

# The mHealth Planning Guide: Key Considerations for Integrating Mobile Technology into Health Programs

## Why mHealth?

Over the past decade, mobile health, or **mHealth**, has emerged as a cutting-edge tool for expanding access to health information and services around the world. mHealth uses mobile and wireless technologies, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and mobile software applications (*apps*), to achieve health objectives.

Why are a growing number of health programs—and even district and national health systems—turning to these technologies to support their efforts? **There are many good reasons to consider using mHealth tools to improve public health.** In fact, there are *billions* of reasons...as in billions of mobile phone users, including some of the poorest people in the world, living in the most difficult settings. Many of these mobile phone users are health workers and their clients who face a range of barriers to accessing health information and services. Sometimes characterized as “underserved” or “marginalized,” there is one way these populations *have* already been reached—by mobile telecommunications carriers.

As mobile networks cover new swaths of the world and reach more people, the cost of mobile phones and airtime is declining. Meanwhile, continual innovation in technology infrastructure means mHealth can reach communities in ways that health services and other communication tools cannot.

As low- and middle-income countries work to meet the health needs of their populations, mHealth can facilitate and support key processes, ranging from patient monitoring to client-centered health information to supply chain management. mHealth also offers unprecedented opportunities for real-time data collection to a degree never before possible in public health.

## Why use this Guide?

*The mHealth Planning Guide* helps individuals and organizations appropriately plan for mHealth deployments. This Guide:

- Provides a thorough **orientation to the mHealth planning process** for anyone looking to learn more about integrating mobile technology into health programs in low- and middle-income countries.
- Outlines **key considerations and resources** for planning an mHealth intervention, from concept development and technology design to preparation for implementation.
- Helps you **build a strong foundation for your mHealth activity**, laying out the many facets of program planning that the mHealth pioneers wish they had known when they were starting out.

Working through the Guide and using the accompanying planning tools will help you **build a solid plan for developing and implementing your mHealth solution**

## Who is this Guide for?

This Guide is intended primarily for global health technical experts, program managers, and staff working to implement mHealth solutions in low-resource settings. The Guide is also useful for donors—see the table below for suggested approaches for different users. **While some parts of this Guide will be more useful to mHealth novices than to experts, much of the information and tools available in this Guide will prove valuable to even the most experienced mHealth program managers and staff.**

For more information, check out two brief use-case studies we have developed to share the stories of mHealth practitioners in [Nepal](#) <sup>[1]</sup> and [India](#) <sup>[2]</sup> who have used the Guide in their work.

In every step the Guide worked as Bible for us. Great support for us. The mHealth Guide has a three step approach for designing mHealth programs. Anyone can work on mHealth Initiatives with the help of this document, which guides you in a step by step process to design the program. -[Khemraj Sherestha, BCC Advisor, Health 4 Life \(H4L\) Nepal](#) <sup>[3]</sup>

## Suggested approaches to using *The mHealth Planning Guide*

Are You...?	You can use this Guide to...
<b>A health program implementer</b>	<ul style="list-style-type: none"> <li>• Make a plan to add an mHealth component to a health activity.</li> <li>• Access guidance on planning for mHealth evaluation, scale-up, or another particular aspect of mHealth.</li> </ul>
<b>A health program manager</b>	<ul style="list-style-type: none"> <li>• Access technical guidance and information on context as you generate and assess ideas for mHealth activities.</li> <li>• Learn about scale and sustainability from the mHealth perspective.</li> <li>• Understand how to best find common ground for national, government, and other in-country partnerships.</li> </ul>
<b>A donor</b>	<ul style="list-style-type: none"> <li>• Evaluate a proposal with an mHealth component.</li> <li>• Develop guidelines for mHealth planning.</li> </ul>

## Contact

We would love to hear from you. If you have an mHealth experience or resource you would like to share, please visit our [feedback form](#) <sup>[4]</sup>.

*The mHealth Planning Guide: Key Considerations for Integrating Mobile Technology into Health Programs* was developed with support from the United States Agency for International Development (USAID). This Guide is the result of collaboration between FHI 360 and the Johns Hopkins University Center for Communication Programs' Knowledge for Health (K4Health) project. Like mobile technology itself, mHealth evidence and best practices are constantly evolving. This Guide is an online publication that will be updated over time to reflect the latest mHealth knowledge and technology trends.

*The mHealth Planning Guide* was informed by a desk review of peer-reviewed publications and white and gray literature as well as more than 20 expert interviews. We would like to extend our heartfelt appreciation to the following mHealth professionals whose expertise helped shape the Guide. (Contributors are listed in alphabetical order.)

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**Related eLearning Courses:**

[mHealth Basics: Introduction to Mobile Technology for Health](#) [6]

## How to Use This Guide

The *mHealth Planning Guide* lays out the three integral—and often concurrent—phases of planning your mHealth initiative. These phases comprise the first three sections of the Guide and are visualized in the figure below.



- **Concept Development** [7]: This phase is focused on **need**. Planners define the problem that the mHealth solution will address; gain a thorough understanding of the context; and determine whether an mHealth solution would be relevant. *This phase is relevant to you if you are just starting your ideation phase and are thinking about using mobile technology in your program.*
- **Solution Design & Testing** [8]: This phase focuses on the **solution** and encompasses key technology decisions, content development and testing, prototyping, and usability testing with end users and target beneficiaries. *This phase is relevant to you if you have a proven concept for your mHealth initiative and are ready to work on technology design and content development.*
- **Planning for Implementation** [9]: The focus of this phase is **process**. Among many planning considerations for implementation are project management, partnership development, preparation for launch, monitoring and evaluation (M&E), scale-up, and sustainability. *These process components are the nuts and bolts of your proposed implementation strategy and need to be considered alongside solution design and testing.*

These three phases are not necessarily linear, chronological steps but rather essential, interconnected components of any mHealth implementation plan. Note that you might not be able to work through the entire Guide in one sitting—this would take at least an entire work day—but we do recommend that you read through the full Guide at least once, if possible, before you start putting ideas to paper.

**Interested to know how the Guide has been used by others?** We have developed two brief use-case studies to share the stories of mHealth practitioners in [Nepal](#) [1] and [India](#) [2] who have read the Guide and applied the information and tools to their work.

**Special Features of the *mHealth Planning Guide***

**mHealth Planning Tools**

As this Guide is intended to help you develop a solid plan for your mHealth activity, we provide four tools to support your planning process. We recommend downloading and printing these tools now so that you have them readily available as you work through the Guide. Click on the image below to download a zip file containing PowerPoint and PDF versions of all of the mHealth Planning Tools in our collection.



[10]

- The **Planning Canvas** (PDF [11], PPT [12]) helps you visualize the essential components to your planning process, with all the topics covered in the Guide represented on one page. The worksheet illustrates how the project components are interconnected pieces of a complete strategy. While your plan will not realistically fit on one page, you can use this template to take notes as you work through the Guide or as a template for a strategy session with a whiteboard.
- The **Key Considerations** are designed to help you think through the critical questions that need to be asked as you design an mHealth solution and plan for implementation. You will notice that there are key considerations listed throughout the Guide. For ease of use, all of these considerations are consolidated into three PDF documents (one for each planning phase covered in the Guide: **Concept Development** [13], **Solution Design & Testing** [14], and **Planning for Implementation** [15]), which you can download and use as checklists or worksheets to guide you through the mHealth planning and development process. The Key Considerations should be used to fill in the Planning Canvas.
- The **Logic Model Template** (PDF [16], PPT [17]), introduced in the **Concept Development** [7] section of the Guide, will help you articulate your program's purpose and link activities to outputs, outcomes, and intended impacts.
- The **Technology Decisions Worksheet** (PDF [18], Word [19]), explained in the **Solution Design & Testing** [8] section of the Guide, will assist you in creating a document that captures your technology requirements. This document will ultimately guide the technology development process, whether you are building it in-house or with outside expertise.

The planning process is iterative in nature and relies on many rounds of incorporating user feedback, developing partnerships, tweaking content, and much more before scale and sustainability can be reached. You can use the Planning Canvas to document major changes and/or breakthroughs in your plan. You will notice that there is a box in the top right hand corner of the worksheet where you can indicate the date and which iteration of the Canvas you are working on.

#### Expert Tips

To add another dimension to the guidance, we highlight tips from mHealth experts in blue font at the bottom of the pages throughout the Guide. To develop the Guide, we interviewed more than 20 mHealth professionals [20] about their experiences, challenges, and successes with mHealth planning and implementation. We share particularly salient testimonies and lessons learned that might shed new light on your own planning process.

#### Resources

The **Resources** [21] section of the Guide is a repository of key mHealth resources for program planners and implementers. Many of these resources come highly recommended by mHealth experts and contain lessons learned from the pioneers of mHealth. While some of the resources are hyperlinked on relevant pages throughout the Guide, the Resources section houses all of the publications and tools available through the Guide in one place for ease of reference and use. Note that this collection of resources does not duplicate useful repositories and databases that already exist elsewhere—but it does provide links to them. On the **Publications** [22] page, you will find a handy **Publications Matrix** [23] to help you select which publications cover the particular planning or implementation topics you are interested in reading about further.

#### Glossary & Acronyms

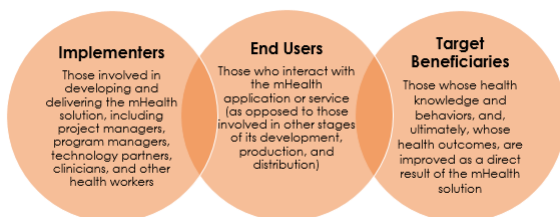
Technology-speak and health-speak can be very different, and there can be a steep learning curve to understand the language if you are new to the mobile technology space. To ease the transition, and to clarify any jargon used throughout the Guide, we have included a **Glossary** [24] with about 50 terms. Glossary items are noted in orange font and hyperlinked throughout the Guide when the word is first used. Note that when you click on a Glossary term, you will be directed outside of your current page to the word's definition on the Glossary page. If you want the Glossary term to open in a different tab, you can right-click on the hyperlink and choose the option "open link in new tab."

An **Acronym** [25] list captures the acronyms used throughout the Guide. Acronyms are not hyperlinked in the Guide, but each is defined when first used on a page.

#### A Note on Terminology

As you read the Guide, you will see the terms **implementers** [24], **end users** [24], and **target beneficiaries** [24] used quite liberally. There are nuances between these terms, as an end user can also be an implementer—for example, if a health program's staff uses an mHealth application to collect program data.

Similarly, a target beneficiary might also be an end user. For example, in an SMS program that shares tips for managing contraceptive side effects with family planning clients, the clients using the SMS service are those whose health outcomes will be improved by the mHealth solution. The diagram below defines the differences and overlaps among these players.



#### More Information

[Why mHealth?](#) [26]

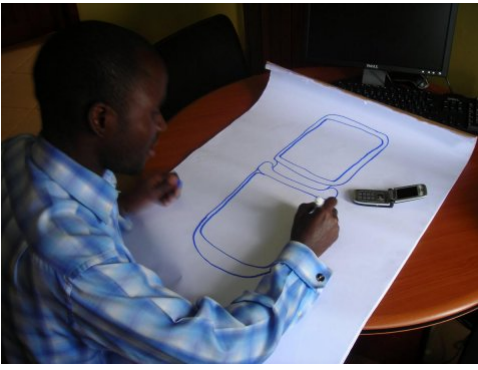
[Why use this Guide?](#) [27]

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## Concept Development

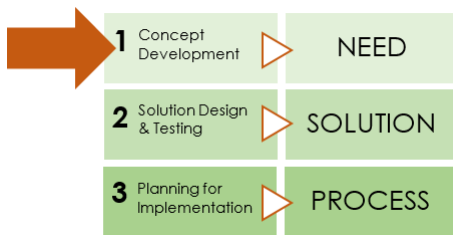


As with any new programmatic effort, **proper planning is essential to a successful mHealth initiative**. In public health, funders, ministries, and **implementers** [24] use a variety of planning processes to link strategic objectives with health outcomes. These processes are also useful for weaving appropriate evidence-based and high impact practices into project design. Adding mHealth to a health program is no different.

The planning steps introduced in this section of the Guide are designed to support implementers exploring the possibility of applying mHealth to a program. Questions like, "What is the problem we are trying to solve?" "Who will be using the solution?" and "How does the intended target population use mobile technology?" begin to shed light on two very important points:

1. mHealth might not be the best or only solution to address the health issue.
2. The target population(s) must be involved from the beginning to validate and contribute to the design of the mHealth concept

**The factors to consider during concept development will help health program planners gain an in-depth understanding of whether there is need for an mHealth solution. Is mHealth an appropriate tool to use to address a given challenge?**



Specifically, this section of the Guide will help you:

- **Learn about mHealth Capability**. [29] *What might mHealth look like within my health effort?*
- **Explore Possible Solution & Desired Results**. [30] *What interventions might help achieve project goals and objectives?*
- Develop a **Logic Model**. [31] *How will the mHealth solution address the health problem and lead to its intended outcomes?*
- Conduct a **Landscape Analysis** [32] to understand more about the mobile industry and mHealth community in your program's intended country of operation, the key players, and what mHealth projects already exist. *In the context of my effort, what do I need to know?*
- Identify and understand your **Target Population** [33], with guidance to conduct **formative research** [24] directly with the intended end users. *What do I need to know about the people who would be involved in this effort—and how do I find that out?*

If you determine that mHealth is the right tool, at the end of the concept development phase you will have a validated mHealth concept that is ready for **Solution Design & Testing**. [38]

If you have an mHealth initial planning or concept development experience or resource you would like to share, please visit our **feedback form** [4].

#### THE EXPERTS SAY...

"In my experience it takes at least 2-3 years for a program to go from concept to reasonable scale. Planning and testing takes a long time, and implementers and donors have to be realistic about when results will start to appear.

For example, MAMA South Africa took about **3 months** to conduct a large stakeholder workshop (with the government, MNOs, NGOs, etc.), define the implementing consortium of partners with associated roles and responsibilities, conduct two literature reviews, define the target audience (including focus groups with users), and landscape likely technology solutions. We needed **1 month** for proposal approval from our funders. We spent **4-5 months** on technology development, content localization and review, acquiring short codes, etc. We launched the beta version of the service about 10 months from the start of planning, and spent **2 months** in user testing. It took an additional **12 months** to formally integrate with an MNO platform and to reach 100,000 users. Two years from planning to fully operational is actually quite fast." - Joanne Peter, Mobile Alliance for Maternal Action

## Getting Started



Imagine you are attending a global health conference, and you go to a session on mHealth, a new topic for you. You understand the idea: More and more people have phones, which has radically changed the way people communicate. For many, the mobile phone has unlocked access to real-time information for the first time. The potential for improving health programs is dizzying: With mobile phones, people can receive reminders to take medications. Providers can refer to job aids to ensure they share correct and current information. A community health worker (CHW) can enter and send visit notes and other data from the field without making the long trip to the city. These examples merely scratch the surface.

You can already envision how mobile phones can add value to the program you are managing. You wonder how to get started. What comes first? How do you know what would work? How is this different from other kinds of programming?

Here are the first two steps, as you sort through these and many more questions:

- **Learn about mHealth Capability** [29]
- **Explore Possible Solutions & Desired Results** [30]

# Learn about mHealth Capability

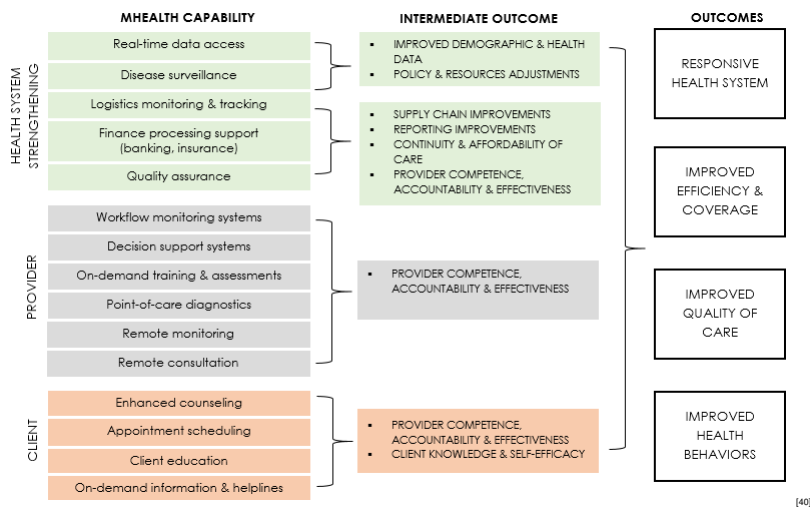


mHealth is capable of strengthening health programs in many ways. mHealth can help health administrators, program managers, and service providers capture, manage, share, store, collect, record, and exchange information. It can link service providers and health efforts to clients through reminders, key messages, referrals, and other kinds of life-changing health knowledge. **In general, mHealth adds value to programs by supporting system, provider, and client processes.** Examples include:

- Health systems strengthening:** Mobile phone use can support data collection and program management tools, making a health system more efficient and effective. Magpi [36] (formerly EpiSurveyor) is a mobile data collection system used in more than 170 countries worldwide. For example, the World Health Organization and Kenyan Health Ministry use Magpi to fight polio [37].
- Provider-centered programs:** Mobile devices can improve provider knowledge and skills by facilitating access to education, training reinforcement, job aids, and peer learning networks. mHealth applications can also support provider supervision, reporting, and quality control efforts. For example, CommCare [38] is a mobile phone-based platform that enables health workers to collect and send health data, manage case work, and access multimedia learning tools wirelessly.
- Client-centered programs:** mHealth services can provide health information and support directly to clients or members of the general public via mobile phones. For example, the Mobile for Reproductive Health (m4RH) [39] program is an opt-in [24] system that provides users with evidence-based information on eight contraceptive methods and offers access to a clinic locator database—all via automated text messages.

Figure 1 builds on this breakdown by giving examples of mHealth capability across the system, provider, and client categories, and aligning each example to proposed health outcomes and impact.

Figure 1. mHealth Capability with Intended Outcomes



Adapted from: Mitchell M, Labrique A. A logic model for mHealth Systems. Personal Communication 2013

Interested in more examples?

- Search through existing mHealth project repositories [41] to learn about how other programs have used mHealth.
- African Strategies for Health published three mHealth Compendiums [42] that collectively feature more than 70 case studies documenting a range of mHealth applications implemented in Africa and elsewhere.
- An article titled mHealth innovations as health system strengthening tools: 12 common applications and a visual framework [43] lays out common mHealth applications used as health systems strengthening innovations across the reproductive health continuum.

## Explore Possible Solutions & Desired Results



[44]

Deciding **whether and how to use mHealth** calls for in-depth understanding of the health issue or challenge that a program will tackle.

**Begin with the end in mind** start by defining your goal and expected outcomes. Next, **consider a range of solutions**—not just those involving mobile phones. It is possible that a low-tech solution is more appropriate to solve the particular issue or that mHealth is just one piece of a larger, more complex solution. Remember that while mHealth is a cutting-edge tool for improving access to health information and services, **mHealth does not replace a health system or a health care provider**

mHealth experts strongly emphasize that **the health problem or challenge must determine the solution** In other words, implementers should not pre-select a technology and then search for a health issue to solve. Ken Banks in *The Truth about Disruptive Innovation* [45] and Kentaro Toyama in *Can Technology End Poverty?* [46] eloquently explain why technology is not an end in itself.

### KEY CONSIDERATIONS

To fully explore the problem at hand and possible solutions, use these guiding steps and questions.

- What is the goal of your effort?
- What is the health issue or challenge to be addressed? What are the root causes or drivers of the challenge?
- What benefits, or results are you seeking to achieve?
- Identify other programs or systems with similar goals. What do these programs do well? What are the gaps?
- Considering the wide range of mHealth possibilities, what might your program benefit from? Is it client-centered, provider-centered, or health systems strengthening?
- What potential solutions might address the issue? Think about ways to improve or complement existing programs. Consider how mHealth could be applied. Create an exhaustive list of possibilities—brainstorming with others is often a valuable way to create such a list.
- Compare and analyze prospective solutions—what seem to be advantages and disadvantages, possible costs, staffing, training, and other “people needs” (this is often underestimated), and what are the challenges to making it happen?

After working through these questions, ask **“Is mHealth the appropriate solution for the problem?”** If yes, continue on to the next section, **Logic Model**. [31]

### THE EXPERTS SAY...

“Among the biggest challenges [in mHealth]: making sure that mobile technology can address the problem to be solved, rather than it just being a solution in search of a problem.” – Nina Frankel, IntraHealth

“[A common pitfall] is when you decide to digitize what is already happening, such as making paper forms electronic. A deeper approach is better. Rather than digitize what’s there, understand the goals of this health service—why does it exist—and approach use of technology with same goals. First, set a high-level goal, and then think about what it looks like to have a technology-enabled service to achieve that same goal. Is it more effective?” – Isaac Holeman, Medic Mobile

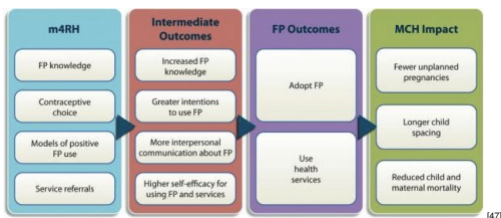
“mHealth amplifies what is there [with regards to how the health system operates]—stronger clinics did better; weaker clinics did not really improve or adopt tools.” – Merrick Schaefer, World Bank (with UNICEF at the time of the interview), Programme Mwana in Zambia

## Logic Model

If you believe mHealth can help your effort succeed, an initial step in the planning process is to **articulate HOW the solution will address the health issue** by developing a **logic model** [24]. A logic model is a depiction of the relationships between the mHealth solution and its intended outcomes and impact.

For example, here is the logic model for the mHealth program, **m4RH** [39].

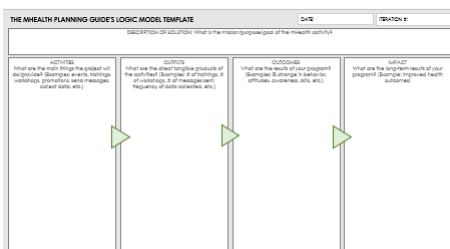
**Figure 2: Logic Model for m4RH** (Source: FHI 360)



[47]

The m4RH messages and clinic locator are designed to lead to intermediate outcomes that influence the use of family planning and health services, ultimately improving key maternal and child health outcomes.

To see additional examples, click these links to download logic models for the **ReMiND Project** [48] and **Programme Mwana** [49]. You will notice that these logic models are structured differently, but they essentially cover the same concepts.



[16] You can download **The mHealth Planning Guide's Logic Model Template** (PDF [16], PPT [17]) to support the development of your own logic model (image at right). The template helps a planner think through the purpose of the project; the general activities that need to take place for implementation; and then the intended outputs, outcomes, and long-term impact. Programs can choose to adapt the logic model template to their organization's standards for project planning and/or to include more granular information.

Additionally, the following tools are available to help you learn how to develop a good logic model for your program:

- **Innovation Network** [50]—a nonprofit evaluation, research, and consulting firm—offers a **Logic Model Workbook** [51], which in addition to detailed guidance, provides a template for building a logic model.
- **True Impact** [52]—a firm that helps organizations maximize and measure the social and business value of their operating practices—has a user-friendly **Logic Model Builder** [53] (available in basic, professional, and enterprise versions), that begins by helping you think through the project goals and ends by helping you design the performance metrics.

## Landscape Analysis



At this point in the process, you have determined that, in concept, mHealth is relevant to help reach your desired results. The next question is, “Will this work in the intended location?” Your mHealth solution must work within the reality of your program’s setting. An mHealth solution that works in one place might not work in another—even if those two places are in the same country. To answer this question, you will need to complete a **landscape analysis** [24] along two dimensions:

1. Explore key considerations about the **mobile technology landscape** [55] where your effort would take place; and
2. Explore key considerations about the existing **mHealth landscape** [56] and efforts already taking place in your program setting.

To get started, learn about and meet with key stakeholders within the ecosystem in which the mHealth innovation will operate. Networking—with stakeholders, local officials, technology providers, implementing partners, and community organizations—is an effective tactic for learning from others’ experience, generating interest and ideas, and creating opportunities for collaboration.

Other sources of information include **online forums and listservs** [57], such as those offered through the mHealth Working Group, Vital Wave Consulting, GSM Association (GSMA), and mHealthinfo.org. Many of these groups post useful resources on their websites that could potentially inform a project’s landscape analysis. For example, the GSMA published a 2013 report titled **Scaling Mobile for Development: A Developing World Opportunity** [58] that provides insights to facilitate mHealth service delivery in low- and middle-income countries. In 2013-2014, GSMA started to publish a series of country feasibility reports (**Malawi 2014** [59], **Nigeria 2014** [60], and **South Africa 2013** [61]). They plan to publish similar reports for mHealth in Cote D’Ivoire, Ghana, Kenya, Mozambique, Rwanda, Tanzania, Uganda, and Zambia.

### THE EXPERTS SAY...

“It is important to coordinate between projects. We come across health workers who are involved in several mHealth projects and, as a result, have several phones. If implementing partners were coordinating with each other in this case, they could have ensured that resources were not wasted on buying multiple phones for each health worker.” - Jeanne Koepsell, Save the Children

“Connectivity can be spotty, and even with good coverage, connectivity will fluctuate. This becomes an issue for mHealth programs that are designed to collect and transmit data over the cellular network. Sometimes it doesn’t work well. We had to create a Plan B: store the data in the device or on a laptop, then transmit it when there is a connection.” - Berhane Gebru, Uganda Health Information Network; Mozambique Health Information Network; Mobile Health Information System (South Africa)

## Mobile Technology Landscape

### KEY CONSIDERATIONS

*Note: To conduct this research, refer to information made available through the GSMA [62] and your country’s telecom regulatory authority, in addition to other sources.*

- What is the mobile phone **market penetration** [24] in the country/region? Break this down by urban/rural, male/female, basic phone/smartphone, and carrier/platform use. How is this projected to change over time?
- Who are the key players in the mobile industry, including **mobile network operators** [24] (MNOs) and telecoms, **aggregators** [24], handset manufacturers, and others? Who are the market leaders and why?
- What are the current mobile market trends and drivers (for example, **short messaging service** [24] (SMS), **big data** [24], Internet)?
- Explore current mobile industry regulations, policies, and upcoming changes. Do any pose a challenge or advantage to the proposed mHealth solution?
- What is the average monthly mobile phone expense for the proposed target population? What is the average total cost of mobile phone ownership for an individual, and is it decreasing, increasing, or staying the same? What telecom market advances are driving the cost structure for users (for example, network coverage by the MNOs)?
- What are typical **use cases** [24]? How do customers use mobile phone services?

