

# SCALING UP MOBILE HEALTH

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ELEMENTS NECESSARY FOR THE  
SUCCESSFUL SCALE UP OF  
mHEALTH IN DEVELOPING COUNTRIES



WHITE PAPER COMMISSIONED BY  
ADVANCED DEVELOPMENT FOR AFRICA  
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## ABOUT ADA

With operational offices located in the centerpiece West Africa, Mali, Advanced Development for Africa (ADA) is an African-based, non-profit organization with its major focus on fostering maternal and child health in Africa. ADA seeks to accomplish its mission through proven methods of capacity building, technology transfer, forums, and cross-sector partnerships that move forward the following goals:

- Improving maternal and child health and reducing the disease burden on the population especially the Millennium Development Goals (MDGs 4, 5 and 6);
- To promote educational excellence by giving youth the opportunity to receive training through Information and Communication Technology (ICT) and virtual learning;
- To boost gender equality and empower women by giving them the right tools and equal opportunities for education;
- To combat HIV/AIDS, malaria and other diseases.

## ACKNOWLEDGEMENTS

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# ACRONYMS

<b>ART</b>	Antiretroviral Therapy	<b>MNO</b>	Mobile Network Operator
<b>BOP</b>	Base of the Pyramid	<b>MOH</b>	Ministry of Health
<b>CHW</b>	Community Healthcare Worker	<b>MVP</b>	Millennium Villages Project
<b>CSR</b>	Corporate Social Responsibility	<b>RBM</b>	Roll Back Malaria Partnership
<b>DfID</b>	UK Department for International Development	<b>RDT</b>	Rapid Diagnostic Tests
<b>DHIS2</b>	District Health Information Software 2	<b>SMS</b>	Short Message Service
<b>GFATM</b>	Global Fund to Fight AIDS, Tuberculosis and Malaria	<b>UNDP</b>	United Nations Development Program
<b>GPRS</b>	General Packet Radio Service	<b>UNICEF</b>	United Nations Children Fund
<b>HMIS</b>	Health Management Information System	<b>USAID</b>	U.S. Agency for International Development
<b>ICT</b>	Information and Communications Technology	<b>USSD</b>	Unstructured Supplementary Services Data
<b>IDRC</b>	International Development Research Centre	<b>WB</b>	World Bank
<b>IICD</b>	International Institute Communication and Development	<b>WHO</b>	World Health Organization
<b>IT</b>	Information Technology		
<b>ITU</b>	International Telecommunication Union		
<b>M&amp;E</b>	Monitoring and Evaluation		
<b>MMV</b>	Medicines for Malaria Venture		

# ADA'S MODEL

## **ADA'S MODEL FOR ACCELERATED DEVELOPMENT**

ADA's approach to accelerated development includes an integrated model of ICT for development, which benefits health as well as other sectors of the economy. There are compelling arguments for this. Firstly, developments in ICT deployment in countries are not driven by the health sector, but primarily by communications, commerce and governance considerations. Secondly, the same ICT infrastructure deployed for health reasons can be used for education, agriculture, small business development and other productive sectors of the economy. Finally, and most importantly, study of the social determinants of health has shown that sustainable health benefits can best be obtained by not only addressing health interventions, but by improving daily living conditions and tackling the inequitable distribution of power, wealth and resources.<sup>1</sup> This white paper, which focuses on mHealth, is therefore only one, albeit a topical and timely one, of a series of such documents which will frame ADA's work.

1. WHO, Final report of the Commission on Social Determinants of Health

# INTRODUCTION

## BACKGROUND

With 5.3 billion mobile subscribers across the globe and almost 90 percent of the world's population covered by a wireless signal, the mobile phone has become the most widely spread communications technology platform. The spread of mobile phone technology and networks has not been limited to developed countries—in fact, developing countries are currently seeing massive growth, with 3.8 billion mobile subscriptions in the developing world alone,<sup>2</sup> making up for 73 percent of subscriptions worldwide. Rural populations are also gaining access to this platform—80 percent of rural communities across the globe have access to a mobile network. Across the African continent and within India, the number of mobile phone subscribers surpassed one billion in 2010 and in some areas exceeds basic infrastructure, including paved roads, electricity and even proper sanitation. India has over 826 million mobile phone subscribers as of 2011, serving nearly 70 percent of India's 1.2 billion population, yet only a third of India's population had access to proper sanitation in 2008, according to a UN report.<sup>3</sup> Additionally, the International Telecommunication Union (ITU) reported in 2010 that the rapid spread of mobile phones in developing countries is being driven by demand and increasing affordability, particularly in India and China where mobile penetration rates are quickly reaching saturation points at over 100 percent.

2. mobiThinking. Global Mobile Statistics 2011. Retrieved June 3, 2011, from <http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats>

3. United Nations University. Greater Access to Cell Phones than Toilets in India. Retrieved June 15, 2011, from [http://www.inweh.unu.edu/News/2010-04\\_UNU-INWEH\\_News-Release\\_Sanitation.pdf](http://www.inweh.unu.edu/News/2010-04_UNU-INWEH_News-Release_Sanitation.pdf)

# MOBILE HEALTH (mHEALTH)

The use of mobile phones to improve the quality of care and enhance efficiency of service delivery within healthcare systems is known as mobile health, or mHealth, and is a sub-segment of the broader field of electronic health (eHealth). WHO has defined mHealth as the “provision of health services and information via mobile technologies such as mobile phones and Personal Digital Assistants (PDAs).” mHealth tools have shown promise in providing greater access to healthcare to populations in developing countries, as well as creating cost efficiencies and improving the capacity of health systems to provide quality healthcare.

Recent evidence from randomized scientific trials and studies has demonstrated that the capabilities of mobile phone technology, particularly SMS messaging, can positively impact treatment outcomes. Results of the WelTel Kenya1 clinical trial, the first study of its kind in Africa, were published in *The Lancet*<sup>4</sup> in November of 2010. The trial focused on the impact of SMS messaging on HIV-infected adults starting antiretroviral therapy (ART) in three clinics in Kenya. The study showed that patients who received SMS support had significantly higher adherence to ART and higher rates of viral suppression when compared with patients in the control group. A scale up of such a mobile phone support system in Kenya could suppress viral loads in 26,000 extra people at the cost of less than USD 8 per person per year, according to Richard Lester of the British Columbia Centre for Disease Control and the study’s lead researcher. Another cluster-randomized trial at 107 rural facilities in Kenya found that SMS message reminders sent to health workers’ mobile phones improved and maintained their adherence to treatment guidelines for outpatient pediatric malaria in Kenya.<sup>5</sup>

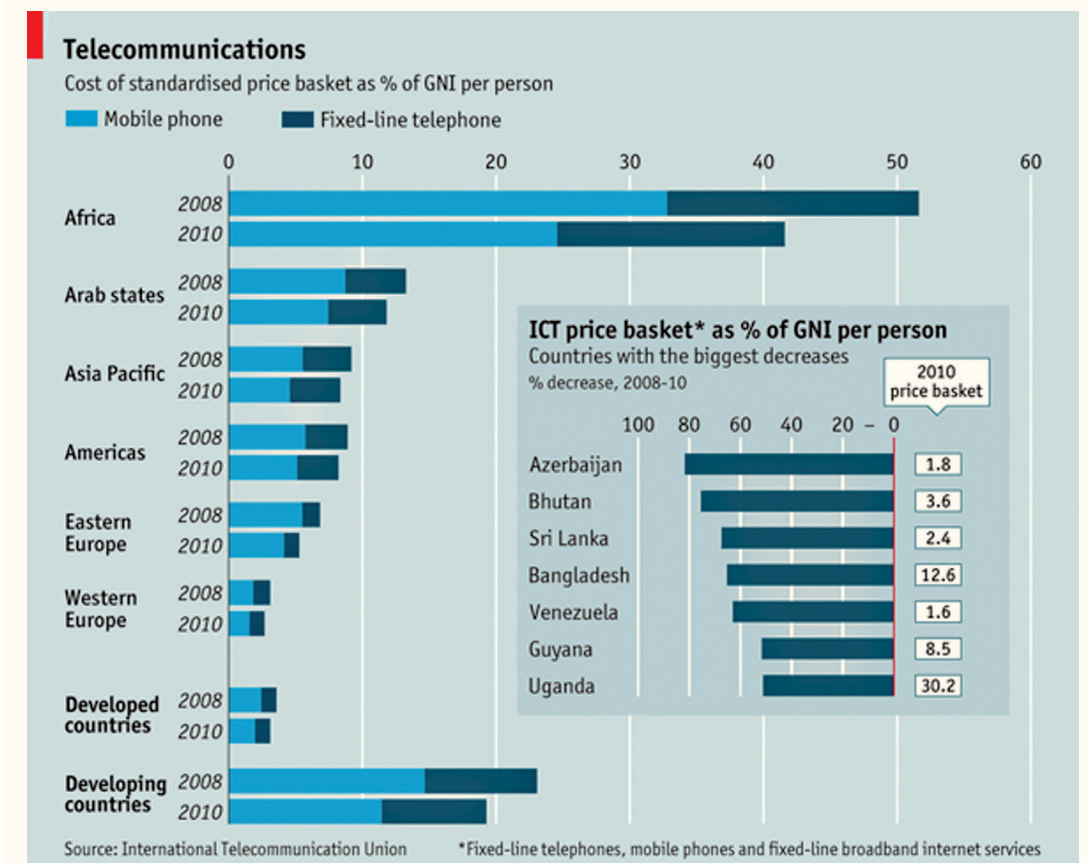
A multitude of mHealth solutions have emerged over the years in countries such as Ethiopia, Kenya, Nigeria and South Africa, which are leading the way in using mobile health services, according to the Global Observatory for eHealth at the WHO. Getachew Sahlu of the WHO identified the convergence of the following factors as the driving force behind the current rapid mHealth growth in developing countries: (1) a record growth of mobile phone users, (2) rapid expansion of mobile networks, (3) the decline in mobile phone costs, and (4) the innovation in mobile technology. The mobile platform presents the unique capability of delivering healthcare services wherever people are—not just in healthcare facilities. mHealth initiatives have also been effective in reaching underserved populations, particularly those in rural areas, changing health behaviors and outcomes, and addressing a wide variety of healthcare challenges, including:

