ICT4SOML:

Leveraging ICTs to Save the Lives of One Million Women and Children in Nigeria

Situation Analysis

11 February 2013
Federal Republic of Nigeria

Table of Contents

1. Nigeria Saving One Million Lives

Nigeria's Contribution to Global Effort to Reduce Maternal and Child Deaths

On October 16, 2012 President Goodluck Jonathan of Nigeria officially launched "Saving One Million Lives" (SOML) during an international conference in Abuja. Saving One Million Lives is an ambitious and comprehensive initiative to scale up access to essential primary health services and commodities and to prevent the deaths of one million women and children under five in Nigeria by 2015.Saving One Million Lives builds on growing international momentum behind child and maternal survival, including the UN Secretary-General's Every Women, Every Child campaign; the June Child Survival Call to Action in Washington, DC; Committing to Child Survival: A Promise Renewed; the recommendations and implementation plan of the UN Commission on Life-saving Commodities for Women and Children delivered in September in New York; and the Abuja conference on essential commodities.

Strategic Focus on Information and Communication Technology

This initiative in Nigeria to save 1 million lives before 2015 prioritizes the strategic use of Information and Communication Technology (ICT) – namely mHealth and eHealth – to support provision of health services, achieve specific targets and to monitor progress against targets. The aim is to leverage access to technology and infrastructure to implement ICT systems and platforms that enable the Federal Ministry of Health (FMOH) through its work with the National Primary Healthcare Development Agency, SURE- P, Ministry of ICT, development partners, private sector, and others to save one million lives in 2 years.

The vision is to create an environment in which every pregnant woman and every child under 5, their caretakers and decision makers, know all the steps and services that the women and children should receive to mitigate risk and avert death, and that they have access to appropriate and accurate information and quality services when and where they need them. Implementation of this vision for SOML requires a cross-sector approach to supporting the deployment of ICT-equipped and supported health programs and to strengthening the enabling environment in which ICT-based programs are implemented. This broad approach incorporates applications governance, policy and legislation, strategy and investments, workforce, standards and interoperability, infrastructure, as well as the applications and services delivered or used by the health system.

Underlying the commitment made by the Nigerian government, the following principles will govern the use of mobile and other ICTs to strengthen the health system:

1) **Empower patients and clients**
2) **Empower health workers**
3) **Provide a platform for shared accountability, inclusion**, **and equity** and consideration for links to mobile financial services through conditional cash transfers

2. Mission Objective

In support of the FMoH's ability to leverage ICT strategically and systematically, the mHealth Alliance is working alongside Intel, GSMA, and other key partners in Nigeria to assess the enabling environment and convene stakeholders to develop the strategies, frameworks, and guidelines needed to maximize the potential of investments in technology to strengthen the health system and save lives.

The mHealth Alliance, Intel, GSMA, and the World Bank conducted a Situational Analysis in Abuja, Nigeria, on 14 to 26 January, 2013, to set the stage for the year-long partnership with the FMOH. The aim of the 12-day mission was to develop a clearly articulated rationale for targeted investments into eHealth and mHealth over the life of SOML.

This is the first step in the proposed 18-month partnership between the FMOH and the mHealth Alliance, in which the mHealth Alliance proposes to conduct a baseline inventory of m/eHealth projects, align Nigerian ICT priorities and activities with relevant global initiatives, identify and address ICT policy issues, develop an ICT strategy for SOML, assess workforce and training capacity, identify and address health informatics standards and interoperability issues, and identify ICT-based opportunities to accelerate progress towards SOML targets.

The mission focused on the following deliverables:

- Informal interviews with key stakeholders
- Identification of members for a Cross-Agency ICT SOML Advisory Group
- Identification of programs/platforms for inclusion in the baseline inventory
- Recommendations for early wins and immediate next steps in leveraging ICT for SOML
- Plan for inventory and assessment
- Detailed plan/SOW for the overall participatory strategic planning process

This report contains:

(1) a conceptual framework for developing an ICT strategy;
(2) the findings of the situation analysis;
(3) next steps to build up the enabling environment for use of mHealth and eHealth to achieve SOML targets; and
(4) Early recommendations for immediate action by the FMOH to prepare for broader use of ICTs within the health system.

The Partnership

The mHealth Alliance will work in a complementary fashion with Intel and GSMA to offer a wide range of resources, expertise, and access to key stakeholder groups. The mHealth Alliance's role in this partnership is to work directly with the FMOH to advise on and build up the enabling environment for the use of ICTs to achieve SOML goals. GSMA is providing

baseline data on mobile network operations and coordinating activities with the mobile network operators. Intel has committed to training 10,000 health workers for a start in Nigeria using its mobile education platform Skoool and brings deep expertise in information systems architecture design and deployment.

Stakeholders Engaged

An ICT for health strategy incorporates stakeholders from across the public and private sector, academia, and international donors and development partners. The mission was supported by and based out of the Federal Ministry of Health under the leadership of Dr. Muhammad Ali Pate, Minister of State of Health. The team conducted informal and unstructured informational interviews within the FMOH, National Primary Health Care Development Agency (NPHCDA), SURE-P, NACA, NAFDAC, and other affiliated agencies; the Ministry of Communication Technology; the National Identity Management Commission; Nigeria Population Commission; development partners and donors, including Clinton Health Access Initiative (CHAI), UNICEF, USAID, Pathfinder, Nigeria CDC, and Futures Group/GRM. The process was launched on 14 January 2013 with the heads of several health agencies, including Dr. Pate, the Minister of State of Health, and the Minister of Communication Technology, Mrs. Omobola Johnson.

