

# Digital health systems to support pandemic response in Tanzania

## Mapping digital health tools and matching deployment opportunities in response to COVID-19

June 2021

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## Introduction


Tanzania's Ministry of Health, Community Development, Gender, Elderly and Children's (MOHCDGEC's) *National Digital Health Strategy: 2019–2024* states its mission "to accelerate the transformation of the Tanzanian health care system through innovative, data-driven, client-centric, efficient, effective, and integrated digital health solutions." The COVID-19 pandemic has strained the health system, bringing a new level of urgency to the government's mission. Leveraging digital health tools is a rapid, cost-effective strategy to accelerate Tanzania's COVID-19 response while at the same time reinforcing its mission.

## Background

Digital Square conducted a landscape analysis of Tanzania's digital systems in the ten-year period from 2010–2020 with information validated by tool implementers and designers and digital health experts, as part of the US Agency for International Development (USAID)–funded Map and Match project. The purpose was to identify the existing digital tools used in Tanzania, map the tools already deployed for COVID-19 response to relevant use cases, and highlight opportunities where existing tools can quickly be adapted and deployed to support COVID-19 response..

  
91  
digital tools identified

  
42  
tools scaled nationally

  
15  
tools deployed for COVID-19

  
42  
tools potentially adapted for COVID-19

## Analysis overview

Map and Match's analysis found that Tanzania's health system uses 91 digital health tools with at least 42 already deployed for COVID-19 response. This brief identifies opportunities for existing digital tools to be adapted to pandemic use cases to respond to needs for the COVID-19 response and potential future epidemics. Mapping of the existing tools to the use cases revealed where there are strengths and opportunities in Tanzania's digital health system's response to COVID-19. For example, the analysis identified only one tool that currently supports two use cases, namely One Health and points of entry, with additional tools ready for adaptation to further address them. Strategic adaptation of existing digital health tools will accelerate the COVID-19 response, offering greater efficiency and more robust support to the government, health workers, clients, and other stakeholders.

## Key definitions

**Pandemic use case** refers to the specific type of information collected, stored, tracked, analyzed, or visualized as it relates to the functional response to an epidemiological event, specifically COVID-19.

**Digital health tool** refers to a website, application, or other computer or mobile technology that supports data collection, storage, tracking, analysis, or visualization. The tool must have an electronic interface. One digital tool can address multiple use cases.

**Application** refers to components of digital tools that are primarily designed for use by clients of the health system or by health workers. Applications can be reused to address more than one use case, or applications can be uniquely used for only one use case.

**Adaptation** refers to making improvements to existing digital tools to improve their applicability and impact in the context of COVID-19.

Figure 1. Current number of digital health tool deployments mapped to pandemic use cases in Tanzania.

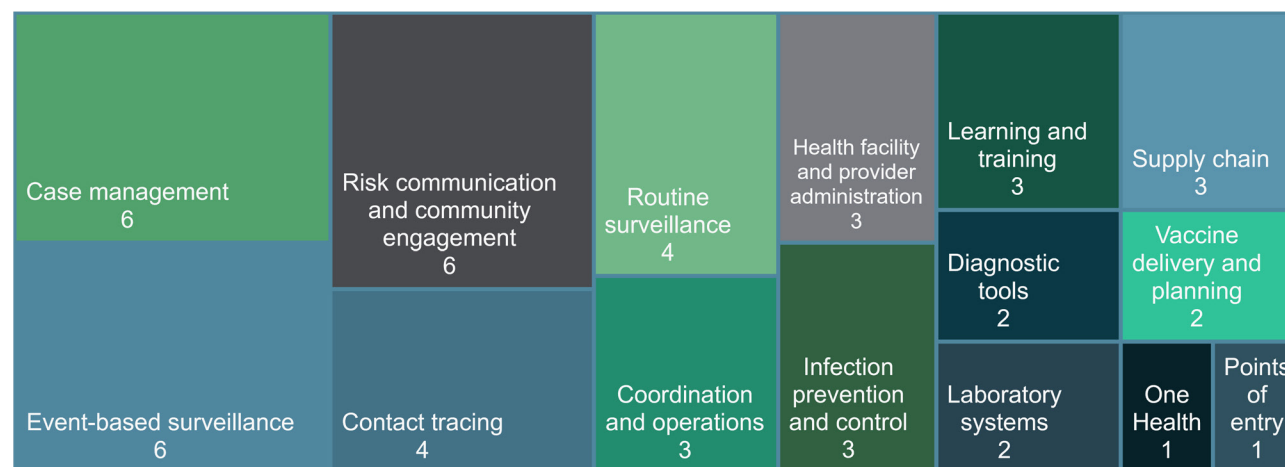


Figure 1 illustrates that many use cases are addressed using several tools in Tanzania's COVID-19 response while other use cases are filled by a sole tool.

*Digital Square and USAID attempted outreach efforts to the MOH to conduct a key informant interview to validate the data found in the Map and Match assessment, but were unsuccessful.*

**Table 1. Mapping and matching digital health tools to strengthen Tanzania’s COVID-19 response.**

Digital Square mapped the current state of tools’ functionality across the pandemic use cases in **blue** to illustrate how the digital health systems are supporting Tanzania’s COVID-19 response. Digital Square matched opportunities for tool adaptation across the pandemic use cases in **green** to reveal places where Tanzania can reuse parts of its existing digital health systems to strengthen its COVID-19 response.

		PANDEMIC USE CASES														
		Case management	Contact tracing	Coordination and operations	Diagnostic tools	Event-based surveillance (including rapid response teams, case investigation)	Health facility and provider administration	Infection prevention and control	Laboratory systems	Learning and training	One Health	Points of entry	Risk communication and community engagement	Routine surveillance	Supply chain	Vaccine delivery and planning
DIGITAL HEALTH TOOLS	Ada Health App															
	AfriDB SafeCare Data Management System (SafeCare4COVID)															
	Community Health Toolkit (CHT)															
	Computer Aided Detection for COVID-19 (CAD4COVID)															
	Everwell Hub															
	Jamii ni Afya															
	Kisomo SmartLearn															
	mHero															
	MomCare															
	Simprints															
	Surveillance Outbreak Response Management and Analysis System (SORMAS)															
	Tanzania’s HMIS (DHIS2 + Tracker + COVID + eIDSR)															
	TImR (SantéIMS)															
	Viamo 3-2-1															
	World Continuing Education Alliance (WCEA)															
	AfriDoctor															
	AfyaCare (Bahmni, OpenMRS)															
AfyaData (ODK)																

■ Digital tools deployed for COVID-19 response      ■ Opportunities to adapt tools for pandemic response

Table 1. Mapping and matching digital health tools to strengthen Tanzania’s COVID-19 response, continued.

		PANDEMIC USE CASES														
		Case management	Contact tracing	Coordination and operations	Diagnostic tools	Event-based surveillance (including rapid response teams, case investigation)	Health facility and provider administration	Infection prevention and control	Laboratory systems	Learning and training	One Health	Points of entry	Risk communication and community engagement	Routine surveillance	Supply chain	Vaccine delivery and planning
DIGITAL HEALTH TOOLS	Afya-Tek (OpenSRP)	■	■		■	■	■	■			■	■	■	■		
	Audiopedia											■				
	Boresha Afya (OpenSRP)	■	■		■	■	■	■			■	■	■	■		
	Cadasta platform						■						■			
	ColdTrace													■	■	
	CommCare	■	■		■	■	■	■	■			■	■		■	
	Connected Health AI Network (CHAIN)			■			■								■	
	CTC2 database	■				■										
	electronic Integrated Management of Childhood Illnesses (eIMCI) (CommCare)	■	■		■	■	■	■	■			■	■			
	eLMIS (OpenLMIS)														■	
	Fionet				■	■										
	Government of Tanzania - Hospital Management Information System (GoT-HoMIS) (DHIS2)	■	■	■	■	■	■		■			■	■	■	■	■
	GxAlert				■	■			■							
	Healthy Pregnancy, Healthy Baby (HPHB)												■			
	iHRIS						■			■						
	Integrated Supportive Supervision (ISS) (ODK)	■														■
	JamboMama App	■											■			
	LabNet								■							
	Mama na Mwana												■			
	Mobile for Reproductive Health (m4RH)												■			

■ Digital tools deployed for COVID-19 response    ■ Opportunities to adapt tools for pandemic response

Table 1. Mapping and matching digital health tools to strengthen Tanzania’s COVID-19 response, continued.