- The shortage of skilled healthcare workers in certain developing country settings
- Treatment adherence and compliance
- Lack of timely and actionable disease surveillance
- Poor drug inventory and supply chain management
- Use of counterfeit drugs
- Lack of medical diagnostic treatment
- Slow rates of information flow and reporting delays.

mHealth represents a cost-effective technology solution to many of these challenges if implemented correctly and brought to scale. The costs of mobile handsets and usage are declining as demand for mobile services increases and mobile networks are being rapidly expanded.

4. Lester R et al. Effects of a mobile phone short message service on antiretroviral treatment adherence in Kenya (WelTel Kenya1): a randomised trial. *The Lancet Online*, 12 June 2011, [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(10\)61997-6/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)61997-6/fulltext)

5. Zurovac D et al. The effect of mobile phone text-message reminders on Kenyan health workers’ adherence to malaria treatment guidelines: a cluster randomised trial. *The Lancet Online*, 3 July 2011, [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)60783-6/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60783-6/fulltext)



Graph of the decline in cost of telecommunications technologies, specifically mobile phones  
Source: The Economist, <http://www.economist.com/node/21517126>



# CASE STUDIES

## CHILDCOUNT+

### ORGANIZATION

Millennium Villages Project (MVP)

### mHEALTH TOOL

Rapid Response, a RapidSMS-based mobile application

### CATEGORY

Remote Data Collection & Health Management Information System (HMIS)

### PHASE

Scaling up

### LOCATION

Kenya, Tanzania, Ghana

### TARGETS

Primary healthcare and MDG-related issues focusing on maternal-newborn-child health services: malnutrition, malaria, and other diseases that affect early childhood development; PMTCT HIV; pneumococcal vaccination coverage

### SUMMARY

ChildCount+ is a community health events reporting and alerts platform aimed at empowering communities to improve child survival and maternal health. Using any standard phone, community health extension workers (CHEWs) are able to use text messages to register patients and send in health reports to a central web dashboard that allows a health team to closely monitor the health of their community and reduce gaps in treatment.

The pilot in Sauri, Kenya started in July 2009. A mobile application, initially known as ChildCount, was used by 100 CHEWs to actively monitor 9,500+ children under five. ChildCount supported the delivery of community-based management of acute malnutrition (CMAM) programs; home-based testing for malaria using Rapid Diagnostic Test (RDT) kits and immediate dispersal of treatments; and home-based treatment of children with diarrheal illness. CHEWs used SMS messages to register patients and send in their data. The more recent ChildCount+ added support for maternal health by registering all pregnant mothers and providing support for antenatal care. The PMTCT (prevention of mother-to-child transmission of HIV) module of ChildCount+ was launched in Ghana in August, 2011. This marks the second MVP site to implement the PMTCT software, with the first site being the Sauri Cluster in Western Kenya.

The ability to track and promptly attend to children who need nutritional or medical interventions is a main strength of the ChildCount+ program. Key strategic partners supported the initiative through:

- An important provision of phone handsets for CHEWs to initially launch the service, facilitated by Sony Ericsson in early 2009.
- Airtel Kenya, then known as Zain, assisted in setting up a toll free number.

### GOALS + RESULTS

ChildCount+ aims to help CHEWs to:

- Register every child under five and provide a basis for monitoring health statuses
- Screen for malnutrition every 90 days
- Monitor for and treat malaria, diarrhea and pneumonia
- Support child immunizations
- Record all local births and deaths
- Recording pregnant women's due dates to make antenatal visits systematic

ChildCount+ is in active use in the MVP site in Kenya. At Sauri, ChildCount+ covers over 65,000 people with child and maternal health care services. The system has also been deployed at the Dertu MVP in Kenya's Garissa County. ChildCount+ is in the process of being rolled out across the remaining 14 MVPs representing approximately 500,000 people—100,000 of which are children under five. UNICEF is in the process of rolling out a variation of ChildCount+ in Senegal and considering it for activities in other countries.

### SUCCESSFUL ELEMENTS

- Adopts a holistic, comprehensive approach to tackling various local health priorities including antenatal, post-partum, maternal, and primary health issues of children under five
- Focuses on alignment with existing information management systems
- Local capacity-building

### IMPLEMENTING + FUNDING PARTNERS

Earth Institute at Columbia University, UNICEF Innovation Group, Millennium Promise, Ericsson, Sony Ericsson, Airtel Kenya and MTN.

### DURATION

2009–ongoing



# mPEDIGREE

## ORGANIZATION

HP and mPedigree

## mHEALTH TOOL

mPedigree

## CATEGORY

Remote Data Collection & Health Management Information System (HMIS)

## PHASE

Scaled up

## LOCATION

Nigeria, Ghana, Kenya

## TARGETS

Sale and use of counterfeit drugs

## SUMMARY

HP and mPedigree, a social enterprise based in Ghana, have teamed up with pharmaceutical companies to offer a way for patients to check the authenticity of their medicines free of charge, with a basic mobile phone. HP provides the infrastructure linking the pharmaceutical companies, telecommunications companies, and mPedigree together to make the initiative possible.

mPedigree developed an SMS-based system to fight the proliferation of counterfeit drug sales in developing countries. The enterprise produces scratch cards that reveal a single-use numeric code on drugs that users can text for free from their mobile phone, instantly receiving information if the drugs are genuine or counterfeit.

## GOALS + RESULTS

The first drugs to use the system, from May & Baker and KAMA Group, debuted in December 2010 in Nigeria and Ghana. HP and mPedigree plan to make the service available for other medications and in more countries in the near future.

The system is operational in Ghana and Nigeria since late 2010. A pilot in Kenya was underway in early 2011 with the aim to scale it up.

## SUCCESSFUL ELEMENTS

- Win-win social enterprise business model, with the service being funded by the participating pharmaceutical companies
- Partnership approach eliminates costs to the user, thereby increasing accessibility to the initiative
  - All GSM mobile network operators in Ghana and Nigeria are signatories to the scheme

## IMPLEMENTING + FUNDING PARTNERS

HP, mobile network operators, pharmaceutical companies, and governmental authorities

## DURATION

2010–ongoing

# mTRAC

## ORGANIZATION

UNICEF Uganda

## mHEALTH TOOL

mTrac

## CATEGORY

Remote Data Collection & Health Management Information System (HMIS)

## PHASE

Scaling up

## LOCATION

Uganda

## TARGETS

Track disease outbreaks and medication at Uganda's 5,000 health facilities and 8,000 community based drug dispensers

## SUMMARY

mTrac is an SMS, USSD and web-based data collection tool built on RapidSMS that enables health workers at district health centers to submit weekly HMIS reports, with a current focus on disease outbreaks and essential medicines. mTrac also has an Anonymous Hotline for reporting service delivery complaints to strengthen community monitoring, and the information is triaged with official data to immediately identifying bottlenecks. SMS alerts are sent to District and National Stakeholders based on a predefined list of thresholds, who are expected to investigate and report on the outcomes, creating a clear accountability chain. Working through UNICEF's Ureport initiative, Ugandan Parliamentarians and over 35,000 community-based leaders receive updates on the performance of their constituencies. The mTrac project was initially piloted by FIND Diagnostics and the Millennium Villages Project (MVP) in roughly 170 health facilities in the Gulu and Kabale districts of Uganda.

## GOALS + RESULTS

The goal of mTrac is to support the efforts of the Ugandan Ministry of Health (MOH) in digitizing the country's health information management systems.

