

Digital Innovation in Pandemic Control Project

# Scaling the Use of Digital Tools for Vaccination Planning, Deployment, and Monitoring

Tanzania Country Profile

November 2023



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# Abbreviations

|                 |  |                |  |
|-----------------|--|----------------|--|
| <b>BMZ</b>      | Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung | <b>ICTO</b>    | Information Communication Technology Officer       |
| <b>CDH</b>      | Center for Digital Health  | <b>IVD</b>     | Immunization and Vaccines Development              |
| <b>COVID-19</b> | coronavirus disease 2019   | <b>JSI</b>     | John Snow Inc.                                     |
| <b>DHIS2</b>    | District Health Information System 2                                 | <b>M&amp;E</b> | monitoring and evaluation                          |
| <b>DICE</b>     | Digital Health Centre of Excellence                                  | <b>MOH</b>     | ministry of health                                 |
| <b>DIPC</b>     | Digital Innovation in Pandemic Control                               | <b>NDHS</b>    | National Digital Health Secretariat                |
| <b>DIVO</b>     | District Immunization and Vaccine Officer                            | <b>NDHSC</b>   | National Digital Health Steering Committee         |
| <b>eIDSR</b>    | electronic integrated disease surveillance and response              | <b>OpenHIE</b> | Open Health Information Exchange                   |
| <b>eLMIS</b>    | electronic logistics management information system                   | <b>OpenHIM</b> | Open Health Information Mediator                   |
| <b>FHIR</b>     | Fast Healthcare Interoperability Resources                           | <b>OpenSRP</b> | Open Smart Register Platform                       |
| <b>GIZ</b>      | Deutsche Gesellschaft für Internationale Zusammenarbeit              | <b>RIVO</b>    | Regional Immunization and Vaccine Officer          |
| <b>GoT</b>      | government of Tanzania   | <b>TImR</b>    | Tanzania Immunization Registry                     |
| <b>HFR</b>      | health facility registry   | <b>UCS</b>     | Unified Community System                           |
| <b>HIM</b>      | Health Informaiton Mediator  | <b>USAID</b>   | United States Agency for International Development |
| <b>HISP</b>     | Health Information Systems Program                                   | <b>VIMS</b>    | Vaccine Information Management System              |
| <b>HMIS</b>     | health management information system                                 | <b>WHO</b>     | World Health Organization                          |
| <b>ICT</b>      | information and communications technology                            |                |  |

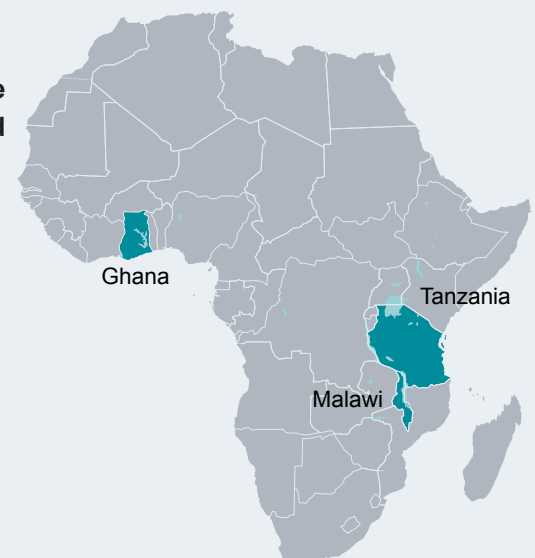
# Executive summary

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) launched the [Digital Innovation in Pandemic Control \(DIPC\) project](#)<sup>1</sup> in 2021 to bring digital health technical expertise to countries to create more pandemic-prepared health systems. In November 2022, the DIPC project provided an award to Digital Square to partner with ministries of health and other key stakeholders to scale the use of digital tools for COVID-19 and routine vaccination planning, deployment, and monitoring. **Digital Square is now implementing the DIPC project to create models for improved and more sustainable pandemic-prepared health systems with a focus on immunization workflows using three exemplar countries: Ghana, Malawi, and Tanzania (Figure 1).**

Digital Square partnered with the Tanzania Ministry of Health (MOH) to review existing assessments and workflows to better understand the landscape of solutions currently used in Tanzania’s immunization health domain. The MOH and Digital Square used various methodologies to produce this country profile, which included a desk review and consultative sessions with MOH officials. **This country profile provides an overview of current digital immunization solutions used in Tanzania and outlines priorities so that Tanzania—guided by the MOH and its existing governance mechanisms and supported by other key stakeholders—can use the findings to inform its journey to develop and operationalize interoperable digital solutions that support immunization from end to end.**

Key findings from ecosystem mapping reveal that Tanzania has strong digital health governance mechanisms in place already, such as the National Digital Health Steering Committee (NDHSC). **Three priority digital systems for immunization and five other integral digital systems are described in this report, with an overview of each solution and a discussion of its major functional features and existing challenges, as well as recommended interventions to strengthen each system.** Tanzania is experiencing rapid growth in the development and adoption of these mobile and web-based digital health systems; however, a number of the existing systems are not integrated

Figure 1: DIPC countries.



and/or interoperable. Although Tanzania has a strong technical capacity for working with digital systems (especially regarding DHIS2-based systems), there is a need for further capacity strengthening. There is also an urgent need to address the lack of stable Internet connectivity in low-resource settings to ensure users can effectively use the systems. Interoperability challenges and gaps in the digital systems supporting the functional components of immunization also exist (e.g., digital immunization certificates, microplanning, product catalog).

As part of the ecosystem mapping exercise, end users of the digital solutions (e.g., District and Regional Immunization and Vaccine Officers, or DIVOs/RIVOs) provided specific recommendations on features and interventions they would like to see added to the immunization registry, including incorporation of COVID-19 (and all forms of adult) immunization. Tanzania has a clear vision for its national digital health strategy and how existing tools can be adapted and scaled up to support the functional components of immunization. Digital Square partnered with the MOH to review and standardize end-to-end immunization workflows, processes, data standards, business logic, and requirements to strengthen and scale digital tools for immunization. The DIPC project has also strengthened the capacity of local technical teams on best practices for integrating WHO and MOH guidelines and recommendations in digital tools using the SMART Guidelines approach (Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable) with multiple modalities (e.g., mentoring, training).

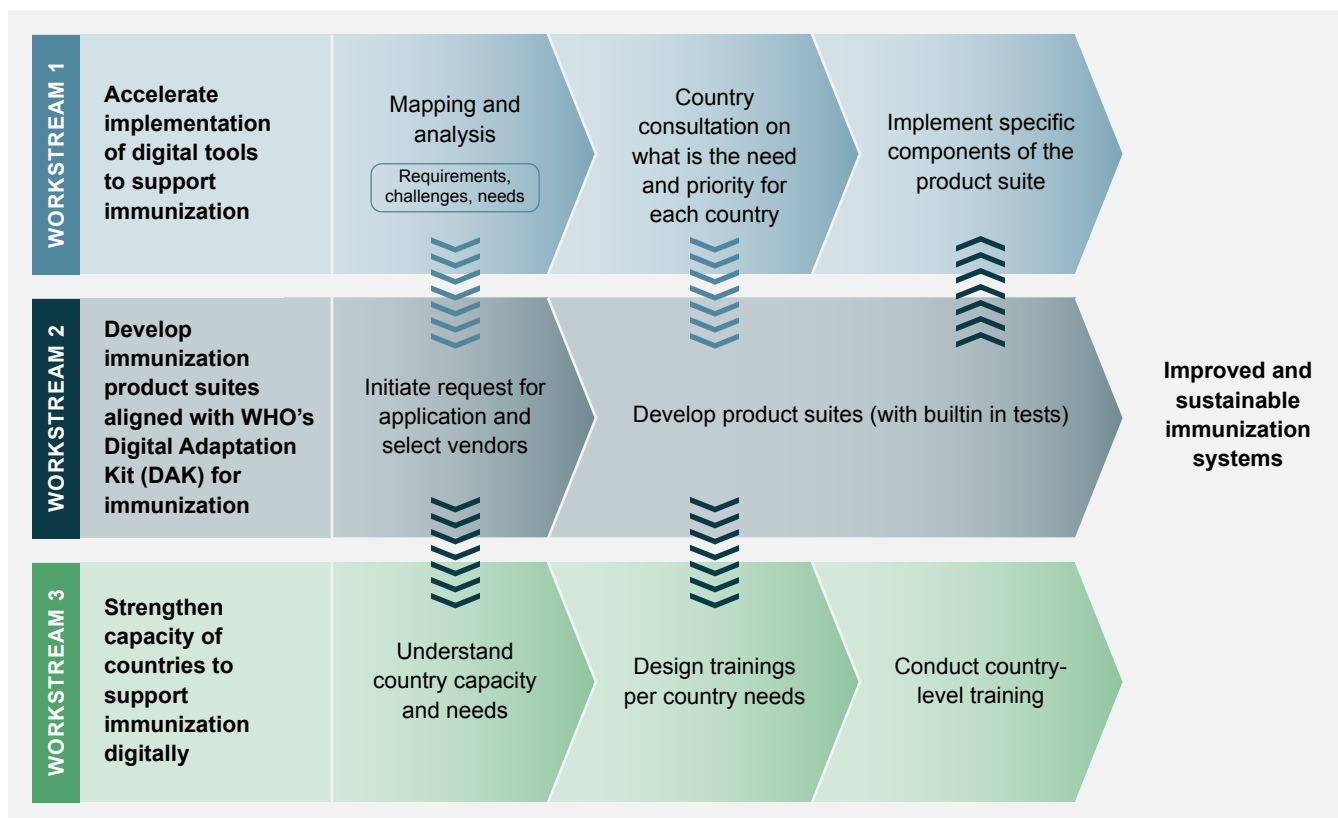
This country profile is intended to serve as a resource for the GoT and other stakeholders (e.g., donors, implementers, academic institutions) who are working to strengthen digital systems that support immunization. Describing Tanzania's current digital health ecosystem can help ensure that future efforts are aligned with the GoT's vision to aim first at areas of highest priority and need. Working together as a global digital health community—led by the GoT and in line with its governance mechanisms and strategies—is imperative to creating and strengthening digital tools that support access to and delivery of lifesaving vaccines.

