

Global mHealth Report

Foreword

World Vision has a long history of partnering with communities worldwide to end preventable deaths and improve the health and nutrition of women and children. As we look forward to our seventh decade, I am proud of our efforts to put innovation to practical use when we support programme effectiveness with mobile technology. This report tracks our efforts in 2017 to show how equipping Community Health Workers (CHWs) with technology tools can help them do their work better and faster and at scale. This exciting approach reminds us of what is possible when we combine innovation with a focus on serving the poor and marginalised. I want to thank our donors, partners and staff for their passion to ensure that vulnerable children everywhere are given the opportunity to grow and thrive for years to come.



DANIEL IRVINE,
Senior Advisor External Engagement
for Health and Nutrition
(Acting Partnership Leader during 2017),
World Vision International

Global Reach

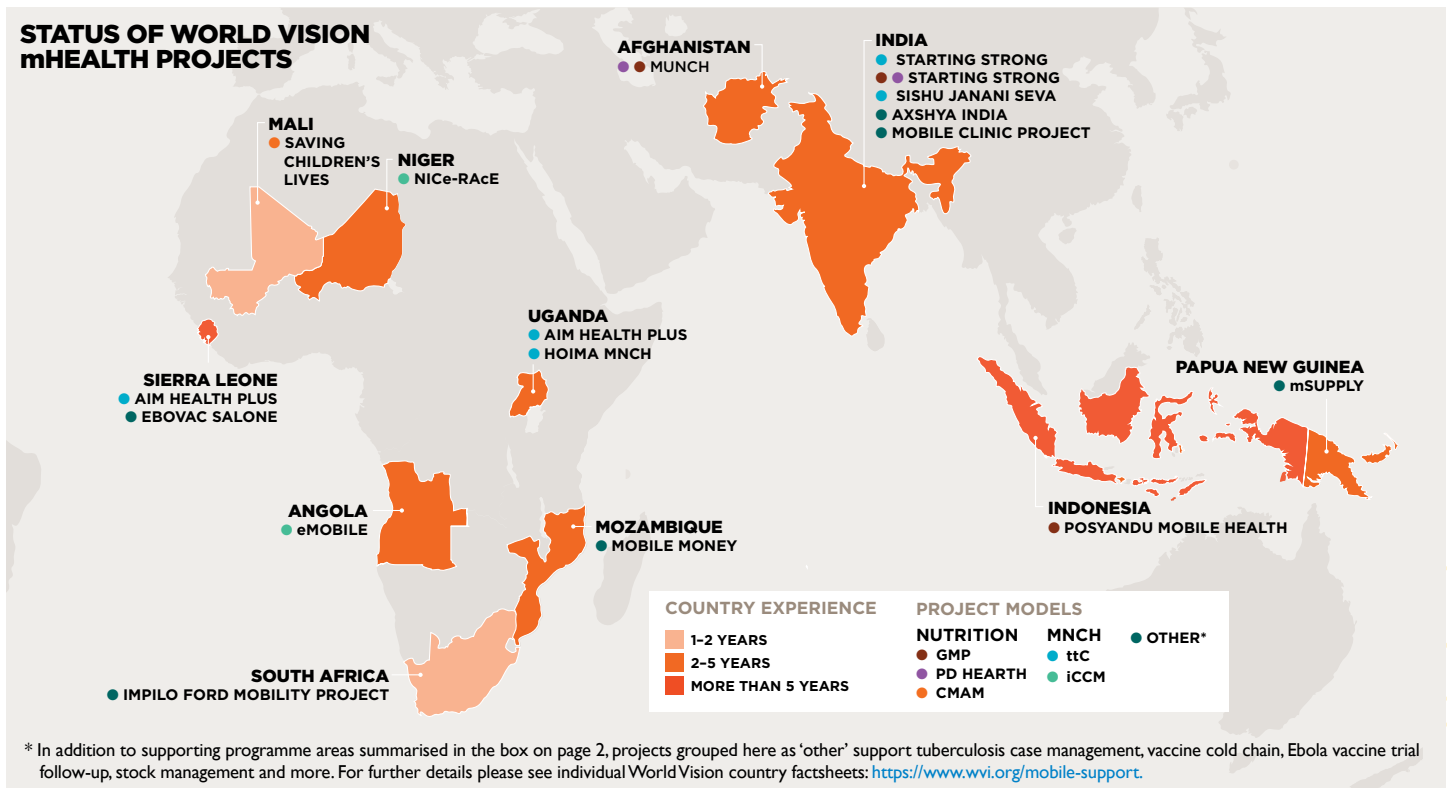
World Vision has been a leader in the mHealth sphere for just over a decade, advancing tools to reduce preventable death and disease among women and children in the developing world. In 2017, World Vision's global mHealth portfolio continued to consolidate as some projects

