

DIGITAL INNOVATION IN PANDEMIC CONTROL GHANA



THE CHALLENGE

The COVID-19 pandemic highlighted challenges in digital health systems and catalyzed country efforts to build and improve digital systems. The Ghana Health Service (GHS) 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.

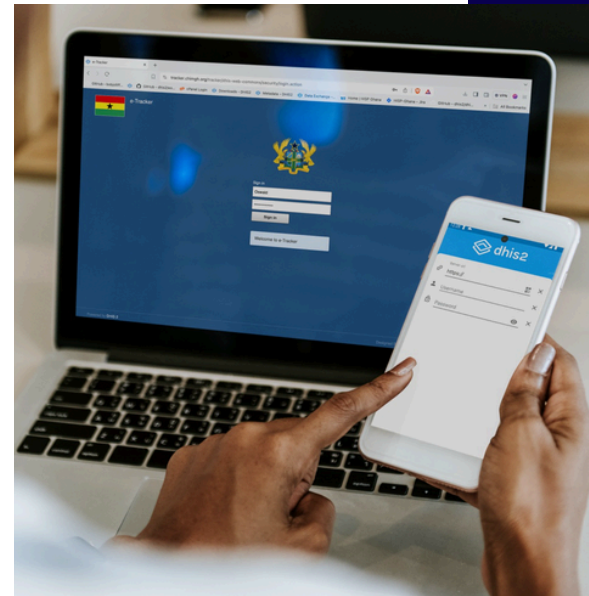
Many of these existing systems, however, are not integrated or interoperable. This means that different digital systems cannot exchange data, so health workers often must enter data in multiple systems, and they cannot access clients across multiple systems. These inefficiencies and inaccuracies with data entry and exchange ultimately prevent the effective use of data for decision-making and impact the quality of care.

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.



A health worker attends a training session to learn how to use E-Tracker to record data on immunization delivery. Photo: HISP Ghana

DEFINING GHANA'S DIPC PROJECT PRIORITIES

To define Ghana's DIPC project priorities, Digital Square first partnered with GHS to better understand the landscape of digital and data tools currently used in Ghana's immunization health domain. In 2023, the team produced an [ecosystem mapping country profile](#) that provides an overview of current digital systems used to support immunization in Ghana and identifies areas where additional investment is needed (e.g., infrastructure, interoperability). Digital Square and GHS then held consultative sessions and determined that DIPC project activities should prioritize strengthening existing in-country digital immunization systems by working to:

1. **Improve the DHIS2 E-Tracker** to better serve as Ghana's national immunization information management system, using a localized system and user requirements document (SURD) to inform its design.
2. **Strengthen health worker capacity** to effectively use digital immunization systems by training end users—e.g., Expanded Programme on Immunization (EPI) National Staff, Regional Health Information Officers, Regional EPI Officers, District Health Information Officers, Public Health Nurses, and Community Health Nurses—on the enhanced DHIS2 E-Tracker and updating content for the GHS eLearning platform.
3. **Support the interoperability of current digital immunization tools** by gathering requirements for an interoperability layer (IOL) and evaluating potential candidate software tools that best meet GHS needs.



Gideon Sarpong Nyamekye, Technical Program Manager at Digital Square, leads a small group of participants during the requirements gathering workshop in Accra, Ghana in June 2023. Photo: PATH

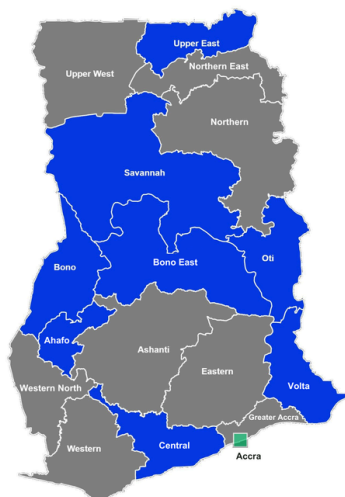
Priority 1: Improving DHIS2 E-Tracker to better serve as Ghana's national immunization information management system

In collaboration with GHS, the DIPC project team held a workshop in June 2023 to identify and localize immunization requirements by harnessing the WHO's SMART Guidelines approach to produce a [localized system and user requirements document](#). This technical document systematically describes the features of Ghana's immunization systems and provides a common language across audiences (e.g., developers and health managers) to ensure a shared understanding of the health information content within the immunization space.

With the requirements in hand, Digital Square then worked closely with GHS and the Health Information Systems Program (HISP) Ghana to enhance the existing DHIS2 E-Tracker tool. The initial version of the DHIS2 E-Tracker was used to capture HIV, tuberculosis, and immunization data but it did not include the functionalities that DIPC added: managing the cold chain for vaccines, tracking vaccine stock levels, reporting adverse events following immunization, and capturing child growth monitoring data.

Under the DIPC project, the team further enhanced the Child Health Module within the DHIS2 E-Tracker to serve as an electronic immunization register for all routine child immunizations for children under five years of age. This enhanced DHIS2 E-Tracker tool can now record Ghana National Card IDs for newborns, capture the digital address of clients using GPS coordinates, and follow clients as they transfer between facilities.

FIGURE 1. DHIS2 E-TRACKER DEPLOYMENT IN GHANA



The Child Health Module can now manage client care workflows at the facility and community levels by providing a customizable platform for entering, tracking, analyzing, and reporting individual-level data within the DHIS2 software platform. The Health Information Systems Program Ghana team, in collaboration with GHS EPI and Digital Square, completed final testing on the enhanced module in July 2024. As of September 2024, a phased rollout of the Child Health Module is beginning across eight of Ghana's 16 regions. Across the eight regions, the team has collaborated with GHS and other partners to plan deployment of the module in 3,700 facilities to manage vaccinations for an estimated 300,000 clients.

Priority 2: Strengthening health worker capacity to use digital immunization systems

To prepare for the deployment of the enhanced Child Health Module in the E-Tracker, the DIPC project initiated comprehensive training for health workers at the national and regional levels in July 2024. These trainings were designed to equip health workers with the necessary skills, foster long-term sustainability, and strengthen local capacity to use the enhanced child health module. Following the national and regional trainings, the DIPC team supported training-of-trainer (TOT) workshops at the district and facility levels, ensuring that knowledge and skills would be effectively disseminated throughout all levels of the health care system.

By the end of the sessions, the DIPC team trained 14 trainers from 2 regions and national-level staff. The team also provided ongoing monitoring and support during the deployment of the enhanced module, helping ensure its successful integration and sustained impact on immunization services in Ghana.



Health workers participate in the training-of-trainers (TOT) for the enhanced Child Health Module in the E-Tracker in August 2024. Photo: PATH

Priority 3: Supporting the interoperability of digital immunization tools

In partnership with GHS, the DIPC project team hired a consultant to engage with country stakeholders to determine the “as-is” and “to-be” states of the country’s interoperability layer (IOL), a critical tool for enabling data exchange between different digital systems. The consultant documented requirements for a tool that may be used to evaluate potential candidate IOL software tools and help identify which IOL tool best meets the needs of GHS.

SETTING THE FOUNDATION

The DIPC project in Ghana has made significant strides in strengthening the country’s digital immunization system by enhancing the Child Health Module within the DHIS2 E-Tracker. By improving Ghana’s capabilities to manage immunization data and healthcare workflows, the DIPC project and GHS have set the foundation for a more resilient and efficient digital health infrastructure in Ghana. 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.



Representatives from GHS, GIZ, and Digital Square at the DIPC requirements gathering workshop in June 2023. Photo: PATH

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.

