took twelve hours and was integrated into staff development efforts. The implementation and management of the digital data collection was possible using its existing M&E team members who were not information technology specialists.

### LESSONS LEARNED

- mHealth can be used for MIS for monitoring real time program activities in remote areas of Ethiopia
- Health workers of various educational levels can easily use smart phones to transmit substantial

volume of data from remote areas of Ethiopia

### CONCLUSION

Since its inception in 2008, L10K has increased its coverage, scope and intensity of its different community-based strategies. The use of mHealth has made it possible to closely monitor the implementation of the changes and scale-up of those strategies. Data from the mHealth MIS is also complementing and supplementing the special studies for evaluating the specific community-based strategies that are being piloted. Thus, the information produced by mHealth has improved data-based decision-making within all levels of project management, improved reporting to donors and other stakeholder by providing more detailed evidence on the performance of the project, and will be generating evidence to demonstrate which community-based strategies are effective in improving MNCH and which are not.

### GEOGRAPHIC COVERAGE

115 districts of Ethiopia

### IMPLEMENTATION PARTNERS

JSI Research & Training Institute, Inc.

### FUNDER

Bill & Melinda Gates Foundation

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# MOBILE PHONE MICROSCOPY FOR THE DIAGNOSIS OF PARASITIC WORM INFECTIONS



## BRIEF OVERVIEW

Soil-transmitted parasitic worms, or helminths, affect two billion people worldwide. People in rural settings in developing countries with poor sanitation, especially children, are disproportionately affected. Children may develop chronic infections that manifest as malnutrition or anemia, resulting in poor physical and mental development. Traditional helminth diagnosis involves examining stool under a microscope; however, new, innovative and cost-effective methods are needed since many of those infected live in rural areas without access to appropriate diagnostic facilities or care.

To compare the diagnostic accuracy of mobile phone microscopy to conventional light microscopy, a proof-of-concept study was integrated into a clinical trial assessing the safety and efficacy of different drugs used to treat parasitic worm infections in school-aged children. By attaching a lens to an Apple iPhone camera, researchers from Toronto General Hospital, Massachusetts General Hospital, the Swiss Tropical and Public Health Institute, the University of Basel, and the Tanzanian Public Health Laboratory (Pemba) were able

to test children's stool samples for roundworm and hookworm. The USD\$15 microscope was created using a strip of double-sided tape and a simple glass lens, operating solely from the power of the cell phone battery.

The study was conducted in September and October of 2012 on Pemba Island in Tanzania. Results were published through the American Society of Tropical Medicine and Hygiene in 2013.

## ABOUT MOBILE PHONE MICROSCOPY

To construct the mobile phone microscope, a 3 mm ball lens was mounted to the camera of an Apple iPhone 4S using double-sided tape. A small hole was punctured in the tape to emit light from the camera lens through the ball lens. Stool sample smear slides were placed less than 1 mm from the lens and were covered by a cellophane strip to prevent contamination. Lastly, a flashlight was used to illuminate the lens while capturing the image using the mobile phone's camera application.

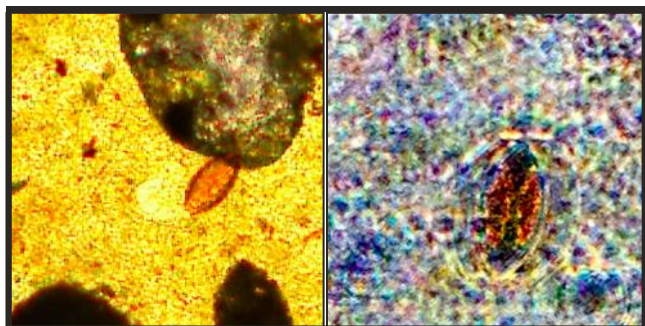
Researchers randomly selected 199 of the original slides analyzed by conventional light microscopy for analysis via mobile phone microscopy for the presence or absence of helminth eggs. All patients were treated with 400 mg albendazole at the end of the study.

## EVALUATION AND RESULTS

While not as sensitive as a traditional light microscope, the mobile phone microscope revealed a sensitivity of 69.4% and specificity of 61.5% for detecting soil-transmitted parasitic worm infections. Sensitivity varied greatly depending on the type of worm and level of infection. Mobile phone microscopy detected 81% of giant roundworm infections, 54.4% of roundworm infections, and only 14.3% of hookworm infections due to low infection and fecal egg counts.

The presence of helminth eggs were revealed in 70% of the samples, and while it is not currently sensitive enough for immediate use, the product is on its way to being diagnostically effective.





Roundworm eggs at 40x magnification by conventional microscopy (left) and mobile phone microscopy (right).

### LESSONS LEARNED

- Mobile phone microscopy is successful at detecting moderate to heavy intestinal parasitic worm infections, but less sensitive at detecting mild infections where the sample contains only a few eggs
- While this study utilized an iPhone 4S, any phone equipped with a quality camera and zoom option can work equally as well
- Mobile phone microscopes will be ready for clinical use when it is sensitive enough to detect at least 80% of infections
- Newer, next-generation technologies may offer improved diagnostic yield but will need to be field tested

### CONCLUSION

While mobile phone microscopy has been used in a laboratory setting, it was important to test its functionality in a real-world setting. Improved technology that can enhance diagnostic yield may function as effective point-of-care tests in resource-

constrained areas. As with many information and communication technology-related innovations, it will need to be tested at scale in order to successfully transition from lab to field.

### GEOGRAPHIC COVERAGE

Tanzania

### IMPLEMENTATION PARTNERS

Toronto General Hospital, Massachusetts General Hospital, the Swiss Tropical and Public Health Institute, the University of Basel, and the Public Health Laboratory (Pemba) in Tanzania

### FUNDER

Medicor Foundation, Swiss National Science Foundation (SNSF)

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#### Information was excerpted from:

Bogoch, Issac, et. al. "Short Report: Mobile Phone Microscopy for the Diagnosis of Soil-Transmitted Helminth Infections: A Proof-of-Concept Study" *Am J Trop Med Hyg* 12.0742 (2013): n.pag. Web.

Nakkazi, Esther. "Africa: Mobile Phone Microscope Detects Worm Infections." allAfrica. 12 March 2013. Web.  
"Smartphones Used to Detect Parasitic Worms." Integrated Regional Information Network. 13 March 2013. Web.

# OPENHDS

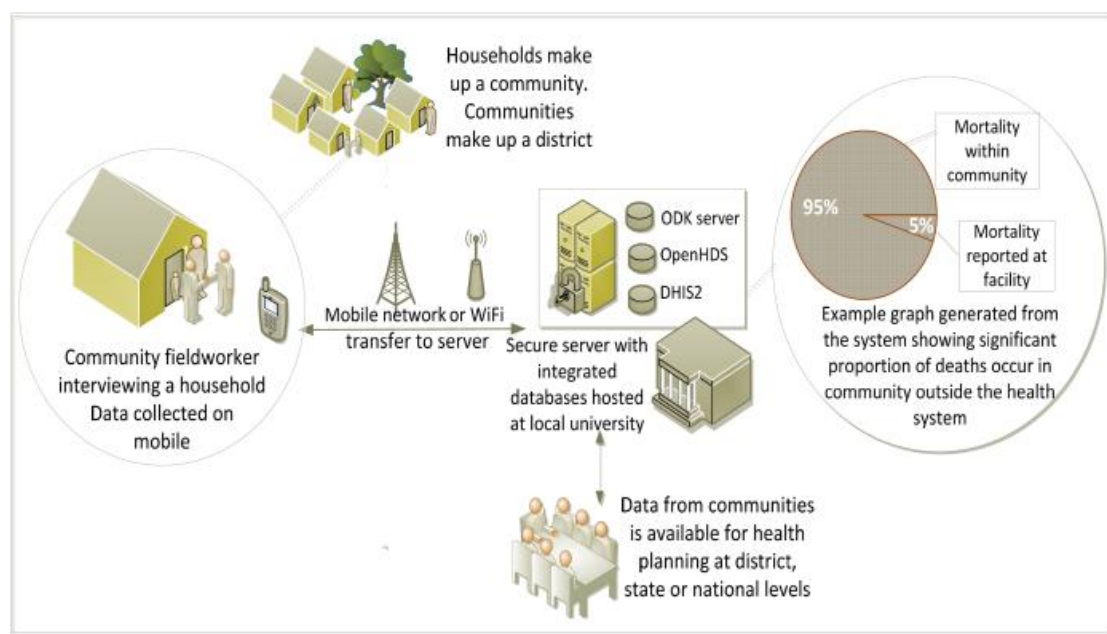
## BRIEF OVERVIEW

Decision makers in many low-income countries lack the required data for evidence-based health system management. One reason for this lack of data is the fact that the routine national health management information systems (HMIS) do not extend to the 'last mile'—the communities and the informal setting of villages, where a significant proportion of health-related events occur. In Nigeria, only 35 percent of people access health services (Nigeria DHS, 2008). Health issues faced by 65 percent of the population may never be accounted for in the facility-based HMIS. As in most countries, community-based HMIS data collection is often either poor, or non-existent, in low resource settings.

The OpenHDS (Open Health and Demographic System) uses an Android tablet application to collect individual level health and demographic data in rural areas. Community field workers periodically visit households to collect information about births, deaths, migrations, pregnancies, deliveries, immunization and other pertinent health information.

## ABOUT OPENHDS

OpenHDS is an open source Android tablet application that enables community field workers to collect births, deaths, migrations, pregnancies, deliveries, immunization and other pertinent health information. Field workers can collect data "offline" and upload data to the OpenHDS server when they have mobile connectivity. The OpenHDS server application has functionality to aggregate data by location, time period, and indicators, and to export this aggregate information to the DHIS



2.0 database. Health program administrators and policy makers can thus have real time access to health and demographic information in the community.

The web-enabled, tablet-based OpenHDS application allows users to efficiently select previously registered individuals and launch various OpenDataKit (ODK) forms to collect additional demographic, morbidity, and service delivery information.

The mobile application facilitates the collection, through household interviews, of many health events that occur in the community (or outside the formal health system). Even with a relatively small target population, accurate and statistically significant health and demographic rates can be computed when health events are combined with ongoing population demographic information. In addition to computing rates needed for MDGs 4 and 5, health administrators and researchers are able to assess health system utilization and the burden of disease for these rural communities over time.

Data validation checks were built into the mobile data forms. Identifying most errors during interviews allowed for more accurate resolution of the inconsistencies.

### EVALUATION AND RESULTS

The project adopted an implementation research approach founded on participatory action research principles, where researchers were directly involved in iteratively designing and implementing organizational change in collaboration with the stakeholders. The guiding research question was: Can mobile technology reduce the complexity of community data collection for state and national HMIS?

Trained field workers used the application to collect health and demographic data from a population of 4,445 individuals (from 1251 households). The project successfully replaced a paper-based community health reporting system with the OpenHDS tablet application.

As a result of implementing OpenHDS, printing, copying, distributing, transporting and storing of paper forms was no longer needed. Data entry clerks were also not required and workers involved in the paper supply chain (including printers and driver person-hours) were eliminated. Not surprisingly, resistance to change was encountered as the mobile system introduced some redundancies in the function of the data entry staff. The work of data entry staff had to be reorganized to data collection and supervisory tasks.