# Background

Since the beginning of the COVID-19 pandemic, [Digital Square](#) has leveraged its unique role and strengths to support countries, donors, and partners in using existing digital tools in response efforts. Harnessing our technical expertise and established relationships across the global digital health ecosystem, including our engagement with and support of digital public goods for health, Digital Square is supporting countries to innovatively select and adapt digital tools to navigate the complexities of the pandemics and strengthen routine immunization systems.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), together with its actors from the field of digitalization and health—including the [Digital Health Centre of Excellence \(DICE\)](#)<sup>2</sup> consortium, which is co-led by the United Nations Children’s Fund and the World Health Organization (WHO)—launched the [Digital Pandemic Control \(DIPC\) project](#) in 2021 to bring digital health technical expertise to countries to create more pandemic-prepared health systems. The DIPC project provided an award to Digital Square to partner with ministries of

Figure 2: The three DIPC workstreams.



health and other key stakeholders from November 2022 to 2024 to scale the use of digital tools for COVID-19 vaccination planning, deployment, and monitoring. The DIPIC project is partnering with MOH by aligning its project goals and activities with countries' national digital health strategies to strengthen health systems to better equip them to respond to COVID-19 and future pandemics.

The DIPIC project is creating models for improved and more sustainable pandemic-prepared health systems with a focus on immunization workflows using three exemplar countries: **Ghana, Malawi, and Tanzania**. The project is carrying out the work by focusing on three primary workstreams (see Figure 2).

## **Workstream 1 goal**

**Accelerating the implementation of digital tools to support sustainable immunization systems in Ghana, Malawi, and Tanzania by:**

- Building on existing investments and advancing the use of technology adopted and adapted to support COVID-19 and routine immunization to better prepare for, prevent, and respond to future pandemics.
- Leveraging existing global guidelines and recommendations and adapting to each country's context.
- Demonstrating how the use of digital tools can further support routine immunization and surveillance.
- Equipping countries with the capacity to test and validate their local infrastructure to vet how well their own digital tools meet the needs of immunization workflows.
- Generating and disseminating an evidence base that can be used to scale similar digital tools and systems in other geographies.

## **Workstream 2 goal**

**Developing immunization product suite(s) aligned with WHO's Digital Adaptation Kit for immunization to:**

- Promote the development, adoption, and reuse of digital public goods for health, with a particular focus on open source global goods, and support an ecosystem of interoperable standards-based technologies.
- Engage the global goods community in identifying and packaging digital public goods for health as joint products to meet immunization needs to make them "shelf ready."
- Create documentation to help countries better understand the group or suite of tools best designed for exchanging data to meet their needs in the immunization health domain.

## **Workstream 3 goal**

**Implementing innovative and sustainable capacity-strengthening approaches by:**

- Partnering with MOH and the Regenstrief Institute to design and carry out an in-depth capacity assessment to identify critical technical skill gaps that need to be filled to ensure that the immunization product suite can be successfully deployed, operated, and scaled in-country.
- Partnering with the Regenstrief Institute and the OpenHIE (Open Health Information Exchange) community to support trainings in Ghana, Malawi, and Tanzania at the planner and manager level and at local and regional health facilities.
- Building from "global" training content to support training of local digital health entrepreneurs to serve as technical counterparts, advisors, and partners to MOH in the three target countries.

# Ecosystem mapping scope and methodology

Digital Square mapped the digital immunization ecosystem in Tanzania as an initial activity under **Workstream 1, aimed at accelerating the implementation of digital systems to support COVID-19 and routine immunization.** Digital Square worked with various departments within the MOH, including Immunization and Vaccines Development (IVD), Information and Communications Technology (ICT), and Monitoring and Evaluation (M&E), to review existing assessments and workflows to better understand the landscape of systems currently used in the country's immunization health domain. The MOH and Digital Square produced this country profile to share with all project stakeholders (e.g., government stakeholders, funders, and implementing partners) so that the information is widely available. This country profile helps define the priority needs so that Tanzania—directed by the MOH and existing governance mechanisms—can use it as a resource on its journey to developing and operationalizing an interoperable digital system that supports the full end-to-end immunization use case.

Digital Square employed the following methods to collect the data included in this report:

- Conducted a **desk review** of Tanzania's health and digital governance documents (e.g., [Digital Health Strategy: July 2019–June 2024](#)<sup>3</sup>) and existing resources on established digital tools (e.g., [Digital Pandemic Preparedness Assessment](#)<sup>4</sup> and the [Map & Match project](#)<sup>5</sup>).
- Held consultative sessions with country leaders to validate the current state immunization ecosystem assessment and propose ways to strengthen relevant components of the digital health immunization ecosystem, as needed. Additional stakeholders consulted include the Health Information Systems Program (HISP) Tanzania, John Snow Inc. (JSI), and the President's Office – Regional Administration and Local Government.

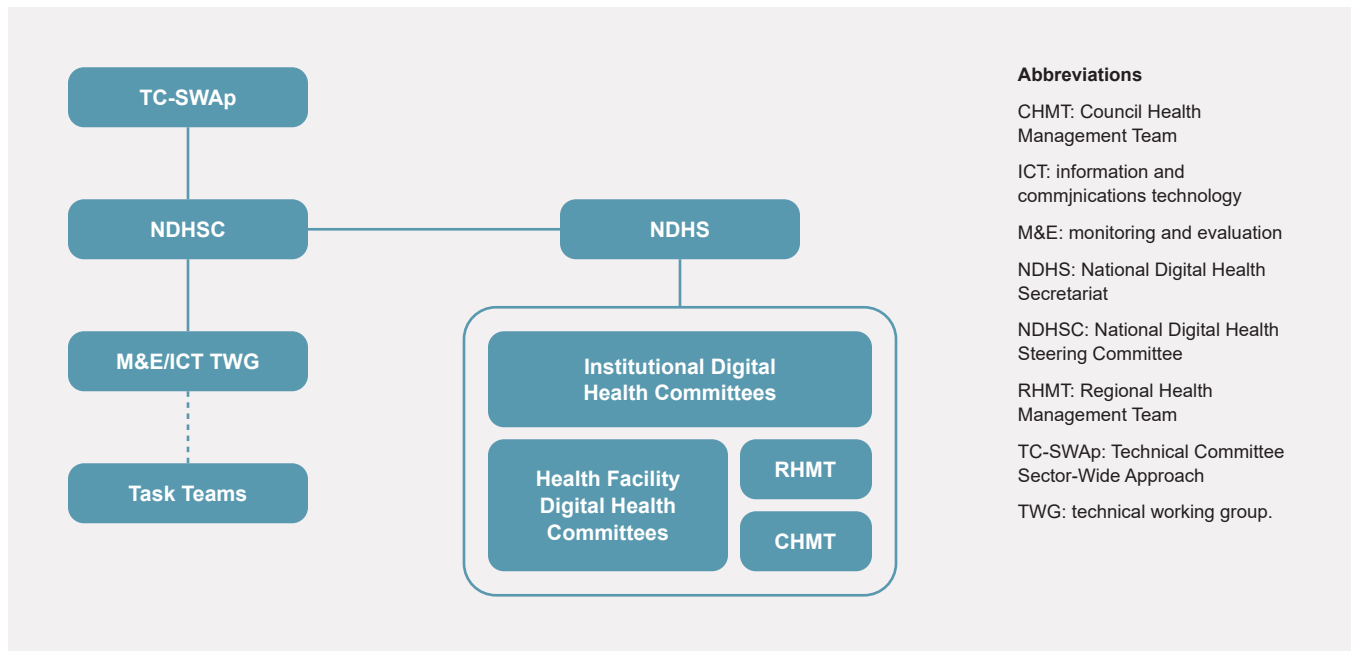
## Findings from Tanzania's ecosystem mapping