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		Case management	Contact tracing	Coordination and operations	Diagnostic tools	Event-based surveillance (including rapid response teams, case investigation)	Health facility and provider administration	Infection prevention and control	Laboratory systems	Learning and training	One Health	Points of entry	Risk communication and community engagement	Routine surveillance	Supply chain
DIGITAL HEALTH TOOLS	M-palliative care link (mPCL) (CommCare)	■										■			
	mSupply (ColdChain and Mobile Vaccine module)													■	■
	mVacciNation	■						■						■	■
	mWater							■							
	National Sanitation Management Information System (NSMIS) (DHIS2)							■							
	Nightwatch: Mobile											■			
	Safe Delivery App									■		■			
	Safer Deliveries App	■		■											
	SanteMPI (formerly MEDIC CR)	■	■	■	■	■			■			■		■	■
	Sauti Project (CommCare, DHIS2)	■	■			■	■	■	■			■	■		
	SMS for Life													■	
	The Dynamic Project					■									
	Timed and Targeted Counselling mHealth application (mTTC) (CommCare)	■	■			■	■	■	■	■		■	■		
	U-Report											■			
	Vaccine Information Management System (VIMS) (OpenLMIS)													■	■
	VigiFlow													■	
	WeiTel Health Platform	■	■	■	■	■		■				■	■	■	■
	Wired Mothers													■	
	Zipline													■	

■ Digital tools deployed for COVID-19 response    ■ Opportunities to adapt tools for pandemic response

## Matching digital health tools ready for adaptation to fill the pandemic use case gaps

The analysis identified existing digital tools that can be adapted to support COVID-19 response for the use case gaps below, which are One Health and points of entry. Use case gaps are defined as use cases that have fewer than two tools addressing them. Many of these tools also provide opportunities to streamline the COVID-19 response across a range of use cases.

To learn more about the tools in the matrix below, please see Table 2 for more details to facilitate adaptations. To find out more about all the Digital Square approved global goods mapped across these pandemic use cases, please see [this Map and Match resource](#), which can provide decision-makers with targeted information to deploy and adapt global goods to fulfill gaps in the COVID-19 response.

### One Health

Community Health Toolkit	AfyaData (ODK)
eHA Data Portal	

### Points of entry

Community Health Toolkit	AfyaCare (Bahmni, OpenMRS)
Afya-Tek (OpenSRP)	Boresha Afya (OpenSRP)
CommCare	eIMCI (CommCare)
GoT-HoMIS (DHIS2)	mHero
SanteMPI	Sauti Project (CommCare, DHIS2)
SORMAS	Tanzania HMIS (DHIS2 + Tracker + COVID + eIDSR)
mTTC (CommCare)	WelTel Health Platform

## Examples of global goods deployed and adapted for COVID-19 response in Tanzania

### Tanzania's HMIS (DHIS2 with Tracker)

Tanzania's HMIS is built on DHIS2, which is an open source, web-based HMIS platform. DHIS2 supports the collection, analysis, visualization, and sharing of both aggregate and individual-level data (using Tracker), including mobile and offline data collection using the DHIS2 Android app.

DHIS2 has several ready-to-install digital data packages to support COVID-19 surveillance and response based on WHO guidelines. DHIS2 has a COVID-19 Surveillance Event Program (i.e., an event-based surveillance program), which is a simplified line list to capture a subset of minimum critical data points to facilitate rapid analysis and response. DHIS2 strengthens contact tracing by enabling identification and follow-up of contacts of a suspected or confirmed COVID-19 case. COVID-19 case-based surveillance enrolls and tracks suspected cases; captures symptoms, demographics, risk factors, and exposures; creates lab requests and captures laboratory data about the case; links confirmed cases with contacts; and monitors patient outcomes.



- Case management
- Contract tracing
- Coordination and operations
- Diagnostic tools
- Event-based surveillance
- Health facility and provider administration
- Laboratory systems
- One Health
- Points of entry
- Risk communication and community engagement
- Routine surveillance
- Supply chain

### SORMAS

Surveillance Outbreak Response Management & Analysis System (SORMAS) is open source software that processes disease control and outbreak management procedures. SORMAS also provides real-time digital surveillance of peripheral health care facilities and laboratories, which facilitates early detection of outbreaks. SORMAS's ability to validate real-time surveillance data enables COVID-19 contact tracing while monitoring the potential for future cases. SORMAS offers easy-to-use, multifunctional mobile health (mHealth) and electronic health (eHealth) applications, which are compatible with standard surveillance systems.

Many countries, including Afghanistan, Burkina Faso, Cote d'Ivoire, Fiji, Ghana, Kenya, Nepal, Nigeria, Tanzania, and Togo, deployed SORMAS adaptations for COVID-19. For example, Ghana and Nigeria activated a module they are using at points of entry such as airports and harbors, covering a population of more than 85 million.



- Case management
- Contact tracing
- Coordination and operations
- Event-based surveillance
- Infection prevention and control
- Laboratory systems
- Learning and training
- Points of entry
- Routine surveillance
- Vaccine delivery and planning

**Table 2. An in-depth look at digital health tools to support the COVID-19 response.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Ada Health App	The Ada Health App guides users to answer simple questions about their own or others' health and symptoms. Ada's AI assesses answers against its medical dictionary of thousands of disorders and conditions. Users receive a personalized assessment report that tells them what could be wrong and what to do next. This app is available in Swahili.	Risk communication and community engagement	Fondation Botnar	Ada Health	Proprietary	
AfriDB SafeCare Data Management System (SafeCare4COVID)	SafeCare is a unique standards-based incremental approach, accredited by International Society for Quality in Health Care, for measuring and improving the quality of health care services in low-resource settings. With the free, globally accessible SafeCare4Covid mobile app, facility staff can perform a self-assessment using their own mobile phones; report on the availability of equipment, staff, and supplies; and check on their own processes and knowledge to treat patients for COVID-19 while staying safe. Data derived from the SafeCare4Covid app can be used through dashboards by stakeholders for data-driven resource allocation and patient allocation. The tool has been adapted into a generic pandemic infection prevention tool.	Coordination and operations, event-based surveillance, health facility and provider administration, infection prevention and control	Achmea Foundation, ELMA Foundation, GCC, Merck for Mothers, PharmAccess Foundation	CRS, MOHSW, PharmAccess Foundation	Open source	Subnational
Community Health Toolkit (CHT)	CHT is a collection of open source technologies and open access design, technical, and implementer resources and is a community of practice for digitally supported care delivery. It is designed to support community health systems and teams delivering care in the hardest-to-reach communities. The CHT has been adapted for COVID-19 response to better facilitate investigation of COVID-19 alerts, as well as to effectively triage to ensure that those most at risk can access appropriate care in a timely manner.	Case management, contact tracing, coordination and operations, event-based surveillance, health facility and provider administration, infection prevention and control, learning and training, one health, points of entry, risk communication and community engagement, routine surveillance, supply chain, vaccine delivery and planning		D-tree International, MOHCDGEC	Open source	National
Computer Aided Detection for COVID-19 (CAD4COVID)	CAD4COVID is a free solution that uses artificial intelligence on chest X-rays to triage suspected COVID-19 cases to support triaging in resource-constrained settings and high-prevalence areas. This solution has been adapted in many countries to triage COVID-19 suspected cases.	Case management, diagnostic tools, event-based surveillance, infection prevention and control		Delft Imaging	Freemium	National
Everwell Hub	The Everwell Hub platform covers the entire digital cascade of care and is the core digital infrastructure that officers, health workers, and patients use to support diagnosis, treatment success, and recovery from TB. The Everwell Hub supports a broad patient management ecosystem (i.e., mobile, web, SMS, IVR). Everwell Hub has adaptations for HIV, mental health, and COVID-19.	Case management, diagnostic tools, event-based surveillance, laboratory systems		Everwell, Government of Tanzania	Open source	National
Jamii ni Afya	Jamii ni Afya has been formally adopted by the MOHCDGEC as part of its 2020–2025 National Community Health Strategy. The MOHCDGEC Zanzibar is training and deploying digitally enabled CHVs nationwide to provide home-based care and counseling for women and children under 5 on ECD, nutrition, and RMNCH. The digital platform is the foundation of the CHV program and includes a smartphone app, dashboards, and data integration into MOHCDGEC systems. The app serves as a client tracking and job aid tool for CHVs, with the secondary purpose of collecting data to feed the reporting HMIS. Data collected for client visits are automatically synced and aggregated for use in program monitoring and the national information system. Additionally, supervisors at health facilities can monitor CHVs' performance based on indicators. For COVID-19, Jamii ni Afya effectively shared with CHVs protocol changes (e.g., no-contact protocols) and provided messaging to CHVs and clients regarding COVID-19 precautions.	Event-based surveillance, risk communication and community engagement, routine surveillance	Fondation Botnar, Gates Foundation, HDIF, Hilton Foundation, James Percy Foundation	D-tree International, Zanzibar MOH	Open source	National
Kisomo SmartLearn	Kisomo SmartLearn is a video-based digital learning app with local content in high-definition videos. The app uses 2D/3D animations and audio to deliver educational material to learners during the COVID-19 pandemic.	Learning and training		Smartcore Enterprise	Proprietary	National