### LESSONS LEARNED

- Mobile data collection is much more efficient than using paper and, ultimately, it has made collecting accurate community health information viable. Mobile data collection eliminates many of the time consuming and organizationally messy steps of handling paper, including printing, distribution, data entry, and error correction.
- The project found little guidance on country specific guidelines for securely managing health information.
- Compared to Android smart phones, the screen real estate and battery life of Android tablets made a significant improvement in data collection.

### CONCLUSION

The OpenHDS application is addressed to the information needs of frontline health workers, and district health managers. This work is a first step in an iterative process of health information systems improvement in poor, rural regions around the world.

Ultimately, providing timely and accessible health information to the key stakeholders of the health care system will have a transformative impact on the effectiveness of health care delivery. While building these systems requires advanced software development skills, attention to standards based specifications and configurable design will make these systems more readily available to groups that can make use of them.

### GEOGRAPHIC COVERAGE

Nigeria (Akpabuyo district in Cross River State) and Tanzania (Ifakara)

### IMPLEMENTATION PARTNERS

University of Calabar (Nigeria), the Ifakara Health Institute (Tanzania), the Swiss Tropical Institute in Basel (Switzerland), and the Columbia University School of Public Health (USA)

### FUNDER

Canadian International Development Agency (CIDA), Canada's International Development Research Centre (IDRC)

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# FINANCE







# HEARTFILE HEALTH FINANCING – AN mHEALTH ENABLED INNOVATION IN HEALTH SOCIAL PROTECTION



## BRIEF OVERVIEW

More than 73% of Pakistan's population pays out-of-pocket to access healthcare. Catastrophic expenditures on health, medical indebtedness and medical impoverishment are, therefore, a common occurrence. In fact, more than 40 million individuals run the risk of spending catastrophically on healthcare. A number of factors compel action as social divides widen in Pakistan. Social protection is a government priority but existing mechanisms have limitations. The state's health related social protection system has narrow coverage and is plagued by a number of challenges.

An NGO think-tank has created a mechanism to fill this gap through its recently established program: Heartfile Health Financing (HHF). HHF is a health-equity fund based demand side system, which enables registered doctors/hospitals to seek financial help for patients who run the risk of spending catastrophically on healthcare in an expedient and transparent manner. The system comprises three components—an mHealth enabled technology platform, a system of validating poverty and prioritizing patients, and a health equity fund. HHF's objectives at inception were twofold: 1) to develop a system, which at the humanitarian level could protect people against medical impoverishment and meet an urgent need of the poor, and; 2) at the development level, to develop a health social protection system suited

for the specific needs of Pakistan and could help broaden the base of pooling for health.

The program's proof of concept on potential within innovative web and mobile phone technologies has already been published in the World Health Report 2010 - Health systems financing: the path to universal coverage.

## ABOUT HEARTFILE HEALTH FINANCING

The HHF system is designed to make cash transfers for health services in an expedient and transparent manner. Backend algorithms enable multisource ascertainment of eligibility with reliance on a combination of indicators and solicitation of data from the National Database Registration Authority's poverty database through an online channel. The system is able to categorize patients by urgency level of treatment required and financial need by evaluating health expenditures vis-à-vis disposable income. Hierarchy of controls with respect to program's governance structure, restricted access to information based on system user rights, responsibility and authority and automated supply chain management controls have enabled transparent tracking of services delivery and payments processing. There is an integrated payment system for multiparty service delivery billing along with built-in budget ceiling and funds allocation compliance process.

With respect to donation management, advanced donation pooling and allocation algorithms for maximizing funding impact and spread, the capability to instruct age, gender, disease and region specific donations and the capability to be responsive to demands, on a real time basis is bringing unprecedented benefits to the donors in determining the use of allocated funds. In addition, the systems' ability to update donors on utilization of their funds on a micro-transaction basis is an additional innovative feature, which is contributing to both transparency as well as efficiency. Through tracking and time stamping as inherent features, it additionally assesses workers' performance and hence helps to institutionalize accountability. Moreover, the program has been



capitalizing on mMoney (a branchless mobile banking interface) to disburse assistance for travel and food related needs of patients.

## EVALUATION AND RESULTS

In the pilot phase, the average turnaround time for request processing was 2.5 days (from initiation of the request to approval of funding). However, the mean time from grant of approval to procedure accomplishment was 7.6 days for orthopedics and 39.5 days for cardiology—the two units initially enrolled—indicating the latter's greater workload. During the entire request seeking process, patients did not have to physically visit a third party (Heartfile, the clearing house), and were able to manage their case from within the hospital or by phone. Therefore, there were no ancillary costs (traveling and food expenditures) borne by the patient and/or the family.

In the last two years, HHF has provided financial assistance to more than 1900 patients requiring high cost interventions. With 18 service points in six tertiary care facilities, more than 150 health care personnel are engaged through the communication loop. More than 8000 outbound and 3000 inbound SMS have been exchanged with patients, health care staff, volunteers, and donors so far. Text messaging is done in local dialect with patients. Process and outcome related evaluation of mHealth features of the program are planned this year with the support of Canada's International Development Research Centre (IDRC).

## LESSONS LEARNED

- The telemedicine-for-assessments (online validation of poverty status) and mHealth component of HHF allows it to be established as a scalable and replicable model for other developing countries.
- Reliance on technology also cuts administration fees with lean operational costs that overcome need for extensive field operations.
- To increase speed and convenience, it is important

to shift to low-cost internet access devices.

- Scalability and outreach relies on national and international partnerships.
- The systems' innovative capacity to stratify patients based on preconfigured rules as opposed to subjective decisions and innovations in workflows, request processing and ingraining transparency are considered valuable.
- Donors are more inclined to donate because of the donor-empowerment feature and the micro-transactional tracking system of HHF

## CONCLUSION

Technology innovations in Heartfile Health Financing (HHF) constitute an end-to-end solution for patient centric demands related to catastrophic health expenditures. Request processing, financing of services and donation management workflows reflect novelty in the way technology of international standard has been used to map the local needs.

### GEOGRAPHIC COVERAGE

Pakistan

### IMPLEMENTATION PARTNERS

Heartfile

### FUNDER

World Economic Forum's International Partnership for Innovative Healthcare Delivery (IPIHD), Clinton Global Initiative, mHealth Alliance of the UN Foundation, Rockefeller Foundation, Canada's International Development Research Centre (IDRC), Pakistan Poverty Alleviation Fund

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#### Information was excerpted from:

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# JAMII SMART | KimMNCHip – REFERRALS, mSAVINGS AND eVOUCHERS



## BRIEF OVERVIEW

According to the World Bank, Kenya is among the highest 15% of countries for maternal mortality and the highest 20% for infant mortality. As part of its commitment to the UN Global Strategy for Women's and Children's Health, Kenya will recruit and deploy an additional 20,000 primary care health workers; establish and operationalize 210 primary health facility centers of excellence to provide maternal and child health services to an additional 1.5 million women and 1.5 million children; and will expand community health care and decentralize resources. With integrated mobile financial services, mHealth solutions are especially able to enhance health outcomes at scale, including essential health services in the context of Reproductive Health and Maternal Neonatal Child Health (MNCH). Currently, most mHealth approaches are project based and often at the pilot level. There is urgent need to move from this stage to national mHealth solutions that are cost-effective and evidence-based in terms of health benefits. Brokering multi-stakeholder partnerships towards creating convergence and new business models, such as Jamii Smart, is needed to bring solutions to scale.

Jamii Smart (meaning "smart families") aims to convert the huge success of M-Pesa - Safaricom's mobile wallet solution adopted throughout Kenya into an effective

mHealth solution that significantly improves MCH by modeling on existing, sustainable mobile technologies with inputs from end users. Through the Kenyan integrated mobile Maternal and Newborn Health information platform (KimMNCHip), this national-scale mHealth initiative offers pregnant women more choices, control and medical care for them and their babies during and after their pregnancy.

The solution is scheduled to go live in April 2013. Phase-ins will run in the Eastern region, Kilifi, Kwale and Kakamega Counties of Kenya, with work already commencing in Kilifi County, and will eventually lead to a nationwide scale-up.

## ABOUT JAMII SMART | KimMNCHip

Jamii Smart has three critical phases:

1. Strengthening Kenya's community health referral system through the use of a dynamic mobile phone and web portal solution linking the demand and supply of MNCH services
2. Promoting mSavings and eVouchers for pregnant mothers, leveraging the existing M-Pesa which also offers micro-insurance services
3. Scaling up nationally and regionally in Africa

KimMNCHip aims to reach 8,000 public health facilities, six million mothers and their children, 88,000 community health workers, and health policy and decision makers.

## EVALUATION AND RESULTS

To date, the program has automated Kenya's mother and child health booklet which the Government of Kenya (GoK), Ministry of Health uses to track critical areas of MCH. It contains critical content for mothers, information on the four delay-related barriers to obtaining emergency obstetric services, and methods for community health workers (CHWs) to proactively support mothers and the role of fathers and men in caring for pregnant women and their children below the age of 24 months. To avert printing costs that lead to

shortages and data management and data quality challenges, KimMNCHip has automated the booklet for use at the clinic level on both mobile and web portals, as well as to the GoK's DHIS database which is accessible by both CHWs and health facility staff. A prototype shared with the GoK has met their approval and the full application was launched in May 2013.

Additionally, the program has created mSavings for mothers through Linda Jamii (meaning “family protection”), an innovative and affordable healthcare insurance option targeting 35 million uninsured Kenyans. For Kshs.12,000 (\$150) per family a year, families will be able to register on a mobile phone and access comprehensive medical coverage. Coverage also includes support for the birth planning process which requires expectant mothers to establish a financial plan. It will also explore the option of communities building a mobile wallet community fund to support women.

Future plans include adopting and automating the currently manual reproductive health Output Based Aid voucher program initiated by the GoK.

## LESSONS LEARNED

- Government engagement is critical in mHealth initiatives and in linking technology to programmatic interventions
- A funder is not necessary to begin implementing creative ideas. Starting with zero funds enabled the initiative to align to the needs on the ground as opposed to donor objectives. The implementation team is also able to contribute to financial and nonfinancial resources.
- The initiative completed many firsts, including prioritizing approaching the government to determine national e/mHealth priorities and aligning technology to the priorities, rather than designing a platform and later engaging users
- The role of an independent consultant/partnership

broker in the process was critical for cross-sector partnership success, providing a central coordination point and ensuring equity, conflict resolution, and a central point of communication. This role will eventually transition to the forming governing body of the solution.

## CONCLUSION

Jamii Smart and KimMNCHip demonstrated its ability to create business models that are affordable for all with the ability to scale up to a national level.

### GEOGRAPHIC COVERAGE

Kenya

### IMPLEMENTATION PARTNERS

Government of Kenya, Safaricom, World Vision, CARE Kenya, African Medical Research Foundation (AMREF) Kenya, and Aga Khan University/Foundation

### FUNDER

Both financial and nonfinancial resources have been provided solely by Implementing Partners

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# TANZANIA NATIONAL eVOUCHER SCHEME



## BRIEF OVERVIEW

Different opinions exist among policy makers, practitioners, and health workers regarding optimal approaches to maintain (“keep-up”) universal coverage of Long-Lasting Insecticidal Treated Mosquito Nets (LLINs) throughout malaria-endemic regions of the world. This case study contributes to this dialogue by describing an innovative mechanism called the “eVoucher,” introduced in Tanzania in 2012. Since 2004, Tanzania’s National Malaria Control Program (NMCP) has supported the Tanzania National Voucher Scheme (TNVS), known to the public as *Hati Punguzo* (“discount voucher” in Swahili), through which paper vouchers were provided to target beneficiaries at Tanzanian health clinics. Vouchers issued to pregnant women and children are redeemed for LLINs at participating commercial retail shops, when accompanied by the end-user’s cost contribution of TZS 500 (about USD \$0.30).