## mHealth Landscape

### KEY CONSIDERATIONS

- Are there similar or complementary mHealth solutions that exist, either in your country or elsewhere? What mHealth solutions already exist in the country, particularly in the geographic location you would like to target? (To find out this information, refer to **Project Repositories** [41], connect with others on **mHealth Listservs** [57], and search through **Publications** [22] for case studies.)
  - How might you adopt or adapt what has already been done?
  - What applicable technological platforms or **open source** [24] tools are available? What, if anything, will need to be developed from the ground up?
- What is the local technological capacity to support the development, maintenance, and potential growth of the mHealth project? What technology partners (for example, reputable consultants or technology companies) are in the country, and what are their strengths and weaknesses?
- What are the national policies regarding mHealth, if any, where the solution will be implemented? Are there current discussions underway to develop a national plan?
  - How might existing or developing policies present challenges or advantages to the project?
  - If the government is planning for **interoperability** [24] of systems, explore its system specifications and considerations for integration. (You might need a technology expert to help with this.)

- Who are the players in the mHealth space [project implementers, non-governmental organizations (NGOs), technology partners, MNOs, ministry of health (MOH) officials, policy makers, funders]? Whose support or buy-in would be helpful to you? (**Partnership development** <sup>[63]</sup> is covered in greater detail later in this Guide.)

## Target Population



<sup>[64]</sup>By now, you have realistically linked the potential of mHealth to your **Desired Results** <sup>[31]</sup>, and started to conduct a **Landscape Analysis** <sup>[32]</sup> to learn how mHealth might be applied within the actual setting. Next up: defining the target population. **Too often, mHealth efforts fail because the designers did not really understand the people who would actually use the tool or service.**

**Working with members of the target audience from the beginning will validate the mHealth concept's viability.** End users <sup>[24]</sup> must be involved throughout the planning and design process to ensure the mHealth solution is appropriate and usable for the intended purpose. Ideally, the concept is generated by members of the target population; whether or not that is the reality, the questions outlined in this section will help you conduct formative research and determine whether the concept is worth pursuing. The following steps will help you see your prospective effort through the eyes of your target audience(s).

### KEY CONSIDERATIONS

- **Define the Target Audience** <sup>[65]</sup>
- **Explore Technology Access & Mobile Use of Target Audience** <sup>[66]</sup>
- **Conduct Formative Research with Members of the Target Audience** <sup>[67]</sup>

Once you work through the key considerations, you will have a clear sense whether your program's mHealth concept is an appropriate solution for the intended end user and whether you should pursue next steps in developing the solution. If you have a complete logic model and strong evidence to support need and demand for the mHealth solution, then you have a validated mHealth concept, and you are ready to continue forward with **Solution Design & Testing**. <sup>[8]</sup>

### THE EXPERTS SAY...

"Involving end users in the concept design is a best practice. When developing a product, you want to make sure it's relevant, useful, and that users will get some benefit from using it, otherwise they won't use it." – James BonTempo, CCP (with Jhpiego at the time of the interview)

"[MedicMobile is] a strong supporter and user of human-centered design, which is an approach to making sense of the human element in innovation projects. It starts with an ethnographic perspective, seeing circumstances through the user's eyes. We then have structured steps at each stage of the design process. First, you start talking to users about an idea you have, for example during in-depth interviews or while shadowing them at work. When you have a sketch or prototype which describes your proposed program, go back to users and ask them about it again. You do this in multiple iterations. The idea is to create a feedback loop that will improve your project in cycle after cycle." – Isaac Holeman, Medic Mobile

## Define the Target Audience

### KEY CONSIDERATIONS

- Describe the prospective target audience. Who, specifically, are the end users of the proposed mHealth program? This might be community workers, health facility staff, specific segments of the general public (rural mothers of young children, low-income indigenous youth), or data collectors.
- How will the end users benefit from the mHealth program? What gap in health information, services, skills or systems is the target audience experiencing that the mHealth solution might realistically fill?

## Explore Technology Access & Mobile Use of Target Audience

Next, explore the ways in which the identified target audience interacts with technology, and more specifically, uses mobile devices. Who has phones? Who controls them? How do they use them? The answers to the questions below can be found by observing and asking the target audience directly. Secondary sources of information, such as reports published by implementing partners, research groups, or mHealth convening organizations, might uncover in-depth insights about the target population's mobile phone use.

### KEY CONSIDERATIONS

- Describe the current technological access and practices of the end users. What is the level of technology knowledge and use? Will the proposed mHealth solution present a steep learning curve?
- Explore the following dimensions of the target population's mobile phone use and how each affects the usability of the proposed mHealth solution:
  - Generally, do individuals in the target population currently own mobile phones or share phones with others? What, if any, is the difference between men and women with regards to ownership or shared phones?
  - What kind of phones are members of the target population using (for example, a basic phone or a smart phone)?
  - Who pays for the phone? Who pays for the airtime? Do costs affect their use choices and patterns--for example, SMS vs. voice, carrying a balance, "call me" systems?
  - How long do people generally have the same mobile phone number? If they use subscriber identity module (SIM) cards, how many do they own, and how often do they switch between numbers?
  - How do people recharge their devices? If users do not have a reliable electricity source, how long do they go without recharging their phones?
  - Where do end users currently use mobile phones (for example, in their own homes or in public)?
  - How comfortable is the end user with using a mobile phone (which may also be referred to as **mobile literacy** <sup>[24]</sup>)? Describe how the target audience uses the mobile phone (for example, voice, SMS, to access Internet)—and their level of comfort with each of these functions? How does literacy impact mobile phone use for this population (for example, do low-literate mobile phone users rely on a literate neighbor to read SMS)?
  - How do gender norms impact mobile phone use? For example, how are women perceived in the society if they own or use a mobile phone? Are women allowed to use the phone outside of the home?

## Conduct Formative Research with Members of the Target Audiences

In focus groups and one-on-one interviews, it is possible to gain an understanding of the target audience's mobile phone use and their preliminary reaction to the mHealth concept your program would like to develop. Further explore the questions about **Technology Access & Mobile Use** <sup>[66]</sup> with members of the target audience, and observe how they interact with their mobile devices to validate assumptions or prior research.



The following are topics to explore when interviewing the intended end user:

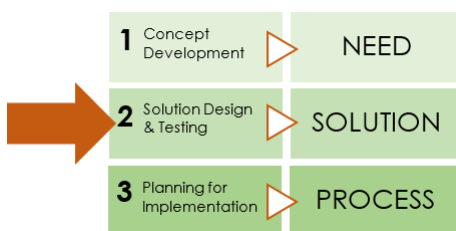
- Current perception of health issue: perceived challenges and opportunities as well as a possible range of solutions
- Current technology knowledge, adoption, and use, and barriers to further uptake
- Mobile phone ownership and costs associated with ownership
- Associations and experiences with the mobile phone (for example, how does owning a mobile phone change your life?)
- Mobile phone literacy and usage profile
- If applicable: cultural and gender dynamics around the [health issue](#) (for example, is the husband the authority on the couple's family planning use?) and/or [mobile phone use](#) (for example, it might be culturally inappropriate for a female to use a mobile phone outside of the home). A [literature review](#) <sup>[68]</sup> published in the *Journal for Equity in Health* explores the impact of mHealth interventions on gender relations, providing insights about which issues might arise and where more research is needed. GSMA mWomen published a [brief](#) <sup>[69]</sup> that provides a case example on the importance of including men in mHealth programs targeted to women.
- Reaction to mHealth solution: explore feasibility and acceptability, demonstrate product if possible, and observe usability (for example, if applicable, test example messaging).
- If applicable, probe about willingness/ability to pay for mobile services.

The interview should be exploratory, applying principles of [human-centered design](#) <sup>[24]</sup>. Human-centered design is based on the fundamental belief that gaining an in-depth understanding of the needs, hopes, and aspirations of the potential end users, the lives they live, and the environment they come from, will support the generation of more effective solutions. To learn more about the human-centered design process, refer to the online course, [Human-Centered Design for Social Innovation](#) <sup>[70]</sup>, launched in 2013 by Acumen and IDEO.org (note: to access the course, you will need to set up an account).

For sample questionnaires for use in interviews with target audience members, please refer to [GSMA's mWomen Research Toolkit](#) <sup>[71]</sup>. The toolkit provides in-depth questions to explore gender dynamics and mobile phone use.

## Solution Design & Testing

So far, you have developed a strong sense of the mobile technology environment and mHealth context within which your program will operate. Your target population research helped you understand how your audience interacts with mobile technology. You know how you want to use mHealth to complement a health program, and have pinpointed the intended outcomes of the mHealth intervention. With the [Concept Development](#) <sup>[7]</sup> phase complete, you are now ready to develop and test your mHealth [solution](#), which is the focus of this section of the *Health Planning Guide*.



Next, you will:

- Spell out your mHealth solution's specific technology requirements and make key [Technology Decisions](#) <sup>[72]</sup>.
- Undergo [Content Development & Testing](#) <sup>[73]</sup> for the mHealth solution, which includes testing the content with prospective end users to assess comprehension and adapting the content as needed.
- Advance the solution design process through [Prototyping & Usability Testing](#) <sup>[74]</sup>, which involves building a prototype of your mHealth technology, testing its usability with end users, and incorporating changes as needed.



At the end of this phase, you will have either a confirmed proof-of-concept [OR](#) clear evidence that the solution will not yield the intended results in its current form. If the former, you have a green light to continue with technology development, and to plan for roll-out and implementation. If the latter, you will need to decide whether to continue solution development and testing, so as to further adapt and validate the concept.

If you have an mHealth solution development and testing experience or resource you would like to share, please visit our [feedback form](#) <sup>[4]</sup>.

### THE EXPERTS SAY...

"In my experience it takes at least 2-3 years for a program to go from concept to reasonable scale. Planning and testing takes a long time, and implementers and donors have to be realistic about when results will start to appear.

For example, MAMA South Africa took about **3 months** to conduct a large stakeholder workshop (with the government, MNOs, NGOs, etc.), define the implementing consortium of partners with associated roles and responsibilities, conduct two literature reviews, define the target audience (including focus groups with users), and landscape likely technology solutions. We needed **1 month** for proposal approval from our funders. We spent **4-5 months** on technology development, content localization and review, acquiring short codes, etc. We launched the beta version of the service about 10 months from the start of planning, and spent **2 months** in user testing. It took an additional **12 months** to formally integrate with an MNO platform and to reach 100,000 users. Two years from planning to fully operational is actually quite fast." - Joanne Peter, Mobile Alliance for Maternal Action

## Technology Decisions

CASE STUDY: SCOPING TECHNOLOGY DECISIONS

How have other organizations approached making technology decisions? In the webinar *mHealth for Logistics: Solving Data Challenges through Mobile Technology*, John Snow, Inc. (JSI) walks through four technologies that can be applied to logistics issues in health programs: (1) mobile forms, (2) basic SMS, (3) a customizable generic platform; and (4) a build-from-scratch system. The advantages and limitations of each technology is discussed, along with associated costs, data analysis features, and data security. This case study provides an example of how to compare technology options. Click on this box to view the presentation and access the webinar recording.

<sup>[76]</sup>You are now ready to scope out the technology specifications of your mHealth solution. If you are a typical health program implementer, this might be uncharted territory. However, you do not have to become a technology expert to describe what you need. Learning a few basics—as outlined in Table 1 below—will help you make key project decisions and articulate your technology needs.

Table 1 includes an exhaustive list of considerations; you are not expected to know all of the answers as you work through each topic. **There is no scripted path, and the decisions made depend entirely on the intended functionality of the technology and the environment in which it will operate.**

We recommend that you **create a document that captures your technology requirements**. This document will ultimately guide the technology development process, whether you are building it in-house or with outside expertise. A helpful exercise is to write down everything that you “wish” the technology could do, and then go back and identify which functionalities are “must have” versus “nice to have” and “not needed.” The Guide’s **Technology Decisions Worksheet (PDF)** <sup>[148]</sup>, **Word** <sup>[149]</sup> will help you complete this task.

Your program’s **capacity needs** and budget for **technology costs** will serve as important reality checks as to the feasibility of delivering on your proposed technology requirements. These topics warrant additional consideration, the guidance for which is available on these pages:

- **Capacity Needs** <sup>[77]</sup>
- **Technology Costs** <sup>[78]</sup>

We encourage you to connect with the collaborative mHealth community of health program staff and technologists—both in your country and globally—to help you navigate your range of options and to understand the terminology (see the Resources Section for more information on these existing **Networks** <sup>[57]</sup> and **Communities of Practice** <sup>[57]</sup>). Also consult with your internal information technology (IT) team, if you have one; if not, an outside consultant can provide valuable support.

Additionally, the **Planning an Information System: A Toolkit for Public Health Managers** <sup>[79]</sup>, developed by WHO and PATH, is a valuable reference guide to supplement the advice provided in Table 1 below. While the focus of the toolkit is on information systems, much of the guidance is transferable to mHealth programs.

**Table 1. Key topics and considerations for developing a comprehensive scope for your technology needs**

TOPICS	KEY CONSIDERATIONS
Core Functionality	<p>Describe the core functions that the technology needs to perform, focusing on the experience of the end user.</p> <ul style="list-style-type: none"> <li>• Describe the user journey, from beginning to end. What is the user expected to do? What is the technology expected to do?</li> <li>• What communication format will be used (for example, short message service (SMS), <a href="#">multimedia messaging service</a> <sup>[24]</sup> (MMS), <a href="#">interactive voice response</a> <sup>[24]</sup> (IVR), video, voice, survey, forms, web, <a href="#">general packet radio service</a> <sup>[24]</sup> (GPRS)? Confirm that the format aligns with your formative research results, and is practical given the context of the program setting.</li> <li>• How will the user access the program? For example, does the user have to opt in to use the service, is it pre-loaded on the mobile device, or does it need to be downloaded?</li> <li>• Will the application involve one-way communication or two-way interaction between the program and the end user?</li> <li>• How often does the mHealth program interact with the user, and vice versa (daily, weekly, or monthly)?</li> <li>• In which languages will the program be available?</li> <li>• If a user wishes to discontinue the program, how will the user disable the application?</li> <li>• What will a user do if he or she needs help? Will there be a customer service line or a point person to help with questions?</li> </ul>

TOPICS	KEY CONSIDERATIONS
<b>Data Analytics <sup>[24]</sup>, Storage, &amp; Availability</b>	<p>Mobile platforms have the capability to collect and store data, often in real time, which is unprecedented data functionality for the public health field. When designing an mHealth program, one must think through the data needs of the program and further understand if and how a mobile platform could collect that information. Some key considerations include:</p> <ul style="list-style-type: none"> <li>• What are the <b>key performance indicators</b> <sup>[24]</sup> for the project, and how will the program measure success? How can user data be used to report on the key performance indicators? Refer to the <b>Logic Model</b> <sup>[31]</sup> and <b>Data Collection, Monitoring &amp; Evaluation</b> <sup>[80]</sup> pages for more information.</li> <li>• What are the standard reports that you want the program to generate?</li> <li>• At what interval does data need to be available (real time, weekly, monthly), and to whom? Consider how will the data be transmitted, and whether there needs to be a back-up plan.</li> <li>• How will data be stored and accessed? What are the <b>hosting</b> <sup>[24]</sup> options? Consider whether web-enabled databases are appropriate (for example, with data sets available to researchers via a login).</li> <li>• What volume of records will need to be stored? How will data be backed up?</li> <li>• In what format will the data be available? Consider a format that facilitates analysis, and consult with researchers if necessary to determine the appropriate format.</li> <li>• Will the program need a <b>data dashboard</b> <sup>[24]</sup>? If so, who is the audience, and what are the specifications?</li> <li>• How will data needs change over time, especially if the program is intended to reach significant scale?</li> <li>• Who owns the data generated by the mobile application?</li> <li>• How will the data be managed? Who will be responsible for managing the data? Refer to <b>Project Management</b> <sup>[81]</sup> for more information.</li> </ul>
<b>Security, Hosting, &amp; Privacy</b>	<p>Data—especially health information about patients—must be handled with care to protect human rights and personal safety. Data security, hosting, and privacy are serious issues to grapple with. Consider how to find and maintain robust and secure hosting. Patient privacy laws vary by country and will likely affect your data collection plans and systems. To understand mHealth privacy and legal issues, get in touch with mHealth experts who can help (see <b>Networks</b> <sup>[57]</sup> under Resources). For more guidance, refer to the mHealth Alliance’s June 2013 report titled, <b><i>Patient Privacy in a Mobile World: A Framework to Address Privacy Law Issues in Mobile Health</i></b> <sup>[82]</sup>.</p>

TOPICS	KEY CONSIDERATIONS
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**Mobile Delivery Platform**

A service delivery platform is a set of components that enable a service to be deployed and integrated with the mobile telecommunications network. Essentially, it is what allows a service to operate. Based on your technology requirements, you will need to identify which platform best suits your technology needs and organizational capacity. Note that there are existing platforms available, such as [CommCare](#) [38], [DataDyne](#) [36], [DataWinners](#) [63], [FrontlineSMS](#) [84], and [RapidSMS](#) [85]. Some are open source downloads which may or may not require programming to fit your needs; others are online services with limited customization capabilities. After reviewing available solutions, you might determine that you need a customized platform to be built to meet your specific requirements. Example exploratory questions include:

- What existing open source tools can be used, if any? Consider the pros and cons of each option, mapping your technology requirements to the capabilities of the platforms. Also understand the programming needs, the level of ongoing support available for each option, and the costs.
- Identify how the technology will be enabled in the mobile telecom environment. Will it work across different mobile network operators (MNOs)? What partnerships need to be developed to activate the service (for example, partnerships with aggregators, MNOs, [mobile gateway providers](#) [24])?
- Consider how the platform will be able to adapt to changes and advances in technology.
- Based on the platform, will the project need new or additional computers or a [server](#) [24] to run the program?
- Consider issues around interoperability and licensing. Both topics are addressed in more detail below.

MODEL	BENEFITS	RISKS
<b>Custom-developed software</b> Examples: Project Optimus (democratic process) in Africa, Colombia, Senegal, and Vietnam.	<ul style="list-style-type: none"> <li>• No time constraint on technology, functionality, and design.</li> <li>• The development experience creates ownership and program sustainability.</li> <li>• It is possible to engage the local IT industry.</li> </ul>	<ul style="list-style-type: none"> <li>• Custom development tends to be difficult to manage within time and budget.</li> <li>• Custom user design does not guarantee satisfaction with the end product, as that depends on the capabilities of the local talent.</li> <li>• Program support depends on the continued availability of individuals.</li> </ul>
<b>Commercial off-the-shelf software</b> Examples: Logix for Strategic Resource Planning, which is used in many countries in the sub-Saharan Africa for essential medicines.	<ul style="list-style-type: none"> <li>• The lead time from selection to implementation is normally shorter.</li> <li>• You can evaluate it before buying.</li> <li>• The product is maintained and supported (if at all).</li> <li>• It has normally been tested and refined in other implementations.</li> </ul>	<ul style="list-style-type: none"> <li>• Often expensive and sold with unclear and complex the structures, for example, a long-term price increase.</li> <li>• Commercial off-the-shelf software is not often designed for implementation in low-resource settings.</li> </ul>
<b>Free packaged software</b> Examples: OpenMalaria (OpenM, Inc.); • Papyrus • Supply Chain Manager World Health Organization: • Vaccination Campaigns Tools Management tool • Child Health Watch Management tool	<ul style="list-style-type: none"> <li>• Shorter lead time.</li> <li>• Available to non-profits.</li> <li>• No software cost (but maintenance or customization if they require investments).</li> </ul>	<ul style="list-style-type: none"> <li>• There is often no contract, to ensure and maintain the long-term depends on goodwill of one or two individuals and there is no institutional support.</li> <li>• Heavy implementation and training costs are hidden.</li> </ul>
<b>Open-source software</b> Examples: OpenMalaria.org OpenMalaria.org OpenMalaria.org OpenMalaria.org	<ul style="list-style-type: none"> <li>• No time constraint on technology, functionality, and design.</li> <li>• You can engage the local IT industry.</li> <li>• Health team participation and share development costs with other organizations.</li> </ul>	<ul style="list-style-type: none"> <li>• Can end up with a poorly supported product.</li> <li>• A locally led community might not be able to provide the business sustainability you want.</li> <li>• Some of the implementation and training costs are hidden.</li> </ul>
<b>Software as a service (SaaS)</b> Examples: LogixPro Hinge	<ul style="list-style-type: none"> <li>• Highly flexible to implement and maintain.</li> <li>• Clearly show the cost to implement and use a SaaS application.</li> <li>• Investment in support software can result in shared among customers.</li> </ul>	<ul style="list-style-type: none"> <li>• Data hosted on remote servers not always in agreement with national policy.</li> <li>• Migration of health data not often well positioned to pay a regular service fee.</li> </ul>

[88] Table 4.1 of the *Planning an Information Systems Project: A Toolkit for Public Health Managers* [88] provides a detailed breakdown of the benefits and risks of working with different software [24] models. (Copyright © 2013 World Health Organization (WHO), Program for Appropriate Technology in Health (PATH). All rights reserved.)

Some of the questions listed here were also addressed in the [Landscape Analysis](#) [32].

**Monitoring & Maintenance**

How will the technology be monitored and maintained over time? What kind of capacity will keep technology functioning as expected, and systems updated appropriately? (See [Capacity Needs](#) [77], as well as the [Project Management](#) [81] and [Partnership Development](#) [63] pages).

TOPICS	KEY CONSIDERATIONS
<b>User Considerations—Hardware <sup>[24]</sup>, Equipment, &amp; Power, and Connectivity Needs</b>	<p>In addition to getting an effective platform in place, you will need to think through other elements that affect the user’s ability to use the technology reliably and consistently. These considerations include hardware, connectivity, and power needs. For example:</p> <ul style="list-style-type: none"> <li>• Will the project purchase phones for the end users? How much lead time is needed to order the phones? Where will the phones be stored before they are handed out? Will the phones need to be charged before they are distributed, and if so, how will this happen? If you have bulk inventory, do you need to purchase charging hardware?</li> <li>• Do the end users have access to electricity to recharge their phones? If not, will the program provide access to charging stations? If solar chargers are used, will that conflict with the time when they need to be used?</li> <li>• Will network service be available consistently in the local environment of the end user? How fast is the network?</li> <li>• Will end users need training on the phones? What time and resources will be needed for end user training?</li> <li>• What other hardware does the program need to operate? Think about modems, subscriber identity module (SIM) cards, access to Internet, and more.</li> <li>• Consider whether a maintenance plan for the mobile devices used for the project is needed. How will broken phones be fixed or replaced?</li> <li>• Consider developing a policy for lost or misplaced phones. For example, would the user have to pay for the replacement?</li> </ul> <p>These considerations should be informed by findings from the <b>Landscape Analysis</b> <sup>[32]</sup> and interviews with the <b>Target Population</b> <sup>[33]</sup>.</p>
<b>Enabling Environment <sup>[24]</sup>—Telecom Regulations, National Policies, &amp; Interoperability</b>	<p>When developing the technology scope, reconsider questions asked during the <b>Landscape Analysis</b> <sup>[32]</sup> to ensure that you staying current. The technology environment can shift in a matter of weeks or months. Refer to publications by your country’s telecom regulatory authority, and gather insights from industry insiders by researching for new article and publications, and subscribing to and connecting to others on listservs. Also, speak with ministry officials and the members of the mHealth community. Some considerations include:</p> <ul style="list-style-type: none"> <li>• Explore current mobile industry regulations, policies, and upcoming changes. Do any pose a challenge or advantage to the proposed mHealth solution?</li> <li>• What are the national policies regarding mHealth, if any, where the solution will be implemented? Are there discussions underway to develop a national mHealth plan, if there is not one? <ul style="list-style-type: none"> <li>◦ How might existing or developing policies present challenges or advantages to the project?</li> <li>◦ If the government is planning for or has established interoperability of systems, explore their system specifications and considerations for integration.</li> </ul> </li> <li>• Are there relevant national policies or regulations regarding the collection, use, and storage of patient health data? If so, is this work in compliance?</li> <li>• Will the solution need to link to an existing health management information system (HMIS), and what do you need to know to make that happen? How will the mHealth solution work with existing technology and infrastructure in the country of operation? Is it a possibility that it may need to link to these kinds of systems in the future?</li> </ul> <p>Key resources to consult include the mHealth Alliance’s report <b><i>The State of Standards and Interoperability for mHealth among Low- and Middle-Income Countries</i></b> <sup>[87]</sup> and the World Health Organization’s resource <b><i>National eHealth Strategy Toolkit</i></b> <sup>[88]</sup>.</p>
<b>Scalability</b>	<p>Most likely, your mHealth technology will be created or customized to handle a particular volume of users at the outset of your project, with the intention that the technology will be built out further as the user volume increases. The way the technology is originally set up can have major implications for scalability.</p> <ul style="list-style-type: none"> <li>• What volume of users is expected in the short and long term?</li> <li>• What is the expected volume of message or information transmission over time?</li> <li>• Where may the program be scaled over time?</li> </ul> <p>Ensure that the mobile delivery platform can operate at scale or can be adapted to do so. Refer to <b>Scale-up</b> <sup>[89]</sup> for more information regarding scale up processes.</p>

TOPICS	KEY CONSIDERATIONS
Sustainability	<p>Sustainability—how the program will be financed to operate over time—deserves consideration during the design phase. Often mHealth programs stall after a <a href="#">pilot</a> phase because financial resources cannot be secured. Consider:</p> <ul style="list-style-type: none"> <li>• What is the financial plan for sustaining operations of the mHealth solution over time?</li> <li>• What donors are funding mHealth deployments? What are their funding levels? What are their application requirements and funding cycles?</li> <li>• If you plan to integrate advertising or mobile payments into the solution, what are the technology implications to consider during the design phase?</li> </ul> <p>Visit the <a href="#">Sustainability</a> page of the Guide for more information on this topic.</p>
Licensing	<p>Software licensing models exist to establish who owns the software, who has the right to modify the software, and the fees associated with using the software (for example, per installation or per license).</p> <p>Open source software is a favorable model in the mHealth community. Open source software allows programmers to change and adapt software without needing the permission of the original software developers. Over time, the software evolves and improves as a result of collaborative work among multiple parties.</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• If you develop new software, how will you license your software?</li> <li>• If you are using existing software, what is that software's licensing model? What impacts will this model have on your ability to adapt the code and sustain operations in the future?</li> </ul>

#### THE EXPERTS SAY...

"Keep it simple. Cut out the bells and whistles and design the system as if you were going to scale up tomorrow." – Marasi Mwencha, John Snow, Inc.

