Preventing Mother to Child Transmission

Report on mHealth strategies to strengthen collaboration and increase the impact of PMTCT initiatives.

frog unicef Elizabeth Glaser Pediatric AIDS Foundation Johnson & Johnson mHealth Alliance



The Prevention of Mother to Child Transmission (PMTCT)

The transmission of HIV from an HIV-positive mother to her child during pregnancy, labor, delivery or breastfeeding is called vertical or mother-to-child transmission (MTCT).

The prevention of mother to child transmission (PMTCT) has four prongs: 1) the prevention of HIV among women of reproductive age; 2) provision of appropriate counseling and contraceptives for women living with HIV; 3) ensuring that pregnant women living with HIV receive HIV testing and counseling, and access antiretroviral drugs during pregnancy, labor, and while breastfeeding so the infection is not passed to the baby; 4) providing HIV care and treatment for women, children, and their families living with HIV. In the absence of any interventions mother to child transmission rates are between 15-45%. For more effective PMTCT services, health systems need to be strengthened and PMTCT interventions need to be integrated into MCH services. The use of mobile technology has the potential to address gaps in providing PMTCT services.



An Introduction to Mobile Health (mHealth)

In many places throughout the world, particularly in developing countries, access to healthcare is limited by lack of facilities, trained personnel, supplies, etc.

mHealth, or mobile health, is the use of mobile technologies to support medical and public health practice and improve health outcomes through devices such as mobile phones, tablets, personal digital assistants (PDAs), patient monitoring devices, and more.

mHealth can help mitigate some of the public health challenges many countries face, by providing cost-effective solutions for diagnosis and treatment support, supply chain management, adherence to medicine regimes, data collection, disaster management, and other health-related issues. While the field of mHealth is still in early stages, there are indications that it is starting to transform health systems and extend the reach of health information and services to previously unreached populations.

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ANC	*Antenatal Care*
ARV	*Antiretroviral*
CHW	*Community Health Worker*
DBS	*Dried Blood Sample*
EID	*Early Infant Diagnosis*
EMTCT	*Elimination of Mother-To-Child Transmission (of HIV)*
HIV	*Human Immunodeficiency Virus*
MNC	*Maternal & Newborn Care*
MNCH	*Maternal Newborn & Child Health*
PMTCT	*Prevention of Mother-To-Child Transmission (of HIV)*
TAT	*Turn Around Time*
WHO	*World Health Organization*

25 07 2012, Washington, DC

the Workshop

A one-day collaborative work session with key stakeholders from public health, technology and design to explore mobile health solutions for the prevention of maternal transmission of HIV / AIDS.

The workshop builds on the real-time data model developed by UNICEF in a 2011 workshop on Community Case Management, also facilitated by frog.

the Participants

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CDC Foundation

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Cell-Life

JACKSON HUNGU
Clinton Health Initiative

YANIS BEN AMOR
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EGPAF

DAVE MUTHAMA
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JOHN ON'GECH
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Johnson & Johnson

Elizabeth Glaser Pediatric AIDS Foundation

unicef

mHealth Alliance™

frog™

an INTRODUCTION

Mobile phones can change the way health-care is delivered in the most rural and underserved parts of the world. There is now a way to have real-time, two-way communication with communities that are beyond the periphery of formal health systems.

Leveraging this emerging and unique solution space, we brought together public health, mobile health and design constituencies to start a conversation on how mHealth can contribute to speed the path to the prevention of mother to child transmission (PMTCT). This effort is aimed at improving the effectiveness of PMTCT programs as well as improving the quality of care for both users and service providers.

Presenting the framework

A baseline framework was introduced to provide a common model for aligning different opportunities and challenges across the care continuum. This framework was developed by UNICEF and frog based on their work in MNCH, incorporating UNICEF & WHO approved guidelines.

Workshop participants were asked to test and refine the framework during the course of the day.



The Day

Supported by a sequence of organized and structured idea generation exercises and moment of reflections*, participants were asked to think creatively about how to engage communities and deliver a supportive user experience leveraging mobile technologies to PMTCT. This one-day active process helped build interest and support for greater consideration of the user experience in the planning process moving forward.

** The workshop was hosted and facilitated by frog using their frogThink methodology for creative collaboration.*

8:00-8:45

0

Intro

Introduction, PMTCT Framework, Mobile, Program Posters

1 GROUP

8:00-10:45

1

Empathy

Mothers, Community Health Workers and their Journeys

5 GROUPS

11:00-12:00

2

Drivers

Mobile Opportunities

1 GROUP

12:30-2:15

3

Prioritization

District Manager Dashboard

4 GROUPS

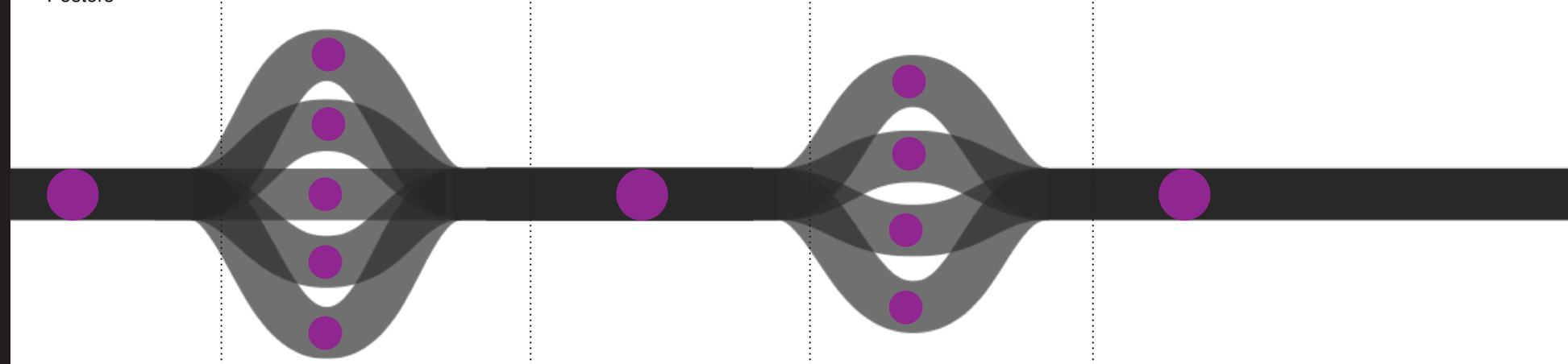
2:15-4:00

4

Reflections & Discussions

Reflection Framework Evolution & Wrap up

1 GROUP



“Availability of mobile is a great opportunity. There are so many areas where it can be utilized...”

Intro

Align participants on the workshop objectives, get to know each other, build a common understanding around PMTCT, introduce and articulate the proposed UNICEF reference framework.

the TOOLS

WORKSHOP AGENDA AND
TOOLS FRAMEWORK
PROJECT POSTER

the GROUPS

NO BREAKOUTS

The participants gathered together for a collective introduction and alignment.



Sharing Workshop Goals

The workshop began with a call to action to the participants to learn about and share best practices and explore innovative ways, with evidentiary support, to integrate mobile technologies into the PMTCT value chain to reduce barriers and improve impact.

01

KNOWLEDGE BASE

Share best practices for mHealth and PMTCT, creating a common knowledge base of existing programs and opportunity areas.

