Lessons Learned from Emergency COVID-19 Vaccination Programs across 28 Countries

December 2023

Background

COVID-19 vaccines were rapidly developed in late 2020, but inequities and inequalities resulted in delays in vaccine rollout in low- and middle-income countries (LMICs). Initially, uptake of the COVID-19 vaccine was low. LMICs faced multiple drivers of low vaccination, including supply chain and distribution challenges, low demand fueled by vaccine hesitancy and misinformation, and access constraints. Once vaccines became available in LMICs in 2021, many countries prioritized elderly, immunocompromised, and other priority populations, followed by the general adult population. This required a shift in the way immunization programs operate, as most vaccination programs had previously targeted pregnant women, infants, and children. As governments planned how to overcome these distinct but interrelated challenges, it became clear that any strategy to increase demand must be supported by simultaneous strategies to increase supply and access.

The Meeting Targets and Maintaining Epidemic Control (EpiC) project, led by FHI 360 with core partners Population Services International (PSI), Palladium, and Right to Care and funded by the United States Agency for International Development (USAID), worked with partner governments in 28 countries to overcome these challenges and increase COVID-19 vaccination rates to meet national targets. In 16 of those countries, EpiC supported direct service delivery, resulting in the administration of a total of 4,320,372 first doses, 12,116,690 last doses, and 2,312,778 booster doses, amounting to 18,749,840 total doses globally (Figure 1).

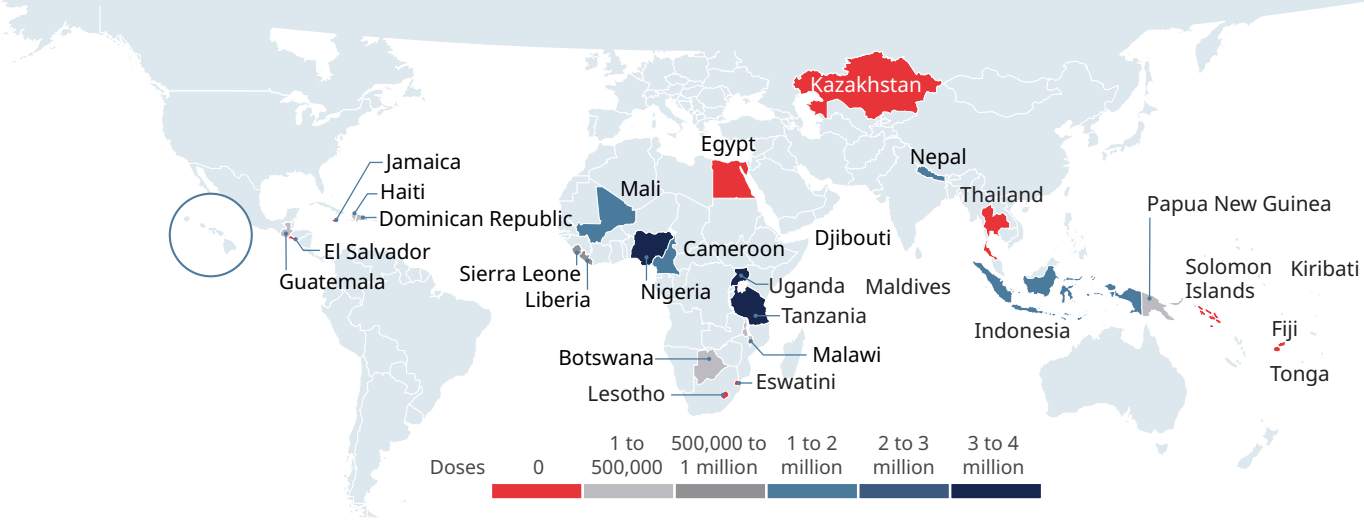

Figure 1. Countries where EpiC supported COVID-19 vaccine readiness and rollout (N=28)

