

Lessons Learned from Using a Mobile Health Application to Improve Timeliness and Quality of Maternal and Newborn Health Service Delivery Across Primary Health Care in Ethiopia



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EXECUTIVE SUMMARY

Background

Real-time access to reliable and accurate information to deliver consistent and high-quality health care is currently in high demand. Over the past three decades, a range of digital technologies for sharing and generating health and medical information has emerged as mobile health (mHealth) platforms. Throughout the world, health service providers and decision-makers are trying to capitalize on the revolution in mobile communications to strengthen health systems and boost efforts to extend the reach of health workers into underserved communities.

Ethiopia's Ministry of Health (MOH) developed a national strategy for electronic health (eHealth) to better coordinate all information communication technology (ICT) for health activities in the country. Based on the MOH's digital eHealth platforms and health management information system, L10K 2020 designed its mHealth strategy for testing and sharing knowledge to improve and ensure continuity of quality health care. The primary aim of the initiative was to build strategies towards system improvement in the delivery, timeliness, and quality of maternal and child health services by leveraging mHealth technology. This report outlines L10K 2020's experiences introducing the mHealth strategy for improving reproductive, maternal, neonatal, and child health (RMNCH) care.

mHealth designing process

L10K 2020 first conducted a landscape assessment to investigate the local context to inform the design of an appropriate mHealth solution. The Health Extension Worker (HEW), health center support (focal person), and client notification applications were designed using the CommCare platform. These applications

have automated packages including client registration and appointment management; follow-up and notifications; job aids (for HEWs only); and referral and tracking systems.

Implementation

The mHealth platform was released in three phases to achieve the full scope and to meet the L10K 2020 and MOH programmatic objectives. The initial phase (Release 1) was developed and tested in one woreda and scaled to four woredas, including one woreda piloted by L10K 2020. This first phase focused on designing a mobile tool for high-quality intrapartum care services, from antenatal care (ANC) to delivery care and postnatal care (PNC). Later phases (Release 2 and 3) built on Release 1 and included additional modules prioritized by the MOH.

L10K 2020 trained all HEWs, midwives, and HEP focal persons/supervisors in the intervention woredas on mHealth with extensive demonstrations, simulations, and practice and testing of different modules using the application. Smartphones were provided for HEWs, their supervisors, and midwives at the health center level after the training. Power banks and solar chargers were also provided for lower resourced facilities based on findings from the infrastructure pre-assessment. Monitoring tools such as weekly and monthly reports (workers' activity, daily form submission, completion time), key indicators by facility (ANC, PNC coverages), and individual-level performance reports by HEW, focal person, and midwives were developed and used for routine performance monitoring using the app. A troubleshooting guide was developed and HEWs supervisors were able to solve the majority of the mobile device and application-related problems with remote and onsite support from L10K 2020 team.

Usability and contribution of mHealth initiative on RMNCH service deliveries

L10K 2020 conducted a process evaluation after a year of implementation to identify the most common challenges users have experienced in adopting the CommCare system. mHealth app usage and user experience were evaluated by reviewing data synchronized to the server and key informant interviews with users (HEWs, midwives, and HEP supervisors). The findings indicate that the mHealth app is user-friendly and has improved the interaction between HEWs and health workers and has facilitated real-time information exchange, defaulter tracing, referral, and feedback systems. Through the mHealth initiative facilitates can provide remote performance monitoring and improve service coverage. The initiative also improves quality and timeliness of care for clients; provides reliable, quality and on-time data for action; supports to access client's previous and current clinical information; strengthens the primary health care unit (PHCU) referral linkage, notification, and feedback system; and saves time and improves skills when used as job-aid.

The mHealth strategy bridged communication gaps between health care workers and HEWs. It assists HEWs to easily identify danger signs and complications in pregnancy and thereby facilitates timely referral using electronic forms downloadable via a smartphone. The data on the mHealth app shows improvements in the timely identification and registration of pregnant mothers by HEWs in the first and second trimester in the pilot sites. Adherence for service also increased across the pregnancy continuum of care as a result of referral and notification of RMNCH clients using the app in the PHCUs.

Key indicators of the continuum of maternal and child care services such as ANC, delivery assisted by a skilled birth attendant, and PNC services showed a good level of adherence to RMNCH care-seeking in the implementation period. Of births registered in mHealth apps, 83% of mothers received postnatal care of which

28 % was within two days of giving birth. This better coverage in the implementation period might be due to the use of the mHealth apps for birth notification and a reminder that improves the tracking system for services in the pregnancy continuum of care.

Lessons and conclusions

L10K 2020 has developed a clear model for implementing an mHealth platform at the entry point of health services, the community-level HEWs. The project's engagement of various stakeholders at different levels of the health sector when developing, testing, and deploying mHealth applications was critical to transferring skills and knowledge and increasing ownership at all levels. Also critical to a smooth hand-over and at-scale government use of the intervention were a strategy to build local capacity, operational guides including troubleshooting, and documentation of implementation lessons. The landscape assessment was the most important factor to understanding the goals the project needed to achieve and mapping out how to reach those goals.

Mobile technology can be leveraged to improve quality health care access, service uptake, and timely information exchange within Ethiopia's primary health care system. Increasing mobile penetration has also been a significant opportunity to increase access to health information and generate demand for health services. MOH used the lessons learned from the mHealth initiative to inform the development of the electronic community health information system (eCHIS) at the national level, which L10K 2020 also supported technically and financially.

To scale and replicate these successes, context-based scoping, resource analysis, and mapping are essential to determine the infrastructure, cost, time, risk, and stakeholders needed throughout the intervention and implementation process.

BACKGROUND

Real-time access to reliable and accurate information to deliver consistent and high-quality health care is currently in high demand (1). The use of mHealth in the public health sector has contributed to significant improvements in the delivery of quality health care across the globe. mHealth applications are widely acknowledged to transform the way clients and health providers exchange health information (2), and they present the opportunity to improve quality and timeliness of maternal and child health services and strengthen referral linkages, particularly in under-resourced health systems (2-8).