### Enabling environment for leadership, governance, and coordination of stakeholders

The government of Tanzania (GoT) prioritized digital health in its revised *National Health Policy 2019* by developing the [Digital Health Strategy 2019–2024](#) to provide a vision for achieving better health outcomes using digital health to strengthen the health system. The strategy and the related implementation plan, also known as the [Digital Health Investment Road Map 2021–2026](#)<sup>6</sup>, provide the basis for the GoT and its partners to work together to accelerate digital transformation in the health sector. The GoT has defined governance structures that are instrumental in maintaining sector-wide coordination (Figure 3). These structures provide strategic oversight and facilitate inclusive governance for the implementation of digital health initiatives. The governance structures are integrated as part of the sector-wide approach and include the National Digital Health Steering Committee, chaired by the MOH Permanent Secretary; the ICT/M&E Steering Technical Working Group; the National Digital Health Secretariat; and subnational, institutional, and facility digital health committees.



**Figure 3. Governance structure of the sector-wide approach in Tanzania.**



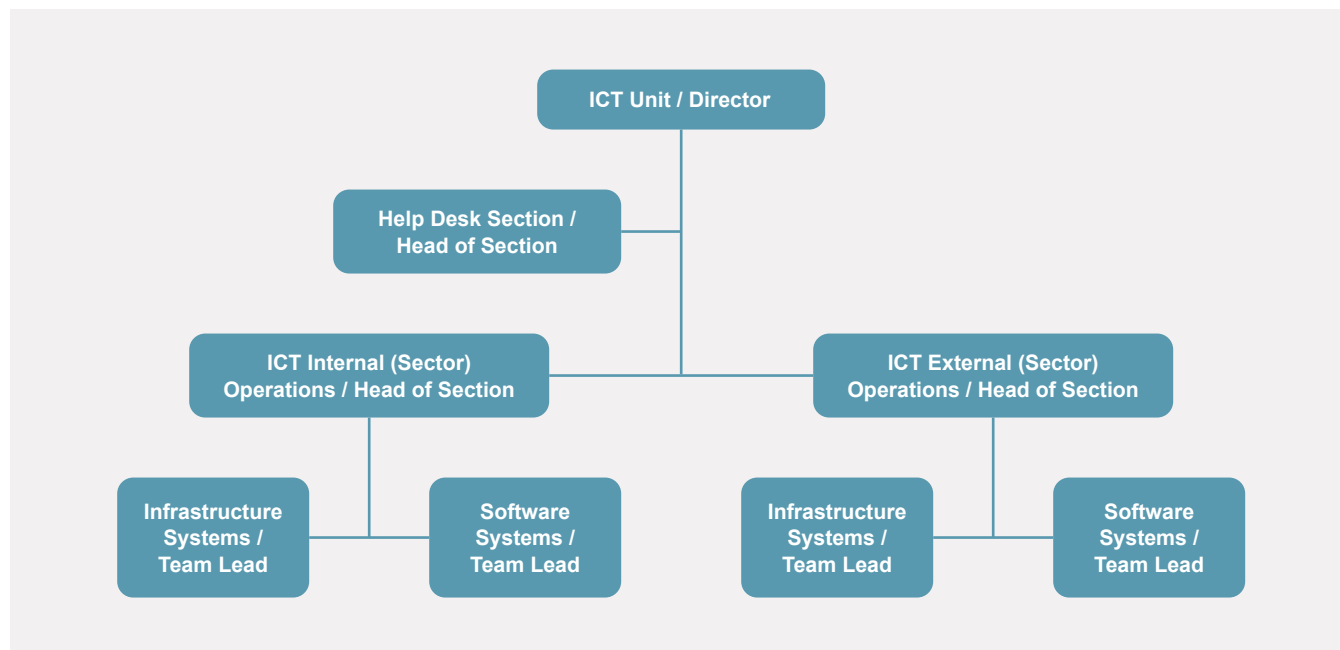
As outlined in the [Health Sector Strategic Plan 2021-2026](#), the GoT, with support from the MOH, established the Center for Digital Health (CDH). The goal of the CDH is to unite innovators, technologists, clinicians, and digital health stakeholders to design, build, and deploy enterprise-level digital health interventions. The CDH will work to coordinate resources, improve coordination, and remove duplicative efforts to implement solutions strategies which are aligned with national strategies. The work done at the CDH will ensure sustainability of digital health solutions implemented in Tanzania. The CDH is housed under the MOH ICT department within the external operations section.

Critical to the success of the Digital Health Strategy and the Digital Health Investment Road Map is a strong and integrated health information system that supports interoperability among various clinical, logistics, and administrative systems. The GoT has developed the Tanzania Health Enterprise Architecture blueprint, which outlines application, data, and technology standards for aligning and guiding digital health systems to support the overarching health sector’s strategic goals and objectives. The blueprint also provides the architectural framework to support information exchange among disparate systems through a standards-based Health Information Mediator (HIM).

The MOH collaborates with various stakeholders and partners in the implementation of its digital health strategy and road map. These include development partners, implementing partners, and both local and international digital entrepreneurs.

Figure 4 illustrates the structure of the MOH ICT Unit, a key partner for the DIPC project. The ICT Unit collaborated directly with the DIPC project to gather requirements for digital systems to support immunization. The DIPC project is also supporting the MOH, including staff from the ICT Unit, to be trained in FHIR® standards and

Figure 4. Structure of the Information and Communications Technology (ICT) Unit of the Ministry of Health.



In addition to the existing governance mechanisms, the MOH works with many funders, implementing partners, and multilateral organizations in the digital health immunization space, as seen below in Table 1. Though the list below is not comprehensive, it is intended to provide a robust picture of the stakeholder landscape.

Table 1. Key stakeholders and governance mechanisms pertinent to the digital health immunization space

| MOH departments   | Governance mechanisms  |
|---|--|
| <ul style="list-style-type: none"> <li>Epidemiology unit</li> <li>ICT unit</li> <li>IVD</li> <li>President’s Office – Regional Administration and Local Government</li> </ul> | <ul style="list-style-type: none"> <li>National Digital Health Steering Committee</li> <li>National Digital Health Secretariat</li> <li>M&amp;E/ICT Technical Working Group</li> </ul> |

| Funders/development partners  | Implementing partners   |
|---|---|
| <ul style="list-style-type: none"> <li>• Bill &amp; Melinda Gates Foundation</li> <li>• Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development)</li> <li>• Centers for Disease Control and Prevention</li> <li>• Gavi, the Vaccine Alliance</li> <li>• Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)</li> <li>• Korea International Cooperation Agency</li> <li>• Rockefeller Foundation</li> <li>• Unitaid</li> <li>• United States Agency for International Development (USAID)</li> </ul> | <ul style="list-style-type: none"> <li>• Abt Associates</li> <li>• Clinton Health Access Initiative (CHAI)</li> <li>• JSI</li> <li>• PATH</li> <li>• VillageReach</li> <li>• WHO</li> <li>• United Nations Children's Fund</li> </ul> |

## Enabling environment for strategy

Digital Square analyzed Tanzania's [Digital Health Strategy 2019–2024](#)<sup>8</sup> to determine where there is alignment across the DIPC project workstreams to prioritize how the project can support the MOH in delivering on the activities named in the strategy (Table 2). Digital Square plans to partner with the MOH to strengthen digital immunization systems while also providing technical documentation, training, and mentoring to technical teams to develop, implement, and maintain the digital immunization systems.

