

## Operations Research Brief



Credit: Gaher Mateen.

A community health worker uses a mobile phone application to facilitate discussions with her client.

### Key Findings:

- The use of cell phones by community health workers (CHWs) with a Home Based Life Saving Skills application, and as part of a broader maternal and newborn care strategy, improved women's health knowledge and use of health services.
- As a job aid, mobile technology spurred interest among women to learn from CHWs, facilitated counseling, and enhanced CHWs' credibility with clients.
- As a communication tool, use of mobile phones helped coordinate referrals to health facilities and delivery of medical supplies.

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## Mobile Technology Strengthens Behavior Change Communication and Referrals by Community Health Workers for Maternal, Newborn, and Child Health in Rural Afghanistan

*This four-year project (2008-2013) tested the innovative use of mobile technology by community health workers (CHWs) within a broader community-oriented approach to improve care-seeking behavior and use of services by pregnant and postpartum women, their families, and communities.*

### The Challenge

In war-torn Afghanistan, rates of maternal mortality (460 per 100,000 live births) and neonatal mortality (25 per 1,000 live births) are among the highest in the world, according to the World Health Organization and to Demographic and Health Surveys. Women have limited access to maternal and newborn care services, linked to geographic barriers, security problems, and cultural concerns about women leaving the home without a male companion and women receiving care from male health workers. Despite investments to improve quality of maternal and newborn care in health facilities, women commonly deliver at home and fail to access health care, even when faced with danger signs.

### Programmatic Context

World Vision and its partners designed a mobile health innovation and implemented a research study in Herat Province, Afghanistan, nested within the broader Better Health for Afghan

*CHWs provide an important link between households and health care facilities.*

Mothers and Children (BHAMC) project, which aimed to improve maternal, neonatal, and child survival. BHAMC reached 36,200 children under five years old and 45,250 women of reproductive age in 74 villages across four districts of Herat. See Box 1 for a description of the comprehensive maternal and newborn care approach. An important component of the strategy was enlisting a network of CHWs and community leaders to: strengthen linkages of households and communities to health posts, hospitals, and skilled providers; improve health behavior; and provide basic lifesaving care within the home and community using Home Based Life Saving Skills (HBLSS).

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## BOX 1. Project Components by Study Group

### Comprehensive Maternal and Newborn Care Approach (Intervention and Comparison Groups)

- Mobilizing leaders from health *Shuras* (community committees formed to address thematic issues such as health and water and sanitation), communities, and families to use maternal and newborn health services using the *Home Based Life Saving Skills* approach (see Box 2). This process was led by family health action groups—groups of volunteer women who, along with the CHW, lead public health efforts in their communities and form a support system for CHWs. CHWs delivered sets of maternal and newborn health messages to caregivers and other decision-makers in the family at scheduled times during pregnancy and the first two years of a child's life.
- Improving newborn care in facilities with the *Baby-Friendly Hospital Initiative*.
- *Rehabilitating moderately malnourished children* using the Positive Deviance (PD)/Hearth method and *improving infant feeding practices* through household-level dialogue and negotiation using timed and targeted counseling.
- Improving capacity of CHWs to *manage diarrhea and pneumonia*.
- Increasing the reach of preventive care by facilitating outreach campaigns to remote locations.

### Additional mHealth Application (Innovation Intervention Group Only)

- **Mobile phone HBLSS modules for CHWs** to counsel pregnant women about antenatal and postnatal care; birth preparedness (transportation, saving money, coordination with health facility for delivery, essential newborn care items); danger signs during pregnancy, labor, and delivery; benefits of facility deliveries; and caring for a newborn; as well as an algorithmic tool to prompt CHWs to identify emergencies that require referral. For more information see <http://www.mhealthworkinggroup.org/resources/better-health-afghan-mothers-and-children-project>.
- **Mobile phone referral application** to help CHWs link women in labor to a skilled provider at the nearest facility.

## Innovative Interventions Tested

The study tested the feasibility, applicability, and effectiveness of CHWs using the HBLSS modules (see Box 2) on a mobile phone instead of standard paper materials to facilitate counseling and referrals as part of the comprehensive maternal and newborn care approach (see Box 1). The mobile phone intervention was introduced in five remote villages of Karukh District, with five other villages in the same district serving as comparison sites. A total of 10 CHWs working in male-female teams to make home visits culturally acceptable (one pair per intervention village) received mobile phones loaded with airtime and an application to facilitate counseling and referrals.

