mHealth at Scale

An end-to-end system co-developed with Frontline Health Workers

A Scalable Solution for the Maternal, Child Health and Nutrition Continuum using Mobile Technology in a Resource-poor Setting

mHealth intervention to reach 100 million population across Bihar, India: US$20 million allocated for scale up

Real-time data strengthens supportive supervision for frontline health workers to deliver quality health services

Mobile phones help frontline health workers to influence mothers and families to adopt healthy behaviors and practices
mHealth at Scale - An end-to-end system co-developed with Frontline Health Workers

Continuum of Care Services

The mHealth Solution to Address Maternal, Newborn, Child Health and Nutrition in Bihar, India

A snapshot

Implemented by CARE along with the Government of Bihar (GoB) and other partners, as part of the Integrated Family Health Initiative (IFHI), the Continuum of Care Services (CCS) is a transformative intervention that has already changed the lives of thousands of women, men and children in the state of Bihar in India. Simple yet effective, it leverages the use of mobile phones and related technologies by the Frontline Health Workers (FLWs) to address current challenges to improving the health of women and children. Through CCS, the unreached can be reached by registering pregnant women, mothers and newborn; real-time healthcare information recorded to track appropriate and timely services through the stages of pregnancy, delivery, and postnatal care; and FLWs provided with decision support tools, such as counseling protocols, to improve the quality of health services. It also provides FLWs with tools for scheduling, planning, and, thus, coordinating home visits.

Additionally, CCS has created a continuous and credible digital record of healthcare data, generated at the village level, and made it available to managers and decision makers in real time. This helps them to not only monitor progress but also to make informed program implementation-related decisions and provide supportive supervision for increasing reach, quality and timeliness of healthcare services.

The key and distinguishing features of CCS are:

- **Replicability and scalability**
  CCS, by design, is integrated within the existing public system of health and nutrition-related service delivery. Through training and direct hands-on support, FLWs have found it simple to use and easy to operationalize. This is evident from high levels of its acceptance by the FLWs and their supervisors. Ownership and involvement of government officials, from inception to implementation, is the key.

- **Providing comprehensive healthcare to women and children**
  Based on the health and nutrition needs appropriate to the stages of pregnancy, post-delivery and newborn care, CCS is an end-to-end mHealth solution which includes a suite of applications and multiple modules. It aids coordination and integration of services across two key government departments that provide healthcare and nutrition-related services to women and children.

- **Real-time data for monitoring and decision-making**
  Use of mobile phone technologies substantially reduces chances of error in recording and transmitting healthcare-related data. Beginning at the village level, CCS enables real-time data recording and availability in a digitized format. This helps to monitor the services provided by FLWs as well as to design effective healthcare interventions and assist policymakers in long-term planning.

- **Empowering FLWs and their supervisors**
  Mobile phones have enhanced the ability of FLWs to deliver quality healthcare services in a systematic and integrated manner. Having the information and tools on their ‘finger-tips’ has dramatically improved the confidence and decision-making abilities of FLWs, as also their social acceptance and status within their respective communities.
The Context

Maternal and Child Health Challenges in Bihar, India

Addressing the health of women and children remains very high on the agenda of the Government of India, state governments and development partners. Improving Maternal, Newborn and Child Health including Nutrition (MNCHN) is a key priority embedded within the Millennium Development Goals (MDGs) 4 (reducing child mortality) and 5 (improving maternal health). Despite the improvements in health sciences and delivery systems, high infant and maternal mortality remain daunting challenges in India. Globally, the largest number of maternal deaths occur in India, close to 56,000 every year.¹ The Maternal Mortality Rate (MMR) stood at 200 deaths per 100,000 live births in 2010, lower than the global average of 210 but well below the 2015 MDG target of 150.² The Infant Mortality Rate (IMR) decreased from 81 to 47 from 1990 to 2011 but is still far short of the 2015 MDG target of 26.7. Forty-three percent of Indian children under five years of age are underweight, 48 percent are stunted, and 20 percent suffer from wasting or low weight-to-height ratio; the comparative global figures are 16 percent, 26 percent and 8 percent.³

Within India, Bihar faces particularly serious challenges to improving its maternal and child health indicators. In 2011, the rates of maternal and child mortality were higher than those recorded for India as a whole (see Figure 1). Poor quality and availability of public health service, weak training systems for FLWs, lack of accurate and timely data, and inadequate health

¹ Maternal Mortality Estimates, UNFPA, 2012
infrastructure have been some key problems in translating health investments into healthier women and children. Notably, FLWs are rendered ineffective due to inadequate healthcare tools, out-dated reporting systems, absence of supportive supervision, and low levels of motivation.