**Table 2. Snapshot of the analysis showing alignment opportunities between national strategy activities and DIPC project workstreams.**

| Tanzania Digital Health Strategy strategic priority number | Initiative   | DIPC project workstream   |
|--|--|---|
| 2  | Digitalize health care services at health facility levels.   | 1: Accelerate implementation of digital tools to support immunization systems.<br>2: Develop immunization product suites. |
| 3  | Implement eLearning and knowledge management platforms for continuous professional development.  | 3: Implement innovative and sustainable capacity-strengthening approaches.  |
| 5  | Strengthen use of data, application, and technology standards (e.g., International Classification of Diseases, 10th Revision; Health Level 7; Digital Imaging and Communications in Medicine; Logical Observation Identifiers Names and Codes; and service codes). | 1: Accelerate implementation of digital tools to support immunization systems.  |
| 5  | Strengthen interoperability across different systems within health and other sectors.  | 1: Accelerate implementation of digital tools to support immunization systems.  |

# Overview of Tanzania’s digital systems to support immunization

Figure 5 defines the components, features, and requirements of a digital system. It illustrates how requirements make up a software system feature and how those features roll into a functional component.

Figure 5. Requirements, features, and components of a digital system.

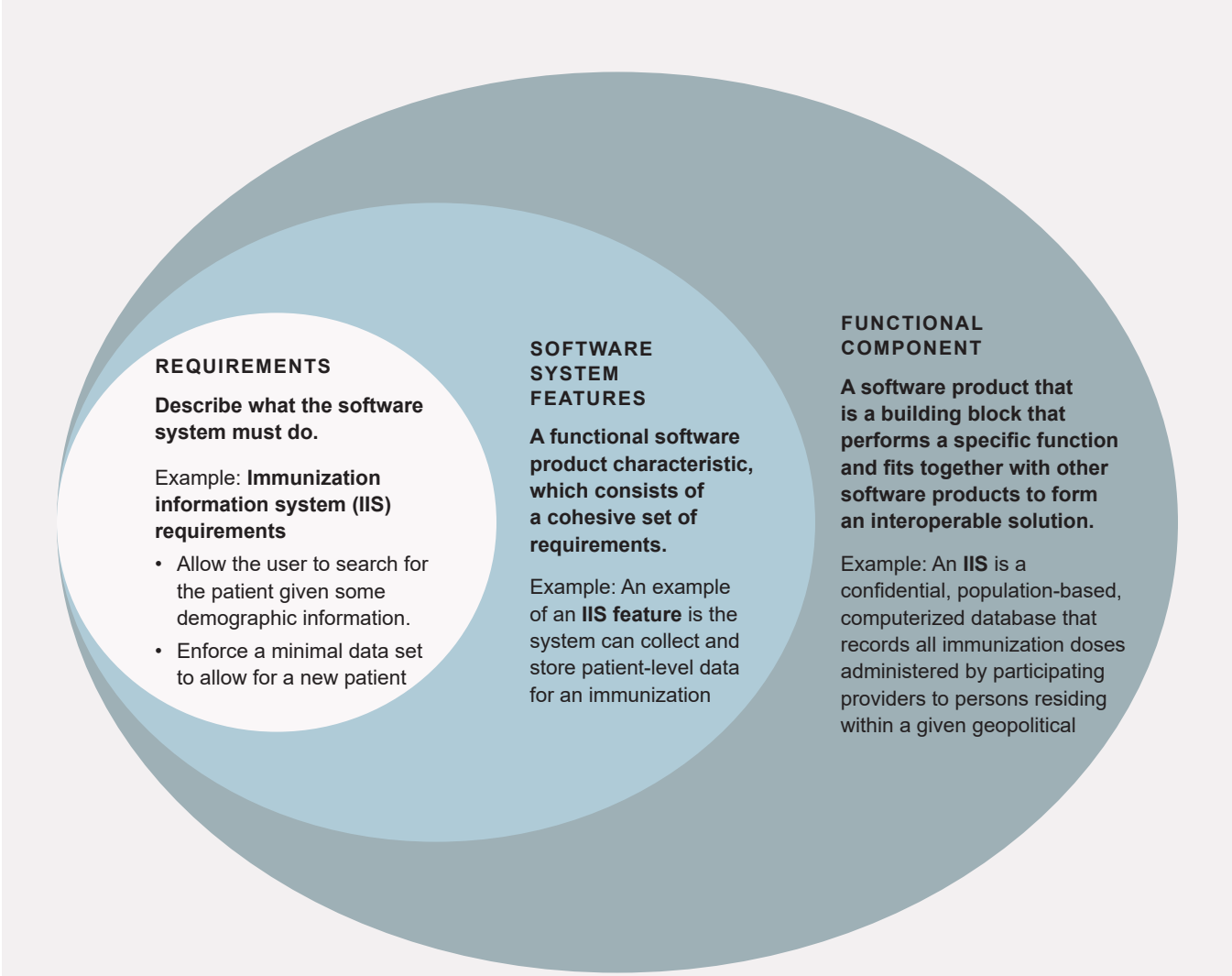
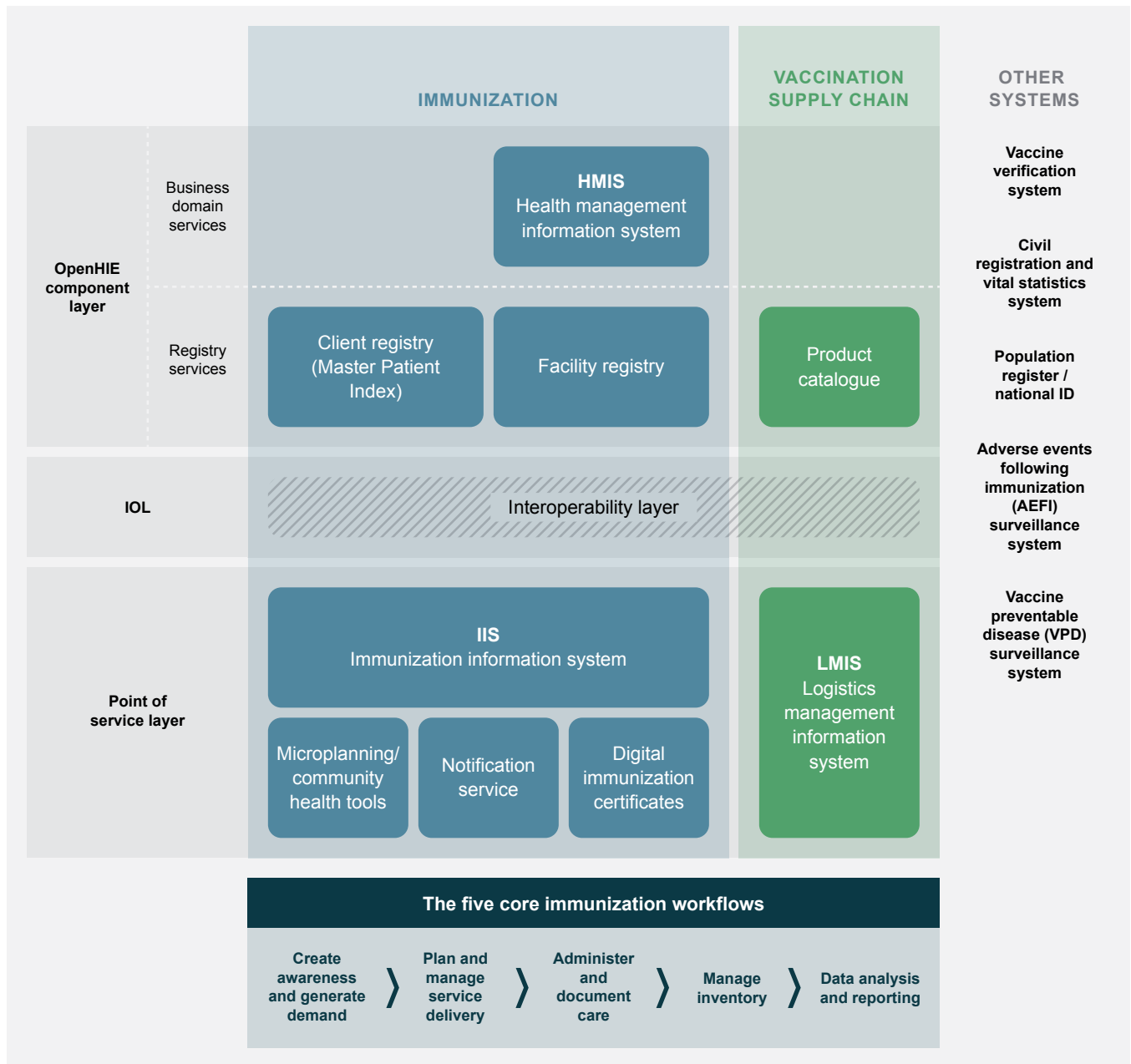


Figure 6 illustrates how a Health Information Exchange composed of various digital health systems may be implemented together to fulfill the five core immunization workflows, shown at the bottom of the diagram. It also shows how the software components supporting immunization and vaccine supply chain management are aligned with the [OpenHIE Architecture](#)<sup>9</sup> domains. The point of service applications (e.g., immunization information system, notification service, microplanning tool) should be designed to exchange data with the registry service applications, and with each other, via an interoperability layer.

