Digital health

Digital health, an umbrella term for any digital hardware and software technology that support health system needs, includes: electronic health (eHealth), which is information and communication technology that is used for health or health-related fields; mobile health (mHealth), a sub-specialty of eHealth that uses mobile or wireless technologies, such as mobile phones; and novel technology areas, for instance artificial intelligence.

Digital strategies, the application of digital technology to existing systems, have demonstrated tremendous potential to address health system challenges in low- and middle-income settings. They provide opportunities to connect patients and health workers, support service delivery, capture health information from remote settings, ensure data quality, and reduce lags in data flow. In 2018, member states of the World Health Organization (WHO) formally recognised digital strategies as important for health system strengthening, achieving universal health coverage and advancing the Sustainable Development Goals.

We have been working in digital health since 2009, with a focus on malaria surveillance and community-based primary healthcare. Our portfolio includes: successfully supporting governments to develop malaria and community health information systems, conducting operational research on the use of short message service (SMS), Android and feature phone applications to improve community-based primary healthcare, and utilising social media to support public health communication.
Malaria Consortium is one of the world’s leading non-profit organisations specialising in the prevention, control and treatment of malaria and other communicable diseases among vulnerable populations.

Our mission is to improve lives in Africa and Asia through sustainable, evidence-based programmes that combat targeted diseases and promote child and maternal health.

Our approach and scope

Our digital health work focuses on providing technical advice to governments on the implementation of digital health strategies and conducting operational research to build the evidence base for digital health development. In 2018, we endorsed the Principles for Digital Development, aligning our work with the wider digital development community. We strive to implement these nine principles in all our digital solutions, and are actively involved in several digital health fora via which we contribute to the creation of common goods (e.g. tools that are adaptable to different countries and contexts) that support the global implementation of digital health.

At Malaria Consortium, we work closely with local governments and future system users to develop digital strategies to strengthen disease surveillance and community-based primary healthcare. We see digital health as a key approach to achieving our strategic objectives of improving access to quality case management and advancing health system effectiveness and efficiency. Although we recognise the potential of digital strategies to strengthen health systems, we only implement these if they are the best available solution and are contextually appropriate. We believe that digital health strategies should complement and enhance existing service delivery models and should strengthen people-centred care. We also promote evidenced-based interventions and, as such, are mindful of the need for more data around the effectiveness of digital health strategies and work to address this through our research.

Our expertise

Outlined below is Malaria Consortium’s expertise in relation to the nine Principles for Digital Development, with examples and highlights drawn from projects and research we have implemented across Africa and Asia.

Designing with the user

We work closely with users and local governments throughout the project lifecycle to co-develop digital strategies to address health system challenges.

In Myanmar, we used open source software to develop a mobile application to support the National Malaria Control Programme (NMCP) to obtain timely malaria data from private healthcare providers – known as general practitioners (GPs) – located in malaria endemic townships. The app is currently undergoing a one-year pilot in six townships in Sagaing region.

We consulted the NMCP throughout the development process, agreeing to mirror the app on the NMCP’s current paper-based patient register, a tool with which GPs are already familiar. Prior to the pilot, we interviewed GPs from each of the six townships to explore their perceptions of using an app for malaria reporting, identify potential barriers to adoption, and hear their suggestions regarding the app’s design and functionality. We also interviewed other key stakeholders (e.g. Township Medical Officers and NMCP representatives) to ascertain their thoughts on the app.

We will repeat these interviews at the end of the pilot to understand whether their perceptions have changed, whether using the app is feasible, and whether further refinements would be needed if the app were to be taken forward by the government in the future.


Understanding the existing ecosystem

We believe that relevant, effective and sustainable digital health strategies are developed through careful consideration of the existing ecosystem.

To support Mozambique’s NMCP in strengthening its malaria surveillance system to become elimination-capable, we conducted a six-month assessment of the country’s existing malaria surveillance system. This included a countrywide data performance and use assessment, and a landscape analysis of additional sources of malaria-related information relevant for a malaria elimination surveillance system.

Our assessment provided a comprehensive review of system performance, highlighted bottlenecks and opportunities and supported consensus building among the government, donors, other implementing organisations and civil society on the necessary technical requirements and functionality for an effective malaria surveillance system in Mozambique.

Designing for scale

We think beyond the pilot phase and create evidence-based, scalable digital health solutions.

As its name suggest, our Innovations at Scale for Community Access and Lasting Effects (inSCALE) project was conceived with scale in mind. It aimed to demonstrate that government-led integrated community case management in Mozambique and Uganda could be rapidly expanded without compromising quality of care if innovative solutions to increase community health workers’ (CHWs) motivation and performance could be found.

Based on extensive formative research, we identified and trialled two such innovations, one community focused and the other technology focused. The latter used mobile phone apps that featured job aids to support decision-making (Mozambique only), data submission and performance-related feedback, as well as closed user groups to allow free calls among CHWs and their supervisors.

Cluster-randomised controlled trials showed that the combined effect of the technology intervention in both countries had improved appropriate treatment coverage for diarrhoea, pneumonia and fever by 10 percent in comparison to the control group.

