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## mHealth Solutions— What's the Cost?

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Meeting Report  
Washington, DC  
June 11, 2014



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## Abbreviations

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1mCHW	One Million Community Health Workers [campaign]
ASHA	Accredited Social Health Activist
CHO	Community health officer
CHW	Community health worker
FLHW	Frontline health worker
iCCM	Integrated community case management
ICT4D	Information and communication technology for development
IVR	Interactive voice response
mHealth	Mobile health technology
mLearning	Training via mobile devices
MoH	Ministry of Health
mPowering	mPowering Frontline Health Workers
MSH	Management Sciences for Health
mSTAR	Mobile Solutions Technical Assistance and Research [project]
USAID	United States Agency for International Development

## Background

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The past decade has seen the exponential rise of mobile phone ownership and the significant promise of mobile health technology (mHealth). Frontline health workers (FLHWs) in developing countries have access to a range of mobile devices, from basic phones through to smartphones and tablets. There are numerous examples of projects that have helped improve the performance of FLHWs by aiding them to use mobile devices to collect data, strengthen clinical decisions, and improve patient counseling, and provide remote access to training resources and job aids.

Despite the extraordinary promise of mHealth, however, projects are failing to reach scale at a national level in low- and middle-income countries. The growing urgency to address this issue has prompted key players in the mHealth community to focus on creating the business case for mHealth and on striving for a deeper understanding of the economic impact that mHealth solutions and programs deployed at scale could have on countries.

Has the time come to invest more in mHealth solutions for FLHWs? Opinions are rarely unanimous. Commonly, there is both excitement when considering smart device potential and wariness of barriers (cost and availability, battery use and ability to recharge, durability and security concerns, limited written and technical user literacy, etc.). A range of questions still needs addressing: Is it possible to deploy smart devices in ways that have a high impact and are sustainable from a cost perspective? Can mobile technology solutions address the continuing challenge to end preventable maternal, newborn, and child deaths? What is the cost of mobile learning compared with more traditional classroom learning? What are the arguments for basic versus advanced mobile tools?

mPowering Frontline Health Workers (mPowering) is supporting a body of work that will contribute insights on how deploying mHealth solutions for FLHWs could improve countries' economies by advancing more productive workforces and reducing the economic drag caused by lack of access to health services. There are several linked strands to this work:

1. First, mPowering held a workshop in June 2014 to bring together policymakers, economists, implementers, academics, technologists, and mobile network operators to consider existing models for costing mHealth programs and apply these models to a real-life case study. This report outlines the presentations and key points that emerged during the workshop.
2. mPowering aims to secure funding to commission research that includes a review of mHealth programs in three or four countries to identify common principles that will help inform ministries and others when budgeting for mHealth strategies. The intention is for this research to support a more in-depth analysis of the knowledge gaps that prevent a full understanding of

the return on investment and impede long-term investment in interventions that could improve efficiencies and health outcomes.

3. mPowering and its partners will host additional workshops over the next 12 months to help build common understanding of the economic incentives and disincentives for various actors in mHealth to participate in long-term mHealth projects, to understand how other efforts to use information and communication technology for development (ICT4D) have demonstrated the business and economic impact of mobile solutions, and to determine a strategy for addressing knowledge gaps through research efforts involving partners across sectors.

# Workshop

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## Introductions

The “mHealth Solutions—What’s the Cost?” event, co-hosted by mPowering, Futures Group, and Intel, took place on June 11, 2014, in Washington, DC. IntraHealth International (IntraHealth) provided meeting space and administrative support for the workshop and FHI 360 facilitated the event. Forty participants from domestic and international organizations working in health, development, and technology attended the event.

**Lesley-Anne Long**, Global Director of mPowering, welcomed participants and provided context for the meeting. The workshop aimed to provide a practical approach to identifying cost drivers of mHealth programs, compare costs of similar mobile solutions as well as more traditional models of training and supporting FLHWs, and assess the benefits of mHealth against its costs. The workshop included six short presentations, group discussion, and application of mHealth costing tools to a case study of Ghana’s new community health worker (CHW) mHealth strategy.

**Wayan Vota** (FHI 360), the facilitator for the day, noted in his opening remarks that there are many cost drivers for mHealth programs, with the mobile technology being only one of many factors to consider. He invited participants to think about the following points while listening to the presentations: the cost drivers identified in each model, any cost factors not addressed, and what assumptions were being made about cost drivers.