"[Costing] depends on type of project. In India, texting is more expensive than the Internet. In other places, it might be the other way around—this matters." – Jeremy Wacksman, Dimagi

"Voice requires a lot of bandwidth and processing power. Relying on thousands of phone calls a minute to reach scale for a voice-based project is a huge technical [software/hardware] challenge. You may need 100 servers rather than 10 – where will you put them and who will monitor and service these?" – James BonTempo, CCP (with Jhpiego at the time of the interview)

#### Reference

[mHealth Implementation Opportunities, Issues and Challenges](#) [91]. Affiliate session at the mHealth Summit. 2012 Dec 5. Washington, D.C.

## Capacity Needs

### Should you develop the mHealth solution in-house—or find a technology firm or expert to help?

When it comes to mHealth technology design and development, some organizations choose to work with an external technology partner while others are able to handle development in-house. Consider these points when making your decision.

- *If developing the technology internally*—Some organizations decide to invest time and resources to develop the staff capacity to develop and deploy mHealth solutions. Often an organization sees this investment as a strategic opportunity to expand on its core competencies. If your organization needs to strengthen its technology capacity, some options include: hiring staff with appropriate technology experience, funding professional development for current staff, or hiring a short-term consultant to train existing staff.
- *If working with local developers*—Technology capacity varies by country. You might be able to find a small team of local developers willing to take on the work for a reasonable price, but ensure that they can comply with your scalability and interoperability specifications.
- *If working with a global technology partner*—Some technology partners have a multi-country presence, which is appealing for projects that are intended to expand to multiple countries.

A common way to solicit possible vendors is through **competitive bidding process**, through which your organization would develop and post a request for proposals (RFP). Tech Soup provides [detailed guidance on the RFP process](#) [92], including sample RFPs and tips on vendor management.

## Technology Costs

While planning the design of the technology, be aware of the wide range of costs associated with developing, deploying, and maintaining an mHealth solution. Some are one-time costs, while others must be budgeted annually (or at other regular intervals). This list covers the key costs only (research and implementation cost considerations are noted elsewhere):

- *Programming costs*—staff time (for technical input and training,), developer time
- *Hardware*—phones, servers, computers, electric chargers, solar chargers
- *Deployment costs*—renting a [short code](#) [24] or [virtual number](#) [24], hosting, web access
- *Service costs*—cost of sending messages, transmitting data; ongoing monitoring and maintenance (planned to meet the evolving scale of your program)

How have other programs estimated and tracked their technology costs? Here are two examples:

- **Total Cost of Ownership for CommCare** [93]: This is a Total Cost of Ownership Model tool that Dimagi created to help organizations estimate the total cost of adopting CommCare or other mobile technologies for their community health workers. This planning tool provides a budget for adopting CommCare over five years.
- **m4RH Cost Considerations** [94]: The cost of operating m4RH or a system like it will vary depending on the context. This one-pager explains the costing considerations for m4RH.

# Content Development & Testing



As you explore technology and design choices for your mHealth solution, you can also develop and test content. **Insights from [formative research](#) <sup>[33]</sup> can directly inform content development.** For example, interviews with prospective end users provide an understanding of:

- how they interact with their mobile phones;
- how they perceive and talk about the health issue in focus; and
- their relevant literacy, numeracy, and technology skills.

When you set out to develop content, be aware of the specifications of your mode of mobile communication. For example, if the mHealth solution will use...

- *Short messaging service (SMS)*—tailor your content to messages of 160 characters or fewer.
- *Video*—check the typical bandwidth capabilities of the devices and networks that will be used.
- *A mobile survey or form*—ensure that you know the character limits and how many survey questions are permitted.
- *Interactive voice recording (IVR)*—find out how many menu options can be built into the service (for example, users are given an option to press 1, 2, or 3 for more information).

The discussion paper [Designing Health Literate Mobile Apps](#) <sup>[95]</sup> provides insights about how to build health literate apps by applying usability and health literacy strategies throughout the development process. The authors focus on the following steps:

- learn about your users,
- write actionable content,
- display content clearly,
- organize and simplify,
- engage users, and
- revise and evaluate.

Just as with print materials, **content development and testing is an ongoing process**. Experienced mHealth implementers attest that you can expect to make changes to content throughout the course of the project. Organize your content in an easily readable, adaptable format, which might vary depending on your program's content needs. For example, Microsoft Word works well to keep track of SMS content because of the "word count" functionality in the program, which Microsoft Excel does not have. Also ensure that you have a [naming convention](#) <sup>[24]</sup> policy with your team to ensure [version control](#) <sup>[24]</sup>—for example, name files according to project title, date, and initials of the last person to edit the content, such as "m4RH\_Messages\_6.30.201\_HV."

Also note that some mHealth programs, such as [Mobile Alliance for Maternal Action \(MAMA\)](#) <sup>[97]</sup> and [CommCare](#) <sup>[38]</sup>, have made content available for adaptation by other programs. The Resources section of the Guide includes a comprehensive list of [mHealth Content Repositories](#) <sup>[41]</sup>. MAMA has also developed [MAMA Content Learning Modules](#) <sup>[98]</sup>, which are short online learning courses designed to assist organizations as they work on their own projects to localize the messages.

## KEY CONSIDERATIONS

- [Drafting the Content](#) <sup>[99]</sup>
- [Testing the Content](#) <sup>[100]</sup>

## THE EXPERTS SAY...

"It is recommended to work with technical experts to approve content and ensure that it meets standards of care." – Berhane Gerbu, Uganda Health Information Network, Mozambique Health Information Network, Mobile Health Information System (South Africa)

"If you are asking a lot of questions [via SMS], people stop responding. We found that four questions worked well. We saw that with every extra question beyond that the respondents dropped off." – Bhupendra Sheoran, YTH (formerly ISIS), SexInfo and The Hookup, USA

"We included the target audience in program design and content development. Our initial strategy was to hold focus groups in schools and community clinics to discuss the main sexual health issues. After warming up the groups, we asked questions, to which participants texted their answers. It helped the program designers see how the youth used texting, and what words they used. Then the program staff wrote messages. Now [as of July 2012], we have partnerships with high schools to work with students to write messages and give feedback on messages. This has produced more appropriate language for the messages. It's been invaluable: it would be a wasted investment if we didn't include the audience. We are constantly trying to figure out how to reach the youth. They are excited to participate as soon as we give them voice." – Rebecca Braun, California Family Health Council (CFHC), The HookUp, USA

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## References

- "Deep Dive" on Developing Mobile Content for Clients <sup>[101]</sup>. mHealth Working Group. 2012 Apr 26. Baltimore, MD.
- Umopathy, S., G.A. O'Sullivan, and S. Rahaim. [mBCC Field Guide: A Resource for Developing Mobile Behavior Change Communication Programs](#) <sup>[102]</sup>. Abt Associates Inc. 2012 Feb.

# Drafting the Content

## KEY CONSIDERATIONS

Consider the following details, informed by preferences and abilities of the target audience, as you develop your draft content. Depending on the type of mHealth solution you have in mind, these might not all be applicable.

- *Language*—Which language should be used? What language is used when texting? Is there a particular script or alphabet that is used (for example, Hindi, Arabic, Roman characters?).
- *Vocabulary and phrasing*—What typical words or phrases does the target audience use to talk about the health issue?
- *Length*—How long should each message or screen be, considering ease-of-use and attention span?
- *Frequency*—How often should messages or content be sent or received, considering user preferences for receiving and sharing information?
- *Tone*—Given the message content, what tone would resonate most with the end users? For example, is an informal, colloquial tone or professional, technical tone more appropriate?
- *Messenger*—Does the messenger matter? How does the source, or perceived source, influence a user's reaction to the content? For example, receiving a message from a doctor could be perceived differently than receiving a message from a friend.

- **Accuracy**—Is the content medically accurate according to the country’s technical guidelines and global standards? Can you adapt content from existing libraries, or local or global resources and guidelines (see **Technology & Content Repositories** [41])? Have you vet the content with technical experts in the field?
- **Consistency**—If the mHealth solution is part of a **multi-channel campaign** [24], are the messages consistent and complementary across the program?

## Testing the Content

### KEY CONSIDERATIONS

#### CASE STUDY: ADAPTING MESSAGE CONTENT FOR ‘THE HEALTHY PREGNANCY, HEALTHY BABY’ TEXT MESSAGING SERVICE IN TANZANIA

In this July 2013 publication, the Mobile Alliance for Maternal Action (MAMA) recounts the process of developing ‘The Healthy Pregnancy, Healthy Baby’ text messaging service in Tanzania. Message development, the case study explains, can be a technical, multi-phased, multi-partner undertaking. While the initial strategy was to develop messages in English and then translate them into Swahili, the partnership later focused their efforts on Swahili content only. The project shares valuable lessons about how to localize message content. Click on this box to read the full publication.

[103]

Content testing with members of the target population is critical to solution development. Test the content to ensure it is comprehensible, appropriate, accessible, and effective for the intended users. You do not have to test the content with a large sample size—in fact, to begin, interview 5 or 10 individuals, make changes based on feedback, and repeat the process until it is evident that the content is clear and effective.

Here are tips for the content testing phase:

- Test all of the messages or content, one section at a time, in the intended sequence and format. It is ideal if the content can be tested in the anticipated delivery format, such as voice or SMS, to accurately reflect the user experience.
- Ask a number of probing questions to assess the user’s ability to understand, remember, and/or react to the message, video, survey prompt, etc. If appropriate, ask, “What is this message asking you to do?” to capture comprehension. Consider using a “**think aloud**” [24] approach, during which you ask participants to narrate what they are thinking when they see the content.
- Observe the participant’s verbal and non-verbal cues, noting moments of confusion or pause as well as ease.
- Ask the user how easy or difficult they find the messages.
- Explore reactions to, and preferences for, content length, tone, frequency, and the messenger.
- Ask for suggestions for word choice, **keywords** [24], or visuals for multimedia messages.

## Prototyping & Usability Testing



[104]At this point, you have made the critical decisions necessary for technology design. You will either adopt and adapt an open source solution or build customized software. If you are handling the technology adaptation or development in house, you have the necessary expertise on staff. Or, if you are outsourcing your technology needs, you have chosen a technology partner. **Now it is time to make your technology requirements a functioning reality**

#### CASE STUDY: USING OPEN SOURCE SOFTWARE TO BUILD A PROTOTYPE

Georgetown University’s Institute for Reproductive Health used FrontlineSMS, an open source software, to mimic the functionality of CycleTel™, an SMS-based family planning method, with a small group of prospective users. Click on this box to access a case study on the experience.

[105]

**The technology world is in a constant state of innovation.** For example, for a smart phone or a computer to work as well as it should, its software and applications need to be regularly updated. Similarly, the technology that supports your mHealth program will change over time.

Further, **technology development is an iterative process.** Many technology groups use **agile software development** [24] methodologies, including adaptive planning among a cross-functional team, incremental development, and overall flexibility to design and deliver an operational technology. Rather than starting with a binder full of specifications and building the entire solution, agile development breaks the specifications into many components in order to realize the end solution. Steps in an agile development process may look like this:



- At first, the technology might be built as **prototype** <sup>[24]</sup>—a low-cost, simple form of the technology—and tested with a small number of users for feedback.
- Then the technology will be built to address that feedback and meet an initial set of functional requirements, and released in a “beta” form **Beta testing** <sup>[24]</sup> with users and administrators helps confirm usability, identify bugs, and improve overall functionality. (**Beta Testing** <sup>[108]</sup> is covered in greater detail in the Planning for Implementation section of the Guide.)
- When the technology is further adapted and ready for wide-scale deployment, the software components are packaged together and released, with the understanding that updates to the system will be needed in the future.

**Gathering user insights, preferences, and feedback at each stage of solution development is critical to the future success of the technology. Start as small and cheap as possible, and then continue to test, build, and iterate.**

#### KEY CONSIDERATIONS

- Does the solution function as intended? What does or does not work well?
- What do end users like and dislike about the solution? What could be improved, and how?
- Are end users interacting with the technology as expected?
- Do end users understand the content? Do they have preferences for when and how often to be contacted?
- Is the technology platform easy to use for project administrators? What do they like or dislike about the administrative user interface? What improvements can be made?
- Is data collected as intended, in the correct format?
- What are anticipated barriers to correct use based on observation and user testimonies? (For example, if the end user shares her phone with another family member, she may not receive the messages intended for her; or if a community health worker’s phone runs out of battery while he is in the field and he cannot collect data on his phone as planned.) What can be done to overcome these barriers?

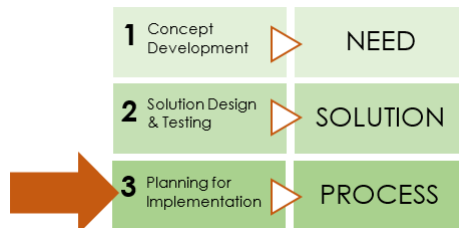
#### THE EXPERTS SAY...

“[What works well in programs is] design research plus ethnographic practice: [we] wrote software with people using it; [we incorporated a] real-time feedback loop, which allowed mid-course corrections). [This is called] agile software development – you write a little [code] at a time, check with users, and then you write more iteratively (see what they actually do versus what the user tells you). This is core to mHealth development.” – Merrick Schaefer, World Bank (with UNICEF at the time of the interview), Programme Mwana, Zambia

“Usability testing was incorporated at several levels. First, we did a lot of internal testing for the content and platform. Then we did beta testing with a small group representing end users. Then, after the product’s release to general public, we monitored and incorporated feedback from users. Usability testing doesn’t stop after release of version 1—the solution should be continuously monitored and improved. Otherwise people stop using it.” – James BonTempo, CCP (with Jhpiego at the time of the interview)

## Planning for Implementation

At this point, you understand the health needs and technological literacy of your target audience and have become familiar with the context in which your program will operate. You have clearly defined the health problem you hope to address, and have pinpointed the intended outcomes of your mHealth program. This knowledge informed the design and content of your mHealth application, which is being tested and refined based on user feedback. While you are designing and testing the solution, you should also be **planning for implementation** of the mHealth program. Planning for



implementation is the focus of this section of the Guide.

The **topics** <sup>[107]</sup> explored in this section of the Guide will help you understand the **Health implementation process**. What elements need to be in place to ensure program success?

As illustrated in Figure 3 below, many factors play a part in the success, or failure, of an mHealth intervention and determine whether it can and should be scaled up. The elements in this schematic—project management, partnerships, launch, scale-up, sustainability, and monitoring and evaluation—are explored in depth in this section of the Guide.

**Figure 3. mHealth Implementation Schematic** (Source: FHI 360)



#### About this schematic

The above diagram of a typical mHealth project cycle is the result of in-depth interviews with 19 mHealth implementation experts and a review of current mHealth literature. The diagram represents the main components of mHealth program implementation: planning, designing, monitoring and evaluating, and scaling up. Program launch, revision, and adaptation are shown as distinct, critical points in the process, while sustainability is encompassed by and must be considered throughout the entire cycle. Stakeholder engagement, project management, and partnerships are essential ongoing components of the cycle.

The **mHealth Planning Canvas** (PDF <sup>[111]</sup>, PPI <sup>[112]</sup>), developed for this Guide, helps you visualize these essential components of your planning process, with all the topics covered in the Guide represented on one page. Like the above schematic, the worksheet illustrates how the project components are interconnected pieces of a complete strategy. The planning process is iterative in nature, and relies on many rounds of incorporating user feedback, developing partnerships, tweaking content, and much more before scale and sustainability can be reached.

#### THE EXPERTS SAY...

“In my experience it takes at least 2-3 years for a program to go from concept to reasonable scale. Planning and testing takes a long time, and implementers and donors have to be realistic about when results will start to appear.

For example, MAMA South Africa took about **3 months** to conduct a large stakeholder workshop (with the government, MNOs, NGOs, etc.), define the implementing consortium of partners with associated roles and responsibilities, conduct two literature reviews, define the target audience (including focus groups with users), and landscape likely technology solutions. We needed **1 month** for proposal approval from our funders. We spent **4-5 months** on technology development, content localization and review, acquiring short codes, etc. We launched the beta version of the service about 10 months from the start of planning, and spent **2 months** in user testing. It took an additional **12 months** to formally integrate with an MNO platform and to reach 100,000 users. Two years from planning to fully operational is actually quite fast.” - Joanne Peter, Mobile Alliance for Maternal Action

If you have an mHealth implementation experience or resource you would like to share, please visit our [feedback form](#) [4].

## Overview of Topics for Planning for Implementation

The Planning for Implementation section of the Guide covers the major elements of implementation. Each topic below links to more detailed information as well as a checklist of key questions to ask yourself as you prepare to launch and implement your mHealth intervention.

- **Project management** [81]. Solid concept and design are absolutely necessary—but to succeed, they must be supported by strong project management and relationship-building. **Attentive and flexible** management helps smooth operation of systems and procedures and allows for wise troubleshooting when the inevitable challenges and problems arise. A good management team also relies on **effective and efficient management of data and user feedback** throughout implementation to see if intermediate outcomes are being met and whether the intervention is likely to meet its goals.
- **Partnership development** [63]. Actively maintaining a network of stakeholder and partner relationships—some of which were initiated during the **Concept Development** [7] and **Solution Design** [8] phases—is essential for a thriving project. **Buy-in and inclusion of multiple perspectives** continues to be important throughout project implementation. The right partners contribute to **financial, programmatic, and technological sustainability**. These partners might include **donors, government ministries, private sector organizations, or non-profits**. They also include informal yet valuable networks such as mHealth **communities of practice and technical working groups**. The key to approaching any potential partner is to be able to show them how their involvement will benefit them as well as your project and to identify the appropriate time to bring them into the project. As relationships develop, assess partnership opportunities with a critical eye and a view across the life of the project. For example, a donation of phones in the name of corporate social responsibility might burden project participants with the wrong kind of equipment.
- **Preparing for launch** [106]. While you have already prototyped and beta tested the solution, the first few weeks to months of public launch should still be treated as a learning phase. **Small-scale initial roll-out** allows you to test run other activities that might be needed to support a full-scale launch, such as **training, support, troubleshooting, demand creation, and social marketing**. While every implementation process encounters some initial bumps in the road, planning for a learning phase will help the project team smooth out major implementation challenges before engaging a higher volume of users.
- **Data collection and monitoring and evaluation** [80] (**M&E**). Monitoring and evaluation is the process of **tracking progress toward project goals and objectives considering effectiveness and efficiency**, and **identifying whether and what improvements and adaptations are called for**. It can foster continual learning and improvement of the implementation process; demonstrate the effect of mHealth on health outcomes and service delivery; shed light on the real costs, and cost-effectiveness of the mHealth solution, and contribute to the global evidence base on mHealth.
- **Scale-up** [89]. The field of mHealth is often criticized for the number of small pilot projects that never get scaled up. Whether an mHealth solution should be brought to scale depends on the original intent of the program as well as the evidence gathered during the pilot phase. If the program is shown to be cost-effective and to have a positive impact on health outcomes, the health system, and the community, it is likely worth scaling up. But many elements need to be securely in place to successfully grow a program: **sustainable financing, capacity to maintain and upgrade technological systems, strong partnerships to navigate the telecom ecosystem**, and more.
- **Sustainability** [90]. Will your mHealth project last beyond the pilot phase? Are there plans to not be dependent on donor funds? Measures of sustainability should be built into an mHealth program from the beginning of the planning process so that if the pilot succeeds, the program can not only continue, but also expand to new audiences. These measures include exploring **long-term financing possibilities**, including incorporation of funding for your mHealth program into the **government budget**, and potentially conducting **business analysis**.

If you have an mHealth implementation experience or resource you would like to share, please visit our [feedback form](#) [4].

## Project Management



Good management is both an art and a science. Management of any mHealth project involves the oversight of a range of factors that influence planning, partnerships, and implementation processes. The person, or group of persons, managing your mHealth project should possess:

- The ability to develop and maintain relationships with a diverse group of stakeholders.
- An entrepreneurial spirit and ability to learn new concepts quickly and adapt strategy based on challenges and opportunities.
- The ability to develop, implement, enforce, and adapt procedures and systems that will support the mHealth program.
- Solid knowledge of the health issue the mHealth program addresses or of technology design and use—and a level of comfort to speak across the disciplines.
- A talent for translating data into meaningful updates for the implementation team and other stakeholders.
- Familiarity with the country and the particular communities in which the program will be implemented.
- Strong interpersonal communication skills—able to be part of a team, as well as to lead a team.

Project management for mHealth requires careful coordination of **people** [109], **systems** [110], and **data** [111]. We discuss key considerations for each of these areas in the following pages.

### THE EXPERTS SAY...

"Having [members from the] MOH participate in the project management team, and also in the design and implementation of the pilot, is crucial for the long term success and sustainability of any mHealth initiative. If you offer a solution to a pressing government need (for example, providing medicines people need), the government will most likely be supportive." - Marasi Mwencha, John Snow, Inc.

"The most exciting part of my job is building a team—and to be part of an interdisciplinary team. We are designers, software engineers, and project managers—all figuring out how to speak the same language about mHealth programs and how to work together." - Isaac Holeman, Medic Mobile

### Reference

Mair FS, May C, O'Donnell C, Finch T, Sullivan F, Murray E. [Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review](#) [112]. Bull World Health Organ. 2012 May 1;90(5):357-64.

## People



<sup>[113]</sup> Like a good juggler, the project manager, or management team, keeps multiple balls in the air.

Project managers **assign, clarify, and track roles and responsibilities** within the implementing team and among partners so that implementation needs are addressed in a timely manner without duplicating effort. In doing so, project manager(s) **build and foster a strong implementation team** both within and outside their organization. This involves **identifying, engaging, and coordinating diverse stakeholders** including staff members, representatives from the Ministry of Health (MOH), policy makers, donors, staff from non-governmental organizations, health administrators and service providers, technology partners, clients, and more.

An mHealth project manager also may play a crucial role as **liaison, or “translator,” between the technological partners or units and the health units**. Though these two groups are working toward a common goal, they typically approach the project from different perspectives, with different assumptions and vocabularies. An effective project manager can help make sure the health team understands the technological abilities or limitations of the project. The project manager can also help the technological team understand the public health perspective and user context. This translation role can be critical to ensuring the mHealth solution performs as envisioned, collects useful data, and directly and efficiently addresses the health need that has been identified.

Additionally, as someone communicating with all players in the mHealth project, the project manager is in a good position to **document and share lessons learned** with the stakeholders and with the larger mHealth community.

#### KEY CONSIDERATIONS

- Have you identified a project manager who possesses the key attributes needed to successfully manage the mHealth program?
- Have the roles and responsibilities of members of the implementing team and the partners been clearly defined and communicated?

## Systems



<sup>[114]</sup> An mHealth project manager is responsible for assuring that systems are in place to implement and manage the program. This

means that within the program, **a supportive structure, adequate financial resources, and firm administrative support** need to be established. The project manager also has to keep abreast of the **enabling environment**—does the program comply with telecom regulations, technology systems and standards, and any MOH mandates?

Once implementation is underway, the project manager will need to track how systems—both internal and external to the organization—are facilitating or creating barriers to implementation, and whether or not systems need to adapt to improve processes.

#### KEY CONSIDERATIONS

- Have organizational policies and procedures been updated to support the mHealth program?
- Have staff members and/or users been trained, and will refresher training be provided if needed?
- What kind of system has been put in place for regular communication between the technological partners, other partners, and the implementing health organization?
- How will the project team members keep each other accountable to the work plan, timeline, and budget?
- Is supportive supervision in place to help staff implement and manage the change in practice? Have supervisors received training not only on the technology and content of the mHealth application but also on how to manage staff challenges that arise during implementation?
- How will the effect of the mHealth solution on staff workload and workplace procedure be monitored?
- Does the mHealth solution comply with the enabling environment, and operate well within existing systems? If new systems are needed, how will the project manager be involved in developing them?

## Data



<sup>[115]</sup> There are several types of data to be managed during planning and implementation. The project team needs to have a plan in place for how to handle the **program’s data and reporting** needs. The **costs** of planning and implementing an mHealth solution must be tracked carefully and continuously. This tracking will ensure adequate planning for the program budget, illustrate whether mHealth is a cost-effective solution in a particular situation, and inform decision makers about the potential for scale up.

Project managers must also manage the data generated by **users** of the mHealth application. This includes ensuring the data is collected in a way that provides insightful information for program staff, donors, and decision makers, while maintaining the privacy and security of users. In many cases, **qualitative data collection** beyond what the technology platform provides is required to assess the mHealth solution’s usability and user satisfaction over time, as well as the program’s outcomes and impact.

#### KEY CONSIDERATIONS

- What is the plan for collecting and tracking cost data?
- What is the plan for collecting and tracking user data? (Also refer to the [Data Collection, Monitoring & Evaluation](#) <sup>[80]</sup> section of the Guide.)
- How will lessons learned be documented and shared with the implementing team and partners?
- How will these lessons be shared with the larger mHealth community?
- What mechanisms can be put in place to collect qualitative data, beyond that provided by the mHealth solution itself? Consider how to follow up with users to collect survey data or arrange interviews or focus groups.

## Partnership Development

### CASE STUDY: PARTNERSHIPS THAT ENABLE MAMA BANGLADESH

The Mobile Alliance for Maternal Action (MAMA) Bangladesh is a public-private collaboration among government partners, nongovernmental organizations, donors, and corporate partners. The collaboration includes:

- Ministry of Health and Family Welfare
- The Access to Information Program within the Prime Minister's Office
- The Maternal and Child Health Integrated Program (MCHIP)
- Smiling Sun Franchise Program
- Fair Price International
- USAID
- Johnson & Johnson
- The United Nations Foundation
- BabyCenter
- Beximco Pharmaceuticals Limited
- Multimode Group

Click on this box to read more about the partnership.

<sup>[116]</sup>Possible partners in an mHealth project are as diverse as the settings in which mHealth solutions are being implemented. They might include:

- Local mobile network operators
- Telecommunications groups
- The consumer product industry
- Pharmaceutical companies
- Government
- Non-governmental organizations
- Academic institutions

Partnerships also encompass more informal networks, such as **communities of practice** or **technical working groups**. Ongoing participation in these networks fosters knowledge sharing and can help establish a successful mHealth pilot that leads to scale-up. Many factors can affect the development of partnerships, including funding, timing, technological capacity, and project scope.

Keep in mind that working with multiple partners—while important for a project's viability and sustainability—can slow down the process. The more partners involved, the more likely confusion and challenges are to arise. **It takes time to build and nurture productive partnerships**—and to gather and integrate feedback from all stakeholders. It is important to establish a system for regular meetings and communications among partners. In addition, outside of your project, consider fostering community among all mHealth players in your country by starting an mHealth working group if one does not already exist. This will provide a forum for knowledge sharing and coordination among projects.