Over the past three decades, a range of digital technologies for sharing and generating health and medical information has emerged as mobile health (mHealth) platforms. Mobile health refers to the use of wireless technology and devices (smartphones and tablets) to enhance access to information and improve the delivery of basic health care services (9, 10). Throughout the world, health service providers and decision-makers are working to capitalize on the revolution in mobile communications to strengthen health systems and boost efforts to extend the reach of health workers into underserved communities (3, 9). mHealth has great potential to promote healthy lifestyles, improve provider and client decision making, and enhance health care quality by improving access to medical and health information and facilitating instantaneous communication (11).

Ethiopia's MOH developed a national strategy for electronic health (eHealth) to better coordinate all information communication technology (ICT) for health activities in the country. According to the eHealth strategies for new framework report of 2011, the MOH proposed an integrated platform, interactive voice response (IVR), to support the Health Extension Program (HEP) using a multi-lingual and scalable solution that allows for a gradual rollout of additional functionality

including supply chain management, referral processing, continuing education, and remote management and supervision. The MOH's strategic plan also prioritizes the digitization and scale-up the existing paper-based health information system (3, 12).

The Last Ten Kilometers 2020 Project (L10K 2020), implemented by JSI Research and Training Institute, Inc., designed its mHealth strategy in collaboration with the MOH to complement the existing functionality of the MOH IVR system and be interoperable with the national electronic community health information system (eCHIS).

Once the mHealth initiative was designed in line with the MOH's vision, policies, and strategies, L10K 2020 designed learning and incubation sites to field test the initiative in Mirab Azernet woreda of Southern Nations, Nationalities, and People's Region (SNNPR) followed by expansion to other three other rural districts: Dembecha (Amhara), Shebe Sombo (Oromia), and Weraï Leke (Tigray).

The primary aim of the initiative was to build strategies towards system improvement in the delivery, timeliness, and quality of maternal and child health services by leveraging mHealth technology to support service provision and strengthen linkages within the PHCUs (health centers and their satellite health posts). The specific objectives include:

- 1) Improve timeliness and coverage of RMNCH services;
- 2) improve the quality of RMNCH services; and
- 3) improve referral care for RMNCH services by leveraging ICT.

This report outlines L10K 2020's experience introducing the mHealth strategy for improving RMNCH care. Specifically, it 1) describes the design and implementation process of the mHealth solution; 2) documents usability and usage of the

mobile solution across the continuum of care; 3) examines the role of the mHealth solution in enhanced RMNCH service delivery; 4) describes the contribution of the mHealth platform to eCHIS; and 5) documents lessons learned and challenges. To organize this report, all project documents including the mHealth program plan, reports, findings from routine monitoring, and the

evaluation of the implementation process were reviewed. Regarding implementation, the process of designing, scoping, development, deployment, troubleshooting, application usage monitoring, and feedback systems used in the implementation of mHealth programs were reviewed. The support and engagement of the health sector was also reviewed to enrich the document.



mHEALTH SOLUTION DESIGNING PROCESS

Landscape Assessment

L10K 2020 conducted a landscape assessment to investigate the local context and to propose a feasible technological architecture (Fig. 1) aligned with L10K 2020 program objectives and opportunities to scale up to support broader MOH objectives.

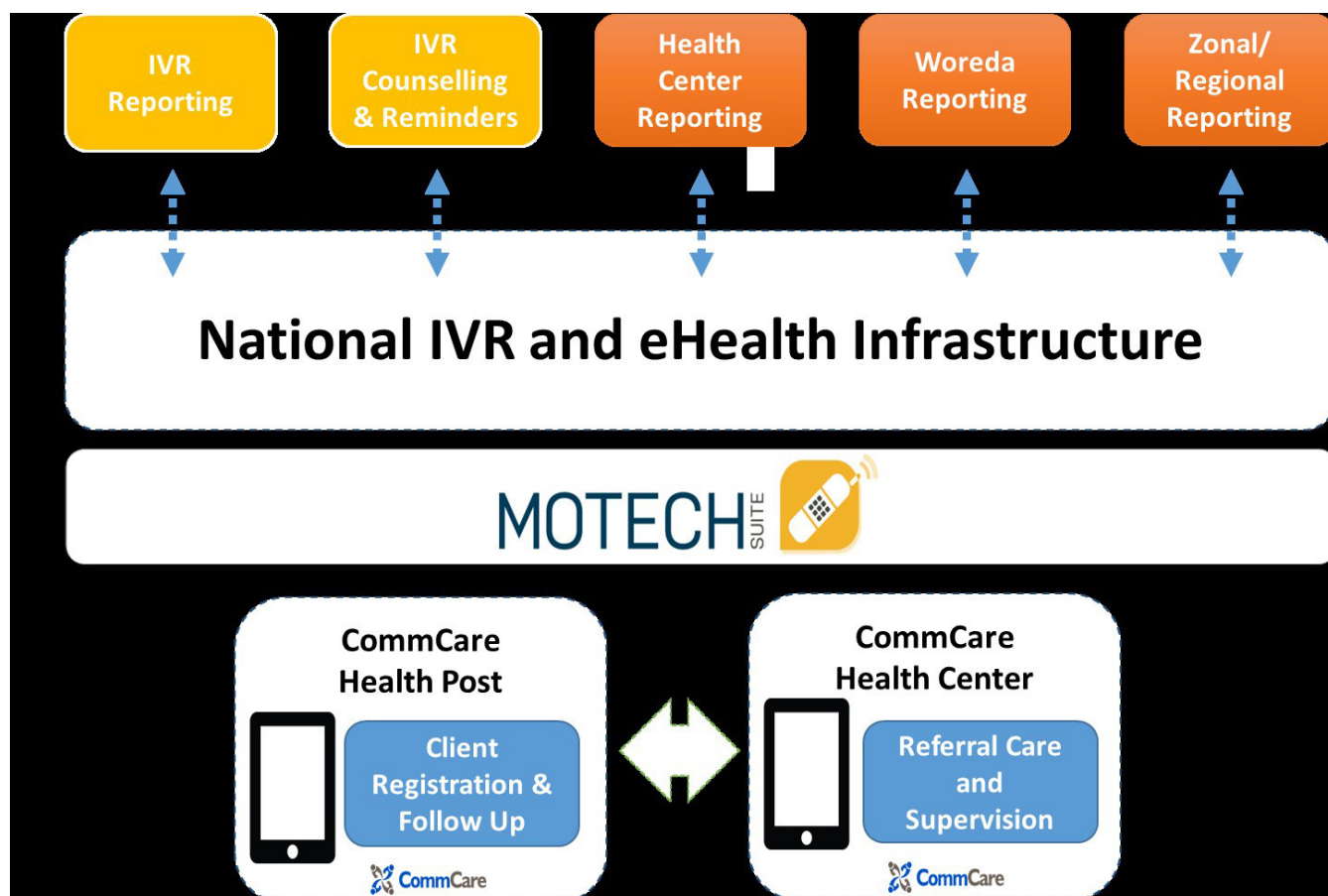
The assessment findings showed that all health centers in the proposed intervention areas had mobile networks with mobile data networks and

access to electric power. While 91% of the health posts had both mobile network and mobile data (internet) network coverage, only 25% and 12% of them had electric and solar power coverage, respectively.

