

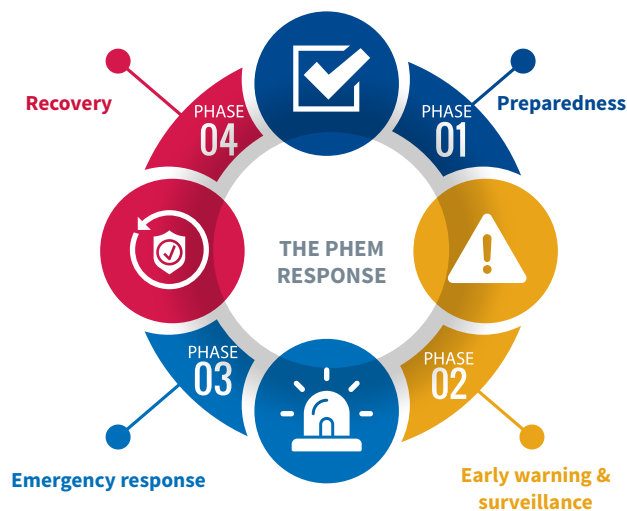
**ACTIVITY BRIEF**

# A DIGITAL HEALTH RESPONSE TO THE COVID-19 PANDEMIC: LESSONS FOR FUTURE DIGITAL HEALTH INVESTMENTS

**Background:** Following WHO’s declaration of the novel coronavirus disease (COVID-19) as a public health emergency of international concern, the pandemic exposed critical limitations in the global public health system, including Ethiopia. With a population of almost 120 million, Ethiopia has the highest number of COVID-19 cases in the East Africa region, and the 6th highest in all of Africa. As of July 2022, a total of 489,341 COVID-19 cases have been confirmed, of which 7,541 (1.54 percent) have died.

**Digital Health Pandemic Response:** Since the first case of COVID-19 was reported in Ethiopia on March 12, 2020, the Government of Ethiopia has implemented measures to prevent and control the pandemic. The Ethiopian Ministry of Health (MOH) launched the national Emergency Operations Center under seven pillars, one of which is the digital response. The identification and use of digital tools is one of many interventions in the COVID-19 preparedness, prevention, care, and treatment response. The USAID Digital Health Activity (DHA), led by JSI, has been supporting the MOH to design the national digital architecture, leveraging existing digital tools and developing new technologies, to respond to the pandemic.

DHA supported the MOH by developing and deploying a suite of integrated digital platforms to support the COVID-19 public health emergency management (PHEM) response which is categorized into four interrelated phases: 1) preparedness, 2) early warning and surveillance, 3) emergency response, and 4) recovery. So far, DHA has supported the early warning and surveillance and emergency response phases in the following areas:



**Figure 1. Phases of public health emergency response**



## Early warning and surveillance



### Electronic community health information system (eCHIS) for house-to-house surveillance

DHA helped quickly customize the eCHIS for use in house-to-house case detection surveys to ensure quality data could be collected, analyzed, and used in real time at the national and regional levels to make decisions about what interventions are needed to curb COVID-19.



### Disease surveillance

DHA deployed data clerks to assist the Ethiopian Public Health Institute (EPHI) and the MOH with COVID-19 surveillance, case tracking, and contact tracing, and helped scale up a DHIS2-based COVID-19 tracker application.



### Surveillance of vaccine side effects following immunization

DHA developed a COVID-19 vaccine adverse side effect tracking program, which is a mobile and web-based tool used by health professionals to report adverse events following immunizations (AEFI). EPHI analyzes the resulting adverse event report to know when and where to take action, including investigating AEFI cases.



## Public health emergency response



### Disease prevention:

DHA developed a hand sanitizer quality control tool, which enabled the Ethiopian Food and Drug Authority (EFDA) to monitor and control the quality of hand sanitizers produced by different manufacturers. It also helped manufacturers track the quality of their hand sanitizer products. Furthermore, DHA used social media platforms, such as Telegram, WhatsApp, and Facebook, to disseminate information and educate the wider community about COVID-19 Prevention methods.



### Home-based isolation and care:

The DHIS2-based application is used to track home-based isolation measures for individuals who test positive for COVID-19 at ports of entry. It is also used for screening, registering, and tracking travelers.



### Tracking COVID-19 vaccine supplies and distributions:

DHA supported VITAS, an electronic logistic information system management tool, used by the Ethiopian Pharmaceutical Supply Services (EPSS) center and its 19 regional hubs across the country to track COVID-19 vaccine data from pre-shipment to the national and regional medical stores. Since 80 percent of the country's vaccine supplies pass through woreda warehouses, DHA also revitalized and scaled-up mBraná, a mobile application used at the woreda level for vaccine logistics management.