To spread awareness of these benefits and encourage support and participation, project managers can assist with the recruitment of **champions** <sup>[24]</sup> for the program: charismatic advocates of a belief, practice, program, policy, or technology. Champions are well-respected opinion leaders in their communities whose passion, credibility, and persuasiveness allow them to successfully promote innovations.

The pages in this section of the Guide cover three important factors to consider when developing new partners:

1. **Incentives and drawbacks** <sup>[117]</sup> of each potential partnership
2. Elements of successful **private sector partnerships** <sup>[118]</sup>
3. **Timing** <sup>[119]</sup>

Additionally, the following publications offer valuable case studies, expert tips, and lessons learned on fostering successful mHealth partnerships:

- ***Mutual Value, Mutual Gain: Best Practices from Successful Social Sector Partnerships with Mobile Network Operators*** <sup>[120]</sup> details best practices in pursuing, negotiating, designing, and implementing partnerships with mobile network operators.
- ***Scaling Up Mobile Health: Developing mHealth Partnerships for Scale*** <sup>[121]</sup> offers a series of case studies of mHealth partnership initiatives that have achieved or are working toward scale. These case studies illustrate elements of success that can be applied to other initiatives and are complemented by recommendations on how to successfully move through the phases of mHealth partnership development in a way that is conducive to scale-up.
- ***Building Partnerships that Work: Practical Learning on Partnering in mHealth*** <sup>[122]</sup> also draws on the insight of mHealth experts to share best practices for partner selection and partnership development in mHealth.

For more resources on Partnership Development, please visit the [Publications](#) <sup>[22]</sup> page of the [Resources](#) <sup>[21]</sup> section.

### KEY CONSIDERATIONS

- Does the partner have both health staff and technology staff? (While not a necessity, it can be beneficial to work with an organization that has expertise in both realms of mHealth implementation.)
- What is the partner's level of in-house technical ability?
- Will this partnership contribute to the sustainability of the mHealth project beyond the pilot?
- Will this partnership increase the ability to apply the mHealth solution to multiple situations or goals in addition to the goal of this particular mHealth project?
- Are the roles and responsibilities of each partner clearly defined and understood by all?
- Describe the system you will use to communicate regularly with each partner.

### THE EXPERTS SAY...

"[To foster sustainability], work with a partner who is in the community long-term. A main criterion for [choosing] partners is whether they will assure accountability to the community." – Isaac Holeman, Medic Mobile

### References

- Hausman V, Keisling K. *Building Partnerships that Work: Practical Learning on Partnering in mHealth* <sup>[122]</sup>. GBCHealth. 2011.
- *Sustainable Financing for Mobile Health (mHealth): Options and opportunities for mHealth financial models in low and middle-income countries* <sup>[123]</sup>. mHealth Alliance and Vital Wave Consulting. 2013.

## Incentives & Drawbacks

## How will your project benefit from a potential partnership?

Project success requires **partnership, participation, and buy-in** among all stakeholders—each player should feel heard and valued. Incentives for participation and benefits of the mHealth intervention should be clear to all of the different stakeholders. When considering which partners to approach, it is important to articulate the benefits and drawbacks of working with each. For example:

- Involving the Ministry of Health (MOH) from the beginning (and understanding the IT capacity of the MOH) can increase project sustainability by gaining the attention of decision makers, ensuring supportive policy is in place at the national level, and tapping into knowledge and experience from other projects being implemented elsewhere in the country.
- **Private sector partners** <sup>[118]</sup> can be a great source of financing, expertise, and equipment, but requirements such as exclusivity contracts can pose a challenge to sustainability. Furthermore, it is crucial to ensure any private sector partnerships will extend beyond one-time funding of a pilot project.

## How will your potential partners benefit from involvement in the project?

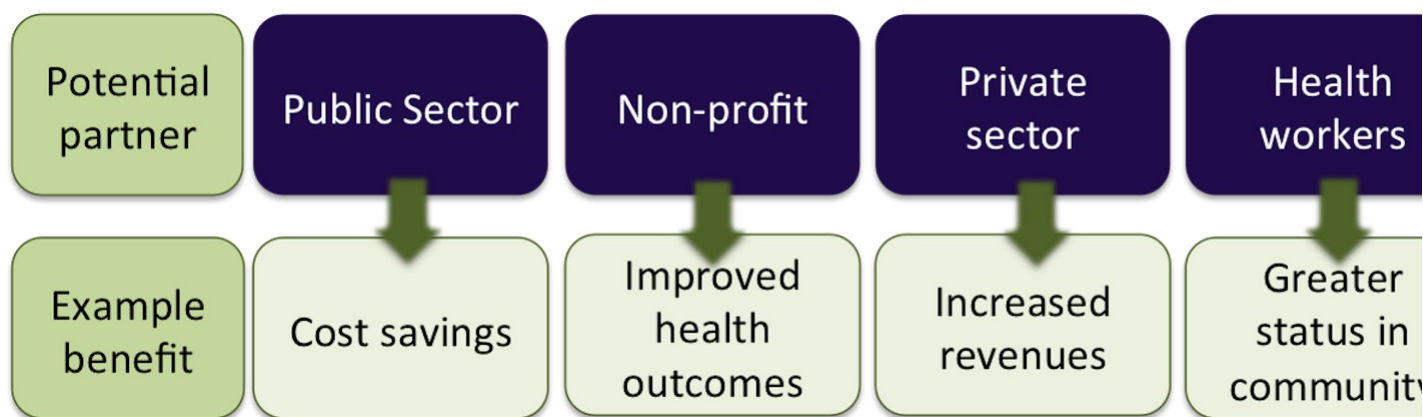
It is critical to understand the business incentives, social motives, and strengths and weaknesses of each partner to ensure a productive partnership. Be prepared to explain to each potential partner how they, as well as the end users, the greater health system, and the community, will benefit from the mHealth program. Examples include:

- A partnership between a nongovernmental organization (NGO) and a pharmaceutical company to develop an mHealth application that combats the sale and use of counterfeit drugs could yield a source of financing for the NGO to implement the project, clear health benefits for the user, and financial and results-related incentives to the pharmaceutical company.
- In Ghana, Switchboard developed a commercial application that created a network of doctors and nurses through a single mobile provider, Vodafone. These health care providers can make free in-network calls to facilitate referrals. This arrangement generates paying customers for Vodafone, as the company gets fees for out-of-network calls.

In *Sustainable Financing for Mobile Health* <sup>[123]</sup>, the mHealth Alliance and Vital Wave Consulting published a table outlining common benefits for each typical stakeholder in an mHealth program: public sector, non-profit, private, health workers, and community members. Figure 4 depicts a shortened adaptation of that table to provide examples of the benefits that each potential partner might seek. There are certain benefits that each partner will value. For example, it is highly likely that most partners interested in mHealth would see improved health outcomes or cost savings as an incentive to participate.

**Figure 4. Potential Benefits of mHealth Partnerships**

(Source: *Sustainable Financing for Mobile Health (mHealth): Options and opportunities for mHealth financial models in low and middle-income countries* <sup>[123]</sup>, mHealth Alliance and Vital Wave Consulting, 2013.)



To spread awareness of these benefits and encourage support and participation, project managers can assist with the recruitment of **champions** <sup>[24]</sup> for the program: charismatic advocates of a belief, practice, program, policy, or technology. Champions are well-respected opinion leaders in their communities whose passion, credibility, and persuasiveness allow them to successfully promote innovations.

## KEY CONSIDERATIONS

- For each potential partner you are considering, what would be the benefits of the partnership to your project? To the partner? To the end user? To the larger health system or community?
- What would be the drawbacks, if any, of this partnership to the stakeholders named in the previous question?
- Do all stakeholders truly understand and support the proposed project goals and objectives? If not, what are their concerns, and how can these concerns be addressed?
- Have the benefits and potential (scale, sustainability) of the mHealth solution to each group of stakeholders been identified and articulated to these stakeholders?
- What incentives are available to users and implementers of the mHealth solution for their participation?

## Private Sector Partnerships



<sup>[124]</sup>Participants at the 2012 mHealth Summit offered the following recommendations for working with the private sector—particularly with telecommunications companies.

- Request data from telecommunications companies, but in return, provide the analyzed data back to them to inform them about their customers.
- Make clear to mobile operators how their involvement in an mHealth project can **expand their market share** <sup>[125]</sup>, improve their services, and generate revenue from their data. For example, mobile transactions including **mobile money** <sup>[24]</sup> and **flashback calls** <sup>[24]</sup> can be used by credit bureaus as a proxy for income.
- Consider the combination of **mobile health and mobile money** <sup>[126]</sup> as a sustainability model. Mobile money might help create an **avenue** <sup>[127]</sup> for more cash transactions around health.

## THE EXPERTS SAY...

"Initially there was a lot of talk about approaching social outreach departments in telecoms. But I don't think that's right. The right place to go is more the business side, the enterprise solutions folks. The mobile operator wants to get something out of this: additional customers, more revenue per user. If you can approach your mHealth project like a business and you bring that to the mobile operator, they will be more receptive to working with you." – James Bon Tempo, CCP (with Jhpiego at the time of the interview)

## Timing



<sup>[128]</sup>In addition to articulating the benefits and understanding the drawbacks of each potential partnership, it is also important to consider timing—**when does it make sense for each partner to enter the process?** Before approaching any potential partner, **identify a clear entry point** into the project for that partner.

For example, some experts caution against involving mobile network operators (MNOs) too early in the process and recommend trying to work with other NGOs and nonprofits to share the access points that mobile network operators offer, such as text message gateways and servers. There is a much greater likelihood of receiving a below-market rate—or securing any type of relationship, for that matter—if you negotiate with the telecommunications partner at the point of scale rather than at the pilot stage. As each telecom market is different, it is also possible that a relationship with an MNO is not necessary to launch an mHealth solution—explore gateway providers and aggregators in the country as well.

In contrast, a common pitfall of many mHealth programs is failure to involve the Ministry of Health (MOH) early enough in the process. **Partnering with the MOH from the initial planning phase can help you ensure the interoperability of your program with government systems and the alignment of your program with national health priorities.** Garnering government buy-in at the national level from the beginning of the project can also help ensure a source of sustainable financing for scale-up and maintenance of the program.

### KEY CONSIDERATIONS

- Are the right parties at the table? Is anyone missing?
- How will the partnership relationship change over time?

### THE EXPERTS SAY...

"Having conversations with partners from the beginning of the concept phase helps them last. Take partners along through the whole process so they are on board and understand, and have sense of shared ownership." - Bhupendra Sheoran, YTH (formerly ISIS), SexInfo and The Hookup, USA

## Preparing for Launch



<sup>[129]</sup>As you prepare to launch your mHealth solution, there are a number of details to consider during the initial roll-out of the program. For example:

- Planning a **beta launch** <sup>[130]</sup> before the actual large-scale launch of the mHealth program might help to identify and resolve any remaining issues (such as technology bugs, process improvements, and staff roles) before the program is released to the wider public.
- Exploring avenues for **demand generation** <sup>[131]</sup> to ensure you have a group of people ready and willing to be participants.
- Planning and conducting a series of **trainings** <sup>[132]</sup> to prepare those who will be implementing, supporting, and using the mHealth solution.

The **MAMA Bangladesh (Aponjon) Formative Research Report** <sup>[133]</sup> details the process followed by Johns Hopkins University Global mHealth Initiative and Dnet to understand (1) effective strategies for Aponjon enrollment, (2) effective strategies for promoting awareness about Aponjon services, (3) acceptable cost models per the subscriber-base, (4) user satisfaction with the technology platform and message content, and (5) Aponjon's influence on health-seeking behaviors. The process followed and the subsequent results illustrate the importance of testing avenues for roll-out to inform large-scale program implementation.

The following pages discuss these three elements of a successful launch in detail.

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### Reference

Lemaire J. *Scaling up Mobile Health: Elements Necessary for the Successful Scale-up of mHealth in Developing Countries* <sup>[134]</sup>. Advanced Development for Africa and Actevis Consulting Group. 2011.

## Beta Launch

### Pilot, beta launch, and initial rollout—what is the difference?

A **pilot project** is a small-scale study conducted to assess feasibility, time, cost, acceptability, and effectiveness of an mHealth program to determine whether it should be scaled up and, if so, to improve upon the original design. Most readers of this Guide are likely planning and implementing pilot projects.

A **beta launch** is the early release of an mHealth application to a limited group of users in order to identify and fix any remaining bugs or issues before the initial roll out, or launch, of the pilot program.

The **initial rollout** follows the beta launch and is the introduction, or full launch, of the pilot application or program to the full target audience.

It is good practice to plan a beta launch before the true launch of the mHealth program. In a beta launch, the mHealth application is released and used by a small audience in order to identify any remaining issues and work out any implementation kinks before making the application available to a wider audience. For example, a beta launch shows you whether end users can easily access and use the application. It illustrates whether the data generated by the application satisfies the needs of the implementation team and partners. It tests whether the delivery channels work as anticipated, and whether the solution works well given the state of connectivity in a particular context.

A user's first experience with a new service can determine their willingness to continue use—if it is a bad encounter, he or she will not be motivated to use the service or application later **on beta testing, you have the opportunity to test solution implementation with real users, while minimizing the negative backlash that could make or break a project.**

### KEY CONSIDERATIONS

- What project elements need to be tested before wider scale launch? Think about what can go wrong that would have a large impact on the user experience and program operations, and ensure that you can test those functions during beta testing.
- Who are the audience(s) for beta launch (for example, end user and data managers). How will feedback be collected and addressed prior to launch? How much time is needed to do the beta testing well?

### THE EXPERTS SAY...

"Usability testing was incorporated at several levels. First, we did a lot of internal testing for the content and platform. Then we did beta testing with a small group representing end users. Then, after the product's release to the general public, we monitored and incorporated feedback from users. Usability testing doesn't stop after release of version 1—the solution should be continuously monitored and improved. Otherwise people stop using it." – James BonTempo, CCP (with Jhpiego at time of the interview)

## Demand Generation



<sup>[135]</sup> Demand generation is about **ensuring that you have a group of people ready and willing to be participants in your mHealth program**. This entails raising awareness, interest, and understanding of the product and its potential benefits. Involving stakeholders, including beneficiaries of the mHealth solution, from the beginning of the planning stages and throughout the implementation process is crucial and can foster buy-in among community-members and end users by ensuring the solution has been tailored to their needs and context.

Early involvement of stakeholders, including program beneficiaries, can also help the planning and implementation team ensure incentives of participation are clear to all who are being asked to implement or use the mHealth application. The **m4RH** web site describes the project's diverse promotional efforts <sup>[136]</sup> and shares lessons learned.

Finally, when a range of stakeholders are involved in the development and implementation of the intervention from the beginning **champions** often emerge—trusted and persuasive members of a community who can effectively communicate the benefits of the program to their peers. In the period leading up to launch, champions can assist with social marketing—educating their sphere of influence about how the solution can address their needs and creating opportunities for discussion. This kind of open communication can mobilize both the implementation team and the end users around the program.

One resource, *The GSMA mWomen Marketing Handbook* <sup>[137]</sup>, offers guidance to mobile network operators and other members of the mobile ecosystem to improve their approach to marketing to low-income women in emerging markets.

### KEY CONSIDERATIONS

- How will potential end users find out about the mHealth solution? How will you test these awareness generation activities? What is the anticipated date of conversion <sup>[24]</sup> to use after awareness generation activities are conducted?
- Who, if any, among your stakeholders are potential champions who can engage in awareness generation for the mHealth solution to implementers and end users?
- What are the incentives and benefits to those implementing the mHealth solution?
- What are the incentives and benefits to the end users of the mHealth solution?

## Training & Supportive Supervision

## CASE STUDY: PLANNING EFFECTIVE TRAINING AND LEVERAGING EXISTING SUPPORT STRUCTURES

Soon after the Early Warning System—an mHealth program that alerts decision makers of pending stockouts of essential medicines in the public health supply chain in Ghana—began conducting trainings, the need to rethink the training approach became apparent.

EWS ultimately shifted the focus of its training from how to use SMS to logistics management in order to meet the actual needs of trainees. The number of trainees was pared down dramatically so that trainers could focus on those who would actually be responsible for reporting. Training of trainers was conducted so that facilitators felt competent and well equipped to provide training to others. And follow-up training and monthly support meetings were incorporated to address the knowledge gaps left by high turnover rates and to refresh veteran workers' skills. Finally, a range of stakeholders was selected to provide ongoing support to end users.

Click on this box to read more about EWS's training and support processes and lessons learned.

<sup>[138]</sup>Many mHealth projects will need to plan and conduct a series of trainings prior to launch to prepare those who will be implementing, supporting, and using the mHealth solution. Training ensures that everyone understands:

- The rationale behind implementation of the mHealth solution.
- Policy or procedural changes that will take place to accommodate the program. For example, if an mHealth application will be used to record patient information in place of paper forms, procedural guidelines and orientation for new staff, should be updated.
- Instruction on how to use the mobile device and application (if applicable).
- How to report and operate around implementation challenges.
- Data management and use.
- The opportunity for those who will be affected by the changes to ask questions and express concerns about the process.
- Why a parallel system (for example, still using the old systems while trying out the new one) might be called for at first, and how that might temporarily increase workloads.

While not every mHealth program requires extensive training or ongoing supervision, in many cases, training is essential to a successful launch. After launch, ongoing training and supportive supervision <sup>[139]</sup> might also be critical to ensure that implementers and end users are using the application correctly over time and as staff turnover occurs. If supervisors are available to answer questions, identify and address incorrect use, recommend refresher training when necessary, and help users troubleshoot problems, success of the mHealth intervention is much more likely.

Keep in mind that in many low- and middle-income country settings, the health workforce is already overburdened. Although the mHealth intervention might promise to reduce workload, the training process and the learning curve that follows take valuable time. Health workers must feel there is enough of an incentive to participate despite these demands—these types of issues are why their perspectives and realities must be examined from the very beginning, and often revisited.

### KEY CONSIDERATIONS

- Describe the training program that will be implemented before launch.
- What opportunities for refresher training will be available if it is needed?
- Describe the supportive supervision that will be available to the implementation team.

### THE EXPERTS SAY...

"The health workforce is already overstretched—even though new devices promise to reduce their workload, the training and learning curve can take valuable time." – Berhane Gebru, FHI 360; Uganda Health Information Network; Mozambique Health Information Network; Mobile Health Information System in South Africa

"In the K4Health Malawi project, we gave phones to more than 600 community health workers (CHWs). For many, this marked the first time they've owned a phone, so we planned a one-day training to help familiarize the CHWs with their new phones. We originally thought a one-day workshop would be sufficient. But, quickly found that wasn't enough training and support, given some CHWs were struggling with SMS usage basics. We ended up conducting a series of trainings, outreach, and refreshers. For example, we would call the CHWs periodically to check in and ask how things were going. The phones would only be helpful if the CHWs understood how best to use them, which required ongoing support to ensure the program's success." – Natalie Campbell, Management Sciences for Health (MSH), The Knowledge for Health (K4Health) Malawi Pilot Project

## Data Collection, Monitoring & Evaluation



As with all health interventions, mHealth implementers need to **document the planning and implementation process** including key decisions that have been made. They also must **demonstrate positive, measurable outcomes**, including impact on health outcomes and health systems. Designing and incorporating a strong monitoring and evaluation (M&E) strategy for a project from the beginning, in conjunction with partners, will not only help ensure long-term support from stakeholders and funders, but will also help strengthen the evidence base for the field of mHealth.

To do this, those planning the M&E strategy need access to current information on the state of **mHealth evidence**, including where the information gaps lie and what will indicate success. This can be done via the **mHealth Evidence Database** <sup>[141]</sup>, which houses the world's peer-reviewed and grey literature from high-, middle-, and low-resource settings on mHealth effectiveness, cost-effectiveness and program efficiency.

The following pages of the Guide will:



- Examine **unique challenges of monitoring and evaluating mHealth**<sup>[142]</sup>,
- Provide tips for **designing M&E into your mHealth program**<sup>[80]</sup>, and
- Present an **example of a high-quality mHealth research and evaluation strategy**<sup>[143]</sup>.

In addition, the **mHealth Planning Tools**<sup>[144]</sup> offered in this Guide, which include a *Planning Canvas*<sup>[11]</sup>, a *Logic Model Template*<sup>[16]</sup>, and a *Technology Decisions Worksheet*<sup>[18]</sup>, can help you track key decisions, planned activities, and anticipated outcomes of your mHealth solution and keep a record of the essential steps in your planning and implementation process.

## KEY CONSIDERATIONS

- How will the mHealth planning and implementation process, including key decisions and the rationale behind them, be documented?
- How often will process documentation be analyzed in order to evaluate program implementation efforts?
- What indicators will be used to measure health outcomes? What indicators will be used to measure program success in other ways, such as cost savings?
- Do the project's M&E indicators meet the evidence and reporting requirements of stakeholders and funders?
- What, if any, standardized mHealth indicators have been incorporated into the M&E plan?
- Can data generated by the technology platform be used for evaluation and reporting?
- Is the proposed evaluation design feasible and appropriate given the resources available?
- Has a system been designed to measure the financial cost of implementation and to analyze the cost-benefit ratio?
- How will the information and feedback generated by M&E be incorporated into program design and implementation on an ongoing basis?
- Do you have appropriate staff on the team to implement the M&E plan?

## THE EXPERTS SAY...

"I [as the project manager] enrolled in the system. I knew that messages come in at about 2pm every day. One weekend, I noticed that I had not received a message by 8pm. I called my staff and our technology partner. They found that there was a group of 35 women who did not get the messages that day. So our technology partner fixed the problem by resending the messages. We realized that there has to be close monitoring involved to take care of such problems, and as a result, we added a data feature to generate a status report." Priya Jha, Georgetown University's Institute for Reproductive Health, CycleTel, India

## References

Sarriot E, Ricca J, Ryan L, Basnet J, Arscott-Mills S. *Measuring sustainability as a programming tool for health sector investments: report from a pilot sustainability assessment in five Nepalese health districts*<sup>[145]</sup>. *Int J Health Plann Mgmt*. 2009;24:326-350.

Whittaker R, Merry S, Dorey E, Maddison R. *A development and evaluation process for mHealth interventions: Examples from New Zealand*<sup>[146]</sup>. *Journal of Health Communication: International Perspectives*. 2012; 17 Suppl 1:11-21.

# Unique Challenges of Monitoring & Evaluating mHealth

Monitoring and evaluating the process and impact of any health intervention presents challenges, but there are several unique factors to consider when planning for M&E of an mHealth program.

- **Indicators—how to measure impact?** It is important to remember that mHealth interventions are not stand-alone projects, but rather technologies that enhance larger programs. As **Table 2**<sup>[80]</sup> illustrates, some of the indicators used to measure the impact of an mHealth intervention will be the same as those used for the larger program.
- **Structure of the evaluation—what is feasible?** Though considered the gold standard for evidence, randomized controlled trials are often not feasible for evaluation

### CASE STUDY: LEVERAGING THE TECHNOLOGY PLATFORM FOR DATA COLLECTION & EVALUATION

The Mobile for Reproductive Health (m4RH) program—an opt-in, interactive, menu-based SMS system that provides users with automated information about eight contraceptive methods—collected data from its users by (1) electronically logging which contraceptive methods were queried by each user, and (2) asking users four SMS-based questions to assess gender, age, promotion point, and potential family planning impact. A program evaluation based on this data confirmed that mobile phones are an effective way to reach men and women of reproductive age with family planning information. Click this box to view results of the study.

<sup>[147]</sup> of mHealth interventions due to time and funding constraints, and the fact that once launched, the service might be available to anyone in the country who owns a mobile phone. Given the constantly changing nature of technology and infrastructure, innovative research methods are needed to evaluate the process and measure the impact of mHealth implementation.

- **Timelines and integrating feedback—what is the balance?** Data collection should start early in the planning process to ensure that key decisions and action steps are documented from the beginning of the project. Tracking these elements of the planning and implementation process can not only inform later efforts to scale up or replicate the program but can also help you understand what about the mHealth intervention worked well, what did not, and why. It is crucial to collect and incorporate feedback from end users on the acceptability and usability of the application before it is launched and on an ongoing basis once the program is rolled out. That said, the planning and implementation team must balance the need to improve the mHealth application and the implementation process based on user feedback with the need to move forward with the project. Setting timelines and limits for the submission of feedback and tempering expectations for the capacity of the solution to change or evolve will help avoid delays and disagreements.
- **Data overload—how to manage?** Additionally, as mentioned elsewhere in the Guide, technology platforms that enable mHealth solutions often have the capability to collect data in real time. This means that every interaction between the technology and the end user can be recorded. To avoid data overload, the mHealth project team needs to assess what kinds of data to monitor and evaluate and at what intervals.

## THE EXPERTS SAY...

"Look at the indicators the health service is using, and use those same indicators." – Isaac Holeman, Medic Mobile

"If you are asking a lot of questions [via SMS], people stop responding. We found that four questions worked well. We saw that with every extra question beyond that the respondents dropped off." - Bhupendra Sheoran, YTH (formerly ISIS), SexInfo and The Hookup, USA

# Designing M&E into mHealth Programs



[148]

To effectively monitor and evaluate an mHealth intervention, use **qualitative** [24] and **quantitative** [24] research methodologies. As the mHealth application is developed, consider whether and how the platform can collect data, in what format, and at what intervals (refer to **Technology Design** [72] in the Solution Design & Testing section for key considerations). Aside from electronic use data that can be collected in real time, consider reaching end users on their mobile devices to ask survey questions (see the **m4RH case study** [149] example). Once you have a sense of the kind of data collection that can be built into the mHealth service or tool, you can design other qualitative and quantitative techniques into your M&E plan.

In addition to collecting and analyzing M&E data on the **process** and **outcomes** of the mHealth intervention, **cost data** must also be tracked and studied to determine whether the mHealth solution is cost-effective and should be scaled up. If the intervention is worth scaling up, stakeholders and financial backers will want to know the initial costs of scaling up the program, as well as the potential cost savings—to the particular health program and to the health system at large—of operating the program at scale.

Table 2 summarizes illustrative program elements worth monitoring and evaluating, and provides sample indicators for each element. The indicators **in bold print** could potentially be measured with data generated by the program's mobile platform.

