

Equipment challenges in rolling out mobile health solutions

The project

Under the inSCALE project (2009–2016), Malaria Consortium developed and tested an interactive mobile phone application to improve the care provided by community health workers (CHWs) in Inhambane province, Mozambique. In 2016, we transformed this successful pilot into a complete digital health platform known as upSCALE, in collaboration with the Mozambican Ministry of Health and Unicef.

The platform aims to improve the quality, coverage and management of community-based health services through a smartphone app for CHWs and a tablet-based app for supervisors. The former walks CHWs through patient registration, assists with diagnosis, and advises on treatment and referrals, while the latter allows supervisors to monitor CHW performance and stock levels.

upSCALE contributes data generated by CHWs directly to the District Health Information System 2 (DHIS2) for synthesis and analysis. Managers at various levels of Mozambique's health system are able to optimise their resource allocation activities thanks to this near real-time data and localised analysis on disease-specific trends.

upSCALE is currently used in Cabo Delgado, Inhambane and Zambézia provinces. Mozambique's national CHW programme envisions a nationwide rollout of the platform by 2021.

Background

As 65 percent of the population in Mozambique's rural areas lacks access to institutional healthcare,^[1] CHWs are trained to deliver essential primary healthcare services within their communities. Alongside other activities, they conduct health promotion activities; provide integrated community case management for malaria, pneumonia and diarrhoea in children under five; refer cases of acute malnutrition and pregnant women with danger signs to health facilities for treatment; offer family planning advice, pregnancy tracking, and antenatal and post-partum care; conduct health checks; and provide treatment adherence follow-up to patients with tuberculosis and HIV/AIDS. There are approximately 5,400 trained CHWs operating across Mozambique's 11 provinces.

Challenges

Maintaining the required inventory of up-to-date and functional equipment at the community level to support the use of upSCALE has been a challenge.

Firstly, breakdowns and malfunctions appeared to be much more common in the field due to the rough conditions in which the devices were used (dust, rain, etc.), the intensity of their usage, and a lack of previous experience with smartphones on the part of many CHWs. Initially, devices were sent to Maputo — thousands of kilometres away — for repair, leaving CHWs without phones for extended periods of time.

Secondly, nearly four percent of devices got lost, were stolen or were not returned when users left the programme. To address this, an accountability policy that sees devices registered as government assets is being implemented.

Thirdly, the upSCALE app is highly battery-intensive and CHWs' solar chargers rarely succeeded in providing more than 65 percent charge. Phones frequently ran out of battery after four hours of consultations, preventing CHWs from reporting data in real-time and using the app as a decision support tool during diagnosis.

Lessons learnt

1. Devices need to be repaired or replaced regularly

Even though upSCALE selected more shock-resistant phones with faster processors and stronger visualisation capabilities than inSCALE, about 15 percent of the devices required specialised hardware repair within the first 12 months. The most frequent malfunctions were LCD defects and damage to touchscreens, charging ports and buttons. While the lifespan of a smartphone was estimated at three years, experience has shown that the average lies closer to two years and that protective accessories — such as screen protectors and covers — are essential to minimise breakages.

2. Through training and efficient supervision, minor smartphone issues can be solved locally

upSCALE generates weekly activity reports and informs supervisors when CHWs are not submitting data. Supervisors can then arrange for on-site technical consultations. By integrating the process for reporting and solving device-related problems into regular supervision visits, issues were handled more efficiently.

As many minor problems — such as issues with installing apps and reaching devices' storage limits — were caused by CHWs' lack of technical know-how, Malaria Consortium delivered a phone literacy course for CHWs and provided further training to health facility-based supervisors and district coordinators. An IT person at the provincial health directorate was also recruited to assist with troubleshooting, phone maintenance and updating the inventory.

3. Outsourcing skilled repair work locally can speed up device return

To avoid large delays in returning broken devices, we outsourced skilled hardware repairs to local providers. This reduced repair times from three to six months to less than one month. However, when spare parts were required that were not available on the domestic market, repairs could still take up to two months and were dearer. Replacing the LCD was the most expensive repair: in 2019, this could cost 2,000 Mozambican Metical (£26) for a phone and 4,200 (£54) for a tablet.

Recommendations

We advise that those planning mobile health interventions in low resource settings:

- provide supervisors with continuous technical support during their first year, to build their capacity to solve small problems locally and accurately identify the devices that need to be sent for repair
- integrate the process for reporting and managing breakdowns into regular supervision visits to improve efficiency and reduce delays
- appoint IT persons at the provincial level to regularly update inventory, and assist with phone maintenance and troubleshooting
- ensure that provincial and district teams allocate the necessary funds and resources (e.g. vehicles and fuel) to conduct regular on-site technical support visits to CHWs and their supervisors
- budget for renewing 15 percent of the equipment annually and allocate 15 percent of the budget for maintenance
- introduce an accountability mechanism for when devices are stolen, misused or not returned
- outsource the skilled repair of hardware and replacement of spare parts to local service providers
- keep a stock of spare parts and batteries for common breakdowns and ensure that sufficient back-up/ replacement smartphones are available — at least one per district
- provide protection accessories like screen protectors and phone covers for all devices
- purchase models of smartphones that are procurable worldwide and for which there are readily available accessories and spare parts
- factor in during planning that the production of phone models can be discontinued over time, causing a deficit of their respective accessories in the market
- ensure that users have high-quality, portable power banks and sufficiently powerful solar chargers.

Reference

1. Republic of Mozambique Ministry of Health. Health sector strategic plan 2014–2019. Maputo: Republic of Mozambique Ministry of Health; 2014.

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