The mTrac pilot was handed fully over to the Ugandan government in 2011. With support from UNICEF and WHO, the Ugandan MOH is in the process of rolling out mTrac nationwide at the country's 5,000 health facilities and 8,000 local medication distribution centers. The roll out is expected to be completed by the end of 2012. One year after the handover from FIND Diagnostics, there is still a response rate of about 90% on a weekly basis from facilities using mTrac.

## SUCCESSFUL ELEMENTS

- The mTrac project meets national health priorities and has been integrated into the national health information system and the government's district health information software database (DHIS2)
- mTrac was designed and developed with sustainability and scalability factors built in from the start—e.g. mTrac runs on basic mobile phones

## IMPLEMENTING + FUNDING PARTNERS

Uganda MOH and WHO (previously FIND Diagnostics & MVP)  
Funding: UK Department for International Development (DfID) for developing the mTrac system, Uganda MOH for project implementation

## DURATION

2010–ongoing

# PESINET

## ORGANIZATION

Pesinet

## mHEALTH TOOL

Pesinet JAVA application (SMS/GPRS)

## CATEGORY

Remote Data Collection & Health Management Information System (HMIS)

## PHASE

Planning scale up

## LOCATION

Mali

## TARGETS

Child health with a focus on respiratory illnesses, diarrheal disease and malaria; early detection and disease prevention; urban populations

## SUMMARY

Launched in pilot phase in October 2009, Pesinet uses mobile phones to support the reduction of child mortality by facilitating access to early treatment, and raising awareness of disease prevention. Pesinet's service leverages the GSM network in Mali and open-source software to record and transfer health information and then reduce the amount of time a doctor needs to access and analyze it. A mobile application has been developed to collect and transfer data on the ground by health monitoring agents. An online application linked to a database allows for remote monitoring of health data by the local doctor, activity management and tracking of key impact indicators.

Healthcare agents are recruited by local healthcare centers and assisted technically by Pesinet. They make weekly home visits to enrolled patients (cost: 1€/month), look for five key symptoms (fever, vomiting, diarrhea, cough, and weight loss), record the data onto a Java mobile application, then send the data to a doctor at the local healthcare center. Mobile technology allows a model whereby a greater number of children can be seen by just one healthcare agent and remotely followed-up by just one healthcare center's doctor.

## GOALS + RESULTS

The goals of the program are to prevent child mortality from preventable and treatable diseases through regular home-screenings, and to create an affordable insurance plan so that health problems do not bankrupt families. Changing the local perceptions of prevention is also a key target for Pesinet as disease prevention is not recognized as a vital component of health care.

Pesinet aims to adhere to a financially sustainable business model by focusing on maximizing the self-sustaining component of the model, while maintaining affordability of the program to beneficiaries. This has translated to slow growth compared to free of charge programs.

Originally implemented in Saint Louis, Senegal, Pesinet failed to achieve the financial sustainability needed and properly integrate into the health system. But the lessons learned and its innovative solutions—including strategic partnerships and technical and financial improvements—helped Pesinet successfully re-launch in Mali in September 2007 and begin their mHealth pilot in 2009.

## SUCCESSFUL ELEMENTS

- Secured strategic partnerships and buy-in from government agencies and private sector players
- Planning for integration into existing local health structures and long-term sustainability by adhering to a financially sustainable business model
- Performed evaluations supported by the National Agency for eHealth and Medical Informatics of Mali and independent external quantitative and qualitative evaluations, including a SWOT analysis of service, to assess the efficacy and efficiency of services

## IMPLEMENTING + FUNDING PARTNERS

Public sector: Mali MOH and its eHealth Agency, the Regional Health Department, local district and local healthcare centers.

Private sector: Ashoka, BNP Paribas, Sanofi Espoir Foundation, Terre Plurielle Foundation, NSA, Alcatel-Lucent Foundation, Antropia, Medicament Export, and Orange Mali Foundation

## DURATION

2009–ongoing

# PROJECT MWANA

## ORGANIZATION

UNICEF Innovation, frog design, Country MOHs

## mHEALTH TOOL

RapidSMS-based mobile application

## CATEGORY

Education, Awareness & Health Promotion

## PHASE

Scaling up

## LOCATION

Zambia, Malawi

## TARGETS

Infants (Early Infant Diagnosis); HIV; Maternal Health

## SUMMARY

Project Mwana focuses on using mobile technology to strengthen health services for mothers and infants in rural healthcare clinics. It was initially deployed in Zambia to deliver HIV test results instantly via SMS to rural clinics and reduce the delay between testing and treatment from several months to a few weeks.

Project Mwana is composed of two related initiatives: Results 160, focusing on accelerating the transmission of lab results for early infant diagnosis of HIV/AIDS; and Remind Me, a patient tracking system that notifies community health workers (CHWs) to check up on mothers and infants. Both make use of mobile networks and SMS technology as a support tool to link CHWs to the formal health system to coordinate and measure children receiving treatment.

Project Mwana's pilots focused primarily on early-stage antenatal care for pregnant women and immediate and long-term post-natal care. Specific points within these timeframes have been identified as optimal in diagnosing and treating HIV-positive mothers to best prevent transmission to their child and ensure their health during the pregnancy and birth.

## GOALS + RESULTS

The immediate goal of this project is to increase mothers' visits to clinics significantly by January 2012 in rural Zambia and peri-urban Malawi by leveraging mobile technologies. The longer-term goal is to develop a communication system that can be scaled across many different countries in partnership with other UNICEF country offices.

Project Mwana is now moving from pilot to implementation phase in Zambia and soon in Malawi. In Zambia, the project was piloted in 31 clinics across 6 provinces and evaluated. The next phase is to scale nationally using a 3-year plan. Project Mwana is also being replicated in Malawi.

## SUCCESSFUL ELEMENTS

- Identified local health priorities in implementation areas as primary objectives of the tool (e.g. maternal health, early HIV diagnosis for infants)
- Working with the government and private sector, including mobile network operators, to support scale up after the success of the pilot phase was assured
- Planned for scale and sustainability before the pilot phase
- Evaluated program to inform national scale up

## IMPLEMENTING + FUNDING PARTNERS

Zambia MOH, UNICEF Zambia, Malawi MOH, UNICEF Malawi, and several implementing and technical partners, e.g. Cactus.

Pilot was funded by UNICEF, Boston University and the Clinton Health Access Initiative.

## DURATION

2010–ongoing

# SMS FOR HEALTH

## ORGANIZATION

Text to Change (TTC)

## mHEALTH TOOL

SMS

## CATEGORY

Education, Awareness and Health Promotion

## PHASE

Scaling up

## LOCATION

Uganda

## TARGETS

HIV workplace program for employees and suppliers

## SUMMARY

Text to Change uses SMS quizzes to challenge mobile phone users on their health knowledge, refer them to HIV testing sites and gather sex and age data from participants which can be analyzed alongside the location of the caller.

In 2009, TTC ran a pilot with HIPS (Health Initiatives for the Private Sector), a USAID funded program, to carry out several SMS-based workplace programs in Uganda. In May 2011, TTC implemented the second part of the program (following the successful pilot), working with Kakira Sugar, a renowned sugar company in Uganda.

The program's purpose is to improve Kakira Sugar's internal communication and increase access to health information and services amongst employees and their families. The program targets not only the 3,000 employees of Kakira Sugar but also the 7,500 farmers who supply cane to the company. The program conducts awareness campaigns on the topics of family planning, medical male circumcision, HIV/AIDS and other sexually transmitted infections, multiple concurrent sexual partnerships and malaria. Participation is free and backed up with reward incentives (for example, a free mobile phone or airtime).

## GOALS + RESULTS

The goal of the program is to increase participation in voluntary HIV counseling and testing (HCT) programs, and increase patient knowledge of available health services and clinics—all via SMS. Last year's program demonstrated an increase of up to 40% in HCT services partnering clinics. At the launch of the second implementation phase in May 2011, at least 200 people responded to HIV testing and over a 100 people sought other health services following the initial awareness campaign.

Through the IICD and the Connect4Change consortium, TTC aims to scale its mHealth initiative to 16 countries in 2011 and 2012.

## SUCCESSFUL ELEMENTS

- Research-based, with 9-month long impact study
- Content was adapted to local contexts to ensure successful uptake
- Achieved scale through model of adding value to the health policies of companies via mHealth
- Developed strategic partnership with network of like-minded organizations focused on ICTs for development

## IMPLEMENTING + FUNDING PARTNERS

TTC projects are supported by African mobile providers (including ZAIN), the Dutch Ministry of Foreign Affairs, FC Barcelona and other partners such as Royal Tropical Institute of Netherlands (KIT) and USAID.

Ugandan pilot partner: Health Initiatives for Health (HIPS) Uganda program (funded by USAID).