**Table 2. Program elements and sample indicators for monitoring and evaluation**

Program Elements	Sample Indicators
Health outcomes	Changes in: <ul style="list-style-type: none"> <li>• Contraceptive prevalence rate (CPR)</li> <li>• Maternal mortality rate</li> <li>• Rate of new HIV infection</li> <li>• Nutritional status (rates of anemia, stunting)</li> </ul>
Health behaviors	Changes in: <ul style="list-style-type: none"> <li>• Demand for health services related to mHealth program</li> <li>• Percent of women breastfeeding</li> <li>• Adherence to antiretroviral therapy</li> <li>• Contraceptive continuation</li> </ul>
Acceptability of the program	<ul style="list-style-type: none"> <li>• <b>Percentage of subscribers retained</b></li> <li>• <b>Percentage of users who unsubscribe</b></li> <li>• User-reported satisfaction</li> </ul>
Quality and accessibility of mHealth services	<ul style="list-style-type: none"> <li>• <b>Number of regular mHealth program users</b></li> <li>• <b>Profile of mHealth users (gender [150], age, location, economic and social status)</b></li> <li>• User-reported satisfaction</li> <li>• <b>Messages to target audience delivered in a timely manner</b></li> <li>• <b>Quality of data collected via mHealth application</b></li> <li>• Level of use of health services related to mHealth program</li> <li>• Percentage of messages vetted by technical experts</li> </ul>
Health worker performance	<ul style="list-style-type: none"> <li>• Change in volume of clients served</li> <li>• Client-reported satisfaction</li> <li>• Supervisor-reported performance observations</li> </ul>
Capacity of local government and implementing organizations responsible for program and health outcomes	<ul style="list-style-type: none"> <li>• Number and duration of program-related trainings</li> <li>• Number, nature, and duration of successful partnerships</li> </ul>
Program <b>sustainability</b> [145], program costs, and cost effectiveness	<ul style="list-style-type: none"> <li>• Number and nature of funding sources</li> <li>• Total cost of ownership</li> <li>• Average cost of mHealth program per beneficiary</li> <li>• Money saved per beneficiary by change in target health behavior or health outcome</li> <li>• Willingness of user to pay for mHealth services</li> </ul>

Program Elements	Sample Indicators
Capacity of target beneficiaries	<ul style="list-style-type: none"> <li>Increased use of related health services</li> <li>Demonstrated understanding of health concept(s) addressed by mHealth program</li> <li>Change in target health behavior</li> </ul>
Extent to which the program operates in an enabling environment	<ul style="list-style-type: none"> <li>Existence of supportive policies and procedural guidelines</li> <li>Adherence to interoperability standards and program procedures</li> <li>Ongoing allocation of resources in budget for mHealth program</li> <li>Action steps taken by program management team to enforce implementation-related changes</li> </ul>

For guidance on the development of national M&E plans, see the *Mobile Alliance for Maternal Action (MAMA) Global Monitoring and Evaluation Framework*<sup>[151]</sup>. The MAMA Framework focuses on monitoring and reporting on progress when implementing mobile messaging programs for mothers, but the information in this document can be useful to other kinds of mHealth programs as well.

## Research & Evaluation Steps in an mHealth Intervention

A group of mHealth experts in New Zealand have established and implemented a process for the design, testing, and evaluation of mHealth interventions, which they describe in detail in their paper *A Development and Evaluation Process for mHealth Interventions: Examples from New Zealand*<sup>[146]</sup>. Table 3 summarizes the authors' research and evaluation steps in an mHealth intervention. While it might not be possible to complete all of these steps for all mHealth interventions, the table presents an example of a high-quality mHealth research strategy, with an emphasis on monitoring and evaluation in later stages. The table offers helpful illustrative measures for each research activity.

**Table 3. Summary of the research and evaluation steps in the development of an mHealth intervention**

(Source: Whittaker R, Merry S, Dorey E, Maddison R. *A development and evaluation process for mHealth interventions: Examples from New Zealand*<sup>[146]</sup>. Journal of Health Communication: International Perspectives. 2012; 17 Suppl 1:11-21.)

Research methods	Purpose	Example measures	
Formative research	<ul style="list-style-type: none"> <li>Focus groups</li> <li>Online surveys</li> </ul>	<ul style="list-style-type: none"> <li>To inform the development of the intervention content and process</li> </ul>	<ul style="list-style-type: none"> <li>How do the target audience use their phones?</li> <li>How does evidence and theory behind intervention fit with mobile phone usage?</li> <li>What would attract target audience to program?</li> </ul>
Pretesting	<ul style="list-style-type: none"> <li>Online surveys</li> <li>Focus groups</li> <li>Individual interviews</li> </ul>	<ul style="list-style-type: none"> <li>To determine acceptability of proposed intervention to target audience</li> <li>To improve and refine intervention on basis of feedback</li> </ul>	<ul style="list-style-type: none"> <li>What styles/content/language do they prefer?</li> <li>Are messages useful and understandable?</li> </ul>
Pilot study	Small and nonrandomized	<ul style="list-style-type: none"> <li>To test content and regimen of intervention</li> <li>To test processes</li> </ul>	<ul style="list-style-type: none"> <li>Is intervention acceptable?</li> <li>Are there any technical or process issues?</li> <li>Baseline measures for sample size calculations if necessary</li> </ul>
Randomized control trial	Pragmatic community-based randomized control trial	To test the effect of the intervention in comparison with a control group	<ul style="list-style-type: none"> <li>Health-related outcomes</li> <li>Objective measures</li> <li>Participant satisfaction</li> <li>Adverse/unintended effects</li> </ul>
Qualitative research	Semi-structured interviews	<ul style="list-style-type: none"> <li>To improve the intervention further</li> <li>To determine implementation issues and methods</li> </ul>	<ul style="list-style-type: none"> <li>How can we improve the intervention?</li> <li>What aspects were un/helpful?</li> <li>Was theory conveyed?</li> <li>Were messages acted upon?</li> <li>What are the best methods for rollout and promotion?</li> </ul>
Evaluation of implementation impact	<ul style="list-style-type: none"> <li>Phone/online surveys</li> <li>Semi-structured interviews</li> </ul>	To determine the effect of the intervention once scaled up	Reach, utilization, health-related outcomes, flow on effects on health/other services, unintended consequences, effect of different promotional methods

## Scale-up



Not every mHealth project is appropriate to scale up—small mHealth deployments often serve a specific short-term function. However, some mHealth projects could make a significant social impact if scaled. This section of the Guide summarizes best practices for ensuring scalability, focusing on **nine best practices for ensuring scalability of an mHealth project**<sup>[153]</sup>, drawn from case studies and expert interviews. Many of these practices are discussed in depth throughout the Guide, and they are paraphrased on the next page.

In November 2013, the mHealth Working Group hosted a meeting on the topic of scaling up mHealth. The presentations, given by JSI and The World Bank, are available for download and provide scale-up considerations based on the case examples of **cStock**<sup>[154]</sup> and **Programme Mwana**<sup>[155]</sup>.

### KEY CONSIDERATIONS

Key scale-up considerations, many of which are also explored elsewhere in this Guide, are discussed below. Some of these questions have been adapted from Expandnet's **Beginning with the end in mind: Planning pilot projects and other programmatic research for successful scaling up**<sup>[156]</sup>, which provides a checklist for assessing the scalability of a pilot project. Others were adapted from the article **Applying a framework for assessing the health system challenges to scaling up mHealth in South Africa**<sup>[157]</sup>. (Full references are at the bottom of the page.)

#### Feasibility of the mHealth solution

- Does the mHealth solution effectively and efficiently address a persistent health or service delivery challenge, and is it feasible in the settings in which it will be scaled up?
- Does the mHealth solution embody community, cultural, language, gender, institutional, and other factors that might help or hinder scale-up, and what adjustments will be necessary to adapt the program to new contexts?
- Has the mHealth solution been tested in the kinds of sociocultural, geographic, and institutional settings in which it will be replicated?
- Does the implementation plan allow enough flexibility to incorporate new knowledge, lessons learned, and technological developments into the process as needed? For example, can the mHealth application be adapted to continually changing technological reality?
- How will the particular types of M&E data you plan to collect inform the decision of whether to scale up the program?
- Is there evidence that the mHealth solution is cost-effective?

#### Support for scale-up at the systems level

- Is the leadership thinking strategically about the place of mHealth in the health system, fostering a supportive culture, and willing to allocate the resources necessary for scale-up?
- Is the mHealth solution integrated into existing systems? Are there clear, universal standards for usability, interoperability, and privacy and security that can be applied at scale?
- Has a strategy been developed to advocate for any necessary changes in policies, regulations, and procedures in order to institutionalize the mHealth solution?
- Does the mHealth program have sustainable access to human and financial resources, and does the health system have the capacity to implement the solution at a larger scale?
- Do the existing local technological partners have the capacity to support the technological requirements of scaling up the program?

#### Benefits of scale-up

- If the mHealth solution is offered on a larger scale, what are the potential cost efficiencies? In other words, what are the estimated cost savings or increases that could occur at scale?
- How could the mHealth program contribute to additional health and/or development issues as well as broader national mHealth goals?

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### References

[Beginning with the end in mind: Planning pilot projects and other programmatic research for successful scaling up](#)<sup>[156]</sup>. World Health Organization and ExpandNet. 2011.

Lemaire J. [Scaling up Mobile Health: Elements Necessary for the Successful Scale-up of mHealth in Developing Countries](#)<sup>[154]</sup>. Advanced Development for Africa and Actevis Consulting Group. 2011.

Leon N, Schneider H, Daviad E. [Applying a framework for assessing the health system challenges to scaling up mHealth in South Africa](#)<sup>[157]</sup>. BMC Medical Informatics and Decision Making. 2012;12:123.

## Nine Elements for Successful Scale-up



<sup>[159]</sup>The authors of *Scaling up mobile health: elements necessary for the successful scale-up of mHealth in developing countries* <sup>[134]</sup> (a paper commissioned by Advanced Development for Africa, Actavis Consulting Group) identify nine best practices, drawn from case studies and expert interviews, for ensuring scalability of an mHealth project. Many of these practices are discussed in depth throughout the Guide, and they are paraphrased here:

1. **Consider sustainability and scalability of the program from the beginning.** Make sure the hardware and software selected for the pilot program can be used on a broader scale. Formulate a long-term plan for financing. Continually monitor and evaluate the process and outcomes of the intervention.
2. **Assess the needs and demands of the target audience and be sure to understand local health priorities and the local technological, political, and programmatic landscape.** Then plan and design the intervention with the local conditions, environment, stakeholders, and barriers in mind.
3. **Identify existing similar mHealth efforts.** Rather than replicating work that has already been done, collaborate with other organizations working toward similar goals. Forge linkages with other mHealth programs in order to learn from their successes and failures. Leveraging existing knowledge and platforms will increase the efficacy of your program and help attract financial support and partnerships for scale-up.
4. **Educate and engage end users and target beneficiaries** <sup>[24]</sup> **throughout the mHealth development process to foster buy-in.** These stakeholders might include community and traditional leaders, community health workers, and community members. Encourage local stakeholders to take leadership roles in the development of the mHealth solution.
5. **Make sure the mHealth program is aligned with local and national health priorities and that it is compatible with existing health information systems.** If the pilot is successful, it will be easy to justify integrating the program into the national health system.
6. **Take steps to foster buy-in from government, communities, and local health systems from the beginning of the planning process.** Include all stakeholders in the planning and decision making process from beginning. Meet with as many government officials, community organizations, and local leaders as possible. Systematically monitor and evaluate the process and outcomes to show key stakeholders the costs, benefits, and other impacts of the program.
7. **Work closely with local implementation partners.** This will help ensure the content and format are user-friendly and accessible to target beneficiaries. Local partners can help you incorporate local language, values, and themes into the mHealth solution and make sure training and social marketing efforts adequately address local information needs.
8. **Form strategic partnerships to support scale-up.** Partners might include, for example, mobile network operators, technology companies, ministries of health, pharmaceutical or other consumer goods companies, and more.
9. **Continually and systematically monitor and evaluate the mHealth intervention to assess its impact and identify necessary adjustments.** Use meaningful, measureable indicators that will inform the decision about whether to scale up. Be sure there is enough flexibility in your implementation process to allow the program to adapt to changing needs, implementation challenges, technological realities, or other issues revealed by monitoring and evaluation (M&E) data.

## Sustainability



<sup>[160]</sup>

Like scale-up, sustainability should be on the radar from the beginning of the mHealth planning process. Given that the mHealth field is not yet mature, many programs still rely heavily on donor funding for start-up and ongoing support. Ministry of Health (MOH) and private sector financing have contributed funding to many efforts, and consortia funding models are quite common for mHealth deployments. There is less documentation of programs that are self-sustaining, though they do exist. This section of the Guide will help you think through sustainability considerations by exploring:

- **Risks to sustainability** <sup>[161]</sup>
- **A sustainability framework** <sup>[162]</sup>
- **Sustainability drivers** <sup>[163]</sup>
- **Financial sustainability** <sup>[164]</sup>

### KEY CONSIDERATIONS

- How will implementation costs be tracked and used to estimate costs of scale-up and potential cost savings of the program?
- Are long-term operating costs considered when making early project decisions, such as what kind of software should be used?
- What actions, if any, will the implementation team take to build local capacity to deliver mHealth services and develop, maintain, and upgrade mHealth systems?
- What is the financing plan to support the program over time?
- Is there a potential revenue generation model to support the service? What does that look like?
- Will end users share the costs of the mHealth application? Why or why not?

- What is the program's business model, if applicable?
- How can the project leverage the expertise and support of international technology partners or other business partners who might provide long-term support? Are there opportunities to leverage donated expertise?

#### THE EXPERTS SAY...

"We worked with a business consulting firm to develop a business model [for CycleTel™], and this has helped IRH articulate what we need financially to go reach scale (1 million users) and self-sustainability in India over a 5-year period. Without the business model to back-up our "ask," it was hard to come up with accurate numbers to request funding earlier in the development process. The business case is helpful, but also note that it is based on assumptions, and if you change any of the assumptions it affects what you are able to accomplish." – Priya Jha, Georgetown University's Institute for Reproductive Health, CycleTel, India

#### References

- Lemaire J. *Scaling up Mobile Health: Elements Necessary for the Successful Scale-up of mHealth in Developing Countries*<sup>[134]</sup>. Advanced Development for Africa and Actevis Consulting Group. 2011.
- Sarriot E, Ricca J, Yourkavitch J, Ryan L, and the Sustained Health Outcomes (SHOUT) Group. *Taking the Long View: A Practical Guide to Sustainability Planning and Measurement in Community-Oriented Health Programming* <sup>[165]</sup>. Calverton, MD: Macro International Inc. 2008.
- Sustainable Financing for Mobile Health (mHealth): Options and opportunities for mHealth financial models in low and middle-income countries*<sup>[123]</sup>. mHealth Alliance and Vital Wave Consulting. 2013.

## Risks to Sustainability



<sup>[166]</sup>Even with strong planning, there will be challenges to sustainability:

- **Donor timelines** for proposal submission and project length can limit the time the planning team has to research and include sustainable elements in the program design.
- Some projects feel **pressure to innovate**, which has led to many pilot projects that **lack interoperability** with existing systems and are unable to continue or expand.
- Although the purpose of a pilot is to generate evidence to determine whether scale-up is feasible and appropriate, too often **funding runs out** before the intervention can be scaled—even if the intervention has been proven to be cost-effective and beneficial to the community.
- If the project is scaled up, **expectations to achieve sustainability in a short amount of time conflict with the cost of mHealth** which, in the short run, can be more expensive than more traditional public health interventions.

The pages that follow in the Sustainability section will help you navigate and overcome these and other challenges to ensure that your project can continue beyond the pilot phase if desired.

## Sustainability Framework



<sup>[167]</sup>ICF Macro developed a **sustainability framework** that can serve as a guide to planning for sustainability of an mHealth program designed for integration into the public health system. The framework encompasses six key components of a sustainable health program.

1. **Health outcomes.** Population health outcomes can be used to measure the effect of the mHealth intervention.
2. **Access to, and quality of, health service provision.** How well are mHealth services being delivered to the target beneficiaries? (To some extent, this will depend on how well equipped health facilities and health workers are to provide services.)
3. **Local MOH district capacity and viability.** What is the capacity of the MOH to provide institutional support for mHealth service delivery?
4. **Local NGO partner capacity and viability.** What is the capacity of local partners to support demand creation activities in the community and household behaviors related to the desired health outcomes of the program? For components 3 and 4, both organizational capacity (leadership and governance, financial management, human resources, and organizational performance) and organizational viability (financial stability, managerial strength, and access to technical knowledge and ongoing training).
5. **Community capacity.** The community must not only demand mHealth services, but they must also supply resulting desired health behaviors such as adherence to treatment instructions, use of family planning, breastfeeding, or whatever the mHealth-related activity might be. For the mHealth intervention to be effective, the target beneficiaries must be able to make decisions about their own health, have some knowledge about health behaviors and openness to new information, and have access to any resources needed to participate in the mHealth intervention or change health behaviors as a result.
6. **Enabling environment.** Many environmental variables can enhance or hinder the impact of the mHealth intervention. The mHealth program must take into account the local context, which includes cultural, political, environmental, social, financial, educational, gender, and other factors.

## Sustainability Drivers



<sup>[168]</sup>A number of drivers enable a project's sustainability, many of which are discussed in the **Scale-up** <sup>[68]</sup> section of this Guide. These might include working closely with MOH and private sector partners from the beginning of the process to **build buy-in** from those who can provide financial, human, and technological resources in the long term.

In addition, **tracking up-front and ongoing program costs and estimating scale-up costs** is essential for both demonstrating potential cost savings and for securing government and private sector investments in mHealth. Understand **total cost of ownership** <sup>[24]</sup> (TCO) of the project—all of the direct and indirect costs, including **social cost** <sup>[24]</sup> and **opportunity cost** <sup>[24]</sup>, of the mHealth application. A solid understanding of TCO can inform decisions about partnerships, subsidization, and other financing options. Dimagi has developed a helpful **TCO Model** <sup>[93]</sup>, included in this Guide, for use by CommCare users. It can be adapted for use by other mHealth programs as well.

Seemingly obvious decisions made early on—like which mobile device is used—have an enormous impact on the program's uptake, cost structure, and continued success. These are examples of potential drivers of mHealth's scalability and sustainability that are established early on in the project:

- Is texting more expensive than the Internet in the program setting?
- Do users have reliable mobile phone reception?
- Is there a local "help desk" or support system in place for troubleshooting and maintenance of software and hardware, and how do the costs for operating this help desk change with user volume?
- Would nurturing local technology partners lead to long-term stability by fostering local ownership and capacity to monitor and maintain the technology over time?
- Is operating an open source platform, a purchased platform, a licensed proprietary platform, or a customized platform more cost effective in the long term?

Other drivers that enhance sustainability include the ability to **be honest about what does not work**, the capacity to **learn from these failures**, and the flexibility to **adapt the mHealth program accordingly**. A strong **monitoring and evaluation** <sup>[60]</sup> (M&E) system will not only facilitate documentation of the successes and failures of the process, but it will also help the implementing team articulate the value and benefits of the program to a range of stakeholders. If the mHealth program is shown to be cost-effective and to have a positive impact on health and other outcomes, the case will be made for continued funding and scale-up.

## Financial Sustainability



<sup>[169]</sup>Frequently **mHealth implementers must decide whether to provide equipment or the service itself to end users free of cost**. Some experts advocate that end users access programs through their own mobile equipment and pay related airtime and fees as they would for other services. This ensures that end users are already familiar with the mobile equipment and are invested in keeping it. Often, end users perceive greater value of a service if they have to pay for it.

Other experts believe that in order to maximize uptake and access to the mHealth program, equipment and related operational costs should be subsidized or provided for free. The implications of these options are important to consider for the long-term sustainability of the project. While subsidizing equipment and fees might be feasible for a small pilot project, it might not be practical when the project is scaled up. On the other hand, requiring end users to pay for a new technology might limit its reach and use.

A **2012 survey** <sup>[170]</sup> of 1,798 respondents from developed and emerging countries gauged their willingness to pay for mHealth services. The survey revealed that **users in low- and middle-income countries are generally more willing to pay for mHealth services than users in high-income countries**. In low- and middle-income countries, 27 percent of users were willing to pay up to \$1 USD per year for mHealth services, 33 percent of users were willing to pay between \$1 and \$5 USD per year for mHealth services, and 20 percent of users were willing to pay more than \$5 USD per year for mHealth services (the other 20 percent were not willing to pay). These results indicate that **mHealth services might be able to generate their own sustainable revenue streams**

**m-Enabled Inclusive Business Models: Applications for Health** <sup>[171]</sup> shares several m-enabled case studies that showcase **commercially viable business models** for serving low- and middle-income communities. The report sheds light on how to serve low-income populations in a manner that will cover program costs and have significant reach, highlighting best practices and sharing business model principles that enable sustainable impact with donors and others.

In another recent publication, **Sustainable Financing for mHealth** <sup>[123]</sup>, the mHealth Alliance and Vital Wave Consulting identify **seven critical success factors for ensuring the financial sustainability of mHealth applications** (several of which overlap with topics already covered in this Guide):

1. **Know the stakeholders.** For each stakeholder, consider the size of the organization; whether it is part of the public or private sector; whether it is a local or international organization; whether it is a new or repeat customer; and whether it is operating on a short- or long-term time horizon. These factors will determine the kinds of data and evidence that will attract a partner to the project and will shed light on the kinds of support the partner can provide.
2. **Ensure the value proposition for all stakeholders.** In other words, understand and articulate the incentives that will attract each partner—what is in it for them?
3. **Plan for long-term economic support.** Anticipate your funding source not only for the pilot stage, but also for future iterations of the project. Who pays for the service—a donor, the ministry, a private sector partner, or the end user?
4. **Localize the business model.** A program model that works well in one locale might need adjustments to succeed in a different setting.
5. **Plan for capacity building, including M&E.** Having a solid plan for capacity building will ease the concerns of potential investors about a lack of financial, human, time, or other resources for mHealth. Ongoing M&E will help the project demonstrate health impact, cost savings, program efficiency, and return on investment to potential partners.
6. **Keep it simple.** Particularly when collaborating with multiple partners, limiting partner contributions to their **core competencies** <sup>[24]</sup> reduces the likelihood of conflicts of interest.
7. **Understand the particular funding needs of mHealth application types.** The type of mHealth application and the evolutionary stage of the mHealth intervention will determine the need for

funding—whether it is “seed” money to support start-up, “gap” funding to support the scale-up process, or “scale” funding to support ongoing operations at scale.

#### THE EXPERTS SAY...

“The development [funding] approach has cycle issues. 3-5 year grant cycles forces a constant churn in staff and funding structures. This can be overcome with significant buy-in by long-term partners (for example, convince the MOH to hire people to support mHealth programs).” - Isaac Holeman, Medic Mobile

## The mHealth Planning Guide Tools

As this Guide is intended to help you develop a solid plan for your mHealth activity, we provide four tools to support your planning process. We recommend downloading and printing these tools so that you have them readily available as you work through the Guide. Click on the image below to download a zip file containing PDF, PowerPoint, or Word versions of all of the mHealth Planning Tools in our collection.



[10]

- The **Planning Canvas** ([PDF](#) [11], [PPT](#) [12]) helps you visualize the essential components of your planning process, with all the topics covered in the Guide represented on one page. The worksheet illustrates how the project components are interconnected pieces of a complete strategy. While your plan will not realistically fit on one page, you can use this template to take notes as you work through the Guide or as a template for a strategy session with a whiteboard. The planning process is iterative in nature and relies on many rounds of incorporating user feedback, developing partnerships, tweaking content, and much more before scale and sustainability can be reached. You can use the Planning Canvas to document major changes and/or breakthroughs in your plan. You will notice that there is a box in the top right hand corner of the worksheet where you can indicate the date and which iteration of the Canvas you are working on.
- The **Key Considerations** are designed to help you think through the critical questions that need to be asked as you design an mHealth solution and plan for implementation. You will notice that there are key considerations listed throughout the Guide. For ease of use, all of these considerations are consolidated into three PDF documents (one for each planning phase covered in the Guide), which you can download and use as checklists or worksheets to guide you through the mHealth planning and development process. The Key Considerations should be used to fill in the Planning Canvas and are designed to help in the following ways:
  - **Concept Development** [13]: The factors to consider during initial planning and concept development will help health program planners gain an in-depth understanding of whether there is a need for an mHealth solution. Is mHealth an appropriate tool to use to address a given challenge?
  - **Solution Design & Testing** [14]: These factors to consider will help developers and health program implementers design and test the technology specifications and content for the mHealth solution.
  - **Planning for Implementation** [15]: The considerations explored in this section of the Guide will help you understand the mHealth implementation process. What elements need to be in place to ensure program success?
- The **Logic Model Template** ([PDF](#) [16], [PPT](#) [17]), introduced in the **Concept Development** [7] section of the Guide, will help you articulate your program’s purpose and link activities to outputs, outcomes, and intended impacts.
- The **Technology Decisions Worksheet** ([PDF](#) [18], [Word](#) [19]), explained in the **Solution Design & Testing** [8] section of the Guide, will assist you in creating a document that captures your technology requirements. This document will ultimately guide the technology development process, whether you are building it in-house or with outside expertise
- The **Publications Matrix** [23] includes key mHealth articles, case studies, frameworks, reports, briefs, research syntheses, and other materials for mHealth planning. These resources outline strategies for designing and implementing successful mHealth programs, and many of these publications share program results and document important lessons learned.

For a list of helpful tools, guides, and handbooks developed by other organizations that are relevant for mHealth planning, please visit [mHealth Knowledge](#) [172].

## Publications

Included here are key mHealth articles, case studies, frameworks, reports, briefs, research syntheses, and other materials for mHealth planning. These resources outline strategies for designing and implementing successful mHealth programs, and many of these publications share program results and document important lessons learned.



[23] Click on the **Publications Matrix** [23] image to view the full list of publications included in this section. Documents are ordered alphabetically by publication year. To help you navigate the list, we included a brief summary of “why it helps with planning” for each publication and also indicated keywords that align with the topics covered throughout the Guide. To access a document, click on the hyperlinked titles within the matrix, or browse the resource list below by scrolling down this page and clicking on the resource record(s) of interest. We have referenced many of these publications throughout the contents of the Guide as well.

This collection represents a comprehensive and vetted compilation of publications that are relevant for mHealth program planning, but note that it does not include every mHealth publication that exists. If you have a feedback about the **Publications Matrix** or would like to suggest an essential publication for inclusion, please share your input using the [feedback form](#) [4].

#### Resources:

### • Designing Health Literate Mobile Apps

As mobile devices become more popular mobile health applications (mHealth apps) present opportunities to improve health and wellness. However, poorly designed mHealth apps can contribute to the challenges many people have understanding and acting on health information—challenges that are exacerbated for users with low health literacy. The authors of this discussion paper call for app developers to build “health literate apps” that apply usability and health literacy strategies throughout the development process. The paper offers a set of strategies for developers and a case study to demonstrate how the strategies can be effectively applied in the development process.

**Why it helps with planning:** Provides actionable steps to create a mobile service (including content) that is appropriate for end users’ level of health literacy.