concluded, some laid the necessary groundwork to bring solutions to scale, and others prepared to launch new projects. With 13 active deployments supporting CHWs and another 4 working to improve health at a community level, World Vision is leveraging the potential of information and communications technology (ICT) across 11 countries in Africa, South Asia and Southeast Asia.

WORLD VISION'S GLOBAL mHEALTH INITIATIVES AT A GLANCE

- 11 COUNTRIES
- 17 PROGRAMMES
- 3,003 ACTIVE CHW¹ USERS
- 463,565 BENEFICIARY COMMUNITY MEMBERS

STATUS OF WORLD VISION mHEALTH PROJECTS



* In addition to supporting programme areas summarised in the box on page 2, projects grouped here as 'other' support tuberculosis case management, vaccine cold chain, Ebola vaccine trial follow-up, stock management and more. For further details please see individual World Vision country factsheets: <https://www.wvi.org/mobile-support>.

1 For the purposes of this report, *Community Health Worker* (CHW) is used to describe a broad range of frontline health workers or health extension workers. In all cases this is taken to mean personnel who have a primary focus on delivering promotive, preventive and sometimes curative health services via home visits or at a central community non-clinic location.

The size and experience of these deployments vary from smaller, newer projects designed as a ‘proof of concept’ (for example, in Mali and South Africa) to more established, larger projects with scale-up potential in India, Sierra Leone and Uganda. **(See map and Figure I)** Although the focus continues to be on supplying CHWs with cell phones to support their service for pregnant women and caregivers of infants and young children, the portfolio includes a growing number of other types of ICT projects – for example, customised vehicles to ensure vaccine cold chain in South Africa and iris-scan technology to track Ebola vaccine trial participants in Sierra Leone.

CULTURE OF LEARNING

AS GLOBAL HEALTH and development sectors adopt more IT-enabled solutions, there is a growing demand for evidence of what works and why. Activating fast learning cycles while keeping an eye to continuous quality improvement is foundational to achieving operational and financial sustainability.

The majority of World Vision programmes fall within five key programmatic approaches **(Box 1)**. Although a growing set of innovative technology solutions are being tested as a means to enhance health and nutrition intervention delivery, the most common solution in use is the CommCare application **(Figure 1)**. The intent of promoting the use of the CommCare application is to leverage ongoing investment and partnership with solution provider Dimagi to establish common technical requirements for each of the five key programmatic areas. These common requirements provide a reliable and affordable platform to support contextualisation for applications in each setting. In practice, while delays in the contextualisation process for the common platform can cause challenges, the rationale behind this approach has been borne out in the field, as several project teams have successfully used a consistent system that can be adapted to meet local needs and aligned to government standards.²

This report offers a broad overview of the types of evidence-building activity occurring across World Vision’s mHealth portfolio. First, we describe how process evaluation is being used in Uganda and Sierra

² See <https://www.ennonline.net/fex/54/mobilehealthapp>

Leone to track the acceptability of an mHealth solution. We share preliminary results of an implementation research project in Niger to quantify the value of mHealth used by CHWs trained to treat the most common causes of death in children. We then highlight the value of formative research to tailor the local configuration of World Vision’s CommCare platform in the context of Irish AID grant-funded sites in Mauritania and Tanzania, where new mHealth deployments will come online during 2018. Finally, we summarise the results of a formal exercise to assess scalability of World Vision’s more mature projects.