Such colossal challenges call for transformative approaches and innovative interventions using modern yet accessible and affordable techniques to change the way health services are delivered to the millions of poor and remote families.

To address MNCHN-related challenges, CARE India, under IFHI, is supporting GoB in improving the delivery of high-impact family health interventions and quality of key health services, as well as identification, testing and scaling up of innovative approaches and solutions. IFHI improves the health and survival of families with pregnant women, and women with children less than two years of age, across the continuum of care as shown in Figure 2.

CCS is a key innovation of IFHI. It is implemented by CARE, and designed to enhance the capacity of FLWs and their ability to deliver key health and nutrition-related services to poor women and children by leveraging mobile phones and related technologies. The CCS mHealth intervention is thus not a standalone mHealth intervention, but is integrated into IFHI, the larger and overarching MNCHN intervention in Bihar.

**Figure 1:** Maternal (per 100,000 Live Births) and Child (per 1,000 Live Births) Mortality, 2011

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**Figure 2:** IFHI framework for providing MNCHN services

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Sources:
- Census of India - Annual Health Survey 2011-12
- Countdown to 2015: Accountability for Maternal, Newborn and Child Survival - The 2013 Update

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\* For more on IFHI visit [http://careindia.org/sites/default/files/BIHAR_IFHI_Multipage_Screen_May%202013.pdf](http://careindia.org/sites/default/files/BIHAR_IFHI_Multipage_Screen_May%202013.pdf)
Mobile Phones

A Unique Opportunity and Solution

Launched in July 2012, CCS is being implemented in Saharsa district of Bihar through 512 FLWs, supported by 58 supervisors and 12 managers, to deliver health and nutrition services to a population of 850,000. FLWs, their supervisors and managers have been equipped with mobile phones, along with initial handholding support and training. In a 16-month duration, a total of 22,381 women and children have been registered under CCS and 181,451 home visits conducted by FLWs.

The mobile phone is used as a tool to facilitate operational ease; automate tracking of mother and child health status; deliver customized counseling in the local language; support monitoring and handholding of FLWs; establish a system of validated information on field-level health service delivery; make this information available in real time to the decision makers and planners; and design a health information system with the potential to be integrated within GoB’s mother and child tracking system5 (MCTS) and thus strengthen it. By digitizing data at the field level, the CCS mobile application improves accuracy and timeliness, and allows for smart data management of health services delivery. Figure 3 provides a snapshot of the various applications and modules developed for the FLWs and their supervisors.

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5 MCTS is a name-based digital system to track pregnant mothers and children in India. It is a management tool of the government to reduce maternal mortality, infant mortality and fertility rates; and track health service delivery at the individual level. For more details, visit https://nrhm-mis.nic.in/UI/MEActivities/MCHTracking/MCH_Tracking_usermanual_final.pdf
FLWs and their Role

Under the Integrated Child Development Services (ICDS) program of the Social Welfare Department, Anganwadi Workers (AWWs) connect with pregnant and lactating mothers, and with children up to six years of age. At the village level, they provide basic healthcare including contraceptive counseling and advice, nutrition education and supplements, as well as pre-school activities.

Under the Ministry of Health and Family Welfare, the Accredited Social Health Activist (ASHA) is a community health worker of the public health system, one assigned for each village. She is trained to be a health educator, and promotes health planning and utilization of public health facilities.

The Auxiliary Nurse and Midwife (ANM) is a trained health worker providing child health service and primary curative care to villagers including immunization, health check-ups, and referral services. AWWs, ASHAs and ANMs work together to provide MNCHN-related services at the village level and report the ground status on health upward.

Figure 3: CCS: modules and applications

FLW
- Name-based registrations
- Home visit scheduler & task manager
- Client interaction and counseling
- Client event management
- Immunization due list
- Child growth monitoring
- Preschool activities
- Take home ration
- My performance
- Sync with my partner

Supervisor
- Indicator-based review
- Real-time data compilation and analysis
- Drill down reports up to FLW and beneficiary level
- My area performance
As a key innovation and a transformative technique, CCS leverages mobile phones to replace current systems and ways of working both for FLWs and their supervisors, while improving health service delivery to communities. It addresses some of the most critical current challenges in the provision of healthcare as indicated in Table 1.