World Vision worked with the software consultancy firm Dimagi to adapt its software application CommCare™ and develop two counseling modules for CHWs based on HBLSS—one for antenatal care and one for postnatal care. The modules were developed in Dari, the local language, in visual and audio formats. The project also set up a database at the BHAMC office and at World Vision headquarters to access the data in real time.

The BHAMC project worked with Operations Mercy in Kabul on the adapted HBLSS, which was renamed as Birthing Life Saving Skills (BLISS) (<http://www.mercy.se/en/projects/afghanistan/bliss-national-program>). BLISS content was the same as in the HBLSS Training Manual but with the replacement of the term “home-based” with “birthing.” This also enabled the training of health workers in health facilities. The training targeted mainly female CHWs but the module also helped train and engage men to support CHWs in HBLSS.

When CHWs visited pregnant women, they used the mobile phone application to facilitate discussions about maternal and newborn health issues. After the CHWs discussed specific actions with the pregnant women, they uploaded information about the women's pregnancies to the mobile phones for record-keeping, reporting, and follow up. When a woman went into labor, the CHWs made a referral call linking the woman's family with a skilled provider at the nearest facility.

**BOX 2.**  
**Home Based Life Saving Skills (HBLSS) Approach**

The materials used in the mHealth application were adapted from the HBLSS modules of the American College of Nurse-Midwives (see <http://www.midwife.org/Home-Based-Life-Saving-Skills-HBLSS>). HBLSS is a family-focused, community-based program to reduce maternal and neonatal mortality by increasing access to basic lifesaving care within the home and community and decreasing delays in reaching referral facilities where life-threatening problems can be managed. The approach supports birth preparedness and encourages involvement of decision makers in making timely decisions. The HBLSS training program is a competency-based training intervention for women and men in the community, emphasizing the importance of community problem identification, problem-solving, negotiation, and respectful consideration of existing solutions before attempting to integrate biomedical practices.

**Research Methodology**

The study used a pretest/posttest design with baseline (2010) and endline (2012) household surveys, with Institutional Review Board clearance, in the five intervention (mobile technology application with HBLSS content) and five comparison (HBLSS paper materials) sites. All intervention and comparison sites were part of the comprehensive maternal and newborn care approach (see Box 1). Both surveys had a total sample size of 206 mothers of children aged 0 to 23 months (103 each from intervention and comparison sites). In addition, focus group discussions were conducted in February 2013 with seven CHWs and eight Shura (village health committee) members from the intervention area. Chi square test statistics were used to analyze changes that could be associated with using CommCare with HBLSS. Heightened security challenges resulted in study limitations including implementation delays, small sample sizes, and a limited follow-up period.

**Research Findings**

After 20 months of implementation, mothers in the intervention areas were significantly more likely than mothers in the comparison areas to have developed a birth plan (76% vs. 63%); to have had at least one antenatal care (ANC) visit (73% vs. 53%); and to know at least two danger signs during pregnancy (71% vs. 58%) (see Table 1). In addition, mothers in the intervention group were significantly more likely than mothers in the comparison group to have had a CHW coordinate referral to a facility (17% vs. 5%). A higher proportion of mothers in the intervention group than in the comparison group also delivered in a facility (58% vs. 47%), but the sample size was too small to detect statistical significance.

Focus group discussions with CHWs and Shura leaders revealed that use of mobile technology supported and improved the quality of CHWs' work:

- CHWs noted that it was easy to use the mobile phone and to engage mothers during counseling sessions. This enhanced knowledge transfer because the mothers were enthusiastic to hear the voice messages and to learn directly from the visual messages on the CHWs' phones.