mHealth Solutions Designing

Based on the findings of the landscape assessment and consultations with Dimagi, a technical consultant for the mHealth project, the Mobile Technology for Community Health

FIGURE 1: Proposed Technology Architecture for mHealth Initiative



(MOTECH) Suite¹ was recommended as a platform for leveraging existing national IVR and electronic health information system (eHMS) infrastructure and supporting L10K 2020's objectives (Table 1). This platform could also support future MOH goals. Through a series of discussions, the MOH approved the L10K 2020 mHealth strategy with the expectation that implementation would complement the existing IVR and be interoperable with the national eHealth strategy.

The platform is designed to be interoperable with leading eHealth management information systems and to comply with a range of industry-recognized standards. The MOTECH Suite comprises two key technology stacks (MOTECH and CommCare),² which are configurable by graphical user interfaces. This enabled L10K 2020 and the MOH to update and maintain the system without the need for software development or continued need to use external support to improve or modify the application.

TABLE 1: Summary of objectives of the mHealth initiative with corresponding technology components

SN	Health Objectives	Technology Components
1	Improve timeliness and coverage of RMNCH services provided by health posts	Leverage MOTECH Suite for automated reminders and follow-up notifications and alerts.
2	Improve the quality of RMNCH services provided by health posts	Leverage MOTECH Suite for mobile electronic job aids (e.g. checklists) for Health Extension Workers
3	Improve referral care for RMNCH clients to health centers	Leverage MOTECH Suite for improved data and referral workflow

To initiate the mHealth initiative, the following mobile applications were adapted, based on Dimagi's experience in other countries, to the local context and implemented:

- **Health Extension Worker (HEW) Application:** developed to support HEWs in the registration, prioritization, referral, and follow-up of RMNCH service delivery and to provide automated job aids.
- **Health Center Application:** developed to allow midwives/health workers at the health center level to confirm referrals from HEWs for RMNCH services in the catchment and to share

information with HEWs related to referral feedback, clients who received services at the health center without notifying the HEWs, and delivery notifications.

- **Support Application:** developed to support HEW focal persons to provide remote technical and programmatic support for and follow-up with the HEWs.
- **Client Notification:** developed for RMNCH clients who signed up in the app to receive notifications or messages to their mobile number. These notifications include appointment reminders and are in local languages.

¹ MOTECH Suite is an open source server- and mobile-phone-based technologies which provides a platform for deploying mobile-enabled services and linking eHealth and mHealth systems.

² CommCare (www.commcarehq.org) is a, an open source, easily customizable, and widely adopted mobile platform that supports frontline workers (FLWs) to track and support their clients with registration forms, checklists, SMS reminders, and multimedia. in low-resource settings.