## Presentations

1. **Paul Nelson** (USAID) and **Shailee Adinolfi** (FHI 360 / Mobile Solutions Technical Assistance and Research [mSTAR] project) announced the launch of the *Digital Finance for Development* handbook. The handbook, which lays out benefits of mobile finance and opportunities for its use, is designed to improve the use of digital financial services in development projects at the United States Agency for International Development (USAID) and is available online at [bitly.com/digfinbook](http://bitly.com/digfinbook). This is an evolving document, and suggestions and feedback are welcome. Nelson and Adinolfi also invited participants to submit case studies, information, or graphics related to mobile finance for inclusion in later drafts of the handbook.
2. **Dr. Kate Tulenko** (IntraHealth) presented “IVR mLearning in Senegal: Is mLearning More Cost-Effective Than Traditional Learning?,” which outlined key cost considerations for mHealth solutions based on an evaluation of an IntraHealth program in Senegal. In this program, CHWs used an interactive voice response (IVR) system for in-service training on standard mobile phones. The program was based on several randomized controlled trials that found that training delivered by mobile devices (mLearning) was more effective for long-term retention of skills and knowledge than face-to-face

training. The program's budget identified one-time investment costs, as well as ongoing maintenance and program costs. Tulenko also identified costs saved compared with face-to-face training, including travel costs, trainer costs, and the cost of lost work time.

Tulenko reported that it is likely that mHealth has comparatively high up-front investment costs and that most countries will find it difficult to fund these initial costs. However, mLearning can save costs in the long term and provides unique benefits. Tulenko outlined examples of mHealth benefits that are difficult to quantify when considering the value of mHealth programs, such as reducing lost clinical time or increasing access to training materials. In addition, mHealth applications often lead FLHWs to spend more time in training or to take more courses, although the value of these effects is not always clear. Tulenko recommended making mHealth a standardized component of all pre-service trainings for FLHWs and suggested that global health professionals agree upon a set of costs or costing methodologies for mHealth and traditional activities. She also stressed the importance of flexibility in mHealth applications, to allow for minority languages and to accommodate users with low or no literacy. Finally, Tulenko noted the cost benefits of mLearning at scale and the need to develop a cadre of economists with a strong understanding of the cost of mHealth.

The ensuing discussion focused on the challenges of quantifying the benefits of mHealth and of linking mHealth usage to health outcomes. One point considered was the common assumption that if CHWs spend more time with each patient (because the CHW was going through the questions or algorithm on her phone), this change is beneficial; it was suggested that it could actually mean that CHWs are seeing fewer patients. Furthermore, additional time spent with a patient does not necessarily indicate that the added time is effective.

- 3. Allison Annette Foster** (IntraHealth) presented “mSakhi: A ‘Smart’ Investment.” mSakhi is an Android-based interactive mobile phone application for ASHAs (Accredited Social Health Activists), a cadre of CHWs in India. The application includes self-learning and counseling tools, decision support, data monitoring and management, and information management, all delivered on an Android platform. It provides audio, graphic images, and short videos. mSakhi is currently used in two districts in Uttar Pradesh. Cost components for mSakhi include mobile phones, training, and software/application maintenance; all costs are influenced by mHealth policy, change management, and interoperability/integration with legacy health information systems. The application costs the equivalent of \$175 per ASHA per year to start up and \$80 per ASHA per year for continuing costs and is funded by a public-private partnership model. Foster reported that the program's results, or “return on innovation,” were positive, with ASHAs visiting more patients, spending more time on self-learning, reporting a higher percentage of births, and having improved knowledge on care and diagnosis, among other results.

The state government of Uttar Pradesh in India, ASHAs, and their patients all report high satisfaction with the application.

Foster led a discussion on quantifying the value of mHealth applications with respect to investment, sustainability, service improvements gained, and health outcomes achieved. mSakhi, she reported, improves ASHAs' learning and skills; increases ASHAs' accuracy, thoroughness, and counseling skills; and allows ASHAs to see more patients. It also provides links between various actors in the health system, including provider to patient, provider to provider, and provider to supervisor. Most important, mSakhi establishes a flexible platform that will grow with technological advancement and adapt to be interoperable and integrated into the larger health system. mSakhi is an example of investing not only in the present but also in the future. IntraHealth will work to quantify the benefits of mHealth, compare costs between mobile and paper models, and demonstrate cost savings among various mobile models.