Changes are underway to improve the current LLIN redemption system. In 2012, electronic vouchers (eVouchers) were introduced to transition from a paper voucher system to an electronic system based on cellular devices. To further boost choice and competition among net suppliers, a second bed net supplier was authorized as a TNVS supplier in late 2012. TNVS suppliers are encouraged to introduce multiple

nets with different features, allowing increased choice to those using an eVoucher, while also stimulating uptake by consumers paying full price. This has helped ensure widespread distribution of LLINs to pregnant women and infant children. Increasingly, through the use SMS technology and mobile phones, eVouchers rather than paper vouchers are being used for LLIN redemption.

## ABOUT TANZANIA NATIONAL eVOUCHER SCHEME

The eVoucher was designed to both mimic and streamline the current processes of the TNVS paper voucher. The transition to eVoucher eliminates about half of the steps required for the paper voucher.

**Step 1:** A clinic worker issues an e-voucher to a pregnant woman or an infant’s caregiver via SMS to a central server operated by MEDA, the Logistics Manager. All SMSs sent to the server are free to the clinic worker and reverse-charged to MEDA, similar to dialing a toll-free number.

**Step 2:** The incoming SMS is validated as having a registered phone number, an authentic voucher category, and a patient’s clinic card number. It must also come from a phone registered with the TNVS program on the MEDA-managed eVoucher platform. Once properly identified, the system sends a unique randomly generated voucher ID number to the clinic worker in response to the request.

**Step 3:** The ID number is written on the individual’s clinic card, taken to a retailer, and presented together with the TZS 500 top-up cash payment.

**Step 4:** The retailer redeems the voucher by sending the unique number via free SMS to the system. If the number is valid, the server authorizes redemption and the end-user gets a net at an inexpensive cost. The retailer profit margin consists of the top-up cash payment from the beneficiary plus any additional margin negotiated in advance with the respective net supplier.

## EVALUATION AND RESULTS

By the end of 2011, evidence suggested that Tanzania had achieved bed net coverage rates exceeding 80% nationwide<sup>1</sup>. This accomplishment was achieved



following two mass LLIN distribution campaigns that together distributed approximately 27 million LLINs, and the distribution of over 8 million LLINs to pregnant women and infants through TNVS. TNVS is now challenged to sustain that high coverage rate, although demographic analysis confirms that targeting only pregnant women and infant children is not enough.

## LESSONS LEARNED

- The eVoucher depends on reliable cellular signals to send the SMS, dependable processing of the messages by the local aggregator, and a stable computer server to act as host. While the majority of clinic workers and retailers interviewed reported some initial communication delays, message transfer was accelerated upon introduction of short-code SMS in early 2012, although some network outages still hamper the system. When signals are delayed, it is likely that clinic staff will offer a replacement paper voucher.
- eVouchers are valid for 60 days upon issue. They depend on an accurate transcription of the voucher number to the health card by health workers and accurate SMS entry by retailers. Some retailers reported receiving incorrect or expired voucher numbers, requiring the beneficiary to return to the clinic for a replacement.
- Preliminary evidence gleaned from the e-voucher suggests up to 90% of vouchers are redeemed within 24 hours of issuance. A retailer stock out can pose a challenge for the program, but real time reporting gathered from each retailer's eVoucher SMS volume can facilitate prediction of stock outs and assist the supplier to take corrective action.

## CONCLUSION

Adoption of the eVoucher by clinics and retailers has been positive. In addition to delivering subsidized bednets to beneficiaries, it has the additional benefit of producing considerable electronic data that is easily analyzed from a public health and a management perspective. Data collected in real-time through the

eVouchers reveals net uptake rate by clinic, redemption time lapse, redemption location, date, and population segment (infant and pregnant women). Data illustrates which clinics have high issuance rates and which retailers achieve high redemption levels. Data also alerts Hati Punguzo program staff to abnormalities and changes in historical patterns which can signal supply chain problems, allowing early detection to quickly remedy the problem.

From its October 2011 launch through the first year of operation, 453,486 eVouchers were issued and 257,148 of them were redeemed for an LLIN. This number is on pace to double in the second year of the project.

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*<sup>1</sup>Although no nationwide data exists, smaller surveys consistently peg ownership of at least one bednet at more than 80%. A NATNETS (ITN steering committee) presentation in December of 2011 indicated that the Southern Zone had achieved coverage rates of 95%.*

## GEOGRAPHIC COVERAGE

Tanzania

## IMPLEMENTATION PARTNERS

Mennonite Economic Development Associates (MEDA),  
National Malaria Control Program (NMCP)

## FUNDER

USAID, DFID

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# TRANSPORTMYPATIENT: FACILITATING ACCESS TO TREATMENT FOR OBSTETRIC FISTULAE



## BRIEF OVERVIEW

The World Health Organization estimates that approximately two million women live with fistula worldwide and that an additional 50,000–100,000 women are affected each year. In Tanzania alone, approximately 2,500–3,000 new cases of fistula are estimated to occur annually. Many girls and women with fistulae must travel more than 500 km to reach one of the major centers for fistula repair, with some travelling as far as 1000 km.

Comprehensive Community Based Rehabilitation in Tanzania (CCBRT) set up the transportMYpatient initiative at the end of 2009 in order to tackle a significant barrier preventing patients with fistula from accessing health services: the cost of transport. Other barriers to accessing treatment include the cost of medical treatment itself and lodging, which are already provided free at the CCBRT Disability Hospital in Dar es Salaam to obstetric fistula patients.

The transportMYpatient initiative mobilizes CCBRT Ambassadors to detect and refer patients with obstetric fistulae and utilizes mobile phone technology to transfer funds through Vodafone's M-PESA service to cover transport costs.

## ABOUT TRANSPORTMYPATIENT

transportMYpatient uses a network of CCBRT's Ambassadors: doctors, nurses, other healthcare workers, non-governmental organization staff or members of the general public living in the community all over Tanzania, who are aware of the services offered by CCBRT. The network was established in early 2010 through a CCBRT outreach team who searched for appropriate individuals to serve as case finders/ Ambassadors.

The transportMYpatient initiative works through the following steps:

- The CCBRT Call Centre Assistant receives phone calls from Ambassadors, potential patients or their family members. Callers are asked a series of screening questions by a CCBRT doctor to confirm the diagnosis of obstetric fistula. The Call Centre Assistant links confirmed obstetric fistula patients to their closest Ambassador, if they are not in communication already.
- The Ambassador sends details of the transport costs required to send the patient to CCBRT. After approval from Program Management, the fare is sent to the Ambassador via mobile phone through Vodafone's M-PESA technology. The Ambassador collects the cash at the nearest M-PESA agent (there are over 6000 M-PESA agents in Tanzania), purchases a bus ticket, and arranges for the patient to travel to CCBRT Disability Hospital in Dar es Salaam.
- Once the patient's journey has begun, the Ambassador informs CCBRT of the bus number and provides the phone number of the bus conductor to the Program Team to facilitate tracking of the patient during their journey in order to ensure their safety. Obstetric fistula patients are met at the bus stand in Dar es Salaam and are accompanied to CCBRT Disability Hospital.

Ambassadors receive an incentive of TSH 10,000 for each patient that successfully arrives at CCBRT with the correct transport receipts.

## EVALUATION AND RESULTS

Since 2010, 725 women suffering from fistula were transported to CCBRT via the transportMYpatient initiative. The number of annual surgeries at CCBRT has increased by more than 300% from 162 in 2009 to 501 in 2012, largely due to the transportMYpatient scheme.

In 2012, 90% of patients reported that they were dry six months after their operation and 96% said that they were fully reintegrated into their communities. This rate of recovery and reintegration means that patients were able to take part in activities they enjoyed before developing obstetric fistula and were able to associate with their peers as they used to.

presenter of Radio FADECO (a community radio in Kagera) became a CCBRT Ambassador. In 2012, Kagera Region had the highest number of referrals in the country.

## CONCLUSION

CCBRT is now considering ways to expand the ambassador network to locate more 'hard to reach' individuals living with obstetric fistulae, including asking successfully treated patients to be ambassadors. CCBRT is also developing a National Strategic Plan to enable all women suffering from fistula to access the life changing surgery.

## GEOGRAPHIC COVERAGE

Tanzania

## IMPLEMENTATION PARTNERS

Comprehensive Community Based Rehabilitation in Tanzania (CCBRT) | The Government of Tanzania

## FUNDER

The Vodafone Foundation (main funder)

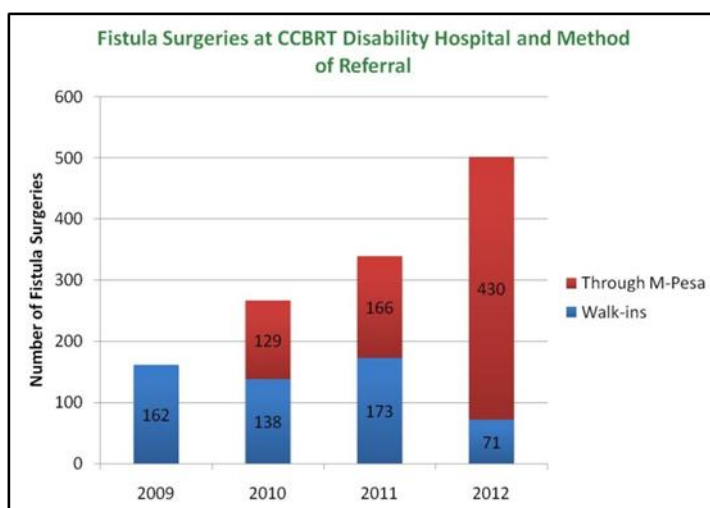
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## LESSONS LEARNED

- In 2012, CCBRT observed that recruiting community radio presenters as Ambassadors has the potential to tremendously increase the number of patients who come to the hospital for treatment. This is evidenced by the increase in the number of patients travelling from the Kagera Region after the

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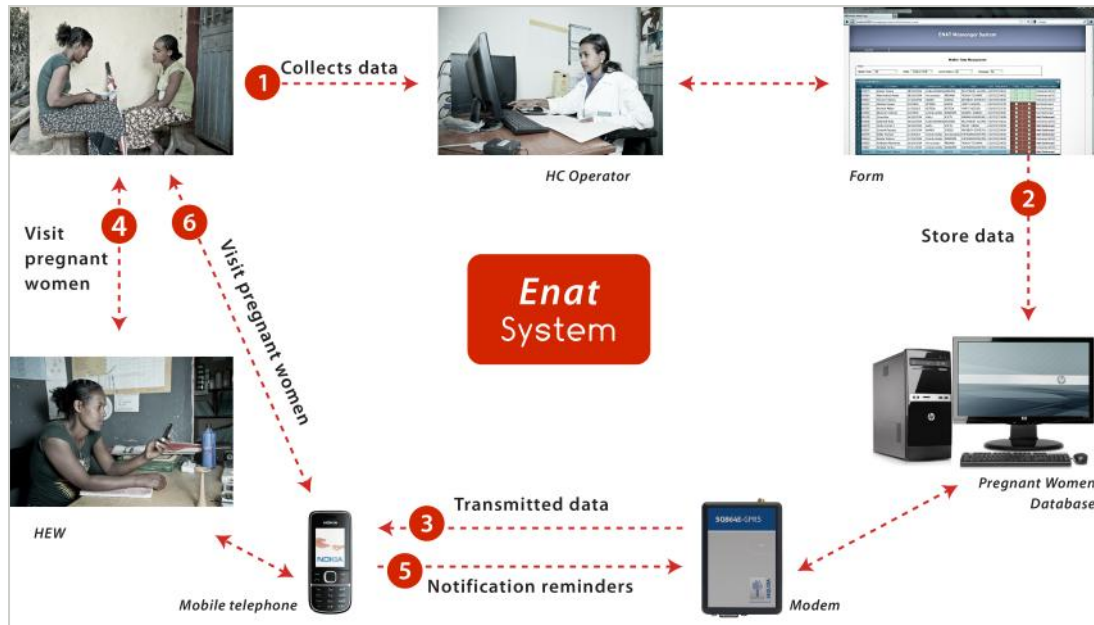
# LOGISTICS







# ENAT MESSENGER FOR MATERNAL HEALTH IN ETHIOPIA



## BRIEF OVERVIEW

The maternal mortality ratio in Ethiopia is among the highest in the world with a rate of 676 deaths per 100,000 live births in 2011. According to the same data, only 34% of pregnant women received antenatal care (ANC) from a skilled health care provider, while only 10% of deliveries occurred at a health facility.