Beneficiary Receptivity to mHealth Uganda and Sierra Leone

The Access – Infant and Maternal (AIM) Health Plus programme supports CHWs in dozens of communities across four countries, providing behaviour-change counselling and care to beneficiaries. In both Uganda and Sierra Leone, CHWs have been trained in the use of mobile phones to facilitate their community-based work. Teams in both countries were interested in how beneficiaries receiving these services felt about the CHWs using mobile devices during their home visits.



AIM Health Plus, Uganda

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In 2017, we carried out a survey of beneficiaries in each country, including an assessment of their frequency of interaction with a CHW using a mobile phone and

BOX 1. FIVE PROGRAMMATIC APPROACHES SUPPORTED BY MHEALTH





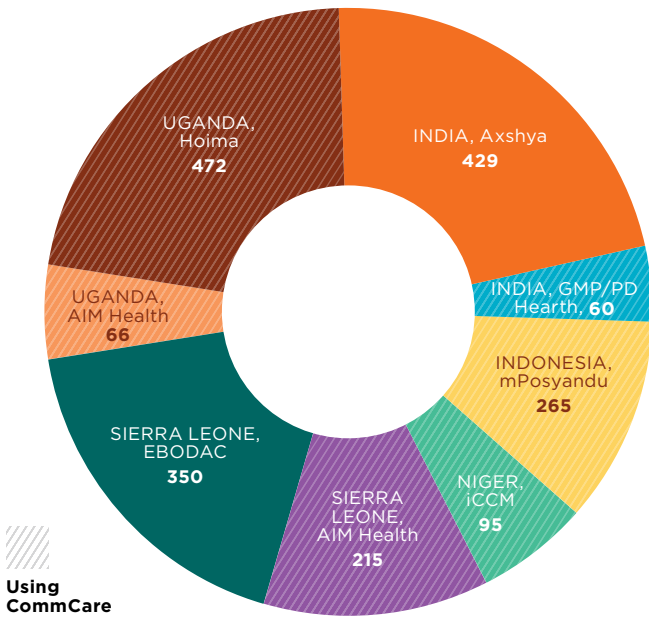
 CHW PROGRAMMING 		
TIMED AND TARGETED COUNSELLING Timed household-level behaviour-change communication methods	INTEGRATED COMMUNITY CASE MANAGEMENT Diagnosis and treatment of common childhood illnesses outside of the health facility	
 NUTRITION PROGRAMMING 		
POSITIVE DEVIANCE HEARTH Positive change in household-level dietary practice based on positive examples in the community	COMMUNITY MONITORING OF ACUTE MALNUTRITION Case finding, triage and treatment to rehabilitate severely and acutely malnourished children	GROWTH MONITORING AND PROMOTION Periodic anthropometric measurement of children under 5 and referral of cases of malnutrition

FIGURE 1. NUMBER OF USERS FOR MHEALTH PROJECTS WITH MORE THAN 50 USERS



their opinions of the technology. Because the mHealth component had already been initiated, beneficiaries with more frequent exposure to CHWs using phones were compared to beneficiaries with less exposure. Opinions reported by 300 beneficiaries, 179 from Uganda (Figure 2) and 121 from Sierra Leone (Figure 3), were used in this analysis.

With respect to views on whether CHWs with mobile phones were better able to provide health information and to help beneficiaries get care at a health facility, there were no differences between the two groups. However, the majority of respondents, regardless of exposure to mHealth, believed that the new technology helped CHWs to perform their roles. In both countries, a high number of beneficiaries reported feeling generally concerned about the information entered on the phone, with little differentiation between the two groups. At the same time, there was no difference between phone vs. paper data-collection systems with respect to this issue, suggesting a general concern for information security rather than a worry about the means of capture.