3. The Enabling ICT for Health Environment

ICT for Health Environment

ICTs can be used to deliver higher quality and more efficient health services to the population, and can be drawn upon to strengthen the system in which all health services are delivered. From the perspective of health programming, we call these ICT-equipped health programs and ICT-supported health programs, respectively. As such, ICTs are both an enabler and a driver of improving maternal and child health delivery systems.

- **ICT-Equipped Health Programs** are those in which health workers directly use mobile and electronic tools to facilitate the services they provide. For example, a Community Health Worker (CHW) uses her mobile phone to view the list of registered pregnancies in her community, expected due dates, and the number of antenatal visits each has received.
- **ICT-Supported Health Programs** are those that leverage core mobile and electronic series that are available across the health system. Examples include a call center for health worker support, patient hotlines, an electronic referral service, or patient and provider registries.

Health programming links into a **National Health Management Information System (NHMIS) and Core e- and m-Health Services**. These include information systems for managing regional health data, reporting, and management of national supply chains and resources, universal patient identifier management system, provider and service registries,

call centers, automated messaging services (SMS/IVR), monitoring and tracking services and electronic referral management.

All of these services rely on the **ICT Infrastructure** for electric power, cellular and internet connectivity, processing and computing, data storage and transport, and information management. Computing hardware, telecommunications hardware, networks, and electrical power systems and grid all fall in this category and overlap with ministries and agencies outside of the management of the Federal Ministry of Health.

Underlying the health system's ability to effectively employ ICTs is the **e- and m-Health Enabling Environment**. The enabling environment consists of seven key components:

(1) Policy
(2) Privacy
(3) Standards and Interoperability
(4) Compliance
(5) Financing and strategy
(6) Workforce
(7) Governance

These elements collectively influence the capacity of the health system to bring ICTs to bear on health system challenges.

The Vision for ICT within SOML

The vision is for the effective use of ICTs to help achieve one million women and children lives saved by 2015. We envision mobile and electronic health technologies to be used in the following manner upon achievement of SOML:

- Health workers use their mobile phones, tablets, and mobile computers to access and track critical patient data, to view information on their own performance, to find information on standards of care, and to get support from a higher level of care.
- Pregnant women, new mothers, and their caretakers can use their mobile devices to receive counseling about what to expect, to communicate with providers, to arrange emergency transport, and to receive reminders about appointment and immunization schedules.
- The health system uses ICTs to connect remote patients and health workers to a support network, to deliver services and resources to the right place and at the right time, to track and monitor health indicators, and to enable a continuously improving health system.

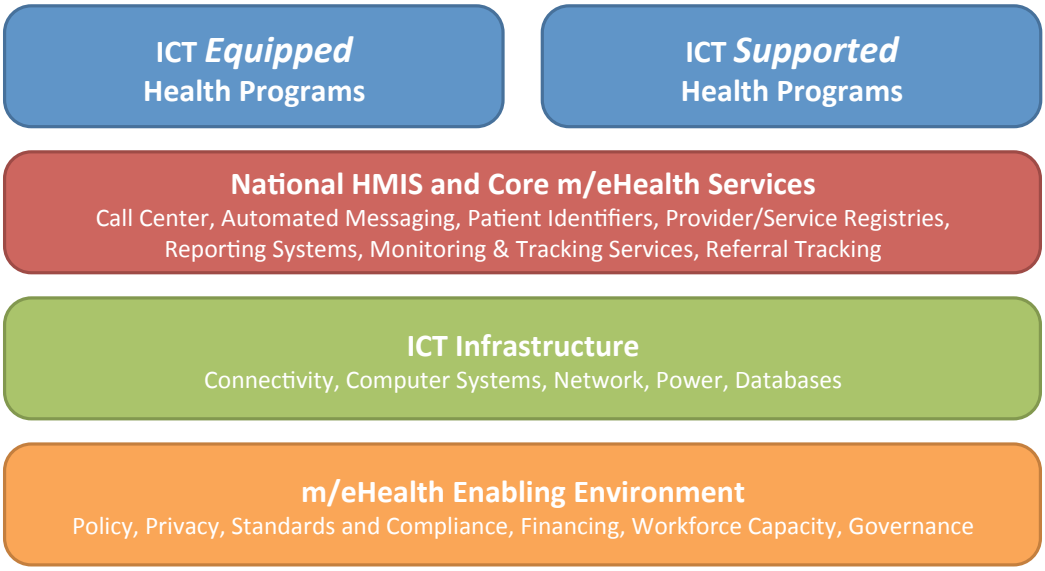


Figure 1. ICT Environment for SOML

4. Building Blocks for ICT within SOML

Numerous m- and eHealth projects are already underway in Nigeria by government, development partners, mobile network operators (MNOs) and other private sector stakeholders. These efforts represent many of the necessary building blocks for successful use of ICT at scale within the health sector. **Figure 2** outlines existing efforts across each of the categories of the Health ICT Environment that can and should be immediately assessed to support alignment with the achievement of SOML targets and achievement of economies of scale. These and other activities identified over the coming months will serve as the starting point for bringing ICTs to scale within SOML.

