Experience in the development and pilot of mHealth application for acute malnutrition programming

Background

Community-based Management of Acute Malnutrition (CMAM) is a proven approach in the treatment of acute malnutrition. However, the effectiveness of CMAM programmes is undermined by a variety of factors, including poor adherence to CMAM clinical protocols, inaccurate record keeping and weak supervision systems. Currently, paper-based systems are most widely used for patient records, summary reporting and stock management.

In response to these challenges, World Vision initiated the development of a mobile application for CMAM in 2013. The application was contextualized and launched in Afghanistan, Chad, Mali, Niger and Kenya in collaboration with International Medical Corps and Save the Children.

CMAM mHealth application features

The application is an open-source mobile solution, built on the CommCare platform. It is designed to provide health workers with an easy to use case management information resource and provide simple and practical decision making and patient tracking tools.

Issues/Challenges	CMAM mHealth App Solution / Feature
Complex treatment protocol and low protocol adherence	Response-triggered decision tree algorithms
Low literacy, numeracy of health workers and language barrier with local population	Text, voice, and pictures prompt HWs along the treatment protocol
Difficulties in tracking an individual during treatment and between different treatment programmes	Automated referral initiation and tracking - Automatic reminders for follow-up - Referral notifications
Infrequent, inconsistent counselling on improved nutrition, health and hygiene practices	Integrated multimedia for targeted counselling
Paper based system slow, unresponsive and poor quality – not available for decision makers	Real-time monitoring through automatic generation of reports
Unresponsive stock management system - Frequent stock outs of therapeutic and/or supplementary food at health facilities	Reminders and alerts to supervisors and supply chain

Initial funding for application developed was provided by World Vision. Contextualization and deployment of the application in Afghanistan was funded by Global Affairs Canada. Funding for contextualization and deployment of the application in Niger, Mali, Chad and Kenya is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of World Vision and do not necessarily reflect the views of USAID or the United States Government.

Country Contextualization and Deployment

The drafting of CMAM mHealth application specifications was undertaken in 2013, with country contextualization first launching in Niger and Afghanistan. Application contextualization and deployment for Chad, Mali and Kenya commenced in 2015.

Country Deployment Summary

	Afghanistan	Chad	Mali	Niger	Kenya
Location of deployment	Herat, Ghor, Badghis provinces: Chisht-i-sharif, Ghuryan, Herat city, Gozara, Injil, Karukh, Kohsan, Koshk-i-robatsangi, Pashton zarghon, Zinda jan, Firozkoh, Dawlatyar, Dolaina, Shahrak, Lal, Qadis, Abkamari, Qala-i-naw, Morghab and Moghor districts	Bitkine District, Geura Region, Abdi District, Ouaddai Region	Tominian district, Segou region	Dakoro district, Maradi region	Wajir Country
Timeline	March 2013– September 2016	January 2015– July 2016	January 2015– July 2016	December 2014– September 2016	October 2015– October 2016
Number of facilities using application	50	16	10	8	20
Number of HW using application	52	24	27	20	68
Key stakeholders	BDN – Bakhtar Development Network, ACTD – Afghanistan Center for Training and Development, MOVE – MOVE Welfare Organization, Grameen Foundation, World Vision	Ministry of Health, Dimagi, Inc., Grameen Foundation, International Medical Corps, World Vision	Ministry of Health, Agence Nationale de Télésanté et d'Informatique Médicale (ANTIM), Dimagi, Inc., Grameen Foundation, World Vision	Ministry of Public Health Dimagi, Inc., Grameen Foundation, System National Information Sanitaire (SNIS), World Vision	Ministry of Health, Dimagi Inc. Save the Children, Transform Nutrition (Research Component)

Preliminary feedback from users

- **Improved clinical protocol adherence**

  Health workers reported that the application assisted with their administration of the clinical procedures for CMAM, through providing a useful job aid, and step-by-step process. In particular the application was considered particularly useful to health workers with limited formal training in CMAM.

- **Improved defaulter/absentee tracing**

  Automated absentee list that is generated after a child misses a visit, along with caregiver contact information has improved absentee tracing.

- **Improved health worker-beneficiary interaction**

  Health workers also reported that the application assisted in effective communication the beneficiaries. For example, if the application advised that admission was not required (based upon clinical or anthropometric criteria), then caregivers would accept this diagnosis without questioning the health worker.

- **Beneficiary acceptance**

  Beneficiaries appreciated the counselling and education messages that were provided through the application, in their local language.

- **Limitations of mobile device and network coverage**

  The application was difficult to work with on a small-screened device and, in some cases, limited battery power was problematic, despite the provision of solar chargers. Network coverage was also limited in some areas.

Key Lessons Learned from application development and deployment

- **Establishing a <u>single</u> set of 'global specifications' for a CMAM mHealth application is not feasible**

  In contextualizing the mHealth application to match country protocols it was found that there are notable differences between the national CMAM protocols in French speaking countries (Niger, Mali, Chad), compared to Kenya. In particular, in French speaking countries a single anthropometric table (WHO WHZ boys) is used, whereas in Kenya four WHO tables are used. Based on these protocol differences, it was determined that finalizing two versions of the application – one for French speaking countries, and one for other countries was necessary.

- **Country contextualization**

  The in-country contextualization process of the application, was labour intensive and complex. Having a technology partner located in-country to provide immediate technical support to address 'bugs' would be useful. , Ongoing responsive support for bug fixes and responding to user needs is essential post deployment.

- **User testing**

  Field testing and re-testing with end users in vital. In addition, having a comprehensive list of test cases to capture various combinations of admission and discharge criteria, and short-term dedicated personnel would be helpful for testing new releases

- **Government Uptake and Sustainability**

  Sensitization and involvement of the Ministry of Health is both important and time consuming. Key areas of discussion with IT partner and MoH are:

  - Existing Government HMIS and/or digital health platform, to ensure the app is built with technical specs that will allow future interoperability
  - Promote mutual understanding of the processes, amount of additional work, and level of effort required to integrate app with govt. HMIS and/or digital health platform
  - Data migration, including any additional hardware (e.g. server) and skilled human resource required to house and manage the data, along with associated costs.

Outstanding Issues and Next Steps

Due to delays in the current country deployments, a few key features of the application are outstanding: automated generation of summary reports (for French app), stock management –automated alerts, automated alerts for defaulter, non-responders, and discharge. A high priority in the coming months is to finalize these features, in order that the apps are ready for further use.

Opportunities for future deployment should be considered in the following contexts:

1. National deployment in line with the national digital health strategy, linked to the government HMIS system. This issue is critical for scalability and sustainability of the application.

2. In humanitarian settings where there is no national HMIS or digital health platform available, deployment may be primarily led by NGOs supporting CMAM implementation.

Several future priorities have been identified for the application:

- Expanded use of application in current countries, linking the application to HMIS system, and national mHealth platforms
- Develop monitoring and reporting standards based on use of individual child data
- Capacity building to support uptake and use of application, e.g. performance reports, supervision functions
- Use of application in CMAM Surge work
- Multiple child health focused apps on an integrated platform (e.g. GMP, iCCM)
- Link application to other platforms (e.g. CMAM report, World Vision CMAM database)