In Uganda, beneficiaries who had more exposure to mobile-enabled CHWs were more certain in how confident they were regarding the use of the devices (less frequently neutral and generally more positive views in the high- vs. low-exposure groups). In addition, beneficiaries who had higher exposure to mHealth-equipped CHWs were less distracted by the phones than were beneficiaries in the other group, suggesting increased comfort with their use. This increasing comfort with the technology is also evident in Sierra Leone, where those with higher exposure were more likely to say that they strongly agreed with the statements around improved CHW ability to share information and make referrals.

Overall, the lack of significant differentiation between frequently and rarely exposed respondents in terms of their perception of potentially positive attributes of mHealth suggests that community members are generally open to the use of phones by CHWs. Yet results also suggest that mHealth projects should be sure to orient beneficiaries and communities as mHealth is being rolled out, particularly in consideration of anxieties around

FIGURE 2. UGANDA: OPINIONS OF BENEFICIARIES WHO HAD MORE FREQUENT (BLUE BAR) AND LESS FREQUENT (BROWN BAR) EXPOSURE TO CHWS USING MOBILE PHONES

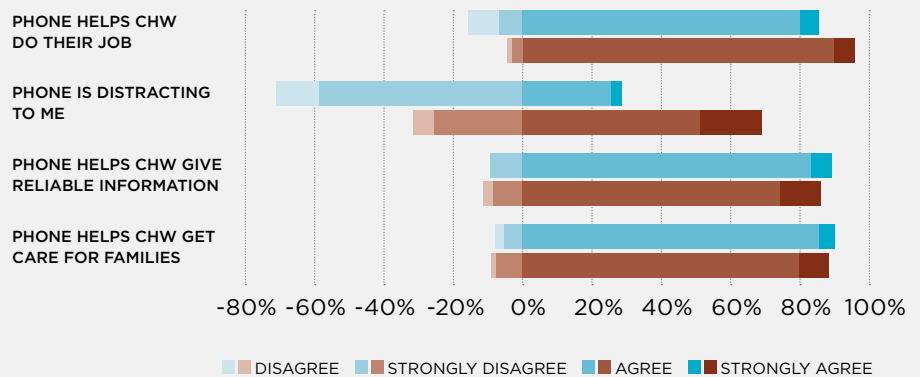
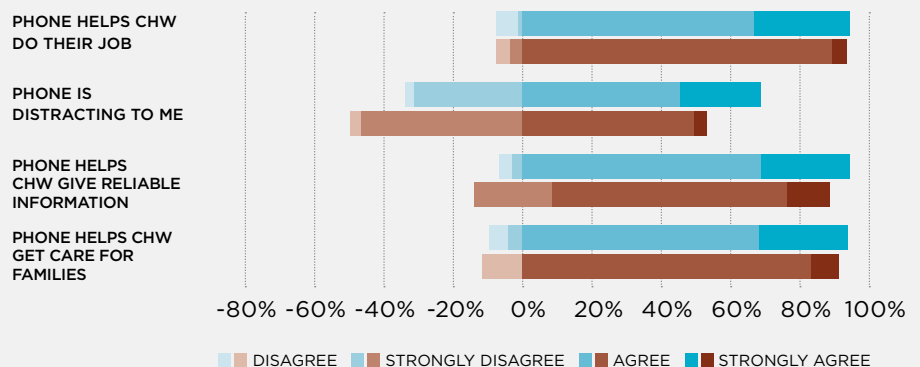


FIGURE 3. SIERRA LEONE: OPINIONS OF BENEFICIARIES IN SIERRA LEONE WHO HAD MORE FREQUENT (BLUE BAR) AND LESS FREQUENT (BROWN BAR) EXPOSURE TO CHWS USING MOBILE PHONES



data security. By exploring these patterns more deeply, we learn that there is general receptivity on the part of community members and areas where the acceptance and perceived benefit can be enhanced or concerns reduced.