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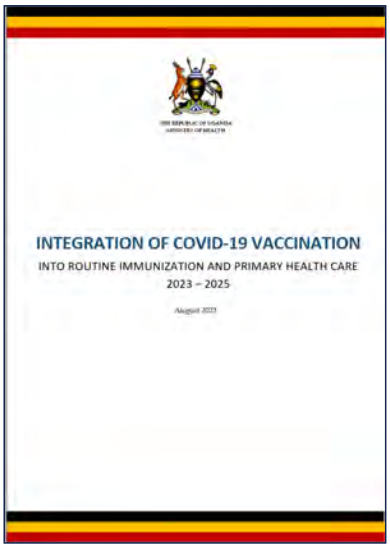
Policy, Planning, and Coordination

EpiC supported district-level microplanning to operationalize and roll out COVID-19 vaccination campaigns. This planning included scheduling when vaccination teams would be available in each community (based on stock and availability of vaccine doses), paired with demand-generation activities. EpiC also coordinated with regional health authorities to establish district-level plans for surge support. As countries concluded their emergency COVID-19 vaccination campaigns, EpiC advocated for integration of COVID-19 vaccination into routine health services.

COVID-19 integration plan, August 2023



Integration of COVID-19 vaccination into routine immunization and primary health care programs in Uganda

After the close of the third round of the national COVID-19 vaccination campaign in Uganda, EpiC collaborated with the Ministry of Health (MOH) to develop a plan to integrate COVID-19 vaccination into routine immunization and other primary health care services. The COVID-19 integration plan was developed through a participatory, collaborative, and inclusive process with multiple national and district stakeholders. EpiC collaborated with the Uganda National Expanded Program on Immunization (UNEPI) to integrate the COVID-19 vaccine into its routine supervision checklist and subsequently oriented national supervisors on use of the checklist. The project supported the development of the Microplanning Guide for COVID-19 Integration into Routine Immunization and the Field Manual for Health Workers on COVID-19 Vaccine Management and Administration.

EpiC also supported the MOH Risk Communication Pillar to develop a demand-generation strategy to support the COVID-19 vaccine integration process. After the plan was adopted by the MOH, EpiC rolled it out in 42 districts by training MOH national and regional master trainers on topics including effective methods for vaccine service delivery, microplanning, recording and reporting vaccine doses administered, and mobilizing the community to take up COVID-19 vaccination. Target audiences for the training were district health teams, the Regional Integrated Disease Surveillance and Response (IDSR) task force, Expanded Program on Immunization (EPI) focal persons, and in-charges from high-volume health facilities.

Advocating for integration of COVID-19 vaccination into routine care in Papua New Guinea

EpiC Papua New Guinea (PNG) provided technical assistance to support each target province with plans to integrate COVID-19 vaccination into routine health services. In National Capital District, EpiC PNG developed and advocated for endorsement of three COVID-19 vaccination integration models, reinforcing the province's ability to develop a cohesive and feasible approach for sustaining efforts as funder support ended. This included integration of COVID-19 vaccination services within primary health care programs and antiretroviral therapy health facilities.

In Madang, EpiC established Madang Urban clinic as a model site for the province on integration of COVID-19 services in an urban public clinic. This support resulted in the rearrangement of general patient flow in the clinic, task allocation of staff on COVID-19 vaccine integration, and demand-generation activities in the vicinity of the clinic.

Demand Generation, Risk Communication, and Community Engagement

When COVID-19 vaccines became available in LMICs in 2021, slow initial uptake was fueled in part by low demand, vaccine hesitancy, misinformation, lack of information, and low risk perception. To overcome these barriers, the EpiC project designed and implemented demand-generation and advocacy strategies as part of national COVID-19 vaccination efforts. Key approaches included building awareness when the new vaccine first became available; understanding drivers of hesitancy including concerns about safety and efficacy; exploring drivers of hesitancy among priority and high-risk groups including the elderly, pregnant women, and people with co-morbidities; and designing strategies and messages to overcome the identified drivers of vaccine hesitancy, including community mobilization and sensitization, addressing misinformation, engaging community leaders and influencers, and direct follow-up with priority groups.