Three **early opportunities** were identified as programs on the critical path for SOML that have both the political will and technological preparedness for scale up:

(1) District Health Information System (DHIS2) is a key platform for monitoring and tracking of performance with respect to SOML targets. The system is already at use nationally for monthly primary health facility reporting and can quickly be expanded to support SOML measures and indicators that it does not already capture. Amobile-DHIS2 application is being used at several sites to significantly decrease the amount of time required to receive the data at the federal level and to provide disaggregation of reports down to the facility-level.

(2) The Conditional Cash Transfer program within the Midwives Services Scheme is increasing antenatal attendance through small incentive payments to pregnant women. Multiple organizations are using mobile applications to track client visits

and danger signs and to record payments. Expansion of mobile decision support, especially to high-risk areas, will increase quality of care. Mobile payment can be used to ensure delivery of payments and to lower administrative overhead.

(3) Strengthen the supply chain for the Life Saving Commodities by leveraging mobiles for supply management and inventory tracking and expanding mobile drug authentication checking. Effective distribution of compliant life-saving commodities for pregnant women and children is critical to achieving SOML goals. Drug authentication via SMS codes is already active for anti-malarials and incorporation of antibiotics is underway. Further expansion into the Life Saving Commodities will enable women and their providers to perform mobile authentication checking. Strengthening the supply chain with mobile tracking of shipments and inventory to the facility level will ensure that essential commodities make it the last mile.

In addition to health programs that are already utilizing ICTs in some manner, health programs exist that do not currently employ ICTs but that could potentially be enhanced or more easily scaled by incorporating some component of mobile or electronic health. The most notable of these is the SURE-P Conditional Cash Transfer Pilot.

There are non-health initiatives that are synergistic with respect to ICT utilization, infrastructure development, or their focus on marginalized populations that may be leveraged to achieve synergies and economies of scale. The most significant example is the Ministry of Finance's planned procurement of ten million phones for agriculture workers.

Relevant activities are taking place in Nigeria at all levels of the ICT Environment, from mHealth interventions to ICT policy development. The opportunity is to develop a coherent strategy that builds on existing efforts by scaling up and ensuring coordination of selected ICT-equipped and supported health programs while establishing an enabling environment to sustain these programs.

Finally, there are initiatives outside of Nigeria that should be explored for alignment with FMOH priorities and potential adoption or participation. The mHealth Alliance proposes that a full analysis of how to effectively leverage external initiatives be completed at the beginning of the engagement. Some key examples include the Open Health Information Exchange (OpenHIE) initiative, the Mobile Alliance for Maternal Action (MAMA), mPowering Frontline Workers, the MoTeCH Suite, and various mHealth working groups at international standards development organizations.

Figure 2. Existing Building Blocks for short-term gains in the use of ICT to achieve SOML targets

Health Programming	ICT-Equipped Health Programs • MADEX for MSS • Pathfinder mobile antenatal and postnatal decision support algorithms • Pathfinder m4Change – opportunistic maternal-child health counseling messages • National Population Commission Mobile birth registration and immunization tracking using SMS and accompanying dashboards and the bottlenecks assessment (with support from UNICEF) • Commitment from Intel to train 10,000 health workers using the skoool Education Platform • National Agency for the Control of Aids Call Center for patient support/education • HIV-focused Electronic Medical Record implementations by several organizations (including Futures Group/GRM) with a FMOH-supported platform-independent HIV EMR standardization effort, including OpenMRS and IQCare ICT-Supported Health Programs • SOML scorecard • National DHIS2 for PHC monthly reporting with level-specific dashboards • mobile DHIS2 pilot supported by World Bank to support real-time reporting and access and more granular data • National Agency for Food and Drug Administration and Control (NAFDAC) eClearance, mHealth Counterfeit drug program, and other ICT-enabled services • PHC Databank • Facility identification standardization • CHAI SMS-printers for delivery of HIV laboratory test results
National HMIS and Core m/eHealth Services	• NACA Toll-free Call Center Facilities, Infrastructure, and Services • NIMC identification management core services • National DHIS2 Aggregate Reporting Service
ICT Infrastructure	• Existing electrical power systems, telecommunications infrastructure and widespread cellular connectivity • Reliable private sector server farms and data management infrastructure in country
m/eHealth Enabling Environment	Leadership, Governance, Multi-sector Engagement • SOML leadership from Presidents office and Minister of State for Health • Multi-sector interest in SOML and ICT goals Strategy and Investment • Guiding SOML strategies developed or under development with significant government and foreign investments • National ICT for Health Strategy developed in 2008 and due for revision. Legislation, Policy and Compliance • National ICT policy by the Ministry of ICT that includes health – this policy prioritizes improving connectivity and access to mobile technology and connectivity in underserved communities along with the Ministry of Agriculture (can identify overlapping priority geographic regions for SOML) • Facility Certification by National Health Insurance System Workforce • Significant ICT expertise in the private sector Standards and Interoperability • HIV-EMR Standardization effort by FMOH, contracted to Futures Group/GRM, funded by CDC • NHIS has developed standardized coding system for diagnoses and treatments which are mapped to international reference terminologies and overlap significantly with SOML