## DURATION

2009–ongoing

# SMS FOR LIFE

## ORGANIZATION

Novartis, Vodafone Health Solutions and Roll Back Malaria partnership

## mHEALTH TOOL

SMS, Vodafone's Mobile Relationship Manager platform—a data management tool with a real-time web dashboard

## CATEGORY

Remote Data Collection & Health Management Information System (HMIS)

## PHASE

Scaled up: nationwide roll-out in Tanzania; new pilots in Kenya and Ghana

## LOCATION

Tanzania, Kenya, Ghana

## TARGETS

Malaria

## SUMMARY

SMS for Life is a public-private project in conjunction with the Roll Back Malaria global partnership that aims to demonstrate that visibility of weekly stock levels for five selected malaria drugs across three Tanzanian districts will promote action to eliminate and/or reduce stock-outs. The nationwide roll-out of this malaria treatment access initiative is planned for Tanzania. The roll-out follows a successful pilot project where mobile and electronic mapping technology was used to track the stock levels of anti-malarial drugs at health facilities to manage supplies of these essential treatments.

Launched in 2009, the "SMS for Life" pilot ran across three districts in Tanzania, ensuring access to essential malaria treatments for 888,000 people. 99% of health facilities involved avoided stock-outs of the artemisinin-based combination therapy (ACT), one of the main anti-malarial medicines. Based on the successful pilot, SMS for Life will now be deployed nationwide across 5,000 health facilities in 131 districts in Tanzania, covering a population of over 40 million.

## GOALS + RESULTS

SMS for Life was initially piloted across three districts of Tanzania, covering 129 health facilities and 226 villages, representing 1.2 million people. During the first few weeks of the SMS for Life pilot the number of health facilities with stock-outs in one district alone was reduced by over 75%. When launched in 2009, 26% of all health facilities did not have any ACTs in stock, but by the end, 99% had at least one ACT dosage form in stock. In addition, 888,000 people in the three pilot districts had access to all malaria treatments at the close of the pilot, versus 264,000 people at the start, which helped to reduce the number of deaths from malaria.

In addition to the roll-out in Tanzania this year, two further pilots will start. Kenya, with funding from Novartis via the global employee survey donation program, will implement a five district pilot to track ACTs and rapid diagnostic tests (RDTs), in addition to collecting weekly case management data. The Medicines for Malaria Venture (MMV), through partnership with University of Oxford, will provide technical support for the implementation and evaluation of the pilot project. Ghana, with funding from Swiss TPH, will implement a six district pilot to track malaria medicines, an antibiotic and RDTs.

Under the auspice of the Tanzanian Ministry of Health and Social Welfare, this roll-out is led by Novartis and supported by Vodacom, Medicines for Malaria Venture (MMV) and the Swiss Agency for Development and Cooperation, all under the umbrella of the global Roll Back Malaria Partnership.

## SUCCESSFUL ELEMENTS

- Public-private partnership model involving strong buy-in from many key stakeholders from the government, private sector and bilateral agencies to support implementation and scale up
- Identified key metrics to measure effectiveness of program and demonstrate success
- Tackles key national health priority (malaria control)
- Supports advocacy within the government in recognizing mHealth as a concrete solution

## IMPLEMENTING + FUNDING PARTNERS

Tanzanian Ministry of Health and Social Welfare and the National Malaria Control Programme (NMCP), Novartis, MMV, Swiss Agency for Development, Vodacom, IBM, RBM Partnerships Secretariat

## DURATION

2009–ongoing

# TELE SALUD

## ORGANIZATION

TulaSalud

## mHEALTH TOOL

EpiSurveyor; Frontline:SMS (and Clickatell)

## CATEGORY

Disease & Epidemic Outbreak Surveillance; Point-of-Care Diagnostic & Treatment Support

## PHASE

Scaling up

## LOCATION

Guatemala

## TARGETS

Maternal and Child Health; Disease Outbreaks

## SUMMARY

TulaSalud's vision is to use ICT and mobile technology to reduce maternal and infant mortality and to monitor disease outbreaks in the remote highlands of Alta Verapaz, Guatemala, which has the largest rural and poor indigenous population in the region with limited access to health care services. Using mobile phones, TulaSalud has been able to improve the flow of information between health professionals based in hospitals and community health workers (CHWs), or tele-facilitadores, in remote villages.

In 2009, TulaSalud distributed mobile phones to 60 community health workers. With the mobile phones, the CHWs could call a doctor for diagnostic or referral support and collect information about each patient consultation using DataDyne's EpiSurveyor.

TulaSalud uses mobile phones to:

- Monitor disease outbreaks in real-time based on the data aggregated from patient consultations through EpiSurveyor
- Send text message alerts and reminders to CHWs using FrontlineSMS
- Evaluate the productivity of CHWs working in the field
- Deliver remote health training via mobile-based audio conferencing

## GOALS + RESULTS

Data collected by the CHWs was instrumental in the early detection of meningitis, rabies and H1N1 in the region. The original paper-based data collection system often took up to 40 days to get data analyzed and communicate risk management directives. TulaSalud's EpiSurveyor data collection system enabled epidemiologists to assess the data as soon as it came in and the CHWs to respond as necessary within 3-4 days.

By 2010, over 19,000 consultations were made and more than 400 patients were referred to health centers. Of these referrals, 156 cases were identified as being high-risk pregnancies and 83 women were at risk of dying. Currently, TulaSalud's database has over 38,000 patient consultations and continues to grow.

The 60 CHWs currently cover 22% of the rural regions of Alta Verapaz. Incrementally, over the next five years, TulaSalud hopes to expand the program to include 330 CHWs equipped with mobile phones.

In coming years, TulaSalud plans to work closely with the MOH as they increase the number of CHWs in Alta Verapaz and consider incorporating data collection at a national level. TulaSalud intends to place more emphasis on collecting information on pregnant women in order to identify high-risk pregnancies early on.

In 2011, the organization will begin scaling their epidemiological monitoring program and potentially introduce new mobile surveys. By 2015, it hopes to integrate processes with Guatemala's national health information system.

## SUCCESSFUL ELEMENTS

- Designed initiative with a thorough understanding of local healthcare structures, conditions and environment
- EpiSurveyor surveys were based on mandatory Health Information Management System forms required by the MOH
- Hardware (mobile phone) selection was adapted to end-user needs and local conditions such as network signal reach and capture

## IMPLEMENTING + FUNDING PARTNERS

## DURATION

- Close partnership with the MOH, ensuring the program was not a parallel system but rather a complementary data collection system running alongside existing government systems
- Buy-in from the national system secured—as evidenced by physicians with no affiliation with TulaSalud providing consultations to TulaSalud's CHWs
- Planning to integrate processes with the national health information system

Partners: Guatemala MOH and the Cobán School of Nursing.  
Receives support from the Tula Foundation based in Canada.

2009–2015

# TXT ALERT

## ORGANIZATION

Right to Care, Praekelt Foundation

## mHEALTH TOOL

TxtAlert

## CATEGORY

Remote Patient Monitoring & Support

## PHASE

Scaling up

## LOCATION

South Africa

## TARGETS

Youth living in poverty; HIV/AIDS

## SUMMARY

Praekelt Foundation developed the open source SMS communication tool called TxtAlert which was launched in conjunction with Right to Care's Themba Lethu Clinic at the Helen Joseph Hospital in 2007. The TxtAlert program supports both HIV patients on ART and their healthcare workers to improve adherence. It aims to increase appointment attendance of HIV patients on ART by notifying patients of their upcoming appointments via SMS and requesting that they reschedule if they are unable to attend (via "Please Call Me" or PCM messages which are popular free text messages in South Africa that ask the receiver to call them back). It also serves as a tracking mechanism for healthcare workers to identify which patients miss appointments or medication pick-ups.

## GOALS + RESULTS

In 2010, the program is expanding to prove that it can be used for any disease management protocol that requires regular doctor follow-ups or medication reminders. The expanded version will contact patients with TB, malaria, diabetes, and any other chronic illness that needs long-term care. TxtAlert's end goal is to offer adherence support and monitoring across a range of diseases to strengthen public health systems.

The project was successfully piloted at the Themba Lethu Clinic at the Helen Joseph Hospital in Johannesburg starting from August 2007. Of the 9,438 ART patients registered at the clinic in November 2008, 9,414 voluntarily opted into TxtAlert. More than 30,000 visit reminder messages have been sent to patients from April to October 2008.

The TxtAlert system depends on electronic records systems, so the Praekelt Foundation has faced challenges in expanding the project to rural areas where systems are not yet digitized. The system currently only runs in Johannesburg because it is dependent on clinics and hospitals having electronic patient databases, which many rural clinics do not have. TxtAlert is being integrated into Project Masiluleke in South Africa.

"The success of TxtAlert is telling: missed appointments have fallen from 30% to 4%. 'Lost to follow-up' rates have declined from 27% to 4%," said Dr Ian Sanne, CEO of Right to Care.