4. **Colin Gilmartin** (Management Sciences for Health [MSH]) presented “The Importance and Use of Integrated Community Case Management [iCCM] Tools.” MSH has developed three community-level costing tools that are designed to provide a financial picture of community health services, particularly iCCM programs. iCCM targets delivery of timely and low-cost interventions at the community level by CHWs. MSH's tools calculate the costs and financing elements linked to all aspects of service delivery, training, supervision, and management of CHW programs in communities and health facilities. Gilmartin stressed that understanding the costs of a community health program is essential in order to show the total program costs as well as marginal costs and to ensure efficient use of scarce resources. He also pointed out the importance of advocacy with donors and Ministries of Finance for additional program funding. The MSH community-level costing tools can also be used to cost the scale-up of mobile health technologies in community-level programs. In addition, the costing tools can assess the associated cost implications of supervision of CHWs, reporting of data, and the supply of medicines. MSH and the One Million Community Health Workers (1mCHW) Campaign have used these tools in 15 countries in sub-Saharan Africa.

Gilmartin outlined the data inputs required for MSH's iCCM Costing and Financing Tool, which generates results including cost per iCCM service (i.e., treatment for malaria, pneumonia, or diarrhea), cases per capita, cost per capita, the number of CHWs needed per scale-up scenario, and total and annual program costs, among others. The iCCM Costing and Financing Tool displays the key cost drivers or categories, including management, supervision, equipment, and training costs. In closing, Gilmartin summarized lessons learned, including the significance of having access to quality cost data, the link between program cost-effectiveness and utilization of services, the need for inclusion of costing data in planning and policymaking, and the importance of linking program expenditures to outcomes.

5. **Sharon Kim** (1mCHW Campaign) presented the Campaign’s work to support the development of national CHW operational and financial plans in sub-Saharan African countries. The 1mCHW Campaign uses a two-phase approach. In phase 1, the Campaign works with the central government to develop a comprehensive financial and operational plan for national CHW scale-up. In phase 2, the Campaign supports the development of a district-led implementation plan to engage implementing partners and existing projects with potential for scale-up. In Ghana, the Campaign worked with the Ministry of Health (MoH) and Ghana Health Service to produce a technical model of a new CHW program. Mobile health technologies were promoted by the Campaign and endorsed by the government as an important component of improving the quality of Ghana’s CHW program. Initial costing for the mHealth element of this model included equipment, training for CHWs and supervisors, and project management costs.
6. **Bobby Jefferson** and **Rob Segan** (Futures Group) and **Mathew Taylor** (Intel) presented “Community Health Worker Training: Total Cost of Ownership.” This presentation compared classroom learning with blended eLearning, compared the use of smartphones with data to the use of feature phones plus tablets for cost and functionality, and examined the sustainability of solutions at scale. They reviewed findings that blended mobile training could enable the training of far greater numbers of CHWs, improve training, and save costs, but they also indicated that challenges remain. In Nigeria, the blended model (a mix of classroom, feature phone, and tablet) could save 42% compared with the cost of the classroom-only model. Implemented at scale, the cost per user would decrease even further. Blended learning can achieve greater impact, saves costs, and allows for flexibility of timing and locations of training.

The Futures Group IQ Solutions site connects health workers and programs to free, customizable software solutions for mHealth. Jefferson, Taylor, and Segan presented recommendations from a recent Dalberg report,<sup>1</sup> including (1) share and collaborate on content for CHWs and (2) experiment with and evaluate blended learning models. Finally, they concluded that offline eLearning with periodic access to a Wi-Fi connection via tablet provides maximum functionality and sustainability.

Following the presentations, a discussion took place that probed more deeply into each project’s costing model, assumptions, and potential applicability to other mHealth initiatives.

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<sup>1</sup> Dahlberg Global Development Advisors. *Preparing the Next Generation of Community Health Workers: The Power of Technology for Training*, 2012. Available at: [http://dalberg.com/documents/Technology\\_and\\_CHWs.pdf](http://dalberg.com/documents/Technology_and_CHWs.pdf).

## Case Study

Sharon Kim presented an outline of the Ghanaian MoH's operational roadmap<sup>2</sup> to build a world-class national platform for community health delivery. In Ghana, a new cadre of CHWs will provide basic and preventive health services to households. Specific services are outlined in the roadmap. Ghana plans to train and deploy more than 30,000 CHWs by 2030, with 15,000 trained by the end of 2016. Use of mHealth is a key component of the CHW strategy. The CHWs will use a mobile platform for data collection, performance management, monitoring by supervisors, job aids, and training. This platform could be available on a smartphone or feature phone and should be able to function both online and offline.

The roadmap included an initial mHealth budget, which estimated that the cost of the CHW mHealth strategy would be \$15 million over three years and included costs for field engineers, training, user fees, equipment, developers, and mHealth specialists. The full text of this case study and budget are included in Appendix D.

## Small Group Discussions

Participants were divided into smaller groups to discuss the Ghana case study.