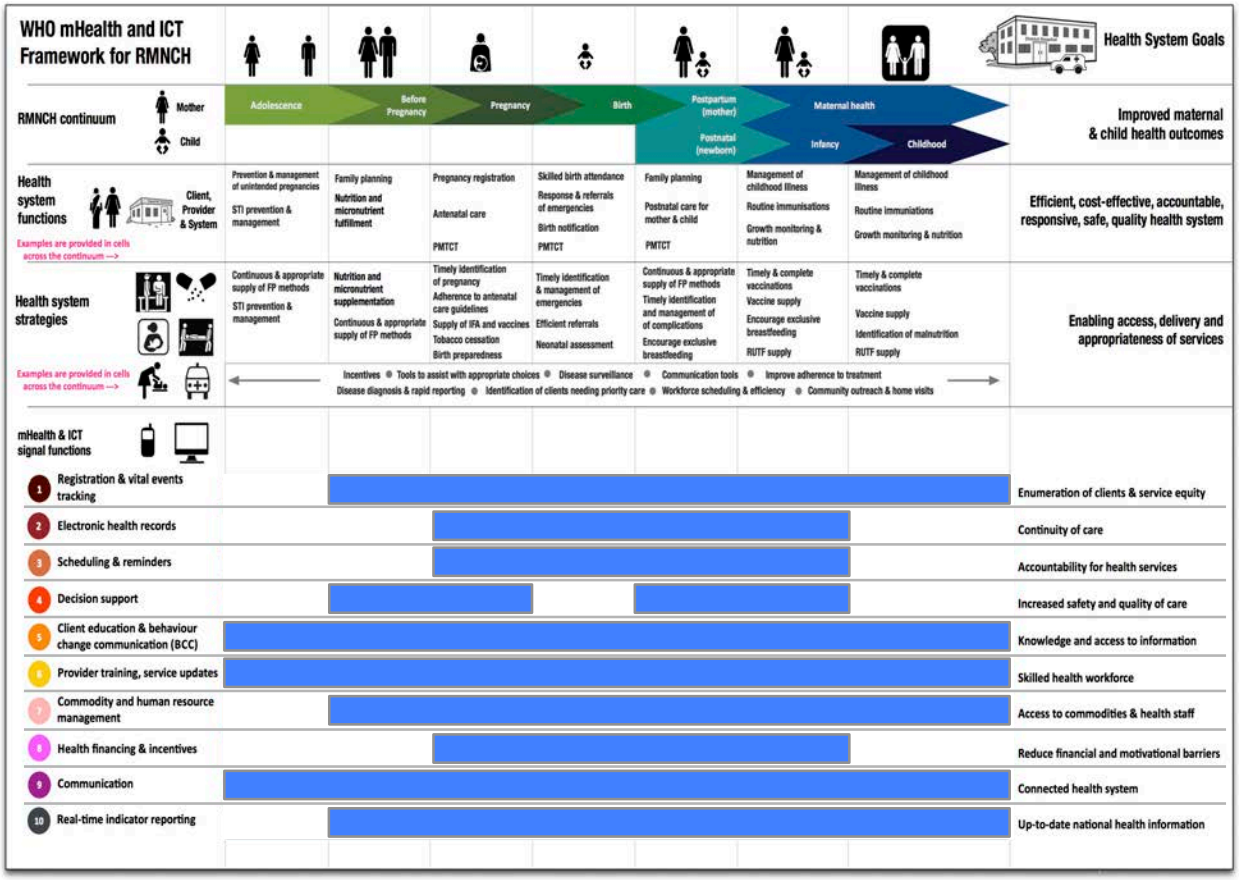
SOML mHealth Framework

It is useful to look at the existing ICT-based health programs across the reproductive, maternal, newborn and child health continuum in order to identify opportunities for strengthening existing programs or filling in gaps in the continuum of care. The *WHO mHealth Framework for RMNCH* describes ten signal functions for the application of mHealth solutions to strengthening health systems across the reproductive, maternal, newborn and child health (RMNCH) continuum (see **Appendix A**). The RMNCH continuum covers the ages of 15 to approximately 45 for women and the first 5 years of life for the child. Within each time period of RMNCH, the framework provides example health system goals, strategies, and functions, which can be used to categorize or guide planning for the use of mHealth and ICTs across the ten signal functions. These functions are:

- Registration and vital events tracking
- Electronic health records
- Scheduling and reminders
- Decision support
- Client education and behavior change (BCC)
- Provider training, service updates
- Commodity and human resource management
- Health financing and incentives
- Communication
- Real-time indicator reporting

Figure 3 illustrates an early application of the WHO mHealth Framework for RMNCH to the Nigerian mHealth/ICT environment based on the limited set of stakeholders that have been engaged thus far. Blue highlights indicate elements of the continuum of care for which there was evidence of existing mHealth/ICT efforts. This chart will be updated using the results of a full mHealth/ICT landscape and opportunities for intervention will be identified.

