

Digital health

Digital health refers to the use of information and communications technology in health systems and medical practice. Comprising both hardware and software, examples include: mobile health (mHealth) and artificial intelligence (AI).

The application of digital technology to existing systems has demonstrated tremendous potential to address health system challenges in low- and middle-income countries (LMICs). It provides 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, World Health Organization (WHO) member states 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, integrating private sector data with existing public health information systems to improve surveillance strengthening essential commodity stock management and monitoring functions, improving supportive supervision of community health cadres, exploring the impact of digitising community health systems on quality of care, utilising social media to support public health communication, and building adaptable and responsive digital health systems to address COVID-19.

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

We work closely with local governments, providing technical advice and expertise on the implementation of digital health strategies, and conducting operational research to build the evidence base for digital health development.

We believe digital health is key to achieving our strategic objectives of improving equitable access to quality case management — through stronger enumeration, planning and monitoring — and advancing health system effectiveness and efficiency. It is not only able to bring affordable, quality health services to those living in hard-to-reach areas, but can also facilitate communities', health workers' and governments' (real-time) access to health information and data — improving knowledge, uptake of services, productivity and informed decision-making. Digital health, thus, has a core role to play in the sustainable attainment of universal health coverage — a global objective that underpins all our programmes.

Nevertheless, we recognise that digital strategies should only be implemented if they are the best available solution, are contextually appropriate and are supported by evidence. Crucially, they should complement and enhance existing service delivery models and strengthen people-centred care and equity.

As such, in 2018 we endorsed the nine Principles for Digital Development, aligning our work with the wider digital development community. We strive to implement these in all our digital solutions, and are actively involved in several digital health fora via which we contribute to the creation of 'global goods' — tools that are adaptable to different countries and contexts.

Our expertise

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.

To address the significant information and communication-related challenges faced by communities, community health workers (CHWs) and governments during COVID-19, in mid-2020 we rapidly adapted an existing digital health platform in Mozambique — upSCALE — and expanded the use of telemedicine to support CHWs to effectively manage the disease.

We conducted a cross-sectional knowledge, attitudes and practices (KAP) survey that revealed that few CHWs knew the correct COVID-19 symptoms, transmission routes and prevention measures. So, we developed targeted awareness and education materials to reinforce government messaging and dispel misinformation. We shared these via the upSCALE platform, sending a series of SMS and video messages to CHWs and integrating seven COVID-19 sensitive modules (covering topics such as hand and respiratory hygiene, safe use and disposal of personal protective equipment and waste management). A second KAP survey will generate findings on these materials' impact.

By obviating the need for travel and face-to-face meetings, upSCALE has provided a dynamic solution for COVID-19 response. It has facilitated real-time tracking of stock levels and collation of case management/ disease surveillance data, and has enabled the delivery of up-to-date messaging and training.

Further reading: <https://bit.ly/378HCh6>

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 National Malaria Control Programme in strengthening its malaria surveillance system to become elimination-capable, in 2019 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.

To address the data quality and data use bottlenecks and opportunities identified, we are operationalising an integrated malaria information storage system (iMISS) that is responsive to all transmission strata in Mozambique. This digitised system harmonises all sources of malaria data into a centralised data repository, reducing fragmentation — which often leads to data gaps and inconsistencies — and enabling data-driven decision-making across all levels of the country's health system.

Further reading: <https://bit.ly/PB-SurvMoz>

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 (iCCM) in Mozambique and Uganda could be rapidly expanded without compromising quality of care if innovative solutions to increase CHWs' motivation and performance could be found.

Following formative research that identified challenges within the traditional iCCM model, we developed and trialled two innovations that we felt could overcome these constraints. One was community-focused and the other technology-focused. The latter used mobile phone apps that featured job aids to support decision-making, 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.

Further reading: <http://bit.ly/2Ht7Rob>



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 healthcare — by 2022. The platform consists of: a multi-media 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.

Further reading: <http://bit.ly/2UJykrk>

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 National Center for Parasitology, Entomology and Malaria Control 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. Together, we transitioned it from a local to a web-based database in 2016, and the system now collects and analyses data from multiple sources, including: case data from village malaria workers, health facilities, and private providers, as well as insecticide-treated 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 targeted responses as the country moves towards malaria elimination.

Further reading: <http://bit.ly/2TCqIDA>

Using an open approach



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

We recently partnered with Akros to pilot the use of Reveal — an open source geospatial platform with open standards — to support the planning, delivery and tracking our 2020 seasonal malaria chemoprevention (SMC) campaign in Nigeria. Reveal uses satellite imagery to generate maps of target intervention areas and guide community distributors in the field to deliver SMC to eligible children using an app on their smartphones. Its monitoring dashboard also allows supervisors to track campaign progress in real time, strengthening data collection.

Investing in this pre-existing 'global good', rather than configuring a new platform from scratch, has allowed us to allocate finite development resources to improving platform delivery for greatest impact.

Further reading: <https://bit.ly/Syn-Reveal>

Reusing and improving



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

In Uganda, we have partnered with Living Goods to adapt an existing digital health platform to strengthen iCCM of infectious diseases. Together, we are collaborating with the current iCCM software provider to enhance, re-configure and modify the platform — thereby saving costs and avoiding duplication of efforts — with the view to improving the accuracy and timeliness of CHWs' activities and enabling real-time monitoring of supply chains.

Further reading: <https://bit.ly/33jXrjE>

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 Reveal project in Nigeria is addressing data-related privacy and security. We supported federal and state MoHs to define their ownership of data collected through the Reveal platform;

the MoHs determine how data should be managed, and who can access and analyse them. Importantly, data are protected at each point of access: users access the app via their own password-protected accounts and are trained in the ethical aspects of protecting patient information; data are 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 are locally irretrievable); and data are transmitted between users' phones and the server over a secure and encrypted channel.

Currently, data are hosted on a cloud server that is compliant with United States and European Union standards of data protection. However, to align with national regulations regarding the local hosting of patient data, we are working with Akros and the Nigerian government to move hosting of the Reveal platform to Nigeria and to build the federal and state MoHs capacity to manage the server.

We are providing technical support during this transition, and are also managing access to data on behalf of the federal and state MoHs, with access restricted through password-protected accounts, access rights defined for each user, and patient-specific identifiers anonymised.

Further reading: <https://bit.ly/Syn-Reveal>

Being collaborative



We recognise that establishing sustainable, end-to-end digital health strategies requires committed partnerships.

We collaborate with governments and partners to ensure that we bring the right mix of knowledge and expertise to each digital health initiative on which we work. For example, we have recently joined forces with four universities/research centres from across the world to jointly develop and assess the feasibility of using an AI algorithm to measure respiratory rate in children under five via videos captured on mobile devices. If successful, and subsequently supported by positive findings in an effectiveness study, this would be a valuable step forward in improving the ease and reliability of paediatric pneumonia diagnoses in LMICs without increasing the burden on healthcare workers.

We also share our learning through publications and events to support the advancement of policy and practice across all our areas of expertise. This year alone we have delivered presentations at the annual meeting of the American Society of Tropical Medicine & Hygiene and the Global Digital Health Forum.

Further reading: <https://bit.ly/PB-AIRR>

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