Preliminary Results from a Randomised Controlled Trial of mHealth Support for iCCM

Niger

World Vision is wrapping up a five-year project funded by the World Health Organization to demonstrate the effectiveness of Integrated Community Case Management (iCCM) in Niger. This WHO-endorsed approach equips CHWs to diagnose and treat common childhood illnesses in the community and refer ill children promptly to a nearby health facility. As part of the larger project, World Vision chose to examine the value of mobile technology to support delivery of iCCM; the application used was a contextualised version of the CommCare application.³ This work was led by academic partners at Ryerson University in Toronto, Canada.

The central research question was, ‘Would Nigerian Community Health Workers, referred to as “Relais Communautaires” or “RCom”, be able to deliver the service more effectively when equipped with the CommCare solution, and, secondarily, how could this tool be improved?’

For this study, 126 RCom were identified and assigned to two groups; 63 received smartphones with the CommCare solution, and 63 did not. All RCom in the study were assessed to determine how well they assessed and diagnosed a total of 554 sick children aged 2 to 59 months, gave appropriate treatment and took appropriate follow-up action, including referral of severe cases to the health facility.

Although more rigorous analyses are pending, these preliminary results illustrate both the many facets of how mHealth is potentially linked with health outcomes and the challenge of interpreting mixed results.

³ For a more complete description of this global partnership between World Vision and its solution provider Dimagi, see our 2015 global report at <https://www.wvi.org/health/global-mhealth-report>.

RCom who received mobile phones performed better in several areas while also falling behind or in line with their counterparts with respect to others. For most measures of diagnosis and treatment of pneumonia, malaria and diarrhoea, there was no significant difference comparing RCom using phones to the control group. These areas include clinical situations such as ensuring that children with diarrhoea received zinc and oral rehydration salts and that a child with fast breathing received an antibiotic. RCom with phones more reliably screened for general danger signs, with a significant difference in the proportion of children screened for convulsions, vomiting, lethargy and capacity to drink or feed (Figure 4). A similar, albeit not statistically significant, difference was seen in the proportion examined for cough, diarrhoea and fever and in the RCom’s ability to treat and correctly refer to a health facility for conditions they were trained to address. However, while there was no

FIGURE 4. NIGER: PROPORTION OF CHILDREN SCREENED FOR A RANGE OF ILLNESS SIGNS AND SYMPTOMS COMPARING MOBILE-PHONE-ENABLED RCOM WITH CONTROL GROUP.

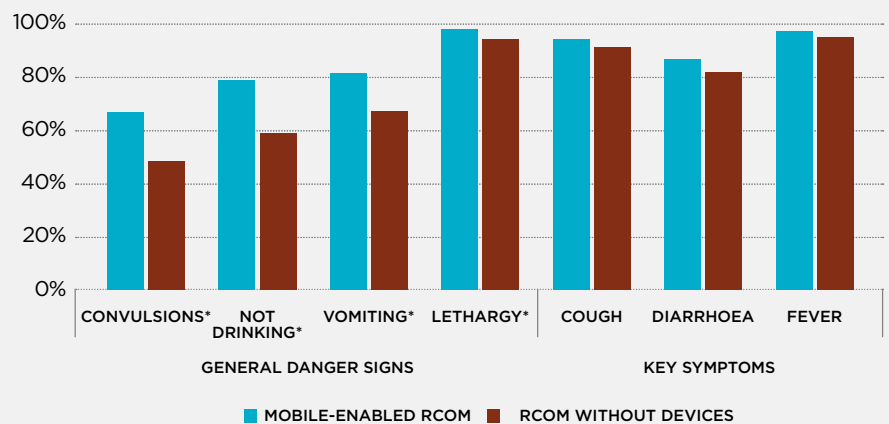
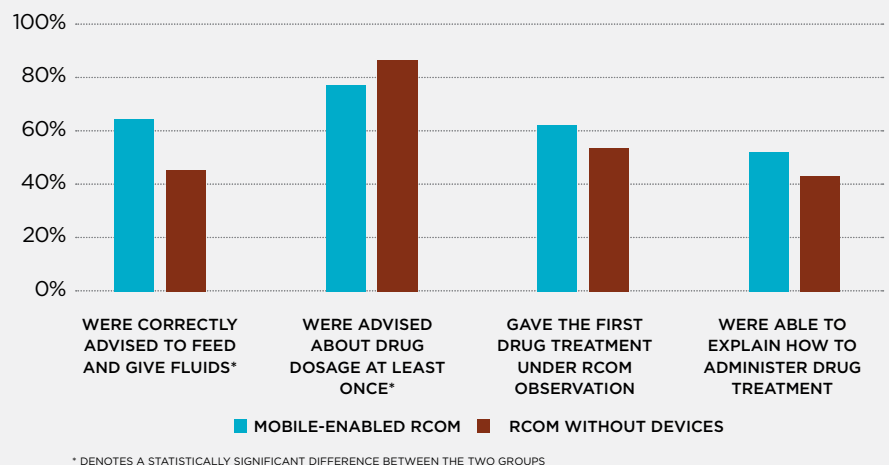