### Managing COVID-19 patients in high load facilities:

At the peak of the pandemic, when there were more critical cases than available mechanical ventilators, DHA developed a queue management system. This helped establish equitable access to mechanical ventilators in COVID-19 treatment centers.



### Strategic information for decision makers:

DHA supported the MOH to rollout a woreda-level aggregate reporting tool and to scale-up a COVID-19 vaccination tracker for health facilities based on the DHIS2 platform. This tool allows for efficient and real-time management of patient data. To improve the use of data for decision making, DHA also supported COVID-19 vaccine stock status analysis, which included vaccine shipments ordered and received, total consumption, months of stock, ending balance, and potential expiry. In collaboration with the MOH, DHA has maximized the use of healthcare information and communication technologies to support safe, efficient, and equitable rollout of the COVID-19 vaccination program.



### Strengthening the health workforce capacity to adopt and utilize the digital tools:

DHA supported training for more than 4,000 health workers to use the vaccine management system and tools.



**Major Achievements:** DHA's multifaceted response contributed to the fight against COVID-19. The following are major achievements throughout the PHEM phases:



### Preparedness:

The EFDA and EPSS leveraged digital platforms and customized them for upstream logistics management information systems. At EFDA, the electronic regulatory information system (eRIS) was customized to fast track country registration processes for COVID-19 prevention related items, e.g., face masks, hand sanitizers, goggles and other critical supplies.

In the first few weeks after the first COVID-19 case was detected, over 80 manufacturers and importers were registered to supply items for both the private and the public sectors. VITAS, the country's electronic logistics management information system (eLMIS) used by EPSS, was quickly customized to ring fence commodities required for the national response. Data from VITAS quantified the national demand based on available resources and scenario planning.



### Early Warning and Surveillance:

DHA helped introduce a number of communications approaches to disseminate accurate and actionable information to the public. DHA helped launch a national broadcast service and toll free numbers (8335 & 994 short code calls) with 24-hour service and daily updates on confirmed cases, fatalities, and recoveries via SMS and Telegram. As of April 2022, close to 10,000 rumors had been reported, and more than 1.3 million people received health information through the toll-free lines. Similarly, the number of Telegram subscribers receiving health information exceeded 7,000 per day. These platforms were also used to disseminate health information, educate the community on protective measures, and encourage individuals to follow preventive measures.

As of June 2022, the disease surveillance system has been used to screen, register, and track over 1 million travelers at ports of entry. The tracker, which is linked to the lab system, is being used as the single source of information for all national and subnational reporting and public information. As of July 2022, a total of 489,341 confirmed COVID-19 cases and 7,541 (1.54%) deaths were captured and reported on the platform.

The eCHIS was used for a house-to-house survey covering more than 3 million households during the early stages of the pandemic response. The community-based activity and testing (COMBAT) campaign uncovered the asymptomatic transmission, and the high rate of transmission reaffirmed the need for a coordinated and multisectoral response.



### Public Health Emergency Response:

Currently, mBrana is being used in 570 woredas, providing woreda-level COVID-19 vaccine supply chain data. As of June 2022, around 8 million doses of COVID-19 vaccines were tracked in 338 woredas using the mBrana application. As of July 2022, more than 52 million vaccine doses were administered and almost 43 million people have taken at least one dose and more than 36 million people were fully vaccinated. Also, more than 5 million laboratory tests were conducted and 489,341 positive cases identified, 7,541 deaths reported, and 464,202 cases recovered from COVID-19 nationally. These reports were shared with the public via traditional and social media, including Telegram, using dashboards developed with the support of DHA.

DHA supported the use of the DHIS2 aggregate in 570 woredas (nearly 60% of all accessible woredas). As of July 2022, over 32 million COVID-19 vaccine doses were reported through the DHIS2 in the woredas where the DHIS2 aggregate is deployed. In addition, the DHIS2 patient-level tracker is in use at selected health facilities in Addis Ababa.