**Table 1: Health services challenges met by CCS**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Current System and Challenges</th>
<th>Improvement through CCS mHealth Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data digitization</td>
<td>Digitization occurs at the block level after about 40 days of paper recording in the field</td>
<td>Digitization begins at the village level</td>
</tr>
<tr>
<td>Health information system</td>
<td>Collection of data at the village level is time-consuming and often inaccurate</td>
<td>Accurate and timely collection of data with ease</td>
</tr>
<tr>
<td>Field-level capacity</td>
<td>Limited due to work overload and insufficient training opportunities</td>
<td>Strengthened due to better work coordination, easy access to health counseling content on mobiles, and increased supportive supervision</td>
</tr>
<tr>
<td>Supervisory support</td>
<td>Difficult and delayed response due to lack of timely access to data</td>
<td>Easy due to real time monitoring by decision-makers and better coordination among FLWs and supervisors</td>
</tr>
<tr>
<td>Service providers’ motivation levels</td>
<td>Low due to overburdening and poor achievement of work goals</td>
<td>High due to improved capacity, community acceptance, and evident improvements in health</td>
</tr>
</tbody>
</table>
CCS is Unique and Effective

Simple yet highly effective, CCS is thus creating a new paradigm in delivery of healthcare services in rural areas of Bihar. Elements and features that make CCS unique and effective include:

- **Comprehensive and integrated health service package:** CCS is designed to ensure continuous health services, from the start of pregnancy until the child is two years old. Women and children are covered throughout this continuum for maximum impact on their health. Its supervisory and managerial applications make it a complete solution, supporting decision-making and supervision of healthcare services. Home visit planners and schedulers, as tools, help FLWs to conduct timely home visits to provide critical and relevant health services.

- **Equipping FLWs, the most critical link in health service delivery:** FLWs are the closest link to families for health service and advice. Decision support tools, such as clinical protocols and algorithms, aid them in educating and positively influencing mothers and families. Counseling is personalized, based on the beneficiary’s need, and designed to aid FLWs in advising beneficiaries in a logical step-by-step manner. With the latest field updates at their fingertips, supervisors are better placed to support and guide FLWs.

- **Empowering FLWs:** A field-level cadre with weak capacity seems transformed over a short period of 16 months. FLWs’ confidence levels are high, they are more effective in health services delivery, and the community and the supervisors recognize their contribution. The mobile is a FLW’s status symbol and healthcare tool, enabling her to convince families to adopt good health practices. She is able to connect with supervisors more confidently and seek their support.

“Home visits are more exciting with this mobile.”
FLW, Bargaon

“I don’t need to remember everything. It (the mobile) guides me on what to discuss.”
AWW, Agwanpur

“I feel proud using this with women in my village. It increases my value in their eyes.”
ASHA, Nado
Partnering with FLWs for technology solution: The CCS application’s user-friendly design is the result of close engagement between FLWs and technology providers facilitated by the CARE team. The language used, navigation logic, and content elements have all been created with and for FLWs. The design exercise involved several iterations, included pre-testing, followed by intensive training for users.

Change is evident in improved healthcare behavior: Several intermediate-level healthcare and nutrition indicators show impressive progress since CCS was launched. For instance, on an average, only 37 percent mothers were visited at least twice at home by any FLW during the last trimester of pregnancy in Saharsa. However, in the CCS blocks, over 88 percent of mothers were covered between June and August 2013. Over the same period, FLWs were also able to visit more newborn children and their mothers. Women avoid deliveries without a skilled attendant at hand. Pregnant mothers encourage FLWs to convince their husbands and mothers-in-law of the value of family planning by showing related videos on their mobile phones.

“We are able to complete substantial work in a short time.”
FLW, Nariyar

“My ability to convince mothers has improved greatly with the mobile phone.”
AWW, Barasher
Moving Forward

Government Leadership to Scale up CCS Statewide

From the very beginning, CCS benefited from close engagement with GoB and its supportive environment. Its potential for statewide applicability is enhanced by its alignment with MCTS in Bihar and demonstration of its effectiveness in one of the most difficult areas of the state. In September 2013, the Bihar State Cabinet decided to invest over US$20 million to scale up the benefits of CCS throughout the state, working with 100,000 FLWs to reach a population of 100 million.

CARE is excited to work with GoB and other partners for transforming the landscape of frontline service delivery to achieve health and nutrition goals in Bihar through effective mHealth solutions. CARE will remain committed to supporting GoB by building strong partnerships with various partners and stakeholders to usher in next generation of mHealth applications.

Hindustan – a daily leading daily of India – edition of September 25, 2013 reporting Government of Bihar's announcement to scale up mhealth intervention with all AWWs across Bihar.
CARE has been working in India for 60 years, focusing on ending poverty and social injustice. We do this through well-planned and comprehensive programmes in health, education, livelihood and disaster preparedness and response. Our overall goal is the empowerment of women and girls from poor and marginalized communities leading to improvement in their lives and livelihoods. We are part of the CARE International Confederation working in 86 countries for a world where all people live in dignity and security.

Photo Credits: IFHI Team, Bihar, CARE

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