In order to reach the goal of 60% of deliveries taking place in health facilities and attended by skilled health care workers, the Clinton Health Access Initiative, in partnership with Addis Ababa University School of Information Science and in consultation with the Ethiopian Federal Ministry of Health, has developed an mHealth application that facilitates tracking and referrals at the community level. The system, Enat Messenger, works to increase the retention of women in ANC care to ensure delivery at a health center.

Enat Messenger was piloted from January 2011 to September 2012 in 56 health posts and 10 health centers in two regions (Tigray and Oromia).

## ABOUT ENAT

The Enat Messenger System runs text-based

confirmation and transmission services via an automated message manager. The system consists of a server, a modem, Nokia 2700 mobile phones with solar chargers and a web-based application with a database. A system document, user manual, and handbook for health extension workers (HEW) were developed to support implementation.

Each week, HEWs sent ANC data from their health post to the nearest health center. The health center entered the data (sent from the health posts and the ANC data for pregnant women following ANC at the health centre level) into the Enat system manually. Based on the data entered, which includes last menstrual period or gestational age, the system automatically calculated the expected delivery date (EDD) and sent text message reminders to the respective HEWs one month and one week before a pregnant woman's EDD. The reminder served as a prompt for the HEW to visit the mother to assess her status.

After each visit, the HEW was expected to send an SMS confirmation back to the system to confirm the visit. The responses were monitored by health care workers at the health center.

The system could also be used to prompt transport of a mother in labor to a health facility. Selected Health



Development Army (HDA) volunteers were equipped with mobile phones and would make a missed call to an HEW to alert her of the onset of labor. The HEW would send an SMS message to the system and the system sent a message to the operator/midwife at the health center.

In total, 59 personnel including midwives, nurses, and IT/data experts at 10 health centers, 124 HEWs at 62 health posts, and 64 HDA community volunteers received training. Each health center was provided with a desktop computer with a modem, one mobile apparatus and a post-paid SIM. Mobile phones and solar chargers were given to HEWs and HDA volunteers, and mobile airtime was refilled on a monthly basis.

## EVALUATION AND RESULTS

The pilot has demonstrated improved communication between health centers and health posts/communities as a result of the Enat Messenger System. This improved link led to the timely identification of term pregnant women and improved the frequency of visits by HEWs to pregnant women before delivery. The increased encounters between HEWs and pregnant women and their families allowed for greater opportunity to discuss the need for institutional delivery or to discuss and address potential barriers such as transportation, and consequently institutional deliveries increased at each pilot site. Moreover, the system improved the storing and tracking of data on pregnant women.

## LESSONS LEARNED

- **System related challenges:** In the beginning of the pilot, there were minor interruptions to the system which were later fixed. These included the inability to send messages in some sites, transmission of only a first or second message (but not both), and duplicate messages about the same mother.

- **User related challenges:** The limited computer literacy of health workers was a challenge. Some were unable to fix minor problems with the system. In addition, some HEWs lost their mobile phones or did not return them when they left the area (i.e. for further education, transfer). Other HEW failed to visit mothers on time and as a result, confirmation messages were delayed.

- **Other challenges:** Poor mobile network coverage and electric power outages in some of the sites affected the functioning of the system.

## CONCLUSION

The Enat pilot demonstrated the applicability of mHealth technology for addressing skilled delivery attendance. The increase in deliveries in health facilities as well as the improved collection and tracking of data on pregnant women supports the argument for scale up of the system to other regions in Ethiopia.

### GEOGRAPHIC COVERAGE

Ethiopia, Tigray and Oromia regions

### IMPLEMENTATION PARTNERS

Clinton Health Access Initiative | Ethiopia Federal Ministry of Health | Addis Ababa University School of Information Science

### FUNDER

Clinton Health Access Initiative

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#### Information was excerpted from:

"mobile Health: Technology to Increase Skilled Deliveries in Rural Communities in Ethiopia" Federal Ministry of Health and Clinton Health Access Initiative. 2012. Web.

# MOBILE PHONE SURVEY SOFTWARE FOR END-USE



## BRIEF OVERVIEW

For developing countries affected by malaria, cost-effective, reliable, secure, and sustainable supply chains can save millions of lives. Shortages and stockouts of health commodities can cause dangerous treatment gaps for patients. Unplanned emergency orders waste money on rush fees and high freight costs. Lack of inventory control wastes valuable commodities due to expiry, improper storage, and theft. Poor coordination leads to redundancies and gaps in service.

The goal of a health logistics system is much larger than simply making sure a product gets where it needs to go; it seeks to ensure that every person is able to obtain and use quality essential health supplies whenever he or she needs them. To determine if malaria commodity needs are met, the U.S. President's Malaria Initiative (PMI) implements quarterly surveys that capture information about the malaria supply chain and malaria diagnosis and treatment at public health facilities in focus countries in sub-Saharan Africa. Results from these quarterly End-Use Verification Activity surveys provide rapid, actionable findings for decision makers.

After piloting paper-based End-Use Verification Activity surveys in 2009, the USAID | DELIVER PROJECT began conducting mobile phone-based End-Use surveys. These

quarterly surveys use DataDyne's EpiSurveyor (now Magpi) platform, which facilitates the creation of data collection forms online, and eases the collection and analysis of survey data.

## ABOUT SURVEY SOFTWARE FOR END-USE VERIFICATION

The PMI End-Use Verification Activity is a quarterly survey that captures information about the malaria supply chain and malaria diagnosis and treatment at public health facilities in focus countries in sub-Saharan Africa. The USAID | DELIVER PROJECT conducted a pilot of the End-Use Verification Activity in 2009 in Tanzania. The pilot used paper surveys and revealed that implementing the survey across all focus countries would be too time-intensive and prone to producing poor quality data.

To address these challenges, the project conducted a pilot in 2009 of mobile phone survey technology to implement the End-Use survey in Ghana. Following the success of that pilot, PMI adopted the use of mobile technology for regular implementation of the activity. The use of mobile technology enables the rapid analysis of data and the quick and widespread dissemination of findings useful for strategic and programmatic decision-making. JSI used DataDyne's EpiSurveyor (now Magpi) platform that enables any computer literate user to freely create data collection forms online, download these forms to a wide variety of mobile phones, upload the captured data, and make use of general analysis tools.

With the mobile-phone based End-Use Verification Activity, digital data collection and entry occurs in the field at the point which data is gathered, removing an extra step of inputting data, which leads to less error and greater efficiency. Importantly, decision-makers have access to real-time data for decision-making, increasing their ability to respond to critical problems in the supply chain.

## EVALUATION AND RESULTS

After the pilot in 2009, data was collected to measure the efficiency of mobile data collection, data quality, and ease of use. Results indicated that data collection is quicker using digital means rather than paper. The time required to conduct the End-Use survey at a health facility using EpiSurveyor was, on average, 27 minutes less than the time required to gather the data on paper. Results from a comparison of the data in the EpiSurveyor database with what was collected on paper indicate that there was very close parity between the EpiSurveyor database and the data gathered by paper and input by hand. From the 412 different fields compared, 6 discrepancies were discovered, which represented a 1.5% difference between the two methods, with the differences indicating better quality data in those collected via mobile phone.

Ease of use of the mobile phone-based survey program was researched through a short questionnaire, where every respondent asked to be able to use EpiSurveyor again. Despite any perceived limitations of the hardware and software, the ability to automatically perform analysis and eliminate the need to manually enter data after the data collection period made replacing paper-based data collection with mobile phones desirable.

## LESSONS LEARNED

- To ensure that data could be secure in the field, even when mobile upload to the remote server was not possible, data collectors needed the ability to back-up data from the mobile phone to a laptop. JSI worked with DataDyne to create this feature, allowing for data transfer via cable or Bluetooth to the user's laptop as a .txt file (compatible with Excel, Word, Notepad, etc.)

## CONCLUSION

Coordinating and implementing large scale surveys is a complicated, time consuming process. Using mobile phones for the End-Use Verification activity has reduced the time needed to implement the activity and produce actionable findings, by streamlining the database

creation, data entry, and analysis steps. In 2012, End-Use Verification was initiated in two new countries, Nigeria and Zimbabwe, and continues in Ghana, Mozambique, Malawi, Tanzania, and Zambia. It is also implemented regularly in Angola, Burundi, DRC, Ethiopia, Kenya, Liberia, and Mali by USAID's Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program.

## GEOGRAPHIC COVERAGE

More than 5,000 health facilities in Ghana, Malawi, Mozambique, Nigeria, Tanzania, Zambia, and Zimbabwe.