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**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
mHero	mHero brings together existing health information systems with locally popular communication platforms to facilitate the exchange of important health information. First created in 2014 to support health-sector communication during the Ebola outbreak in West Africa, mHero has since been adapted for COVID-19 response in the DRC, Guinea, Kenya, Liberia, Mali, Senegal, Sierra Leone, Tanzania, and Uganda. mHero has adapted to include additional features of COVID-19 disease surveillance workflows, to send messages from any FHIR-compliant database (e.g., OpenMRS), and to respond to messages via WhatsApp and Facebook Messenger.	Case management, contact tracing, coordination and operations, event-based surveillance, health facility and provider administration, learning and training, points of entry, risk communication and community engagement, supply chain	J&J, UNICEF, USAID	MOHSW	Open source	National
MomCare	MomCare is a digital three-way agreement (i.e., smart contract) among mothers, contracted health facilities, and health service funders at preset terms and conditions to deliver quality maternal and newborn health services (i.e., care bundles). The platform efficiently and transparently links patients, providers, and payers to improve the financing and delivery of maternity care. MomCare includes a telehealth/triage app via SMS to support patients during COVID-19. During COVID-19, MomCare adaptations allowed continued access to care for expecting women. Data-driven overviews of high-risk women due to deliver made it possible to contact these women swiftly and attend to them to have a skilled delivery enabled by an after-curfew-hours ambulance referral system.	Risk communication and community engagement, routine surveillance	CIFF, ELMA Foundation, Merck for Mothers, MSD for Mothers	PharmAccess Foundation	Proprietary	Subnational
Simprints	Simprints deploys biometric identification documents on health and humanitarian projects to increase health care visits and quality while preventing fraud. The Simprints scanner scans fingerprints and hooks up to a mobile phone. Accurate identification supports effective response by ensuring that patients are correctly linked with their records, and that their records can be linked longitudinally. The Simprints biometric solution is a desirable technology in the context of contact tracing and case management for COVID-19.	Case management, contact tracing, event-based surveillance, vaccine delivery and planning		Simprints Technology	Proprietary	Subnational
Surveillance Outbreak Response Management and Analysis System (SORMAS)	SORMAS is open source software that processes disease control and outbreak management procedures. SORMAS also provides real-time digital surveillance of peripheral health care facilities and laboratories, which facilitates early detection of outbreaks. Afghanistan, Burkina Faso, Cote d'Ivoire, Fiji, Ghana, Kenya, Nepal, Nigeria, Tanzania, and Togo deployed SORMAS adaptations for COVID-19. Countries are able to access validated real-time surveillance data to enable contact tracing and monitoring of the potential for future cases. Although not currently used for points of entry in Tanzania, Ghana and Nigeria activated a new module they are using at points of entry such as airports and harbors, covering a population of more than 85 million.	Case management, contact tracing, coordination and operations, laboratory systems, learning and training, event-based surveillance, infection prevention control, points of entry, routine surveillance, vaccine delivery and planning		Digital Square, SORMAS	Open source	
Tanzania's HMIS (DHIS2 + Tracker + COVID + eIDSR)	Tanzania's HMIS is the MOHCDGEC's implementation of DHIS2. DHIS2 is an open source, web-based platform, typically used as a national health information system for data management and analysis purposes, for health program monitoring and evaluation, facility registries and service availability mapping, logistics management, and mobile tracking of pregnant mothers in rural communities. DHIS2 supports the collection, analysis, visualization, and sharing of both aggregate and individual-level data, including mobile and offline data collection using the DHIS2 Android app. DHIS2 is deployed in more than 70 countries. In Tanzania, DHIS2 is used for COVID-19 response to accelerate case detection, situation reporting, and active surveillance.	Case management, contact tracing, coordination and operations, diagnostic tools, event-based surveillance, health facility and provider administration, laboratory systems, points of entry, risk communication and community engagement, routine surveillance, supply chain	DHIS2, Gavi, MOHCDGEC, Norad, The Global Fund	HISP Tanzania, MOHCDGEC	Open source	National
TImR (SantéIMS)	SantéIMS (formerly OpenIZ) is nationally deployed as Tanzania's TImR EIR. TImR gives health workers access to immunization data that can be used for decision-making to improve the effectiveness and efficiency of delivering immunization services. SantéIMS is a purpose-built, offline-first, highly scalable and flexible EIR platform that supports end-to-end implementation and management of immunization programs at any scale. It provides fully integrated vaccination registration and vaccine delivery workflow support from point of care to stock management, to indicator reporting and beyond. For COVID-19, the vaccination planning and scheduling component has been used to manage and facilitate social distancing.	Health facility and provider administration, risk communication and community engagement, supply chain, vaccine delivery and planning	Gates Foundation, Gavi, WHO	MOHCDGEC, PATH	Open source	National

 Digital tools deployed for COVID-19 response  Opportunities to adapt tools for pandemic response

**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Viamo 3-2-1	Viamo's flagship product, the 3-2-1 Service, is a free information service available in 18 countries globally. Users can access prerecorded audio messages in local languages for free. Users can also play interactive audio games, which are engaging, pathway-based games that allow them to think through decisions on relevant topics. Viamo partnered with CARE International in Tanzania to deliver COVID-19 messages through the 3-2-1 Service, surveys, and push camp. The Wanji Game is also included in this tool to share COVID-19 prevention messages in Tanzania in partnership with PVI. The Wanji Game uses an interactive "listen-then-choose" audio game to promote positive behavior and to test players' current knowledge and understanding of prevention techniques.	Risk communication and community engagement	CARE International	CARE International, PVI, Viamo	Proprietary	National
World Continuing Education Alliance (WCEA)	This learning management system is a multifield eLearning and mHealth system that supports virtual and blended learning linked to certifications for professional development and lifelong learning. Examples of content include modules about nursing and midwifery and COVID-19 (both clinical and nonclinical). The platform generates reports on study habits and data of users (i.e., age, gender, location, qualification, role, employment status).	Learning and training		Midwifery Association, WCEA	Proprietary	National
AfriDoctor	AfriDoctor is an online platform that digitizes patients' care paths and brings health providers closer to their patients. The platform allows patients to book online appointments with their providers and receive free SMS reminders. The platform gives providers a calendar management tool, invoicing and medical records management tool, and visibility/referencing of health structures.	Health facility and provider administration, learning and training	Ecare Group, Investisseurs Privés	Aucun, Ecare Groupe	Freemium	National
AfyaCare (Bahmni, OpenMRS)	AfyaCare is a hospital management information system to improve revenue collection and clinical processes in regional and zonal hospitals.	Case management, diagnostic tools, event-based surveillance, health facility and provider administration, laboratory systems, points of entry, supply chain, vaccine delivery and planning	GIZ, Netherlands IICD	Africa eHealth Solutions, GIZ, Government of Tanzania, MSH, MDH, UCC	Open source	National
AfyaData (ODK)	AfyaData is an open source infectious disease surveillance system that consists of an Android-based mobile application and a web-based application that acts as a server. The mobile app is used for collecting and submitting surveillance data and for receiving and tracking feedback, while the server component is responsible for data storage and management.	Case management, event-based surveillance, one health, routine surveillance	Ending Pandemics	InSTEDD, SACIDS	Open source	National
Afya-Tek (OpenSRP)	The Afya-Tek program, a digital care and referral system, reimagines Tanzanian primary health care to be centered around clients and to improve the coordination among providers to ensure quality care is accessible to all. Using mobile apps integrated with biometrics, CHWs can track clinical information about their clients, access decision support during home visits, initiate referrals, and ensure appropriate follow-up care. The Afya-Tek system links these CHWs to health facilities and private drug shops to facilitate the submission of visits, referrals, and follow-ups and ensure that relevant data is available to other care providers. It is built on the OpenSRP app, which supports the health worker to prioritize point-of-care tasks, track service delivery, and simplify reporting. OpenSRP has been used to build localized applications for RMNCH, adolescent health, immunization, ECD, malaria rapid diagnosis and management, and tuberculosis treatment management.	Case management, contact tracing, diagnostic tools, event-based surveillance, health facility and provider administration, infection prevention and control, laboratory systems, points of entry, risk communication and community engagement, routine surveillance, supply chain	Fondation Botnar	Apotheker Consultancy, D-tree International	Open source	Subnational
Audiopedia	Audiopedia is an ecosystem of localized digital audio content and technologies for social and behavior change communication campaigns. Audiopedia includes audio health education delivered through web applications for smartphones and feature phones. For COVID-19, Audiopedia published the Corona WhatsApp Audio Campaign on Audiopedia.IO. Recorded messages can be shared through WhatsApp and fight misinformation.	Risk communication and community engagement		Audiopedia, URIDU	Open source	Subnational
Boresha Afya (OpenSRP)	USAID's Boresha Afya Project is a five-year project implemented in seven regions of the Tanzania Mainland and Zanzibar. The goal of the project is to improve the health status of all Tanzanians—with a focus on women, youth, and children—by improving the availability of, and access to, quality, respectful, and integrated health services. The project's digital health component includes digital learning to improve the performance of health providers and the emergency transport and referral system to improve maternal survival. The digital component of Boresha Afya is built on OpenSRP, which maintains client data, automates health care, provides a foundation for the continuum of care, and includes GIS for operational planning.	Case management, contact tracing, diagnostic tools, event-based surveillance, health facility and provider administration, infection prevention and control, laboratory systems, points of entry, risk communication and community engagement, routine surveillance, supply chain	USAID	Jhpiego	Open source	Subnational