02

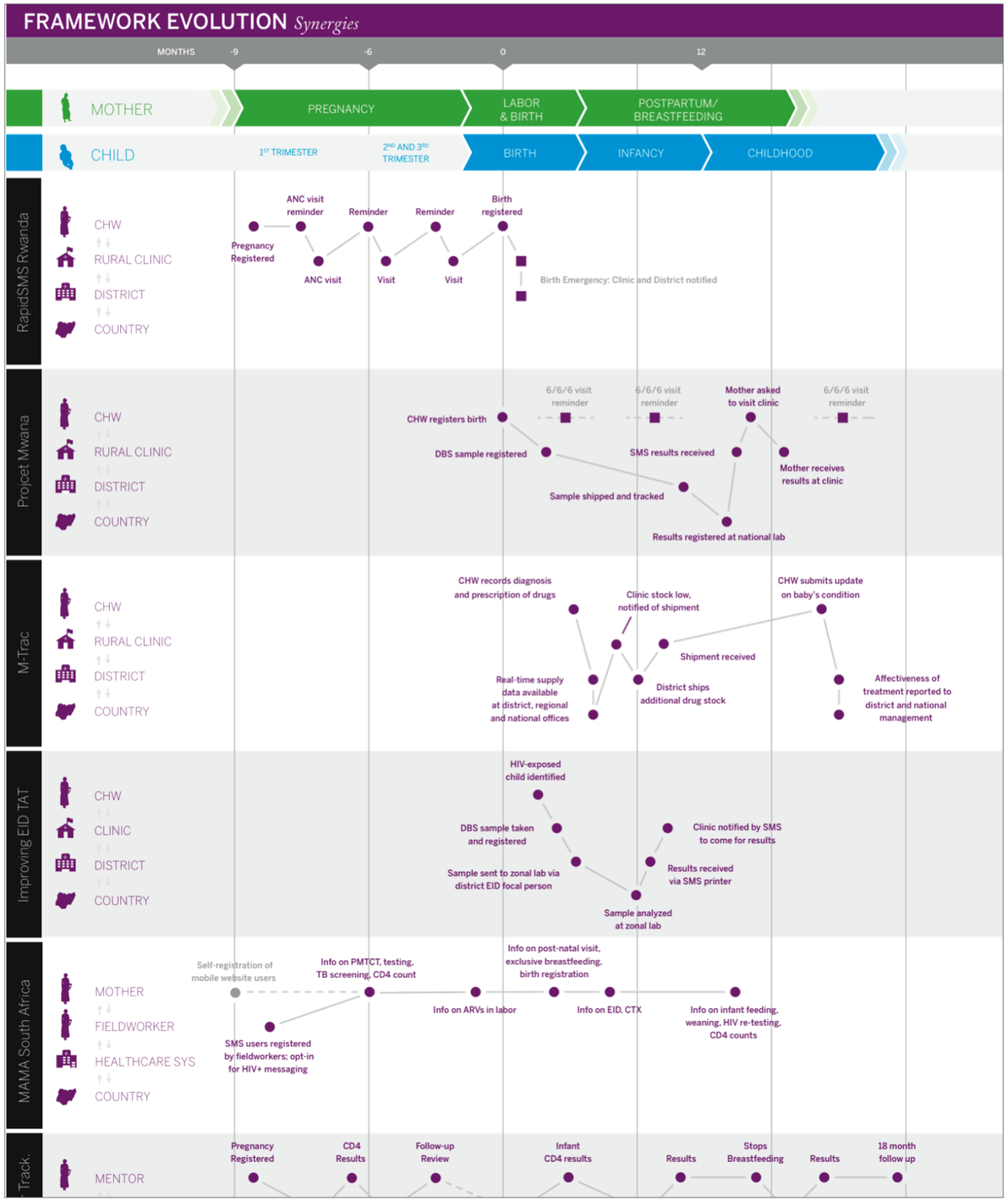
PROCESS & CRITERIA

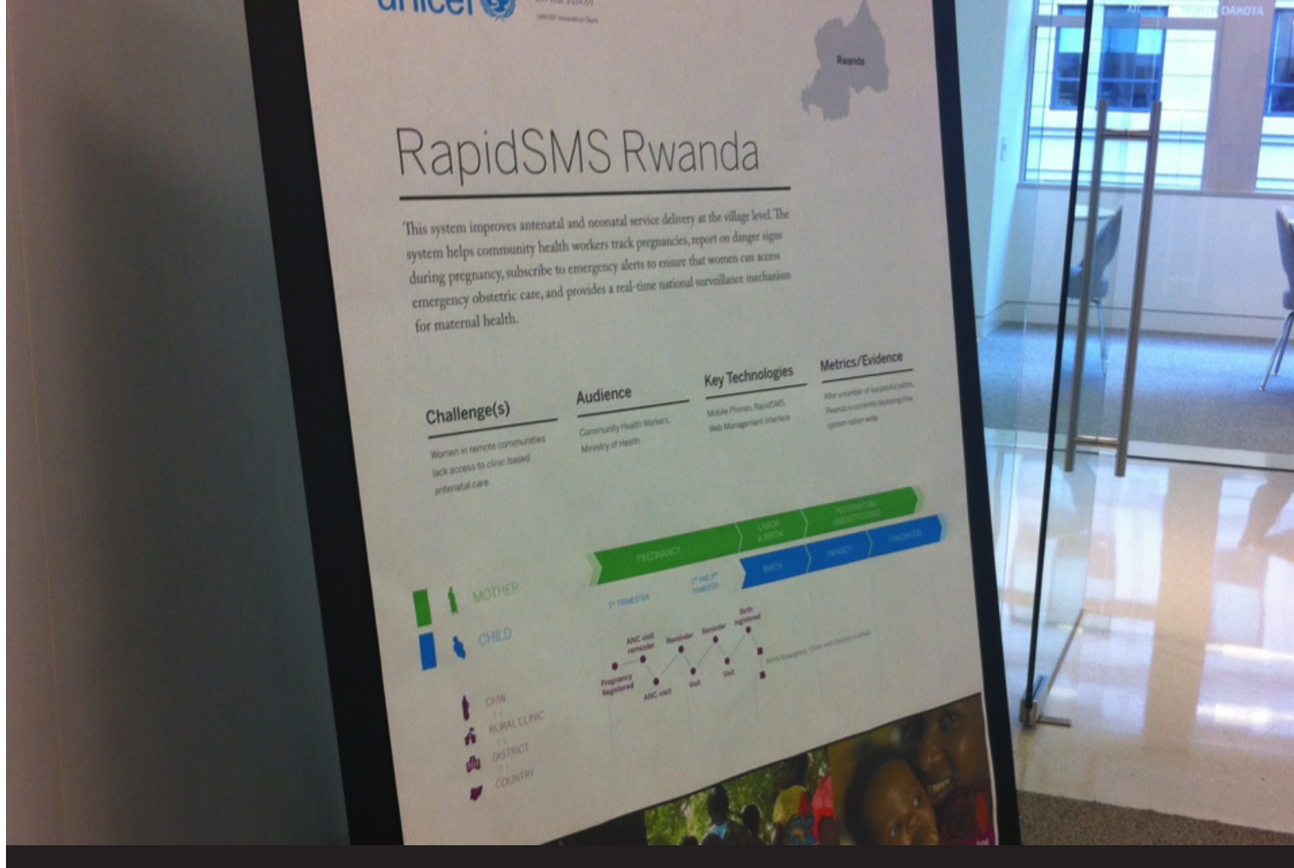
Define a process and criteria for mainstreaming mHealth solutions into PMTCT programs.

03

FRAMEWORK & GUIDELINES

Create a model for integrating mHealth solutions into PMTCT programs, and define key indicators for evaluation.





Testing the framework

The poster serves as a collection of programs on a common framework, enabling the evaluation of program opportunities and emerging areas.

08 PROJECTS / **08** COUNTRIES

“We should never forget the women and their own context, the difficulties she faces on a day to day basis.”

Empathy

Look at PMTCT through the eyes of the people it impacts; create empathy for mothers and community health workers (CHW) by mapping their day-to-day lives and needs; identify ways that mobile interventions can address these needs and increase engagement.

the TOOLS

PERSONA WORKSHEET
USER JOURNEY MAP
DEFINING EVENT LIST
ACTOR & TOUCHPOINTS CARDS
MOBILE OPPORTUNITIES CARD

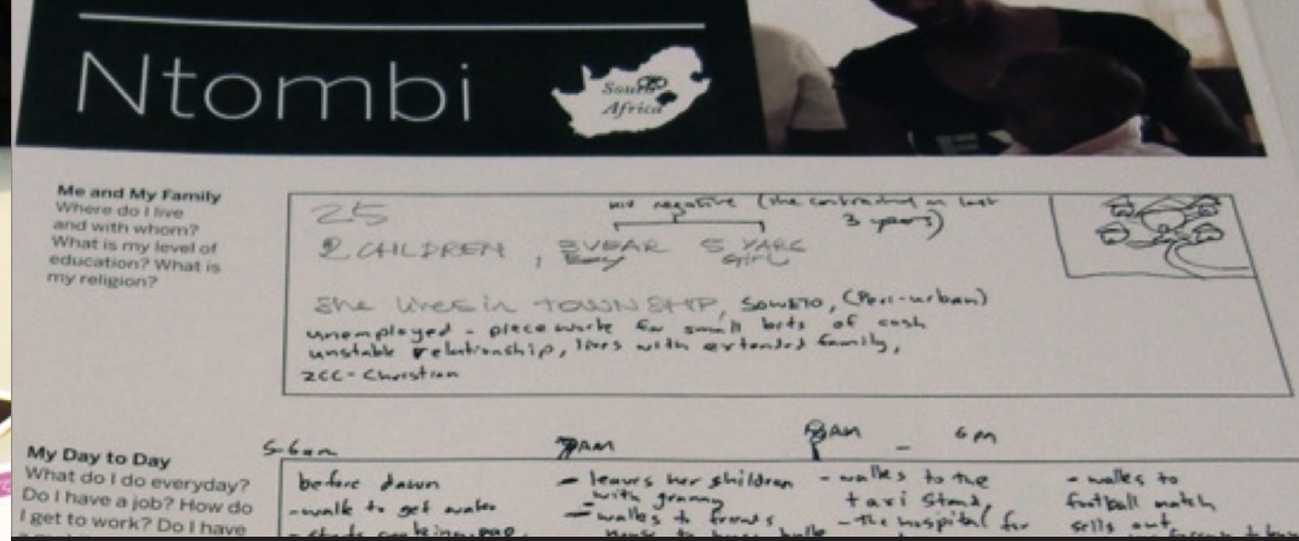
the GROUPS

5 BREAKOUTS

The participants split into 5 groups and chose to focus on either a mother or a CHW.

Look at the outcomes in the appendix ▸





Personas

Guided by a worksheet, participants were asked to build the profile of a mother or a CHW. By answering a specific set of questions focusing on care habits, family picture, day-to-day life and attitudes towards and interactions with the healthcare system, participants were able to bring to life a user archetype.

We then came back together as the full group to meet Ntombi, Zoey, Lenshina, Dore, Olivier, Jeanett, Aweiti and Deion and traveled to South Africa, Lesotho and Kenya, immersing ourselves in the envisioned context through the unique lens of the user, whether mother or CHW. This unique point of view enabled an enhanced examination of the PMTCT Framework.

** fictional personas built during the workshop*

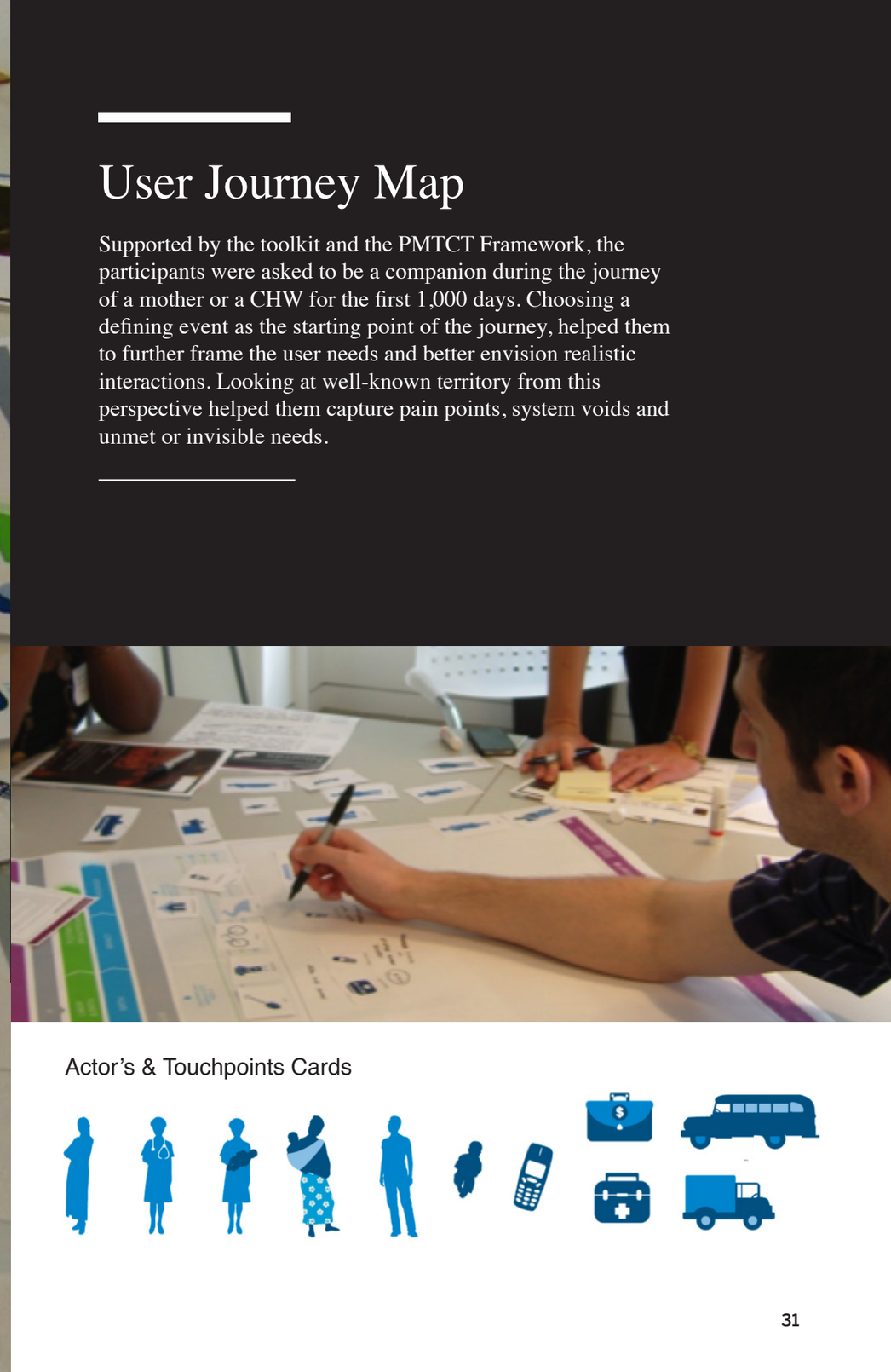
Defining Event

Mother & Child shared journey

Actors & Touchpoints cards

User Journey Map

Supported by the toolkit and the PMTCT Framework, the participants were asked to be a companion during the journey of a mother or a CHW for the first 1,000 days. Choosing a defining event as the starting point of the journey, helped them to further frame the user needs and better envision realistic interactions. Looking at well-known territory from this perspective helped them capture pain points, system voids and unmet or invisible needs.



Actor’s & Touchpoints Cards

Mobile Opportunities

The journey map was used as a landscape via which to discuss and define where mobile opportunities could play a role to support the unmet needs of mothers and CHW's. The most promising opportunities and their corresponding value to the user were then mapped to the journey touchpoints.

** Some mobile opportunities that emerged:*

Mother
PREGNANCY UPDATES

Strengthen the mother to child link to higher motivation to stick to the regimen

- Awareness and retention

Mother
SCHEDULED PICKUP

Informing on when and where to pick up the medications, depending on availability.

- Supply chain and retention

CHW & Mother
REAL-TIME CONSULT

Facilitating access to experts or information databases, when in need.

- Education and quality of care

CHW
CONTINUOUS FEEDBACKS

Providing continuous reviews on the activities status, pushing performance and keeping engagement up.