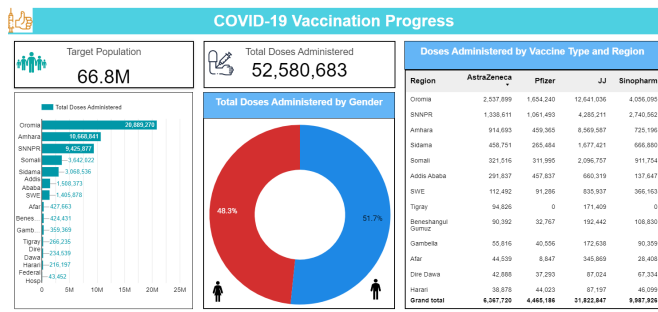


Figure 2: Sample dashboard used to track regional distribution of COVID-19 vaccines

The tracker has shown potential for improving the quality of data and providing verifiable electronic certificates for travelers. Over the past few months, nearly 50,000 electronic certificates were generated and provided to clients.

Site	COVAX (10 doses)	COVAX Smp (10 doses)	COVID Divalent (10 mg)	Ultra-Low Dose Freezer (EaH)	Ultra-Low Dose Freezer (Tropical) (EaH)
1 Adama Hub	0	812	0	0	0
2 Addis Ababa [2] Hub	0	4,803	0	0	0
3 Addis Ababa Hub	0	2,594	2,361	0	0
4 Arba Minch Hub	0	3,385	0	0	0
5 Asossa Hub	0	1,975	0	0	0
6 Bahar Dar Hub	0	0	0	0	0
7 Dire Dawa Hub	0	0	0	0	0
8 Dire Dawa Hub	0	0	0	0	0
9 Gambella Hub	0	0	0	0	0
10 Gondar Hub	145	4,002	0	0	0
11 Hararssa Hub	0	0	0	0	0
12 Center	0	1,812,497	233,382	26	12
13 Jijiga Hub	0	66	51	0	0
14 Jimma Hub	0	0	0	0	0
15 Kabi Dihar Hub	0	0	0	0	0
16 Makale Hub	0	281,867	363	0	0
17 Negelle Borena Hub	0	2,824	363	0	0
18 Nakemba Hub	0	3,416	291	0	0
19 Semera Hub	0	23,173	0	0	0

Figure 3: Sample mBrana dashboard used to track vaccine supplies by region

During the second and third COVID-19 vaccination campaign, the daily data reporting rate was consistently monitored and presented to the national taskforce for use in decision making.

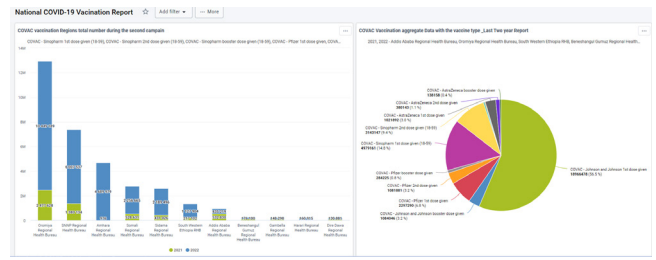


Figure 4: Sample COVID-19 vaccination dashboard

The AEFI dashboard was created and shared with decision makers. Vaccination data in the DHIS2 was disaggregated by regions, types of vaccines, age, sex and other dimensions for action.

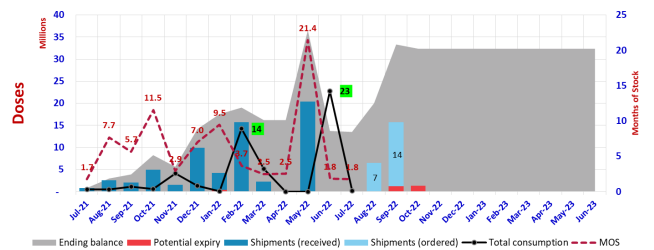


Figure 5: Sample dashboard developed by DHA showing stock status of COVID-19 vaccines



DHA collaborates with stakeholders to customize and rollout the DHIS2 aggregate and the client tracker. The University of Oslo Health Information Systems Program (HISP) team is supporting the customization of the platform and its routine maintenance. Encouraged by the success of the DHIS2 aggregate in 570 woredas and appreciating the need to expand its use, WHO provided financial support to train an additional 474 woreda health offices to use the tool. DHA staff conduct the training and provide post-training monitoring and support to improve reporting rates and timeliness. DHA also collaborates with USAID and other COVID-19 and supply chain partners to visualize data and improve its use for performance management and design of various interventions, e.g., social and behavior change.