## IMPLEMENTATION PARTNERS

John Snow, Inc. (The USAID | DELIVER PROJECT); Country-specific partners: **GHANA:** Stores, Supplies and Drugs Management (SSDM), National Malaria Control Program (NMCP), Pharmacy unit, Disease control unit, Family Health Division (FHD), National Tuberculosis Control Program (NTCP), National AIDS Control Program (NACP) and the Centre for Health Information Management (CHIM) | **MALAWI:** NMCP | **MOZAMBIQUE:** NMCP and Central de Medicamentos e Artigos Medicos (CMAM) | **NIGERIA:** NMCP, Targeted States High Impact Project (TSHIP), Malaria Action Program for States (MAPS) | **TANZANIA:** NMCP and Pharmaceutical Services Section (PSS) | **ZAMBIA:** Ministry of Health | **ZIMBABWE:** Ministry of Health Child Welfare (MOHCW), MOHCW Directorate of Pharmacy Services

## FUNDER

PMI, USAID

## CONTACT INFORMATION

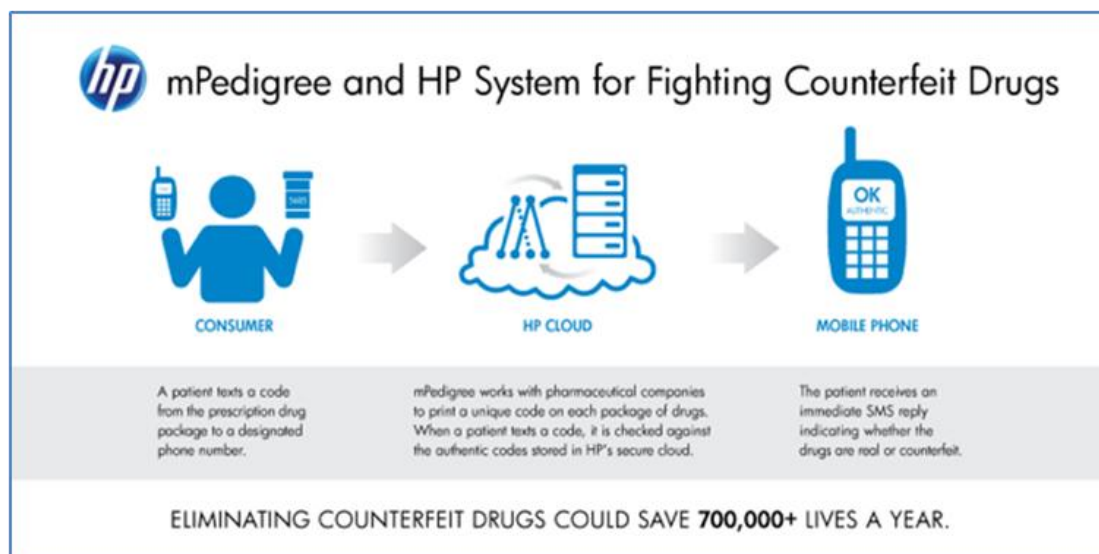
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# mPEDIGREE



## BRIEF OVERVIEW

Counterfeit drugs are believed to be responsible for an alarming number of deaths, especially in the developing world. According to a study by Y.A. Chowdary et al., all types of products – whether affordable, expensive, generic or branded – are being counterfeited and emerge in community pharmacies, hospitals, and other less-regulated settings. Previous methods have been developed to combat the problem, yet proved unsuccessful. However, the use of ubiquitous information and communication technology (ICT) tools has proven to be more promising.

Bright Simons, a Ghanaian social entrepreneur, has developed a phone-based system called mPedigree to tackle the problem of counterfeit drugs. mPedigree is an innovative anti-counterfeit ICT software application that seeks to empower the consumer so that they have a way of verifying their medication's safety. Through the provision of a free text message service, users are able to verify the origin and authenticity of drug treatments before use.

The core technology was invented in 2005 and mPedigree was formally launched in Ghana in 2007. Since its launch, the service has expanded to India, Nigeria, East Africa and South Asia.

## ABOUT mPEDIGREE

mPedigree protects consumers from counterfeit drugs in regions with low literacy and low technical capacity. The model relies on negotiating deals with phone and drug companies and having manufacturers implement the program at the lowest possible cost. Matching the technology platform to regional infrastructure, Hewlett Packard (HP) created a cloud-based system that tracks pharmaceutical supply chain data on the back end, while leveraging the high mobile penetration in region for the consumer interface. The innovative system allows buyers to verify the authenticity of medicines for free by text messaging a unique scratch-off code found on the product to a universal number. This request is routed to mPedigree's servers and consumers receive a quick response to authenticate their purchase.

## EVALUATION AND RESULTS

Global partnerships have been developed with Fortune 500 companies, over two dozen telecom agencies, regulators, and pharmaceutical companies. In 2011, Themis Medicare became the first Indian healthcare company to sign up with the mPedigree Network. As of February 2013, mPedigree's verification codes have appeared on almost ten million packs of medicine in Ghana, Kenya, India and Nigeria. Four other countries are currently conducting a beta launch.



## LESSONS LEARNED

- An electronic resource system must be able to boost transparency in the marketplace and efficiency in the regulatory process
- Electronic resource systems should also facilitate the promotion of common standards and enhance the capacity of manufacturers and marketers of medicines to benefit from regional economies of scale
- Identifying collective interests, specifically loss of revenue for pharmaceutical companies and governments and the network expansion of local telecommunications companies, has allowed the network to secure support from the key constituents it needed to drive impactful change.
- A sound marketplace for medicines requires an enrichment of the partnerships between drug manufacturers, marketers, pharmacists and regulators

## CONCLUSION

Through an unparalleled integration across corporations, governments, and service providers, mPedigree is enabling consumers in the developing world to place absolute confidence in any medication they purchase or receive in the open market or from any provision outlet in the public sector. Fast, secure, and easily accessible in remote areas, the system addresses the main barriers to counterfeit monitoring and has helped avert the numerous deaths associated with patients ingesting counterfeit drugs. It is a strong example of how technology is meeting the challenge of identifying these dangerous and lethal drugs.



### GEOGRAPHIC COVERAGE

Ghana, India, East Africa, Nigeria, South Africa

### IMPLEMENTATION PARTNERS

Hewlett Packard, Orange Health, National Agency for Food and Drug Administration and Control in Nigeria (NAFDAC), Kenyan Pharmacy and Poisons Board (PPB), West African Health Organization (WAHO), Several Telecom Companies

### FUNDER

Several Pharmaceutical Clients, the U.S. Technical Support Working Group (US TSWG), Founders

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# mTRAC STOP MALARIA PROGRAM (SMP)



## BRIEF OVERVIEW

Malaria is Uganda's leading cause of morbidity and mortality. It accounts for 25 to 40% of outpatient visits to health facilities and is responsible for nearly half of inpatient pediatric deaths. The proportion of children under five treated with an antimalarial drug on the same or the next day after onset of fever is about 36%, although the proportion receiving an ACT is only about 14%. The proportion of women receiving two doses of intermittent preventive treatment in pregnancy (IPTp) is 32%. Ensuring the availability of the right quantity of the right type of malaria medication is difficult. This is in part due to the often missing or inaccurate information related to stock levels. In the past, District Malaria Focal Persons tracked the stock levels of malaria medicines

and identified stock outs by telephoning health facility in-charges or getting reports during their integrated support supervision visits. These systems were time-consuming and the reporting was not in real-time.

As part of the USAID-funded Stop Malaria Program (SMP)—project supporting malaria programs in 34 districts in Uganda through activities that address malaria prevention, diagnosis and treatment, capacity strengthening in M&E, and integrated support supervision—the MOH's mTRAC SMS-based system is being utilized to track stock levels of essential malaria medicines at health facilities.

The mTRAC system was developed by UNICEF with funding from DFID and WHO, and adopted by the MOH. It has been rolled-out to all Uganda's districts with USAID Implementing Partners (IP) playing a key role in facilitating the roll-out and in ensuring its ongoing use by the District Health Teams. As a USAID IP, SMP began providing support on the mTRAC system implementation since November 2011.

## ABOUT mTRAC SMP

All USAID IPs have supported the MOH's rollout of its electronic Health Management Information System (HMIS) through printing HMIS tools, training of district health team staff, assisting districts to complete accurate and timely reports, and providing internet connectivity. mTRAC is part of the overall electronic HMIS system.

The MOH's mTRAC system uses SMS technology to track stock levels of essential malaria medicines at health facilities. District health workers have been trained to summarize the data entered in the weekly HMIS form as an SMS string using their own cell phones. The reports are then sent to a District Dashboard in the mTRAC system, which is accessed and approved by the District Health Officer. The MOH-Resource Center also accesses this data and compiles a summary report based on the data submitted the previous week. The report is shared with the Stop Malaria Program, which then works with districts to avoid or correct stock problems by redistributing medicines from over-stocked facilities to facilities facing imminent stock-out, and by contacting

National Medical Stores (NMS) to advocate for restocking.

## EVALUATION AND RESULTS

While early data cannot yet clearly state the effect of mTRAC, the following graph does suggest fluctuations in stock-outs have appeared to decrease. Further evaluation must be completed before attributing improvements to mTRAC.

## LESSONS LEARNED

- The success of any electronic solution depends on the follow-up support provided after the initial training and SMP fills this critical gap by providing ongoing support supervision to mTRAC users.
- mTRAC also has some challenges, such as structural issues with the HMIS weekly surveillance form because the form does not disaggregate data for some items, such as quinine, which is not disaggregated by type (injectable or tablets) on the form. Thus, District health teams have to follow up with the actual health facilities with stock-outs to determine whether it is injectables or tablets that are needed.
- Poor network connection and congestion, especially at reporting times, is also sometimes a deterrent to consistent reporting by the health facility in-charges. As part of the mTRAC Steering Committee, USAID is working to address these challenges.

## CONCLUSION

The mTRAC system may be contributing to the quick and efficient reporting of stock-outs of essential anti-malarial drugs, enabling medical personnel to respond to disease outbreaks in record time and take preventative measure.

## GEOGRAPHIC COVERAGE

Uganda

## IMPLEMENTATION PARTNERS

Johns Hopkins School of Public Health: Center for Communication Programs; Partners: Malaria Consortium, Infectious Diseases Institute (IDI), Communication for Development Uganda (CDFU) and the Uganda Health Marketing Group (UHMG)

## FUNDER

USAID, DFID, WHO

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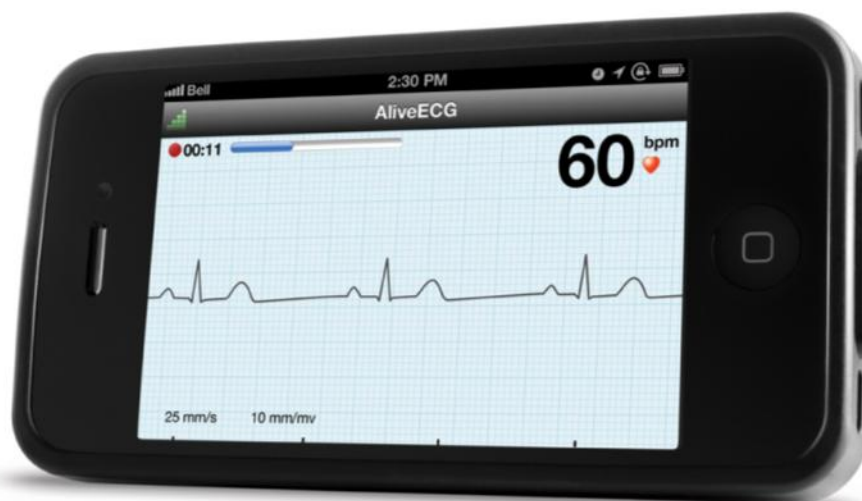
# SERVICE DELIVERY







# ALIVECOR HEART MONITOR – MOBILE ECG



## BRIEF OVERVIEW

The proliferation of mHealth tools has produced several mobile applications available to health professionals and general users, such as glucose monitors that attach to an iPhone, as well as heart rate and sleep monitoring applications. Through iteration, more advanced and easier to use products are entering the market. One such product is a low cost, clinical-grade mobile heart monitor, or electrocardiogram (ECG) monitor, that fits over the back of a smartphone.

Wireless technologies have enabled the transmission of high quality ECG recordings without the need for a conventional 12-Lead ECG. AliveCor's Heart Monitor device is compatible with the iPhone, allowing for wireless recording of 30-second Lead I single channel rhythm strips. Physicians and patients can record, display, store, and transfer ECG recordings from the iPhone.