 Digital tools deployed for COVID-19 response  Opportunities to adapt tools for pandemic response



**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Cadasta platform	Cadasta provides a common global platform and set of technology and training tools that allow local organizations, government entities, and communities to document and map land and occupants in a more quick, efficient, and affordable way. Cadasta uses an Esri-based suite of best-in-class tools and technologies that takes the land-related data and migrates the data into government systems.	Infection prevention and control, routine surveillance		Cadasta, Seed Change	Proprietary	Subnational
ColdTrace	ColdTrace is a wireless remote temperature monitoring solution designed for vaccine refrigerators in rural clinics and health facilities. The impact of COVID-19 on lifesaving immunization services has highlighted the need for a resilient cold chain system that can serve both routine and emergency vaccination going forward. This is possible by having end-to-end visibility into the country's vaccine cold chain network and ensuring data on fridge performance, power, and connectivity are available to the MOHCDGEC in real time through ColdTrace. ColdTrace has partnerships with seven national governments and is active in 17 other countries. Nexleaf Analytics has connected cold chain equipment from more than 16,822 health facilities and trained more than 1,400 health workers to respond to cold chain failures.	Supply chain, vaccine delivery and planning	GAC	NexLeaf Analytics	Proprietary	
CommCare	CommCare is an offline-capable mobile data collection and service delivery platform used in more than 80 countries. CommCare is popular for its offline case management capabilities proven to be effective at scale. It is designed for everything from simple surveys to comprehensive longitudinal data tracking. It allows for easy digitization of surveys, has forms that are intuitive for end users, uses simple device deployment, and includes translation features. The tool assists HBCPs to screen for common problems, manage household visits and referrals for services, collect data, and report on program activities and outcomes.	Case management, contact tracing, diagnostic tools, event-based surveillance, health facility and provider administration, infection prevention control, laboratory systems, learning and training, points of entry, risk communication and community engagement, supply chain	CDC	Dimagi, D-tree International, National AIDS Control Program, Pathfinder	Open source	Subnational
Connected Health AI Network (CHAIN)	CHAIN uses AI to support the supply chain. CHAIN is enterprise software that learns and builds the predictive supply chain for health from the ground up. CHAIN makes it possible for existing resources to serve more people in need, unlocking capacity and increasing access to care.	Coordination and operations, health facility and provider administration, supply chain	Gates Foundation, UNICEF, USAID	Macro-eyes, MOHCDGEC, PATH, VillageReach	Proprietary	
CTC2 database	The CTC2 database is a database for HIV/AIDS clinics to manage data on their care and treatment of patients based on the national HIV care and treatment monitoring and evaluation tools. The database accepts data from the CTC2 card and performs various tasks including data checking, production of nationally mandated reports, and providing users with a wide range of automated printouts and data analysis tools. It is highly user-friendly and easy to install.	Case management, event-based surveillance	CDC, PEPFAR, The Global Fund,	NACP, UCC	Open source	National
electronic Integrated Management of Childhood Illnesses (eIMCI) (CommCare)	eIMCI has run on a personal digital assistant (PDA) since 2008. The eIMCI protocol follows the MOHCDGEC's IMCI protocol guiding health workers step by step through the child's assessment (i.e., classification, treatment, and communication of instructions). Observations recorded by the health worker are entered directly into the PDA. For symptoms that require additional follow-up to assess severity, the algorithm prompts the necessary questions.	Case management, contact tracing, event-based surveillance, health facility and provider administration, infection prevention control, laboratory systems, learning and training, points of entry, risk communication and community engagement	Rockefeller Foundation	D-tree International, Harvard School of Public Health, Ifakara Health Institute	Open source	Subnational
electronic Logistics Management Information System (eLMIS) (OpenLMIS)	The eLMIS automates the request and report processes for more than 6,000 health facilities, which are reviewed and approved at different levels (e.g., district, regional) of the supply chain. The automated requisitions are automatically sent to the medical stores department for fulfillment and then the resupply is directed to the health facilities. The eLMIS provides basic data quality checks during data entry and processes and visualizes the data to support informed decision-making. The eLMIS is an integral part of many other health systems integration in Tanzania. Currently eLMIS supports/integrates with DHIS2, Epicor 10, mSupply, and the Facility Financial and Accounting Reporting System. eLMIS can be used for COVID-19 to track COVID-19-related commodities to and quantify them based on consumption trends.	Supply chain	Gates Foundation, Rockefeller Foundation, The Global Fund, UNFPA, USAID	JSI, MOHCDGEC, VillageReach	Open source	National
Fionet	The Fionet platform combines point-of-care, handheld devices connected to online, AI-powered data services. The technology enables off-site health supervisors to see and adjust frontline health care activity and needs.	Case management, diagnostic tools, event-based surveillance		Fio Corporation, NIMR	Proprietary	Subnational

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**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Government of Tanzania - Hospital Management Information System (GoT-HoMIS) (DHIS2)	GoT-HoMIS is a hospital management information system that improves revenue collection and clinical processes in district hospitals and lower-level facilities. The system incorporates various core functionalities/modules, including providing EMR, serving as a laboratory information system, tracking and keeping an inventory of medical supplies, enabling billing and revenue collection, conducting practitioner performance tracking, and automating reporting (e.g., MTUHA forms).	Case management, contact tracing, coordination and operations, diagnostic tools, event-based surveillance, health facility and provider administration, laboratory systems, points of entry, risk communication and community engagement, routine surveillance, supply chain, vaccine delivery and planning	GIZ, USAID	Abt Associates, PORALG	Public domain	National
GxAlert	GxAlert is a digital platform that facilitates country-level surveillance of viral load laboratory testing by allowing data to flow across the health system. GxAlert can connect to other electronic tuberculosis managers or M&E systems. GxAlert can also send targeted SMS alerts to facility managers, health officers, and suppliers. GxAlert enabled a solution to address the following gaps: (1) device management, monitoring, and reporting; (2) calibration, maintenance, and procurement planning; (3) lab technologists' capacity, availability, and training; (4) real-time results notifications to respective stakeholders including rapid case notifications for all positive results to all relevant health care officers; and (5) inventory management and notifications to reduce stockouts and expires.	Diagnostic tools, event-based surveillance, laboratory systems		SystemOne	Proprietary	National
Healthy Pregnancy, Healthy Baby (HPHB)	HPHB delivers pregnancy and maternal and newborn child health content with a nutrition focus produced by in-country specialists. The Tanzania Food and Nutrition Centre played a vital role in the development and content validation. The content, available in Kiswahili and English, is transmitted via SMS, voice message transcript, and topic-specific factsheet formats to families across Tanzania. It is freely available to all families across the country because of a successful partnership with leading MNOs.	Risk communication and community engagement	CDC, FDCO, GSMA, TTC	Cardno, GSMA, TNFC, Viamo	Open source	National
iHRIS	iHRIS is a free and open source software solution that forms an integrated human resources information system, enabling countries to collect, maintain, and analyze health workforce data and manage health workforce resources at ministries of health, district health offices, and health care facilities more easily. iHRIS can be adapted to support COVID-19 response to manage and track health workers' vaccinations and to conduct workforce planning for COVID-19 hotspots and staffing needs (e.g., personal protective equipment). iHRIS is used by the Zanzibar MOH for workforce planning and management. It is also used by CSSC, a large FBO, providing services in Tanzania.	Health facility and provider administration, vaccine delivery and planning	USAID	Intrahealth, UDSM	Open source	National
Integrated Supportive Supervision (ISS) (ODK)	ISS is an electronic checklist used for supervision during active case search and routine immunization.	Case management, vaccine delivery and planning			Open source	National
JamboMama App	JamboMama App conducts pregnancy surveillance, provides alerts when it is time for an antenatal checkup, and asks questions and gives updates about vital data that enable the detection and prevention of risks for mother and child.	Case management, risk communication and community engagement		SAHFA		Subnational
LabNet	LabNet is a nationwide LIS that connects regional labs with the central pathology laboratory for referral testing and knowledge sharing. Results can often be delivered on the same visit—which means better treatment, faster.	Laboratory systems	Abbott	Abbott		Subnational