### • CycleTel™: Bringing a market-based mindset to mHealth

CycleTel™ is an innovative mHealth product: a fertility awareness-based family planning method delivered to users via SMS. The Global mHealth Initiative spoke with Alexis Ettinger and Nicki Ashcroft from the Georgetown University’s Institute for Reproductive Health (IRH) to learn more about this USAID-funded program. The article covers the following topics:



- What is CycleTel?
- Why go mobile?
- CycleTel's Growth - How has CycleTel evolved?
- CycleTel's Future - How will CycleTel approach scale-up? What's next for CycleTel?

**Why it helps with planning:** Details testing go-to-market strategies for a market-based mHealth service. Provides insights into sustainability and scale-up.

## • Mutual Value, Mutual Gain: Best Practices from Successful Social Sector Partnerships with Mobile Network Operators

For operators to take advantage of the revenue potential found in underserved communities in emerging markets, the formation of efficient and effective partnerships between operators and social sector organizations that have long-standing networks and expertise in serving rural and marginalized populations is crucial. This Insights paper details best practices in pursuing, negotiating, designing and implementing social sector/operator partnerships to increase the social sector's understanding of how to successfully work with operator partners for mutual benefit.

**Why it helps with planning:** Supports partnership development and management with MNOs--the initial approach and negotiation, partnership structure and implementation, and exit from the partnership.

## • Snapshot: MAMA in Bangladesh--Including Men in Mobile Services for Women

In cultures where women's empowerment is a complex, challenging subject on both social and cultural levels, men can be the champions or detractors to any mHealth approach. MAMA tackles this issue by integrating men and other household members within their offerings.

**Why it helps with planning:** Case example of how to include men in mHealth programs that are targeted to women. Insights from Bangladesh and South Africa illustrate how gender dynamics may change per operating environment.

## • mHealth for Maternal Health: Bridging the Gaps

In April 2014, 50 implementers, experts and donors from the mHealth and maternal health communities gathered in Boston for a meeting titled "mHealth for maternal health: bridging the gaps." Throughout the two day meeting, the participants of this technical meeting grappled with the constraints to delivering high-quality, accessible, and affordable maternal healthcare, discussed the opportunities for information and communication technologies to help alleviate those constraints, and outlined the beginnings of a shared "mHealth for maternal health" research agenda. The technical meeting was hosted by the Maternal Health Task Force, in collaboration with Johns Hopkins Bloomberg School of Public Health and the World Health Organization. This report documents the results of the meeting's discussions, summarizes key themes, and lays out conclusions and next steps, including the existing information and evidence gaps for mHealth for maternal health.

**Why it helps with planning:** Up-to-date documentation of mHealth for maternal health, including discussion of opportunities and gaps.

## • mHealth Field Guide for Newborn Health

This guide explains how mHealth serves newborn health through referral and tracking of mothers and infants, decision support for CHWs, CHW supervision, scheduling and tracking postpartum and postnatal visits, and teaching and counseling for mothers and families. Case studies are provided from Afghanistan, India, Malawi and Indonesia. Links to resources for planning, implementation, and evaluation are included along with lessons learned across the case studies.

**How it helps with planning:** Explains how mHealth can support key practices for newborn health, with 4 case examples. Provides implementation lessons and resources relevant to all mHealth efforts.

## • Principles for Digital Development

The Greentree Consensus represents a concerted effort by donors to capture the most important lessons learned by the development community in the implementation of information and communications technology for development (ICT4D) projects. These principles seek to serve as a set of living guidelines that are meant to inform, but not dictate, the design of technology-enabled development programs.

These principles were inspired by the [Greentree Principles of 2010](#) <sup>(173)</sup>, the [UNICEF Innovation Principles of 2009](#) <sup>(174)</sup>, and the [UK Design Principles](#) <sup>(175)</sup>, among others. The current version has been developed in consultation with The Bill and Melinda Gates Foundation, USAID, UNICEF, The World Bank, SIDA, Omidyar Foundation, The State Department, UNHCR, WFP, UNFPA, UNDP, Global Pulse, UNWomen, and OCHA.

JOIN THE CONVERSATION: The Greentree Consensus wants the direct input and dedication of development and technology professionals to translate these abstract principles into practical action. They ask that you:

- Provide your feedback on how to implement these principles on a daily basis
- Submit a Guest Post on a case study, tool, or approach you are taking to implement the principles
- Organize a session on the principles at your organization, and report back on your experience
- Champion the principles within your organization and across the industry

If you have any questions or need support, check out the [community forum](#) <sup>(176)</sup>.

**Why it helps with planning:** Living guidelines to inform (not dictate) the design of technology-enabled development programs.

## • Systematic Review on What Works, What Does Not Work and Why of Implementation of Mobile Health (mHealth) Projects in Africa

Access to mobile phone technology has rapidly expanded in developing countries. In Africa, mHealth is a relatively new concept and questions arise regarding reliability of the technology used for health outcomes. This review documents strengths, weaknesses, opportunities, and threats (SWOT) of mHealth projects in Africa from 2003-2013. Results were grouped to assess specific aspects of project implementation in terms of sustainability and mid/long-term results, integration to the health system, management process, scale-up and replication, and legal issues, regulations and standards.

**Why it helps for planning:** This is a systematic review of 44 mHealth projects in Africa from 2003-2013 yielding implementation lessons across identified factors. Provides considerations for an effective mHealth project in the African context.

## • Connected Life: The Impact of the Connected Life Over the Next Five Years

Mobile technology is redefining our lives and making it increasingly connected. From health and education to transportation and smarter cities, the proliferation of mobile communication and a connected life is now well established and here to stay. This report presents numbers on the potential impact that mobile phones can bring to health and other social sectors, based on existing evidence.

**Why it helps with planning:** Provides research that contributes to the concept development and landscape analysis phases.

## • What is mPossible?

This video entitled "What is mPossible?" attempts to address a number of concerns commonly held about the feasibility of deploying mHealth solutions in low-resource settings. Activities and

interviews of Frontline Health Research Workers of the JiViTA Project in Bangladesh ([www.jivita.org](http://www.jivita.org) <sup>(177)</sup>) are featured, a close collaboration between Johns Hopkins Bloomberg School of Public Health ([www.jhsph.edu](http://www.jhsph.edu) <sup>(178)</sup>), mPower Social Enterprises ([www.mpower-social.com](http://www.mpower-social.com) <sup>(179)</sup>) and the Ministry of Health and Family Welfare of the Government of Bangladesh ([www.dghs.gov.bd](http://www.dghs.gov.bd) <sup>(180)</sup>).

**Why it helps with planning:** Demonstrates the value of working with your end users when introducing new technology. Covers implementation considerations (challenges and advantages) when equipping community health workers with mobile phones in Bangladesh.

## • Delivering mHealth Education at Scale in India: Lessons Learned

In this webinar, Sara Chamberlain, Head at ICT of BBC Media Action, India discusses scaling mobile health education services for hundreds of thousands of frontline health workers across the Indian states of Bihar, Orissa and Uttar Pradesh, in partnership with six of the largest mobile operators in India: Airtel, BSNL, Idea, Reliance, TATA and Vodafone. BBC Media Action's award-winning mobile health education services - Mobile Kunji and Academy - have just been approved for national roll out by the health ministry in India.

BBC Media Action works on the Ananya programme in Bihar with the Bill & Melinda Gates Foundation, the state government, Pathfinder International and technology solution providers: OnMobile Global Ltd, the Grameen Foundation, and Dimagi. The Ananya programme involves a range of partners including CARE, WHP, IFC, PCI and PSI. For background information on the BBC Media Action's work in mHealth, see their report, "[Health on the Move](http://www.rethink1000days.org)" <sup>(181)</sup> and their microsite their work in Bihar at [www.rethink1000days.org](http://www.rethink1000days.org) <sup>(182)</sup>.

**Why it helps with planning:** Tangible example of a scale-up strategy for mHealth; outlines challenges and solutions. Webinar recording and slides available.

## • Health on the Move: Can Mobile Phones Save Lives?

This briefing focuses on how one of the greatest engines of innovation in the 21st century – the mobile phone – provides a high-impact solution to save lives. It identifies three aspects of mHealth that renders it such a potentially robust healthcare tool:

- Reach. The first is its capacity to leverage existing – and quite basic – phones to provide life-saving information to people in difficult-to-reach, rural areas.
- Design. The second is its capacity to tailor both the delivery and content of that information to the needs of poor, illiterate and marginalised populations.
- Scale. The third is its capacity to operate at scale in a cost-effective, financially sustainable way.

The breakdown of the content in the policy briefing is as follows:

- Part 1 examines the data on maternal and child health globally and in India.
- Part 2 explores the role of mobile phones within the sphere of health communication, highlighting mHealth as an educational tool.
- Part 3 provides a brief overview of BBC Media Action's mHealth work in Bihar, India.
- Part 4 lays out the conceptual insights that work has yielded for reaching poor and marginalised populations.
- Part 5 illustrates the integral role of scale in making such mHealth initiatives sustainable financially.
- Part 6 reviews the state of the evidence on mHealth.
- Part 7 draws conclusions arising from the analysis in parts 1–6.

**Why it helps with planning:** Case study and policy brief on how to leverage mobile phones to reach the hardest to access, focusing on the topics of reach, design, and scale. Walks through concept development, solution design & testing, and implementation.

## • Influence of mHealth Interventions on Gender Relations in Developing Countries: A Systematic Literature Review

Research has shown that mHealth initiatives, or health programs enhanced by mobile phone technologies, can foster women's empowerment. Yet, there is growing concern that mobile-based programs geared towards women may exacerbate gender inequalities. A systematic literature review was conducted to examine the empirical evidence of changes in men and women's interactions as a result of mHealth interventions.

The current literature suggests that mobile phone programs can influence gender relations in meaningfully positive ways by providing new modes for couple's health communication and cooperation and by enabling greater male participation in health areas typically targeted towards women. MHealth initiatives also increased women's decision-making, social status, and access to health resources. However, programmatic experiences by design may inadvertently reinforce the digital divide, and perpetuate existing gender-based power imbalances. Domestic disputes and lack of spousal approval additionally hampered women's participation.

**How it helps with planning:** Provides rationale for why it is important to explore gender dynamics in mHealth programs.

## • SMS 4 SRH: Using Mobile Phones to Reduce Barriers to Youth Access to Sexual and Reproductive Health Services and Information

This summary report provides an overview of how mHealth programming may be used to improve youth access to sexual and reproductive health (SRH) services and information. The report frames the discussion of mHealth through an examination of the specific barriers that limit youth access to them. The barriers identified have been divided into four categories:

- **Accessibility Barriers**, including cost and location.
- **Information Barriers**, including lack of SRH information and lack of location information.
- **Socio-Cultural Barriers**, including embarrassment/fear of social stigma and social pressure/cultural norms.
- **Provider Barriers**, including provider bias, lack of provider training, and poor service and delivery management.

Each barrier is illustrated with examples of how it limits youth access to SRH information and services around the world. Potential mHealth approaches to each barrier are offered, with examples and case studies of existing programs from a variety of settings and organizations. Limitations and opportunities for using mHealth to address each barrier are discussed. Finally, lessons that have been learned are offered to guide the process of developing and implementing mHealth programming focused on youth.

**Why it helps with planning:** Provides an overview of how mHealth programming may be used to improve youth access to sexual and reproductive health services and information.

## • The Truth About Disruptive Innovation

This blogpost, written by Ken Banks of FrontlineSMS, discusses why it's important to understand the problem before using fashionable mobile technologies.

## • mHealth Compendiums (First, Second, and Third Editions & Infographic)

**mHealth Compendium Third Edition** - The mHealth Compendiums document a range of mHealth applications being implemented primarily in Africa. This volume was published in November 2013 and is the third edition in the series. It contains twenty-four new case studies which document mHealth innovations, many of which seek to contribute to USAID's two overarching objectives of *eliminating preventable maternal, newborn and child deaths* and *achieving an AIDS free generation*.

**mHealth Compendium Second Edition** - The second volume of the mHealth Compendium was published in May 2013 and contains twenty-seven case studies which document a range of mHealth applications being implemented mainly throughout Africa. Like the first edition, the case studies have been organized within five programmatic areas: Behavior Change Communication, Data Collection, Finance, Logistics and Service Delivery.

**mHealth Compendium First Edition** - The first edition of the mHealth Compendium, published in November 2012, contains thirty-five case studies which document a range of mHealth applications being implemented throughout Africa and, in some exceptional cases, in other regions. In order to help USAID missions access relevant mHealth information, this compendium offers project descriptions, publication references, and contact information for making further inquiries.

**Infographic, Volumes 1, 2 & 3:** The infographic documents a range of mHealth applications being implemented primarily in Africa. This summary synthesizes and highlights case study materials in Editions One, Two and Three to help USAID missions and other interested parties identify and access information contained within the Compendiums.

**Why these resources help with planning:** Serves as a project repository and case examples for mHealth applications being implemented mainly in Africa from 2012-2013. Helps during landscape analysis. Designed to provide information to USAID missions.

## • Lessons Learned: ICTs for Supply Chain Management in Low-Resource Settings

A report and set of case studies on lessons learned from implementing information and communication technology (ICT) projects for supply chain management in low-resource settings, based on experience from Dimagi and VillageReach in a variety of engagements in Ghana, Tanzania, Malawi, Uganda, and Mozambique.

**Why it helps with planning:** Examples of the mHealth planning process in action, covering technology design and implementation lessons on the topics of program design, training and support, and scale-up.

## • Addressing Gender and Women's Empowerment in mHealth for MNCH: An Analytical Framework

The proposed analytical framework for addressing gender and women's empowerment within mHealth and MNCH programs builds on a review of existing evidence and gaps, a review of existing mHealth projects, and consultations with experts at key events. The framework is premised on the fact that addressing gender equity and women's empowerment is critical to successfully achieving health goals and that issues related to gender equality and women's empowerment are not yet fully understood in the context of mHealth. The framework therefore proposes four domains of analysis based on mHealth intervention components.

The framework highlights the fact that women's voices and participation is central to their access and use of mobile phones and technology for better health. Additionally, women's empowerment and participation needs to be seen in a context while engaging men as well as other relevant gatekeepers, and addressing social and cultural norms that inform and shape the gender relations, behaviors and thus practices. This holistic view is critical to achieve the health goals related to Millennium Development Goals (MDGs) 4, 5 and 6.

The framework is meant to serve:

- As a tool to further examine, understand and analyze gender related issues and implications within mHealth interventions, including the unintended negative consequences of mHealth such as violence against women, in order to address them by developing meaningful mHealth intervention strategies and approaches.
- As a 'living' framework, which will be further informed by the evidence and analysis gathered henceforth.

The proposed framework may be used by practitioners, including national governments and NGOs, to further examine the issues on the ground, by academics and researchers to undertake further research in this area, by policy makers to examine gender sensitive mHealth and eHealth policies, and by donors and other partners to support gender transformative mHealth interventions.

**Why it helps with planning:** Proposes an analytical framework for addressing gender and women's empowerment within mHealth and MNCH.

## • mHealth Innovations as Health System Strengthening Tools: 12 Common Applications and a Visual Framework

This new framework lays out 12 common mHealth applications used as health systems strengthening innovations across the reproductive health continuum.

**Why it helps with planning:** Provides a comprehensive framework for thinking about the ways in which mHealth contributes to strengthening health systems. While focus is on reproductive health, the framework can be applied to other technical areas.

## • State of Evidence: mHealth and MNCH

The mHealth Alliance commissioned this report to present the findings of a needs assessment and gaps analysis of the current state of the evidence in mHealth, using maternal, newborn, and child health (MNCH) as a use case. The intent for the needs assessment and gaps analysis summarized in this report is to 1) identify gaps

in the evidence base, and 2) advocate for and encourage others to undertake research to fill these knowledge gaps and build the evidence base for mHealth. The report aims to identify challenges and make recommendations towards enhancing the mHealth for MNCH evidence base. The primary intended audience is stakeholders who generate and use evidence in mHealth for MNCH.

**Why it helps with planning:** Trends, gaps, stakeholder needs, and opportunities for future research on the use of mobile technology to improve MNCH, which is useful during the concept development and research design phases for programs addressing MNCH.

## • A Reality Checkpoint for Mobile Health: Three Challenges to Overcome

In this editorial, the *PLOS Medicine* editors discuss the three challenges that mHealth initiatives face in realizing their potential to transform health service delivery. The three reality checks are: (1) are your systems interoperable?, (2) are you using open standards, and (3) how will you evaluate? The editors also call for cooperation and coordination between very different stakeholders to deliver on the potential of mHealth.

**How it helps with planning:** Lays out three key questions (on interoperability, open standards, and evaluation) that programs need to consider before starting an mHealth project.

## • Scaling up mHealth: Where Is the Evidence?

**Summary Points:**

- Despite hundreds of mHealth pilot studies, there has been insufficient programmatic evidence to inform implementation and scale-up of mHealth.
- The authors discuss what constitutes appropriate research evidence to inform scale up.
- Potential innovative research designs such as multi-factorial strategies, randomized controlled trials, and data farming may provide this evidence base.
- The authors make a number of recommendations about evidence, interoperability, and the role of governments, private enterprise, and researchers in relation to the scale up of mHealth.

**Why it helps with planning:** Offers an in-depth look at the state of mHealth evidence (in 2013) and practical recommendations regarding how to improve mHealth research/evaluation to better inform scale up.

## • MAMA Community Spotlight Series

In 2013, the Mobile Alliance for Maternal Action (MAMA) launched a Community Spotlight series to highlight some of the work being done by organizations using MAMA's adaptable mobile messages. The Community Spotlight series features organizations that are using mobile technology to improve maternal, newborn and child health. The current spotlights include:

- **ChatSalud Nicaragua** <sup>(1883)</sup>, **July 2014:** In Nicaragua, one in four adolescent girls will become pregnant before the age of 19, and in rural Nicaragua the rate rises to one in three. At the same time, over 90% of Nicaraguans have access to a cell phones. Using a combination of MAMA messaging, m4RH messaging, and messaging from local organizations as a base, ChatSalud adapted a combination of these messages to fit the local context.
- **Chipatala Cha Pa Foni, Malawi**, <sup>(1844)</sup> **September 2013:** The Chipatala Cha Pa Foni (CCPF) in Malawi is a hotline and voice/text based tips and reminders service providing women and guardians of young children in rural and underserved areas with access to information, medical advice and referrals on reproductive, maternal, newborn, and child health (RMNCH) issues.
- **Savana Signatures, Ghana** <sup>(1851)</sup>, **August 2013:** Savana Signatures is currently implementing a Technology for Maternal Health project in four districts (Tamale, Yendi, Savelugu and Kumbungu) and six health facilities (Kings Medical Center, Yendi, Savelugu, Tamale Central, Tamale West and Tamale Teaching hospitals) in Ghana.
- **Living Goods, Uganda** <sup>(1866)</sup>, **June 2013:** The complete case study of how Living Goods, Uganda has used the MAMA adaptable messaging including challenges, lessons learned, and future plans to scale up.
- **Healthy Pregnancy, Health Baby Text Messaging Service, Tanzania** <sup>(1877)</sup>, **July 2013:** The complete case study of how Healthy Pregnancy, Healthy Baby Text Messaging Service in Tanzania has used the MAMA adaptable messaging, including challenges, lessons learned, and future plans to scale up.
- **The Liga Inan Project, Timor-Leste** <sup>(1888)</sup>, **May 2013:** The Liga Inan ("Mobile Moms") Project is using mobile phones to connect expectant mothers with health care providers in Timor-Leste to improve the likelihood of a healthy pregnancy and birth. The goal of the Liga Inan project is to increase utilization of quality skilled care before, during and after delivery.

Check the [MAMA's Tools & Resources](#) <sup>(1891)</sup> page for future updates.

**Why these help with planning:** Case studies that highlight how programs have used MAMA's adaptable mobile messages. Examples of mHealth planning process in action.

## • Hype for mHealth: More “y” or “o” on the Horizon?

In this letter, the authors present the response of a group of researchers in the mHealth community to the recent calls for evidence issued by global health and funding agencies. They support their conclusions through a summary of the numerous ongoing mHealth studies listed in the US federal clinical trial registry. They identified 215 unique mHealth studies that were registered in the clinicaltrials.gov database, of which 81.8% (n = 176) studies used a classical randomized trial design and 40 new studies were added to the database between May and November 2012 alone. Based on these results, the authors posit that the field is entering a new 'era' where a body of rigorous evaluation of mHealth strategies is rapidly accumulating. They also suggest that mHealth interventions can be evaluated with the same rigor as other public health strategies, attenuating some of the hype previously associated with mHealth.

**Why it helps with planning:** Provides insights into how mHealth programs can be evaluated and assurance that the evidence-base for mHealth is building.

## • mHealth: Mobile Technology to Strengthen Family Planning Programs

**High-Impact Practices in Family Planning** (HIPs) are promising or evidence-based practices that, when scaled up and institutionalized, will maximize investments in a comprehensive family planning strategy. The newest in this collection of briefs is *mHealth: mobile technology to strengthen family planning programs*<sup>[19]</sup>. This eight-page brief focuses on mobile health (mHealth) and how mHealth approaches may hold the potential to strengthen family planning programming, including reaching underserved populations and addressing critical health-systems issues in areas such as human resources, health management information systems, and financing. This eight-page brief discusses the potential impact of this new technology and provides tips that represent a synthesis of lessons learned from published literature, gray literature, and in-depth interviews with 18 mHealth experts.

**How it helps with planning:** As an USAID High Impact Practices Brief, this document provides the evidence for why/how mHealth applies to family planning programs and includes key planning and implementation lessons. Also serves as an advocacy piece.

## • Operational Challenges in the Cambodian mHealth Revolution

Even when an mHealth intervention is known to be effective, the structure of the telecommunications industry, combined with user behaviors, can make it extremely difficult to implement in some countries. Four significant operational challenges facing mHealth programs in Cambodia have been identified through the author's own experiences implementing mHealth initiatives with the Cambodian Health Education Media Service (CHEMS). These challenges are potentially relevant to other countries with similar telecommunication markets.

**Why it helps with planning:** Highlights mHealth operational challenges related to the structure of the telecom industry and user behavior, underscoring the importance of formative research.

## • Going Native (or Not): Five Questions to Ask Mobile Application Developers

The author of this article -- as a public health researcher and software developer -- advises health professionals on key questions to ask software developers when vetting vendor options to develop a mobile app. The author offers five questions to ask prospective developers, and also explains the difference between native and non-native apps.

**Why it helps with planning:** The information in this article is most relevant for smartphone app development, but it does provide context and information on developing software for any mobile device. The author suggests five questions that should be asked of any software developer.

## • Sustainable Financing for Mobile Health (mHealth): Options and opportunities for mHealth financial models in low- and middle-income countries

The consumption and delivery of health-related services via mobile communication devices, known as mHealth, is fast becoming an essential component of global health. Yet, concern is growing within the global health community that, despite the extraordinary promise of mHealth, implementations are challenged to sustain 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 financial modeling. The Sustainable Financing for Mobile Health (mHealth) report, commissioned by the mHealth Alliance and delivered by Vital Wave, provides a platform for examining how mHealth implementations make the transition from reliance on short-term grant funding to long-term economic buyers.

The report uses a value chain analysis framework at the stakeholder level to evaluate five financial models that exist today in priority mHealth areas. The various facets of analysis in this report are brought to life through an examination of Nigeria as a use case for putting into practice the recommendations for each of the five mHealth application areas. It concludes with recommendations that can guide funders, buyers and implementers at various stages of mHealth projects to achieve financial sustainability.

**Why it helps with planning:** Evaluates five existing mHealth financial models, contributing insights to advance sustainability models for mHealth services.

## • M4RH Cost Considerations

The cost of operating m4RH or a system like it will vary depending on the context. This one-pager explains the costing considerations for m4RH.

**Why it helps with planning:** Example inputs could be used for costing other programs.

## • Patient Privacy in a Mobile World: A Framework to Address Privacy Law Issues in Mobile Health

Protecting personal health information that is collected and transmitted over mobile devices has been cited as an essential factor to bringing mHealth to scale. Led by the mHealth Alliance, the Thomson Reuters Foundation, Merck, and Baker & McKenzie this report aims to increase the understanding of privacy and security policies related to the use of mHealth.

**Why it helps with planning:** Provides information on the current mHealth privacy and security laws worldwide, results of a gap-analysis on this topic in seven countries, and the key issues to consider to assess/address patient confidentiality and privacy moving forward.

## • Programme Mwana (PPT)

Merrick Schaefer, Senior Innovation Specialist at The World Bank, gave this presentation at the mHealth Working Group meeting on November 2013 m. The presentation is an overview of UNICEF's Programme Mwana, a health systems strengthening intervention in Zambia and Malawi that addresses two programmatic health areas: 1) Early Infant Diagnosis (EID) of HIV; and 2) improving postnatal visits of mothers and infants. The program uses two mobile technology applications: Results160 and RemindMi.

**Why it helps with planning:** Detailed scale-up case study. Refer to slides 64-65 for scale-up considerations.

## • Scaling Up Mobile Technology Applications for Accelerating Progress on Ending Preventable Maternal and Child Deaths

This report documents key points presented and discussed at the regional meeting "Scaling Up Mobile Technology Applications for Accelerating Progress on Ending Preventable Maternal and Child Deaths" held November 10, 2013 in Addis Ababa, Ethiopia. The meeting was hosted by the Federal Ministry of Health and Social Welfare of Ethiopia and USAID/Ethiopia. The meeting served to assess the progress achieved by 15 African countries in moving towards scaling up the use of mobile technology for health. Meeting participants also discussed innovative financing for scaling mobile technology and how to make the business case to the private sector.

The countries that participated in the meeting included:

- Angola
- Benin
- Burkina Faso
- DRC
- Ethiopia
- Guinea
- Kenya

- Madagascar
- Malawi
- Niger
- Nigeria
- Rwanda
- Senegal
- Tanzania
- Togo
- Uganda

**Why it helps with planning:** Refer to country progress reports to inform landscape analysis efforts in these 16 countries. Also access information on sustainability and working with the private sector.

## • The State of Standards and Interoperability for mHealth among Low- and Middle-Income Countries

The mHealth Alliance commissioned this report to review the state of health informatics standards and interoperability with respect to the use of mobile health among low- and middle-income countries (LMICs) with the aim of identifying critical gaps and opportunities to support the scale up of mHealth. The report found that as mobile health systems move towards scale, existing guidelines and strategies will need to be revised to reflect new demands on executive sponsorship; national leadership of eHealth programmes; eHealth standards adoption and implementation; development of eHealth capability and capacity; eHealth financing and performance management and eHealth planning and architecture maintenance.

**Why it helps with planning:** Identifies critical gaps, opportunities, and recommendations regarding the use of standards and interoperability in mHealth, which are important issues for mHealth programs to be aware of during solution design.