Each group was asked to discuss the assumptions and cost drivers included within the draft Ghana strategy, and begin working toward recommendations to the MoH. These recommendations were shared with the wider workshop group in a final discussion session. The results of the group discussions will contribute to the strategy discussions that the 1mCHW Campaign team, mPowering, and others will be engaging in with the MoH Ghana.

## Group Feedback

1. **Group one**, facilitated by Sharon Kim, first clarified the key assumptions made in costing the CHW strategy. They assumed that CHW salaries were included in the larger roadmap and not in the mHealth strategy, that the platform would not use SMS or push notifications, and that a functional system was in place to manage the platform. They also assumed costs associated with 10% inflation per year; that smartphones would be the device used; that public-private partnerships would lead to low-cost phones and data; that all content would be open source, eliminating the need for user feeds; and that the mHealth strategy would be well defined and guided by existing policy, with no need for policy revisions.

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<sup>2</sup> One Million Community Health Workers Campaign. *Government of Ghana: National Community Health Worker (CHW) Program*. 2014. Available at: [http://1millionhealthworkers.org/files/2014/04/GH1mCHW\\_Roadmap\\_2014-04-20\\_Final\\_compressed.pdf](http://1millionhealthworkers.org/files/2014/04/GH1mCHW_Roadmap_2014-04-20_Final_compressed.pdf). Accessed August 6, 2014.

Group one also listed some key assumptions that needed clarification. For example, they asked whether funding would come from the government, from donors, from the private sector, or from a combination of these sources. Group one also asked about the outcomes desired from the mHealth strategy and ways to quantify those outcomes. For example, they asked if the aim of the mHealth strategy was to change patient outcomes, to improve quality of care, or to extend care to larger groups of people. In addition, they cautioned that if increased referrals led to higher numbers of patients seeking care, the MoH should plan for costs associated with that change.

Group one listed some practical items that the MoH should consider, including levels of data coverage in target areas, the need for data collection and management protocols, the need to establish a supervisory mHealth unit to manage data usage and training, and ways to provide support to the strategy at the national, district, and regional levels. The group identified (1) data collection related to morbidity and mortality and (2) mobile training and patient counseling support as key functions of the mHealth platform. This group predicted that mobile phones would be the largest cost item but that phones could be purchased for less than \$100 per device.

2. **Group two's** discussion, facilitated by Pamela Riley (Abt Associates), centered primarily on the need to define use cases for an mHealth platform. The group assumed that vital registration, family planning counseling, registering pregnancies, referring to antenatal care, recognizing warning signs in pregnancy, distributing commodities, and follow-up on facility visits would likely be high-priority activities for CHWs. Initial costs would include developing and adapting content, purchasing software and hardware, training, and advocacy. Operational costs would include software and content updates, hardware support, training, program oversight, and capacity building for government and the health system.

The group noted several items that needed to be considered in developing the Ghana budget, including content development or adaptation to create a mobile training package; a digital payment platform; integration with existing national health systems; data analysis tools and training on the platform for users; measurement, evaluation, and oversight; eHealth tools at clinics; and direct mobile messages to clinics. Group members recommended that the MoH consider using a feature phone plus tablet model, though a 7- to 8-inch tablet on its own would also be a good tool for training. They also acknowledged that the need for fully secured and encrypted data and real-time connectivity may require different devices. Risks of the mHealth program included turnover; device theft, breakage, and repair; complexity of the platform; gender implications of and cultural reactions to providing CHWs with mobile devices; data privacy and security; and ability to use the data that are collected. Key funders were anticipated to be large international donors, and the group also explored the possibility of private sector engagement through advertising and

bundled services to help generate revenue to support the Ghana mHealth strategy for CHWs.

3. **Group three**, facilitated by Dykki Settle (IntraHealth), identified the “big issues” that needed to be understood for accurate costing. The group emphasized the importance of deploying health workers to the right locations, not just deploying the correct numbers of CHWs. They considered the balance of increasing the number of fixed locations or community health posts compared with CHWs’ doing home or community visits. If CHWs are based in health facilities, there should be a process to map the fixed locations, while CHWs outside of facilities would need to triage patients according to urgency. Triage could be supported through mobile automated protocols for clinical decision support, such as Mobile Technology for Community Health. CHWs doing home visits would also need the ability to use GPS and digital maps as well as increased power or batteries for mobile devices.

Group three made some key assumptions: that the platform would not use SMS or push notifications and that a functional system was in place. They also assumed costs associated with 10% inflation per year, that smart phones would be the device used, that public-private partnerships would lead to low-cost phones and data, that content would be open source, and that the strategy would be well defined and guided by policy.