Figure 3. WHO mHealth Framework for Reproductive, Maternal, Newborn and Child Health

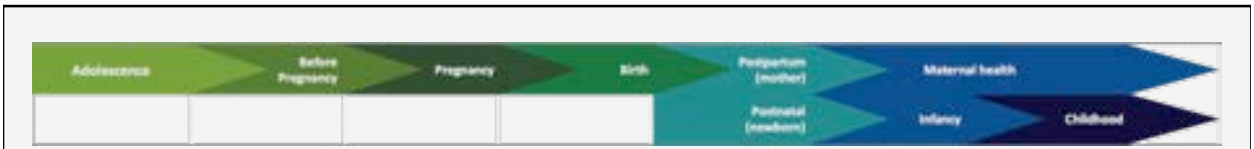


Attribution: *The WHO mHealth and ICT Framework for RMNCH was developed in collaboration with JHU GMI by Lavanya Vasudevan, Alain Labrique, Reid Miller, and Garrett Mehl for the WHO mHealth Technical Advisory Group (TAG) on Evidence, Impact and Scale in Reproductive, Maternal, Newborn and Child Health.*

SOML Scorecard

The impact indicators of interest within SOML are MMR, IMR, and U5MR. The FMOH of Nigeria has shortlisted 37 indicators to measure progress during and following the SOML initiative. These indicators are being adapted into executive, national, state and ward dashboards over the next year. Data sources are available for many of the indicators, but there is a subset for which data sources have not been identified. ICTs will play a key role in the collection of new data and in enabling the collation and analysis of both aggregate and disaggregated views of SOML scorecard data. ICTs can also be used to create an Executive Dashboard for the leadership to have easy access to and visibility over the scorecard figures. ICT-equipped interventions will be selected based on their alignment with the above indicators.

Figure 4 organizes the SOML indicators across the RMNCH continuum for easy alignment with the WHO RMNCH mHealth Framework. After a baseline is established for these indicators, this figure can be used to trace specific quality deficiencies back to archetypical ICT-equipped interventions based on the examples in the WHO mHealth Framework for RMNCH.



Adolescence & Pre-pregnancy

- # FP Acceptors
- # attending FP clinics
- # using modern contraceptives

Pregnancy

- # pregnant women with at least 1 ANC visit
- % receiving HIV testing and result at ANC
- % pregnant women with known HIV status
- % HIV+ pregnant women on ARVs
- % households owning ITNs
- % on IPT2 to prevent malaria

Birth

- # attended deliveries
- % infants born to HIV+ pregnant women tested w/ in 1 year
- % HIV+ pregnant women receiving complete PMTCT package

Postpartum/Postnatal

- # mothers seeking postnatal care for newborns
- # newborns receiving postnatal care
- # babies given DPT3
- # babies given OPV3
- # babies given measles
- # babies given Penta
- # Infants fully immunized
- % infants exclusively breastfed (6mos)

Infancy and Childhood

- % U5 pneumonia cases treated with co-trimoxazole or amoxicillin
- % U5 diarrhea cases treated with zinc or ORS
- Presence of zinc and ORS in stat's essential meds list
- % children w/ malaria symptoms receiving RDT
- % U5 malaria treated with ACTs
- % U5 receiving Vitamin A
- # children admitted to CMAM sites
- # U5 treated for malnutrition
- Deworming coverage U5 children

Cross-Cutting Indicators

- Has the state signed the MOU with the PDU to facilitate the supply chain initiative
- Stock out of essential drugs
- % households owning ITNs
- Stock out of ACTs
- # midwives/CHEWs to population
- # LGAs reporting in HMIS
- # LGAs reporting completely in HMIS
- State per capita expenditure on healthcare

Figure 4. SOML Indicators across the RMNCH Continuum

5. Key Challenges and Risks

A number of challenges and risks were identified that merit further discussion and planning of mitigation strategies to minimize their impact. These include:

- The first and most critical is the limited ICT staffing and spending within the FMOH and its affiliated institutions. Significant investments must be made into technical staff, especially building up strong technical leadership capacity within the FMOH and NPHCDA.

- Limited health workforce ICT literacy reduces the uptake and effectiveness of technologies already deployed.

- The lack of feedback, at all levels of the health system, on data that is collected electronically, further reduces user buy-in and misses an opportunity to track progress and to engage in continuous quality improvement.

- Too few structured opportunities exist for cross-sector engagement and collaboration on the use of ICT for health, leading to duplicative efforts and a failure to achieve economies of scale. A mechanism is needed to leverage synergistic

programs across the FMOH and within the ministries of Agriculture, Education, Finance, and Communication Technology.

- Connectivity and power pose a significant threat to the scale and effective use of ICT to achieve SOML targets. Restrictive Mobile Network Operator (MNO) regulations and an immature eHealth market increases private sector risk relative to other non-health sectors, in which ICT adoption and investments are growing significantly faster.

6. Recommendations and Next Steps

Based on the findings of the situation analysis, we recommend that the FMOH launch two parallel tracks: (1) the first track will focus on taking advantage of existing movements to achieve early results and economies of scale within the short timeline of SOML; (2) the second track will address challenges and obstacles to the effective use of ICTs by strengthening the enabling environment for the use of ICTs, prioritizing activities that will achieve results by 2015, but also setting the stage for the long term strengthening of the Nigerian national health information infrastructure through the development of an ICT Framework for SOML.

Recommendations to Build Up the ICT Enabling Environment

The first step to strengthening the enabling environment is to better understand its current state, by landscaping existing m- and e-Health efforts within Nigeria and assessing the enabling environment to leverage ICTs to achieve SOML targets. These products will inform the development of an ICT/eHealth strategic framework that ensures the necessary leadership, investments, policies, human resources, infrastructure, services and applications are in place to support at scale deployment of ICTs.