## • m-Enabled Inclusive Business Models: Applications for Health

The SHOPS project funded a 16-month study conducted by the Monitor Group as reported in *Promise and Progress: Market-based Solutions to Poverty in Africa*. The study identified mHealth (mobile applications for health) business models enabling enterprises to successfully engage with the poor in Africa, primarily in Ghana, Kenya, Senegal, South Africa, and Tanzania. This primer aims to (1) highlight key practices that will assist m-enabled enterprises in reaching commercial viability in the near term, and (2) assist funders interested in business model principles that enable sustainable impact. Presenting four case studies on m-enabled solutions and 10 lessons for consumer-facing and systems-oriented mHealth projects, the primer shows that inclusive businesses in all sectors are still in their infancy and that much can be learned about how they work, why many struggle, and why only a few succeed.

**Why it helps with planning:** Highlights key practices and existing challenges for making mHealth services commercially viable. Covers business model lessons for consumer-facing and systems-oriented mHealth solutions.

## • cStock: A Sustainable Approach to Using mHealth to Support the Community Health Supply Chain (PPT)

Megan Noel, Monitoring & Evaluation Advisor for JSI's Supply Chains 4 Community Case Management (SC4CCM) Project gave this presentation at the November 2013 meeting of the mHealth Working Group. The presentation covers the cStock program along with the SC4CCM project in Malawi, which a focus on scale up considerations.

**Why it helps with planning:** Detailed case study with information on scale-up, sustainability, and project management.

## • Scaling Mobile for Development: A Developing World Opportunity

Mobile for Development (M4D) is a growing sector, with well over 1,000 live services now tracked by the GSMA across the developing world in verticals such as money, health, education and entrepreneurship. The problem is that while the sector has enjoyed continued growth in a number of services over the last 5-7 years, scale and sustainability have generally not been achieved. This work is designed to inform and add insight to help address challenges to mobile-enabled services that can help to facilitate service delivery in developing countries. This report outlines the challenges and opportunities for achieving commercial success and social impact through M4D services. This research has been developed by Mobile for Development Intelligence with support from the Rockefeller Foundation.

**Why it helps with planning:** Provides data on the global mobile industry (evolution and prospective growth), key trends to watch, insights about frameworks and platforms, and mechanisms to drive scale and sustainability (including business models and user-centered design).

## • MAMA Bangladesh (Aponjon) Formative Research Report

The MAMA 'Aponjon' formative research report is a practice-oriented evaluation of the MAMA program during its initial phase of implementation in Bangladesh. Developed by a joint team from the Johns Hopkins University Global mHealth Initiative and Dnet, the report focuses on 1) identifying the most effective programmatic strategies to guide future implementation of "Aponjon" and 2) outlines gaps in existing monitoring and evaluation systems to guide future avenues for research.

**Why it helps for planning:** Details formative research process and go-to-market testing, which in turn informs program implementation. Includes research forms.

## • Scaling Up Mobile Health: Developing mHealth Partnerships for Scale

One of the common objectives for mHealth initiatives today is scale up. Players from the public, private and non-profit sectors are now actively seeking partners to collaborate with in order to increase the capacity, reach and impact of their projects. Today, partnerships are employing new methods of cooperation, new business models, and demonstrating greater measurable results thanks to diversity across partners and the joining of new ways of thinking, technology, methods, best practices, and more to support the scale up of a project. A realization is emerging that the fragmentation of efforts is a big barrier to achieving large-scale impact, and that the right partnerships can bring about scale through joining distinct sets of core capabilities and collaboration directed towards common goals.

**Why it helps with planning:** Provides recommendations about building, implementing, and sustaining partnerships in mHealth, and how to ensure partnership-driven scale up. Case studies cover in-country and cross-country scale up examples and success factors. Illustrates the number of partnerships required to enable scale up.

## • Applying a framework for assessing the health system challenges to scaling up mHealth in South Africa

Mobile phone technology has demonstrated the potential to improve health service delivery, but there is little guidance to inform decisions about acquiring and implementing mHealth technology at scale in health systems. Using the case of community-based health services (CBS) in South Africa, this article applies a framework to appraise the opportunities and challenges to effective implementation of mHealth at scale in health systems.

**Why it helps with planning:** Provides a framework to assess the factors that enable/facilitate as well as challenge mHealth implementation and scale up.

## • Factors that promote or inhibit implementation of e-health systems: An explanatory systematic review

A systematic review of the literature on the implementation of e-health to identify: (1) barriers and facilitators to e-health implementation, and (2) outstanding gaps in research on the subject.

## • MAMA Global Monitoring and Evaluation Framework

This framework is a guide for project implementers to help them develop national Monitoring and Evaluation plans to monitor and report on progress when implementing mobile messaging programs for mothers.

**Why it helps with planning:** Comprehensive M&E example to support M&E strategy development. Provides an example theory of change model and ideas for data collection methods, key M&E questions, indicator reference sheets, and how to operationalize an M&E strategy. Also provides insights on impact evaluations.

## • The Economics of eHealth and mHealth

As a first step to developing the investment case for mHealth, this article outlines some of the key economic and financial questions that need to be answered in developing in-country eHealth investments. The proposed questions focus on the costs of eHealth infrastructure; regulatory structures that provide incentives at different levels of the health delivery system to encourage investment in, and use of, eHealth; and measuring the outcomes of successful eHealth utilization, including anticipated return on investment.

**Why it helps with planning:** For programs that need to justify the cost of investing in mHealth, this article lays out ideas for quantifying potential mHealth outcomes.

## • A Development and Evaluation Process for mHealth Interventions: Examples From New Zealand

The authors established a process for the development and testing of mobile phone-based health interventions that has been implemented in several mHealth interventions developed in New Zealand. This process involves a series of steps: conceptualization, formative research to inform the development, pretesting content, pilot study, pragmatic randomized controlled trial, and further qualitative research to inform improvement or implementation. Several themes underlie the entire process, including the integrity of the underlying behavior change theory, allowing for improvements on the basis of participant feedback, and a focus on implementation from the start. The strengths of this process are the involvement of the target audience in the development stages and the use of rigorous research methods to determine effectiveness. The limitations include the time required and potentially a less formalized and randomized approach than some other processes. This article aims to describe the steps and themes in the mHealth development process, using the examples of a mobile phone video messaging smoking cessation intervention and a mobile phone multimedia messaging depression prevention intervention, to stimulate discussion on these and other potential methods.

**Why it helps with planning:** Describes the steps and themes involved in the development of an mHealth intervention, with an emphasis on involving the end-user and applying rigorous research techniques to assess effectiveness.

## • Seven Factors for Designing Successful mHealth Projects

Although mobile technology has the power to vastly improve healthcare delivery in developing regions, many issues can affect the success of mHealth systems. This paper lists seven factors (or rather, implementation considerations) that affect the success of mHealth, based on some salient issues that have come to the fore in past projects. The factors are:

- Factor 1: mHealth is not mass media
- Factor 2: Deliver multiple services through mHealth
- Factor 3: Evolve business models for curative and preventive health
- Factor 4: Consider mobile data collection as the means to an end
- Factor 5: Partial automation deters mHealth adoption in health system
- Factor 6: mHealth is integrative
- Factor 7: mHealth is multidisciplinary

**Why it helps with planning:** Offers considerations to be aware of when designing an mHealth program that operates within a health system.

## • The Transformational Use of Information and Communication Technologies in Africa

This report captures the existing use of ICT in six sectors (agriculture, climate change, education, health, financial services, government) and two cross-cutting themes (regional trade and integration, ICT competitiveness). It further examines the immediate potential that could be realized with further attention by both the private and public sectors and makes recommendations for policy makers and development practitioners. The detailed studies carried out for this report (available at [www.eTransformAfrica.org](http://www.eTransformAfrica.org) <sup>[192]</sup>) include twenty country case studies spanning the continent and an ICT data table that showcases country data for mobile and broadband indicators. The case studies show how ICTs can help overcome government failures in different sectors.

This publication is the result of a collaboration between the African Development Bank, the World Bank, the African Union, and various authoring teams and their interactions with African entrepreneurs, farmers, health workers, and civil servants – all using ICT to make better decisions in their economic and social lives. This publication not only sheds light on the path Africa is already on, but also encourages continued creative thinking in how to utilize ICTs to benefit more Africans.

**Why it helps with planning:** Provides data/information for landscape analysis for African-based mHealth implementations. Section II/Chapter 6 (pages 98-108) focuses on ICT and health, providing case studies and key recommendations for a range of stakeholders. Section III spotlights cross-cutting issues that play a role in understanding the mHealth operating environment.

## • Information and Communications for Development 2012: Maximizing Mobile

This report analyzes the growth and evolution of applications for mobile phones, focusing on their use in agriculture, health, and financial services, as well as their impact on employment and government. It also explores the consequences for development of the emerging 'app economy', summarizing current thinking and seeking to inform the debate on the use of mobile phones for development. It's no longer about the phone itself, but about how it is used, and the content and applications that mobile phones open.

**Why it helps with planning:** Overall, this report explains the applicability of mobiles in development. Chapter 1 provides data for concept development/landscape analysis. Chapter 3 (pages 45-60) focuses on mHealth--provides insights on mHealth players/ecosystem, business models, and implementation lessons.

## • Leveraging Mobile Technologies for Maternal, Newborn & Child Health: A Framework for Engagement

This paper lays out a strategic framework to help global health specialists, implementers and policy makers working to achieve MDGs 4 and 5 conceptualize how mobile phone technology can be used to improve MNCH. The framework is an overarching conceptual model for promoting and using mHealth for MNCH from which workplans and results frameworks can be developed.

**Why it helps with planning:** Lays out how mHealth can be applied in MNCH programs and aligns with the MDGs. Highlights guiding principles, operational priorities, illustrative outcomes, and potential stakeholders for consideration during the planning process.

## • The Use of Information and Communication Technology in Family Planning, Reproductive Health, and Other Health Programs: A Review of Trends and Evidence

This technical paper focuses on how new technology – particularly mobile technologies – has the capacity to improve access to family planning and reproductive health information and services. It presents examples of information and communication technologies being used in Ethiopia, Kenya, Rwanda, Senegal, Tanzania, Malawi, India and Bangladesh, and looks at how digital platforms and mobile technology are being integrated into the overall health system strengthening approach.

**Why it helps with planning:** Identifies 9 overall enabling conditions for ICT/mHealth use and scale-up in family planning and other health programs.

## • mHealth: New Horizons for Health through Mobile Technologies

Global survey results regarding the status of mHealth in the World Health Organization's (WHO) Member States. Completed by 114 Member States, the survey documented for analysis four aspects of mHealth: adoption of initiatives, types of initiatives, status of evaluation, and barriers to implementation.

**Why it helps with planning:** Supports concept development and the landscape analysis process. Provides recommendations to mature the field of mHealth.

## • Beginning with the end in mind: Planning pilot projects and other programmatic research for successful scaling up

This short ExpandNet/WHO guidance document, which is a working draft, provides 12 recommendations and a checklist to help build scaling up considerations into projects from the outset. In this way one can anticipate and plan ahead for eventual scale up from the earliest stages of designing a pilot, demonstration or other operations research intervention.

**Why it helps with planning:** Highly regarded key considerations for scaling-up global health programs to be considered at the beginning of project planning.

## • Building Partnerships that Work: Practical Learning on Partnering in mHealth

This document examines the collective experience of various organizations, including NGOs and multilateral institutions, in building partnerships in mHealth.

**Why it helps with planning:** Lays out considerations for effective mHealth partnerships based on first-hand experiences.

## • Scaling Up Mobile Health: Elements Necessary for the Successful Scale Up of mHealth in Developing Countries

This white paper identifies best practices and specific programmatic, operational, policy, and global strategy recommendations to promote the scale up of mHealth in developing countries through an assessment of current implementations of mHealth programs and interviews of mHealth experts. Profiled in this report are several mHealth programs that have been piloted and are currently in the scale up phase, and have proven enough success that they should be considered as models for other initiatives to follow.

**Why it helps with planning:** Profiles 9 mHealth programs currently in the scale up phase, documenting best practices for implementation, expert tips, and recommendations (programmatic, operational, policy, and global strategy).

## • Barriers and Gaps Affecting mHealth in Low and Middle Income Countries

The mHealth Alliance commissioned an in-depth exploration of the policy barriers and research gaps facing mHealth. This White Paper, written by a team of researchers at the Center for Global Health and Economic Development at The Earth Institute, Columbia University, examines and synthesizes the existing mHealth literature to assess the current state of mHealth knowledge and identify barriers and gaps.

**Why it helps with planning:** Overview of mHealth challenges, barriers, and gaps in knowledge across 5 thematic health areas. Notes policy and research gaps.

## • Can Technology End Poverty?

Kentarō Toyama published a forum in *Boston Review* titled, "Can Technology End Poverty?" He posits: "Many development experts promote information and communication technology (ICT) as a way to relieve global poverty. They should pay more attention to the human beings who use it. Technology—no matter how well designed—is only a *magnifier of human intent and capacity*. It is not a substitute."

## • Measuring sustainability as a programming tool for health sector investments: report from a pilot sustainability assessment in five Nepalese health districts

In this report, ICF International experts discuss a unique pilot of the systematic use of the sustainability framework in five districts of Nepal supported by the U.S. Agency for International Development (USAID) through different project partners and how progress can be assessed at a district level and monitored at a program level. ICF concluded that systematic application of the sustainability framework can improve the international health sector investment decisions of development agencies. It also gives districts an information base on which to build autonomy and accountability. The ability to form and test hypotheses about the sustainability of outcomes under various funding strategies was made possible by this approach and will be a prerequisite for more efficiently meeting the international health agenda.

**Why it helps with planning:** Provides a framework for planning for sustainability that could be applied to mHealth programs, and could also improve investment decisions of development agencies.

## • Sizing the Business Potential of mHealth in the Global South: A Practical Approach

This report builds on a previous report, *mHealth in the Global South: Landscape Analysis* prepared by Vital Wave Consulting to examine the current mHealth landscape and provide an overview of the scope and impact of mobile initiatives on health care across developing regions. The Landscape Analysis also analyzes critical success factors for making mHealth more widely available through sustainable implementations. mHealth programs require the participation of stakeholders from across international organizations, governments, NGOs, and private companies. This report provides professionals from across sectors and industries with methodologies for sizing the market opportunity for mHealth solutions in the Global South. As these methodologies rely on primary and secondary research, this report was prepared after thorough research for available data and identifies gaps where subject-matter expert input is needed.

**Why it helps with planning:** Sizes the mHealth market opportunity so that organizations in the mHealth ecosystem can prioritize their investments, align mHealth investments with other business programs, and justify expenditures to internal and external stakeholders.

## • Towards the Development of an mHealth Strategy: A Literature Review

Based on a review of peer-reviewed literature, program evaluation and industry reports, and grey literature, as well as communication with a broad range of stakeholders, this document (1) provides an overview of mHealth as a domain within eHealth and key strategic learning that ought to be applied to the formal integration of mobile technologies within the health sector; (2) reviews health-related applications associated with mobile technologies; (3) explores how various technologies are being used to achieve health objectives, (4) documents key leaders and partnerships that have emerged to test and expand mHealth in low and middle income countries; (5) provides critical considerations based on early mHealth initiatives and research; and (6) provides key recommendations for next steps in the area of mHealth.

**How it helps with planning:** Provides a comprehensive account of the state of mHealth in 2008, including preliminary implementation lessons learned and challenges (many of which are still relevant today).

## • mHealth: A Developing Country Perspective

This 9-page document, prepared for the Making the eHealth Connection: Global Partnerships, Local Solutions conference of 2008 in Bellagio, Italy, describes mHealth as one of the major challenges being faced by both medical practice and health care policies. It discusses and diagrams current mobile monitoring and diagnosis and discusses the potential evolution of further mobile access for mHealth applications. It includes case studies from South Africa, Indonesia, and India. The authors conclude that the overall development of mHealth will be driven by consumer demand, possibly resulting from value-added service by the mobile phone industry, by health care policy makers, and, possibly, by technological advances in wireless broadband in the near future.

**Why it helps with planning:** Predicts the drivers of mHealth success, including technology advancements and consumer demand.

## • Gender Digital Divide Indicators

This one-page document provides a starting place for those looking to develop gender-based information communication technology (ICT) indicators. The document lists components of the Regentec Gender Digital Divide Indicators, organized by topic. Topics include decision making and policy, content, skills, and connectivity. The document is adapted from Table 3 on Page 38 of the article, *Women and Gender in ICT Statistics and Indicators for Development*<sup>[193]</sup>.

**How it helps with planning:** Ideas for gender-based ICT indicators.

## • MAMA Content Learning Modules

The MAMA online learning courses consist of short learning modules designed to assist organizations as they work on their own projects to localize the messages. The modules cover the principles of behavior change, localization, how to handle cultural beliefs, and more.

## Resources

**mHealthKnowledge.org**<sup>[172]</sup> is a repository of key mHealth resources for program planners and implementers. Many of the resources come highly recommended by mHealth experts and contain lessons learned from the pioneers of mHealth. While some of the resources are hyperlinked or posted on relevant pages throughout this Guide, mHealthKnowledge.org is designed to have everything in one place for ease of reference and use. Note that we did not reinvent useful repositories and databases that already exist elsewhere—but we did link you to them! Seminal publications from the **mHealth Alliance**<sup>[194]</sup> are now archived on mHealthKnowledge.org. The resources are organized into the following sub-sections:

- **Applications & Platforms**<sup>[195]</sup>
- **Communities of Practice**<sup>[196]</sup>
- **Capacity Building & Learning**<sup>[197]</sup>
- **mHealth Alliance**<sup>[194]</sup>
- **Multimedia Content**<sup>[198]</sup>
- **Project Repositories**<sup>[199]</sup>
- **Tools & Guides**<sup>[200]</sup>
- **Blogs & News**<sup>[201]</sup>

This section will be continuously updated as relevant resources become available. If you have an mHealth planning or implementation resource you would like to share, please suggest it via our [feedback form](#)<sup>[4]</sup>.

# Glossary

**Agile software development:** A group of software development methods based on iterative and incremental development, in which requirements and solutions evolve through collaboration. It promotes adaptive planning, evolutionary development and delivery, and encourages rapid and flexible response to change. Agile methods break tasks into small increments. Iterations are short time frames that typically last from one to four weeks. Each iteration involves a cross functional team working in all functions: planning, requirements analysis, design, coding, unit testing, and acceptance testing. At the end of the iteration a working product is demonstrated to stakeholders. This strategy minimizes overall risk and allows a project to adapt to changes quickly.

**Beta test:** An external pilot-test of a product (usually software or technology) before wide public release. The product has already passed through alpha test—i.e., the first-level, internal pilot-test conducted by the product team to ensure the product meets defined specifications. But since many problems or opportunities for improvement do not become apparent until the product is used under normal, everyday conditions, the Beta release is an important stage for spotting flaws. Beta testing can be considered "pre-release testing."

**Big data:** "Big data" is a popular term used to describe the exponential growth and availability of data, both structured and unstructured. It refers to a collection of data sets so massive and complex that it becomes difficult to process using traditional database management tools or data processing applications. The challenges include capture, curation, storage, search, sharing, transfer, analysis, and visualization. Many organizations are concerned that the amount of amassed data is becoming so large that it is difficult to find the most valuable pieces of information. However, big data—if analyzed efficiently and effectively—holds the promise of enabling: 1) cost reductions, 2) time reductions, 3) new product development and optimized offerings, and 4) smarter business decision making.

**Champions:** In public health programs, a champion is considered a charismatic advocate of a belief, practice, program, policy, and/or technology. It is a champion's unique combination of skills—passion, persistence, and persuasiveness—that distinguish him or her from other advocates. The "champions advocacy model" is meant to increase the likelihood that a new or underutilized strategy will become standard practice.

**Conversion rate:** The percentage of potential end users in the target population who take a desired action (e.g., signing up for a service), as a result of direct marketing and distribution campaigns. Successful conversions are defined differently by individual marketers, advertisers, and content creators. For example, to an advertiser, a successful conversion may be defined as the sale of a product to a consumer whose interest in the item was initially sparked by clicking an online advertisement. To content creators, a successful conversion may refer to a software download.

**Core competency:** A defining capability or advantage that distinguishes an enterprise, organization, or initiative from its competitors. Core competencies are particular strengths relative to other organizations in an industry, which provide the basis of added value. In management theory, a core competency fulfills three criteria: (1) it is not easy for competitors to imitate, (2) it can be applied to many products and markets, and (3) it contributes to the end consumer's experience and perceived benefits regarding the good or service.

**Data analytics:** The process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions and findings, and supporting decision making. Data analytics is used in many industries to allow companies and organizations to make better business and strategy decisions.

**Data dashboard:** A dashboard is a user interface that, somewhat resembling an automobile's dashboard, organizes and presents information and data in a way that is easy to read. In software or technology, a dashboard is often a single page, real-time user interface, showing a graphical presentation of the current status and historical trends of an organization's or program's key performance indicators to enable instantaneous system tracking and informed decision-making.

**Enabling environment:** Attitudes, actions, policies, and practices that stimulate and support effective and efficient functioning of organizations, individuals, and programs or projects. The enabling environment includes legal, regulatory and policy frameworks, and political, socio-cultural, institutional, and economic factors.

**End user:** The person who actually uses a particular product or service. The term "end user" distinguishes the person who will actually interact with the mHealth application or service from individuals who are involved in other stages of its development, production, and distribution.

**Flashback calls:** Also known as recall, or "please call me," flashback calls are a type of service that allows you to send a message requesting somebody to call you back. Some mobile network operators allow customers to send free "please call me" messages to friends and family across their network. The capability is designed to help people get in touch with others, especially in times of emergency, when they do not have enough airtime to make calls or send SMS.

**Formative research:** Formative research is generally conducted as part of project planning and/or over the course of project implementation. It is used as a basis for developing effective strategies and identifying appropriate communication channels. For example, in social and behavior change communication, formative research helps researchers and program managers identify and understand characteristics—such as interests, behaviors, and needs—of target populations that influence their decisions and actions. Formative research is integral to the sound planning of programs and to the improvement of existing programs.

**Gateway provider:** Mobile, or SMS, gateway software providers are often referred to as aggregators. The aggregators have multiple agreements with the large mobile network providers, such as Verizon and AT&T, to send and receive text messages through these networks' SMS centers. These gateway providers will send and receive SMS traffic to and from the mobile phone networks' SMS centers, which are responsible for relaying those messages to the intended mobile phone.

**General packet radio service (GPRS):** General Packet Radio Service is a packet-switching technology that enables data transfers through cellular networks. It is used for mobile internet, MMS and other data communications. In theory the speed limit of GPRS is 115 kbps, but in most networks it is around 35 kbps. Informally, GPRS is also called 2.5G.

**Hardware:** In the context of mHealth and information technology generally, "hardware" is any physical device—something a person is able to touch. A computer monitor and mobile handset are examples of hardware.

**Hosting:** Hosting (or "Web hosting") is a service provided by a vendor that offers a physical location for the storage of webpages and files. Hosting companies are like a landlord: they rent physical space on their servers for storage. Hosting services are most often used for websites, and can also be used for files, images, source code, and similar content. For website hosting, there are three main types of hosting available: 1) shared web hosting, where a large number of websites are typically housed on the same server; 2) dedicated web hosting, where an entire server is leased and reserved for a single website; and 3) virtual private server hosting, a hybrid of the first two options in which a website is hosted on its own virtual server so that it will not be affected by the websites of other customers.

**Human-centered design:** Human-centered design (also known as user-centered design) is a process in which the needs, wants, and limitations of end users of a product are given extensive attention at each stage of the design process. It is a multi-stage problem solving process that requires designers to analyze and foresee how users are likely to use a product, and also tests the validity of their assumptions with regard to user behavior in real world tests with actual users. The primary difference from other product design philosophies is that human-centered design tries to optimize the product around how users can, want, or need to use the product, rather than forcing the users to change their behavior to accommodate the product.

**Implementers:** Those involved in developing and delivering the mHealth solution, including project managers, program managers, technology partners, clinicians, and other health workers.

**Interactive voice response (IVR):** Interactive Voice Response (IVR) is an automated telephony system that interacts with callers, gathers information and routes calls to the appropriate recipient or information. An IVR system accepts a combination of voice and touch-tone keypad inputs, and provides appropriate responses based on the customer's prompts in the form of voice, fax, callback, e-mail and perhaps other media. Historically, IVR solutions have used pre-recorded voice prompts and menus to present information and options to callers, and touch-tone telephone keypad entry to gather responses. Modern IVR solutions also enable input and responses to be gathered via spoken words with voice recognition. IVR solutions enable users to retrieve information including bank balances, flight schedules, product details, order status, movie show times, and more from any telephone. Additionally, IVR solutions are increasingly used to place outbound calls to deliver or gather information for appointments, past due bills, and other time critical events and activities.

**Interoperability:** The ability of diverse systems to work together. The term was initially defined for information technology or systems engineering services to allow for information exchange. For two systems to be interoperable, they must be able to exchange data and subsequently present that data such that it can be understood by a user.

**Key performance indicator (KPI):** A key performance indicator (KPI) is a type of performance measurement. An organization may use KPIs to evaluate its success, or to evaluate the success of a particular activity in which it is engaged.

**Keywords:** A mobile keyword is a unique word that can contain letters or numbers within a text message, intended as a prompt for response. Keywords allow an end user (i.e., the receiver of the message) to interact with a service. In the example 'Reply PIZZA to receive weekly specials', 'PIZZA' is the keyword.

**Landscape analysis:** A type of research conducted to provide a deep and broad exploration of a particular topic or industry. The analysis usually takes place to inform project or strategy planning. It is used as a means to identify current gaps, constraints, and opportunities, in order to validate the need for innovations, new activities, or strategy shifts.

**Logic model:** A tool used to lay out how an effort or initiative is supposed to work. Logic models—most often used by program managers and evaluators—are usually a graphical depiction of the logical relationships ("if-then" causal relationships) between the resources, activities, outputs, and outcomes of a program. For example, if certain resources are available for a program, then certain activities can be implemented, and if the activities are implemented successfully, then certain outputs and outcomes can be expected. A logic model keeps participants in the effort moving in the same direction by providing a common language and point of reference.

**Market penetration:** A measure of the amount of sales or adoption of a product or service compared to the total theoretical market for that product or service. The amount of sales or adoption can be an individual company's sale, or can be industry-wide, while the theoretical market can be the total population or an estimate of total potential consumers for the product. In mHealth, mobile phone penetration is an important metric to inform a landscape analysis. Mobile phone penetration rate is a term generally used to describe the number of active mobile phone numbers (usually as a percentage) within a specific population.