Group three emphasized the importance of support for strong governance and country ownership and inquired about whether or not there was a national mHealth working group and which other groups needed to be included. They suggested the national eHealth/health information system steering committee, Ghana Health Workforce Observatory, National Health Insurance Scheme, and other ministries deploying mobile technology platforms that could be leveraged. The group also identified opportunities for interoperability with District Health Information System 2, the Integrated Human Resource Information System, mobile money, and other systems, such as a logistics management information system, that are compliant with MoH eHealth architecture and strategy. The current budget is based on CommCare costings, but there are other mHealth initiatives that could be considered for scale-up. A single platform would ease training and coordination costs but would also eliminate the potential use of other applications. For long-term sustainability, standards should be established to link different applications and functions.

Because Ghana has several different mobile networks, group three recommended negotiating a multiple network approach. The strategy should also anticipate power issues, solar or alternate power sources, and connectivity. Basic phones with Wi-Fi availability in health facilities could present an alternative model. Other factors to consider include supervisors having the capacity to support CHWs’ use of the phones, incentives to expand the scope of supervisors to oversee CHWs, and mobile network operators’ contributing to a universal service fund to increase access in

rural areas. The MoH should identify critical data early in the process but avoid excessive burdens in data collection that will impair care. For example, the MoH could collect implicit data using GPS and time stamping and should identify whether they will need to collect aggregate or individual data. In closing, group three noted that these decisions are not only about mHealth but are also dependent on many other initiatives.

4. **Group four**, facilitated by Allison Annette Foster, worked under the following assumptions: that the mHealth application would not include SMS; that facilities have a system in place to manage the mobile application; that planners and costers have a strong understanding of costing models and that inflation would be 10% per year. Group four based their costing model on a smartphone application that was hosted on its own server and was open source. Finally, they assumed that the scope of the CHWs' practice would be well defined, with good policy oversight, and no need for policy change. For this discussion, group four assumed that the CHWs would primarily be responsible for patient referral and reminders, antenatal care services, and data collection.

Group four discussed additional information that would be needed, including how costs were determined, who would pay for the program, and how health benefits could be quantified to the MoH. They also asked whether higher referral rates by CHWs would lead to more patients receiving treatment and whether mHealth changes patient outcomes and/or quality of care. In addition, the group indicated that more information was needed on data collection methods, coverage, how data will be used, whether or not it is feasible to overlay new technology on the existing systems, whether or not the MoH currently has institutional capacity to oversee the strategy, and how support would be provided at each level of the health system.

Group four identified initial costs as translation of content, local server hosting, integration of a new application with the existing system, initial training, purchase of hardware, software development and adaptation, initial short-term labor for setup, content adaptation, and curriculum development. They identified continuing costs as continuous training, refresher training, or retraining due to attrition; incentives for CHWs; data usage; server maintenance; replacement or repairs of hardware; technical support; and government oversight or management costs. Scale-up considerations include the potential for decreases in the cost of hardware or services; expansion of the package of services offered; an increased need for communication, coordination, management, and oversight with a larger program; and upgrades as technology continues to develop.

5. **Group five**, facilitated by Bobby Jefferson, opened the discussion by sharing ideas of how to determine relevant assumptions and appropriate models to approach the issue. First, cost classification may need to distinguish between one-time costs and ongoing costs. Costs could be different depending on the level of health systems: community, facility, and

tertiary, and federal versus district. Second, in terms of assumptions / model development, they suggested identifying what specific mHealth intervention would be going to scale: data collection, SMS reminders, or both. Depending on the types of mHealth strategies, the methods for costing could be different. In terms of costing, the group also discussed the necessity of a more consistent and systematic approach to cost classification, with transparent inclusion and exclusion criteria.

Group five emphasized the importance of setting a target audience for costing and the consideration of “Who pays?” that is critical for sustainability and ownership of nationwide scale-up of mHealth. Given that the target audience was assumed to be the government of Ghana, the group also discussed potential challenges in valuation of mHealth benefits from the perspective of health systems. While benefits to providers or patients can be measured relatively easily through wages, travel costs, out-of-pocket payments, and other criteria, benefits in overall health systems (e.g., transparency, accountability) could be somewhat difficult to quantify; demonstrating the value could be meaningful evidence to the policymakers’ point of view.

The group raised the issue of potential political barriers due to the substantial investment targeted to CHWs in this project. There might be some competition or resistance from other health sectors, such as formal health professionals/facilities. In this regard, the group discussed the need for creative business models that could lead to a win-win solution among stakeholders. For example, the SMS reminder with conditional cash transfer or other incentive mechanisms could encourage patients to increase service utilization (for example, facility delivery), which in turn could potentially benefit all—CHWs (greater responsiveness), professional health workers (higher revenue), and patients (better health). Group five also encouraged the MoH to consider subsidizing phones for purchase by CHWs or adapting the application to the phones that CHWs have, rather than purchasing new phones for CHWs. Finally, the group noted the importance of considering existing health systems and infrastructure, which could determine how much additional funding would be required to scale up. Further, mHealth could also involve significant institutional change and particular skill sets; costers considering investment should take this aspect into account.