The interoperability layer is a middleware software that enables secure, standards-based communication between software applications. The five additional digital systems shown on the right-hand side of Figure 6 may interact with the immunization system in the future, although they are out of scope for this phase of the DIPC project because they are not directly involved in the core immunization workflows. This also emphasizes the importance of why system architecture that is interoperable is a critical part of any immunization solution.

**Figure 6. Functional immunization components.**



Abbreviation: OpenHIE, Open Health Information Exchange.

Table 3 below provides an overview of different digital systems being used for immunization across Tanzania and their current state. A more detailed description of each system is included in the results section below.

**Table 3. Overview of the current landscape of Tanzania’s digital systems to support functional components of immunization.**

| Components                             | Deployed on national scale                            | Deployed on sub-national scale | Not yet deployed or current gap |
|--|---|--------------------------------|---------------------------------|
| Civil registration & national ID       | National Identification Authority System, RITA system |                                |                                 |
| Client registry                        |   |                                | NHCR                            |
| Community health                       |   | UCS* (OpenSRP)                 |                                 |
| Awareness & demand generation          |   | TImR                           |                                 |
| Digital immunization certificates      | Chanjo COVID  |                                |                                 |
| Health facility registry (HFR)         | HFR   |                                |                                 |
| HMIS                                   | DHIS2   |                                |                                 |
| Immunization information system        | Chanjo COVID  | TImR                           |                                 |
| Inter-operability layer                | HIM   |                                |                                 |
| Learning & training system             | eLearning Platform for Health                         |                                |                                 |
| Logistic management information system | VIMS  |                                |                                 |
| Micro-planning                         |   | TImR                           |                                 |
| Product catalog                        |   |                                | Gap                             |
| Surveillance                           | eIDSR   |                                |                                 |

**Key**

- System is deployed, but not prioritized in DIPC project phase 2 scope
- System is prioritized for support as part of DIPC project phase 2 scope
- System is not yet deployed, out of scope for DIPC project phase 2

Abbreviations: DHIS2, District Health Information System 2; eIDSR, electronic integrated disease surveillance and response; HIM, Health Information Mediator; HMIS, health management information system; NHCR, National Health Client Registry; OpenSRP, Open Smart Register Platform; RITA, Registration Insolvency and Trusteeship Agency; TImR, Tanzania Immunization Registry; UCS, Unified Community System; VIMS, Vaccine Information Management System.

\*Although the UCS has been piloted in some communities, it does not currently have immunization-related workflows or features, although this mapping has identified it as a potential existing digital solution that could be adapted to support immunization.

# Results of Tanzania’s key digital systems supporting the immunization health domain

## Descriptions and parameters overview

This section describes the digital solutions Tanzania uses to support the immunization health domains. For each digital system, the results provide a **system overview** and details about its **major features, users, challenges, and recommendations** (where available). The DIPC applied classifications from WHO’s [Classification of digital interventions, services, and applications in health, 2nd Edition](#)<sup>a10</sup> (Figure 7) to frame the analysis. By looking at the users, challenges, and recommendations for each digital system, we describe how each supports the immunization health domain and where gaps and opportunities exist to improve each one.

The **major features of digital systems** include **functional features** that describe the programmatic requirements the digital system must have to meet the users’ needs and achieve tasks within a business process. An example of a functional feature is the ability to register a new client in the immunization registry. This also includes **nonfunctional requirements** that provide the general attributes and features of the digital system to ensure usability and overcome technical and physical constraints. In addition to security and privacy features that have their own section attributed to them in the analysis due to their importance, other examples of nonfunctional requirements include having the ability to work offline or having multiple language settings.

**Interoperability and standards** describe which other digital systems can effectively exchange information with the priority system and whether the system’s architecture is based on data standards. Building interoperable digital systems that allows for the exchange of information between systems is an essential component to improving patient care, and using a standards-based approach when building these systems ensures data is ‘uniformly and efficiently exchanged across systems.’<sup>b</sup>

**Users** describe the targeted primary user of each intervention. WHO’s Classification of Digital Health Interventions breaks users into the following four overarching groupings (for the analysis in this profile, the section below will only focus on the first three user groupings):

Figure 7: WHO’s classification of digital interventions, services, and applications in health, 2nd ed resource.



a WHO’s Classification of Digital Health Interventions v2.0 is a resource document that provides a shared language to describe the uses of digital technology.

b Digital Square Global Goods Guidebook, Fourth Edition. Seattle: PATH; 2023.

1. **Interventions for persons:** Persons are members of the public who are potential or current users of health services, including health prevention and wellness activities. Other terms that have been used to describe individuals in this group include ‘patients’, ‘Persons’ and ‘health service users’. Caregivers of individuals receiving health services are also included in this group.
2. **Interventions for health care providers:** Health care providers are members of the health workforce who deliver health interventions. This group have also been described as health workers or healthcare workers. *Examples of job roles in Tanzania pertaining to this user grouping include community health workers, nurses, doctors, facility-level immunization providers, and pharmacists/pharmacist technicians.*
3. **Interventions for health management and support personnel (health system managers):** Health management and support personnel are involved in the administration and oversight of health systems. Interventions within this category reflect managerial functions related to supply chain management, health system financial management, human resource management.. *Examples of job titles in Tanzania pertaining to this user grouping include supply chain managers, human resource managers, and finance officers.*
4. **Interventions for data services:** This consists of crosscutting functionality to support a wide range of activities related to data management, use, and data governance compliance.<sup>c</sup>

**Health system challenges** describe issues that each system faces, categorized according to WHO’s eight groupings in its Classification of Digital Health Interventions:

- |                 |                  |                |                   |
|-----------------|------------------|----------------|-------------------|
| 1. Information  | 3. Quality       | 5. Utilization | 7. Cost           |
| 2. Availability | 4. Acceptability | 6. Efficiency  | 8. Accountability |

**Recommendations** are organized using the same four categories from the users descriptions above to specify which user grouping the recommendation is intended to target (i.e., Persons, health care providers, health system managers, and/or data services).

There are three primary systems profiled in the analysis: Chanjo COVID, the Tanzania Immunization Registry (TImR), and the Vaccine Information Management System (VIMS).

## Digital systems in Tanzania

### PRIORITY DIGITAL SYSTEM 1

#### Tanzania Immunization Registry (TImR)

The TImR was implemented to improve data quality (e.g., transition regions to a paperless system) and data use for immunization, especially routine immunizations. Currently, the TImR has ~1.9 million client records and was implemented in approximately 3,736 out of 6,000 facilities across 15 of the 26 regions in mainland Tanzania. With funding support from Gavi, the MOH is planning to scale up TImR to all 26 regions starting in 2024, with support from PATH as an implementing partner.

<sup>c</sup> This WHO classification user group is omitted from the analysis below because many of the health care providers or health management and support personnel are responsible for data services. The four groupings were taken from: World Health Organization (WHO). *Classification of Digital Health Interventions: A Shared Language to Describe the Uses of Digital Technology for Health*, 2nd ed. WHO; 2023. <https://www.who.int/publications/i/item/9789240081949>. The definitions in this section are taken verbatim from this WHO publication to help frame this country profile.



## SYSTEM OVERVIEW

| Scale    | Primary WHO classification system    | System owners | Health and interoperability standards | Partners                   | Implementers |
|----------|--------------------------------------|---------------|---------------------------------------|----------------------------|--------------|
| National | C7: Immunization Information Systems | MOH           | FHIR® compliant†                      | Gavi, MOH (ICT, M&E), PATH | PATH         |

## MAJOR FEATURES OF THE DIGITAL SYSTEM

TImR supports SMS notifications, vaccine scheduling, and stock management at the point of care.

## INTEROPERABILITY AND STANDARDS

Currently, TImR is not interoperable with other immunization systems such as VIMS and Chanjo COVID. Mediators to support information exchange with DHIS2 and VIMS were created and tested but are not operational due to various technical challenges.