The need for a strategic eHealth framework was frequently cited during the situation analysis interviews. A national eHealth framework will structure the national ICT discussion and present an architecture and roadmap with which ICT-based interventions and software platforms should align. Plans developed to use ICTs in order to achieve SOML targets can be expanded in the future to comprehensively address national health information systems needs beyond maternal-child health.

The *WHO-ITU National eHealth Strategy Toolkit (2012)* presents a comprehensive process for assessing the current national eHealth landscape that is embedded in a national eHealth strategy development effort that takes into account local health system priorities and resources. While the toolkit is designed for the development and operationalization of a long-term and comprehensive eHealth strategy, it is recommended that the process be expedited and confined to SOML in order to meet the short SOML deadlines. **Figure 5** illustrates sample timelines for the process of assessing the eHealth landscape and developing an ehealth vision that can serve as a guide for these same steps within SOML. Please refer to the toolkit for details, along with necessary stakeholders and expected outputs of each step.

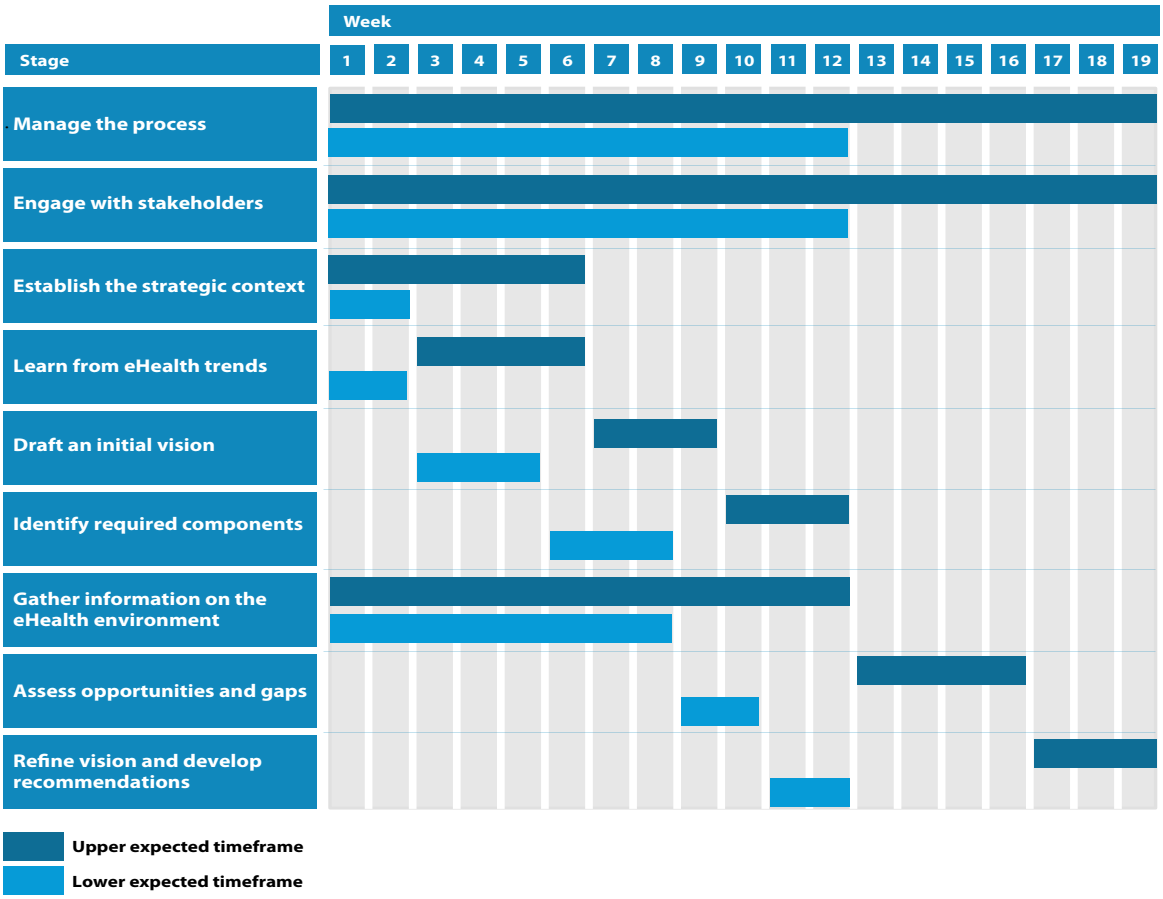


Figure 5. Sample timeframe for developing a national eHealth Vision from the WHO-ITU National eHeatlh Strategy Toolkit.

Refer to **Appendix B** for the generic enterprise architecture as presented in the WHO-ITU Toolkit. One of the outputs ICT Strategy effort will be to determine which portions of this architecture will be taken on during the 2-year SOML initiative.

Preparatory work for SOML, efforts by the FMOH, FMCT, and development partners, and this situation analysis set the stage to make progress quickly on the above steps, since health system priorities have already been defined, stakeholders are already engaged, and some operational structures are already in place.