## Closing

Lesley-Anne Long thanked participants for their valuable contributions and invited colleagues to remain engaged with mPowering through similar events, webinars, and other activities throughout the year. She encouraged any participants who were interested in joining a working group to support the Ghana MoH CHW strategy to contact mPowering. Finally, Lesley-Anne thanked Intel, Futures Group, FHI 360, and IntraHealth for their partnership in hosting and coordinating the event.



# Appendix A: mPowering Frontline Health Workers Briefing Document

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mPowering Frontline Health Workers aims to accelerate the use of mobile technology to improve the performance of frontline health workers (FLHWs) around the world.

## OUR VISION

**We exist because millions of women and children don't have access to a trained and skilled FLHW.** Nearly 300,000 women and more than 6 million children die every year. Most of these deaths are in developing countries, and many could have been prevented with simple, affordable interventions from an FLHW.

FLHWs are often the first and only link to health care for millions of families. **Our vision is a trained and skilled FLHW for every woman and child.**

## OUR MISSION

Mobile technology has the potential to improve the performance of FLHWs. Through mobile devices, FLHWs can access training resources, job aids, and support from supervisors, even in remote areas. **Our mission is to contribute to the elimination of preventable child and maternal deaths by accelerating the use of mobile technology to improve the skills and performance of FLHWs.**

## OUR OBJECTIVES

- Partner with governments and organizations to build understanding of the power of mobile technology to strengthen child and maternal health services.
- Support scale-up of effective mobile health technology (mHealth) programs to improve the skills and performance of FLHWs.
- Generate evidence and information on the use of mobile technology by FLHWs to mobilize resources and improve the design of mHealth programs.

## OUR WORK

We advocate for more effective training, supervision, and support for FLHWs and connect them to the resources they need. Our major areas of activity include the following:

- **Content and tools for FLHWs:** Connecting FLHWs to high-quality mobile resources for training, decision support, and health information through the mPowering Content Platform.
- **Country programs:** Supporting mHealth programs for FLHWs through country-based multipartner coalitions.
- **Research and evaluation:** Generating evidence and information on the use of mobile technology by FLHWs to inform strategy and improve program design.
- **Advocacy:** Mobilizing private sector investment to scale up sustainable solutions.

## Appendix B: Agenda

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### mHealth Solutions—What's the Cost?

Workshop June 11, 2014

10:00 a.m.–3:00 p.m.

1776 I Street NW, Washington DC 20006

Has the time come to invest more in mobile health technology (mHealth) solutions for frontline health workers? Can mobile technology solutions address the continuing challenge to end preventable maternal, newborn, and child deaths? What's the cost of mobile learning compared with more traditional classroom learning? What are the arguments for basic versus advanced mobile tools?

Opinions are rarely unanimous. Commonly, there is both excitement when considering smart device potential and wariness of barriers (cost and availability, battery use and ability to recharge, durability and security concerns, limited written and technical user literacy, etc.). Is it possible to deploy smart devices in ways that are highly impactful as well as sustainable from a cost perspective?

This workshop is an opportunity for lively conversation about the cost-effectiveness of mHealth for tackling the world's most pressing health problems. You will hear about existing mHealth costing tools and models and will be able to ask the tough questions about what works and what doesn't, with the opportunity for practical application to real examples.

# Agenda

## Morning

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- 9:30 Refreshments and a light breakfast
- 10:00 Introduction to the day
- 10:15 Presentations:
1. Paul Nelson (USAID) and Shailee Adinolfi (FHI 360/mSTAR)
  2. Kate Tulenko (IntraHealth)
- 10:40 Discussion
- 11:00 Presentations:
3. Allison Annette Foster (IntraHealth)
  4. Colin Gilmartin (MSH) and Sharon Kim (1mCHW Campaign)
- 11:25 Discussion
- 11:40 Presentations:
5. Sharon Kim (1mCHW Campaign)
  6. Bobby Jefferson, Rob Segan (Futures Group) and Mathew Taylor (Intel)
- 12:15 Discussion
- 12:30 Lunch

## Afternoon

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- 1:30 Scene setting for the small group sessions
- 1:40 Small group sessions
- 2:30 Reconvene and present key points from group work
- 2:55 Closing remarks

# Appendix C: Reading List for Workshop Participants

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Key resources are bold.