Generating demand for COVID-19 vaccination in Lesotho

EpiC Lesotho collaborated with the MOH to increase COVID-19 vaccine awareness, demand, and coverage. The project expanded community-based demand-generation approaches by working closely with district health management teams (DHMTs) and local government entities for their buy-in and support. To engage communities, EpiC identified and engaged community influencers, including chiefs, champions, community leaders, and village health workers, to conduct school and workplace visits and door-to-door outreach.

To provide accurate information about vaccines and build demand, EpiC applied digital marketing strategies including sponsored social media posts and engagement of social media influencers. After conducting social media monitoring and social listening to track public opinion on COVID-19 vaccination, EpiC developed targeted messages to address the drivers of COVID-19 vaccine hesitancy and misinformation. EpiC also strengthened the capacity of 55 media houses and journalists to accurately report on health and vaccine information, and trained health care workers, community leaders, and faith-based partners on demand generation and communication skills to promote vaccine uptake. In 2023, EpiC supported Lesotho's human papillomavirus (HPV) and COVID-19 vaccination integration campaign by disseminating demand-generation messages across social media platforms. Between November 2022 and August 2023, EpiC Lesotho reached 9,114 people with vaccine promotion and mobilization messaging, of whom 96% (8,733 individuals) received a COVID-19 vaccine.

Increasing demand for COVID-19 vaccines in Tanzania through mass media and community mobilization

Posters designed to increase risk perception and encourage vaccination were disseminated throughout mainland Tanzania and Zanzibar.

EpiC collaborated with Tulonge Afya, USAID's flagship social and behavior change project in Tanzania led by FHI 360, to increase demand for COVID-19 vaccination and overcome vaccine hesitancy. In the last three months of 2021, the projects reached about 37 million Tanzanians with vaccines by promoting messages via mass media and leveraging trusted community leaders to influence beliefs, risk perception, and behaviors.

To increase COVID-19 vaccine acceptance, demand, and dose completion, the projects worked with the Health Promotion Section (HPS) in mainland Tanzania, the Health Promotion Unit (HPU) in Zanzibar, the World Health Organization (WHO), and the United Nations Children's Fund (UNICEF) to develop demand-generation messages and promotional materials. The projects developed radio and TV spots, posters, informational brochures, and appointment reminder cards designed to increase vaccine literacy, address issues of vaccine safety and effectiveness, and increase risk perception.

The projects also worked with journalists and media outlets in Tanzania to support effective, accurate reporting on COVID-19 that promoted vaccine uptake across print, radio, TV, and social media channels. As part of this initiative, they developed a COVID-19 vaccine media toolkit and conducted trainings for 82 journalists in mainland Tanzania and 36 in Zanzibar to increase knowledge about vaccines and strengthen skills to deliver accurate information to audiences. Leveraging the trust and reach held by religious leaders in their communities, EpiC and Tulonge Afya engaged Christian, Muslim, and Hindu faith-based organizations to disseminate COVID-19 vaccination messages and debunk myths and misconceptions.

Rolling out a multifaceted demand-generation strategy in Papua New Guinea

Central Dabaris rugby players and coaching staff after receiving their COVID-19 vaccinations. Photo by EpiC PNG.

In PNG, EpiC supported COVID-19 vaccine readiness and rollout, including a demand-generation and communications strategy to counter misinformation and address vaccine hesitancy. The project developed information, education, and communication materials and messaging on COVID-19 vaccination, reaching millions of people through mass, traditional, and social media. In addition, extensive community engagement activities were implemented, including enlisting influencers such as premier rugby league players as vaccine champions. EpiC also strengthened the capacity of health care workers and community volunteers to effectively communicate the benefits of COVID-19 vaccination to community members. These efforts, combined with other EpiC support for service delivery and human resources for health, contributed to the administration of 172,072 vaccination doses over the life of the project.