## USERS

TImR is used at health facilities. Health workers use the system to manage vaccination appointments and fill out vaccine delivery forms and manage vaccination stock at the facilities.

| Grouping                 | Users | Description   |
|--------------------------|-------|---|
| 1 Persons                | No    |   |
| 2 Health care providers  | Yes   | TImR is used at health facilities. Health workers (e.g., facility-level nurses and clinicians) use the system to schedule and manage vaccination appointments, manage vaccination stock, and support other immunization services. |
| 3 Health system managers | Yes   | The DIVO portal that is accessible by users at the district level   |

## HEALTH SYSTEM CHALLENGES

End users shared the challenges they encountered using the system, categorized according to WHO's Classifications of Digital Health Interventions.

| 1   | Information                        |   | Priority               |
|-----|------------------------------------|---|------------------------|
| 1.3 | Lack of high-quality/reliable data | <p><b>Report extraction:</b> Data are sometimes erased during extraction process, resulting in unreliable data that render reports unusable. Following these failures, users cannot view the reports which leads to a delay in effective decision-making and planning.</p> <p><b>Unsynchronized facility data:</b> There is still a huge amount of data in health facility tablets that have not been synced with the server, which results in data inconsistencies across facilities that affects system usage and continuity of care.</p> | <p>Low</p> <p>High</p> |

## HEALTH SYSTEM CHALLENGES

|          |                                       |  |                 |
|----------|---------------------------------------|--|-----------------|
|          |                                       | <b>Stock data updates:</b> Facilities are not receiving stock data and updates from the district due to Internet or other system-related issues (e.g., received pentavalent and pneumococcal conjugate vaccine stocks at times would not be reflected on the stock overview summary and would therefore show a facility as being out of stock during a vaccination session).   | High            |
|          |                                       | <b>New functional features:</b> District officials must be assigned admin-level access to be able to assign villages to specific facilities, add target populations, or track zero-dose under-5 children.  | N/A             |
| 1.5      | Lack of access to information or data | Even though the system is FHIR compliant, it is currently not exchanging information with other systems in the ecosystem (e.g., the mediators between TImR and VIMS were developed and tested but have not been operational due to various technical setbacks).  | High            |
| <b>6</b> | <b>Efficiency</b>                     |  | <b>Priority</b> |
| 6.3      | Poor planning and coordination        | <b>System maintenance and support:</b> Users do not regularly receive notification of planned or emergency downtime resulting from changes made on the application of the hosting environment. In addition, there is high dependency/ reliance on the original developers, Hamilton Health Sciences, for technical support in resolving bugs and implementing any upgrades, rendering the whole process of technical support lengthy, costly, and ineffective. | High            |

## RECOMMENDATIONS

Users made several recommendations for strengthening this digital system, categorized according to WHO's Classification of Digital Health Interventions.

|          |   |  |  |
|----------|---|--|--|
| <b>2</b> | <b>Health care providers</b>  |  |  |
| 2.5.3    | Transmit routine news and workflow notifications to health care provider(s) | Add screen for sending system alerts when there is downtime or maintenance to all facilities or selected sites (administrator and region, district) for users to be aware of what is going on to properly allocate their time. |  |
| <b>3</b> | <b>Health system managers</b>   |  |  |
| 3.1.3    | Manage certification/ registration of health care provider(s)               | Improve administrator portal (DIVOs to have admin access specific to their roles, such as assigning village to their facilities, viewing stock and status).  |  |
| 3.2.1    | Manage inventory and distribution of health commodities                     | Enable system to allow administrators/DIVOs to see status of stock (i.e., pending or accepted).  |  |
| 3.2.2    | Notify stock levels of health commodities                                   | Enhance administrator portal to add stock visibility screen for administrators to be able to see stock sent from facilities.<br><br>Enable system to provide a reason why stock is not saved.                                  |  |
| <b>4</b> | <b>Data services</b>  |  |  |

|       |                                      |   |
|-------|--------------------------------------|---|
| 4.1.2 | Improve data storage and aggregation | Enable system to allow bulk synchronization of data to be done by DIVOs or system administrators.<br><br>Enhance ETL (extract, transform, and load) incremental data/changes to ensure data availability.                             |
| 4.4.1 | Enable data exchange across systems  | Enable system to make archived data available for other systems (e.g., client registry).<br><br>Enable information exchange between TImR and the Civil Registration and Vital Statistics to allow sharing of birth notification data. |

## PRIORITY DIGITAL SYSTEM 2

### Chanjo COVID

Chanjo COVID is a web-based application built on top of the District Health Information System 2 (DHIS2) platform to support COVID-19 vaccination nationwide. The application was rolled out throughout the country to enable appointment bookings, scheduling and recording of vaccinations, and issuance and verification of vaccination certificates, among other things. In 2022, the GoT developed and implemented a mobile client for the application to facilitate offline data capture and fast-track clearance of backlog data that had piled up at the health facilities. It is available in all 26 regions of mainland Tanzania.

| SYSTEM OVERVIEW   |          |  |               |                        |
|---|----------|--|---------------|------------------------|
| Global Goods Guidebook v.4 (pages)  | Scale    | Primary WHO classification system  | System owners | Implementers           |
| DHIS2 (41–42); established application  | National | C7: Immunization Information Systems<br><br>D6: Health Management Information Systems (HMIS) | MOH           | HISP Tanzania, MOH ICT |
| MAJOR FEATURES OF THE DIGITAL SYSTEM  |          |  |               |                        |
| Its main functional features include booking vaccinations, recording vaccinations, issuing vaccination certificates, and verifying certificates.  |          |  |               |                        |
| INTEROPERABILITY AND STANDARDS  |          |  |               |                        |
| Although Chanjo COVID is not currently integrated into other systems, there is an active initiative to integrate it with VIMS. PATH, through Digital Square (USAID), is supporting the MOH ICT department and vertical programs to strengthen the HIM, including developing and implementing interoperability use cases. Some of the use cases between VIMS and Chanjo COVID were included to improve end-to-end vaccine availability and to use supply chain data so that health workers across all levels have real-time visibility of stock data and can efficiently execute supply of vaccines. |          |  |               |                        |

## USERS

Chanjo COVID is used at the health facilities. Health workers use the system to manage vaccination appointments and fill out vaccine delivery. The system also issues digital vaccine certificates and verifies these at port of entry. The system is used on mobile smartphones, tablets, and desktop computers.

| Grouping                 | Users | Description  |
|--------------------------|-------|--|
| 1 Persons                | No    | N/A  |
| 2 Health care providers  | Yes   | Facility-level health workers  |
| 3 Health system managers | Yes   | District-level managers (DIVO, ICT officer, HMIS focal person), national-level MOH representatives |

## HEALTH SYSTEM CHALLENGES

End users shared the challenges they encountered using the system, categorized according to WHO's Classifications of Digital Health Interventions.

| 1   | Information                           |  |
|-----|---------------------------------------|--|
| 1.3 | Lack of high-quality/reliable data    | No stock management functionality.                                       |
| 1.5 | Lack of access to information or data | Chanjo COVID does not currently exchange information with other systems. |

## RECOMMENDATIONS

Users made several recommendations for strengthening this digital system, categorized according to WHO's Classification of Digital Health Interventions.

| 4.1   | Data collection, management, and use |                                  |
|-------|--------------------------------------|----------------------------------|
| 4.1.2 | Data storage and aggregation         | Include a stock management tool. |

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## PRIORITY DIGITAL SYSTEM 3

### Vaccine Information Management System (VIMS)

The Vaccine Information Management System (VIMS) is a cloud-hosted web application that is used by national, regional, and council users in Tanzania for end-to-end vaccine logistics management. VIMS computerized the then Excel-based Stock Management Tool/District Vaccination Data Management Tool.

## SYSTEM OVERVIEW

| Scale    | Primary WHO classification system            | Funders            | Licensing   |
|----------|--|--------------------|-------------|
| National | B6: Logistics Management Information Systems | MOH IVD & ICT, JSI | Open source |

## MAJOR FEATURES OF THE DIGITAL SYSTEM

VIMS supports the following functionalities and features:

- Stock management: Quantification of vaccines for international procurement, ordering, receiving, distribution, adjustment, and reporting.
- Activity reporting: Stock reporting for both routine and COVID-19 vaccines, as well as built-in standards and custom reports.
- System notifications: In-app and email notifications on low stock, near-expiry stock and batches, pending orders, and requests that have not been fulfilled.
- Other features: Document archiving, equipment inventory and monitoring, management and sharing of resources, general system administration and configuration, ability to capture logistics data and cold chain inventory data.

## INTEROPERABILITY AND STANDARDS

VIMS is not yet interoperable with other systems, although efforts are underway to make it exchange data with Chanjo COVID, TiMR, and the health facility registry (HFR).