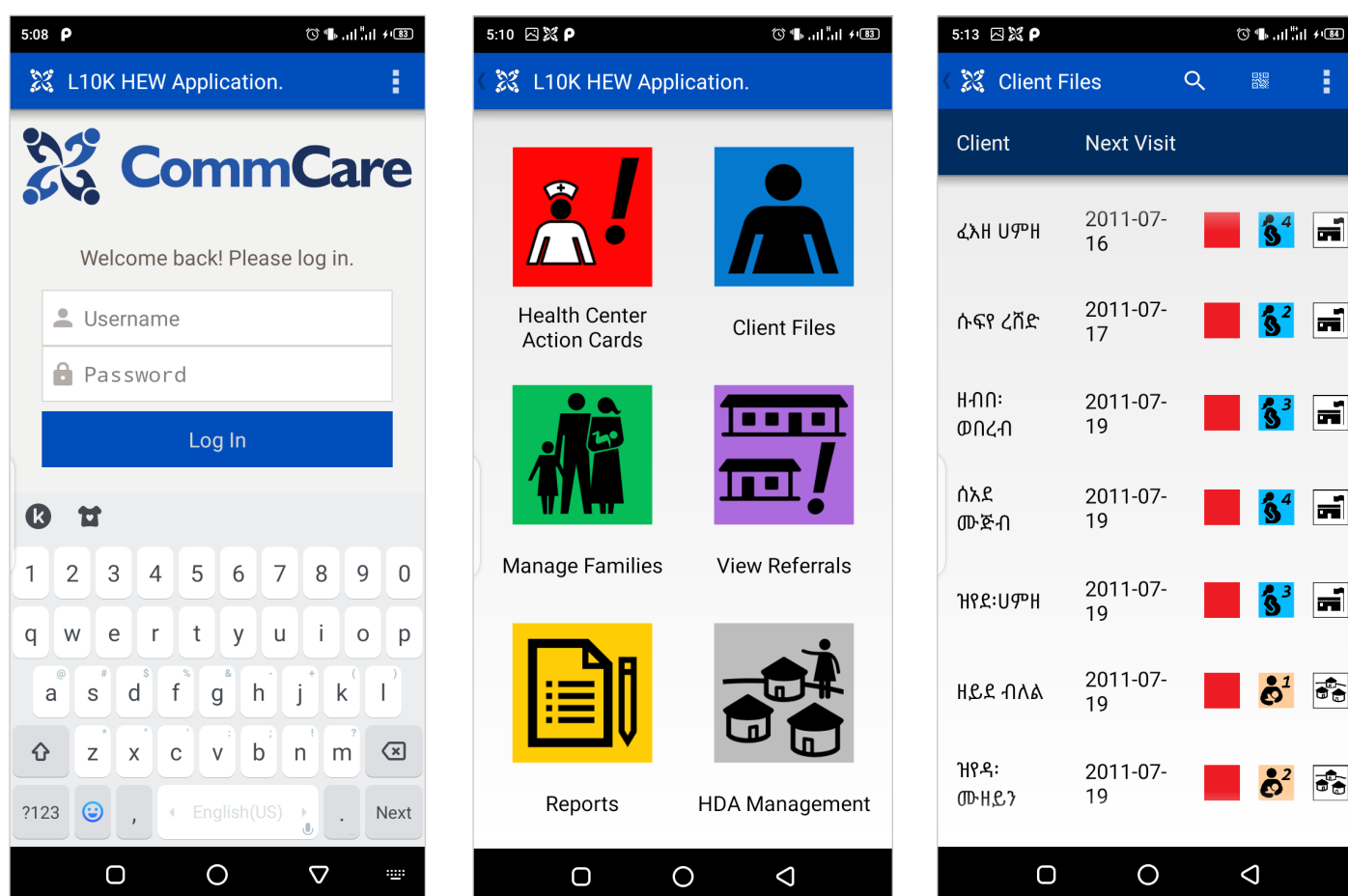
mHealth Packages

Registration and appointment management:

Each HEW was provided a smartphone with the mHealth application and a unique username and password to register new clients for RMNCH services and track existing clients through the continuum of services (Fig. 2). Once logged in, the HEW selects the relevant service to deliver or views the list of clients with pending

appointments. If a client is not on the list, the HEW initiates a new registration for the client. If a client bypasses the health posts (HPs) and go to the health center (HC) for services, midwives/ health workers in the maternal and child health (MCH) department would register the client using the application, which will automatically send a notification to the HPs with the necessary information including types of service provided, due date, and place of next appointment.

FIGURE 2: HEWs CommCare-based mHealth application for client registration and tracking



Reminder, follow-up alert, and notification:

Before the introduction of the mHealth platform, HEWs used a paper folder and tickler box system to track client appointments for each service type. With the paper-based system, it was difficult to trace clients who missed appointments. The introduction of mobile applications complements this system by strengthening communication between clients and service providers at different levels.

The RMNCH service registration system at the health center triggers mobile notifications for HEWs on home visits. When a woman or a child receives services at the health facility, their basic information is entered into a database and they are assigned to a specific HEW for follow-up. This information can be entered using a mobile phone and or tablet when there is internet connectivity. The HEW is then notified of the client who needs a follow-up visit. Clients, HEWs, and midwives receive these notifications as an SMS or an alert through the application on their mobile phone.

Escalating messages to both the HEW and her supervisor can be sent if a visit is overdue. Notifications and alerts related to the appointment (due or missed), referral, and births were sent using the mobile app and SMS at the health center and health post levels.

Electronic job-aids for HEWs: Job-aids and counseling tools were automated for HEWs to use during household visits using mobile functions such as voice, video or audio clips, and images to enhance quality and effectiveness of counseling on RMNCH service provision. The automated job-aids include workflow and protocol support through checklists and decision support; multimedia content that could be played through the phone to strengthen counseling and education; and educational messages that could be played through IVR to strengthen counseling and education.

Referral and tracking: Before the introduction of the mHealth platform, HEWs provided a referral note/slip which a client would take to the health center, and the health center would write a counter referral or feedback note/slip with important information regarding services delivered and any follow-up care needed. This process was automated through the mobile application to strengthen communication and ensure completed (two-way) referrals between different providers and facilities.

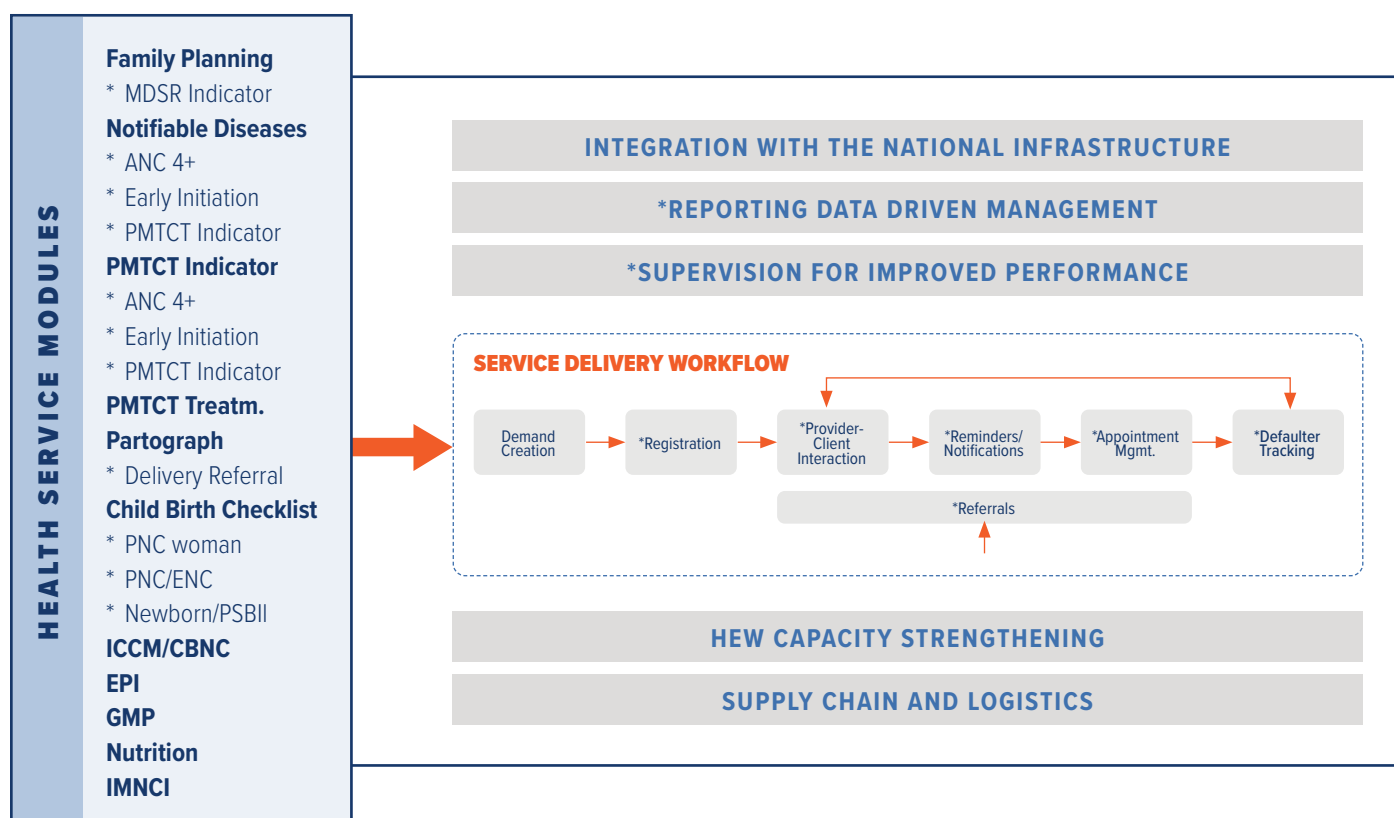
To strengthen referral care for mothers and newborns identified with complications during ANC, birth preparedness, and PNC or other visits, a closed user group system was created for HEWs and staff at the health center. Anyone within the closed user group is able to see ongoing activities and can call others in the group at no cost to themselves. This has enabled more direct communication between health center staff and HEWs.

