



CASE STUDY

ETHIOPIA

DIGITAL HEALTH RESPONSE TO THE COVID-19 PANDEMIC: LESSONS TO INFORM ONGOING AND FUTURE DIGITAL HEALTH INVESTMENTS

Abstract:

In responding to the COVID-19 pandemic, countries were challenged with gathering, using and analyzing data needed to ensure that their target populations received vaccines as per the recommended schedules. Ethiopia was able to implement various digital health innovations that provided high-quality information for timely epidemic response, community education, and critical supply chain adjustments. This experience from Ethiopia demonstrates the positive role of digital innovations in times of crisis like the COVID-19 pandemic.

COVID-19 Vaccine

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Background & context: Ethiopia

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 systems, including in Ethiopia. With a population of nearly 120 million, Ethiopia is the sixth most COVID-19-affected country in Africa, with the highest number of COVID-19 cases in eastern Africa.

The first case of COVID-19 was reported on March 12, 2019. Since then, 493 190 COVID-19 confirmed cases have been reported, of which 7,572 (1.54 %) died as of August 31, 2022. Since the first case was detected in Ethiopia, the government has implemented various measures to prevent and control the pandemic.

Ethiopia's innovative response

When the Ministry of Health (MOH) identified digital tools as part of the public health emergency management (PHEM) response, Digital Health Activity (DHA), a John Snow, Inc. (JSI) led project with funding from USAID, supported the MOH in leveraging existing digital tools and developing new technologies for COVID-19 preparedness, prevention, care, and treatment efforts.

Facilitating detection of adverse events following immunization

As part of the COVID-19 vaccination campaign, DHA developed a COVID-19 vaccine adverse events tracking tool to be used by the public to capture Adverse Events Following Immunization (AEFI). The AEFI application is a mobile phone-based reporting tool that gives real-time visibility to monitor AEFI. This application is designed to be used at any point in the supply chain by health workers and other vaccinated individuals to report AEFI.

The application provides regulators as well as health workers with real-time visibility into the status of the vaccinated individuals, adverse events, and allows Ethiopian Food and Drug Authority (EFDA) to track AEFI reports and initiate investigations for serious adverse effects.

Enhancing existing digital systems to accommodate COVID-19 vaccines

To ensure end-to-end visibility of COVID-19 vaccine distribution and to build on existing systems, DHA customized the country's electronic logistic management information system (eLMIS) tools such as Vitas and mBrana.

Vitas

Vitas is a platform designed to support warehouse management, inventory control, and logistics management information. It is used to control inventory, from receipt to issue, and manage transportation and storage in EPSS center and hub warehouses.

It provides data analytics and reporting to guide demand planning while supporting procurement operations through purchase order creation and management; improves resource management by providing commodity costing based on free on board (FOB) value, landed cost, unit cost, and cost build up and cost analysis; facilitates day to day warehouse operations and tracks the transfer and storage by picking list generation, first expiry first out (FEFO) management, batching, location tracking, transfer and loss and adjustment management, and cross-warehouse visibility; automates receipt and issues using real-time consumption, stock balance, and expiries and losses and adjustments to ensure accurate fulfillment including dispatch management and issues and receipt and delivery confirmations; and tracks inventory levels, monitors pipeline to established minimum and maximum levels, and transfers expiries and wastage to minimize excess stock and fulfill orders on time.

mBrana

mBrana is an open-source mobile software platform designed to manage inventory from receipt to issue. It is fully integrated into Vitas, Ethiopian Pharmaceuticals Supply Service's (EPSS) supply chain management information system, and Fanos, EPSS's supply chain dashboard, in order to ensure end-to-end visibility into the entire EPSS's supply chain. It is designed to manage vaccine inventory at woredas and zones throughout Ethiopia.