As the enabling environment for ICTs is strengthened, the Nigeria FMOH will be able to develop or expand on ICT-equipped and supported programs for reproductive, maternal, newborn and child health (RMNCH). **Figure 6** outlines a preliminary list of ICT-equipped and supported health programs that are likely candidates for scale up within Nigeria based on the results of the situation analysis and on the success of deployments in other countries.

ICT-Equipped Health Programs	ICT-Supported Health Programs
• Mobile and electronic vital events tracking • Mobile family planning, pregnancy and immunization decision support for CHEWs and Midwives • Staged and opportunistic RMNCH automated counseling/education messaging service • Mobile emergency transport pre-approval and setup • RMNCH Calling Center for patient and provider support • Mobile demand generation campaigns	All health programs within RMNCH at the community, primary, secondary, and tertiary level link to the National HMIS and Core m/eHealth Services: • Vital Events Registry • Monitoring and Tracking Services • Automated Messaging (SMS/IVR) • Toll-free Call Center • Patient Identification Service • Provider/Facility Registries • Dashboards and Reporting Systems

Figure 6. Illustrative ICT-equipped and ICT-supported health programs for SOML.

Early Recommendations to Leverage ICT for SOML

The following steps should be taken as soon as possible in order to make rapid progress towards SOML targets by building off existing ICT-enabled activities and to prepare for longer-term efforts to strengthen the ICT for health environment.

- Begin expansion and scale-up of the 3 early opportunities: (1) Leverage DHIS2 and mobile-DHIS2periodic facility reporting systems for monitoring and tracking progress within SOML; (2) Use mobile decision support and payment for the Conditional Cash Transfer and Midwives Services Scheme programs; and (3) Expand mobile drug authentication checking to the Life-Saving Commodities and strengthen the supply chain through mobile tracking and inventory management.
- Evaluate the "Building Blocks" of existing ICT efforts outlined in **Figure 2** for expansion and scale up. In particular, it is critical to align with the National Health Insurance (NHIS) Claims and Reimbursement System for financial sustainability.
- Establish Cross-Agency eHealth Advisory Group, co-chaired by the FMOH and MCT, to meet monthly to develop ICT strategy and framework, plan for coordinated activities and investments, and review progress.
- Recruit a senior eHealth advisor within the FMOH to serve as the main point of contact for all activities related to the use of ICT for SOML within the health sector.
- Recruit Executive Level Chief Information Officer (CIO) and Chief Technology Officer (CTO) to provide strategic leadership and accountability to eHealth investments within the FMOH and across other federal ministries and agencies.
- Conduct detailed assessment of ICT use and lack of use in targeted SOML sites.
- Prioritize the health system for the deployment of a national unique identification system to serve as the foundation for enabling continuity of care and tracking progress towards health system goals.

- Work with MCT to prioritize mapping and costing of investments in infrastructure that will support overall use of ICT within SOML, including:
    - Cellular Coverage/Connectivity
    - Broadband internet connectivity
    - Electrical Power and Grid infrastructure
    - Computer Hardware and Datacenters
- Assess current MNO e- and mHealth engagement and coordinate a workshop with, at minimum, the eight major MNOs with specific action items under SOML.
- Begin formative research to support the development of mHealth services for clients and health workers that can be delivered by MNOs.

mHealth Alliance Engagement

The mHealth Alliance proposes to work with the FMOH and its partners to advise on early efforts to utilize ICT and the building up of the enabling environment for the scale of eHealth and mHealth within SOML. The mHealth Alliance will work to ensure that the decisions made and actions taken by all supportive stakeholders are undertaken through systematic application of what is known based on assessment and planning in the areas of problem identification and solutions options that are informed by- evidence, standards, sustainable financing, policy, and capacity. The Alliance and its partners will engage in the following activities to support the Nigerian government and its coalition of partners to more effectively leverage technology to achieve the targeted reductions in maternal and child morbidity and mortality:

- Document the state of all existing m- and eHealth initiatives in Nigeria that specifically align with SOML
- Document existing m- and eHealth interventions that are being implemented elsewhere that specifically align with SOML
- Engage key stakeholders within FMOH and National Primary Healthcare Agency (NPHCA) with the national and international mHealth technology community to align technologies with priorities and targets
- Develop a roadmap and budget for the design, development, and implementation of selected technologies
- Identify key policy needs in Nigeria to support effective governance and protection of people's rights- especially in relation to privacy, security, and confidentiality
- Identify and develop key technology standards and guidelines needed to promote systems integration and data sharing. Develop an operational plan for how to implement standards and guidelines
- Assess the capacity of the FMOH and NPHCA (and core partners) to oversee and manage the implementation m and eHealth interventions
- Develop a Theory of Change and M&E Plan that supports outputs from DHIS2 for the evaluation of use of ICTs for SOML
- Work with the local technology for health/mHealth community to develop a platform for collaboration, networking, and long-term support for m and eHealth in Nigeria (establishment of an mHealth Alliance Nigeria)