## SUCCESSFUL ELEMENTS

- Tool is designed with the end-user in mind, providing simple yet powerful functionality
- Integration within existing healthcare information systems
- Utilized locally relevant service, PCM messages, to create successful and sustainable business model

## IMPLEMENTING + FUNDING PARTNERS

Right to Care

## DURATION

2007-ongoing

# EXPERTS

Interviews with mHealth experts informed the following set of best practices and recommendations to grow a project beyond a successful pilot phase and achieve scale up. The experts interviewed (listed below) are involved in various fields of mHealth including research, evaluation, advocacy, policy, program design, implementation and global strategies.

## David Aylward

- Senior Advisor, Global Health and Technology at Ashoka
- Former Executive Director of the mHealth Alliance

## Patricia Mechael

- Executive Director of the mHealth Alliance
- mHealth and Telemedicine Advisor at The Earth Institute
- Author of Barriers and Gap Affecting mHealth in Low and Middle Income Countries: Policy White Paper

## Brooke Partridge

- President and CEO of Vital Wave Consulting

## Anne Roos-Weil

- Co-Founder and CEO of Pesinet

## Getachew Sahu

- eHealth Expert
- Program Manager at the World Health Organization (WHO)

# BEST PRACTICES

The case studies assessed in this paper highlight a set of common elements that are necessary for ensuring successful scale up that are applicable across programs that fall into different thematic focus areas of mHealth. Drawing from these case studies and interviews with experts in the field, the following best practices for implementing a successful pilot phase and ensuring scale up were identified.

**1 → Plan for scale up and sustainability on a large scale. Sustainability and scalability factors must be built into the program from the beginning.**

All pilots should plan for scale up and sustainability from the beginning, according to Brooke Partridge. Scalability and sustainability factors include ensuring hardware and software chosen for the pilot can be used on a broader scale, developing a long-term funding plan, evaluating and measuring the impact of the intervention, and others described in the rest of this document. Building these factors into the program from the start will ensure that a successful pilot presenting an effective intervention can achieve scale. Implementations may work sustainably on a small scale but may not translate to implementation on a larger scale.

**2 → Perform assessments to identify real needs and demands of target beneficiaries, local health priorities and to understand the local landscape (existing players and solutions, policies, local settings and practices, etc.) in the area of implementation. Take into account the local conditions, environment, stakeholders and barriers identified through the assessment during the design and planning phase.**

Important differences between local contexts can determine what is an appropriate mHealth implementation for a specific location. Brooke Partridge highlights the need to take these into account during the planning and design phase of the project.

The local conditions, including existing healthcare infrastructure, mobile network signal reach, literacy levels, language requirements and cultural practices, can have a significant impact on the success of the project. The goal is to identify the current barriers and challenges to tailor the initiative to best serve the population's needs given the local conditions. For example, Pesinet is building an application that automatically switches between transferring data via SMS and GPRS based on the wireless signal available and stores the data for future transmission if no signal is available. The capability to operate in poor coverage areas and areas in which electricity is a limited resource should be taken into account as needed. In areas where literacy levels are low, using voice or multi-media communication (such as images) would be a more locally appropriate solution.

Understanding the environment the mHealth solution is being brought into is key, therefore Patricia Mechael recommends performing ethnographic studies and local assessments to acquire a concrete understanding of the health system environment and norms within which the system will be operating. This includes identifying both cultural and social norms that affect patient behavior and uptake of the mHealth intervention, as well as the political and policy environment that affects implementation and scale up of the intervention. For example, if there is a gender gap in mobile phone ownership, this may render an intervention ineffective if its target audience—women—do not have regular access to a mobile phone. Creating a program with skilled designers, and local community and end-user input, can bring a more anthropological and user-focused approach to

the program while also bringing a perspective that can support the long-term sustainability and potential scale up of the program.

Assessments can also ensure there is a real need or demand within the beneficiary populations for mHealth solutions. For example, in some developing country settings the problem may not be a lack of health resources but rather the actual use and demand by the local population. This is the case in Mali where in urban areas, such as Bamako, the challenge is getting the local population to take advantage of the available medical resources, particularly for disease prevention, and increasing their demand for health services.

Another important component is understanding the policy ramifications of scaling up and strategizing on how the mHealth program can be aligned with a country's existing healthcare structures (such as a national health information system). Anne Roos-Weil, CEO of Pesinet, an organization implementing an mHealth program in Mali, recommends that implementers learn very specifically the economics of healthcare within the government and healthcare structures and how to integrate the program within that system. Pesinet spent the last three years in Mali understanding how the local community healthcare structures were financing their activities, whether and where the government and local collectivities were involved in that financing and what would the benefits of government involvement be.

**3 → Identify existing similar initiatives and players. Do not duplicate efforts; collaborate with other organizations for deeper impact.**

An effective way to achieve scale is to link the mHealth program with other relevant programs in the area and build off of their successes and learn from their failures. According to Sean Blaschke, Technology for Development Specialist for UNICEF Uganda, the goal should be to collaborate to leverage existing efforts rather than run parallel solutions and duplicate efforts. Duplicating efforts can dilute the efficacy of mHealth and can prevent the program from acquiring funds and partners to support scale up.

Identify what other initiatives and players are present and whether there are already other solutions present that might meet the need in a less costly or more effective way. Patricia Mechael suggests mapping what existing players have already done and identifying what works and what doesn't in the local context.

**4 → Educate and engage end-users and target beneficiaries in the development of the mHealth intervention to support successful uptake.**

Local stakeholders, particularly community and traditional leaders, CHWs and local populations, should be educated on the mHealth solution and how they can support and benefit from it. Furthermore, engaging local people from the target beneficiaries or end-user groups in leadership roles in the development of the mHealth intervention can strongly support uptake of the intervention in the long-run. The capacity of end-users and any necessity for capacity-building must also be taken into account.

**5 → Align the mHealth program (including objectives and target outcomes) with the local and national health priorities and any existing health information systems.**

The mHealth initiative must have clearly defined objectives for what the program is trying to achieve with the technology as well as target outcomes that are in sync with local health priorities and serve the goals of the national health system. Several of the mHealth projects presented in the Case

Studies section have made this a key element of their program, notably Project Mwana in Zambia and SMS for Life in Tanzania. This element can ensure that the mHealth program has strong justification to be integrated into the national health system, which will promote the long-term sustainability of the project.

**6 → Secure buy-in from government, communities and local healthcare structures as soon as possible. Design a partnership agreement that can be validated by various stakeholders.**

Anne Roos-Weil remarked that a common barrier to scale up is not having the right interface with the government and local communities. To ensure the sustainability of a project, buy-in must be nurtured or secured from the local and national governmental agencies, as well as local community structures. This means these external stakeholders recognize that the mHealth program can contribute to meeting local health priorities and its target outcomes are aligned with their objectives and plans, and that they, as stakeholders, are included in the decision-making process and planning to promote local ownership and investment in the program. Anne recommends making significant efforts to meet with as many government players, local collectivities and community organizations, and local leaders as possible from the outset to really understand where and how decision-making takes place, particularly on funding. The next step is to perform consistent monitoring and evaluation to be able to show key stakeholders within the government the cost-benefit ratio of the mHealth program. Providing this type of data can increase the government's buy-in and investment in the program. Promoting ownership within local communities in areas of implementation can promote the uptake of the intervention and belief that it provides an additive benefit. These elements are vital to supporting scale up.

A close partnership with the MOH can promote the integration of the project into existing health systems and promote enabling policy-making to support mHealth. A partnership agreement designed in collaboration with and validated by the MOH and local stakeholders can serve as a tool to support the expansion and adoption of the mHealth intervention across wider areas. Pesinet is adopting this approach to create the right partnership agreement that they can then use to duplicate their initiative in a variety of local healthcare structures (such as a partnership agreement with the federation of local community healthcare centers). This agreement can help to prove the effectiveness and benefits of their intervention as well as help to secure government buy-in.

**7 → Collaborate with local implementation partners.**

Local implementation partners are key to informing the proper implementation of the project given the local context. The relevant local implementation partners can range from local healthcare agencies and community health workers to social marketing or content developers to traditional and community leaders. Through these partnerships, the initiative gains access to knowledge that can help to overcome local barriers to uptake and successful implementation of the project. If content is being developed as part of the mHealth initiative, it should be developed in collaboration with local partners to integrate local language references and themes to ensure relevance and strong resonance of the message among beneficiaries.

**8 → Establish strategic partnerships to support scale up of the project.**

Strategic partners, particularly relevant industry partners such as mobile network operators and technology companies, can provide their technical know-how and core competencies, resources and network to contribute to the scale up of the project. According to Matt Berg, ICT Director for the Millennium Villages Project, finding the right partners, listening to them and engaging them

9 →

**Perform monitoring and evaluation (M&E) and assessments of impact; use meaningful, measureable metrics. Maintain flexibility in project implementation to adapt to changing needs and priorities of beneficiary populations and avoid failures.**

One of the main drivers of the scale up of mHealth will be the evaluation of initiatives and collection of data to prove the efficacy and efficiency of mHealth projects in achieving target outcomes and meeting local/national healthcare priorities. According to a recent WHO report, only 7 percent of mHealth initiatives in developing countries have been evaluated. More data is needed to inform policy and decision-making to help create enabling environments for mHealth.

