

DIGITAL INNOVATION IN PANDEMIC CONTROL MALAWI



THE CHALLENGE

The COVID-19 pandemic highlighted challenges in health systems and catalyzed country efforts to build and improve digital health systems. The Malawi Ministry of Health (MOH) uses different digital systems for health care service delivery, and in the aftermath of COVID-19, the country experienced rapid growth in the planning and development of these mobile and web-based digital health systems.

Many of these existing systems, however, are not integrated or interoperable. This means that different digital systems cannot exchange data, so health workers are often required to enter data in multiple systems and have limited access to client data across different systems. Inefficiencies and inaccuracies with data entry and barriers to exchange ultimately prevent the effective use of data for decision-making and impact the quality of care.



*A health worker at Salima District Hospital enters a manual data sheet into a digital system. Disconnected digital systems can lead to inefficiencies and inaccuracies.
Photo: PATH/Victory Kamthunzi.*

THE DIPC PROJECT APPROACH

Challenges with digital immunization systems are common in many countries, especially in the context of pandemics and other emergencies where systems are built in a hurry or with only one use in mind. To improve sustainability and strengthen the readiness of digital immunization systems for future pandemics, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)'s Digital Innovation in Pandemic Control (DIPC) project works with ministries of health to select, adapt, and scale the use of robust digital tools.

As an implementing partner of the DIPC project, Digital Square at PATH uses its expertise to create models for improved and more sustainable pandemic-prepared health systems with a focus on immunization workflows. Digital Square is working with three partner countries: **Ghana, Malawi, and Tanzania**. Project activities are centered on three primary workstreams:

1. **Accelerate** the implementation of digital tools to support sustainable immunization systems.
2. **Develop** common requirements for immunization to inform the development of appropriate digital systems using the World Health Organization (WHO)'s Standards-based, Machine-readable, Adaptive, Requirements-based, Testable (SMART) Guidelines approach.
3. **Strengthen** the capacity of countries to support, manage, and sustain immunization systems.

DEFINING MALAWI'S DIPC PROJECT PRIORITIES

To define Malawi's DIPC project priorities, Digital Square first partnered with the MOH Digital Health Division (MOH DHD) and the MOH Expanded Programme on Immunization (MOH EPI) to better understand the landscape of digital and data tools currently used in Malawi's immunization health domain. In 2023, the team produced an [ecosystem mapping country profile](#) that provides an overview of ten current digital systems used to support immunization in Malawi and identifies areas where additional investment is needed (e.g., infrastructure, interoperability).

Next, Digital Square, MOH DHD, and MOH EPI held consultative sessions and determined that DIPC project activities should prioritize strengthening existing in-country digital immunization systems by working to:

1. **Localize the new immunization System and User Requirements Document (SURD)** so that health care is administered according to clinical guidelines that increase quality of care.
2. **Develop an electronic immunization registry (EIR)** within the Malawi Healthcare Information System (MaHIS).
3. **Strengthen the capacity of MOH partners** to manage and adapt the EIR so it can be locally sustained.



Participants collaborate at the DIPC project ecosystem mapping workshop held in Malawi in July 2023 to better understand existing digital systems supporting immunization. Photo: PATH.

Priority 1: Localizing the new immunization System and User Requirements Document (SURD)

Digital Square and the MOH convened in February 2023 to determine which digital health global good could fulfill the ministry's requirements. MOH DHD and MOH EPI shared their intent to invest in the existing Hospital Wide Information System, also known as the MaHIS, a customized system built on the schema of the global good OpenMRS but with a custom-built user interface. To support these efforts, Digital Square collaborated with GIZ and its partners to expand the ministry's ongoing work on the MaHIS by creating an adult immunization module.

Following discussions about tool selection, Digital Square worked with MOH DHD and EPI partners to identify and localize immunization requirements by harnessing WHO's SMART Guidelines approach to develop a SURD. The [localized immunization SURD](#) came out of the [four-day workshop](#) held in July 2023 to better understand the system and user requirements. This technical document describes the features of Malawi's immunization system in a standardized way, providing a common language across audiences (e.g., software developers and health managers) to ensure a shared understanding of the content. The SURD was formally validated and adopted by the MOH in January 2024.