- Quality of care



Shareout

Supported by the persona worksheets and journey maps, a spokesperson for each team presented out to the larger group bringing to life the perspective of a mother or CHW and describing key moments in their health journey. These moments highlighted key gaps in communication and engagement that correlated to promising opportunities for mobile interventions to augment existing practices. Participants drew upon their personal experience and expertise to bring the personas and journeys to life and highlight relevant differences across geographies.





“It is not reinventing the wheel, but leveraging knowledge and existing experiences.”

2

Drivers

Consolidate the insights and opportunities from the Empathy exercise and map to common needs and painpoints; Share collective experience regarding existing programs or initiatives that address similar challenges.

the TOOLS

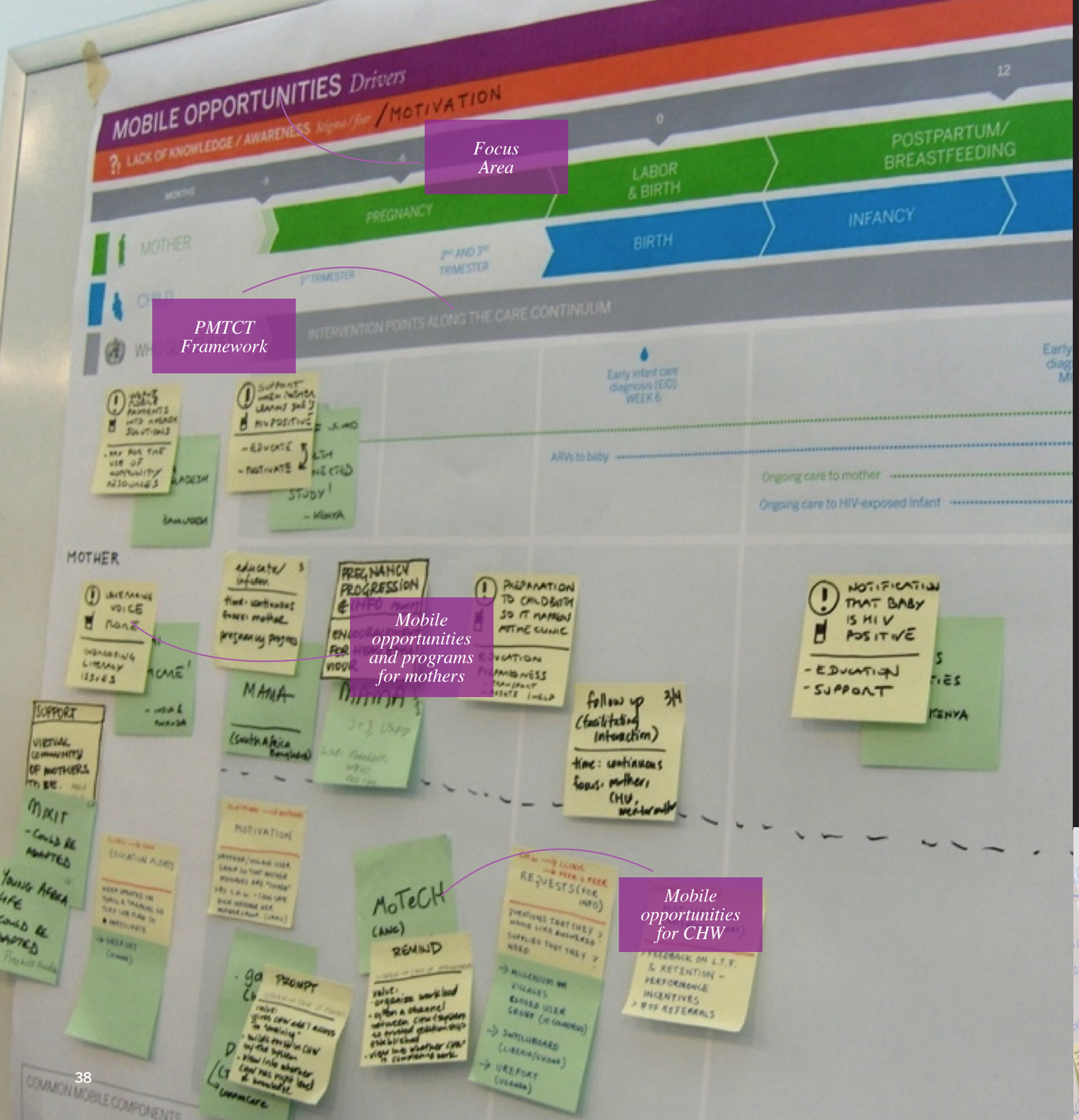
MOBILE OPPORTUNITY CARDS
PROGRAM CARDS
MOBILE CHALLENGES
MOBILE OPPORTUNITIES
WORKSHEET

the GROUPS

NO BREAKOUTS

The teams came together to share and discuss the opportunities that emerged.

Look at the outcomes in the appendix ▸



Opportunity Mapping

Participants looked at how the mobile opportunities uncovered in the mother and CHW journeys, and how the existing initiatives that were identified could map onto the PMTCT Framework focus areas. While the more user-centric focus areas were quickly populated with program references and opportunities, additional focus areas were added by participants to give more visibility to topics such as quality of care and service coordination.

Existing Focus Areas

MOBILE OPPORTUNITY CARDS

PROGRAM CARDS

MOBILE CHALLENGES

MOBILE OPPORTUNITIES

WORKSHEET

Emerging Focus Areas

MONITORING SERVICE QUALITY

TRACKING/REPORTING CHW's WORK

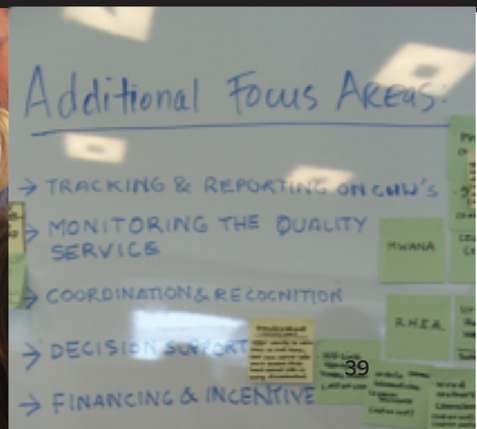
COORDINATION AND RECOGNITION

DECISION SUPPORT

FINANCING AND INCENTIVES

DRUG VERIFICATION





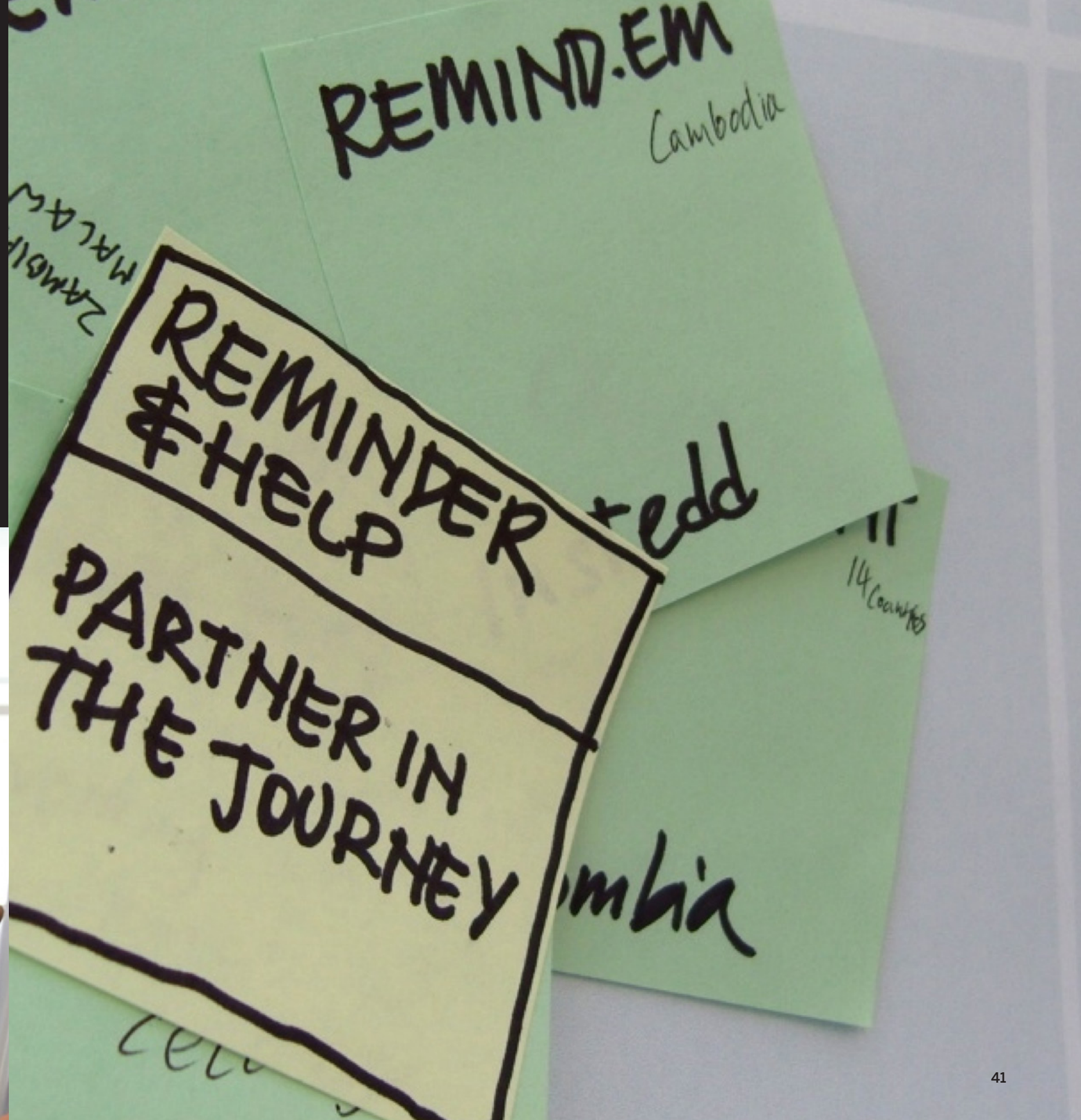
Existing Program Mapping

To leverage participants' knowledge and to maximize information sharing, each group has been asked to enrich the identified mobile opportunities by citing a link to existing projects that are similar in scope.