## CHALLENGES

Despite the above achievements, there are many challenges, including the inability to expand digital health interventions to all parts of the country due to the conflict in Tigray, Amhara, Afar, Benishangul Gumuz, and Oromia regions. The conflict has resulted in total or partial damage to the health information system infrastructure and has hindered the migration of health workers. Also, connectivity issues still affect stock visibility of COVID-19 vaccine supplies, particularly at the lower level of the health system, and enforcing the use of digital tools has been inconsistent. Lastly, literacy levels, IT equipment ownership, and the ability to interact with technology systems need more consistent support.



## LESSONS

Digital health interventions can make a difference in times of crisis. In Ethiopia, digital health interventions are used to provide quality information for timely COVID-19 pandemic response decisions, including improved visibility into the supply chain. Digital health tools are also helping reach segments of the community with messages about COVID-19 prevention methods. The following four factors led to the rapid development, implementation, adoption, and success of the COVID-19 digital response:



### **Coordination and Systems Approach:**

There was an expressed need in the health system for a rapid, organized, data driven, and seamless collaboration among different actors to halt the spread of infection. Systems approach to pandemic response is very important to ensure that all facets of the response pillars are not left unaddressed. The national COVID-19 response was designed with a systems approach, and the success of the digital response is largely due to the comprehensiveness of the planning process, which was organized into seven pillars, with digital response being one.



**Government-led:** The government's commitment and consideration of the pandemic as a health, social, economic, and political priority paved the way for a swift digital health response. In addition, the government-led one plan, one budget, and one report approach rapidly mobilized financial, human, and other resources, including digital platforms, which paved the way for a timely, coordinated, and robust emergency response.



**Demand for digitalization:** The panic and the complexity surrounding possible COVID-19 transmission in manual exchange of information accelerated the digital tool adoption.



**Resource allocation:** The shifting of already limited resources by the government, partners, private sector, and communities was a crucial part of the pandemic response.



**Building on existing investments:** Previous digital health investments played a critical role and served as a springboard, as opposed to having to start building a digital response from scratch.

However, recurrent waves of the pandemic continue to hit Ethiopia, causing significant morbidity and mortality. Preventive measures such as vaccinations and use of personal protective equipment remain the mainstay of the country's prevention strategy. There are going to be innovations from all corners of the world to put an end to the pandemic. It is important to continuously adapt to the context and improve digital tools by being responsive to evolving user needs for a holistic epidemic response. Ongoing and future digital health interventions should build on these lessons from the COVID-19 digital health response to accelerate the digitization of the entire health system in Ethiopia.



## WAY FORWARD

DHA will continue supporting digital health interventions that address gaps and drive progress towards improving access, quality, and use of COVID-19 prevention, care, and treatment services. DHA recommends the following actions for a strong, sustainable pandemic response:



### **Scale and improve the capture of patient data for decision making:**

DHA will work with the MOH, regional health bureaus, and other stakeholders to ensure use of a single, comprehensive source of data for informed decision making. This includes scaling up the DHIS2 tracker for patient data management in 1,500 vaccination sites throughout the country, ensuring the migration of backlog data into DHIS2 for vaccine certification management, and supporting data analysis for informed decision making. Currently, 20 million records are sitting in MS Excel or paper formats and need to be migrated to DHIS2. DHA will also support health facilities in conflict areas to capture and report patient data using Open Data Kit (ODK)s and interactive voice response (IVR) technologies.



### **Ensuring wide scale up of end-to-end visibility of vaccine logistics data:**

Visibility into the vaccination program, including the inventory of vaccines at all levels, is an important part of the COVID-19 response. Ethiopia has achieved complete visibility at the national and regional levels and partial visibility at sub regional levels. To improve visibility at sub regional levels, DHA will help scale up the use of mBvana in 245 woreda health offices and introduce the health facility edition of mBvana in selected health centers at regional and zonal towns.



### **Improve quality and use of vaccine program and supply chain data:**

Through capacity building and evidence sharing, the DHA will continue to conduct routine data quality assessment at vaccination centers. This will be achieved in four ways. First, by establishing data review and feedback mechanisms at regional levels by recruiting and deploying short term consultants at regional health bureaus. Second, by conducting national and regional data review meetings. Third, by developing real time patient and supply chain dashboards. Lastly, by training stakeholders on how to use the dashboards, recording and reporting tools.



### **Deploy a data analytics platform with smart features.**

Alerts, notifications, automated insight generation built into different digital tools improve system utilization, communication and data use. DHA will continue assessing needs and building these features into the different digital products, as applicable.



### **Continue customizing digital platforms for behavior change:**

To support COVID-19 prevention efforts, DHA will collaborate with stakeholders to customize digital platforms capable of reaching individuals and communities with messages about how to protect themselves from COVID-19.