Harnessing mHealth to reach every woman, every child

World Vision®

The issues at a glance

- Hundreds of millions of people remain invisible to and unreached by health services; mHealth solutions offer the potential to bridge health information gaps and support health system strengthening by improving community health workers' knowledge and credibility, data quality, and coverage of and demand for essential maternal, newborn and child health services.
- For mHealth to deliver to vulnerable groups, it needs political backing, public–private partnerships that target extension of technology solutions, trained and resourced community health workers, and quality health infrastructure that reaches the most marginalised at the community level.
- World Vision calls on all mHealth implementers to ensure collection and use of disaggregated data, to develop and implement comprehensive eHealth policies and plans and to empower communities to count and reach the most vulnerable with high-quality, affordable and accessible health services.

Introduction

As a global community we have cause to celebrate the estimated 90 million children under 5 whose lives have been saved since 1990.[1] However, Millennium Development Goal (MDG) 4, to reduce under-5 deaths by two-thirds by 2015, remains unfinished, and for the more than 6 million children who die annually, we are already too late.[2] If we are to achieve MDG 4 and go beyond that to end preventable maternal, newborn and child deaths in the Post-2015 agenda, significant effort will need to be exerted to count the uncounted and reach the unreached.[3]

An estimated 250 to 500 million people remain invisible to and unreached by health, education and other social services, as outlined in World Vision's *More Than Numbers Report*.[4] Specifically, indigenous and ethnic minorities, refugees and displaced persons, child labourers and trafficked children, orphans, persons living with disabilities or in urban slums, and those unregistered at birth are among the invisible and most vulnerable. Every child has the right to be counted; the invisible deserve visibility; and the most vulnerable children deserve the opportunity to survive and thrive. How do we illuminate those still lost in the shadows? In the midst of the technological revolution, how are we using Information Communication and Technology (ICT) to count and reach the most vulnerable with quality, affordable health care?

> Every child has the right to be counted; the invisible deserve visibility; and the most vulnerable deserve to survive and thrive.

Annila Harris/World Vision

The global mHealth movement

Globally, there are over 6.8 billion mobile phone subscriptions, and mobile penetration rates stand at a staggering 96 per cent, including 89 per cent in developing nations.[5] The rapid expansion of mobile telecommunications has inspired the health sector to leverage this technology for efficient, effective, accountable and high-quality health service delivery – known as mHealth. Poised to tremendously improve the well-being of children, women and communities across the globe, mHealth has the potential to support trained health professionals, empower community health workers (CHWs), bridge gaps and strengthen health systems.

The mHealth movement has in part provided the impetus for the call by the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda for a

'data revolution', as well as the stimulus for the proposed target by the Open Working Group to 'ensure the availability of high-quality, timely and disaggregated data'.[6] Similarly, the independent Expert Review Group on Information and Accountability for Women's and Children's Health has appealed for a 'new movement for better data'.[7] In 2013, the UN Commission on Information and Accountability for Women's and Children's Health reported over 100 countries implementing mHealth methodologies, 56 per cent of which support maternal, newborn and child health.[8] Nearly half of these countries have a national eHealth policy or strategy, 36 per cent of which leverage mobile technology for maternal, newborn and child health. Gaining considerable momentum, mHealth is primed to revolutionise health systems and health care; the question now remains: can it count the uncounted, reach the unreached, bridge the killer gaps in health, education and social systems?

A cross-cutting solution

mHealth is a cross-cutting solution to a broad spectrum of complex challenges: it can be used to promote health education and awareness; support diagnosis, treatment and referral/counter-referral; track disease and epidemic outbreaks; manage supply chains and mitigate drug stock outs; collect and monitor real-time data remotely; and train and communicate with health professionals and CHWs. Notably, the positive impact of mHealth can be seen across all levels of a health care system, from poor rural patients to the central Ministry of Health.[9] Despite this extraordinary potential, mobile technology alone will not fix broken health systems, which in many countries, continue to marginalise and overlook the most vulnerable. Fragmented health systems in low-income countries often connect community health needs to formalised primary health care through CHWs. This linkage most effectively extends access to quality care to the most vulnerable and marginalised when accompanied by technical capacity development, communication connectivity and skilled support supervision. Strong political will, successful public–private partnerships, functional health professionals supporting CHWs, and quality health infrastructure are essential prerequisites to mHealth programming.[10]

World Vision's overarching mHealth principles

World Vision's mHealth programming, which spans 18 countries, aims to empower the most vulnerable households and community health workers/volunteers through the use of common, shared, multi-functional and collaboratively designed mobile health solutions to deliver community-based health interventions. This ambitious vision is framed by a number of overarching principles: namely, World Vision's mHealth work strengthens government partners' health management information systems (HMIS) while considering data governance and security, establishes sustainable costing and scalable technology and meets the self-described needs of the community.