In 2012, the AliveCor Heart Monitor was FDA cleared for the US and CE marked for the EU, allowing for clinical use to screen and monitor heart rhythms. Plans are under way for registration and commercialization worldwide. AliveCor will also be expanding the Heart Monitor to additional smartphone devices

## ABOUT ALIVECOR

AliveCor's ECG monitor comes with two electrodes embedded in a wireless case that snaps onto the back of an iPhone. The device is launched via the free AliveECG app, which allows a reading by either placing the sensors directly over the chest or from the finger tips. Recorded rhythm strips can be of any duration, and are stored in the app and securely in the cloud in PDF format for reviewing, analysis, and printing through AliveCor's website.

## EVALUATION AND RESULTS

AliveCor's Heart Monitor has been used in several clinical trials and undergone rigorous testing through numerous medical professionals and in many ongoing studies at various institutions. Abstracts were presented in 2012 at three major cardiology meetings, demonstrating usability, accuracy, and the ability to use the device for community screening.

One of the studies included an eight-week study at the University of Southern California. Without training, 53 subjects used the Heart Monitor to record ECGs on themselves, and 61% of them also used the device on others. Participants transmitted weekly 30-second readings to the cloud. Transmission interpretation included various data such as normal



sinus rhythm and abnormal electrical activity in the heart, or arrhythmias.

After using the device, 24% of subjects reached out to their private physicians for a consultation and 16% felt they had discovered a health condition previously unknown to them. Also, 78% wanted to continue using the device after the study had ended. Thirty-three percent felt they were more health conscious after participating and 88% thought it transmitted accurate information.

### LESSONS LEARNED

- Study participants found the device most conducive for use based on its form, portability, and ease of use
- The heart monitor can be adopted by patients as a non-continuous, patient-triggered event monitor
- Patients who are more familiar with technology, at least to the level of operating a bank ATM, are more likely to be successful at operating the device when they are symptomatic
- The device may be useful to record daily tracings of patients for post-procedure follow-ups who do not already have an implanted cardiac device
- While the device has several potential uses, it may not catch the initiation of an arrhythmia, which has diagnostic value, or be able to identify short arrhythmias

### CONCLUSION

A clinical quality, low cost heart monitor that can be easily and intuitively linked to a smartphone provides

health providers and users the chance to learn about and characterize heart rate and rhythms, and the ability to identify arrhythmias at any time. The technology and optimization of the device will improve public awareness of health metrics and early diagnosis, as well as increase the availability of advanced cardiac monitoring on a global scale.

#### GEOGRAPHIC COVERAGE

Currently United States, United Kingdom, and Ireland with worldwide expansion planned

#### IMPLEMENTATION PARTNERS

AliveCor

#### FUNDER

Burrill & Company, Khosla Ventures, Qualcomm Ventures, Oklahoma Life Science Fund

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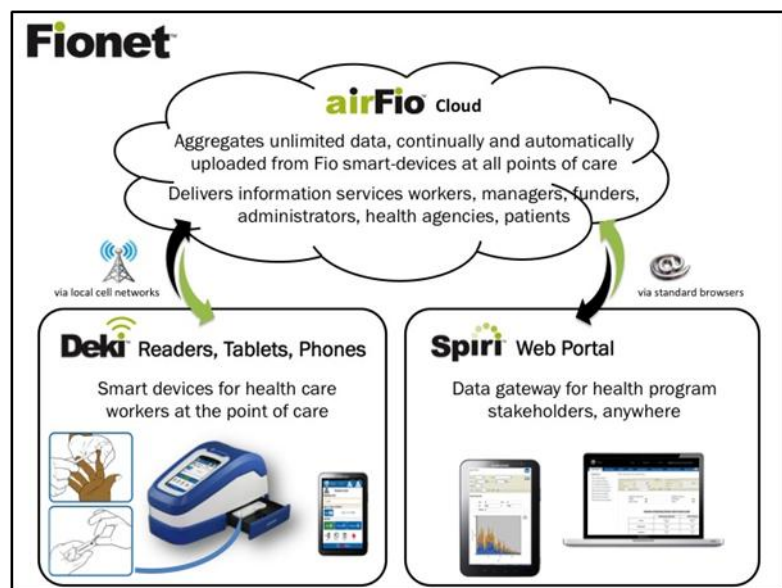
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# FIONET: MOBILE DIAGNOSTICS INTEGRATED WITH CLOUD INFORMATION SERVICES



## BRIEF OVERVIEW

Two of the biggest problems in the management of infectious diseases in resource-limited settings are 1) inadequate diagnosis and clinical management at the point of care, and 2) inadequate capture and transfer of point-of-care data to health program stakeholders for monitoring and evaluation, continuous quality improvement, and resource allocation. Rapid diagnostic tests (RDTs), the only practical diagnostic tests compatible with point-of-care settings, are read by eye, commonly resulting in field accuracy far below the manufacturer's performance rating. Meanwhile, health care workers are too busy delivering essential care to patients to focus on data capture. As a result, data from the point of care – where planning and trends must begin and where spending outcomes have their end – is largely inaccessible.

Fio Corporation has developed Fionet to address these problems. Fionet comprises three integrated components: Deki, Spiri, and airFio. Deki mobile software applications and companion devices for health care workers integrate clinical workflow guidance and digital data capture at the point of care, then transmit records of patient encounters to airFio. Deki is designed for use with standard Android phones, tablets,

and the Deki Reader, a mobile, in vitro diagnostic device that interprets commercially available RDTs for infectious diseases such as malaria, HIV, syphilis, hepatitis, and dengue and is CE-marked for malaria RDTs. airFio is a secure cloud database that stores point-of-care data transmitted by Deki over local mobile phone networks. Spiri is the gateway via web browsers to airFio and its menu of cloud information services. Spiri allows health program stakeholders to remotely monitor diagnostic performance, adherence to case management protocols, health care workers activity levels, and other health performance indicators.

## ABOUT FIONET IN GHANA

The Ghana Health Service (GHS) expressed a desire to expand the usage of RDTs throughout Ghana with the following objectives: 1) improved quality control of diagnostic procedures, 2) consistent and highly accurate interpretation of RDTs and 3) improved data capture from clinical encounters where RDTs are used. In September 2012, GHS and Fio Corporation launched an initial deployment of Fionet in three districts of the Accra region: Greater Accra East, Dangme East and Dangme West.

## EVALUATION AND RESULTS

Before launching Fionet, over 180 GHS and private health workers and managers were trained on Fionet. Participating facilities and managers were instructed to utilize Fionet full time for malaria RDT processing and interpretation as well as for malaria reporting and case management. Deki Readers were configured to collect data on malaria RDTs as well as microscopy samples for comprehensive reporting. Since the launch, Deki Readers have been active in 50 clinics and over 20,000 records have been uploaded to the airFio cloud database. 500 RDT-based and 250 microscopy-based records continue to be collected each week.

The Accra Phase demonstrated the effectiveness of Deki Readers to ensure RDT quality through step-by-step guidance during RDT processing, identification of misuse or poor RDT quality, and objective interpretation of RDT results. RDT processing quality issues including

using expired RDTs, mismatching patients and RDTs, mistakes in incubation timing, and evidence of RDT misuse such as adding too much blood, were detected by Deki Readers in 26% of RDTs processed.



The Deki Readers also improved district and program managers' abilities to remotely monitor quality control at the individual-, facility-, and program-wide levels. Records uploaded by Deki are geo-tagged and contain complete user, facility, and patient data; RDT records contain an image of the RDT being processed. Through Spiri, managers remotely audited diagnostic performance and monitored adherence to case management protocols.

Data captured was automatically transmitted over the local mobile phone network; 74% of records were uploaded to airFio within 10 minutes, 89% within two hours, and 97% within one week. The data was automatically aggregated and securely stored on airFio, and Sub-district, district, regional and national reports were automatically updated, eliminating laborious manual data entry and reporting.

## LESSONS LEARNED

- During the training period, many health workers whom had little prior experience with RDTs made significant processing errors. Fio enhanced the Deki Readers via an over-the-air software update to better identify conditions of RDT misprocessing, invalidate RDTs of compromised quality, and recommend that the health worker repeat the test.
- Midway through the program, the flow of data to airFio slowed due to RDT stock outs. The program switched to an RDT from a different manufacturer

which the Deki Reader was not yet compatible with. Fio has since added that and others to its list of compatible RDTs.

## CONCLUSION

The Accra Phase demonstrated that Fionet works in Ghana and is well suited to meet the needs of the Ghana Health Service in a transformative manner that can be rapidly deployed and centrally managed using the existing mobile phone infrastructure. GHS has the systems and capability to train users and leverage Fionet to make measurable and sustainable gains in monitoring and evaluation, quality of diagnoses, improved health care worker performance, and minimization of material waste in primary health care services.

As a result of the Accra Phase's success, Fio and GHS are working to implement a phased deployment of Fionet in the country over the course of 2013/14.

## GEOGRAPHIC COVERAGE

Ghana. Fionet is also being utilized in Kenya, Tanzania, Indonesia, Democratic Republic of Congo, Sierra Leone, and Colombia.

## IMPLEMENTATION PARTNERS

Ghana Ministry of Health, Ghana Health Service, Fio Corporation, Fio Health Ghana Ltd.

## FUNDER

Ghana Health Service, Fio Corporation, Fio Health Ghana Ltd.

## CONTACT INFORMATION

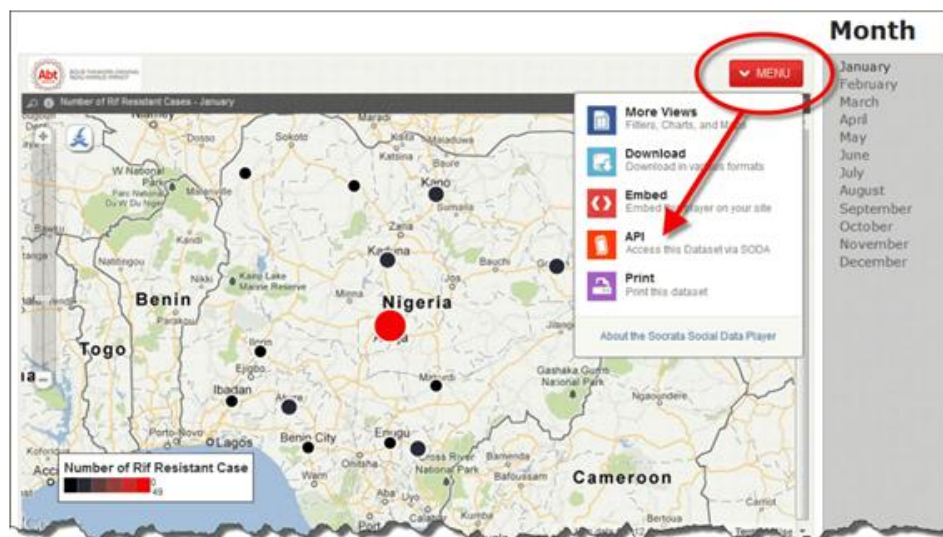
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# GXALERT



## BRIEF OVERVIEW

Only 66% of the estimated number of incident TB cases globally were diagnosed and reported to the WHO in 2011, due in part to a reliance on a proven but time-consuming process of sputum smear microscopy used to diagnose TB in many low- and middle-income countries. Diagnosis of drug resistant TB also remains a particular challenge, given the infrastructure, biosafety requirements and human resources needed to conduct traditional culture and drug susceptibility testing (DST). The Xpert MTB/RIF assay, recommended by the WHO in December 2010, allows for the simultaneous detection of TB and rifampicin resistance (a first-line TB drug) in under two hours, using a platform that entails fewer biosafety and human resource requirements than traditional culture-based DST. Furthermore, the sensitivity of Xpert MTB/RIF for detecting TB is significantly higher than that for microscopy, particularly in patients with HIV infection and children who are less able to provide adequate sputum samples.