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**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Mama na Mwana	The Mama na Mwana (Mother and Child) is an mHealth initiative with the objective to substantially contribute to a reduction in maternal, neonatal, and postnatal mortality in Tanzania. Using mobile surveys to gather feedback systematically and consistently on the quality of care experienced by service recipients (i.e., prospective and new mothers), the initiative aims to provide evidence that will inform quality improvement for RMNCH services. Currently, data are collected using RapidPro surveys administered via SMS, with plans to extend it to IVR. The surveys are scheduled to coincide with the four-visit model of the national-focused antenatal care guidelines, and two postnatal visits. RapidPro campaigns are used to handle the scheduling and trigger the appropriate round of questioning an enrollee receives. Responses to these questions are to help populate indicators, monitor service availability, identify barriers to uptake, and learn more about perceptions of quality of care.	Risk communication and community engagement	UNICEF	UNICEF	Open source	National
Mobile for Reproductive Health (m4RH)	m4RH is an opt-in SMS-based health communication program whereby users can access information on family planning methods. The text messages provide essential information about each method, including method effectiveness, duration of use, and ability to return to fertility.	Risk communication and community engagement	USAID	FHI 360, Marie Stopes, PSI, Text to Change	Open source	National
m-Palliative Care Link (mPCL) (CommCare)	mPCL is a mobile application designed to alleviate late-stage cancer pain using a three-way communication system among the patient, CHW, and nurse/specialist. mPCL connects oncology professionals with patients in their communities and local health workers. For example, if the palliative care professionals cannot get to the patient, local health workers can support the assessment of pain and its management for that patient. The app allows for the collection of data and the delivery of information by way of a smartphone, tablet, or PC, while possessing an intuitive interface that is easy to follow by low-literacy users.	Case management, risk communication and community engagement	NIH	Dimagi, Fogarty, Main Medical	Open source	Subnational
mSupply (ColdChain and Mobile Vaccine module)	mSupply can be used for inventory management. The tool can display aggregated data on dashboards about vaccine dispensation numbers and rates. The tool can produce a list of people to send SMS reminders to receive their vaccine doses and record adverse drug reactions. mSupply uses Bluetooth sensors to monitor cold chain equipment.	Supply chain, vaccine delivery and planning	Danida, JSI, mSupply Foundation	MOHCDGEC	Open source	Subnational
mVacciNation	mVacciNation addresses hurdles impeding the success of vaccination programs. The tool enables health workers administering vaccinations at clinics to capture and record information for individual children. It also assists health workers to track vaccine stock levels to optimize the supply chain and fridge temperatures to ensure the safe storage of vaccines. mVacciNation's digital capabilities support caregivers with reminder messages about their child's immunization schedule. Nurses are presented with vaccines based on the registered stock levels on the app, and fridge breakdowns can be addressed as soon as they occur. Health program managers can calculate a vaccine's coverage rate rather than estimate it since this information is collected for each patient through mVacciNation.	Case management, infection prevention and control, supply chain, vaccine delivery and planning	Amref Healt Africa, Gavi, GSK, UNICEF, USAID, Vodafone	Mezzanine	Proprietary	Subnational
mWater	mWater is a free and open-access mobile platform for mapping sites (e.g., water sources), sharing test results, and performing surveys for social water monitoring.	Infection prevention and control	USAID Development Innovation Ventures Program	Mwanza City Council Public Health Office, Mwanza Urban Water and Sewerage Authority, mWater	Open source	Subnational
National Sanitation Management Information System (NSMIS) (DHIS2)	The NSMIS was developed to address the historical challenge of collection and storage of household and institutional WASH data. The system pulls data from the primary collection level and aggregate level.	Infection prevention and control	USAID	MOHSW	Open source	National
Nightwatch: Mobile	The program uses celebrity-branded mobile communities and features personalized communication by mobile phone to address gaps in malaria knowledge.	Risk communication and community engagement	mHealth Alliance, Vodacom Tanzania	Clouds Entertainment, Malaria No More, Tanzania House of Talent, Vodacom		National

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**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Safe Delivery App	The Safe Delivery App is a free, evidence-based mobile application that uses simple, intuitive animated instruction videos, drug lists, and quizzes to guide health workers about how to handle the most common childbirth emergencies. The Safe Delivery App has been adapted with a module to help equip midwives in low-resource settings with up-to-date information to protect themselves, mothers, and newborns from COVID-19 and to ensure that women continue to receive quality services during pregnancy and childbirth. During the pandemic, the Safe Delivery App COVID-19 module has been used for many virtual trainings, including remote BEmONC trainings and stand-alone trainings on the Safe Delivery App.	Learning and training, risk communication and community engagement	Gates Foundation, Merck for Mothers	BlueTown, ECSACON, IHI, TUGHE, Ulandssekretariatet	Proprietary	
Safer Deliveries App	The Safer Deliveries program equips CHVs with digital tools to promote maternal and newborn health. CHVs use a mobile application to guide them in assisting families to plan for facility deliveries and counsel, screen, and refer pregnant women, newborns, and postpartum women to facilities if needed. The program also builds the capacity of the MOH to use program data, generated as a byproduct of CHV visits, to improve decision-making.	Case management, coordination and operations	CRS, Save the Children, Saving Lives at Birth, UNICEF	D-tree International, Jhipiego, Zanzibar MOH	Proprietary	Subnational
SanteMPI (formerly MEDIC CR)	SantéMPI is a mature, cross-platform, national-scale master patient index, patient matching, and unique ID implementation solution. SantéMPI enables linking of patient records from distributed systems into a single virtual patient record. SantéMPI's flexible, disconnected capability supports use cases such as remote registration in national unique health ID implementations and remote/distributed vaccination program enrollment and registration. SantéMPI provides robust privacy and security controls, probabilistic matching, and integration with OpenHIE. It has been directly integrated with electronic health record systems including OpenMRS, OSCAR EMR, and VistA EHR as well as the SantéIMS EIR immunization platform. SantéMPI is unique in its ability to operate offline or offline, in the most challenging of environments having sparse or unreliable network connectivity, through its Disconnected Gateway and MPI Registration App components. For COVID-19, it can be used to support vaccine registration, to create COVID-19 vaccination cohorts based on priority, develop vaccination plans, create vaccination cards and client QR codes, and integrate with COVID-19 case management and data visualization tools such as DHIS2.	Case management, contact tracing, coordination and operations, diagnostic tools, event-based surveillance, laboratory systems, points of entry, routine surveillance, vaccine delivery and planning	Mohawk College	FyfeSoftware Inc.	Open source	National
Sauti Project (CommCare, DHIS2)	The Sauti Project works with the MOHCDGEC to bring community-based HIV and reproductive health services close to key and remote populations in 12 regions. The Sauti Project reaches other Tanzanians disproportionately affected by HIV. The Sauti Project digital health component includes mobile data collection to increase access to health services and increase efficiency of resources.	Case management, contact tracing, event-based surveillance, health facility and provider administration, infection prevention control, laboratory systems, learning and training, points of entry, risk communication and community engagement	USAID	EngenderHealth, Jhipiego, MOHCDGEC, NIMR Mwanza, Pact	Open source	Subnational
SMS for Life	SMS for Life uses simple and affordable technologies so that health facilities that dispense essential medicines can report their stock levels and key disease surveillance indicators to the district medical officers who are responsible for treatment availability. The solution increases the visibility of antimalarial stock levels at remote health facilities, thereby ensuring district medical officers have the information they need to adequately manage antimalarial commodities at each facility. SMS for Life initially launched in 2009 to help prevent stockouts of antimalarials in Tanzania. Over the years, the scope of the program has also expanded to more disease areas and health parameters including tracking of tuberculosis and leprosy medicines.	Supply chain	Google, IBM, MMV, MOHCDGEC, Norad, Novartis, PMI, SDC, SwissTPH, Vodacom	Google, IBM, MMV, MOHCDGEC, MSH, Norad, Novartis, PMI, SDC, Swiss TPH, Vodacom	Proprietary	National
The Dynamic Project	The Dynamic Project helps clinical decision-making and improves the quality of diagnoses for sick children thanks to an innovative clinical support algorithm available on a tablet. The aim is to improve quality of care through implementing, validating (e.g., impact on clinical outcome and antimalarial/antibiotic use), and further improving ePOCT+ with an innovative clinical decision support algorithm combined with point-of-care diagnostic tests. ePOCT+ builds on the validated electronic point-of-care test (ePOCT) tool, yet contains additional modules for data visualization, e-learning, supervision, and self-audit. ePOCT+ will evolve through AI, adapting care to environmental changes and machine learning, combined with constant medical evaluation. The Dynamic Project will tailor algorithms in real time, improving response to outbreaks and generating reporting for informed planning and targeting of interventions by health authorities.	Event-based surveillance	Fondation Botnar, SwissTPH	IHI, NIMR, Unisanté	Open source	Subnational