## USERS

| Grouping                | Users | Description |
|-------------------------|-------|-------------|
| 1 Persons               | No    |             |
| 2 Health care providers | No    |             |

## USERS

|                          |     |   |
|--------------------------|-----|---|
| 3 Health system managers | Yes | <p>District-, regional-, and national-level use (DIVOs, RIVOs, and IVD Program Officers, respectively)</p> <ul style="list-style-type: none"> <li>At the national level, there are approximately 50 users, including program managers at the MOH and representatives from implementing partner organizations supporting immunization and service delivery. Users at the national level use the system for end-to-end stock management, including national vaccine quantification for international procurement, access reports, data analysis, and intake and distribution. General system administration—including configuration of users, administrative areas, and health facilities data—is also done centrally by the technical team at the MOH.</li> <li>Across all 26 regions of Tanzania’s mainland, approximately 80 users, including Regional Medical Officers, RIVOs, and assistant RIVOs, use VIMS for general stock management of vaccines, data management, analysis, and reporting. RIVOs and their assistants also use the system to enter and manage annual population targets for vaccination for councils within their regions.</li> <li>At the district level, VIMS is used by an estimated 500 users (District Medical Officers, DIVOs, and assistant DIVOs) in all 184 administrative councils (districts) in the country. Council users rely on VIMS for vaccine stock management, data analysis, monthly reporting, and management of facility vaccination population targets.</li> </ul> |
|--------------------------|-----|---|

## HEALTH SYSTEM CHALLENGES

End users shared the challenges they encountered using the system, categorized according to WHO’s Classifications of Digital Health Interventions.

|     |                                       |  |
|-----|---------------------------------------|--|
| 1   | <b>Information</b>                    |  |
| 1.5 | Lack of access to information or data | It is currently not exchanging data with other systems. Interoperability with the TImR and health and the HFR through Tanzania’s HIM was implemented but is not operational. |

## RECOMMENDATIONS

Users made several recommendations for strengthening this digital system, categorized according to WHO’s Classification of Digital Health Interventions.

|   |                               |  |
|---|-------------------------------|--|
| 3 | <b>Health system managers</b> |  |
|---|-------------------------------|--|

| HEALTH SYSTEM CHALLENGES |   |   |
|--------------------------|---|---|
| 3.1.2                    | Monitor performance of healthcare provider(s) | Strengthen the capacity of GoT technical teams on VIMS technologies, architecture, and underlying platform to enable them to effectively manage and maintain the system.  |
| <b>4</b>                 | <b>Data services</b>                          |   |
| 4.1.2                    | Data storage and aggregation                  | Incorporate features and functionalities to address gaps in reporting, data quality, notifications, and vaccine information visibility.   |
| 4.4.1                    | Data exchange across systems                  | Develop/upgrade information exchange between VIMS and HFR, VIMS and TImR, and VIMS and Chanjo COVID for automated and real-time data exchange to improve quality of data, improve visibility of stock, and minimize the burden of data entry. |

## DIGITAL SYSTEM 4

### Health Management Information System (HMIS)

DHIS2 is an open source, flexible, web based HMIS. In Tanzania, it is used on a national scale for capturing aggregate data on vaccine stock and delivery. It has limited capacity at all levels, including data management, technical infrastructure and support, data analytics and use, skilled personnel, and funding to support the digitalization of health facilities. The system is managed by the MOH ICT and M&E units, with tech support from the ICT unit, and is funded by HISP Tanzania and the University of Dar es Salaam.

| SYSTEM OVERVIEW                    |          |   |  |   |
|------------------------------------|----------|---|--|---|
| Global Goods Guidebook v.4 (pages) | Scale    | Primary WHO classification system         | Health and interoperability standards  | Funders   |
| DHIS2 (41–42)                      | National | D6: Health Management Information Systems | Health standards: ICD-9, ICD-10, ICD-11; SNOMED; ICPM; ICD10-PCS; ICD9-PROCS; WHO Essential Medicine, UNIPROT Genome<br>Interoperability standards: HL7 FHIR | University of Dar es Salaam / HISP Tanzania and MOH ICT |

| MAJOR FEATURES OF THE DIGITAL SYSTEM  |
|---|
| <ul style="list-style-type: none"> <li>• <b>Web-based:</b> The HMIS is a web-based system, making it easier for health facilities at all levels to report on their activities and performance, providing reports and visualizations for planning, monitoring, and evaluation purposes.</li> <li>• <b>Comprehensive:</b> The HMIS covers data from a wide range of health services and outcomes, including outpatient care, inpatient care, maternal and child health, tuberculosis, leprosy, immunization, nutrition, and HIV/AIDS.</li> <li>• <b>Flexible:</b> The HMIS is adaptable to the needs of different health facilities and different regions of Tanzania.</li> <li>• <b>User-friendly:</b> The HMIS is user-friendly and easy to navigate.</li> <li>• <b>Secure:</b> The HMIS is secure and protects the confidentiality of patient data.</li> </ul> |

## INTEROPERABILITY AND STANDARDS

DHIS2 is integrated with the HFR, eLMIS, Human Resource for Health Information System, and other systems in Tanzania. It is not, however, exchanging information with the TImR, Chanjo COVID, or VIMS.

## USERS

Data are manually entered at some facilities, and for the facilities that do not have access to the systems, council-level users such as DIVOs, compile data from facilities within their geographic areas and enter them into DHIS2.

| Grouping                 | Users | Description  |
|--------------------------|-------|--|
| 1 Persons                | No    |  |
| 2 Health care providers  | Yes   | Health workers who input data and promote data use so they can visualize trends and access information to improve service delivery.  |
| 3 Health system managers | Yes   | Health managers at the district, regional, and national levels have access to review the quality of services across all levels, starting at the facility level and up to the national level. |

## HEALTH SYSTEM CHALLENGES

End users shared the challenges they encounter using the system, categorized according to WHO's Classifications of Digital Health Interventions.

|          |  |   |
|----------|--|---|
| <b>1</b> | <b>Information</b>                               |   |
| 1.6      | Insufficient utilization of data and information | Limited data management, data analytics, and use due to limited capacities and a lack of skilled personnel at all levels.       |
| <b>2</b> | <b>Availability</b>                              |   |
| 2.2      | Insufficient supply of services                  | Limited technical infrastructure and technical support due to limited capacities and a lack of skilled personnel at all levels. |
| 2.4      | Insufficient supply of qualified health workers  | Limited personnel with the technology related skills needed to support health workers to use the digital systems effectively.   |
| <b>7</b> | <b>Cost</b>                                      |   |
| 7.2      | Lack of effective resource allocation            | Limited funding to support digitalization of health facilities.   |

## DIGITAL SYSTEM 5

### Electronic Integrated Disease Surveillance and Response (eIDSR)

An eIDSR system is used for reporting and tracking diseases of public health importance. It is aligned with the



3rd edition of the WHO Regional Office for Africa’s guidelines for IDSR which includes surveillance and response protocols for 44 diseases and health conditions of public health importance. Following the COVID-19 outbreak and introduction of COVID-19 vaccines in Tanzania, the MOH sought to use the eIDSR to track confirmed cases of COVID-19 and compare how many of those individuals had been vaccinated versus the general population. This was achieved through implementation of peer-to-peer information exchange between the eIDSR and Chanjo COVID digital applications.

| SYSTEM OVERVIEW   |                                       |  |                       |   |
|---|---------------------------------------|--|-----------------------|---|
| Global Goods Guidebook v.4 (pages)  | Scale                                 | Primary WHO classification system  | System owners         | Partners  |
| DHIS2 (41–42); established application  | National                              | D6: Health Management Information Systems<br>E2: Public Health and Disease Surveillance Systems                                      | MOH Epidemiology Unit | MOH ICT, University of Dar es Salaam, HISP Tanzania |
| MAJOR FEATURES OF THE DIGITAL SYSTEM  |                                       |  |                       |   |
| The eIDSR system is used to track both vaccinated and unvaccinated COVID-19 patients, as well as capture notifiable diseases on a national scale.   |                                       |  |                       |   |
| INTEROPERABILITY AND STANDARDS  |                                       |  |                       |   |
| The eIDSR has peer-to-peer integration with the Chanjo COVID system for confirmation of vaccination for patients who are diagnosed with COVID-19. The eIDSR is not integrated with the TImR for routine immunization and does not give details on the type of vaccine a patient has received. |                                       |  |                       |   |
| USERS   |                                       |  |                       |   |
| The eIDSR is used by surveillance focal persons at health facilities nationwide.  |                                       |  |                       |   |
| Grouping  | Users                                 | Description  |                       |   |
| 1 Persons   | No                                    |  |                       |   |
| 2 Health care providers   | Yes                                   | Surveillance focal persons at health facilities nationwide use eIDSR to track COVID-19 vaccinations and capture notifiable diseases. |                       |   |
| 3 Health system managers  | Yes                                   | Health system managers use the system to access the data after the eIDSR data are fed into the HMIS.                                 |                       |   |
| HEALTH SYSTEM CHALLENGES  |                                       |  |                       |   |
| End users shared the challenges they encounter using the system, categorized according to WHO’s Classifications of Digital Health Interventions.  |                                       |  |                       |   |
| 1   | Information                           |  |                       |   |
| 1.5   | Lack of access to information or data | eIDSR is not integrated with TImR for tracking routine immunization.   |                       |   |

## HEALTH SYSTEM CHALLENGES

|     |                           |  |
|-----|---------------------------|--|
| 1.7 | Lack of unique identifier | eIDSR does not give details on the type of vaccine a patient has received. |
|-----|---------------------------|--|

## DIGITAL SYSTEM 6

### Health Facility Registry (HFR)

The HFR is a system for registration of both public and private health facilities in Tanzania's mainland. The system acts as a true source of health facility data for all applications within the Tanzania digital health ecosystem, including the electronic immunization systems. Housing facility information in the HFR ensures consistency in the use and reporting of facility-level data across systems and institutions, as well as across the health sector.