It offers consistent and accurate data through real time access to vaccine availability, receipts and issues, and bin card tracking; help quickly generate and instantly send orders to hubs and track order progress, from order to issue to delivery; improves adherence to supply chain standard operating procedures by using the standard vaccine request form across all facilities; allows users real time access to vaccine stock at health institutions; and allows users to generate reports including historical data.

Health workforce capacity building

DHA provided capacity-building support to health professionals and all other stakeholders in the supply chain on different digital tools for COVID-19 prevention and control. Training of trainers (TOTs) and end-user training was given to staff working at the different health facilities. Post-training follow-up, mentorship, and on-the-job training was also provided.

Outcomes

Generally, DHA's multi-faced response contributed significantly to the fight against the COVID-19 pandemic. Within weeks after the first COVID-19 case was detected, over 80 manufacturers and importers were registered to import and supply items for both the private and the public sectors. Vitas used by EPSS, was quickly customized to ring-fence commodities required for the national response and quantified national demand based on available resources and helped in scenario planning.

National broadcast services and short toll-free codes (8335 & 994 short code calls) were launched and ran 24 hours a day; telegram channels and SMS services provided daily updates on confirmed cases, fatalities, and recoveries. These platforms were also used to disseminate health information, educate the community on protective measures, provide information about COVID-19 vaccination, and encourage individuals to follow preventive measures.

The mBrana application enabled digital remote tracking and distribution of stock levels of 77,233,156 doses of COVID-19 vaccines in 338 woredas as of June 30, 2022. As of August 31, 2022, a total of 52,580,683 vaccine doses were administered, and 43,131,421 beneficiaries were vaccinated, and these aggregate data were captured using the DHIS2 platform over 570 woredas. These reports have been shared with the public through the mainstream and social media, including Telegram channels using dashboards developed with the support of DHA. DHA also built the capacity of 4,190 individuals through various digital tools.

In addition, the DHIS2 beneficiary level tracker has been deployed at selected health facilities in Addis Ababa. The tracker has shown potential for improving the data quality and providing verifiable electronic certificates for travelers. Over the past few months, nearly 50,000 electronic certificates have been generated and provided to beneficiaries.

During the second COVID-19 vaccination campaign, the daily data were digitally captured, and the reporting rate was consistently monitored and presented to the national task force for informed decision-making. Vaccination data coming through DHIS2 was disaggregated by regions, types of vaccines, age, sex, and other dimensions.

Furthermore, health facilities have started reporting adverse events following AstraZeneca, Sinopharm, Janssen, and Pfizer vaccinations using the AEFI application EFDA. EFDA uses a dashboard prepared for this purpose to visualize and analyze the reports.