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**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

Digital health tool	Purpose	Use case(s)	Funder(s)	Implementer(s)	Licensing	Scale
Timed and Targeted Counselling mHealth application (mTTC) (CommCare)	The mTTC app is built in the common MOTECH Suite (CommCare), allowing easy adaptation and alignment to national data systems. The mTTC app is used by CHWs conducting Timed and Targeted Counselling (TTC) home visits to communicate and track health practices for maternal, newborn, and child health at the household level. The app collects real-time household-level data on practices, which can easily be assimilated and used in data-based feedback and supervision. The app ensures CHWs time home visits correctly by gestation/age of child, sending reminders on missed visits and follow-up, and improves workload management. It includes audiovisuals with multiple language settings and press-play messages to give accurate information to caregivers.	Case management, contact tracing, event-based surveillance, health facility and provider administration, infection prevention control, laboratory systems, learning and training, point of entry, risk communication and community engagement	Irish Aid, USAID, World Vision	MOHCDGEC	Open source	Subnational
U-Report	U-Report is a messaging tool that empowers young people around the world to engage with and speak out on issues that matter to them. It works by gathering opinions and information from youth on topics they care about, ranging from employment to discrimination to child marriage. U-Reporters respond to polls, report issues, and support child rights. The data and insights are shared back with communities and connected to policymakers who make decisions that affect young people.	Risk communication and community engagement	UNICEF	UNICEF	Open source	National
Vaccine Information Management System (VIMS) (OpenLMIS)	Tanzania's VIMS combines vaccine data management, stock management, and cold chain equipment inventory management into one tool that facilitates monitoring and improves immunization program performance. It collates (1) service delivery data, (2) vaccine stock management data, and (3) cold chain equipment inventory data at the district level. The stock management feature is similar to TImR, which has a web application. VIMS is being rolled out from the national down to the district level, and TImR interfaces with VIMS at the district level. The prior system used the district vaccine data management tool, stock management tool, and cold chain equipment inventory management tool.	Supply chain, vaccine delivery and planning	Gates Foundation, Gavi, UNICEF, USAID, WHO	CHAI, JSI, MOHCDGEC, PATH, VillageReach	Open source	National
VigiFlow	VigiFlow is a management system for recording, processing, and sharing reports of adverse effects for medical products. VigiFlow enables maximum local control and provides an effective means for management review and analysis of national data. VigiFlow has a medicine track and trace system that will ensure that all medical products and health technologies in the market have a tracing number.	Supply chain	WHO		Open source	Subnational
WelTel Health Platform	WelTel is an evidence-based text messaging solution for improving patient adherence. The tool is used in many countries to support evidence-based integrated patient engagement, virtual care, communication outreach and data collection for COVID-19, and many other health areas (e.g., MNCH, TB, HIV, PrEP). The tool has been validated to impact positive behavior change to improve health outcomes and save lives. WelTel's system supports appointment scheduling and reminders, and it broadcasts videos of public health information on a secure patient portal. WelTel is currently deployed for COVID-19 response in Rwanda, Uganda, Tanzania, and the United Kingdom. The platform is deployed on a national level in Rwanda at points of entry (e.g., airports) and EOCs. The tool is being used to track COVID-19 contacts and positive cases in a home-based care program.	Case management, contact tracing, coordination and operations, diagnostic tools, event-based surveillance, infection prevention and control, points of entry, risk communication and community engagement, routine surveillance, vaccine delivery and planning	CDC, CIHR, GCC, NRC IRAP, NIH, PEPFAR	University of Queen's	Proprietary	
Wired Mothers	In Zanzibar, Wired Mothers links women to health facilities before, during, and after childbirth. A two-way communication system allows Wired Mothers to talk directly with a health provider and access emergency obstetric care. It also includes an automated SMS system with one-way messaging. Selected health facilities are provided with dedicated mobile phones that can be reached using a toll-free number if women experience a complication during pregnancy or delivery.	Risk communication and community engagement	National Reproductive and Child Health Programme	University of Copenhagen, Zantel, Zanzibar MOH	Open source	Subnational
Zipline	Zipline started a blood-delivery service in 2016 that uses drones to deliver medical products to remote, hard to reach areas in a matter of minutes, versus a matter of hours or days. Zipline now delivers two-fifths of Rwanda's blood supply outside the capital, and it has been scaled to all of Rwanda as well as to neighboring Tanzania. The Tanzanian government has enlisted Zipline in four distribution centers stocked with blood transfusion supplies, emergency vaccines, HIV medication and antimalarial drugs, along with other goods like sutures and IV tubes. Health professionals can use Zipline to order supplies via mobile phones and can receive the necessary supplies within 30 minutes, on average.	Supply chain	Gavi, UPS	MOHCDGEC, Zipline	Proprietary	

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## At a glance

Figure 2 shows that Tanzania's digital health tools rely on different software licensing types for sustainability with open source being the most common. Figure 3 demonstrates that Tanzania has 42 digital health tools deployed on a national scale while 36 operate on a subnational scale. These figures are not specific to COVID-19 response, but they provide an overall picture of Tanzania's digital health infrastructure.

Figure 2. Software licensing types of Tanzania's digital health tools.

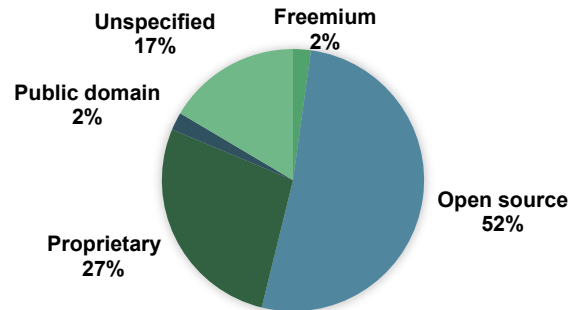
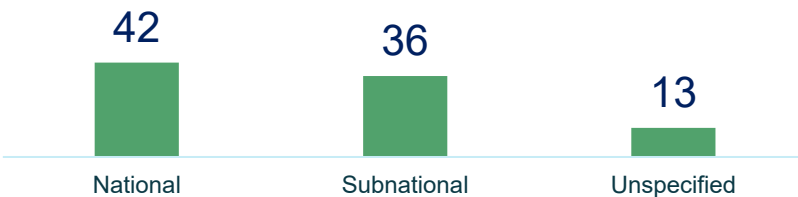


Figure 3. Number of digital tools deployed at scale in Tanzania.



## Conclusion

Digital Square mapped 91 existing, adaptable digital health tools in Tanzania and matched them to help target investments to accelerate the country's COVID-19 response and simultaneously strengthen its health system. This brief underpins how critical it is to align funding to Tanzania's existing digital health infrastructure to bolster its capacity to mitigate the effects of the current pandemic and prepare the country to respond to future outbreaks.

## Take action

**Coordinate with all digital systems stakeholders** to create a unified, robust digital health system that can strategically and rapidly be part of the ongoing COVID-19 response. It is paramount to support the government's lead and support its national digital health strategies and the tools it approves. Visit the [Digital Health Atlas](#) to see a complete, regularly updated snapshot of Tanzania's digital health system. If you know of a digital system that is not identified in this brief, please add it to the [Digital Health Atlas](#).

**Reuse existing tools when possible.** Do not invest in new systems if there are existing systems the government endorses that can effectively approach each of the pandemic use cases.

**Learn more about Tanzania's digital health systems** and their role in the COVID-19 response by reviewing Tanzania's full Map and Match dataset.

**Apply GIZ's Assessment Tool for Digital Pandemic Preparedness** to better understand the strengths and gaps in the country's COVID-19 response and to be well prepared for future disease outbreaks.