FIGURE 5. NIGER: PROPORTION OF CAREGIVER-RELATED EVENTS COMPARING MOBILE-PHONE-ENABLED RCOM WITH CONTROL GROUP.



difference for most symptoms, when children presented with fast breathing or with blood in stool, two of several symptoms, RCom without devices were significantly better at arriving at the same diagnosis than was a clinical observer. These patterns reflect no consistently beneficial effect of phone use in support of the diagnosis and treatment of the three priority childhood illnesses.

Counselling quality is an area that further illustrates the complexity of these results. While those with mobile phones were more likely to correctly advise for fluids and feeding during illness, those in the control group were more likely to give advice about dosage and treatment of antibiotics for respiratory infection or use of oral rehydration salts plus zinc for diarrhoea (**Figure 5**). Despite this, RCom with phones were significantly more likely to oversee caregivers giving the first treatment dose, and caregivers slightly more frequently remembered how to administer medication to the child. Beneficiaries also reported no difference in their generally favourable appreciation of the care they received. While these findings were mixed, it is also unclear how supervision and continuing education may have played a role.



NiCe-RAcE, Niger

This study presents an important and rigorous investigation of how mobile phones may or may not support iCCM programming. The findings are encouraging in regard to certain elements, such as screening children and advising caregivers, but are mixed or discouraging for others, such as giving caregivers advice on treatment dosage. At the same time, these results raise the question of whether identified gaps in mHealth solution performance can be addressed. In addition, the evaluation shows the value of academic partnerships as we undertake research to assess the value of mHealth solutions.

With the formal release of study findings, iCCM programme managers have the opportunity to reassess the role of mHealth as they support CHWs to deliver high-quality clinical care to infants and young children facing life-threatening illness in Niger.

'PHONES HELP US BETTER DIAGNOSE' —THE COMMUNITY HEALTH WORKER'S PERSPECTIVE

'AS A RELAIS COMMUNAUTAIRE, I work in my community to manage simple cases of disease among children. I was selected to be trained to use a mobile phone as part of improving the quality of case management for these children and also providing data to make decisions. The phones mean that we can lower the risks for the children we examine because [the phones] help us think about every possible situation and the symptoms we might observe. Phones help us better diagnose and treat sick children in the communities we serve. We

have also seen that mothers or caregivers have more confidence when we use this technology with them. The phones make them more comfortable and allow us to give them better advice on how to take care of their children. Although there are sometimes challenges with the internet connection, mobile phones have helped us to improve our service and make a difference in curing children who suffer with diarrhoea, malaria and pneumonia.'