The TBxpert Project, funded by UNITAID and executed by the WHO Stop TB Department and the Stop TB Partnership, will provide approximately 1.4 million Xpert MTB/RIF test cartridges and over 220 GeneXpert instruments for the rapid detection of TB and rifampicin resistance in 21 recipient countries in 2013-2015.

Despite this diagnostic advance, however, paper-based laboratory registers can take weeks or months before they are delivered to a central office and keyed into a monitoring and evaluation (M&E) system by hand. This may result in delayed treatment of Multi-Drug Resistant Tuberculosis (MDR-TB), as well as a higher likelihood of infecting others with MDR-TB, including facility-based health care workers.

GxAlert is a system which attaches a 3G USB modem to GeneXpert machines and ensures real-time reporting of results to a centralized database. By reducing time of reporting TB diagnostic results, GxAlert will enable national TB programs to move second-line drugs to the right location, alert facility personnel to take precautionary measures, and ensure that infected individuals begin treatment immediately. Faster treatment initiation will improve outcomes and reduce risks of MDR-TB positive patients infecting others.

## ABOUT GXALERT

In January 2013, the WHO Stop TB Partnership began rolling out 149 Cepheid GeneXpert rapid TB diagnosis machines to 27 nations. A single GeneXpert test takes 90 minutes to present results, versus the current three months for a cultured test. Although the results were available rapidly, in pre-launch rollouts in Nigeria in early 2012, these rapid results were still being transcribed into paper ledgers, resulting in months-long delays in reporting and numerous transcription errors along the way.

A team from Abt Associates shortened this reporting cycle from months to mere seconds and improved data quality by partnering with GeneXpert manufacturer Cepheid to network the GeneXpert test devices with existing electronic disease surveillance systems under an initiative called GxAlert. (See [www.GxAlert.com](http://www.GxAlert.com).) By



adding a 3G USB modem and innovative processes to GeneXpert devices, GxAlert networks the diagnostic machines and provides the following new capabilities:

Automatically send SMS text or email alerts to MOH officials when a new MDR positive or Rif positive case is detected.

Monitor usage and expiration dates of cartridges, and utilization rates of each device.

View real-time machine errors to determine if additional training or technical support is needed.

The faster reporting time allows the Nigerian Federal Ministry of Health to aggregate MDR-TB test results in real-time, directly into eTB Manager™ or their M&E tool of choice. This enables the Federal Ministry of Health to begin MDR treatments faster and move second-line drugs where they are needed most.

## EVALUATION AND RESULTS

In a pilot conducted in Nigeria in October 2012, GeneXperts successfully and securely transmitted simulated data from Nigeria into the GxAlert cloud-based system. The pilot confirmed that data could be received at GxAlert by multiple GeneXpert devices at the same time.

Following testing and validation in March 2013, the Nigeria Ministry of Health approved full scale-up of GxAlert to its remaining 24 GeneXpert devices and will become the first nation with a fully networked MDR-TB alert system. An Abt team is currently in the field scaling up the GxAlert solution from pilot to national level.

The GeneXpert machine also tests for influenza, HIV and by 2017, 37 diseases in total, making the technology solutions built for TB scalable to other health information platforms.

## LESSONS LEARNED

- While technology provides the conditions for change, country-based models are needed to

translate data feeds into better mobilization of staff and resources

- Implementation will provide a roadmap for using global data standards with existing M&E/alert/open data tools to develop rapid responses by a health system

## CONCLUSION

Technology plus health systems strengthening activities can improve a National TB Program's ability to: 1) curtail the spread of MDR-TB by responding more rapidly to diagnosis; 2) accurately forecast drug stocks; 3) monitor the comparative quality of clinics' diagnostic efforts; 4) improve accountability through transparency and open data; and 5) protect health IT investments through real-time aggregate monitoring of device utilization, error rates, and malfunctions.

### GEOGRAPHIC COVERAGE

Nigeria

### IMPLEMENTATION PARTNERS

Abt Associates is leading a team of partners which include Cepheid, Nigeria Federal Ministry of Health, and Management Sciences for Health

### FUNDER

Abt Associates

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# MARIETXT: A MOBILE POWERED MANAGEMENT INFORMATION SYSTEM



## BRIEF OVERVIEW

In a fast paced world today, having access to real-time information and the ability to stay current based on rapid organizational shifts helps to serve clients more efficiently, as well as to inform planning.

MarieTXT is a mobile powered management information system. The system was developed to build the capacity of the private sector to provide better services to clients and to enable real-time reporting and communication with service providers and managers of the Marie Stopes Uganda (MSU) social franchise (BlueStar) network. It is a web based modular system that has evolved into a fully short message service (SMS) powered management information system.

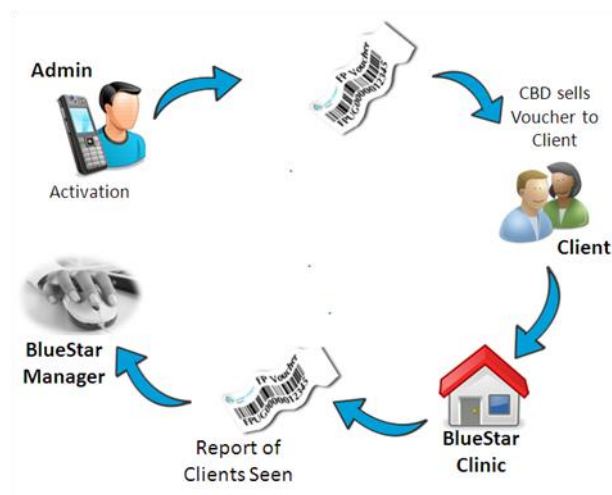
MarieTXT was developed in 2012 by MSU and deployed across all BlueStar network health facilities in Uganda, to enable service providers and community based distributors (CBD) to report daily and weekly reports using mobile phones, as well as participate in knowledge assessments, and pre- and post-training evaluation. MarieTXT has also been piloted with other MSU service delivery channels, business processes and quality assurance including Village Health Teams (VHT), Integrated Marketing & Communications (Hotline), and stock management.

## ABOUT COMMCARE

Eighty percent of the data is fed into the system through SMS and it is captured into a structured query language (SQL) database that has a web interface used to view the data.

MSU's BlueStar network includes a voucher project. The voucher module within MarieTXT takes record of the full life cycle of a voucher service. Record is taken through SMS reports sent at each stage of the voucher service cycle including voucher activation, issuance to the MSU officer, sale to a CBD, sale to a client and when the client takes the voucher to a BlueStar clinic for a service. By tracking this voucher cycle, including voucher redemption rates, health managers can look at ways to improve service delivery.

The system captures service numbers of family planning (FP) methods offered on a weekly basis. This is done by service providers at BlueStar clinics.



MarieTXT also offers a text based Hotline where users are able to send questions and inquiries about sexual & reproductive health, family planning, HIV/AIDS, referrals and obtain a response through SMS.

MarieTXT takes electronic record of stock movement to regions and teams, as well as stock disbursement to providers. The system helps procurement teams to

monitor expiry status of selected family planning items in the warehouse, and ensures providers are able to communicate quickly regarding stock levels, to avoid stock-outs and resulting loss of opportunity for service delivery.

Finally, in addition to the above features, MarieTXT has an “opt in” feature where interested users and clients are able to register and subscribe to periodic reproductive health and family planning information. This component predominantly targets youth.

## EVALUATION AND RESULTS

Within the first year of implementation, the system had 1,965 registered users, produced 4,862 summary reports, and received a total of 29,984 messages. Of those, 17,765 messages reported voucher sales. On a weekly basis, these users receive questions relating to their work. Based on the responses and their knowledge levels, appropriate training and capacity building plans are developed.

## LESSONS LEARNED

- MarieTXT can be used both internally (MSU) and externally (public/private health facilities), particularly in disseminating family planning information to interested and prospective clients of MSU
- The system is an open source software, expandable to report on other services offered by MSU or activities undertaken by partners, as the program and activities expand
- The process used to develop FP messages can be replicated for new content such as HIV, maternal and child health, and tuberculosis
- Like many other mobile technology projects after incurring start-up costs, projects like MarieTXT need maintenance. Resources are required for ongoing leasing of the short code, offering free SMS messaging, and encouraging and motivating service providers and partners to report regularly

## CONCLUSION

This project demonstrates mobile technology as an effective way an organization can achieve real time reporting while building the capacity of the private sector. The use of mobile phones as reporting tools enables access to real time information and data, providing an up-to-date status of projects and programs running in an organization.

### GEOGRAPHIC COVERAGE

Uganda

### IMPLEMENTATION PARTNERS

Marie Stopes Uganda (MSU), Marie Stopes International (MSI) for technical assistance

### FUNDER

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# mCARE: ENHANCING NEONATAL SURVIVAL IN RURAL SOUTH ASIA



## BRIEF OVERVIEW

According to research conducted by West, Christian, Labrique and other colleagues in Bangladesh, 50% of women experiencing an obstetric crisis use a mobile phone to call a provider, obtain medical advice, or arrange transport or financial aid. The JiVitA Maternal & Child Health and Nutrition Research Project has implemented projects where, at the onset of labor, mobile phone calls were made to nurse-midwife teams who were then dispatched to the home, where over 80% of births in this population occur. This has resulted in highly skilled birth attendance for 89% of the 500 pregnancies under that pilot study. While mobile phones are becoming ubiquitous in rural Bangladesh, many lower socioeconomic families may not own a phone, while they are often at the highest risk of increased maternal and neonatal mortality and morbidity. This is changing rapidly, as a survey of 168,000 families, conducted in the JiVitA project site in rural Bangladesh in early 2012, revealed that over 70% of households in the study area own a personal mobile phone.

The mCARE project has developed and is testing an integrated mobile phone-based data system that links rural community health workers (CHW) and their clients (pregnant women and newborns) in order to 1) systematize pregnancy and birth registration, 2) effectively target the delivery of antenatal and postnatal care to mothers and newborns, and 3) enhance survival of preterm infants by promotion of emergency referral

and essential newborn care in resource-poor settings.

This project is being implemented from 2011 to 2014 in the JiVitA Project Site in rural Gaibandha District of Bangladesh, one of the largest rural population research sites in South Asia, covering 650,000 people and where 90% of all infants are reported to be born at home.

## ABOUT mCARE

mCARE's goal is to improve pregnancy registration and enhance survival of preterm infants in resource-poor settings through active pregnancy and birth surveillance, targeted and accountable provision of antenatal and postnatal care and referral facilitation. Its health information system includes automated reminders for antenatal and postnatal visits, checklists for basic home-based newborn care, notification of labor and birth, and emergency mobilization or referral support for rural women and families.