Brooke Partridge cites “putting in place meaningful and measurable metrics that not only indicate success but also guide adjustments that need to be made along the way,” as a vital element to ensuring scale up of a program. Having an M&E plan and performing M&E activities in the field are essential to ensuring the effectiveness and utility of the mHealth program. The implementation of the program should be flexible and respond to findings from M&E studies that are fed back into the program so that it remains relevant to the local health priorities and evolving beneficiary needs. Assessment of impact is also crucial for stimulating investment from strategic partners.

are critical success factors. A project that works well in one context might be ineffective in another if partners are secured but not engaged in a meaningful way so as to make use of their skills and knowledge. Common mHealth strategic partners strongly agree that partnerships with various players in the value chain are necessary if mHealth is to grow beyond the pilot phase.

**KEYNOTE SESSION AT GSMA-  
mHEALTH ALLIANCE MOBILE  
HEALTH SUMMIT  
STRATEGIC PARTNERS  
TO SUPPORT  
SCALE UP**

Christian De Faria, SVP, Commercial & Innovation, at African operator giant MTN, talked of the company’s strategy to work with Sanlam Health as its strategic partner in developing and implementing mHealth initiatives across all of the operator’s 21 networks. While MTN brings infrastructure, distribution reach and a “service mindset” to the table, De Faria said that Sanlam brings core medical knowledge and an understanding of the local medical operating environment.

“We can sell airtime well but we are not specialists in healthcare—our philosophy is to partner with companies that know,” commented De Faria. “We have to complement each other and be respectful of the regulatory environment in every country. By partnering we know that the service we provide will be reliable and up to standard.”

Meanwhile Carlos Martinez Miguel—Head of Strategic Analysis & Planning at Spanish and Latin American operator Telefonica’s Global Healthcare division—claimed that “network operators can be the ideal ‘travel companions’ for healthcare systems and providers.” Stating that “strategic partners are required” for all mHealth initiatives, Miguel said operators make good partners due to their experience in communications as well as customer service. “We have the ability to invest and offer end-to-end managed services.”

—Mobile Health Live



# RECOMMENDATIONS

## PROGRAMMATIC

1 →

### **Integrate the program within existing healthcare structures.**

Work closely with relevant stakeholders, including the government, to best integrate the mHealth program within the existing local healthcare structures. For example, if a mobile health tool is designed to register mothers and children and monitor their health outcomes regularly, then the types of data collected and types of indicators reported on should match those already used by the Ministry of Health (MOH). An immediate partnership with the MOH may not always be feasible, but is more likely to happen in the long run if the program is already designed to sync with the existing infrastructure.

There may be cases where the existing infrastructure is problematic, for example there are too many indicators that health workers are expected to report on in monthly reports, and digitizing that may only add to their work burden—the real solution would be to renegotiate the current system expectations with the MOH. This is of course unlikely, especially on small pilots not yet affiliated with the government. However in most cases it will be beneficial to work within the current system, even if it's flawed, rather than create a separate, parallel structure that leads to duplication of efforts.

2 →

### **Employ an integrated solution and/or holistic approach rather than a silo single-solution approach. Identify innovative ways to incorporate other mobile services using cross-sectoral approaches.**

A holistic approach ensures that the mHealth program is tackling multiple local health priorities, which can facilitate and create a stronger argument for the integration of the mHealth program within the national health system. Further, many single-solution mHealth implementations are finding that governments want to cover more than just one health objective if they are to support the program (whether through funding, human resources, politically, etc.).

This kind of integration involves pairing mHealth tools with, for example, mobile money tools, like those that have grown rapidly in markets in Kenya and Tanzania. One of the biggest costs preventing remote populations from accessing healthcare is simply transportation to the health-care facility. Therefore, organizations in Tanzania and Kenya are exploring the use of mobile money services to reimburse transportation and lodging costs to increase access to surgical care. Brooke Partridge agrees that this type of cross-sectoral approach of linking up with other mobile services such as mobile agriculture, mobile micro insurance, mobile women, etc., can support scale up. The key is to identify what initiatives are already on the ground and ready to be integrated into an mHealth program.

Patricia Mechael highlighted that “integrated solutions that fall within multiple mHealth thematic areas are also becoming more widely implemented as the focus shifts toward improving the quality of care at the point of care, enhancing service delivery and then leveraging the data that is generated by these various systems as a byproduct that then generates the information needed for data collection.” She believes that such integrated and holistic mHealth solutions can more easily be mainstreamed into national health initiatives and thereby achieve scale up.

3 →

### **Identify a sustainable and scalable business model that is applicable for large-scale implementations and can bring in valuable strategic partnerships to support scale up.**

Designing a business model that clearly identifies how an organization piloting a tool will remain financially sustainable into the future facilitates the development of meaningful partnerships. The business model should articulate how the intervention benefits the partners and end-users alike,

7. The Next 4 Billion: Market Size and Business Strategy at the Base of the Pyramid. World Resources Institute. Retrieved on October 20, 2011, from <http://www.wri.org/publication/the-next-4-billion>

as well as identify clear entry-points for the partners. Understanding a partner's success metrics and communicating this understanding in the business model will be key to demonstrating how the mHealth solution will benefit them, according to Brooke Partridge. Ensuring that the business model speaks to the incentives of that organization is a critical success factor.

According to David Aylward, there is a clear win-win business model for pharmaceutical industry players to engage more in mHealth development in the domains of drug adherence and combatting the sale and use of counterfeit drugs. Although ICTs have not been part of the pharmaceutical industry's core competencies, there is a clear business case for them to get involved in supporting mHealth initiatives. Other sectors, such as network operators and other telecommunications industry groups, are looking for mHealth players to develop financially sustainable business models that they can engage with. David Aylward also spoke about how the consumer product industry players can tap into the mobile revolution to access base of the pyramid (BOP) populations and helping to meet health objectives. Targeting the BOP, whose market size was recently estimated to be four billion,<sup>7</sup> can quickly bring a project to scale upon a successful pilot phase.

David Aylward recommends the social enterprise model as another type of business model that could promote the scale up of mHealth. Using a type of pay-and-use business model has proven to be financially sustainable for an eHealth initiative in rural India by Healthpoint Services Global, Inc. Healthpoint adopted a horizontal approach to tackling various local health priorities (safe drinking water, affordable primary healthcare delivered via telemedicine and supported by electronic health records, modern diagnostic tests and licensed pharmacy operations). This eHealth initiative has been particularly effective in reducing healthcare-related costs for their beneficiaries and providing a positive cash flow to the company to support further scale up of the program in more communities. This type of social enterprise model also serves to create local employment opportunities thereby creating a win-win-win business model for the company, the beneficiaries and local communities. This type of business model can more effectively attract investments from strategic corporate partners. David Aylward believes there still needs to be more evaluation of this type of model for mHealth on a wide scale before other types of investment funds, such as impact investments, can willingly support scale up in developing countries.

The funding component of the business model is key to ensuring scale, and this scale cannot be achieved if a business model is abandoned for the acceptance of corporate social responsibility (CSR) investments or short-term grant opportunities. While these funding sources may be easier and quicker to acquire to finance the initial pilot phase of a project, the project may run the risk of becoming reliant on short-term funding thereby jeopardizing its sustainability in the long-run.

#### 4 → **Build partnerships with the private sector after a successful pilot phase.**

The local mobile network operator whose services your mHealth tool relies on can be an important strategic private sector partner. The goal is to create relationships that go beyond corporate social responsibility and one-time funding of a project. A more sustainable relationship can be cultivated by leveraging the network operator's technical capacity and core competencies to support the mHealth intervention. Factors that most commonly affect building such a relationship include funding, timing, capacity for technology and the scope of the project. For Project Mwana in Zambia, the money saved by partnering with Zain during a 20-clinic pilot was very small compared to what could be saved if the team brokered an arrangement later to support 1500 clinics.<sup>8</sup> During the scaling up phase, the project could then use the much higher volume of messages as a leveraging point.

Identifying entry points to engage private sector actors and showcasing how the project can serve their business interests can support the creation of strategic partnerships. In addition to looking at the benefits of such partnerships, it is also important to look at what are the drawbacks to partnering with certain private sector actors (for example, exclusivity contracts).

8. How to Work With Operators. Mobile Active. Retrieved on July 3, 2011, from <http://www.mobileactive.org/Working-With-Operators-part-one>

# OPERATIONAL

#### 1 → **Seek out and invest in building local capacity to minimize costs and support local ownership of the project.**

Don't underestimate the human resources needed to deploy, use, and maintain mHealth applications, advises Patricia Mechael. Technical IT expertise is often critical to the success and long-term sustainability of a project that involves the use of ICTs. Training local counterparts to support the implementation, customization and trouble-shooting of the platform is important to minimizing costs as well as promoting local capacity-building and ownership of the project. This expertise can often be found not only in the private sector, but also within local universities.