**TABLE 1.**  
**HEALTH-RELATED OUTCOMES AT ENDLINE,**  
**BY STUDY GROUP (%)**

Outcome	Intervention (n=103)	Comparison (n=103)
<b>Any ANC visit*</b>	<b>73</b>	<b>53</b>
2 or more ANC visits	50	45
4 or more ANC visits	18	17
Received iron supplements	64	50
<b>Developed a birth plan*</b>	<b>76</b>	<b>63</b>
Saved money	50	44
Arranged transport	27	22
<b>Coordinated with health facility*</b>	<b>17</b>	<b>5</b>
Delivered in facility (assisted by doctor, nurse, or midwife)	58	47
<b>Knows 2 or more pregnancy danger signs*</b>	<b>71</b>	<b>58</b>
Knows 2 or more newborn danger signs	95	95
Had a postnatal visit	39	39
Initiated breastfeeding within 1 hour of birth	81	72
Any CHW visit	54	51
2 or more CHW visits	43	49

\* Differences between intervention and comparison groups were statistically significant at P < .05.

- CHWs used the mobile phones to coordinate delivery of needed medical supplies, especially during winter months when regular delivery is difficult. The CHWs also used mobile phones to follow up on health emergency cases that they had referred to facilities, which reinforced mothers' trust and confidence in the CHWs with mobile phones.

In sum, study findings indicate that mobile technology supports CHWs in their daily activities of coordinating referrals and interacting with and counseling clients in remote communities, which enhances the credibility of CHWs with clients. The data also indicate that mobile technology can improve health knowledge and behaviors of clients, including knowledge of pregnancy danger signs, development of birth plans, and promotion of ANC visits, and can potentially increase deliveries at facilities.

## Recommendations and Use of Findings

**Using mobile health technology to enhance communication within a family-focused, maternal and newborn health care approach is a promising strategy for addressing geographical and cultural barriers that impede access to basic health care services in Afghanistan and similar post-conflict settings.** Findings from this pilot study demonstrate that equipping CHWs with a locally customized mobile application for counseling and referrals is feasible, affordable, and highly acceptable among rural Afghan women and that it improves their health knowledge and behavior. The particular mobile application used in this study combined the functions of a job aid, communication tool, and monitoring system, which can improve multiple aspects of an intervention that seeks to improve demand for maternal and newborn health services. The monthly expense to operate each mobile phone (for both Internet connection and voice calls) was very low (about US\$2/month).

The newborn health and postnatal care areas show persistent challenges in the application of HBLSS, and subsequently are in need of further research. Mounting evidence seems to point to adapting

existing content that is focused on promising community approaches to mobile technology platforms to improve the role of CHWs and communities in facilitating behavior change. World Vision's MOTECH Suite ([www.motechsuite.org](http://www.motechsuite.org)) provides nutrition modules for growth monitoring and promotion and Positive Deviance (PD)/Hearth, which have been rolled out in Sri Lanka and Indonesia.

This initiative was the first in Afghanistan to use mHealth to strengthen health programs, catalyzing subsequent efforts including the Maternal and Under-5 Nutrition and Child Health Project (MUNCH), funded by the Canadian-led Muskoka Initiative, in the three provinces of Herat, Badghis, and Ghor. In addition, World Vision is using this experience to strategically align mHealth across a wide range of programs, leveraging new and existing collaborations and public-private partnerships at the global level. In several countries, World Vision is integrating mHealth into existing health programs with Ministries of Health, is in related dialogue with national telecommunication regulators, and has forged or is in process of negotiating agreements with mobile network operators.

### RECOMMENDATIONS:

- This project trained and supervised a very small number of CHWs; expanding the project will require careful documentation of the design and process of training and supervision of CHWs, including costs.
- Harmonizing CommCare™ data with the district-level health information system is another consideration for further expansion of the model. CHWs reported that they were able to use the application to upload information to the central database. However, the added value of having real-time information as opposed to paper-based data at the end of the reporting period is not clearly known.
- Similar studies with larger sample sizes and that include cost analysis should be conducted to build more evidence on the value of using mobile technology in community health promotion strategies, especially in post-conflict settings.

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For more information about BHAMC and the pilot CommCare intervention, contact Dennis Cherian at [DCherian@worldvision.org](mailto:DCherian@worldvision.org). Also see the BHAMC Final Evaluation (including the Operations Research report) at [http://www.mchipngo.net/documents/cs\\_dox/WV/Afghanistan/24/FINAL/WV\\_Afghanistan\\_FE.zip](http://www.mchipngo.net/documents/cs_dox/WV/Afghanistan/24/FINAL/WV_Afghanistan_FE.zip). For information about World Vision programs in Afghanistan, see <http://www.wvi.org/afghanistan>.