CHWs are responsible for pregnant women in their communities whom they monitor and ensure the delivery of antenatal services. Their work and primary signal functions can be enhanced using simple mobile and cloud-based scheduling and support systems, such as the mCARE mobile CHW Support System. Community health workers are connected to their pregnant clients and their newborns to improve the delivery of antenatal care by scheduling follow-up visits, by compressing the time to respond to crises by allowing families to trigger the mobilization of referral and emergency response systems, and by creating novel windows of opportunity for intervention through innovative use of known data such as gestational age and previous pregnancy outcome to predict potentially high risk deliveries.

## EVALUATION AND RESULTS

The project builds on a long engagement in collaborative, population-based research by the JiVitA Maternal and Child Health and Nutrition research site in rural Bangladesh. The CHW-client link contains a rigorous evaluation component that measures system functionality, usability and performance indicators prior to deployment and testing at scale.



In the country's rural northwest where the mCARE study is focused, few mothers deliver babies at hospitals (>80% of women give birth at home - in the absence of skilled medical personnel - and most women are at home when complications occur). For the women who can reach health facilities to address their health problems, a preliminary study was interested to understand whether these facilities were well equipped to address these life-threatening complications. It evaluated emergency obstetric care capabilities at 14 high-volume private and public health facilities while also identifying ideal patient referral locations for the mCARE system. The study determined there was potential to improve referral and that mobile health technology could play a key role.

### LESSONS LEARNED

- It is feasible to deploy and evaluate an mHealth intervention project in an established research setting where outcomes are well studied and denominators are known. This wealth of information allows for both quantitative and qualitative evaluation.
- Complications can be averted and infant mortality can be potentially reduced through simple, low-cost interventions during delivery and the early neonatal period, a high-risk period that can be accessed with mobile notification.
- Systematic surveillance, pregnancy identification and birth notification systems are possible to deploy in low-resource settings, using simple technology.
- Low-literate community workers are capable, and often have access to mobile technologies, even in remote, resource-poor settings.

### CONCLUSION

mCARE is working to demonstrate that mobile health technology can play a role in improving referral systems. The project has completed formative and development stages, and Bangladesh's ministry of health has approved testing at scale. The next step will be to measure resulting improvements through a study involving 1,600 pregnant women.

### GEOGRAPHIC COVERAGE

Gaibandha District, Bangladesh

### IMPLEMENTATION PARTNERS

Johns Hopkins Bloomberg School of Public Health in collaboration with technical and research partners mPower-Health and the JiVitA Maternal Child Health and Nutrition Research Project, under the stewardship of Bangladesh's Ministry of Health and Family Welfare

### FUNDER

UBS Optimus Foundation

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#### Information was excerpted from:

Gray, Jeff. "Mobile health researchers seek to improve emergency obstetric care in Bangladesh." *National Institutes of Health Fogarty International Center*. 12.1. (January/February 2013). Web.

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# TXTALERT FOR PATIENT REMINDERS

## BRIEF OVERVIEW

The biggest challenge for people with chronic conditions is to stick to their medication. For conditions that require lifelong treatment, like HIV and diabetes, patients go through many daily challenges. Some of these challenges include forgetting to take their drugs, feeling sick (nauseous) when they do take the drugs, and fear or reluctance to go to the doctor regularly, as this would potentially entail more drugs, more injections, blood samples, etc.

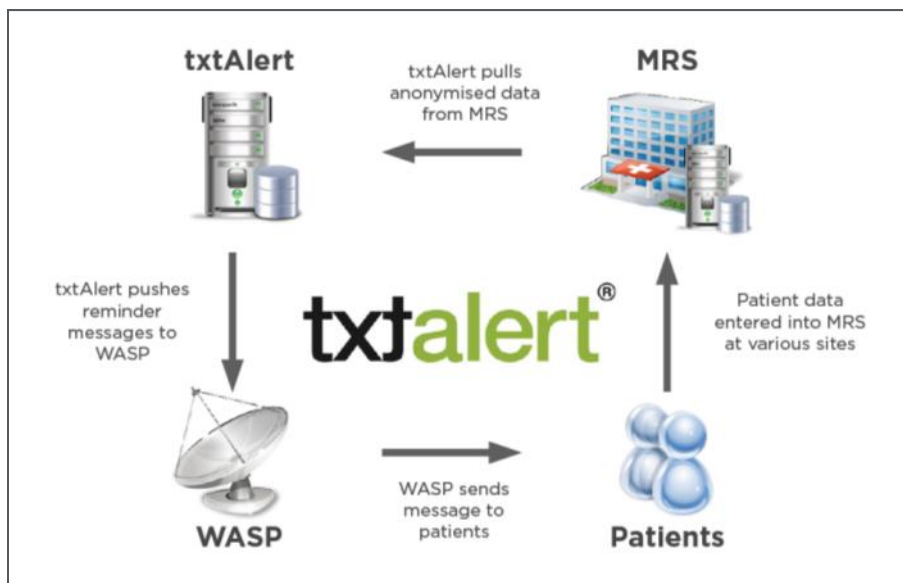
Drug resistance is a very dangerous and often life-threatening condition where prescribed treatments cannot successfully treat a condition and cure the patient. Drug resistant tuberculosis (TB) has very high fatality rates. Drug resistance is generally preventable if patients stick to, and complete, their prescribed treatment.

Another huge challenge is to have patients come to the doctor at regular intervals. In rural and resource-poor communities, challenges with transport and gaps in communication between the patient and the treatment provider often result in patients "dropping off treatment" or becoming "lost to follow up". Once a patient is "lost to follow up" or off the treatment radar, it is often very hard to track them down and reintroduce them onto treatment.

txtAlert is a server-based system that works in conjunction with a hospital/clinic's medical record system (MRS) to remind patients of their upcoming appointments.

## ABOUT TXTALERT

txtAlert was first piloted in 2007 in partnership with Right To Care, one of the biggest ARV (antiretroviral) treatment providers in South Africa. Right to Care was struggling with large numbers of patients who miss their appointments, who simply drop off treatment, or become "lost to follow up". They wanted a mechanism which would strengthen their patient tracking



department by reminding patients of their visits while also allowing them to easily and cost-effectively follow up on a patient who has missed an appointment. The aim was to allow for appointment reminders and to create a facility where patients could contact the clinic to reschedule or confirm an appointment – at no cost to the patient.

txtAlert is a server-based system that works in conjunction with a hospital/clinic's medical record system (MRS) to remind patients of their upcoming appointments. In clinics where an existing electronic MRS is in place, txtAlert will then integrate with that MRS. In clinics where no electronic MRS exists, Praekelt Foundation can develop a custom interface to input appointment data and manage patient bookings more effectively.

txtAlert now has four different iterations:

- **txtAlert ARV:** This version of txtAlert sends appointment reminders to users to reduce loss to follow up at clinics. Additionally, users can send a free "Please Call Me" SMS to a designated number to reschedule appointments.
- **txtAlert CD4:** This version of txtAlert delivers CD4 count results to patients who have been tested

for HIV but may not return to the clinic to collect their CD4 counts results, and therefore may not know that they qualify for ARV treatment.

- **txtAlert PMTCT:** This version of txtAlert sends reminder SMSs to pregnant women who are follow a PMTCT protocol, and can also include general maternal support messages for moms during their pregnancy. These SMSs are aimed at helping women to adhere to this treatment based on various criteria and results of tests entered into the Medical Records System.
- **txtAlert TB:** This is the latest iteration which Praekelt is currently developing, and will send reminders for patients on TB-treatment, to help them complete their treatment. It will also have a built-in self-reporting mechanism for patients to report their progress in TB treatment completion.

## EVALUATION AND RESULTS

In the initial trial of txtAlert at the Theba Lethu clinic, significant results were achieved in reducing the number of missed appointments. Missed appointments have fallen from 30 percent to 4 percent, and loss to follow up has declined from 27 percent to 4 percent as well. There are currently over 18000 users of the system at three different clinics in Gauteng, South Africa.

The Wits Reproductive Health & HIV Institute (WRHI) is conducting a study on txtAlert Standard and CD4 users at two of these clinics as part of the Vodacom mHealth Initiative. Thus far, results show that those patients receiving SMSs in the CD4 program started ARV treatment earlier than those not receiving SMS results.

The PMTCT version of txtAlert currently has 6000 participants enrolled in a study at 33 clinics and two hospitals in KwaZulu-Natal. The results of this study will be published in September 2013.

## LESSONS LEARNED

- The language and tone of the SMS reminders is critical – especially in cases where a user shares a

phone and has not disclosed their status.

- Lack of electronic medical records systems in clinics and hospitals presents a major challenge for roll-out of this service
- Buy-in from clinic staff is critical to the success of a txtAlert project

## CONCLUSION

txtAlert has shown positive results in studies so far and has a number of variations that can be used for different disease – and reminder protocols. Plans for expansion of the project include integration into additional Medical Record Systems, including OpenMRS .

### GEOGRAPHIC COVERAGE

Gauteng and KwaZulu-Natal Provinces, South Africa

### IMPLEMENTATION PARTNERS

Praekelt Foundation developed the core technology; Partners: Virtual Purple, Therapy Edge, Provincial Department of Health, KwaZulu-Natal, Right to Care, Wits Reproductive Health & HIV Institute (WRHI), UNICEF South Africa

### FUNDER

Vodacom Foundation South Africa, USAID, Right to Care, UNICEF South Africa

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# ANNEX I

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## mHEALTH COMPENDIUM EDITION ONE CASE STUDIES

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### BEHAVIOR CHANGE COMMUNICATION

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Chakruok Interactive Radio Program  
CycleTel™  
iCycleBeads™ Smartphone Apps  
La Ligne Verte Family Planning Hotline  
Mobile 4 Reproductive Health (m4RH)  
SMS and IVR to Improve Family Planning Services  
Text Me! Flash Me! Call me!  
Workplace-based SMS Awareness Campaign

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### DATA COLLECTION

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Automating Data Collection for HIV Services  
Child Status Index (CSI) Mobile App  
EpiSurveyor/Magpi  
Integrated Health Systems Strengthening Project – IHSSP: RapidSMS  
JSI Early Warning System

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### FINANCE

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Changamka Maternal Health Smartcard  
Mobile Finance to Reimburse Sexual and Reproductive Vouchers

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### LOGISTICS

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cStock  
Delivery Team Topping Up System  
Integrated Logistic System – ILSGateway  
Mobile Product Authentication MPA  
mTrac: Monitoring Essential Medicine Supply  
Tupange SMS Community Tracking System

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### SERVICE DELIVERY

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CommCare for Home-Based Care  
Community IMCI (cIMCI)  
eFamily Planning (e-FP)  
eNutrition  
Maternal Health (Antenatal and Postnatal Care)  
mHealth for Safe Deliveries in Zanzibar  
Mobiles for Quality Improvement (m4QI) – SHOPS Project  
MOTEC Suite  
Project Mwana – SMS for Early Infant Diagnosis of HIV  
SIMpill® Medication Adherences Solution  
Supportive Supervision (SS) for TB in Nigeria  
The Malawi K4Health Mobile Learning Pilot

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The First Edition of the Compendium is available at [www.as4h.org/ash-publications.html](http://www.as4h.org/ash-publications.html).

For more information, please visit  
<http://www.africanstrategies4health.com/resources.aspx>







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