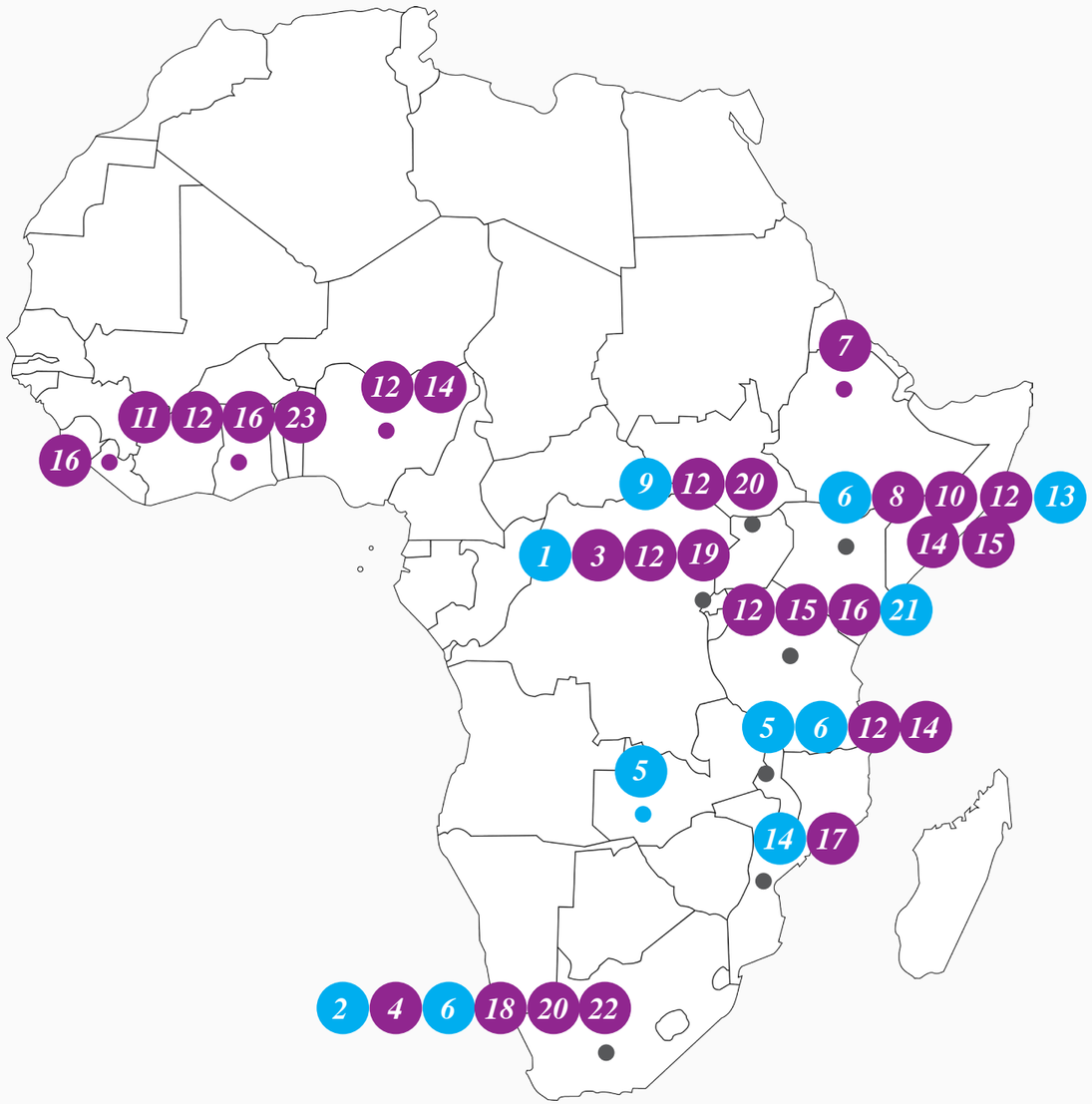
We collected

24 PROJECTS / **12** COUNTRIES





Index of Recent and Current Projects and Programs Relevant to PMTCT



1 Rapid SMS Rwanda
A
Country: Rwanda
Technology: RapidSMS
Partners: UNICEF, Government of Rwanda, Access
Appendix 1

2 MAMA - Mobile Alliance for Maternal Action
A, C
Country: South Africa, India, Bangladesh
Partners: Johnson & Johnson, USAID, United Nations Foundation, mHealth Alliance, BabyCenter
Appendix 1

3 R.H.E.A. - Rwanda Health Enterprise Architecture
D
Country: Rwanda
Technology: RapidSMS, OpenMRS
Partners: Jembi Health Systems, Rockefeller Foundation, PEPFAR, CDC IDRC

4 Young Africa Live
C
Country: South Africa
Partners: Praekelt Foundation

5 Mwana Program
A, D
Country: Zambia, Malawi
Technology: RapidSMS
Partners: Governments of Malawi and Zambia, Boston University, Clinton Health Access Initiative (CHAI), ZPCT, Médecins sans Frontières
Appendix 1

6 Mothers2Mothers (Let's SOAR)
A, D
Country: South Africa, Kenya, Malawi
Technology: J2ME, Hyland Enterprise Content Management Solutions; Partners: Mothers2Mothers, Hyland Software, Cell-Life

7 HIV-Link
D
Country: Ethiopia
Partners: Medic Mobile

8 SMS4PMTCT
A, C
Country: Kenya
Technology: customized application developed by Nyaruka
Partners: University of Washington, Kenya Medical Research Institute, University of California, San Francisco, Nyaruka

9 M-Trac
B
Country: Uganda
Technology: RapidSMS
Partners: UNICEF, Government of Uganda, World Health Organization
Appendix 1

10 MPT for Prevention of Mother-to-Child Transmission of HIV
C
Country: Kenya
Partners: Elizabeth Glaser Pediatric AIDS Foundation, World Health Organization, Alliance for Health Policy and Systems Research, National AIDS and STD Control Programme, Ministry of Health, Kenya

11 Ghana Telemedicine Project
D
Country: Ghana
Technology: Switchvox, mobile phone Closed User Group service from telecommunications provider, OpenMRS

12 Closed User Group
C, D
Country: Tanzania, Uganda, Rwanda, Malawi, Ghana, Kenya, Nigeria
Partners: Earth Institute (Millennium Villages Project), Airtel, Sony Ericsson

13 Pamoja Project
C
Country: Kenya
Technology: FrontlineSMS
Partners: Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), Kenya Ministry of Medical Services, Kenya Ministry of Health
Appendix 1

14 Clinton Health Access Initiative (CHAI)
A,B, C
Country: Kenya, Nigeria, Malawi, Mozambique
Partners: Medic Mobile (Malawi), CDC Foundation, Elizabeth Glaser Pediatric AIDS Foundation (EGPAF)

15 Public – Private Partnerships Initiative (PEPFAR)
A, B C, D
Country: Tanzania, Kenya
Technology: Varied
Partners: CDC Foundation, CDC, Ministries of Health, FHI 360, JPHEIGO, Engender Health, EGPAF, Clinton Health Access Initiative

16 Switchboard
C, D
Country: Liberia, Ghana, Tanzania
Partners: Switchboard, Vodafone, MTN

17 The Use of Mobile Cellphones for Community Verification of PBF
D
Country: Mozambique
Technology: Episurveyor
Partners: Elizabeth Glaser Pediatric AIDS Foundation (EGPAF), Save the Children
Appendix 1

18 Good Start III
D
Country: South Africa
Technology: Mobenzi Researcher
Partners: South African Medical Research Council

19 ChildCount+ PMTCT Module
B
Country: Rwanda
Technology: RapidSMS
Partners: Earth Institute, UNDP/UNOPS, Millennium Promise, Airtel

20 HUPA
C, D
Country: South Africa
Technology: HIV Mobile Decision Support
Partners: Harvard University, D-Tree International, Dimagi, Pathfinder, CDC, World Health Organization

21 Early Infant Diagnosis Program
A
Country: Tanzania
Tehnology: Rapid SMS from GSM printer units
Partners: Elizabeth Glaser Pediatric AIDS Foundation, Ministry of Health of Tanzania, Clinton Health Access Initiative, CDC Foundation
Appendix 1

22 Philani Plus Mentor Mothers Programme
A, C, D
Country: South Africa
Tehnology: Mobenzi Researcher and Outreach
Partners: Philani, UCLA, Stellenbosch University

23 MoTECH
A, C, D
Country: Ghana
Partners: Columbia University Mailman School of Public Health, Grameen Foundation, Ghana Health Service, Bill and Melinda Gates Foundation

PMTCT Focus Areas

A - Tracking Mother and Baby

B - Supply Chain Management

C - Supply Chain Management

D - Coordination, Supervision & Quality of Care

Project Profile included in this report

“Understanding processes and workflows is critical to understand where mobile can help.”

Priorities

Adopt the point of view of a District Manager within the Health Ministry to look at how he or she might prioritize the data collected from mobile interventions; Choose one of the focus areas and create a data dashboard to help the DM succeed in his or her job.

the TOOLS

PERSONA WORKSHEET

DASHBOARD WORKSHEET

MOBILE OPPORTUNITIES

PROGRAM CARDS

the GROUPS

4 BREAKOUTS

Participants grouped around the most promising focus areas, looking at them from the DM perspective.

Look at the outcomes in the appendix ▸

Personas

Guided by a worksheet, participants were asked to build the profile of a District Manager. By answering a specific set of questions, participants were able to immerse themselves in the life of a District Manager as service provider and gain a better understanding of the District Manager's day-to-day duties and needs, as well as how they differ in Zambia, South Africa, Lesotho and Kenya.

Name & Country

Me and my job

My day to day

Managing my district

My duties in one year



Selected focus

Mobile Opportunities

Dashboard

Emerging Data Points

Relevant Mobile

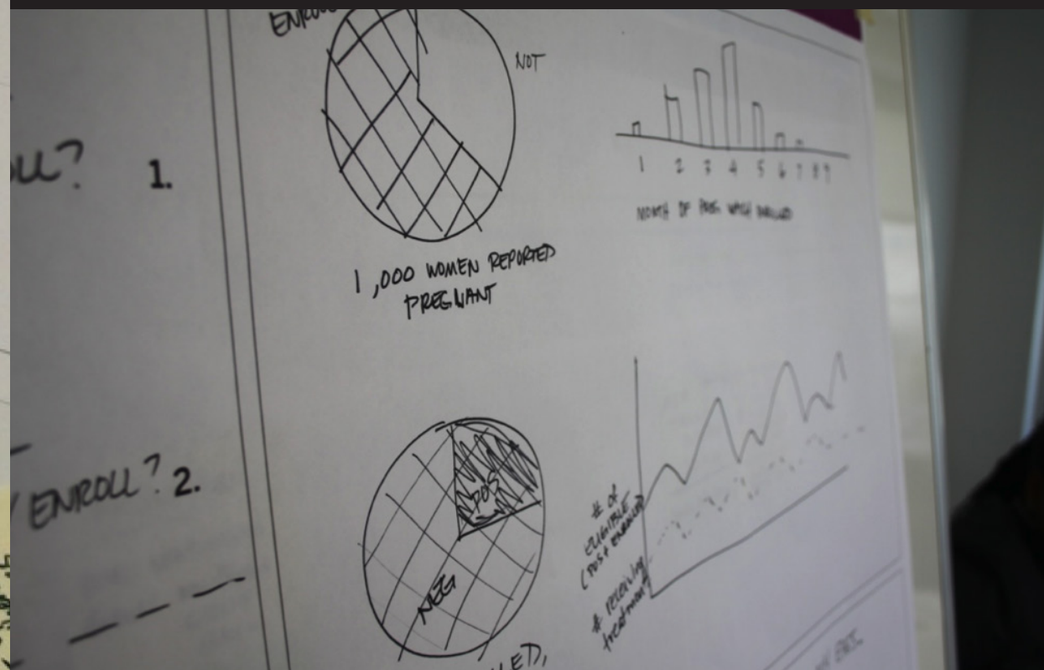
Dashboard

Looking back at the collected mobile opportunities of one of the focus areas, each group extracted the relevant available data points and identified how to prioritize these data in order to enable DM's to perform their jobs more effectively.

Through the discussion, the strong interconnection among the focus areas (e.g. stock-outs, adherence, motivation, knowledge, etc.) emerged such that each group was able to partially overlay its considerations with the considerations of the other groups.

Which focus area we worked on

- Stockouts of kits and medications
- Lack of knowledge / awareness
- Tracking of mother / baby pairs
- Adherence to drugs



Shareout

Supported by the persona worksheets and the dashboard, a spokesperson for each team presented out to the larger group an overview of their work, highlighting how and why the selected data points of a specific focus area could help the District Manager's job and how this could affect mothers and CHWs lives.

Emerged Dashboard Structure

OPERATION
Data points to make better decision in the day to day work (managing facilities, logistics and stock outs).

MONITORING
Data points to identify emerging patterns and better address medium term organization of resources.

EVALUATION
Data points to influence decision making at a high level and impact resource planning.



“Continuous collaboration is key in moving initiatives foreword.”

Reflections

Capture the key takeaways from the day’s activities, looking back at the insights, experiences and conversations throughout the day to highlight key learnings and outcomes.

the TOOLS

REFLECTION POSTER

the GROUPS

4 BREAKOUTS

The teams came together for a final discussion around emerged topics and values of the session itself.