## General

Healthcare Information for All [discussion forum online]. Available at: <http://www.hifa2015.org/>.

World Health Organization (WHO). *Final Reports of Technical Review of Costing Tools: Commissioned by an Inter-Agency Steering Committee and the Partnership for Maternal, Newborn and Child Health*. 2008. Available at: <http://www.who.int/pmnch/topics/economics/costoolsreviewpack.pdf>.

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Tan-Torres Edejer T, Baltussen R, Adam T, et al., eds. *Making Choices in Health: WHO Guide to Cost-Effectiveness Analysis*. Geneva, Switzerland: WHO; 2003. Available at: [http://www.who.int/choice/publications/p\\_2003\\_generalised\\_cea.pdf](http://www.who.int/choice/publications/p_2003_generalised_cea.pdf).

Baltussen RMPM, Hutubessy RCW, Evans DB, Murray CJL. *Uncertainty in Cost-Effectiveness Analyses: Probabilistic Uncertainty Analysis and Stochastic League Tables*. EIP/GPE/EQC, WHO. GPE Discussion Paper Series, No. 34. Available at: <http://www.who.int/healthinfo/paper34.pdf>.

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## Appendix D: Ghana Case Study

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### Ghana One Million Community Health Workers (1MCHW) Campaign

#### Background

The Ghanaian Ministry of Health (MoH), working with the 1MCHW Campaign, has created a roadmap<sup>3</sup> to build a world-class national community health delivery platform. Community health workers (CHWs), a lower-level cadre of health professionals, will be trained quickly to deliver preventive and curative services at the household level. Bringing basic health services to Ghanaian communities without access to primary health care will strengthen Ghana's overall health system and help lay the foundation for universal health coverage in Ghana.

Input from multiple departments of the MoH, Ghana Health Service, nongovernmental organizations, academia, global funding agencies, and the private sector have helped to create this roadmap. These stakeholders will continue to be involved as implementation planning gets under way.

#### Ghana's CHW Deployment Targets

- Phase 1 (by 2016): 15,157 CHWs
- Phase 2 (by 2019): 27,845 CHWs (100% rural coverage)
- Phase 3 (by 2023): 31,707 CHWs (100% nationwide coverage)

#### Objectives of the Ghana CHW Strategy

1. Bring basic health care services to the doorsteps of rural populations and hard-to-reach areas.
2. Deploy trained CHWs to deliver quality primary health care services in prioritized electoral areas of the country.

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<sup>3</sup> One Million Community Health Workers Campaign. *Government of Ghana: National Community Health Worker (CHW) Program*. 2014. Available at: [http://1millionhealthworkers.org/files/2014/04/GH1mCHW\\_Roadmap\\_2014-04-20\\_Final\\_compressed.pdf](http://1millionhealthworkers.org/files/2014/04/GH1mCHW_Roadmap_2014-04-20_Final_compressed.pdf). Accessed August 6, 2014.

3. Rapidly recruit and train CHWs from the large pool of unemployed high school graduates.
4. Harmonize, strengthen, and scale up various categories of community-based primary health care interventions.
5. Use mobile health information technology to leverage community-based service delivery.

### **Roles and Responsibilities of CHWs**

Each CHW will be expected to spend 80% of his or her time in the community to deliver the services that can be found in Appendix C of the roadmap. CHWs will work closely with community health officers (CHOs) in the field and in the Community-Based Health Planning and Services compounds. The CHWs are expected to pursue a work routine that revolves around household visits. The idea is to bring health services to the clients rather than follow the traditional method of expecting the client to seek out the health care provider. CHWs will make routine home visits with a goal of reaching every household in their catchment at least once every three months. They will hold regular community meetings once every quarter to provide feedback on the health status of the community, under the supervision of their supervisor (a local CHO) and another representative from the Ghana Health Service.

### **Objectives for CHW Mobile Health Technology (mHealth) in Ghana**

1. An mHealth platform for CHWs will enable data collection, performance management, training refreshment, and real-time monitoring of activities. It will enable evaluation of indicators to help inform decision-making for CHOs (the CHW supervisors) and program managers.
2. The information that CHWs collect in a household through an mHealth platform will be verified and validated by CHOs before aggregation into the wider health information system (e.g., District Health Information System 2). This not only allows for integration of mHealth and eHealth systems but also motivates CHWs as contributors to the national system.
3. The data that CHWs record from their activities and services will be processed (verified and validated) to provide a real-time picture of CHW activity and performance, both to hold the CHWs accountable and to guide the overall management and continuous improvement of the program. Data will be reported back to CHWs to guide their day-to-day activities. CHWs will also be given notifications on epidemiological trends based on disease surveillance data and information collected about caseloads at local health facilities.
4. An mHealth platform will also provide CHWs with decision support modules, the capability to receive reminders to make follow-up visits to certain households, and a variety of customizable alerts that can be

associated with case management details such as high-risk and low-risk status.