When an HEW refers a client to the health center during a visit, the app automatically triggers a notification to the health center with the necessary referral information including the date that the client is planning to visit the health center. Once the client arrives, the health center application is updated by health workers with the services delivered and whether any follow-up care is required from the HEW. This information is also available on the HEW app and they can track the status of the referral.

IMPLEMENTATION

The mHealth platform was developed over three phases to build towards the full scope of L10K 2020 and MOH programmatic objectives (Fig. 3). The health services prioritized by the MOH are shown on the left and the activities the platform is capable of supporting are on the right.

FIGURE 3: Health service modules prioritized by the MOH (left) and MOTECH Suite platform (right)



The various health service packages were released in phases as described below:

Release 1: This phase focused on quickly developing and releasing the highest priority modules while building organizational capacity for supporting and scaling the technology. The highest priority modules and activities were ANC, delivery, and PNC service recording, referral, and notification. The mobile tool was designed to meet programmatic needs while also being responsive to the context of users and project stakeholders, the workflows required, and the

constraints of the operating environment. Release 1 was developed and tested in Mirab Azernet in SNNPR and scaled to the other three pilot woredas. Releases 2 and 3 built on Release 1 and included additional modules prioritized by the MOH.

Release 2: This phase refined and expanded the L10K 2020 priority modules from Release 1 and deployed a second set of modules. The subset of modules in the second release included family planning, nutrition, child vaccinations, and tetanus toxoid vaccinations.

Release 3: This modules in this phase included integrated community case management (iCCM) and community-based newborn care (CBNC). In addition to designing these programmatic modules, the team integrated feedback from Release 1 and 2 to improve the usability of the system.

The following sections describe the major activities performed during the implementation of the mHealth initiative.

Training and Material Distribution to mHealth Users

HEWs, midwives, and HEP focal persons/supervisors in the intervention woredas participated in a five-day mHealth training (Table 2). The training provided an orientation on smartphones/tablets and key application features, how to install/uninstall the application, logging in and out, syncing data, the application menu, settings, and navigational functionality. Through demonstration, exercises, and testing, the training focused on how to use the app to register clients and navigate existing client records, record services, use automated job-aids for counseling, create referral/feedbacks, monitor performance, trace defaulters, and track reports. Case-scenarios for every application module were designed as practical exercises and one trainer was assigned to five trainees to provide coaching and support during the practical sessions.

L10K 2020 distributed 308 smartphones to HEWs, their supervisors, and midwives after the training. Smartphones were distributed per number of HEWs at the health post level but only one communal smartphone was distributed to health centers irrespective of the number of midwives.

Power banks and solar chargers were also provided for lower resourced facilities based on findings from the infrastructure assessment survey.

Reporting, Supervision, and Performance Monitoring

The supervision and performance reports were made available to the HEWs and supervisors through the mobile app. The regular report can be generated using the app reporting modules which were developed with HMIS platforms. The app allows HEW supervisors and midwives to see real-time health post performance reports in their catchment through their mobile phones or tablets. These reports are regularly reviewed and discussed with the HEW to provide immediate feedback and ensure immediate action using the mHealth apps.

Monitoring tools such as weekly and monthly reports (workers' activity, daily form submission, completion time), key indicators by facility (ANC and PNC coverage), and individual-level

TABLE 2: mHealth app users trained in the pilot sites of L10K 2020

Region	HEWs and HWs Trained on mHealth			
	Training of Trainer (TOT)	HEWs	Midwives and HEP supervisors	Total
Amhara	5	58	40	103
Oromia	5	47	31	83
SNNP	6	35	28	69
Tigray	5	88	40	133
TOTAL	21	228	139	388

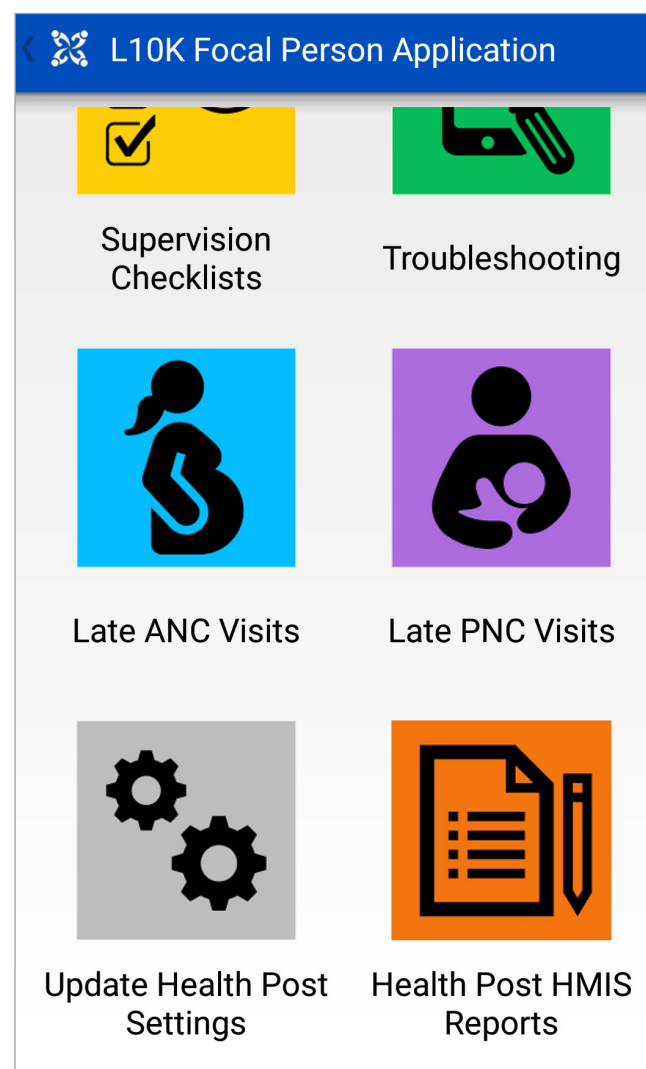
performance reports for HEWs, focal persons, and midwives were developed and used for routine performance monitoring through the app. App usage was remotely monitored at the national level and there is a biweekly feedback system for PHCUs and woreda health offices for service provision using the RMNCH application.