> World Vision aims to empower the most vulnerable households and community health workers through the use of common, shared mobile health solutions to deliver community-based health interventions.

While many low-income countries have prioritised HMIS, and some have taken steps towards collecting civil registration and vital statistics, virtually none has a fully functioning system in place.[11] World Vision, in partnership with government ministries, seeks to build capacity of health professionals and improve health and ICT infrastructure to overcome these gaps. Nationally standardised health indicators are used as the basis for mobile applications, which are built with the capability to seamlessly sync with HMIS. Open-sourced solutions, along with locally available and culturally acceptable technology, are critical components of World Vision's mHealth programming to encourage sustainable scalability. Likewise, in consultation with CHWs, health professionals, local politicians and mothers, caregivers and other stakeholders, issues of local contextualisation and configuration, network coverage, phone charging and airtime availability are considered during mHealth solutions conception and implementation.

World Vision, in collaboration with the Bill and Melinda Gates Foundation, the Grameen Foundation and Dimagi, have deployed a global, yet customisable, field-tested mHealth solution called MOTECH Suite (Box 1). This shared solution minimises software-development, operations and support costs; enables sharing source codes, best practices and learnings to avoid duplication; and ultimately contributes to improved maternal and child health. World Vision and partners ensure that government ministries are central to and have ownership of tried and tested mHealth solutions for national scale-up, collaborate with multi-stakeholder platforms to strengthen collective action, and contribute to international campaigns such as 1 Million Community Health Workers and mPowering Frontline Health Workers.[12]

Box 1: MOTECH Suite solution

CommCare, the key mHealth component of the MOTECH Suite, used by World Vision, the World Health Organization and 50 other leading organisations in 30 developing nations across four continents, has contributed to remarkable developments.[13] Functionally, CommCare can manage and monitor health records of children and pregnant mothers, support diagnosis and treatment, collect real-time data, disseminate audio and pictorial behaviour-change communication messages and refer complicated cases. Notably, CommCare can support trained health personnel to supervise CHWs remotely and actively via complementary cloud servers.

As compared to traditional pen-and-paper processes in **India**, CommCare has supported up to a 48 per cent improvement in knowledge retention among CHWs, 33 per cent greater caregiver engagement and 1.7 times longer household counselling sessions, which were 2.6 times more likely to engage a husband and 1.6 times a mother-in-law.[14] mHealth has inspired frontline CHWs in **Tanzania** to conduct more frequent home visits, while improving timeliness by 86 per cent.[15] In **India**, data completeness has been proven to increase from 67 per cent with paper-based systems to 84 per cent with CommCare.[16] A 20 per cent improvement in antenatal care attendance and a 22.3 per cent increase in births presided over by a skilled birth attendant have also propelled the progress of quality health care in **Afghanistan**.[17] In **Mozambique**, birth preparedness plans, including saving money and identifying transport options, are 64 per cent more likely to be developed by expecting parents having received behaviour-change communication via mHealth platforms.[18] CommCare, and by extension CHWs, in both **Guatemala** and **India**, are perceived as trusted and credible sources of health information, easing the introduction of sensitive or taboo topics.[19]

Thus mHealth solutions enable health professionals to offer continual support supervision to CHWs, who in turn are empowered to deliver relevant, consistent, timely and quality community-based health care that is widely accepted and improves health-related behaviour and continuity of care.

World Vision's mHealth portfolio

As of 2014, World Vision's mHealth portfolio spans 18 countries in Africa, the Middle East, and South and Southeast Asia.[20] World Vision's MOTECH Suite solution is actively deployed in 11 nations, and is expanding to an additional four during the calendar year. Government programmes in Kenya, Rwanda and Cambodia are also supported by World Vision. A host of mHealth solutions have been built to support the delivery of health and nutrition project models (Box 2). Approximately 1,750 frontline CHWs have been trained on at least one model, are equipped with a mobile phone handset and are reaching approximately 70,000 community members. By 2016, it is expected that 10,000 CHWs will be trained and equipped, serving up to 1 million mothers, children and families.

Barriers to and solutions for implementation

World Vision recognises the barriers to implementing successful mHealth programmes and is planning solutions to address them. As highlighted by the UN Commission on Information and Accountability for Women's and Children's Health, chief challenges include a lack of qualified or experienced mHealth professionals; inadequate infrastructure – electricity, network coverage, HMIS functionality; a lack of adequate business models; and poor political commitment.[21] To directly address these concerns, World Vision engages relevant government ministries, encouraging political support and concrete commitments towards mHealth policies and strategies. In collaboration with its partners, World Vision invests significant resources in capacity development of CHWs, HMIS officers and other health professionals to ensure competency, cohesion and consistency. Affordable and scalable technological infrastructure, such as CommCare-enabled mobile telephones and solar chargers for CHWs, computers with Internet connectivity and access to the data hub of the HMIS for district health offices, have featured prominently in World Vision's mHealth portfolio. Governance, operating and business models have been developed based on a social enterprise approach, which aims to maximise improvements in human and socio-economic well-being rather than profits. World Vision's carefully constructed mHealth programming accounts for and provides solutions to major barriers, closes mHealth's software and hardware gaps and propels programmes towards national-level implementation, all of which strengthen health systems to count and reach the most vulnerable children and mothers.