Look at the outcomes in the appendix ▸

Presenting reflections

Participants highlighted one key takeway from the day as well as examples of programs that they would like to learn more about. How will they take this knowledge into their day-to-day work? The PMTCT framework represented a key opportunity to tap into the combined experience within the room as well as outside expertize within the mhealth community.





Design Principles

PUT THE USERS FIRST

Having data and not knowing what to do with it is as bad as not having any data.

GO BEYOND MOBILE

Mobile has to be part of a multi-pronged approach, that will work with and within other systems.

THINK SYSTEM-WISE

We need to look at the problems both at the national scale and at the level of the single mother. Then solve them in a way that works for both.

MASH-UP COMPETENCES

We need to bring designers, health technical leads and mobile technologist together more often.

next Steps

the CHALLENGE

The workshop provided an inspiring set of reflections together with a rich collection of opportunities and constraints around the proposed framework. The strengths and weaknesses that were highlighted over the course of the day are of great help to better shape the framework and extend its potential context of use.



Emerging Themes

Referring to the hands-on experience participants had during the workshop, each stakeholder was asked to analyze and share back strengths and weaknesses of the proposed framework experienced so far. The collaborative space of the workshop provided a great opportunity to see the problem space from different perspectives, and highlight some recurring themes to guide our efforts as a community moving forward.

ADVANTAGES

It is a powerful communication tool to talk about mobile health solutions

Ease of comparison of existing initiatives, promote synergies and connections

Scales up easily as a canvas for maternal and child care in general

Maps effectively the connections at the system and the community level

OPPORTUNITIES

Map the evidences as well as the actions, to trace what is working and what not

Provide a broader spectrum of involved actors to match the projects and context needs

Give visibility to the system layer to the stakeholders involved in program development

Extract guidelines to better address the efforts of projects to come

Get buy-in from organizations like WHO to move forward

FRAMEWORK EVOLUTION *Maintaining Momentum | Effective Use*

What is the key ~~tech~~ toolset we can use across projects?

How can we make sure the framework works for all in the journey

Communications tool for mobile health - needs a structure

help to tell the story of M Health to CEOs, country dir's - landscape

needs to be mapped: Where is the evidence for
- reminders
-
-
-

PATTY
apply draft framework to a country level for testing

depict stakeholders in program design
- implementers
- managers
- telecoms
-
-

~~Scale up~~ ~~quick~~ ~~point of care diagnostic systems~~
put framework in context of bodies like WHO - get their buy-in

BOBBY
maturity levels - what steps do I have left to go? - (look @ criteria against where project is)

BLAIR
diagram projects + see org's + people who are involved → in order to build a collab model

CHRISTIAN
framework needs to be sanctioned from higher up (WHO)

CHRISTIAN
take to country level teams + vet with them

PATTY
- problem
- people
- targets
develop a process towards a systems based approach

Collaboration models - stories for what has worked in the past

CHRISTIAN
need ministry of health to buy in to the framework

~~BOB~~
- which solutions are best for mobile vs. traditional interventions?

JOHN
supervision - figuring out the supervisor role
monitoring / accounta
-Bill: schematic link between already exists

JOHN
need a better way to systemize efforts - since impacts organizations human resources, etc.

icons need to ~~label the recipient~~ people needs to be in the right context for each country

Data Collection
↓
outcome = ability to monitor. this is a big incentive

RJ
what are the "must have" elements in a project vs. "nice to have"

PATTY
in exercises, we weren't looking enough at the broader picture - but only looked at community level

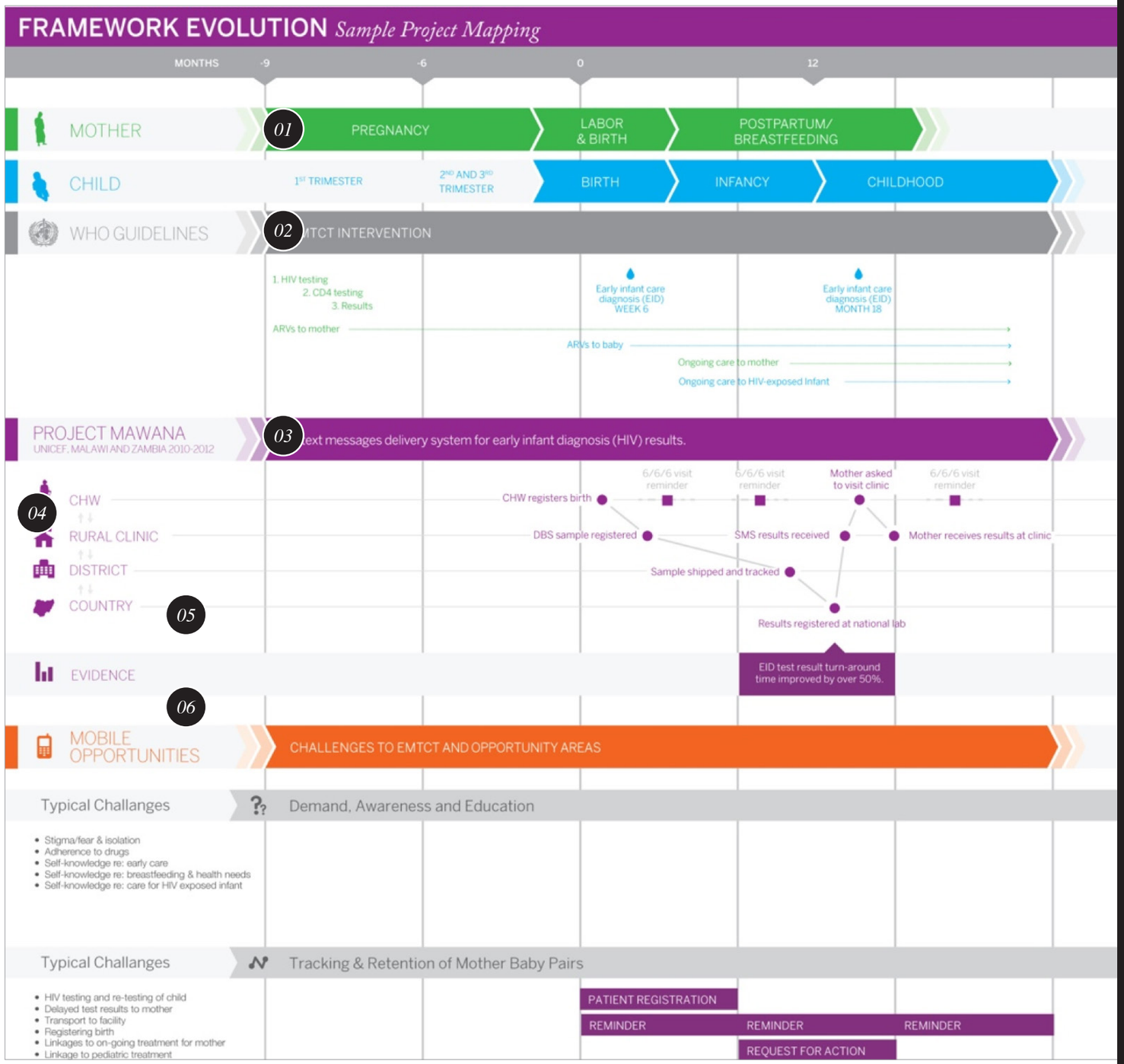
PATTY
could be a broader convo. for maternal child health in general

RJ continued
1) need for a multidisciplinary approach
→ need to move discussion / FW to a country level

Robert
Funders need to be on board to set standards around a FW

Bobby
standards are a very long-term proposition

RJ
need to move FW to the concreteness of reality @ the local level



Framework Evolution

Participants discussed specific ways to evolve the framework so that it can be of maximum use to each participating organization as a tool for decision making and prioritization. A series of enhancements were integrated into the final version for adoption within a broader community of practice.

01

This version of the framework is focused on mothers and newborns, but could be replaced with a different care continuum, for HIV for example.

02

The framework can accommodate any number of guidelines within the maternal and newborn continuum. In this case we are using WHO & UNICEF PMTCT guidelines but could overlay others.

03

Details of a given project can be mapped here in terms of how different participants within the healthcare system are connected.

04

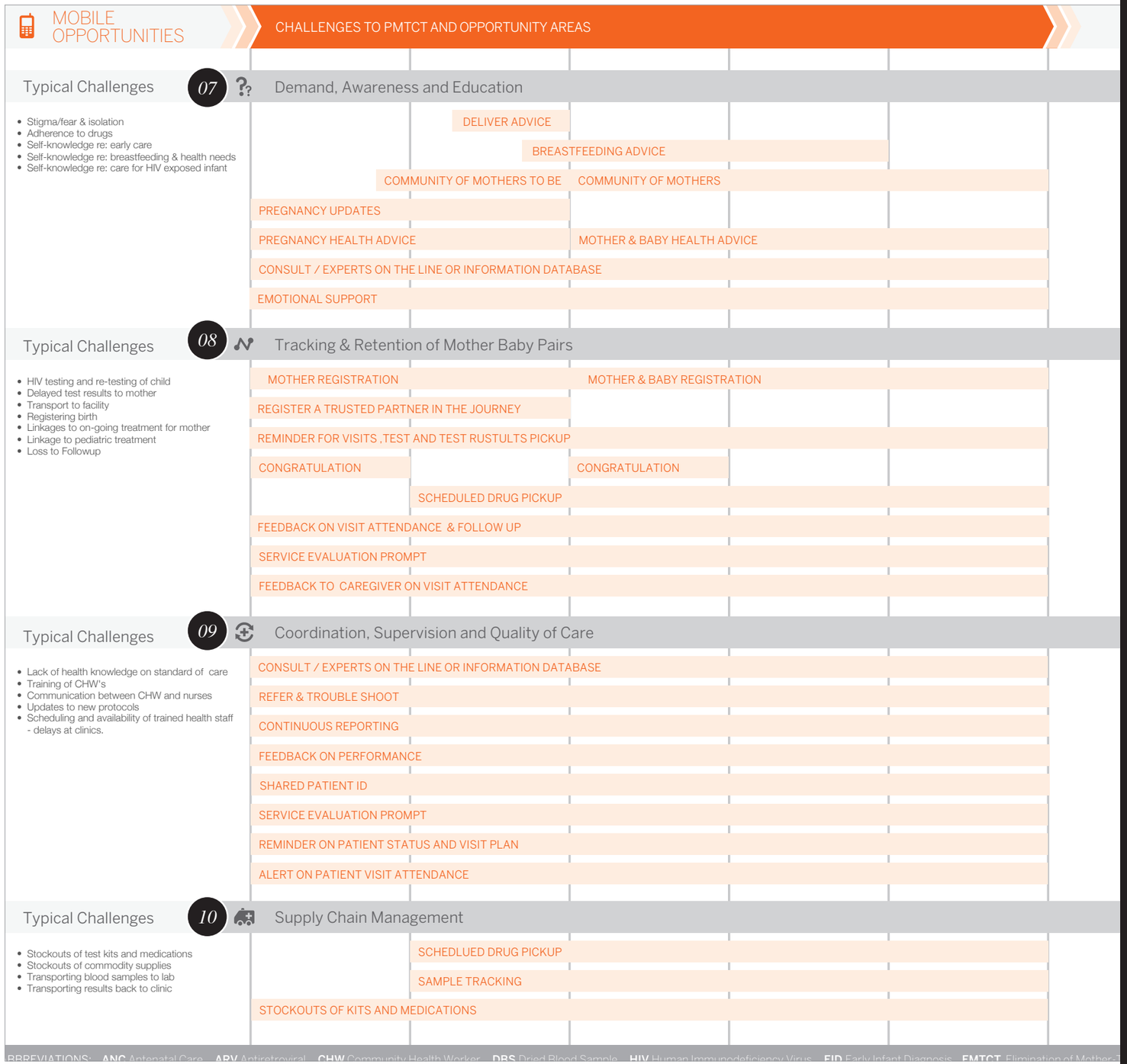
A broader set of icons will be developed to accommodate the project needs.