Appendices

Appendix A – WHO mHealth and ICT Framework for RMNCH v5.8

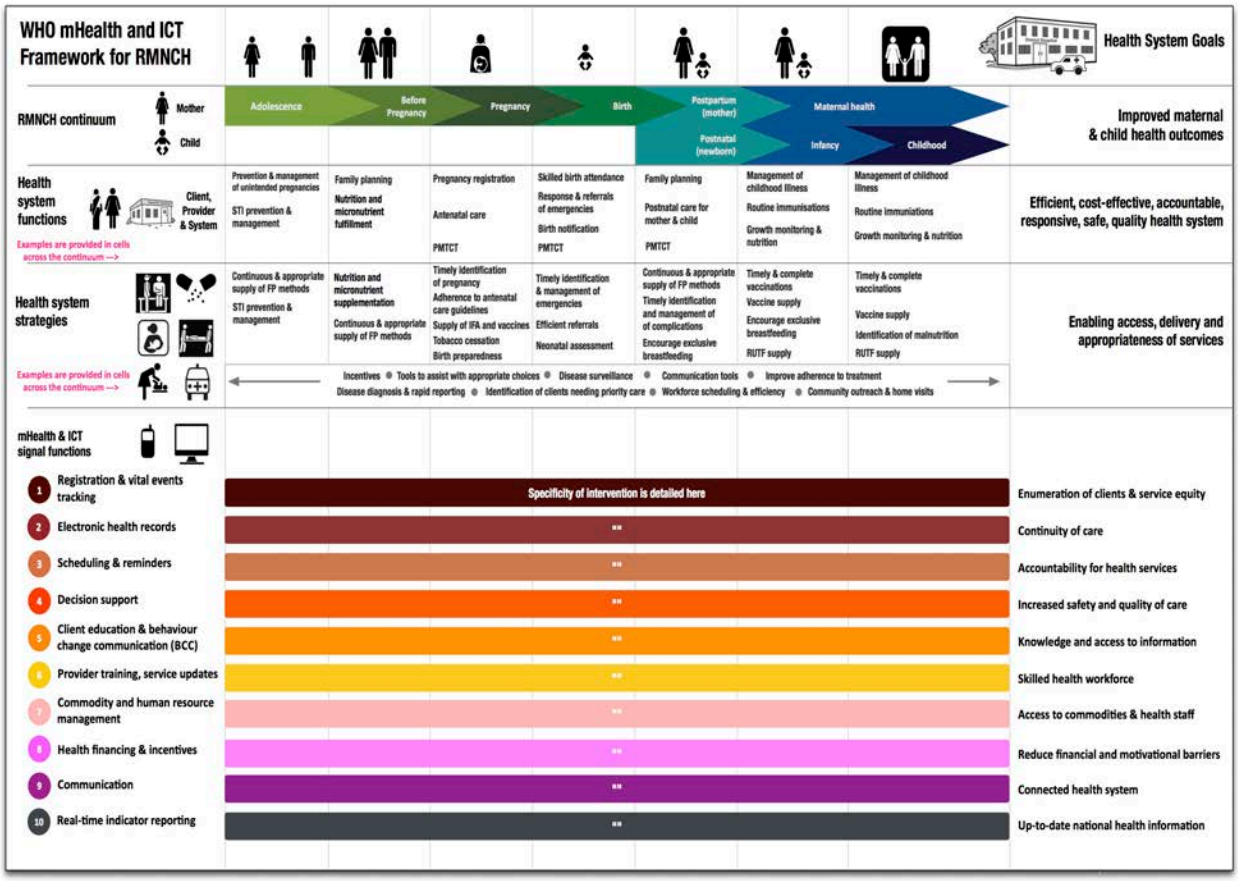
The following description is excerpted from the *WHO mHealth and ICT Framework for RMNCH v5.8 Description*:

"The "WHO mHealth Framework for RMNCH" describes the potential value of mHealth solutions in strengthening health systems across the reproductive, maternal, neonatal, and child health (RMNCH) continuum. The framework combines metrics describing the health system functions and needs, as well as the ICT and mHealth strategies used to address those needs. In doing so, the framework provides a comprehensive overview of missions and goals of existing and proposed ICT and mHealth projects across the RMNCH continuum.

"In brief, the RMNCH continuum profiles the stages of life for women ages 15-49 years, and their children. The health system functions describe the provision of essential interventions that include preventive and curative care along the RMNCH continuum for improved maternal and child health outcomes. Health system needs outlines the mechanisms that allow access to and delivery of appropriate health services to be provided to mothers and children. Some mechanisms, such as communication tools, are crosscutting and apply across the continuum, while others, such as timely and complete coverage of vaccinations, apply to specific stages within the continuum. The 10 domains of ICT and mHealth functions include broad categories that encompass many sub-functions. These domains, and some representative ICT and mHealth projects are described in detail below.

"This Framework reflects the refinement and consolidation of concepts described in a number of technical documents and illustrative diagrams representing a range of stakeholders. It attempts to resolve the multiple perspectives of innovation in the mHealth and ICT space. It also works to ensure that the concepts are aligned with frameworks proposed by the UN EWEC IWG mHealth Catalytic Grant projects, the guidance of WHO and other H4+ Agencies, GSMA, the mHealth Alliance, the Partnership for Maternal, Newborn, and Child Health (PMNCH), and leading academic research institutions; and is consistent with technical concepts used in the PMNCH Essential Interventions Report, Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health, and WHO Monitoring the Building Blocks of Health Systems.

"This framework is a work in progress, with subsequent revisions and additions released as future versions. We welcome the input of other stakeholders to ensure its relevance and value to the health, mHealth, and ICT communities working to improve the health of women and children globally."



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Appendix B – WHO-ITU Sample National eHealth Component Map