MORI KANE,
Relais Communautaire for Guezanya village, Dosso, Niger

Use of Formative Research to Design mHealth Projects Mauritania and Tanzania

With mHealth innovation in support of programmes growing in importance, careful planning in new country contexts is key. A formative research process to assess the mHealth landscape and challenges in new settings helps to set the stage for a healthy progression to project maturity.

World Vision's AIM Health Plus project will support new mHealth deployments in Mauritania and Tanzania in conjunction with their maternal, newborn and child health and nutrition programmes. In both countries, teams recently undertook assessments of potential challenges and opportunities in the context of the national eHealth ecosystem. Although field staff in Tanzania were familiar with digital health tools, their counterparts in Mauritania were generally unfamiliar with them. In both contexts, health-facility staff and CHWs were comfortable using basic mobile phones, but power was a concern due to lack of reliable national grids and reliance on solar charging. In both countries, network availability varied across sites served by competing mobile network operators. In Mauritania, interviews with CHWs revealed that their smartphone experience and understanding of mobile data

usage was extremely low, with most individuals' experience limited to voice and some SMS texting.

Based on this formative research, project plans have been revised. For example, a strong understanding of the challenges, particularly infrastructure and logistic concerns, will ensure that the right equipment is prioritised for procurement by project teams. Other aspects of the assessment will guide adaptation of the CommCare application, such as language selection and how to align to Ministry of Health monitoring indicator frameworks and information systems. A profile of CHW and health-facility staff capacity will help refine their training curriculum, emphasising the need for teaching basic smartphone skills and establishing a clear agreement of responsibility on device ownership and use. Investment in tailored formative research will position Mauritania and Tanzania teams to launch robust mHealth programmes in 2018.

Ensuring Scalability

India, Sierra Leone and Uganda

World Vision's mHealth projects around the globe are at different stages of maturity. Unfortunately, it is all too common for projects to reach the 'proof of concept' stage yet terminate well before showing reliable coverage of a suitable administrative unit, such as a district or province. Bridging the gap to integrate (i.e. share information with national health information systems) can prove elusive. As projects approach this transition stage, one of the questions is the viability of scaling up and achieving integration while contributing to a strengthened health care system.

In partnership with Johns Hopkins University, during 2017 World Vision conducted the first known multi-country assessment of mHealth-supported health and nutrition programmes using the structured framework offered by the MAPS (mHealth Assessment and Planning for Scale) Toolkit.⁴ A fellow from Johns Hopkins worked with World Vision teams in India, Sierra Leone and Uganda to perform the

assessment. Data collection included interviews and focus groups with CHWs (as primary technology users) as well as with World Vision staff and external stakeholders in both government and partnering NGOs. The toolkit assesses strengths and weaknesses of a project across multiple areas, called 'axes' (including partnerships, technology and architecture, and financial health among others).



Axshya India, India

Following the exercise, each team received individual feedback to inform decision-making towards the scale-up process (**Figure 6**). In Uganda, assessment scores were high for nearly all axes (an average of 83 per cent), which reflects careful planning, thoughtful partnerships with other stakeholders and thorough investment in operations and in monitoring and evaluation processes. Sierra Leone performed at a lower level in many axes but had a score of 85 per cent in the very important area of partnerships, the highest for any programme. The Sierra Leone programme offers a strong example of how a project can play to its strengths towards achieving a successful deployment and can offer many practical learnings in an area that is a challenge for other deployments.

In addition to highlighting strengths and gaps to chart a course forward, an examination of results from two deployments in India shows that the MAPS assessment should be timed to occur when the project can gain maximum benefit. During the assessment, the Bengaluru project was already well established, as evidenced by the highest groundwork score of any programme. With this and other areas already on solid ground, the results of the MAPS exercise were especially informative to the World Vision team, and a clear action plan emerged with relative ease. Conversely, the Narsinghpur project was in the process of restructuring and transitioning between technology solutions, which was reflected in a low technology and architecture score, resulting in a high level of financial uncertainty and the lowest financial health score of the three projects.