**Connect with additional relevant resources, including:**

**Digital Square** continues to update its [wiki](#) with adaptations of Digital Square Global Goods and has a [COVID-19 resource page](#) that features hosted webinars that provide demos of tool adaptations.

The recently released [Global Goods Guidebook](#) (version 2.0) includes additional information about global goods deployment for COVID-19.

Map and Match's [project landing page](#) has many resources, including the Digital Applications and Tools Across an Epidemiological Curve, Global Goods Adaptations Across Use Cases, and other country briefs.

[Digital Solutions for COVID-19 Response](#), published by Johns Hopkins University, features digital platforms that have been adapted for COVID-19 case management and contact tracing needs. The assessment includes a review of nine tools that were selected based on their existing deployment, flexibility, and adaptability for COVID-19 use cases; their ability to support multiple languages; and stakeholder interest in how these applications can be leveraged in response to COVID-19.



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# Annex 1. Abbreviations

Acronym	Definition
<b>AI</b>	artificial intelligence
<b>BEmONC</b>	basic emergency obstetric and newborn care
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CHAI</b>	Clinton Health Access Initiative
<b>CHVs</b>	community health volunteers
<b>CHWs</b>	community health workers
<b>CIHR</b>	Canadian Institutes of Health Research
<b>CRS</b>	Catholic Relief Services
<b>CSSC</b>	Christian Social Services Commission
<b>DHIS2</b>	District Health Information System 2
<b>DRC</b>	Democratic Republic of the Congo
<b>ECD</b>	early child development
<b>ECSSACON</b>	East Central Southern African College of Nurses
<b>EHR</b>	electronic health record
<b>eIDSR</b>	electronic Integrated Disease Surveillance and Response
<b>EIR</b>	electronic immunization registry
<b>EOCs</b>	emergency operations centers
<b>FBO</b>	faith based organization
<b>FDCO</b>	UK Foreign, Commonwealth & Development Office
<b>FHIR</b>	Fast Healthcare Interoperability Resources
<b>GAC</b>	Global Affairs Canada
<b>Gavi</b>	Gavi, the Vaccine Alliance
<b>GCC</b>	Grand Challenges Canada
<b>GIS</b>	geographic information system
<b>GIZ</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
<b>GSK</b>	GlaxoSmithKline
<b>GSMA</b>	Global System for Mobile Communications

Acronym	Definition
<b>HBCPs</b>	home-based care providers
<b>HDIF</b>	Human Development Innovation Fund
<b>HISP</b>	Health Information Systems Programme
<b>HMIS</b>	health management information system
<b>IBM</b>	International Business Machines Corporation
<b>ID</b>	identification number
<b>IHI</b>	Ifakara Health Institute
<b>IICD</b>	Netherlands International Institute for Communication and Development
<b>IVR</b>	interactive voice response
<b>J&amp;J</b>	Johnson & Johnson
<b>JSI</b>	John Snow Inc.
<b>LIS</b>	laboratory information system
<b>M&amp;E</b>	monitoring and evaluation
<b>MDH</b>	Management and Development for Health
<b>MMV</b>	Medicine for Malaria Ventures
<b>MNCH</b>	maternal, newborn, and child health
<b>MNOs</b>	mobile network operators
<b>MOH</b>	Ministry of Health
<b>MOHCDGEC</b>	Tanzania Ministry of Health, Community Development, Gender, Elders and Children
<b>MOHSW</b>	Ministry of Health and Social Welfare
<b>MSH</b>	Management Sciences for Health
<b>NACP</b>	Tanzania National AIDS Control Program
<b>NIH</b>	National Institutes of Health
<b>NIMR</b>	National Institute for Medical Research
<b>Norad</b>	Norwegian Agency for Development Cooperation
<b>NRC IRAP</b>	National Research Council Canada Industrial Research Assistance Program
<b>OpenHIE</b>	open source Health Information Exchange

## Annex 1 continued. Abbreviations

Acronym	Definition
<b>OpenLMIS</b>	open source Logistics Management Information System
<b>OpenMRS</b>	open source Medical Record System
<b>OpenSRP</b>	open source Smart Register Platform
<b>ODK</b>	Open Data Kit
<b>PEPFAR</b>	United States President's Emergency Plan for AIDS Relief
<b>PMI</b>	United States President's Malaria Initiative
<b>PORALG</b>	Tanzania President's Office Regional Administration and Local Government
<b>PrEP</b>	pre-exposure prophylaxis
<b>PSI</b>	Population Services International
<b>PVI</b>	Peripheral Vision International
<b>QR</b>	quick response
<b>RMNCH</b>	reproductive, maternal, newborn and child health
<b>SACIDS</b>	Southern African Centre for Infectious Disease Surveillance
<b>SAHFA</b>	Smart Access to Health For All
<b>SDC</b>	Swiss Agency for Development and Cooperation
<b>SMS</b>	short message service
<b>SORMAS</b>	Surveillance Outbreak Response Management and Analysis System
<b>SwissTPH</b>	Swiss Tropical and Public Health Institute
<b>TB</b>	tuberculosis
<b>TNFC</b>	Tanzania Food and Nutrition Centre
<b>TUGHE</b>	Tanzania Union of Government and Health Employees
<b>UCC</b>	University of Dar es Salaam Computing Center
<b>UDSM</b>	University of Dar es Salaam
<b>UPS</b>	United Parcel Service
<b>USAID</b>	United States Agency for International Development
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WCEA</b>	World Continuing Education Alliance

Acronym	Definition
<b>WHO</b>	World Health Organization



## Annex 2. Use case definitions

Category	Objective	Functional description
<b>Case management</b>	Systematic processing of suspected infected persons	Systems for documenting patient details and clinical interactions
<b>Contact tracing</b>	Reduction of epidemic reproduction rate	Identification and follow-up with people who have had high-risk interactions with infected persons
<b>Coordination and operations (including emergency operations centers)</b>	Preparedness and response plans, support for multisectoral responses	Systems to support cross-coordination for multisectoral response, emergency operations centers, and executing response plans
<b>Data analytics, visualizations, and use</b>	Efficient and effective response to validated outbreaks	Systems for enabling data-driven decision-making and communications to field teams
<b>Diagnostic tools</b>	Improve efficiency in clinical diagnosis and collection of data from diagnostic tools	Diagnostic tools with digital connectivity to support monitoring, documentation, and reporting of diagnoses
<b>Event-based surveillance (including rapid response teams, case investigations)</b>	Early detection of outbreaks and epidemics, case detection and investigation, national and subnational emergency operations to ensure rapid management of infectious disease	Systems with functionality or ability to monitor patterns indicative of infectious disease epidemic outbreak; systems to detect and document cases of emerging disease threats, investigate those threats, identify cases, and manage the response
<b>Health facility and provider administration</b>	Robust organizational underpinning for response	Systems for managing facility accounting and HR
<b>Infection prevention and control</b>	Prevent infection among patients and health workers	Systems that support triage, isolation, WASH, waste management to prevent transmission to staff, other patients, and the community
<b>Interoperability</b>	Improve effectiveness of tools	Provision of standardized interfaces to other software modules
<b>Laboratory systems</b>	Validation of infectious disease incidence	Systems with functionality to order lab tests, follow progress of patient sample, receive test results (confirm suspected case)
<b>Learning and training</b>	Support health worker readiness, including improve patient data collection and sample testing	Localized E-learning solutions for health workers and others
<b>One Health</b>	Prevent zoonotic disease outbreaks	Monitoring of potential vectors to humans by tracking infectious diseases in local wildlife and livestock
<b>Points of entry</b>	Detect and manage international spread of disease by identifying suspected infected persons at border entry points	Systems to strengthen border health security, screen, and follow-up with suspected infected persons at ports of entry and other border entry points
<b>Risk communication and community engagement</b>	Improved public awareness of facts and best practices for disease prevention	Systems for channeling messaging and communication to public to promote public awareness, counter misinformation, encourage treatment seeking behaviors, and encourage citizens to take appropriate actions to promote health
<b>Routine surveillance</b>	Routine health data monitoring to identify trends	Systems to manage health data and track trends on an ongoing basis, regardless of whether there is an outbreak or epidemic; systems usually include aggregate data
<b>Supply chain</b>	Support allocation of resources to aid in response	Systems for monitoring facility readiness and stock levels
<b>Vaccine delivery and planning</b>	Systematic monitoring of vaccinations in the population	Systems for documenting vaccinations for patients







## Annex 3. Digital tools supporting vaccine deployment

Digital technologies can act as accelerators for the introduction, deployment, and scale-up of vaccines in countries to assist health workers, communities, and other stakeholders. The use of digital tools and the data they enable facilitate rapid, iterative, and scalable approaches to ensure vaccines are safely delivered to health facilities, that health workers are equipped to administer them, and that communities are informed and confident in their efficacy.