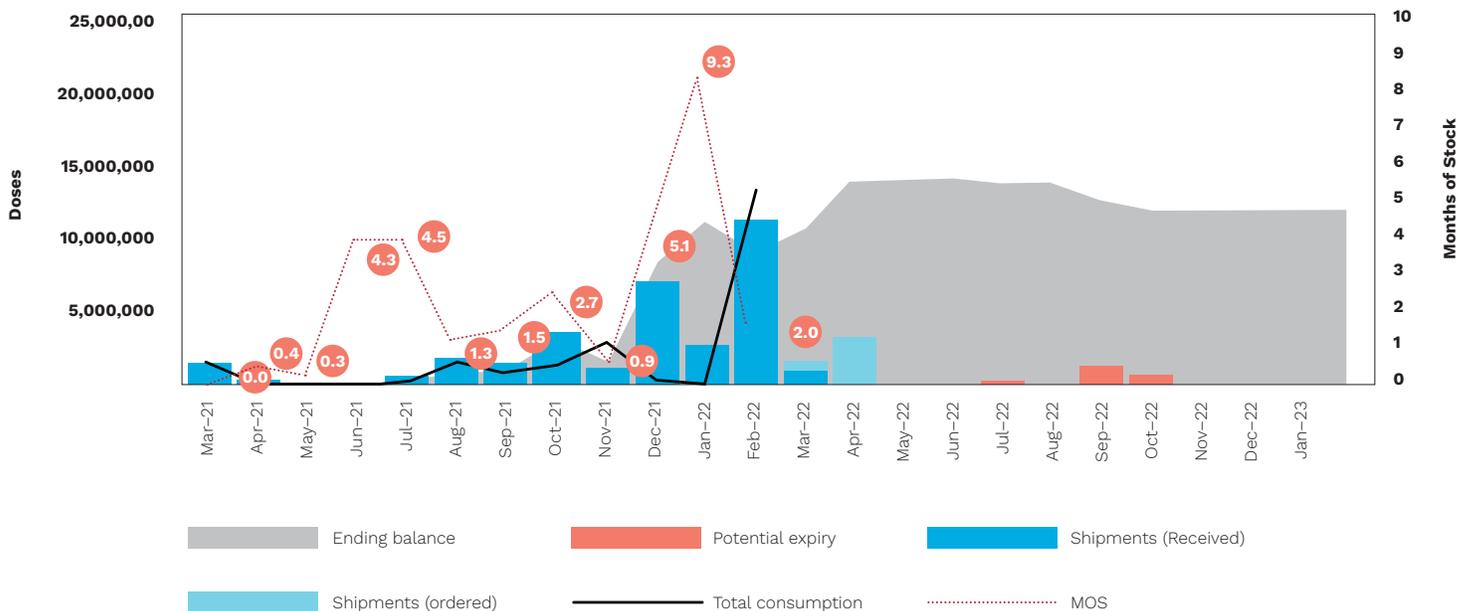


Figure 1: Sample dashboard developed by DHA showing the stock status of the COVID-19

Lessons

The experience of DHA indicates the positive role of digital health interventions in times of crisis like the COVID-19 pandemic. Digital health interventions have provided quality information for timely epidemic response decisions, including improved visibility of essential supply chains at many levels. The digital health tools helped reach community segments with targeted messages on COVID-19 prevention methods. It is believed that the following four factors led to the rapid development, implementation, and adoption of digital tools:

- **Coordination:** There was an expressed need in the health system for a rapid, more organized, data-driven and seamless collaboration among different actors to halt the spread of the virus. A systems approach to pandemic response is needed to ensure that all facets of the response are addressed. The success of Ethiopia's system approach of their digital response is largely due to the comprehensiveness of the planning process, which was organized into seven pillars, the 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.
- **Demand for Digitalization:** The panic and the complexity surrounding possible COVID-19 transmission in paper-based information exchange accelerated the digital tool adoption.
- **Resource allocation:** The shifting of already limited resources (E.g., human resource, hospital beds, medical equipment and budget) by the government, partners, the private sector, and communities to the prevention and control of COVID-19 was crucial to fighting the pandemic's spread.
- **Building on existing investments:** Previous and ongoing digital health investments played a critical role in serving as a springboard, rather than starting from scratch, in responding to public health emergencies. The Vitas, mBrana and DHIS2 tracker were investments made before the occurrence of the COVID-19 pandemic. The MOH and DHA customized these tools to meet the needs of the covid-19 response.
- **One plan, one budget, and one report:** The government-led one plan, one budget, and one report approach augmented a rapid mobilization of financial, human, and other resources, including digital platforms for timely, coordinated, and robust emergency response.

As recurrent waves of the pandemic continue to hit the country, causing significant morbidity and mortality, preventive measures such as vaccinations and personal protective equipment remain the mainstay of the current prevention strategy. The evolution of the pandemic will necessitate new policies and strategies to mitigate the health and socioeconomic consequences of the pandemic. It is essential to continuously adapt to the context and improve digital tools by responding to evolving user needs for a holistic epidemic response. Ongoing and future digital health interventions need to take these lessons from the COVID-19 digital health response to accelerate the overall health system digitization in Ethiopia.

Acknowledgments

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