Priority 2: Developing an electronic immunization registry (EIR) within the Malawi Healthcare Information System

During a pivotal consultative meeting that included the deputy directors of MOH DHD and EPI, the DIPC project team learned about the country's plans to develop a national EIR. This EIR would include immunizations for both children and adults within the MaHIS to cover all public hospitals. Resource constraints had hindered progress on that system's development. The DIPC project offered those missing resources, and the MOH DHD and EPI recognized the project as the right initiative to support the development of a national EIR. All project stakeholders decided to focus the EIR development on a pilot in Mchinji, Salima, and Ntcheu districts.

Digital Square ran an open Request for Proposals process to select the most qualified local technical partners to complete the EIR development work. Ten companies submitted a bid. After conducting a thorough evaluation process in partnership with the MOH DHD, EPI, and GIZ, Digital Square selected Luke International (LIN) and Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) to complete the development work.

The DIPC project team built the EIR using the localized immunization SURD's foundational parameters to guide its process. Next, the project team visited select health facilities to clarify some points that were not clear in the approved SURD—for example, around how to configure SMS reminders. The MOH DHD and EPI, in close collaboration with Digital Square, LIN, and GIZ, completed final testing on the enhanced module in September 2024.

FIGURE 1. MAHIS EIR DASHBOARD

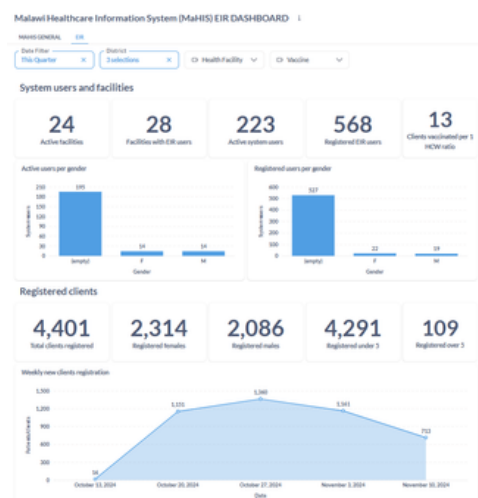
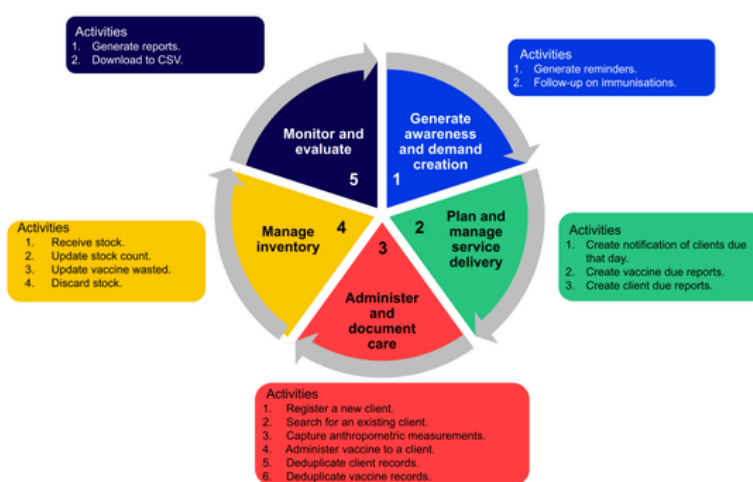


FIGURE 2. CORE WORKFLOW AREAS AND EIR FUNCTIONALITIES



The EIR is available through a web browser (see Figure 1) and an Android mobile phone application. It contains five core workflows: 1) generate awareness and demand creation, 2) plan and manage service delivery, 3) administer and document care, 4) manage inventory, and 5) monitor and evaluate (see Figure 2). To facilitate access to the EIR, the DIPC project offered support to the MOH to whitelist the MaHIS URL with the major telecommunications providers, ensuring health workers do not face a barrier in having to pay for data bundles each time they access the system.

TABLE 1. FEATURES AND BENEFITS OF THE MAHIS EIR

FEATURES	BENEFITS
Digital record keeping	Improved access to immunization data
Vaccine tracking and scheduling	Improved timeliness of vaccinations
Reminders and alerts	Improved vaccination coverage
Real-time data access	Ability to respond to vaccine-preventable disease outbreaks
Multi-dose vaccine management	Support for multi-dose schedules
Vaccine stock and inventory management	Waste reduction and real-time monitoring
Report generation and data visualization	Informed decision-making

In October 2024, the MOH and DIPC project team began a phased rollout of the MaHIS EIR across 46 facilities located in Mchinji, Ntcheu, and Salima. Once all three districts are using the EIR, the system will be managing vaccinations for an estimated 70,000 clients, including adults and children. The vaccines managed by the system help prevent and lessen the burden of common but deadly diseases, including measles, tuberculosis, rotavirus diarrhea, pneumonia, diphtheria, tetanus, and pertussis.