### Functionalities for CHW mHealth

- Patient registration (including tracking of vital events [e.g., births, deaths, and immunizations]) and end-to-end case management
- Awareness campaigns and treatment adherence messaging
- Decision support and embedded job aids
- Full programmatic monitoring and supervision of the CHWs and CHW managers

The platform itself should function on **either a smart or feature phone** and be fully secured and encrypted along with multilingual support.

The mHealth platform will include support for multimedia job aids including tests, images, audio, and video. It will function fully in an offline mode that allows for asynchronous communication. All data are owned by the MoH but can optionally be supported and managed by third parties, and the system has open data integration points to enable data communication with other systems in both the public and private sector. These applications will comply with the national enterprise architecture for electronic data in health.

Implementing an mHealth-based data collection system will require notable infrastructure upgrades and connectivity at the local level. In addition, significant technical capacity, such as a cloud-based, locally hosted server to handle the data processing and storage, is required for the system to run smoothly.

### Budgeting for mHealth (2014–2016)

The table below contains a summary of Ghana’s 1MCHW Campaign mHealth deployment budget in its first three years. The unit numbers are based upon estimates of staff needed and total number of CHWs with required equipment needs. The total cost for the years 2014–2016 is estimated to be **\$15,036,923**.

Input	Unit cost	2014		2015		2016		2014-2016
		# Units	Cost	# Units	Cost	# Units	Cost	Total
Field engineer	\$12,000	43	\$516,000	43	\$516,000	43	\$516,000	\$1,548,000
Training costs	\$2,000	43	\$86,000	43	\$86,000	43	\$86,000	\$258,000
Equipment	\$150	8,996	\$1,349,400	10,568	\$1,585,200	11,730	\$1,759,500	\$4,694,100
User fee	\$249	4,498	\$1,120,002	9,782	\$2,435,718	15,647	\$3,896,103	\$7,451,823
Developers	\$25,000	2	\$50,000	4	\$100,000	5	\$125,000	\$275,000
mHealth specialists	\$27,000	10	\$270,000	10	\$270,000	10	\$270,000	\$810,000
<b>Total</b>			<b>\$3,391,402</b>		<b>\$4,992,918</b>		<b>\$6,652,603</b>	<b>\$15,036,923</b>

Following are descriptions of the specific values in the table above:

### ***Field Engineer and Training Costs***

Estimated costs of sending field engineers to deploy an mHealth system will be \$12,000 per district in addition to \$2,000 per training in each district. Assuming that all districts will require this investment, and that 43 districts will set up the mHealth system per year, the amount allocated toward Field Engineers and CHW training will total \$602,000 per year or **\$1.8 million** over three years (\$1,548,000 in salaries and \$258,000 in training costs over three years).

### ***Equipment***

Mobile phones and solar chargers will require an initial investment for each CHW for the first three years. The estimated unit cost per mobile phone and solar charger are \$100 and \$50, respectively; over three years, each CHW is expected to use two phones and two solar chargers. In 2014, 8,996 mobile phones and 8,996 solar chargers will be needed, at a cost of \$1,349,400. With additional CHW deployment in 2015 and 2016, mobile phones and solar chargers will cost \$1,585,200 and \$1,759,500. Overall, about **\$4.7 million** will need to be allocated toward mobile phone and solar chargers.

**New CHWs to be added each year:**

- 2014: 4,498
- 2015: 5,284
- 2016: 5,865

### ***mHealth Software User Fee and Annual Data Plan***

mHealth software user fees and annual data plans are estimated to cost \$249 per CHW per year. According to CHW growth projections, the total estimated cost over three years is \$269,343 in software fees and \$7,182,480 in annual data plans, totaling **\$7.5 million**.

### ***Software Developers and mHealth Specialists***

The estimated annual salary of software developers is \$25,000. If a total of five developers will be required through the year 2016 (i.e., two employed in 2014, two additional developers in 2015, and one additional developer in 2016 to accommodate increasing data and users), their salaries over three years

will cost **\$275,000**. The estimated annual salary for an mHealth specialist is \$27,000, and, if one mHealth specialist is allocated to each of the 10 regions, the annual cost for these personnel will total \$270,000. Over three years the cost will total **\$810,000**.

**mP<sup>+</sup>OWERING**  
FRONTLINE HEALTH WORKERS

