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LEARNING BRIEF

Challenges and opportunities in seasonal malaria chemoprevention campaign digitalisation

Lessons learnt from Mozambique

Key learning

- Access to digital dashboards and near-real-time data enables data-informed decision-making, which facilitates more effective use of campaign resources, including targeting supervision, training and support activities.
- Effective partnerships, coordination and communication between key stakeholders are essential to enable the rollout of campaign digitalisation across multiple districts, and to ensure the timely identification and resolution of issues.
- To optimise the benefits of campaign digitalisation, digital tools should be fully integrated into routine SMC activities, and implementation models should be adapted to enable the use of real-time data.

Background

Digitalisation can strengthen health systems by transforming the collection and analysis of data. Streamlining data collection and analysis improves the delivery of quality health services at the local level and ensures that the progress of health campaigns can be effectively monitored. Malaria Consortium has broad experience in developing and delivering digital health projects. Over the past 10 years, we have worked with Mozambique's Ministry of Health — with funding from UNICEF — to deliver upSCALE, a digital platform for integrated community case management to improve the quality and coverage of health services at the community level. upSCALE supports community health workers to provide quality diagnosis, treatment and referral to patients via a mobile phone application, allows supervisors to monitor health worker performance and stock levels, and gives enhanced visibility of community-level data at district, provincial and national levels, enabling data-informed decision-making.[1]

As part of Mozambique's wider vision for integrated health campaign digitalisation, Malaria Consortium has partnered with the National Malaria Control Programme (NMCP) to develop and roll out the first use case of DIGIT HCM (Health Campaign Management) for seasonal malaria chemoprevention (SMC). Developed by eGovernments Foundation (eGov), DIGIT HCM, known locally as SALAMA in Mozambique, is an open-source, end-to-end digital health campaign management platform. SALAMA was initially adopted by the NMCP to support mosquito net distribution campaigns in Mozambique during 2023, and was rolled out to support SMC implementation in Nampula in 2024, with further campaign use cases (including indoor residual spraying) to follow.

This learning brief reflects on lessons from the SMC digitalisation process, from platform development and training through to the distribution of SMC medicines.

What is SMC?

SMC is a highly effective intervention to prevent malaria infection in children under five in areas where malaria transmission is seasonal.

SMC involves the regular and repeated administration of antimalarial medicines — sulfadoxine–pyrimethamine plus amodiaquine (SPAQ) — during the peak transmission season. Each annual round of SMC comprises four or five SMC cycles given in intervals of about one month. The medicines are typically delivered door-to-door by community distributors.[2]

Following the successful introduction and scale-up of SMC in Nampula province between 2020 and 2023, SMC was incorporated into Mozambique's Malaria Strategic Plan 2023–2030 as a key malaria prevention strategy for other parts of the country with seasonal malaria transmission.[3,4]

Project activities

Malaria Consortium and partners co-designed, tested and launched an SMC module within the SALAMA platform to support the 2023/24 SMC campaign in Nampula. eGov led the product development process and provided technical support; Mozambique's NMCP led the implementation of the intervention; and Malaria Consortium provided technical and logistical support.

Development began in September 2023, with multiple stakeholders collaborating to conceptualise the platform. Malaria Consortium provided critical insights on SMC campaign planning, processes, operating models, needs and challenges. These informed the subsequent development of the platform's workflows, user journeys and dashboards, ensuring that SALAMA reflected the needs of the SMC programme. Once the goals and requirements of DIGIT HCM had been set, the team reviewed mock-ups of user journeys to ensure that the platform effectively adhered to SMC protocols and good practice.

After platform testing and refinement, eGov held a master training-of-trainers session in November 2023, which prepared participants to train provincial trainers on SMC implementation using the digital platform. Training was then cascaded to regional, district and community levels, with training on the digital platform incorporated into the standard SMC training sessions.

Before starting the SMC round, devices were prepared, and Malaria Consortium planned the logistics of platform implementation and allocated mobile devices to districts. The NCMP team was responsible for allocating these devices to health facilities, and the health facilities to the communities, to support fully digital door-to-door distribution. The SALAMA platform was launched at the start of the SMC round in February 2024. During implementation, a digital technical team — composed of NMCP, eGOV and Malaria Consortium — provided a support helpdesk for mobile devices and the SALAMA platform.