05

A layer of evidences has been added.

06

The mobile components of the project are grouped according to four different opportunity areas and aligned across the time continuum where / when possible.



ABBREVIATIONS: **ANC** Antenatal Care **ARV** Antiretroviral **CHW** Community Health Worker **DBS** Dried Blood Sample **HIV** Human Immunodeficiency Virus **EID** Early Infant Diagnosis **EMTCT** Elimination of Mother-

Mobile Opportunities

The mobile opportunities elucidated over the course of the day were reviewed and synthesized into a refined set of focus areas that fit with the expertise represented by the participants in the room. These focus areas will increase the opportunities to compare programs in similar areas and understand how they map to the overall problem space of PMTCT.

07 *Demand, Awareness and Education*

Stigma/fear & isolation; Adherence to drugs; Self-knowledge re: early care; Self-knowledge re: breastfeeding & health needs; Self-knowledge re: care for HIV exposed infant

08 *Tracking & Retention of Mother Baby Pairs*

HIV testing and re-testing of child; Delayed test results to mother; Transport to facility; Registering birth; Linkages to on-going treatment for mother; Linkage to pediatric treatment; Loss to Followup

09 *Coordination, Supervision and Quality of Care*

Lack of health knowledge on standard of care; Training of CHW's; Communication between CHW and nurses; Updates to new protocols; Scheduling and availability of trained health staff; Delays at clinics

10 *Supply Chain Management*

Stockouts of test kits and medications;Stockouts of commodity supplies; Transporting blood samples to lab; Transporting results back to clinic

Planned Activities

The partners committed to driving this framework forward across the mHealth community. We identified a number of immediate actions that would allow us to engage a broader set of stakeholders, from funders to practitioners. We see this approach as model for mHealth that can be extended well beyond PMTCT.

Test and validate the framework in local country settings

- Tanzania Evidence Working Group Workshop (January 2013)
- UNICEF country offices (ongoing)

Drive broader awareness

- Social Good Summit (September 2012)
- mHealth Summit (December 2012)
- Mobile World Congress (February 2013)

Disseminate process and findings

- Social Good Summit (September 2012)
- mHealth Summit (December 2012)
- Mobile World Congress (February 2013)

Engage critical constituencies

- Drive alignment with funders in mHealth space
- Support adoption of framework by practitioners.

PMTCT & mHealth Project Profiles

the PROJECTS

Rapid SMS Rwanda
Rwanda - UNICEF

Project Mwana
Zambia, Malawi - UNICEF

M-Trac
Uganda - UNICEF

The Pamoja Project
Kenya - EGPAF

EpiSurveyor for PBF verification
Mozambique - EGPAF

Improving EID TAT
Tanzania - EGPAF

MAMA South Africa
South Africa - MAMA

Mother Baby Pair Tracking
South Africa - mothers2mothers



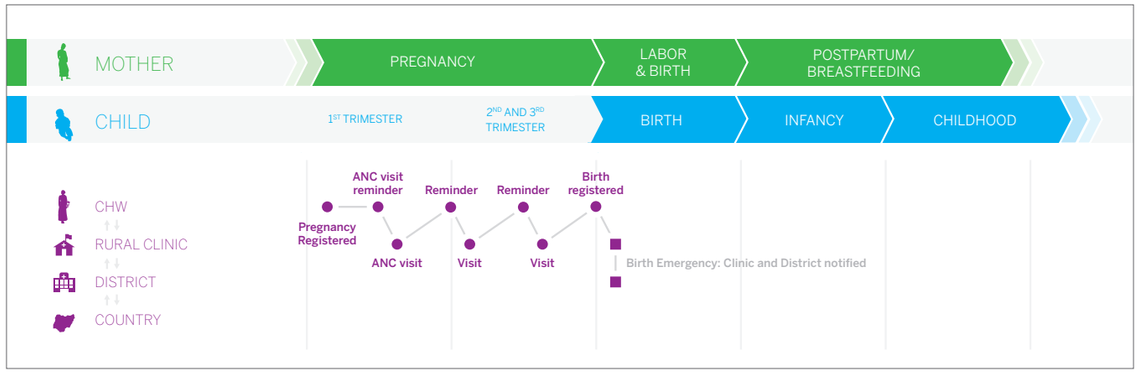
Erica Kochi
UNICEF Innovation Team



RapidSMS Rwanda

The system improves antenatal and neonatal service delivery at the village level. The system helps community health workers track pregnancies, report on danger signs during pregnancy, subscribe to emergency alerts to ensure that women can access obstetric care, and provides a real-time national surveillance mechanism for maternal health.

Metrics/Evidence	Key Technologies	Audience	Challenges
After a number of successful pilots, Rwanda is currently deploying this system nation-wide.	Mobile Phones, RapidSMS, Web Management Interface.	Community Health Workers, Ministry of Health.	Woman in remote communities lack access to clinic-based antenatal care.







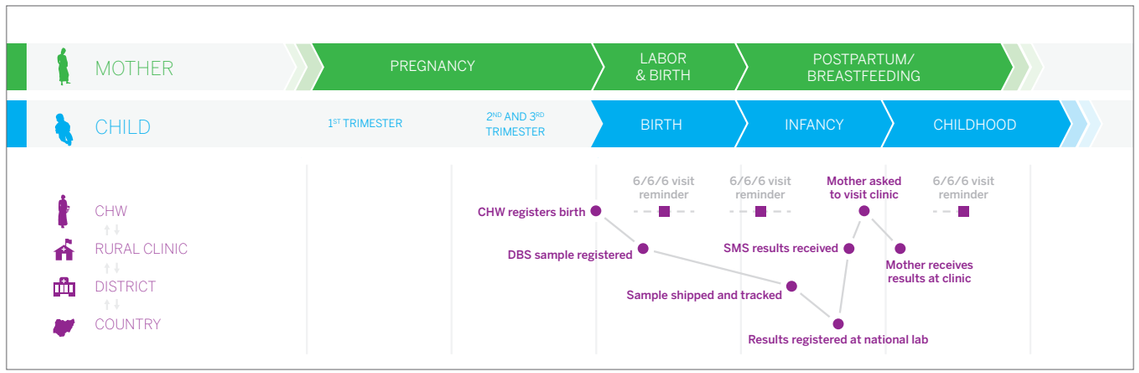
Erica Kochi
UNICEF Innovation Team



Project Mwana

The Mwana Initiative has improved test result turn-around time by over 50%. It delivers early infant diagnosis (HIV) results to rural and under-served communities in Zambia and Malawi via text messages rather than paper. Community Health Workers also register births and trace patients via SMS to ensure that they receive key childhood interventions.

Metrics/Evidence	Key Technologies	Audience	Challenges
EID test result turn-around time improved by over 50%.	Basic Mobile Phones, RapidSMS	Community Health Workers	Logistical challenges in remote communities delay EID results and subsequent interventions.





Erica Kochi
UNICEF Innovation Team



M-Trac

M-Trac is a SMS-based disease surveillance and medicine tracking system. It provides real-time data for response while monitoring health service delivery performance. The initiative also integrates governance and accountability through citizen feedback, an anonymous hotline and public dialogue sessions. UNICEF Uganda and the Ministry of Health are rolling this out nationwide in 2012-2014.

Metrics/Evidence

M-Trac is to be rolled out nationwide over the next 2 years.

Key Technologies

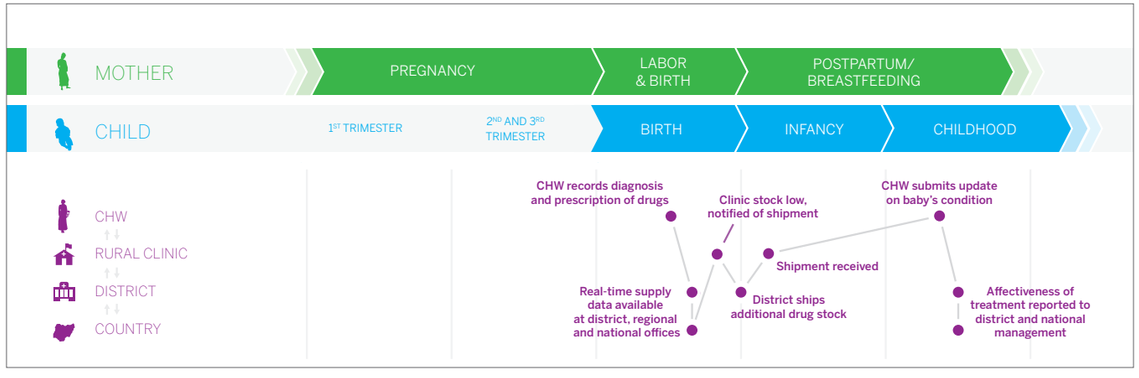
Mobile Phones, RapidSMS, Web Management Interface

Audience

Clinic Staff, District and Regional Management, Ministry of Health

Challenges

With limited infra-structure and supply shortages, it is difficult to maintain a healthy supply chain of essential medicines







Elizabeth Glaser Pediatric AIDS Foundation

Christian Pitter
EGPAF Global Technical Policy and Partnerships

Adaku Ejiogu
EGPAF Partnerships



The Pamoja Project

The Pamoja SMS project supports implementation and expansion of high quality HIV prevention, care and treatment services at facilities. Twice a week, SMS messages and emails are sent to health workers in Pamoja-supported sites, encouraging them to handle service delivery differently (e.g. decentralization, task shifting, integration of services, mentoring) and provide important updates in key services. The goal is to improve access to quality care by improving local capacity for long term sustainability.

Metrics/Evidence

The project has boosted morale and cooperation among over 250 health workers at 150+ facilities.

Key Technologies

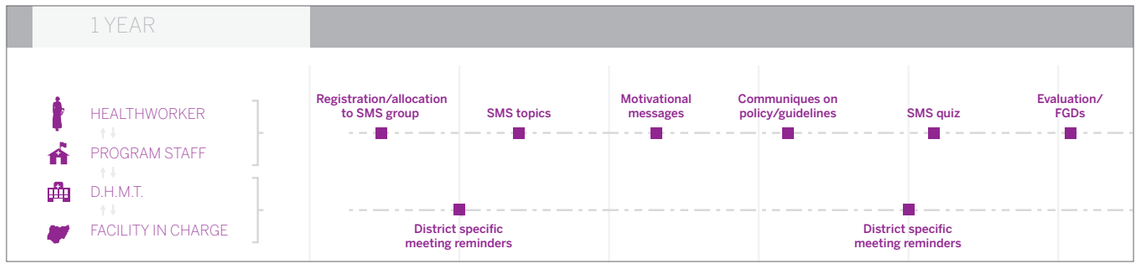
Mobile Phones, Email

Audience

Facility Healthcare Workers, Program Staff

Challenges

Educate healthworkers and encourage task shifting/ sharing, decentralization, integration of services, and mentoring/training.





Elizabeth Glaser Pediatric AIDS Foundation

Christian Pitter
EGPAF Global Technical Policy and Partnerships

Adaku Ejiogu
EGPAF Partnerships



EpiSurveyor for PBF verification

EGPAF is implementing a performance-based financing (PBF) program to improve health outcomes in Gaza and Nampula provinces. The PBF program is used to decentralize resources and motivate healthcare providers to improve quality of services. The facility healthcare workers are aware of the incentives offered and so there is a need to verify the quality of the services provided and the data reported. EpiSurveyor surveys via mobile phones collect data that verify the quality of services.

Metrics/Evidence

Verification of PBF outputs has shown improved quality of care, worker motivation and reinforced accountability.