#### 2 → **The software and mHealth application should be geared towards the objectives of the program, suitable for local conditions and designed with the end-user in mind.**

The choice of software should depend on the resources (including IT expertise) available to the project. The software should be suitable for local settings and be user-friendly. Anne Roos-Weil highlighted the need to understand the local networks by identifying what types of data transfer are cheapest and provide the highest range of connectivity in the area of implementation. This will determine what types of applications are best for the initiative. For example, Pesinet uses an application that by default would send data via GPRS where coverage is available because the cost of transfer via GPRS locally is cheaper than SMS and network coverage exists in many areas in Mali. However, GPRS is not consistently available and connections can be unstable therefore Pesinet's application includes an offline mode where data is stored until a future time where connectivity is available. For areas where GPRS is not available a feature to switch to SMS transmission is currently being developed.

Pesinet's application is also specifically geared towards the collection of data to relay back to doctors, which is their primary objective, rather than provide diagnostic support or other tools that mHealth applications can provide. Maintaining user-friendliness to support the achievement of such implementation objectives is key for successful uptake of the technology by end-users. The choice of hardware (i.e. mobile phones) is also important for the scalability of the program—chosen hardware should be cost-effective, robust and also highly user-friendly to ensure consistent and effective use by end-users as well as lower the costs of maintenance.

#### 3 → **Identify what motivates the end-users, not just what the objectives of the program are. Use incentives to promote the consistent and effective use of the mHealth tool.**

For an mHealth data collection platform, the end-users' (for example, CHWs) ability and motivation to use the mHealth tool is key to the success of the program. For example in the ChildCount+ project, the goal was to collect data, however that did not typically motivate the end-user. The end-users found value in the feedback and point-of-care support that the mHealth tool provided and this is what motivated them to consistently and effectively use the tool, which also resulted in the effective collection of health data and real-time monitoring of health outcomes as a byproduct.

Another tool to motivate end-users is the use of incentive-based systems and identifying what kinds of incentives encourage the wide-scale adoption and proper use of the mHealth tool by various stakeholders. One recent Text to Change project piloted in Mbarara, Uganda, aimed to increase voluntary HIV/AIDS testing. Participants received weekly quiz questions, and at the end of the project, they had the opportunity to win prizes at a local HIV counseling and testing center. Participating

9. Mechael P et al. (2010). Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper. Retrieved June 3, 2011, from [cghed.ei.columbia.edu/sitefiles/file/mHealthBarriersWhitePaperFINAL.pdf](http://cghed.ei.columbia.edu/sitefiles/file/mHealthBarriersWhitePaperFINAL.pdf)

4 →

### **Perform social marketing.**

An integral component of achieving scale is ensuring there is uptake among local populations. In order to achieve this, Anne Roos-Weil recommends social marketing as an essential tool in promoting the service; educating, communicating and discussing with the community their needs and how the mHealth intervention can benefit them; mobilizing them around the service and its concept. One of Pesinet's biggest lessons learned from their pilot phase, according to Anne Roos-Weil, was that one should try and involve stakeholders from different groups in the beneficiary population at the beginning of the project. Therefore, she recommends that communication mechanisms should be formulated in the planning phase to inform the program's objectives and exchange ideas with beneficiaries to increase their ownership and confidence in the intervention.

5 →

### **Empower users through the mobile phone technology, particularly women.**

For example, if the mHealth initiative falls under the Education, Awareness and Health Promotion thematic area, the content should take advantage of the mobile platform as a two-way communication tool rather than a single directional communication tool by encouraging users to respond. One of the design goals of the program should be to enable and empower the users to take advantage of the technology and promote innovative thinking on how best to use the technology within local contexts. Training women CHWs or mothers within households to use mobile technology and promoting women's ownership of mobile phones can have far-reaching effects beyond mHealth objectives and serve as a mobile women (or mWomen) component of the program. Various social and economic goals can be advanced via an mWomen component, including female empowerment and increased sense of safety, increased economic opportunities and access to information to make better decisions for themselves and their families.

6 →

### **If an area of the project is failing, fail quickly and publicly; adjust the program accordingly.**

Failures are integral to informing future successes. While a particular aspect of a project might fail, it can lead to innovation and redesign in other areas. Sean Blaschke of the Tech4Dev initiative with UNICEF Uganda advises implementers to fail quickly and publicly to promote knowledge-sharing and prevention of recurring failures among other organizations. The key is also to look at other local project implementation and learn from their failures in similar contexts.

clinics saw a nearly 35 percent increase in first-time visitors immediately after the program, according to Text to Change.

Another method is to offer minutes or SMS message units to encourage compliance by the general public. According to a recent report on Barriers and Gaps to mHealth,<sup>9</sup> salary payments through cell phones could also provide immediate reward for effective usage of mHealth applications.

# POLICY

1 →

### **Mainstream mHealth in the MOH and relevant government bodies.**

One of the major issues with scale has been the way that mHealth projects have been financed. A lot of the funding for implementation has come from outside the governments via private philanthropies and bilateral donors. A byproduct of this funding environment is limited accountability and additive impact of current programs. According to Patricia Mechael, one of the main policy issues that needs to shift to address this is for mHealth to be mainstreamed and taken up by government in partnership with the private sector, including the NGO community and relevant industry players such as pharmaceutical and telecommunications companies. This will serve to increase in-country ownership and buy-in from local healthcare structures and increase the likelihood of sustainability and scale up.

2 →

### **Establish an e/mHealth structure to support the multi-sectoral mainstreaming of mHealth and advise the decision-makers on creating an enabling policy and regulatory environment for mHealth scale up.**

Governments are beginning to adopt the idea that mobile technology is the way forward to achieving national and localized health objectives in resource-limited and remote settings. To support a long-term strategy around the use of mHealth (and eHealth) within national health systems, mHealth must be mainstreamed within existing government institutions. This can be achieved by setting up an e/mHealth structure, such as a National eHealth Council, to facilitate the mainstreaming of mHealth solutions by:

- Advocating and convincing the MOH, other relevant government bodies and ministries, donors and private sector partners that mHealth on a large scale is an effective and efficient solution to achieve national health objectives and meet health-related MDG targets.
- Providing enabling policy and regulatory recommendations and advice to support the scale up of mHealth.

Creating a structure outside the MOH is necessary because building the infrastructure to support eHealth, such as getting a national ICT agency to run fiber-optic cables to all district hospitals, goes beyond the purview of the MOH. However, one of the major risks is contributing to the proliferation of institutions within heavy and bloated public sectors, which is often a characteristic of public sectors in Africa and India. One of the lessons learned is to create light structures to support mainstreaming within existing institutions with the tasks of advocacy, advising, and building the national capacity for eHealth.

According to a framework for eHealth by Dr. Yunkap Kwankam,<sup>10</sup> there should be three structures within the National eHealth Council: (1) an eHealth Corps to serve as a professional category of health workers; (2) an eHealth Steering Committee to advise the MOH on setting policy and strategic direction for eHealth; and (3) a national center of excellence for eHealth for best practice, capacity-building and policy coordination.

An important contributing factor that supported Pesinet to grow beyond the pilot phase was the support they received from Mali's eHealth agency. "They helped us get an agreement from the government to set up our activities and negotiate the partnership agreement with the Ministry of Health. They've promoted the Pesinet program through different ways, both locally and regionally," said Anne Roos-Weil. mHealth implementers also need governmental support to ensure their program meets local regulatory specifications, particularly on a wide-scale implementation, and ensure coordination among existing initiatives.

10. Kwankam Y et al. GeHCs-ISfTeH Framework for eHealth.

3 →

### **Create an inter-ministerial working group and collective agreement involving stakeholders from the various ministries to support the scale up of mHealth programs.**

mHealth implementers need to interface with and be supported by more than just the in-country MOH or e/mHealth governmental structure due to the nature of mHealth of incorporating health, ICTs and education (and perhaps more) within their programs, according to Brooke Partridge. Therefore, they need to deal with the policies and regulatory issues of multiple ministries and agencies within the country.

mHealth programs are also becoming more comprehensive and holistic in nature to tackle multiple local health priorities and achieve scale up. Patricia Mechael identifies collective engagement across various ministries within the government, including Health, Finance, Gender, Social Planning/Development, Education, ICT or Telecommunications, and others (depending on the type of intervention) as a critical factor in supporting scale up. Getachew Sahlu advocates for strong communication links between these critical stakeholders: "The more they start talking to one another, the more effective governments would be in addressing eHealth and mHealth scale up."

A collective agreement between these various stakeholders in the inter-ministerial working group to support mHealth can ensure there is alignment between local health priorities and mHealth focus areas, common standards, clear strategies to support scaling up, prioritization and allocation of resources, and knowledge-sharing and communication on challenges and progress. Patricia Mechael recommended holding a one or two-day workshop with relevant stakeholders from the national level as well as some of the main implementers on the ground to perform landscape mapping and inform the agreement.