Results

- **Collaboration and cross-organisational working:** SMC campaign digitalisation was successfully rolled out across all 23 districts of Nampula, facilitated by effective partnerships, coordination and communication between key stakeholders.
- **Participatory co-design process:** Malaria Consortium worked closely with stakeholders both in Mozambique and globally to integrate and optimise SMC workflows into the digital system, ensuring DIGIT HCM met the specific needs of SMC programmes. The SMC module of the DIGIT platform is now supporting SMC campaigns in other countries.
- **Mobile device logistics:** A total of 7,706 mobile phones were delivered from Maputo to Nampula in a short space of time. This was achieved despite phones initially arriving late, damaged and insufficiently packaged, which meant the original delivery slot was missed while they were assembled and packaged for onward shipping.
- **Multi-level training approach:** During the initial cascade training, 14,620 people received training on all SMC components. From cycle 2, refresher training was provided at community level to 5,800 teams of community distributors (two per team) and their 967 supervisors. Before cycle 2 started, device assistants were trained at district level (one per district) and health facility level

(one per health facility) to support device readiness during SPAQ administration days.

- **Successful use of the SALAMA application at scale:** Community distributors used the application to distribute SMC medication to 1.5 million children across Nampula province. Data collection via the application was possible when devices were offline without data loss in areas with poor connectivity, enabling the complete removal of paper-based data collection. Users' ability to use the SMC distribution module improved with each cycle.
- **Supportive supervision:** An integrated team from Malaria Consortium, the NMCP and eGov carried out data-driven supervision and oversight during each SMC cycle to evaluate implementation, troubleshoot and support application use and technical issues, and identify areas for improvement.
- **Data-informed decision making:** The provincial government used digital dashboards and near-real-time data to rationalise the use of campaign resources including targeting supervision and subsequent refresher training sessions. Experiences from across Nampula were shared, and action plans were developed to improve the campaign.
- **Technical support:** The campaign benefited from an active technical helpdesk team that provided both virtual and field-based assistance.

Lessons learnt

Management, coordination and planning

Effective engagement of all key stakeholder groups from the outset of the campaign will reduce the need for later changes and ensure the necessary logistics are in place to minimise subsequent delays. During implementation, we saw that any divergence from the original plan can lead to increased campaign costs and create unexpected needs, such as additional supervisors, vehicles and daily allowances, and more internet top-ups for mobile devices.

Application development

Establishing a technical working group early in the planning process will ensure better product design and realistic timelines for the development of features. It will also help to avoid overlapping activities — such as NMCP staff supporting other health campaigns in the same period. We found that delays in setting up the technical working group can lead to several features being requested within a short timeframe, requiring a high level of engagement from the developers. Some features may then be uncomplete or not fully tested when the application is demonstrated in training sessions.

Procurement and logistics

Developing strong working partnerships with suppliers makes it possible to draw on their resources to fill in gaps that threaten the progress of the campaign. We overcame logistical challenges to arrange the delivery of a large number of mobile phones from Maputo to Nampula in a short space of time. Through our good relationship with the logistics company, we were able to store the phones with them in Maputo until we could rearrange a new delivery to Nampula province.

Training

A cascade training approach effectively delivers training to all levels of the health system. We found that training on digital tools and data can be fully integrated into routine SMC training without the need for standalone training sessions. Several challenges were identified, including missing features in the training application (such as supervision forms) at the start of the master training, slow internet at provincial training sites, a lack of printed user manuals for reference, and low digital literacy among some trainees. To overcome these hurdles, printed manuals and training materials are vital for areas without electricity, and data bundles should be offered for uninterrupted training sessions.