Box 2: Health and nutrition project models with mHealth solutions

Timed and Targeted Counselling refers to an approach that extends primary health care to the household level through a CHW-led counselling programme. It promotes 7 key health interventions for pregnant women and 11 for children under the age of 2, via 10 timed and targeted household visits.

Integrated Community Case Management is an effective and proven strategy for CHWs to deliver life-saving diagnostic and curative interventions for three common childhood illnesses (pneumonia, diarrhoea and malaria) as well as refer severe cases to health facilities.

Positive Deviance/Hearth refers to an internationally proven community-based approach for rehabilitating moderately malnourished children under 5. Caregivers of well-nourished children from poor families, so-called 'positive deviants,' demonstrate best practices in preparation of meals for children to caregivers of malnourished children. This two-week-long hands-on training uses locally available foods and takes place in the home.

Growth Monitoring and Promotion is a core prevention-focused activity in an integrated child health and nutrition programme, which is linked with counselling that increases awareness about child growth, improves caring practices and increases demand for health services.

Community Management of Acute Malnutrition is an effective approach that builds on local capacity to treat the majority of acutely malnourished children in their homes using ready-to-use therapeutic foods and routine health services.

Partnership and scale-up lessons from Sierra Leone[22]

In Sierra Leone, World Vision has demonstrated the value and promoted the use of mHealth so effectively that the Ministry of Health and Sanitation has begun to lead the development of an eGovernance Act of Parliament, as well as the negotiation of national-level partnerships, strategies and systems in coordination with the Ministry of Information and Communication and the National Telecom Regulator. Currently, 332 CHWs serving 22,000 households in Bonthe District have been trained on and equipped with the MOTECH Suite

solution to support the implementation of timed and targeted counselling. The mHealth application expedites the three major processes of registration, household visits and health services, as well as referral/counter-referrals. This project is in the midst of scaling up to include all 900 CHWs within World Vision's Area Development Programmes (ADPs) in Bonthe District; sequentially, it will expand to approximately 2,500 to 3,000 CHWs throughout all World Vision's ADPs, and eventually to national scale.

Paul Bettings/World Vision

Growth monitoring innovations in Sri Lanka[23]

World Vision Lanka, in coordination with the Family Health Bureau, has begun piloting Growth Monitoring and Promotion and PD Hearth programming using the MOTECH Suite solution to minimise under-5 malnutrition rates, which have stagnated at 17 per cent stunted and 21 per cent underweight.[24] The Growth Monitoring and Promotion application includes reminders of appropriate anthropometric screening methods, automatic z-score calculations and nutritional status identification. This innovation allows CHWs to more easily accomplish the typically challenging anthropometrical calculations and displays comprehensive colour-coded nutritional status interpretations. Rather than simply 'weighing children to death,' informed decisions are made and immediate action is taken. The feeding practice and underlying cause assessments advise inclusion of malnourished children into PD Hearth or other nutrition programmes. The pilot phase covers 2 ADPs, empowers 40 CHWs, and reaches 6,000 children.

> World Vision's mHealth programmes promote partnerships, leverage mSaving schemes, monitor and promote growth and broker behaviour change.

Collaborating in consortium and mSavings in Kenya[25]

In partnership with the Ministry of Health, Safaricom, AMREF, Care and Aga Khan University, World Vision Kenya has been implementing the Jamii Smart mHealth solution since 2011. The initial clinical phase equipped health facilities and staff with the resources and capacity to digitise the Ministry of Health's mother/child booklet. A second community-based phase will provide CHWs with the skills and resources to conduct behaviour change communication with mothers and caregivers, while also capturing and relaying data to the health system and vice versa. Uniquely, mSavings components will be added during the second phase, allowing expecting mothers to manage costs for their facility-based health care and transportation.

World Vision Kenya seeks to reach 9,000 pregnant and lactating mothers and over 18,000 children under 5 in its area of implementation in Kilifi/Bamba, while other implementing partners reach three additional areas. Overall, Jamii Smart aims to empower 88,000 CHWs to reach 8,000 public health facilities and 6 million mothers and their children through national scale-up.

Jon Warren/World Vision

Recommendations

World Vision believes that in order to empower CHWs to recognise, reach and care for the most vulnerable children, mothers and families with life-saving and life-giving mHealth solutions, the following recommendations need to be realised by national governments, mobile network operators, technology providers, civil society multilaterals, donors and other stakeholders.