FIGURE 6: SUMMARY OF MAPS ASSESSMENT SCORES BY COUNTRY PROGRAMME

	SIERRA LEONE	INDIA BENGALURU	INDIA NARSINGHPUR	UGANDA
GROUNDWORK	70%	88%	77%	87%
PARTNERSHIPS	85%	77%	74%	84%
FINANCIAL HEALTH	78%	79%	56%	77%
TECHNOLOGY & ARCHITECTURE	59%	81%	71%	79%
OPERATIONS	63%	83%	66%	82%
MONITORING & EVALUATION	47%	89%	84%	87%

WORLD VISION IS VIEWED AS AN EXPERIENCED MHEALTH PARTNER

'WORLD VISION has been an integral partner to our digital health initiatives at the Ministry of Health of Uganda for many years. As we move towards broader implementation of these technologies, we've seen great value in learning from World Vision's experience, particularly in their widespread use of mobile phones at the community level. They have demonstrated on the ground that these programmes can work, providing evidence that helps us justify funding for eHealth

activities nationwide. I especially appreciate World Vision's capacity to implement mHealth in line with government priorities, which is a result of a long and fruitful partnership. I look forward to continuing our work together to find the proper role for digital health in achieving universal health coverage in Uganda.'

Dr Eddie Mukooyo,
Assistant Commissioner of Health Services,
Division of Health Information,
Uganda Ministry of Health

Dr Mukooyo was recently promoted to a new role as Chairman of the Uganda AIDS Commission

When the individual country reports were shared, each project team provided feedback on the process and MAPS results with reference to their identified strengths and weaknesses. Project teams were comfortable with the timing and implementation of the assessment, though one suggested multiple iterations over the life of a project. Teams reported that they were mostly aware of the weak areas within their projects but that the exercise informed prioritisation of needed adjustments and helped provide guidance on how to do so. On the other hand, nearly half of the project teams reported that they did not consider specific areas as strengths until identified by the assessment. Teams saw these successes both as validation of their accomplishments and as providing them with a basis to deepen collaboration and develop additional agreements with partners. Overall, the results were viewed very positively by teams who understood the high value of an outsider's point of view framed within a well-developed framework to identify areas to be addressed and leveraged.

The opportunity for exchange of learning across different programmes is self-evident. (See Figure 6) Partnership was a strength in Sierra Leone but was identified as an area for growth in other projects. Monitoring and evaluation systems were a strength in Uganda and a relative weakness for others. Continuing to offer

resources like the MAPS toolkit, tracking work towards achieving scalability, and facilitating knowledge sharing between projects are priorities going forward.

Building Towards Excellence

The assessment and evidence-building efforts described in this report have contributed to improvements in World Vision's mHealth programming. Internally, they enable a learning process for improved planning and continual improvement of projects that are in initial stages or in progress. These efforts are also contributing to a growing set of resources, ranging from individual assessments of programme quality to a wider analysis of programmes across multiple contexts.

Overall, this report presents a snapshot of digital health work undertaken by World Vision and its partners to innovate and improve programmes supporting women and children in the developing world. The constant evolution of technology-based solutions and growing trust in the infrastructure for their use requires that research and evidence gathering evolve in step while we maintain an eye towards consistency and quality. By leveraging high-quality measurement tools and engaging in building key partnerships with common goals, World Vision continues to demonstrate leadership in the digital health sphere.



mPosyandu, Indonesia

3 See mHealth Assessment and Planning for Scale Toolkit, World Health Organization (2015): <http://www.who.int/reproductivehealth/topics/mhealth/maps-toolkit/en/>.

World Vision is a Christian relief, development and advocacy organisation dedicated to working with children, families and communities to overcome poverty and injustice. Inspired by our Christian values, World Vision is dedicated to working with the world's most vulnerable people. World Vision serves all people regardless of religion, race, ethnicity or gender.

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For more information on individual country projects, including points of contact, see <http://www.wvi.org/mHealth>.

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