Data monitoring

Data access at all levels and data discussion leadership by the NMCP are key elements for data appropriation by the programme. Access to dashboards and near-real-time data monitoring can help to identify anomalies in collected data as well as high- and low-performing areas, so the underlying reasons can be identified and rapidly addressed. It is important to review the SMC implementation model in order to incorporate opportunities to review and take action based on near-real-time data. For example, the provincial government used digital dashboards and near-real-time data to rationalise the use of campaign resources including targeting supervision and subsequent refresher training sessions. Daily data review meetings during SPAQ distribution days provided a space to review key indicators such as data synchronisation, SPAQ delivery, stock levels and reported issues. Issues included gaps in training that led to reduced data quality on some instances — for example if trainees did not have access to the complete SALAMA domain. In some cases, data reliability was affected by dead device batteries and poor internet in remote areas, which disrupted data synchronisation. We determined that providing a buffer of mobile data bundle recharges would ensure that sufficient data is available throughout the campaign for users to synchronise collected data. Switching to an internet network provider with the best local coverage in areas with poor connectivity would prevent delays to data submission.

Supervision

Real-time data-driven supervision is necessary for supervisors at all levels of the health system. In addition to recording community distributor competencies using digital forms, community-level supervisors need to be able to access their team's performance dashboards to view the performance indicators for team members.

Technical support

Fully testing the performance of mobile phones and installing and testing the latest version of application software before the start of the campaign will avoid delays to training and implementation. Throughout the campaign, a helpdesk team provided ongoing support for technical issues reported to them via the platform and a messaging application, helping to resolve issues as they arose. However, tracking issues reported via a messaging application proved challenging, and there was limited technical capacity at district and health facility levels to resolve and monitor problems. This was enhanced from the second cycle, by hiring device assistants at district and health facility level, and training the district monitoring and evaluation staff to support on digital technical issues experienced at district, health facility and community levels. We found that establishing a frequently asked questions document and incorporating a technical support package within training enhanced troubleshooting efficiency and improved field teams' ability to resolve issues independently.

Recommendations

Management, coordination and planning

- Clearly define partners' roles and ensure that all stakeholders are fully engaged in the planning process from the outset. This will ensure adherence to the initially agreed intervention plan and avoid having to make modifications that increase implementation costs.
- Conduct regular reviews throughout the project to ensure continuing alignment with the original plan.
- Include a contingency reserve within the project's budget to cover unforeseen expenses or risks that could arise during implementation.

Application development

- Engage a technical working group early in the development phase and coordinate activities with other stakeholders to avoid overlaps.
- Test the application and dashboard thoroughly and resolve all problems identified well before implementation, ensuring that software engineers are available to work on identified problems until the application is stable.

Procurement and logistics

- Use sturdy, cushioned packaging to protect fragile items such as mobile phones from physical damage during shipping.
- Implement effective tracking and tracing systems to ensure the visibility of shipments in real time. This helps with stock management, as well as providing information about possible delays on the part of the carrier.
- Request guarantees from suppliers that devices are delivered to pre-agreed deadlines to avoid any subsequent delays by the carrier hampering scheduled training and implementation activities.

Training

- Provide users with sufficient training in all components of the application to ensure high-quality data recording and real-time data use.
- Fully integrate training on the use of digital tools and real-time data into routine SMC training.
- Provide printed manuals or alternative training resources in remote areas.

Data monitoring and supervision

- Establish data review processes at all levels to ensure that the access to near-real-time data enabled by the platform is fully utilised to monitor campaign performance and inform campaign planning, supervision and support activities.
- Establish community distributors team performance dashboards for real-time data-driven supervision by community distributor supervisors and health facility coordinators.
- Reflect the supervision report — including fraud detection — on the dashboard to inform decision makers.

Technical support

- Provide sufficient data for internet access and data upload from mobile phones during training and implementation to avoid delays to work. Pre-purchasing buffer top-ups can prevent disruption.
- Carry out timely mapping of the coverage of different mobile internet providers across the implementation area and allocate top-ups accordingly.
- Develop a frequently asked questions document and include a technical support package within training to ensure district and health facility-level staff have technical support capabilities. This will guarantee local sustainability in troubleshooting.

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Cover image: Community distributors provide a caregiver with SMC medication for her child in Nampula province, Mozambique

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