**Mobile aggregator:** (See also, gateway provider). A company that acts as a middleman between application/content providers and mobile carriers. An aggregator primarily provides message traffic



throughput to multiple wireless operators or other aggregators, and often rents virtual numbers and short codes to application/content providers. An aggregator may also provide mobile initiative campaign oversight, administration, and billing services.

**Mobile literacy:** The range of ability to use applications and functions on a mobile phone, often directly associated with a mobile phone user's literacy level (or rather, his or her ability to read and write).

**Mobile money:** A cash management service available on the mobile phone or internet that facilitates money transfer. With mobile money, customers can convert cash to and from electronic value ("e-money"), and they can use mobile money to perform transfers or make payments. In many countries, especially low-resource settings, mobile operators already have large airtime distribution networks which can be leveraged to provide customers with a network of mobile money agents where they can perform cash-in and cash-out transactions. Large mobile operators in developing countries typically have 100 to 500 times more airtime reseller outlets than all of the banks' branches put together.

**Mobile network operator (MNOs):** A mobile network operator (MNO) (also known as mobile phone operator (or simply mobile operator), carrier service provider (CSP), wireless service provider, wireless carrier, telecom, or cellular company) is a telephone company that provides services for mobile phone subscribers. An MNO is a provider of wireless communications services that owns or controls all the elements necessary to sell and deliver services to an end user, such as radio spectrum allocation, wireless network infrastructure, billing, and customer care. A key defining characteristic of an MNO is that it must own or control access to a radio spectrum license from a regulatory or government entity.

**Multi-channel campaign:** A multi-channel campaign, often used in marketing, refers to the delivery of a brand/campaign message via more than one touch point 'experience' to influence a target audience's behavior or intent to purchase a product or service.

**Multimedia messaging service (MMS):** Abbreviated as MMS, the Multimedia Messaging Service is a store and forward messaging service that allows subscribers to exchange multimedia files as messages. MMS supports the transmission of various media types: text, picture, audio, video, or a combination of all four. The originator can easily create a Multimedia Message, by snapping a photo with the phone camera, or by using images and sounds stored previously in the phone (or downloaded from a web site). In order to send or receive a MMS, the user must have a compatible phone that is running over a GPRS or 3G network. Most current mobile phones and operator networks support MMS.

**Naming convention:** An agreed-upon method for naming things. The intent is to allow useful information to be deduced from a set of names based on a specific pattern. For instance, in Manhattan, streets are numbered; those that run east-west are named "Street", and those that run north-south are named "Avenue." In IT and knowledge management, naming conventions are often used to name files in a consistent way, to simplify archiving and retrieval.

**Open source:** Generally, open source refers to a computer program in which the source code is available to the general public for use and/or modification from its original design. Open source code is typically created as a collaborative effort in which developers improve upon the code and share changes and improvements with each other. Supporters of the open source model believe that by allowing anyone to modify the source code, the application will become more useful and error-free over the long term. To be considered as open source software, certain criteria must be met:

- The program must be freely distributed.
- Source code must be included.
- Anyone must be allowed to modify the source code.
- Modified versions can be redistributed.
- The license must not require the exclusion of other software or interfere with the operation of other software.

**Opportunity cost:** The cost of an alternative that must be forgone in order to pursue a certain action. In microeconomic theory, the opportunity cost of a choice is the value of the best alternative forgone, in a situation in which a choice needs to be made between several mutually exclusive alternatives given limited resources. Assuming the best choice is made, it is the "cost" incurred by not enjoying the benefit that would be had by taking the second best choice available. The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently. Therefore, opportunity costs are not restricted to monetary or financial costs, and can include the real cost of any output forgone, such as lost time, pleasure, or any other benefit that provides utility.

**Opt-in:** The property of having to choose explicitly to join or permit something. For example, a customer usually has to opt-in to receive email communication from a company or service. In mobile technology, an end user may have to opt in via text message to join a service. This is the method generally used by direct marketing firms, subscription, or non-subscription periodicals, information suppliers, etc. After the opt-in, a company or service will keep sending the material or messages until the recipient chooses to opt out.

**Pilot testing:** A small-scale study conducted to assess feasibility, time, cost, acceptability, and effectiveness of a program to determine whether it should be scaled up or replicated, and, if so, to improve upon the original design. A pilot study is a standard scientific tool for "soft" research, allowing scientists to conduct a preliminary analysis before committing to a full-blown study, experiment, or program.

**Prototyping:** A prototype is an early sample, model, or release of a product built to test a concept or process. Prototyping is the process of building an initial working model of a system. Once a working prototype is available, practical feedback can be solicited from users who can touch and see the model and suggest revisions.

**Qualitative research:** Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. Qualitative research is an inductive approach, and its goal is to gain a deeper understanding of a person's or group's experience. It is data that is usually not in the form of numbers. Qualitative research asks broad questions and collects word data from participants (the data is usually not in the form of numbers). The researcher looks for themes and describes the information in themes and patterns exclusive to that set of participants.

**Quantitative research:** Quantitative research refers to the systematic empirical investigation of social phenomena via statistical, mathematical, or computational techniques. Quantitative data is any data that is in numerical form such as statistics, percentages, etc. Quantitative researchers ask specific, narrow questions and collect a sample of numerical data from participants to answer questions. The researcher analyzes the data with the help of statistics. The findings are supposed to yield an unbiased result that can be generalized to some larger population.

**Server:** A server, also known as a network service, is a computer system, which is used as the central repository of data and various programs that are shared by users in a network. A server is a computer designed to process requests and deliver data to other computers and their users over a local network or the Internet. Network servers typically are configured with additional processing, memory and storage capacity to handle the load of servicing other computers. Common types of network servers include: web servers, proxy servers, and FTP servers.

**Short codes:** Short codes (also known as short numbers) are special telephone numbers, significantly shorter than full telephone numbers that can be used to address SMS and MMS messages from mobile phones or fixed phones. Short codes are designed to be easier to read and remember than normal telephone numbers. Short codes are widely used for value-added services, such as television program voting, ordering ringtones, charity donations, and mobile services. Often, messages sent to a short code can be billed at a higher rate than a standard SMS and may even subscribe a customer to a recurring monthly service that will be added to the customer's mobile phone bill until the user chooses to terminate the service.

**Short messaging service (SMS):** SMS or the Short Messaging Service allows users to send and receive personal text messages directly between mobile phones. Each message can be up to 160 characters long and can be sent to and from users of different operator networks. All mobile phones support SMS.

**Social cost:** Social cost is a term that is sometimes used in economic discussions to refer to the costs that are experienced by others when specific types of goods and services are purchased. Social cost is about assessing the potential liabilities of a given action or operation on the community at large, rather than simply considering the costs that an individual assumes by taking a specific action or buying a certain product. For example, the social costs of a manufacturing company that makes a range of goods may include pollution, loss of wildlife, or decrease in real estate values for nearby homes.

**Software:** A collection of instructions and code installed into a piece of hardware. An Internet browser, a mobile app, and a computer's operating system are all examples of software.

**Target beneficiaries:** The people whose health knowledge and behaviors, and, ultimately, whose health outcomes, are improved as a direct result of the mHealth solution.

**Think aloud:** A method used to gather data in usability testing in product design and development, (also used in psychology and a range of social sciences). Think-aloud protocols involve participants speaking their thoughts, actions, and emotions as they are performing a set of specified tasks. Users are asked to say whatever they are looking at, noticing, thinking, doing, and feeling as they go about their task. This enables observers to see first-hand the process of task completion (rather than only its final product). Observers take notes of everything that users say, without attempting to interpret their actions and words. Test sessions are often audio- and video-recorded so that developers can go back and refer to what participants did and how they reacted.

**Total cost of ownership:** A type of calculation to help consumers and project managers assess the long-term direct and indirect costs and benefits related to the purchase of a product or service. The intention is to arrive at a final figure that will reflect the effective cost of the purchase over the life of the product or service. For example, calculating the total cost of ownership of a computer workstation would include the initial purchase price of the computer, monitor, and printer; likely repair and service costs; replacement schedule (e.g., a "free with purchase" inkjet printer will likely need to be replaced more quickly than a more expensive laser printer); and the cost of supplies/consumables (such as ink cartridges, toner, and replaceable parts).

**Use case:** A use case describes "who" can do "what" with the system or software in question. In software and systems engineering, a use case is a list of steps, typically defining interactions between a role (or "actor") and a system, to achieve a goal. The actor can be a human or an external system.

**Version control:** A method to ensure that electronic files, shared among multiple users, are named and saved appropriately in order to keep track of the latest version. Version control allows team members to track each change as it is made, and to reverse changes when necessary.

**Virtual number:** A virtual number is a telephone number without a directly-associated telephone line. Usually these numbers are programmed to forward incoming calls to one of the pre-set telephone numbers chosen by the client; either fixed, mobile or voice-over-internet-protocol (VoIP).

## Acronyms

<b>CHW</b>	community health worker
<b>CPR</b>	contraceptive prevalence rate
<b>EWS</b>	Early Warning System
<b>GSMA</b>	GSM Association
<b>GPRS</b>	General Packet Radio Service
<b>HMIS</b>	health management information system
<b>IT</b>	information technology
<b>IVR</b>	interactive voice response
<b>KPI</b>	key performance indicator
<b>M&amp;E</b>	monitoring and evaluation
<b>M4RH</b>	Mobile for Reproductive Health
<b>MAMA</b>	Mobile Alliance for Maternal Action
<b>mHealth</b>	mobile health
<b>MMS</b>	multimedia messaging service
<b>MNO</b>	mobile network operator
<b>MOH</b>	Ministry of Health
<b>NGO</b>	non-governmental organization
<b>PDA</b>	personal digital assistants
<b>RFP</b>	request for proposal
<b>SIM</b>	subscriber identity module
<b>SMS</b>	short messaging service
<b>TCO</b>	total cost of ownership

Source URL: <https://www.k4health.org/toolkits/mhealth-planning-guide>

#### Links

- [1] <http://www.mhealthknowledge.org/sites/default/files/UserExperiences-Khemraj%202.pdf>
- [2] <http://www.mhealthknowledge.org/sites/default/files/UserExperiences-Marianna%202.pdf>
- [3] <http://www.thehealthcompass.org/my-favorite-resource-personal-favorites-staff-and-partners>
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- [41] <https://www.k4health.org/toolkits/mhealth-planning-guide/project-repositories>
- [42] <https://www.k4health.org/toolkits/mhealth-planning-guide/mhealth-compendiums-first-second-and-third-editions-infographic>
- [43] <https://www.k4health.org/toolkits/mhealth-planning-guide/mhealth-innovations-health-system-strengthening-tools-12-common-applications-and-visual>
- [44] <http://www.photoshare.org/photos/2006-423>
- [45] <https://www.k4health.org/toolkits/mhealth-planning-guide/truth-about-disruptive-innovation>
- [46] <https://www.k4health.org/toolkits/mhealth-planning-guide/can-technology-end-poverty>
- [47] <https://www.k4health.org/sites/default/files/m4rh.png>
- [48] <https://www.globalhealthlearning.org/sites/default/files/page-files/ReMiND>
- [49] [https://www.globalhealthlearning.org/sites/default/files/page-files/Mwana\\_Logical](https://www.globalhealthlearning.org/sites/default/files/page-files/Mwana_Logical)
- [50] <http://www.innonet.org/>
- [51] [http://www.innonet.org/client\\_docs/File/logic\\_model\\_workbook.pdf](http://www.innonet.org/client_docs/File/logic_model_workbook.pdf)
- [52] <http://www.trueimpact.com/>
- [53] <http://www.trueimpact.com/logic-model>
- [54] <http://www.photoshare.org/photo/9595-1>
- [55] <https://www.k4health.org/toolkits/mhealth-planning-guide/mobile-technology-landscape>
- [56] <https://www.k4health.org/toolkits/mhealth-planning-guide/mhealth-landscape>
- [57] <https://www.k4health.org/toolkits/mhealth-planning-guide/networks-news-and-listservs>
- [58] <https://www.k4health.org/toolkits/mhealth-planning-guide/scaling-mobile-development-developing-world-opportunity>
- [59] [http://malawi.gsmamhealthfeasibility.com/GSMA\\_Country\\_Feasibility\\_Report\\_Malawi\\_2014.pdf](http://malawi.gsmamhealthfeasibility.com/GSMA_Country_Feasibility_Report_Malawi_2014.pdf)
- [60] [http://nigeria.gsmamhealthfeasibility.com/GSMA\\_Country\\_Feasibility\\_Report\\_Nigeria\\_2014.pdf](http://nigeria.gsmamhealthfeasibility.com/GSMA_Country_Feasibility_Report_Nigeria_2014.pdf)
- [61] <http://southafrica.gsmamhealthfeasibility.com/South-Africa-mHealth-Feasibility-Report-2013.pdf>
- [62] <http://www.gsma.com/>
- [63] <https://www.k4health.org/toolkits/mhealth-planning-guide/partnership-development>
- [64] <http://www.photoshare.org/photo/2006-728>
- [65] <https://www.k4health.org/toolkits/mhealth-planning-guide/define-target-audient>
- [66] <https://www.k4health.org/toolkits/mhealth-planning-guide/explore-technology-access-mobile-use-target-audience>
- [67] <https://www.k4health.org/toolkits/mhealth-planning-guide/conduct-formative-research-members-target-audiences>
- [68] <https://www.k4health.org/toolkits/mhealth-planning-guide/influence-mhealth-interventions-gender-relations-developing>
- [69] <https://www.k4health.org/toolkits/mhealth-planning-guide/snapshot-mama-bangladesh-including-men-mobile-services-women>
- [70] <http://plusacumen.org/courses/hcd-for-social-innovation/>
- [71] <http://www.gsma.com/mobilefordevelopment/gsma-women-research-toolkit>
- [72] <https://www.k4health.org/toolkits/mhealth-planning-guide/technology-decisions>

[73] <https://www.k4health.org/toolkits/mhealth-planning-guide/content-development-testing>

[74] <https://www.k4health.org/toolkits/mhealth-planning-guide/prototyping-usability-testing>

[75] <http://www.photoshare.org/photo/351-23>

[76] [http://www.jsi.com/JSIInternet/Resources/publication/display\\_cfm?xtGeoArea=INTL&id=13532&thisSection=Resources](http://www.jsi.com/JSIInternet/Resources/publication/display_cfm?xtGeoArea=INTL&id=13532&thisSection=Resources)

[77] <https://www.k4health.org/toolkits/mhealth-planning-guide/capacity>

[78] <https://www.k4health.org/toolkits/mhealth-planning-guide/technology-costs>

[79] <https://www.k4health.org/toolkits/mhealth-planning-guide/planning-information-systems-project-toolkit-public>

[80] <https://www.k4health.org/toolkits/mhealth-planning-guide/evaluation>

[81] <https://www.k4health.org/toolkits/mhealth-planning-guide/project-management>

[82] [http://mhealthknowledge.org/images/content/trustlaw\\_connect\\_report.pdf](http://mhealthknowledge.org/images/content/trustlaw_connect_report.pdf)

[83] <https://www.datawinners.com/?redirsrc=%2Fen%2Fhome%2F>

[84] <http://www.frontlinesms.com/>

[85] <https://www.rapidsms.org/>

[86] [https://www.k4health.org/sites/default/files/table\\_4.1\\_ict\\_toolkit.pdf](https://www.k4health.org/sites/default/files/table_4.1_ict_toolkit.pdf)

[87] [http://mhealthknowledge.org/images/content/siate\\_of\\_standards\\_report\\_2013.pdf](http://mhealthknowledge.org/images/content/siate_of_standards_report_2013.pdf)

[88] [http://www.itu.int/pub/D-STR-E\\_HEALTH.05-2012](http://www.itu.int/pub/D-STR-E_HEALTH.05-2012)

[89] <https://www.k4health.org/toolkits/mhealth-planning-guide/scale-up>

[90] <https://www.k4health.org/toolkits/mhealth-planning-guide/sustainability>

[91] <https://www.mhealthworkinggroup.org/resources/mhealth-implementation-opportunities-issues-and-challenges-mhealth-summit-auxiliary>

[92] <http://www.techsoup.org/support/articles-and-how-tos/rfp-library>

[93] <https://www.k4health.org/toolkits/mhealth-planning-guide/total-cost-ownership-model-commcare>

[94] <http://m4rh.fhi360.org/wp-content/uploads/2012/11/Cost-Considerations.pdf>

[95] <http://www.photoshare.org/photo/6497-24>

[96] <https://www.k4health.org/toolkits/mhealth-planning-guide/designing-health-literate-mobile-apps>

[97] <http://mobilemamaalliance.org/>

[98] <https://www.k4health.org/toolkits/mhealth-planning-guide/mama-content-learning-modules>

[99] <https://www.k4health.org/toolkits/mhealth-planning-guide/drafting-content>

[100] <https://www.k4health.org/toolkits/mhealth-planning-guide/testing-content>

[101] <https://www.mhealthworkinggroup.org/resources/meeting-report-deep-dive-developing-mobile-content-clients-april-26-2013>

[102] <https://www.k4health.org/toolkits/mhealth-planning-guide/mbcc-field-guide-resource-developing-mobile-behavior-change-communication-programs>

[103] [http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-July-v4-TC\[2\].pdf](http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-July-v4-TC[2].pdf)

[104] <http://www.photoshare.org/photos/351-54>

[105] [http://www.frontlinesms.com/wp-content/uploads/2011/10/FrontlineSMS\\_IRH\\_CycleTel\\_2011.pdf](http://www.frontlinesms.com/wp-content/uploads/2011/10/FrontlineSMS_IRH_CycleTel_2011.pdf)

[106] <https://www.k4health.org/toolkits/mhealth-planning-guide/preparing-launch>

[107] <https://www.k4health.org/toolkits/mhealth-planning-guide/overview-planning-considerations-mhealth>

[108] <http://www.photoshare.org/photo/351-1>

[109] <https://www.k4health.org/toolkits/mhealth-planning-guide/people>

[110] <https://www.k4health.org/toolkits/mhealth-planning-guide/systems>

[111] <https://www.k4health.org/toolkits/mhealth-planning-guide/data>

[112] <https://www.k4health.org/toolkits/mhealth-planning-guide/factors-promote-or-inhibit-implementation-e-health-systems-explanatory-systematic-0>

[113] <http://www.photoshare.org/photo/6682-9>

[114] <http://www.photoshare.org/photo/1515-290>

[115] <http://www.photoshare.org/photo/126-459>

[116] <http://aponjon.com.bd/Content.php?Mid=35&SubMid=16>

[117] <https://www.k4health.org/toolkits/mhealth-planning-guide/incentives-drawbacks>

[118] <https://www.k4health.org/toolkits/mhealth-planning-guide/private-sector-partnerships>

[119] <https://www.k4health.org/toolkits/mhealth-planning-guide/timing>

[120] <https://www.k4health.org/toolkits/mhealth-planning-guide/mutual-value-mutual-gain-best-practices-successful-social-sector>

[121] <https://www.k4health.org/toolkits/mhealth-planning-guide/scaling-mobile-health-developing-mhealth-partnerships-scale>

[122] <https://www.k4health.org/toolkits/mhealth-planning-guide/building-partnerships-work-practical-learning-partnering-mhealth>

[123] <https://www.k4health.org/toolkits/mhealth-planning-guide/sustainable-financing-mobile-health-mhealth-options-and-opportunities-mhealth-financial>

[124] <http://www.photoshare.org/photo/2463-8>

[125] <https://www.k4health.org/toolkits/mhealth-planning-guide/sizing-business-potential-mhealth-global-south-practical-approach>

[126] <http://solutionscenter.nethope.org/blog/view/what-do-mobile-money-and-mhealth-offer-each-other-what-mhealth-offers-mobil>

[127] <http://solutionscenter.nethope.org/blog/view/what-do-mobile-money-and-mhealth-offer-each-other-what-mobile-money-offers>

[128] <http://www.photoshare.org/photo/351-21>

[129] <http://www.photoshare.org/photo/126-500>

[130] <https://www.k4health.org/toolkits/mhealth-planning-guide/beta-launch>

[131] <https://www.k4health.org/toolkits/mhealth-planning-guide/demand-generation>

[132] <https://www.k4health.org/toolkits/mhealth-planning-guide/training-supportive-supervision>

[133] <https://www.k4health.org/toolkits/mhealth-planning-guide/mama-bangladesh-aponjon-formative-research-report>

[134] <https://www.k4health.org/toolkits/mhealth-planning-guide/scaling-mobile-health-elements-necessary-successful-scale-mhealth-developing-countrie-0>

[135] <http://www.photoshare.org/photo/12697-9>

[136] [http://m4rh.fhi360.org/?attachment\\_id=50](http://m4rh.fhi360.org/?attachment_id=50)

[137] <https://www.k4health.org/toolkits/mhealth-planning-guide/gsm-mwomen-marketing-handbook>

[138] <http://hingx.org/Share/Attachment/1361?fileName=Lessons Learned 2013.pdf#page=18>

[139] <http://www.hciproject.org>

[140] <http://www.photoshare.org/photo/351-67>

[141] <https://www.mhealthevidence.org/>

[142] <https://www.k4health.org/toolkits/mhealth-planning-guide/unique-challenges-monitoring-evaluating-mhealth>

[143] <https://www.k4health.org/toolkits/mhealth-planning-guide/research-and-evaluation-steps-development-mhealth-intervention>

[144] <https://www.k4health.org/toolkits/mhealth-planning-guide/planning-tools>

[145] <https://www.k4health.org/toolkits/mhealth-planning-guide/measuring-sustainability-programming-tool-health-sector-investments>

[146] <https://www.k4health.org/toolkits/mhealth-planning-guide/development-and-evaluation-process-mhealth-interventions-examples-new-zealand-0>

[147] <http://www.poline.org/node/563632>

[148] <http://www.photoshare.org/photo/934-163>

[149] <mailto:http://www.poline.org/node/563632>

[150] <https://www.k4health.org/toolkits/mhealth-planning-guide/gender-digital-divide-indicators>

[151] <https://www.k4health.org/toolkits/mhealth-planning-guide/mama-global-monitoring-and-evaluation-framework>

[152] <http://www.photoshare.org/photo/351-68>

[153] <https://www.k4health.org/toolkits/mhealth-planning-guide/key-scale-considerations>

[154] <https://www.k4health.org/toolkits/mhealth-planning-guide/stock-sustainable-approach-using-mhealth-support-community-health>

[155] <https://www.k4health.org/toolkits/mhealth-planning-guide/programme-mwana-ppt>

[156] <https://www.k4health.org/toolkits/mhealth-planning-guide/beginning-end-mind-planning-pilot-projects-and-other-programmatic-research-successful>

[157] <https://www.k4health.org/toolkits/mhealth-planning-guide/applying-framework-assessing-health-system-challenges-scaling-mhealth-south-africa-0>

[158] <http://bmcedinformdecismak.biomedcentral.com/articles/10.1186/1472-6947-12-123>

[159] <http://www.photoshare.org/photo/5000-78>

[160] <http://www.photoshare.org/photo/351-72>

[161] <https://www.k4health.org/toolkits/mhealth-planning-guide/risks-sustainability>

[162] <https://www.k4health.org/toolkits/mhealth-planning-guide/sustainability-framework>

[163] <https://www.k4health.org/toolkits/mhealth-planning-guide/sustainability-drivers>

[164] <https://www.k4health.org/toolkits/mhealth-planning-guide/financial-sustainability>

[165] <http://www.mchip.net/node/765>

[166] <http://www.photoshare.org/photo/181-54>

[167] <http://www.photoshare.org/photo/351-88>

[168] <http://www.photoshare.org/photo/2580-14>

[169] <http://www.photoshare.org/photo/351-9>

[170] <http://www.statista.com/statistics/242955/price-sensitivity-in-developed-and-emerging-countries-for-mhealth-2012/>

[171] <https://www.k4health.org/toolkits/mhealth-planning-guide/m-enabled-inclusive-business-models-applications-health>

[172] <http://www.mhealthknowledge.org>

[173] [http://digitalprinciples.org/wp-content/uploads/2014/06/Greentree\\_Principles\\_2010.pdf](http://digitalprinciples.org/wp-content/uploads/2014/06/Greentree_Principles_2010.pdf)

[174] <http://www.unicefstories.org/principles/>

[175] <https://www.gov.uk/design-principles>

[176] <http://digitalprinciples.org/forums/forum/community-forum/>

[177] <http://www.jivita.org>

[178] <http://www.jhsph.edu>

[179] <http://www.mpower-social.com>

[180] <http://www.dghs.gov.bd>

[181] [http://www.bbc.co.uk/mediaaction/publicationsandpress/policy\\_mhealth.html](http://www.bbc.co.uk/mediaaction/publicationsandpress/policy_mhealth.html)

[182] <http://www.rethink1000days.org/>

[183] <http://mobilemamaalliance.org/sites/default/files/Spotlight-Chatsalud.pdf>

[184] <http://mobilemamaalliance.org/sites/default/files/1772-MAMA-Spotlight-September-v3-JH.pdf>

[185] <http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-August-v2-JH.PDF>

[186] [http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-June-v1-JH\\_1.pdf](http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-June-v1-JH_1.pdf)

[187] [http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-July-v4-TC%5B2%5D\\_1.pdf](http://mobilemamaalliance.org/sites/default/files/1749-MAMA-Spotlight-July-v4-TC%5B2%5D_1.pdf)

[188] [http://mobilemamaalliance.org/sites/default/files/1749-single-case-study-template-v5-JH\\_0.pdf](http://mobilemamaalliance.org/sites/default/files/1749-single-case-study-template-v5-JH_0.pdf)

[189] <http://mobilemamaalliance.org/tools-and-resources>

[190] <http://k4health.us4.list-manage2.com/track/click?u=4c824d609a93e07ec89e2df8e&id=215f804770&e=d387288777>

[191] <http://k4health.us4.list-manage.com/track/click?u=4c824d609a93e07ec89e2df8e&id=73f7c1c113&e=d387288777>

[192] <http://www.eTransformAfrica.org>

[193] <http://itidjournal.org/itid/article/viewFile/254/124>

[194] <http://www.mhealthknowledge.org/resource-type/mhealth-alliance>

[195] <http://www.mhealthknowledge.org/resource-type/applications-platforms>

- [196] <http://www.mhealthknowledge.org/resource-type/communities-practice>
- [197] <http://www.mhealthknowledge.org/resource-type/capacity-building-learning>
- [198] <http://www.mhealthknowledge.org/resource-type/multimedia-content>
- [199] <http://www.mhealthknowledge.org/resource-type/project-repositories>
- [200] <http://www.mhealthknowledge.org/resource-type/tools-guides>
- [201] <http://www.mhealthknowledge.org/resource-type/blogs-news>