Key Technologies

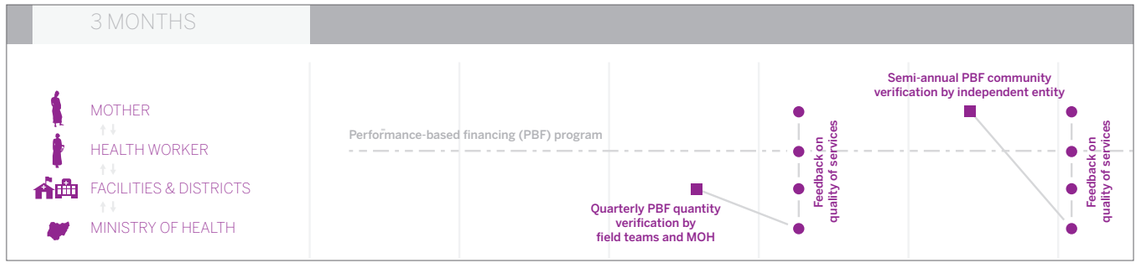
Mobile Phones, EpiSurveyor, Backup Database

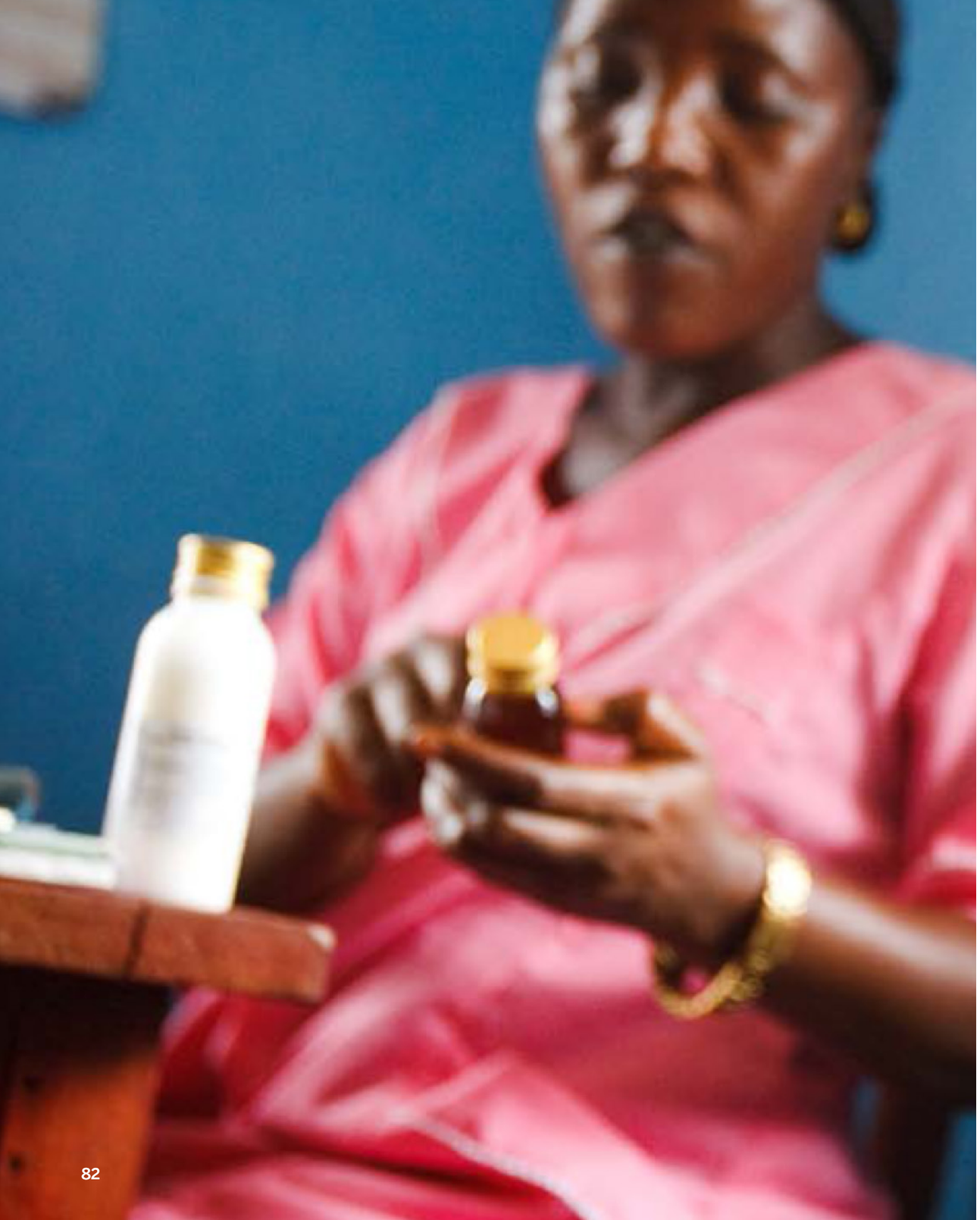
Audience

Facility Healthcare Workers, Data Auditors

Challenges

Verification of PBF outputs has shown improved quality of care, worker motivation and reinforced accountability.





Elizabeth Glaser Pediatric AIDS Foundation

Christian Pitter
EGPAF Global Technical Policy and Partnerships

Adaku Ejiogu
EGPAF Partnerships



Improving EID TAT

SMS printers are used to improve early infant diagnosis (EID) turnaround times (TAT) enabling early initiation of pediatric ART. Currently installed at 33 sites, results are received directly from the zonal facility following sample analysis and data entry. This has reduced the early infant diagnosis turnaround time to below one month (2 weeks average).

Metrics/Evidence

TAT of results from zonal laboratory to health facilities was reduced from three months to an average of two weeks.

Key Technologies

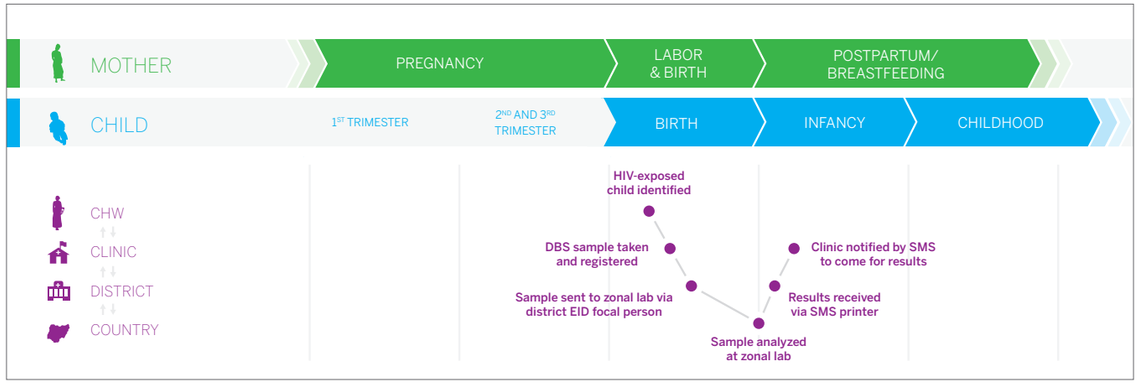
Mobile Phones, SMS printers

Audience

Facility Healthcare Workers, Zonal Lab Technicians

Challenges

Previously, the dry blood spot (DBS) test results took 8-12 weeks. This delay resulted in loss to follow-up of the infant.





Joanne Stevens
MAMA South Africa

SOUTH AFRICA

MAMA South Africa

MAMA South Africa provides vital health information via mobile phones to expectant and new mothers and their families, supporting them week-by-week during pregnancy and the first year of baby's life. Most South African moms-to-be learn that they are HIV positive for the first time during pregnancy, and lack social support to help them cope with the diagnosis of a life threatening disease while adjusting to the demands of pregnancy and a new baby.

Metrics/Evidence

MAMA will target 500,000 women and household decision-makers over two years. 100 registered for SMS services in first two weeks.

Key Technologies

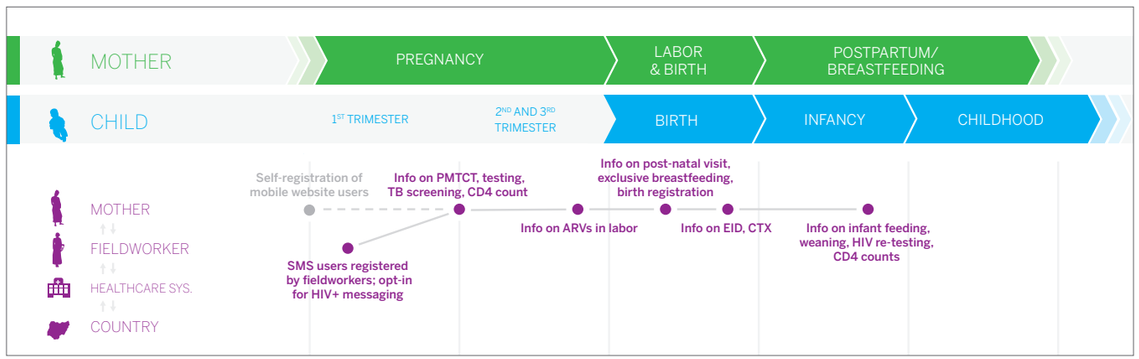
Mobile Website/ Portal (askmama.mobi), staged SMS messages, interactive quizzes via USSD

Audience

Low-income and at-risk expectant and new mothers, as well as their household decision makers.

Challenges

Maternal deaths have increased 40% since 1998 due to HIV/AIDS. Mothers need caring, accurate, straightforward information that is timely and discreet.





Tim Nichols
mothers2mothers,
South Africa

David Torres
mothers2mothers,
South Africa



Mother Baby Pair Tracking

The MBPT project tracks the evolution and relationship of pregnant HIV positive mothers to prevent transmission to their infants once born. A custom smartphone application tracks the relationship lifecycle to ensure maximum efficiency and impact for the m2m support procedure. The software supports the interaction between mentor mother and client; clients are notified, reminded, and accounted for. The mentor mother also has access to the clients profile and information on her phone.

Metrics/Evidence

The project has cut time spent recording data on-site. Real-time analytics are also being collected to review the overall process.

Key Technologies

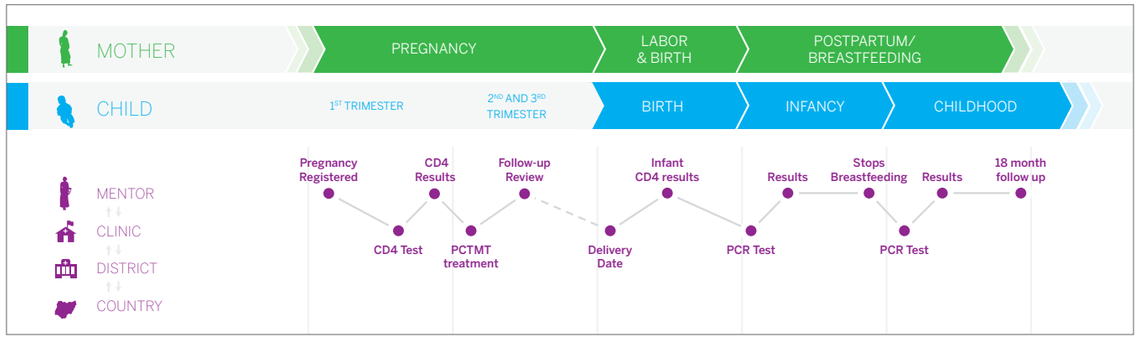
Smartphones, Android OS, SMS gateway, FrontlineSMS, onBase ECM app/server, auto-indexing, keywords, document scanning

Audience

Clients, Mentor Mothers, Management, Governments, NGOs

Challenges

Introduction of technology to relationship, training, working environment, security, data quality, how to pair after initial visit



PMTCT & mHealth Evidence

A Landscape Brief of the Current Evidence Base

an INTRODUCTION

The use of mobile phone technologies to improve health outcomes (mHealth) is increasing, particularly in the areas of HIV and reproductive, maternal, newborn, and child health (RMNCH). While still nascent, the body of evidence supporting the use of mHealth to improve both program processes and results is growing with promising signs toward addressing some of the key challenges in improving maternal and child health. Studies have demonstrated how mHealth contributes to reducing maternal mortality, implementing child health protocols, and promoting treatment adherence for HIV patients.