Guided by a research uptake plan developed at the project’s inception, we engaged with partners and donors throughout the project’s implementation. This resulted in the Mozambican government agreeing, in 2016, to scale up our intervention nationally, under what later became known as upSCALE.


Building for sustainability

We collaborate with governments to design and develop sustainable digital health strategies that maximise the long-term impact of our work.

In Mozambique, we are working with the government to secure nationwide coverage of upSCALE, a digital health platform that aims to improve the quality, coverage and management of community-based primary healthcare, by 2022. The platform consists of: a multimedia mobile phone app that supports CHWs’ decision-making and enables automated reporting of key indicators; a tablet-based app for supervisors that facilitates monitoring and assessment of CHWs’ performance; and a community health information management system for synthesis and visualisation of data at district, provincial and national levels.

To promote sustainability from the start, we aligned the upSCALE platform with national guidelines for community-based care and developed the system in conjunction with CHWs and CHW programme staff. Key to upSCALE’s ongoing sustainability has been Ministry of Health (MoH) ownership and drive to scale the platform nationally. To support this process, we have collaborated with Unicef to strengthen local capacity at all levels, with the vision that the Mozambican government will take over platform rollout and management. This has included: setting up contracts with provincial phone repair companies to enable local troubleshooting, working closely with district and provincial staff to incorporate upSCALE costs within forecasts and budget requests, transitioning to local hosting, and integrating upSCALE within wider government systems.


Being data driven

We believe that digital health strategies should provide high quality data to the right people, at the right time to inform decision-making and action.

In Cambodia, we supported the NMCP to develop its malaria surveillance system. With our technical assistance, this was introduced in 2009 and it remains the country’s main malaria data collection system today. Transitioned from a local to a web-based database by us in 2016, the system collects and analyses data from multiple sources, including: case data from village malaria workers, health facilities, and private providers, as well insecticide treated mosquito net distribution data and aggregated data from the national health management information system.

The system’s functionality promotes improvements in data quality through built-in validation checks during data entry and the automated identification of missing data. Tiered user administration access provides different functionality and data access to each user type, while customisable dashboards present up-to-date data (including geo-spatial visualisations) to support rapid decision-making, which is key to ensure appropriate, targeted responses as the country moves towards malaria elimination.


Using an open approach

We endorse an open approach to digital development, and so support open standards, open data, open source and open innovation.

In Mozambique, we have used existing open platforms – such as CommCare and District Health Information System 2 – to build a community health information system called upSCALE. To encourage open innovation, upSCALE’s mobile apps are available freely so that others can download and modify these under a Creative Commons Attribution-ShareAlike license. Likewise, to provide government departments with greater access to community-level data for decision-making, we are working with Unicef and other partners to expand and connect the upSCALE platform with other in-country systems.

Reusing and improving

We look for ways to adapt and enhance existing products, resources and approaches when developing new digital strategies.

In Uganda, we developed an mHealth intervention that sought to increase the coverage of intermittent preventive treatment of malaria in pregnancy (IPTp). We used the MoH’s existing mTRAC SMS platform to send health workers who had participated in our classroom-based training on malaria in pregnancy text messages that reinforced the content they had covered. We based both the classroom training and SMS messages on existing MoH manuals, updating IPTp provision guidelines in line with WHO’s most recent policy recommendation.


Addressing privacy and security

We pay very close attention to how and why we acquire, use, store and share data.

A key component of the upSCALE project in Mozambique is addressing data-related privacy and security. We supported the MoH to define its ownership of data collected through upSCALE; the MoH determines how data should be managed, and who can access and analyse it. Importantly, data is protected at each point of access: CHWs access the app via their own password-protected accounts and are trained in the ethical aspects of protecting patient information; data is stored on their phones in an encrypted format that is secured by the user’s password (so, if a device is turned off or logged out the data is locally irretrievable); and data is transmitted between users’ phones and the server over a secure and encrypted channel.

Currently, data is hosted on a cloud server that is compliant with United States and European Union standards of data protection. However, to align to national regulation regarding the local hosting of patient data, we are working with Unicef and the Mozambican government to move hosting of the upSCALE platform to Mozambique and to build the MoH’s capacity to manage the server. We are providing technical support during this transition, and are also managing access to data on behalf of the MoH, with access restricted through password-protected accounts, access rights defined for each user, and patient-specific identifiers – such as names – anonymised.


Being collaborative

We recognise that we cannot establish fit-for-purpose and sustainable digital health strategies alone.

We collaborate with local governments and different partners to ensure that we bring the right mix of knowledge and expertise to each digital health initiative on which we work. We share our learning through publications and events to support the advancement of policy and practice across all our areas of expertise. Through active engagement with and participation in external fora – such as the Digital Principles Forum, the Health Data Collaborative and the Digital Solutions for Malaria Elimination Community of Practice – we also strive to align our strategies with the wider digital development community and to contribute to the development of common goods.


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Cover image: inSCALE app being used by a community health worker to submit weekly report, Uganda