#### SYSTEM OVERVIEW

| Scale    | Primary WHO classification system | Licensing   | Funders                                 |
|----------|-----------------------------------|-------------|---|
| National | C4: (Health) Facility Registries  | Open source | MOH ICT, University of Computing Center |

#### MAJOR FEATURES OF THE DIGITAL SYSTEM

The HFR is a tool used to provide access to information on officially recognized public and private health facilities in Tanzania's mainland. Several systems are connected to the HFR to ensure a trusted, consistent source of information and data on facilities that are being used and referenced across systems.

#### INTEROPERABILITY AND STANDARDS

Integration is done through the HIM with the following connected systems: DHIS2, eLMIS, Tanzania Health Supply Chain Portal, National Health Insurance Fund, Afya Supportive Supervision system, Human Resource for Health Information System, and Medical Store Department system.

#### USERS

The eIDSR is used by surveillance focal persons at health facilities nationwide.

| Grouping                 | Users | Description   |
|--------------------------|-------|---|
| 1 Persons                | No    |   |
| 2 Health care providers  | No    |   |
| 3 Health system managers | Yes   | Health system managers look-up, add, or update health facility codes and related information. |

## HEALTH SYSTEM CHALLENGES

End users shared the challenges they encounter using the system, categorized according to WHO's Classifications of Digital Health Interventions.

### 1 Information

|     |                               |  |
|-----|-------------------------------|--|
| 1.3 | Lack of quality/reliable data | <p>There is no mechanism to validate services offered against available equipment (e.g., a facility without a radiographer and X-ray machine cannot offer X-ray services).</p> <p>The system does not restrict based on minimum facility registration requirements per facility type.</p> <p>The system has two menus for updating and upgrading facilities that offer similar functionalities which can confuse users. It does not capture the inspection process at the council and regional levels.</p> <p>Duplication of facility records can occur due to having the district focal person or facility owner creating a new application instead of upgrading/changing the existing records (e.g., updating name, ownership, or location).</p> |
|-----|-------------------------------|--|

## DIGITAL SYSTEM 7

### Tanzania Health Information Mediator (HIM)

The Tanzania HIM is an interoperability layer within the Tanzania digital health framework that is designed and implemented to facilitate interoperability between point-of-care systems (e.g., TImR) and other digital health applications, such as those involved in managing supply chain of commodities and vaccines (VIMS), core registries (e.g., HFR), and health systems (DHIS2). The use of an interoperability layer makes it easy to reuse and share information and promote data use.

#### SYSTEM OVERVIEW

| Global Goods Guidebook v.4 (pages) | Scale    | Primary WHO classification system         | System owners         | Health and interoperability standards  | Funders and implementers        |
|------------------------------------|----------|---|-----------------------|--|---------------------------------|
| OpenHIM (27)                       | National | D2: Data interchange and interoperability | MOH Epidemiology Unit | Compliant with FHIR and Tanzania Health Enterprise Architecture blueprint standards and guidelines | MOH ICT and PATH/Digital Square |

#### MAJOR FEATURES OF THE DIGITAL SYSTEM

The Tanzania HIM is a middleware component designed to ease interoperability between disparate systems. So far, more than 36 systems are connected and able to exchange information.

## INTEROPERABILITY AND STANDARDS

- Even though mediators through the HIM were developed to support information exchange between VIMS and the HFR and VIMS and the TImR, they are yet to be fully operational.
- 160 interoperability use cases are available at the national level.
- The HIM is compliant with FHIR and Tanzania Health Enterprise Architecture blueprint standards and guidelines.

## USERS

| Grouping                 | Users | Description  |
|--------------------------|-------|--|
| 1 Persons                | No    |  |
| 2 Health care providers  | No    |  |
| 3 Health system managers | Yes   | System administrators have the ability to add more interoperability use cases. |

## DIGITAL SYSTEM 8

### Unified Community System (UCS)

The UCS is an application based on OpenSRP (Open Smart Register Platform) and used to support community-based services and interventions. The MOH is envisioning an enhanced UCS, subject to availability of resources, to support community-based immunization campaigns and services. The enhancement will include implementing mediators through the HIM to facilitate exchange of immunization data between the UCS and the facility-based immunization registry for continuity of care for immunization Persons.

Since 2021, Digital Square has collaborated with the GoT through the MOH to strengthen the community health system based on the OpenSRP software. The OpenSRP platform is an open source, digital global good whose primary users are frontline health workers. It empowers health workers by allowing them to digitally record the services they render at community- and health-facility levels, while simultaneously providing program managers and policymakers with current data for improved decision-making. With funding support from USAID, Digital Square worked with the MOH to strengthen the UCS's functionalities and governance structure as part of Tanzania's health information system. The system comprises three components: the WAJA (Watoa huduma ngazi ya jamii) application for community health care workers, the KITUONI application for facility health care workers, and the reporting application (In-App and dashboard) for the managerial level to provide insights and analytics of data to support decision-making. The UCS is currently used to support the following health domains: HIV/AIDS; reproductive, maternal, newborn, and child health; tuberculosis/leprosy; and malaria. UCS has a health interoperability mediator layer, funded through the US President's Emergency Plan for AIDS Relief (PEPFAR), which allows it to securely exchange data with other systems. Though the UCS does not currently possess immunization-related workflows or features, though it could be adapted to do so.

## SYSTEM OVERVIEW

| Scale       | Primary WHO classification system       | System owners                   | Health and interoperability standards   | Funders | Implementers   |
|-------------|---|---------------------------------|---|---------|----------------|
| Subnational | A2: Community-based information systems | MOH's Health Promotion Services | OpenSRP can support: <ul style="list-style-type: none"> <li>• HL7 FHIR</li> <li>• CIEL</li> <li>• ICD-9, ICD-10, ICD-11</li> <li>• LOINC</li> <li>• SNOMED</li> </ul> | UCS     | Digital Square |

## USERS

| Grouping                 | Users | Description  |
|--------------------------|-------|--|
| 1 Persons                | No    |  |
| 2 Health care providers  | Yes   | Community health workers and facility-level workers. |
| 3 Health system managers | Yes   | Community health worker managers/team leads.         |

# Conclusion and next steps

Digital Square, with the MOH, mapped and analyzed the current immunization ecosystem in Tanzania to identify gaps, challenges, and opportunities for the DIPC project to support strengthening of digital health immunization systems in a coordinated effort with the government and other stakeholders.

Implementation of the DIPC project in Tanzania focused on strengthening existing in-country digital immunization tools by:

1. Reviewing and standardizing end-to-end immunization workflows, processes, data standards, business logic, and requirements to strengthen and scale digital tools for immunization.
2. Mapping the existing digital tools for immunization (e.g., TImR, Chanjo COVID, and VIMS) to understand gaps and areas of improvement.
3. Strengthening capacity of local technical teams on best practices for integrating WHO and MOH guidelines and recommendations in digital tools using the SMART Guidelines approach (Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable) with multiple modalities (e.g., mentoring, training).

This country profile is intended to serve as a resource for the GoT and other stakeholders (e.g., donors, implementers, academic institutions) who are working to strengthen digital systems that support immunization. Describing Tanzania's current digital health ecosystem can help ensure that future efforts are aligned with the GoT's vision to aim first at areas of highest priority and need. Working together as a global digital health community—led by the GoT and in line with its governance mechanisms and strategies—is imperative to creating and strengthening digital tools that support access to and delivery of lifesaving vaccines.

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