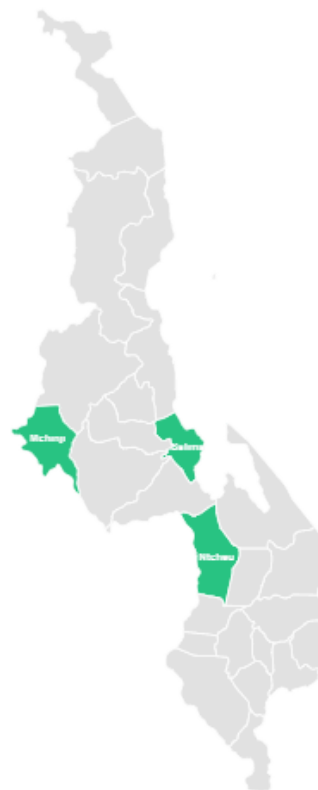
Priority 3: Strengthening the capacity of MOH partners to manage and adapt the EIR

To prepare for the deployment of the MaHIS EIR (see Figure 3), the DIPC project partnered with the MOH to provide comprehensive training for health workers at the central and district levels in October 2024. Digital Square supported the MOH DHD and EPI to provide training-of-trainer (TOT) workshops to more than 50 health workers including Disease Control Surveillance Assistants (DCSAs), ICT Coordinators, and Statistical Clerks at the district and facility levels in Mchinji, Ntcheu, and Salima. These trainings equipped these local health workers with the necessary skills to train others and ultimately manage the EIR, thereby fostering long-term system sustainability. The TOT approach also enabled knowledge and skills to be cascaded effectively throughout the health system, from the national level to the community level.

After the TOT trainings, the new trainers (e.g., DSCAs, ICT Coordinators, Statistical Clerks) then conducted 49 user training sessions. By the end of these sessions, the MOH DHD, MOH EPI, and DIPC project team trained more than 1,200 health workers, including all DCSAs from each of the 46 health facilities across Mchinji, Ntcheu, and Salima.

During the deployment of the EIR, the DIPC project team partnered with the MOH DHD and EPI to provide ongoing monitoring visits and support, helping ensure its successful integration and sustained impact on immunization services in Malawi. The monitoring visits across health facilities helped pinpoint ongoing challenges that need to be addressed, including making suggested improvements to the software, developing better Wi-Fi infrastructure, and increasing digital literacy among health workers. The MOH DHD plans to host refresher trainings for end users and to reinforce continuous learning in the three districts. Additionally, the MOH DHD plans to replicate the training process in additional districts in 2025.

FIGURE 3. DEPLOYMENT OF THE MAHIS EIR ACROSS MALAWI



Health workers in Mchinji district learn how to use the MaHIS EIR mobile app at an end user training in October 2024. Photo: PATH/Joseph Mtenje.

MAKING STRIDES FOR RESILIENT DIGITAL HEALTH

The DIPC project in Malawi made significant strides in strengthening the country's digital immunization system by developing and deploying the MaHIS EIR module into the existing government-owned MaHIS. By improving Malawi's capabilities to manage immunization data and health care workflows, the DIPC project and MOH have set the foundation for a more resilient and efficient digital health infrastructure in Malawi.

As these efforts continue, the project can serve as a model for how digital innovation can be leveraged to build more responsive and sustainable health systems.



A group of health workers in Mchinji district, Malawi, pose for a photo at an EIR training session in October 2024. Photo: PATH/Joseph Mtenje.

ABOUT DIPC

Through the Digital Innovation in Pandemic Control (DIPC) project, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Digital Square at PATH are addressing challenges in building digital immunization systems by partnering with ministries of health in Ghana, Malawi, and Tanzania to select, adapt, and scale the use of robust digital tools for vaccination planning, deployment, and monitoring. The DIPC project partners with ministries of health by aligning its activities with countries' national digital health strategies to create sustainable digital immunization systems. By emphasizing aligned, sustainable digital systems, the project aims to better equip countries to respond to future pandemics and strengthen their overall health systems.