Troubleshooting

Operational processes for troubleshooting were established to manage mobile and app-related problems. Common problems users faced include malfunctioning charging pin, phone app failure and lock, hardware damage, and software removal. A troubleshooting³ guide was developed (Fig. 4) and training provided for HEP supervisors and health information technicians (HITs) and other program staff at the PHCU and woreda levels.

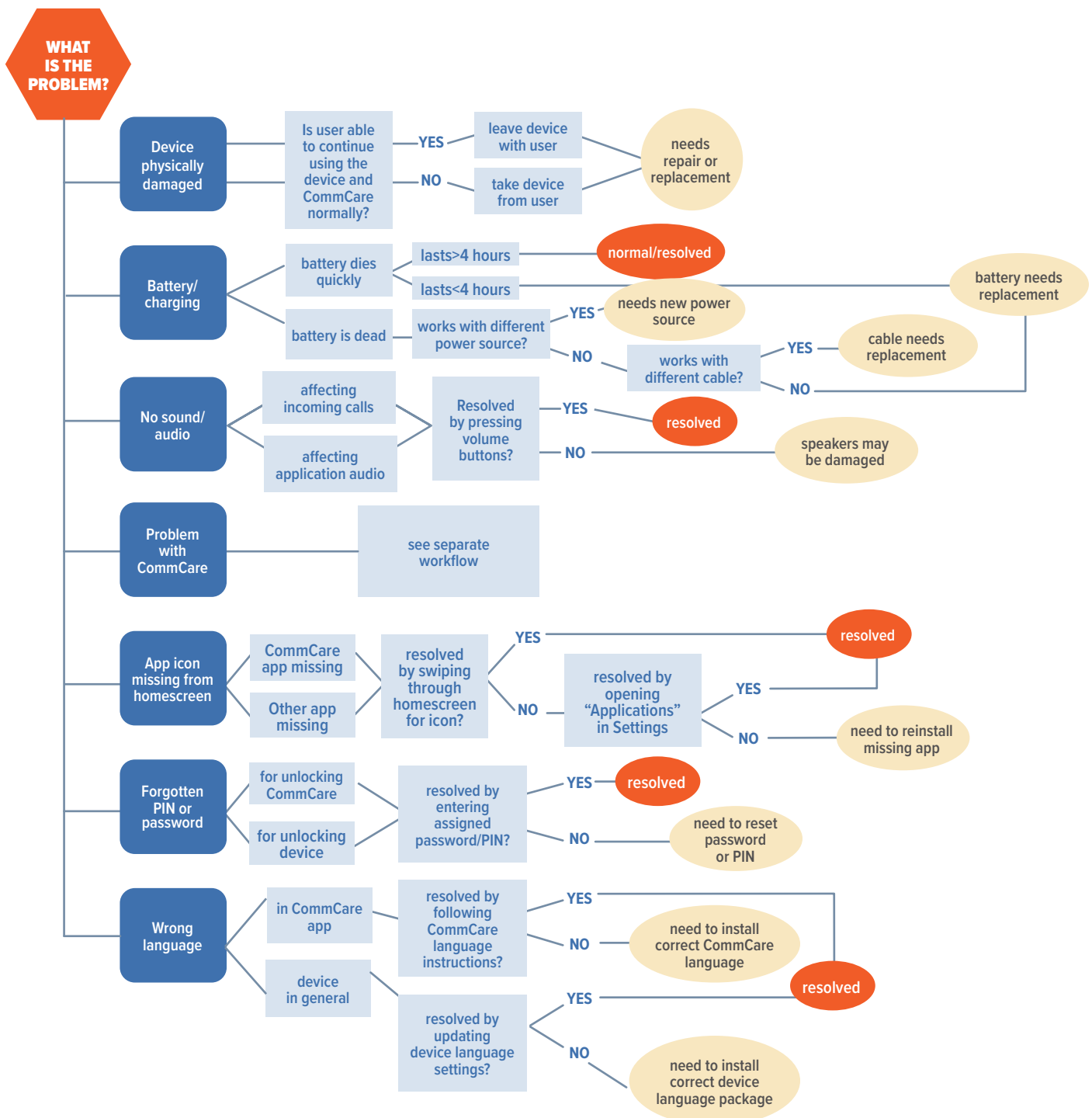
Trained health workers were able to address most of the common problems using the troubleshooting guide and with remote support from L10K 2020's regional and central teams. The L10K 2020 teams also provided onsite support and supervision to end users.

FIGURE 4: L10K Focal Person Application



³ Troubleshooting is a form of problem solving. It is a logical, systematic search for the source of a problem in order to solve it, and make the device or process operational again.

FIGURE 5: L10K 2020 mobile device and app troubleshooting key step indication diagram



USABILITY AND CONTRIBUTION TO RMNCH SERVICE DELIVERY

L10K 2020 conducted a process evaluation after a year of implementation to identify the most common challenges users faced when adopting the L10K 2020 CommCare system. mHealth app usage and user experience were evaluated by reviewing data synchronized to the server and key informant interviews with users (HEWs, midwives, and HEP supervisors). About 20 (95%) of the HEWs said that they prefer the mHealth (CommCare) app over the paper-based system since it helped them to strengthen referral linkage, defaulter tracing, remote performance monitoring, and consultation. The benefits of using the mHealth app for RMNCH service delivery as reported by end users within Ethiopia's primary health care system are presented in Box 1.