The Global Plan towards Elimination of New HIV Infections Among Children by 2015 and Keeping Mothers Alive and the 2012 International AIDS Conference theme, "Turning the Tide Together," signal an urgency and renewed optimism to join forces and build momentum for the elimination of mother-to-child transmission (EMTCT) of HIV. It is also important to highlight the global shift toward the integration of health services. Understanding how interventions contribute to strengthening community and health systems underscores the importance of examining mHealth as it applies across the entire continuum of health services.

This landscape brief provides a summary of current projects and the available evidence relating to the use and potential of mHealth for improving results in vertical transmission programs.



How mHealth Can Improve EMTCT and RMNCH: Experience and Evidence

There are a limited number of published studies that evaluate the impact of mHealth specifically on pregnant women who are HIV+ or who are registered for EMTCT prophylaxis. However, there are a number of significant studies and projects generating evidence relevant to using mHealth in EMTCT programs and other parts of the RMNCH continuum of care.

Coordination, Supervision and Quality of Care

Protocols for Diagnoses

Clinical outcomes are impacted by making appropriate diagnoses and then making timely referrals for initiating treatment. Often, time delays in going to health facilities for proper diagnosis can lead to fatal delays in accessing treatment. Step-by-step protocols can facilitate diagnosing health conditions and making referrals.

Evidence demonstrates that mobile phones can be used to help community and other frontline health workers recognize signs of obstetric complications, malnutrition, various childhood illnesses, and maternal depression.

Service Support and Training

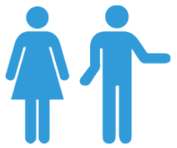
The role and responsibilities of community and other frontline health workers have been increasingly expanding and include such tasks as record keeping, following up with patients who miss clinic appointments, recognizing symptoms of potentially dangerous health conditions, making referrals, and providing emotional support. Any tools that can help them perform their job better contribute to a better operating health system.

Studies have demonstrated that mobile phones can be used to:

(1) Improve community health worker performance through real-time monitoring of time spent with clients;

(2) Improve CHW knowledge of standards of care and;

(3) Consult with experts and supervisors to make timely referrals of emergency cases.

	Evidence
	A randomized control trial (RCT) in Kenya for pediatric malaria treatment showed use of text messaging improved treatment protocol management by nearly 25%.(1)
	Results from Tanzania indicate that health workers following integrated management of childhood illness (IMCI) on mobile phones performed better than health workers who used paper based IMCI. A correct diagnosis was given by electronic IMCI more consistently than the paper-based system.(2)
	A 2012 RCT from Tanzania demonstrated that SMS reminders to community health workers improved performance by reducing the average number of over-due days for visiting clients by 86%. (3)
	In Indonesia, mobile phones strengthened midwives' capacity to address more complex cases and increased consultations with health professionals.(4)
	A study in Ghana evaluating the ability of traditional birth attendants (TBAs) to use text messaging to correctly follow a protocol for reporting births demonstrated that all TBAs followed the reporting protocol correctly. (5)

Demand, Awareness, Education, Tracking & Retention

Appointment Reminders

Nonattendance for appointments is a challenge to health care managers and providers. SMS appointment reminders support mothers and staff at health facilities. A majority of women access antenatal services at least once during pregnancy. However, many women are then subsequently lost to follow-up at several critical points of care, resulting in missed opportunities to reduce the risk of vertical transmission of HIV and promote maternal and child health. These critical points include testing, initiation of prophylactic or therapeutic ARVs, early infant diagnosis, uptake of family planning, and ongoing support and maternal care.

SMS reminders can decrease the number of appointments missed and increase communication exchange between patient and clinic. There is a emerging body of evidence demonstrating that mobile phones are being effectively used to transmit appointment reminders for women and their infants to visit clinics for basic antenatal services, HIV testing, early infant diagnosis (EID), immunizations, obtaining test results, and post-natal checkups. Reminders are sent either to community health workers or directly to the women themselves.



Treatment Adherence

Starting and adhering to a clinically prescribed antiretroviral treatment and care regimen is critical for successfully eliminating vertical transmission for HIV+ mothers with appropriate CD4 counts. Treatment adherence also minimizes the risk of transmitting the HIV virus through breast milk to infants. Treatment adherence significantly improves the likelihood that mothers remain alive and healthy to adequately care for their children. Pediatric treatment adherence is also critical to the survival and health of HIV+ infants.

The use of mHealth tools for HIV treatment adherence has the strongest evidence based upon the number of published studies with methodological rigor. While most of the studies have evaluated adult treatment adherence, the findings can arguably be generalized to apply to infant adherence.

Safe Delivery

Women in many low- and middle-income counties face the greatest risk of dying from pregnancy-related complications, such as hemorrhaging and hypertension. Most maternal deaths can be reduced if delivery takes place at a health facility and in the presence of a skilled birth attendant who is equipped to handle complications.

Mobile phones are being used to convey information to expectant mothers regarding the importance of the presence of a skilled health attendant during delivery. Mobile phones are also being used by skilled birth attendants and community health workers to recognize signs of obstetric complications and to make necessary referrals.

Nutritional Counseling, Exclusive Breastfeeding, Immunizations, and Family Planning

Particularly in HIV contexts, exclusive breastfeeding and following proper infant and young child feeding guidelines minimize postpartum transmission of HIV from mother to child through breast milk. Appropriate immunizations increase chances of child survival for both HIV- and HIV+ infants. Family planning, including the use of modern contraceptives, is a key strategy in the primary prevention of HIV. A body of evidence demonstrates that mobile phones used to convey health information on exclusive breastfeeding, childhood immunizations, and family planning have successively led to increased demand for health services in these areas.

	Evidence
	An SMS program along the Thai-Myanmar border reported the odds of on time antennal visits and immunizations for women approximately doubled (1.91 and 2.13 respectively) for enrolled mothers.(6)
	At least two randomized control trials demonstrated that patients receiving SMS text message support or reminders were significantly more likely to adhere to prescribed treatment regiments (53% vs. 40%; 59.7% vs. 49.8%), with one study actually demonstrating significantly improved rates of viral suppression (57.1% vs. 48.3%).(7)
	The provision of mobile phones and SMS based support in Zanzibar increased the odds for skilled delivery attendance (57% vs. 45%) and four prenatal care visits (41% vs. 28%) and reduced complications (7.5% vs. 11.5%) among pregnant women.(8)
	A study in India demonstrated that mothers who received mobile phone counseling were significantly more likely to exclusively breastfeed for 6 months than mothers who received counseling at a facility (96% vs. 67%). (9)
	Mid-term results from a study in South Africa indicated that more than 90% of mothers who received SMS texts returned with their infants for testing compared to 78% who did not received texts who brought their infants back for testing.(10)

Data Management and Improving Efficiencies

The core of a well-functioning health system is collecting and managing data. Accurate, complete, and reliable data contributes to how decisions are made regarding all aspects of the health system, particularly the allocation of resources.

A robust body of evidence supports using mHealth for data collection and management of information, such as drug and testing supply inventories, birth and death registration (maternal and neonatal), maternal care histories, pregnancy registration, delivery of test results, nutrition surveillance, and postpartum hemorrhage data by health workers.

	Evidence
	Preliminary results from Project Mwana in Zambia indicate the use of SMS texts reduced mean turnaround time for EID result notification by 40%. Mean turnaround time was reduced by 48%. (11)
	A number of qualitative evaluations report the successful use of mobile technology to (1) Record the weekly progression of pregnant women in Thailand. (2) Collect data on immunizations, prenatal scheduling and routine demographic information that feeds into centralized electronic records and can easily be accessed by rural paramedics in Haranya, India. (3) Record, monitor, and disseminate information relating to pregnancy, nutrition, and immunizations in Andhra Pradesh, India. (12)
	A soon-to-be published systematic review found that 24% of HIV projects in the literature described the use of mobile phones for data collection, such as survey and electronic patient diaries.(13)



Other Potential Areas for the Use of mHealth

Using a systems analysis lens and remembering how EMTCT and RMNCH relate and feed into the entire health system is critical to determining how mHealth can be applied along the EMTCT and RMNCH continua of care. Important areas that directly impact EMTCT programs include:

- Supply chain management
- HIV prevention
- Water, sanitation, and hygiene (WASH)
- Micro-finance
- Improving psycho-social well-being of mothers and community health workers
- Improving economic livelihoods in areas such as agriculture
- Reducing stigma and discrimination

Miscellaneous Lessons Learned from Stakeholder Interviews

- Mobile phones are more effective if used to reach mothers compared to reaching them vis-à-vis community health workers.
- Sufficient back-end logistical support is critical for using mobile phones effectively in global health programs.
- Illiteracy is an issue in most developing areas impacting the ability of mothers to directly receive information via SMS.
- Experience shows that in many circumstances women would be willing to pay for an SMS service providing useful health information. However, this would need to be confirmed by market analysis.
- Differences in using mHealth in urban and rural settings should be taken into account in program design.
- Differences between whether a mother owns her own phone or has access to a phone that is shared with others should be taken into account in message content and program design.
- International guidelines regarding various components of EMTCT and RMNCH frequently change, making it imperative for frequent updates in an mHealth system to bring these changes to the field.
- Mobile phones have potential to facilitate task shifting and increase efficiencies by shifting the work normally done in the clinics to the phone itself. For example, a series of questions about a patient's condition can be posed through the phone to determine whether a patient needs to return to the clinic in 6 months rather than 3 months from the last visit.
- Mobile phone vouchers are successfully being used as an incentive to HIV positive patients to adhere to treatment regimens.

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(4) Chib, A. (2010), The Aceh Besar midwives with mobile phones project: Design and evaluation perspectives using the information and communication technologies for healthcare development model. Journal of Computer-Mediated Communication, 15: 500–525. doi: 10.1111/j.1083-6101.2010.01515.x.

(5) Mutwiwa, S., Lunze, K., Olum, C., Kasseje, D. (2012). Progress Report on the Systematic Review: The Effective-ness of Using Mobile Phone-Based Interventions to Accelerate the Three Health MDGs in Low and Middle Income Countries. (Unpublished Report).

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(8) Lund, S. and Hemed M (2010), Wired Mothers: Use of Mobile Phones to Improve Maternal and Neonatal Health in Zanzibar. [Internet]. Copenhagen: University of Copenhagen. Available from: www.i-m-s.dk/files/.../Stine%20Lund%20Wired%20Mothers.pdf.

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(10) Technau, KG, deTolly, K., Sherman, G., Kuhn, L., Benjamin, P., Bassett, J., Coovadia, A., Mobile Text Messaging Improving PMTCT Follow-up in South African Public Setting, Abstract 6th IAS Conference on Pathogenesis, Treatment and Prevention, Rome, Italy 17-20 July 2011.

(11) Seidenberg, P., Nicholson, S., Schaefer, M., Semrau, K., Bweupe, M., Masese, N., Bonawitz, R., Chitembo, L., Goggin C., & Theaa, D., (2012). Early infant diagnosis of HIV infection in Zambia through Mobile Phone Texting of Blood Test Results, Bull World Health Organ 2012;90:348–356 | doi:10.2471/BLT.11.100032.

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(13) Catalani C., Philbrick, W., Fraser, H., Mechael, P., Is-raelski, D., (2012) mHealth for HIV Treatment & Prevention: An Implementation Science Review of the Literature.

We need to bring designers, health technical leads, + mobile technologists together more often...

→Give feedback to health facility based on performance

→link data to action



Elizabeth Glaser Pediatric AIDS Foundation

Johnson & Johnson

unicef

mHealth Alliance™

frog™