Improving COVID-19 vaccine access among rural communities in the Western Highlands of Guatemala

In June 2021, the EpiC project coordinated with the Ministry of Public Health and Social Assistance (MSPAS) to lead a multidisciplinary group of USAID/Guatemala implementing partners to develop the Guatemalan Rural Vaccination Strategy. Five priority health area directorates (DAS) were identified in the western and northern regions of the country, each with large indigenous populations and little road infrastructure, making access to the areas—and, thus, vaccination of their populations—difficult. By May 2022, less than half of the priority DAS population had received one dose of the vaccine. To intensify vaccination efforts in these DAS, EpiC supported implementation of the Rural Vaccination Strategy in Ixcán, Quiché, and Alta Verapaz starting in May 2022, and added support in San Marcos and Huehuetenango two months later. EpiC supported the quantification, hiring, and distribution of contracted vaccinators, data entry clerks, and vaccination center managers, mobilizing brigades of vaccinators for field visits. EpiC provided vehicles to transport vaccinators; in rural, mountainous areas with poor road infrastructure, EpiC-hired vaccinators traveled by foot or motorcycle to conduct house-to-house visits and to staff fixed posts and micro-vaccination sites.

Vaccinators use a zipline to bring supplies across a river that had recently surged due to heavy rains in Ixcán, Guatemala. Photo by Alvaro Rodríguez.

Because indigenous languages are primarily spoken in these areas, communications efforts around COVID-19 vaccination were challenging. Misinformation and lack of awareness about the COVID-19 vaccine and its benefits had been circulating in several remote communities in Guatemala, creating some vaccine hesitancy. To overcome these challenges, EpiC staff worked with local DAS and municipal health district authorities to distill and disseminate key messages about the vaccine in the predominant local indigenous languages spoken in the communities. This type of coordination between local actors and EpiC allowed for the vaccination of people previously reluctant to be vaccinated.

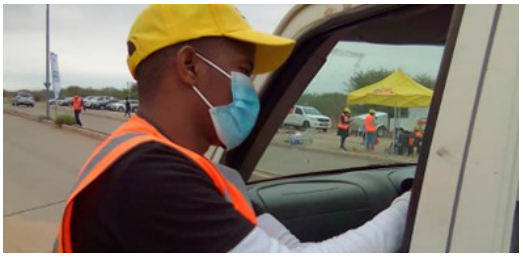
Strengthening Service Delivery

Introduction of the novel COVID-19 vaccine required strong service delivery systems in place to ensure that doses could reach the eligible population. To strengthen service delivery systems, EpiC trained vaccination teams on how to administer the new vaccine, including dosage and storage requirements, reporting adverse effects, and data entry and reporting. EpiC also worked with district and local governments to increase availability of the vaccine through additional service delivery sites, including at mobile sites, community outreach, health care facilities, mass vaccination events and campaigns, door-to-door vaccination campaigns, and integration with routine health services. EpiC supported local governments to forecast and plan for the correct quantity of doses to align with microplans, ensuring that supply met demand.

Expanding access to COVID-19 vaccines in Botswana at drive-through sites and mobile outreach

Between October 2021 and January 2022, EpiC Botswana partnered with the MOH to reach more than 34,258 people with COVID-19 vaccinations at drive-through sites, project-supported clinics, and government health facilities, and through mobile and community outreach. The project partnered with DHMTs in Gaborone and Francistown to establish and run drive-through vaccination sites. These drive-through services were promoted in the local media (radio and TV), through newspaper advertisements, and on the Ministry of Health and Wellness and DHMT Facebook pages. Eligible Batswana preregistered and waited for just a few minutes in their cars at the sites, making the prospect of getting vaccinated much easier for many people.

A nurse supported by the EpiC project vaccinates a client at a drive-through site at Obed Itani Chilume Stadium in Francistown, Botswana. Photo by Gaone Mogaetsho.



EpiC Botswana supported vaccination sites by providing trained nurse vaccinators, data clerks, vehicles, and drivers, as well as tablets, vaccine carriers, and hand sanitizers. The vaccinators and data clerks were engaged as paid consultants to support COVID-19 vaccination drive-through activities and were trained by DHMTs in collaboration with EpiC and other partners. The project also provided technical assistance to the DHMTs to ensure that vaccination data were collected via tablets and synced daily into the District Health Information Software 2 (DHIS2) system. The involvement of the private sector was critical to the success of the vaccination drive-through sites. For example, the mobile network Mascom donated airtime, allowing data clerks at the Francistown location to capture and enter data into DHIS2.