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“Using the paper-based system was difficult to address all eligible clients for services. It was also challenging to access information about pregnant women who received service at the health center and higher health facilities [self-referral]. Now, we can trace defaulters and follow clients easily, provide timely service, and access information about the clients who bypass our health post through application notifications and referral linkage. It also saved our time and effort because we are not expected to go to each village for notifying clients about each visit. Instead we can send a message and or call to the client or Women's Development Army member using the mobile phone.”

—HEW, 24 YEARS OLD, OROMIA

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BOX 1: Benefits of using mHealth app for RMNCH service delivery

- **Facilitates remote performance tracking and monitoring**
- **Improves health service coverage**
- **Enhances delivery of quality and timely care to clients**
- **Provides reliable, quality, and on-time data for decision making**
- **Supports access to client's previous and current clinical information**
- **Strengthens referral linkage, notification, and feedback system within the PHCU**
- **Provides a job-aid that helps save time and improve skills**
- **Promotes pregnancy identification and defaulter tracing in the RMNCH continuum of care**

While users reported numerous benefits to using the mHealth app, they also reported the ongoing challenges listed in Box 2. There was high turnover of trained HEWs and health workers. About half of the HEWs trained on the mHealth app left their duty station (resignation, education, or transfer) within one year. In addition, there were very few HIT professionals to handle the fluctuating demand for ICT support to fix mobile devices and mHealth application bugs. Users worried about losing their mobile devices, and they sometimes left the devices at home during community visits. About seven (3%) tablets were lost and 86 (28%) damages were reported within the first year of implementation in the pilot sites.

The use of single mobile devices across multiple service delivery points, which limited the number of devices available to midwives and focal persons, was also reported as a challenge. HEWs reported that although solar charger and power banks were provided for lower resourced health posts, they did not always work.

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“It is difficult to take risk of mobile device/tablet loss. We have no [also] power source at the health post and usually, we send the mobile devices through another person for charging to the nearby town and we also traveled a long distance alone for outreach service/home visit with two mobiles including our phone. In such a situation, we bothered a lot not to lose ... and we usually left the mobile device at home though it is very important for our work,”

—HEW, 30 YEARS OLD, TIGRAY

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Usability of the mHealth Solution

Many mHealth app users reported that the app is very easy and enjoyable to use; they understood its intent, purpose, and potential for impact in their job. Overall, HEWs who were engaged in the usability study rated core features of the application as ‘easy’ to ‘very easy’ after being asked to simulate the use of the application in real-life situations. Despite the majority of users (80%) having no prior experience with

BOX 2: Challenges reported on the use of mHealth app for RMNCH service delivery

- High turnover of trained app users
- Work overload with existing paper-based recording system
- Fear of theft or loss of phone/tablets
- Shortages of phone/tablets (sharing single device/tablet across service delivery points)
- Delay in replacement of nonfunctional mobile devices
- Use of mobile device for other purposes (video recording, installing other mobile application) which can affect the CommCare app
- Delay in reporting non-functional device/app and untimely maintenance
- Interruption of mobile data connection and unavailability of consistence mobile airtime

smartphones or ‘apps’ in their personal lives, users are generally confident in finding CommCare on the phone and completing basic form navigations. This suggests that a user’s lack of familiarity with smartphone technology is not necessarily a key barrier to increasing usage of the app.

Many mHealth users also demonstrated a general understanding of case management and interconnectivity between the HEW and the health center app. HEWs demonstrated high literacy levels and general comfort in reading question texts and counseling labels on the small phone screen. Many users also demonstrated ease and intuition to play the audio recordings associated with counseling messages.

Standardized, Timely, and Quality Service Delivery

L10K 2020's mHealth users reported that they used the app as a job-aid, recording tool, service monitoring tool, and messaging tool to send and receive notifications and referrals. HEWs explained that they used the mHealth application as a job-aid and counseling guide during service provision. Clients' adherence in the pregnancy continuum of care improved as a result of standardized care and counseling services. L10K 2020's mobile health application users also described the app as a very useful tool that helped them improve interactions, linkage between facilities, timely exchange of real-time information, and provision of standardized and quality service.

“mHealth enables us to have real-time information and deliver quality and timely service for pregnant and postnatal women. The paper-based system takes time and extra effort to get the previous history of the clients about specific services but this mHealth app enabled us to access all types of information about the clients and we used it as checklists for our services. This simplified our routine job more than ever on the provision of standardized care for clients.”

—HEW, 26 YEARS OLD, OROMIA

Improved Linkage and Real-time Information exchange at the PHCUs

The mHealth strategy bridged communication gaps between healthcare workers and HEWs. It assisted HEWs to easily identify danger signs and complications in pregnancy and thereby facilitated timely referral using electronic forms downloadable via a smartphone.

As reported by users, mHealth solution helped HEWs and health workers to exchange information through the app and enabled them to monitor each client based on their appointment date, location, and types of services. This improved service delivery through better access to client information, including tracking services provided along the pregnancy continuum of care. The app also helped them to easily identify defaulters and trace them.