4 →

### **Identify and promote the use of specific data, technology and interoperability standards.**

Governments should play a stronger role in the regulation and meeting of standards by mHealth technologies. Without identifying data and technology standards and interoperability architectures, mHealth programs will continue to produce competing and duplicate sets of data. To achieve integration within local healthcare structures and within national health information systems (and thereby scale up the solution), program designers and implementers need to know what the local data and technology standards are and how to design their programs to ensure interoperability.

Getachew Sahlu highlighted WHO's role in supporting this recommendation within countries by holding workshops, seminars on health information, and making mHealth a component of their advocacy in WHO's member countries.

5 →

### **Advocate for the integration of mHealth within local public and private healthcare initiatives; prioritize mHealth training for healthcare workers.**

Governmental support of mHealth via the prioritization of mHealth training will resonate strongly with local healthcare workers who are not yet aware of the benefits of mHealth in data collection, diagnosis and treatment support and improved health information flows and reporting. Along with the e/mHealth structure, the MOH and other public agencies should advocate for the use of mHealth to organizations implementing healthcare initiatives within the country in order to broaden the implementation of mHealth in the field and benefit from it. With data and interoperability standards in place, organizations can easily use these systems to share data with relevant stakeholders to improve allocation of resources and prioritization of health needs.

# GLOBAL STRATEGY

1 →

### **Establish a global network of key institutional players to inform an overall global approach to support the scale up of mHealth in developing countries.**

Generally, countries have different mHealth strategies based on their local priorities and settings. However, Getachew Sahlu argues for an overarching global approach to mHealth implementation in countries which would help address cross-cutting and yet inter-linked issues, such as health, technology, finance, regulatory policies, governance, national development priorities, and local ownership. Most of these issues are within the mandate of and being pursued by one or more global institutions, such as WHO, ITU, UNDP, WB, GSMA, and other regional organizations. Institutions like the ITU and GSMA can also contribute to the cost-cutting and regulatory measures needed within the country to support scale.

Patricia Mechael felt strongly that the Global Fund (GFATM), the largest external donor for health initiatives, could play a strong role in promoting the scale up of mHealth, particularly in funding the M&E and performance evaluation of mHealth as well as promoting the use of mobile technologies within GFATM proposals. Having the GFATM involved in supporting the scale up of mHealth could significantly improve outreach, service delivery and supply chain management if mHealth was supported within their proposals.

2 →

### **Establish a global repository of mHealth applications, tools, best practices, recommendations and evaluation data. Institutional players must be willing to share and connect their existing repositories.**

mHealth repositories are being developed by various institutional players, including the mHealth Alliance's Health UnBound, or HUB, which provides a platform for various mHealth players to connect and collaborate, and the GSMA's Mobile Health Live portal, which provides real-time content that informs, educates and empowers successful deployments of mHealth technology. A global repository linking these existing repositories and databases should be set up to support the successful implementation and scale up of mHealth initiatives by providing a one-stop shop for mHealth players to access information. According to Getachew Sahlu, such a global repository would "enable improved access to mHealth resources, enable informed policy decisions, while providing necessary data to researchers, solution developers, and the general public. This in effect will ease the scale up of mHealth projects in countries." WHO is working with institutions to establish linkages between the repositories and is currently in the discussion stages of creating an enterprise sort of inventory on all successful mHealth initiatives and applications to share with the general public.

3 →

### **Create frameworks for success targeted towards informing policy-makers, project designers and implementers, and donors.**

Such frameworks can help inform decisions and ensure sustainable models are used in mHealth implementations. One of the main elements needed in a framework for success for policy-makers is the development of reference architectures for interoperability and data standards. In order to achieve this, Patricia Mechael recommends analyzing successful adoptions of architectures in a handful of countries representing different contexts and using that to inform a template or toolkit to demonstrate to other countries how different types of standards and architectures can be used. A critical factor to the success of such an endeavor is the systematic and detailed documentation

of the process and steps taken to establish these successful architectures and standards. Governments can derive a lot of value from this type of step-by-step information.

The donor community also should have a framework of success to follow to ensure their funding focuses on ensuring sustainability and scale by requiring the implementation of the best practices mentioned above and requiring reporting on this. This is particularly important to create a shift in funding schemes to focus on monitoring and evaluation, which needs to be prioritized by donors. Also, implementers should be required by donors to adhere to interoperability and data standards for mHealth.

According to Patricia Mechael, utilizing a back and forth iterative process of analyzing at the local level and bringing recommendations up to the global level can bring about tools that are universally useful. She believes these global frameworks can be established through a partnership between various institutional players including the WHO, ITU, GSMA, mHealth Alliance and the Broadband Commission. Existing international collaborations that are starting to emerge could help convene and shepherd this.

**4 → Advocacy by institutional players to both internal and external stakeholders, particularly to donors, to utilize and integrate mHealth into programs in developing countries.**

Mobile phone technology is widespread in developing countries, allowing organizations to directly access beneficiaries and enable capacity-building to empower local populations with the information they need to improve their health. Advocating for the use of mHealth to governments, donors, other institutional players and organizations is essential to the scale up of mHealth in the field.

**5 → Donors and institutional players need to support the evaluation of initiatives in developing countries and the creation of common metrics, indicators and methodologies to evaluate impact on health outcomes.**

The goal of evaluating mHealth programs is to determine whether the program is effective, whether it's serving the right people and whether it's achieving the social objectives and target outcomes originally set out. Evaluation is costly and needs to be budgeted for. Anne Roos-Weil highlighted the need for donors to seriously invest in evaluation in the first few years of the program. This evaluation is needed early on to produce evidence demonstrating the benefits of mHealth in the community, the effectiveness of the program in achieving its objectives and its contribution to local health priorities. Such data can serve to inform local policy-making to further support the implementation and integration of mHealth in existing healthcare systems and structures.

A useful evidence base on developing country initiatives will be emerging in the coming year as more players (such as USAID and IDRC) begin to fund randomized controlled studies of interventions, according to Patricia Mechael. Academic institutions in both developing and developed countries are now collaborating with implementers around research and evaluation. What is needed now is the creation of meaningful and rigorous metrics and methodologies to evaluate impact. The data needed to bring initiatives to scale lies in answering questions such as: what is working, what is not working, how is it working and how much does it cost? Patricia Mechael believes the role of the donor community, particularly private philanthropies, needs to shift towards providing support for policy-making, strategic alignment, standardization issues and research to support the scale up of mHealth.

**THE WHO'S ROLE  
SUPPORT FOR  
mHEALTH SCALE  
UP THROUGH  
GLOBAL EFFORTS**

WHO is working in close collaboration with member states and technology partners to coordinate a global effort to support the scale up of mHealth in developing countries through the following mechanisms:

**1. Data Collection and Case Studies**

Through global surveys and case studies on mHealth in member states, WHO aims to inform policy-makers and the general public on the trends, evolution, and impact of mobile-phone technology on health in developing countries;

**2. Data Standards and Interoperability**

WHO promotes standards-based and integrated approaches on the use of ICTs, including mobile phone technology, with the view to ensuring interoperability, sustainability, and scalability of mHealth solutions;

**3. Partnerships**

WHO brokers public-private partnerships on mHealth, leveraging the competence of the private sector in mobile technology development, and ensures the safeguard of privacy, and confidentiality of health services rendered through mobile phones;

**4. Local Policy-Making**

WHO assists countries in their development of appropriate policies for mHealth.

# CONCLUSION

Though the field of mHealth continues to evolve, it is clear that the landscape of mHealth is inundated with pilot projects that often are not sustainable beyond the pilot phase and fail to scale up. For this landscape to change to support long-term, sustainable implementations of mHealth, the support of a variety of actors is required including governments, donors, project designers and implementers, institutional players and the private sector.

For implementers, the elements necessary for the successful scale up of mHealth involve building sustainability and scale into the project from the beginning, ensuring the solution is locally appropriate, securing buy-in from key stakeholders, creating strategic partnerships, ensuring alignment with local and national health priorities and integrating into local healthcare structures. For governments to create an enabling environment for scale up, mHealth must be mainstreamed into existing healthcare structures, agencies, and national health authorities' policy and priorities frameworks. Data and interoperability standards must also be put in place to ensure that health information being collected is fed back into the system and informs resource allocation decisions. For the global community including donors and institutional players, it is essential that monitoring and evaluation is planned and

budgeted for within programs to ensure sustainability beyond a successful pilot phase. Organizations need a global network and repository of information that they can rely on for best practices, recommendations, frameworks for success, applications and an evidence base of what works and what doesn't for various contexts.

The goal is to move towards enabling long-term, large-scale, economically viable and sustainable initiatives that can be evaluated to demonstrate to governments, donors and the private sector that mHealth can effectively and efficiently improve patient outcomes in the coming years. Scaled up implementations will also help to determine the appropriate mix of public and private involvement and identify successful business models that can enable more mHealth initiatives in various contexts to achieve successful scale up.

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