National governments should

- Ensure a consistent focus on addressing health inequalities through improved counting of and attention on the most vulnerable children, and the subsequent use of this data in policy development and programme design as well as in progress monitoring and review.
- Strengthen, expand and coordinate public–private partnerships between government ministries, the telecommunications industry and regulators, civil society multilaterals, donors and academia.
- Support the development and implementation of comprehensive national eHealth and mHealth policies.
- Promote electronic capture, monitoring, evaluation and accountability of a standardised collection of maternal, newborn and child health indicators as part of eHealth and mHealth policy and strategy.

All mHealth implementers should

- Align all mHealth programming with national policy and strategy.
- Ensure that data and information from mHealth programmes include a viable, sustainable business model and seek to strengthen health management information systems rather than create or reinforce parallel systems.
- Engage and empower families and communities as active participants in data collection, analysis, review and accountability mechanisms for improved health service planning and delivery.

ENDNOTES

[1] UNICEF (2013). *Committing to Child Survival: A Promise Renewed, Progress Report*.

[2] UNICEF (2014). State of the World's Children: Every Child Counts.

[3] United Nations (2013). *A New Global Partnership: Eradicate Poverty and Transform Economies Through Sustainable Development*.

[4] World Vision International (2013). *More Than Numbers: Why better data adds up to saving the lives of women and children*.

[5] International Telecommunication Union (2013). *The World in 2013: ICT Facts and Figures*.

[6] United Nations (2013); Open Working Group (2014). *Introduction and Proposed Goals and Targets on Sustainable Development for the Post 2015 Development Agenda*.

[7] Independent Expert Review Group (2013). *Every Woman, Every Child: Strengthening Equity and Dignity through Health*, World Health Organization.

[8] World Health Organization (2013). *eHealth and innovation in women's and children's health: A baseline review*.

[9] C.B. Aranda-Jan et al. (2014). 'Systematic review on what works, what does not work and why of implementation of mobile health (mHealth) projects in Africa'. *BMC Public Health*. 14:188.

[10] T. Betjeman, S. E. Soghoian, M. P. Foran (2013). 'mHealth in Sub-Saharan Africa'. *International Journal of Telemedicine and Applications*.

[11] World Health Organization (2011). *Country Health Information Systems: A Review of the Current Situation and Trends*.

[12] 1 Million Community Health Workers Campaign (2014). http://www.1millionhealthworkers.org; mPowering Frontline Health Workers (2014). http://www.mpoweringhealth.org.

[13] Dimagi (2014). http://www.commcarehq.org.

[14] IntraHealth (2012). *mSakhi: Putting Information into the Hands of Community Health Workers*; Catholic Relief Services (2013). *ASHA Facilitation: Lessons Learned from the Remind Pilot Project*.

[15] B. DeRenzi et. al. (2012). 'Improving Community Health Worker Performance Through Automated SMS'. The Fifth International Conference on Information and Communication Technologies and Development, 25–34.

[16] I. Medhi et al. (2012). 'Combating Rural Child Malnutrition Through Inexpensive Mobile Phones'. Nordic Conference on Human-Computer Interaction.

[17] World Vision (2012). *Afghanistan: Application of Mobile Technology to Improve Maternal and Newborn Health Outcomes*.

[18] World Vision (2012). *Use of Mobile Phones for Improvement of Maternal Newborn and Child Health Care*.

[19] D. Chittamuru et al. (2012). *CommCare: Evaluation of a Mobile Application for Maternal Health in Rural India*; Bhavsar et al. (2012). *Perceptions of Community Health Workers in Rural Guatemala Using a Mobile Application for Early Identification of High Risk Pregnancies*.

[20] World Vision's mHealth portfolio is implemented by a unique and diverse consortium of ministries of health, technology providers, mobile network operators, NGOs and donors, such as USAID, DFID, IrishAid, AusAid, CIDA, WHO, African Development Bank, and the Bill and Melinda Gates Foundation.

[21] World Health Organization and International Telecommunication Union (2014). *eHealth and innovation in women's and children's health: A baseline review*.

[22] World Vision International (2014). http://www.wvi.org/health/mobile-phones-ttcmnch-sierra-leone; Interview with Magnus Conteh, World Vision Ireland and Allieu Bangura, World Vision Sierra Leone, 21 March 2014.

[23] World Vision International (2014). http://www.wvi.org/health/mhealth-sri-lanka; Interview with Dilka Peiris and Vyramuth Mirilan, World Vision Lanka, 27 March 2014.

[24] UNICEF (2014). *State of the World's Children: Every Child Counts*.

[25] World Vision International (2014). http://www.wvi.org/health/mhealth-kenya; Interview with Miriam Mbembe and Cynthia Nyakwama, World Vision Kenya, 24 March 2014.