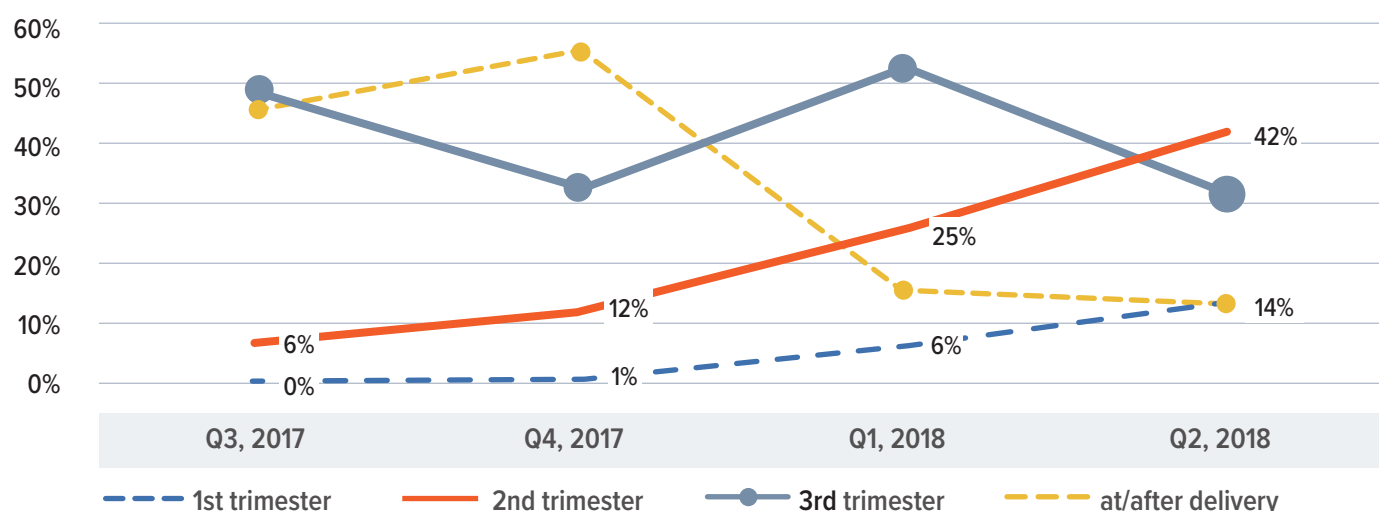
“With a paper-based system, it was difficult to know and retrieve late users for RMNCH services especially the areas with scattered populations and challenging topography, but now we can trace them and can give services per the schedule. It also supports us to pay attention to schedulable services and improved our interaction with clients to improve the coverage of MNCH.”

—HEW, 28 YEARS OLD, AMHARA

Pregnancy Registration and Adherence for Services in the Continuity of Care

Early identification and registration of pregnant women is an entry point to provide focused ANC, delivery, and PNC services along the pregnancy continuum of care. At the beginning of the mHealth initiative, the majority of the pregnant women were registered by HEWs in the third trimester and or later. Data from the mHealth app shows an increase in the registration of pregnant mothers in the first and second trimester at mHealth pilot sites as a result of referrals and notification of cases through the app in the PHCUs (Fig. 6).

FIGURE 6: Pregnant women identification and registration trends in L10K 2020 mHealth pilot project sites, July 2017-June 2018



Key indicators of maternal and child care services such as ANC, delivery assisted by a skilled birth attendant, and PNC services showed a good level of adherence to RMNCH care-seeking during the implementation period. Of births registered in mHealth apps, 83% of women received postnatal care, of which 28 % was provided within two days of giving birth. This improved coverage as compared to previous trends in the woreda and the country may be attributed to the use of the mHealth apps for birth notification and reminders that improve the tracking system for services along the pregnancy continuum of care.

“The app helped us to remotely follow the performances of HEWs. We have access to see all client information in our catchment who registered in the app such as clients due date for ANC, delivery, and PNC. We can identify clients who are late to receive those services, the reason for the delay, and to take corrective measures timely by discussing with HEW. Our coverage shows improvement as a result of our close follow-ups through uses of the app and gives us a room to timely fix problems.”

—HEW SUPERVISOR, 24 YEARS OLD, AMHARA

CONTRIBUTION OF THE mHEALTH PLATFORM TO eCHIS

The mHealth app was designed in alignment with the existing health system. Realizing its potential and wide applicability, MOH used the mHealth platforms and lessons as inputs for the development of the national eCHIS at scale. The MOH prioritized the later phases of the mHealth initiative (Release 2 and 3) and adapted them to eCHIS program with a full handover from L10K 2020 to the MOH. The eCHIS application digitalizes the existing manual family folder and service workflows to record and report household member health and related data. The system captures data on the HEP and other community-level services and uses these data to improve HEP performance, community health outcomes, and HEW support across the primary health care system.

L10K 2020 provided technical support to MOH experts on the deployment and integration process of the mHealth platform to eCHIS. MOH and L10K 2020 experts and officials developed a plan to set up the CommCareHQ application and built the capacity local experts to properly handover integration of the eCHIS system. Major activities accomplished by L10K 2020 during the transition of mHealth to eCHIS included: 1) local installation of instance of CommCareHQ, and its configuration algorithm and backend components (database type, =search engines); 2) discussion of integration of eCHIS system into the national Ethiopian Health Data Analytics Platform (EHDAP) system; 3) capacity building of local experts on server setup and use of the frontend features, and



use and customization of the CommCare mobile android application; and 4) content review of eCHIS/family folder module.

L10K 202 facilitated national and regional master trainer of training sessions (technical and financial), supported the cascading to the end-user, and procured and distributed about 1,150 tablets for end users during the deployment of eCHIS in health posts. As of the first expansion, the eCHIS app is now being implemented at 1,386 health posts in 134 agrarian woredas and the MOH is planning to scale national wide.

LESSONS LEARNED

L10K 2020's engagement of the stakeholders at different levels of the health sector when developing, testing, and deploying the mHealth applications was critical to skills and knowledge transfer and to increasing ownership at all levels. Also critical to a smooth handover and at-scale government use of the intervention were a strategy to build local capacity, operational guides including troubleshooting, and documentation of implementation lessons. The landscape assessment was the most important factor to understanding the goals the project needed to achieve and mapping out how to reach those goals.

The mHealth app is user-friendly and improves the interaction between HEWs and health workers and facilitates real-time information exchange, defaulter tracing, referral, and feedback systems within Ethiopia's PHCs. Leveraging mobile technology improved quality health care access, service uptake, and timely information exchange.

Despite the numerous benefits of the mHealth initiative, challenges impacted its full implementation:

- Providing adequate infrastructure like mobile data, electricity, smartphones/tablets, and solar chargers is critical to effectively leverage the benefits of mobile technology. Gaps identified through routine monitoring include delayed distribution of mobile cards, delayed replacement of damaged/lost mobile devices, and failure in timely reporting of non-functional devices/apps. Addressing these issues would motivate users to use the app without interruption and would improve performance.
- The implementation of mHealth in the intervention sites was strained by several infrastructural challenges including limitations with the data transfer and mobile internet capabilities available for the types of mobile devices being used.
- Internet connectivity interruption during several months of piloting the mHealth initiative affected the quality and timely information exchanges within the PHCUs.
- The functionality and usage of the app for RMNCH service delivery and recording was not regularly monitored by the health system and lacked technical integration with the existing system at all levels.



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