Through the Map and Match project, Digital Square mapped the existing functionality of approved global goods to COVID-19 use cases, including those supporting planning, delivery, administration, and monitoring of COVID-19 vaccines. These adaptations and supporting resources are listed on Digital Square's [wiki](#).

Table 3 illustrates how digital tools can support activities aligned to five use cases focused on vaccines. Digital Square has information about its approved global goods and how they align to these use cases currently as well as potential adaptations on its [website](#). This list does not include all digital public goods in the digital health ecosystem. Other tools like RapidPro and WelTel, which are not supported through Digital Square, can be included in these use cases.

**Table 3. Global goods tools to support vaccine deployment use cases.**

Description of vaccine deployment use cases	Digital Square approved global goods use cases
<p><b>Plan for vaccine introduction in country</b></p> <p>Digital tools can be used for planning and “microplanning” to inform how many vaccines are needed, where vaccines can be stored and monitored, who the most vulnerable populations are and where they are located, and other information essential to planning. Assessing the tools and data available throughout the health system, including patient data and health worker data, will inform this planning.</p> <p>As part of a vaccine introduction, governments need to build awareness of the vaccine and its benefits, and combat misinformation. Digital tools can be used for planning purposes to send messages to both health workers and communities about the vaccine.</p> <p>Training health workers is essential before introducing a new vaccine. Governments need to provide information to health workers on vaccine administration, possible side effects, and how to treat patients showing adverse reactions. Digital tools can be leveraged to rapidly share this information and offer virtual training.</p>	<p> <b>Messaging</b></p> <p> <b>Microplanning</b></p> <p> <b>Training</b></p>
<p><b>Support vaccine introduction</b></p> <p>Digital tools can enhance the launching of a vaccination campaign. Communication tools like SMS and social media can support rapid information sharing with communities as the vaccine is made available.</p> <p>Pharmacies, hospitals, clinics, and other facilities use robust digital systems to ensure vaccines are stocked at facilities by tracking inventory and shelf life and ordering additional supplies when needed. Digital tools can manage the transactional movements of vaccines within multilevel supply chains. Supply chain systems can also ensure that syringes, diluents, and other materials needed for vaccine delivery are stocked.</p> <p>Digital tools can support temperature monitoring during transport and where vaccines are stored. Remote temperature monitoring can improve cold chain performance, giving health workers assurance that vaccines are safe and effective.</p> <p>Digital tools can track when clients receive vaccines as well as other data fields (e.g., vaccine type, immediate negative reactions, and longer-term potential adverse events). Countries can adapt existing electronic immunization registries (EIRs) for vaccine monitoring and follow-up.</p>	<p> <b>Patient monitoring</b></p> <p> <b>Supply chain</b></p> <p> <b>Vaccine management</b></p>

### Digital Square approved global goods use cases



#### Electronic immunization registries

DHIS2 Tracker, OpenSRP, OpenMRS, Tamanu



#### Messaging

CommCare, Community Health Toolkit, mHero, OpenSRP



#### Microplanning

Healthsites, OpenSRP, Reveal



#### Patient monitoring

CommCare, DHIS2 Tracker, OpenSRP, SORMAS



#### Supply chain

DHIS2, OpenLMIS, Logistimo, OpenBoxes, Product Catalogue Management Tool



#### Training












CommCare, Community Health Toolkit, mHero, OpenSRP, SORMAS



#### Vaccine management

CommCare, Community Health Toolkit, DHIS2, DHIS2 Tracker, Logistimo, OpenBoxes, OpenLMIS, OpenSRP, Tamanu

**Table 3. Global goods tools to support vaccine deployment use cases, continued.**

Description of vaccine deployment use cases	Digital Square approved global goods use cases
<p><b>Enhance roll-out of vaccine, support ongoing vaccine monitoring</b></p> <p>In this phase, scaling to vaccinate large portions of the population is a priority. Vaccine roll-outs can be enhanced by adapting digital tools to add workflows and functionality as vaccine coverage expands. Governments need to consider additional information communications technology (ICT) needs like larger cloud-hosting services and use of tools that are operational offline for areas that have limited mobile network coverage.</p> <p>Supply chain is critical as vaccines are transported to more sites across the country. Digital supply chain tools, especially when paired with vaccine delivery data (e.g., from electronic medical records/EIRs), can help forecast supply needs and include decision support to prompt vaccine orders when supply falls below a defined threshold.</p> <p>EIRs and other tools can help prevent overcrowding in clinics by scheduling specific clinic times for vaccines. This ensures more equitable distribution of health services.</p>	<ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Supply chain</b></li> <li> <b>Patient monitoring</b></li> <li> <b>Vaccine management</b></li> </ul>
<p><b>Enhance communication to sustain vaccine demand</b></p> <p>Many COVID-19 vaccines are multi-dose shots. To ensure clients receive boosters, now and in the future, enhancing communication to sustain demand for the vaccine is important. Digital tools can be used to send messages to both health workers and communities about the vaccine. Communication tools can be linked with patient monitoring tools to automatically trigger direct communication to clients. Digital tools can continue to be used to increase vaccine demand and address misinformation, dispelling rumors and misinformation that cause vaccine hesitancy.</p> <p>Many EIRs include contact information and messaging features for patients' caregivers, allowing for direct communication to caregivers. These messaging features have historically been used to notify caregivers about upcoming immunization sessions or overdue vaccines. As the global community develops a greater understanding of COVID-19—including its transmission patterns, full range of symptoms, and treatment options—health workers also have the ability to share health promotion messages with patients.</p>	<ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Messaging</b></li> <li> <b>Patient monitoring</b></li> </ul>
<p><b>Use data to inform vaccine-related decisions</b></p> <p>Patient monitoring and tracking tools as well as EIRs can help generate meaningful insights for future vaccination efforts and encourage data-driven decisions when countries are able to plan for catch-up campaigns. For example, some EIRs can quantify the number of missed vaccines and determine which areas have been under-vaccinated. This individual-level data will enable decision-makers to target immunization services and allocate funding to those areas most in need. For more information, <a href="#">this publication</a> explains how Gavi and UNICEF are working to scale up use of digital tools for vaccination campaign performance monitoring.</p> <p>Interoperability is critical. As governments review the portfolio of tools and systems that are in place to support vaccine management, it is crucial that there is strong consideration given to the movement of data between systems to ensure a harmonized set of records for the population. This ensures that no individual is missed or counted twice.</p>	<ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Patient monitoring</b></li> <li> <b>Supply chain</b></li> <li> <b>Vaccine management</b></li> </ul>

**Digital Health Center of Excellence (DICE) to support the COVID-19 pandemic response**

As countries operationalize their COVID-19 vaccine rollout plans, there is an opportunity to identify areas where digital health interventions can amplify these efforts, while improving service delivery and strengthening health systems more broadly.

The success of digital health solutions often correlates with the strength of the enabling environment for these technologies, such as ICT infrastructure readiness, workforce capacity, data standards, interoperability, and the policy and regulatory environment. Poorly designed or inappropriate digital interventions, as well as vertical approaches geared only toward COVID-19, risk undermining and ultimately weakening national systems.

To more effectively organize support to countries for COVID-19 response, a multiagency COVID-19 DICE, with a UNICEF-WHO cohosted secretariat, will launch in April 2021. The DICE will provide coordinated technical assistance to low- and middle-income countries to support sustainable and scalable deployment of carefully chosen digital health solutions that support COVID-19 pandemic response plans.

Areas the COVID-19 DICE covers include:

- Support countries to conduct a structural readiness assessment of their enabling environment, define business requirements, conduct platform analysis, and map partnerships, existing tools, and gaps. Along with support to countries, this will require standardizing approaches and tools across development partners.
- Coordinate surge support to countries to assist in their development of a rapid strategic approach to meet the imminent needs of the vaccine delivery and transition to a sustainable strengthened and digitally enabled health system.
- Foster capacity and partnership with regional and national digital health experts toward the development of capacity that can provide long-term technical support to the region.
- Strategically support developers and product owners to modify and optimize software products relevant for pandemic response and vaccine delivery toward interoperability, standardization, and vaccine-specific functionalities.
- Complement and operationalize WHO and UNICEF guidelines developed in the context of the Access to COVID-19 Tools Accelerator (ACT-A) to further clarify and identify mature options open to countries building health infrastructure.
- Support the transition, alignment, and integration of COVID-19-related digital health investments through a systems strengthening lens.
- Pilot and assess transformative approaches to digital health deployments, monitor global developments and opportunities for standardized approaches, increase south-south knowledge transfer, and compile lessons learned.