Prioritizing older adults in Indonesia to receive the COVID-19 vaccine

The elderly population in Indonesia faces several challenges in reaching COVID-19 vaccination sites, particularly when vaccination events are held during normal working hours, as many rely on their adult children for transportation. In addition, older adults may not be aware of vaccination events happening in their communities. To overcome these challenges, EpiC partnered with district health officials to identify older community members, inform them about available COVID-19 vaccination services, and provide transportation to vaccination sites. In addition, EpiC brought vaccination opportunities closer to communities. After enlisting private sector health care workers as volunteer mobile vaccination teams, EpiC rolled out door-to-door home vaccination campaigns and vaccination services for housebound elderly community members.

An elderly woman receives a COVID-19 vaccine at a community-based vaccination event at a mosque in Garut Regency, West Java Province. Photo by EpiC Indonesia.

In addition to these targeted approaches, EpiC has reached elderly adults with the COVID-19 vaccine through fixed-site immunization services at health facilities, mass vaccination events, mobile teams, and community-based outreach sites. Through all of these approaches, EpiC has reached more than 164,000 adults ages 60 and older in Indonesia with a COVID-19 vaccine or booster shot since August 2021.

Supporting logistics and vaccine supply chain management in Nepal

EpiC Nepal provided the MOH with human resource support for logistics and supply chain management of COVID-19 vaccines. To strengthen the ultra-cold chain system of central vaccine storage in Nepal, EpiC procured and transferred two -80 C freezers with a capacity of 828 liters each, 100 cryogenic face shields, 100 pairs of cryogenic gloves, four digital data loggers, and two electric voltage stabilizers to the Management Division within the Department of Health.

Strengthening COVID-19 Vaccine Data Management and Reporting Systems

Digitizing vaccine data generates real-time information on which vaccines are available where, and in what quantities. It also allows health authorities to compare data sources and detect backlogs in data recording, such as when recorded individual-level data do not agree with information from aggregate data. This allows health officials to make informed decisions about where vaccines are needed.

Clearing vaccine data backlog in Uganda

EpiC collaborated with Uganda's MOH, Health Information Service Provider (HISP) Uganda, Shifo Foundation, USAID/Uganda Health Systems Strengthening (UHSS) activity, and regional implementing partners to support clearance of a countrywide COVID-19 vaccine data backlog in September 2022. The project supported districts to enter aggregate and individual-level vaccination data into the MOH's national COVID-19 vaccination reporting system, EPIVAC. The activity improved the quality of COVID-19 vaccination data through data entry, data cleaning, hands-on mentorship, and supervision. The activity covered 144 districts of Uganda, excluding Kampala District. Teams were deployed across the country for the activity, which took 10 to 20 days per district, depending on the backlog volume at the district.

Given the extensive data collected for each person vaccinated for COVID-19, it was not possible to enter these data into EPIVAC at the vaccination service delivery point. However, health care workers were required to report daily aggregate data to the MOH; hence, a gap arose between the aggregate data and individual-level data entered in EPIVAC, revealing a data backlog. As such, EpiC trained and paid 153 district-level biostatisticians, 153 health information management system focal persons, and 2,415 district-level data entry clerks to enter the individual data records to harmonize them with the aggregate data in EPIVAC. This effort reduced the data backlog from more than 4 million records to less than 1 million.

EpiC Uganda created two Power BI dashboards: one for COVID-19 vaccination coverage and one for COVID-19 vaccination backlog, which improved data visualization and use by the project. EpiC disseminated the dashboards to the MOH and trained five officials in the use of Power BI. Under the guidance of the MOH, EpiC also developed two COVID-19 standard operating procedures for data management at the district and health facility levels, which were shared with the MOH and Uganda National Expanded Program on Immunization (UNEPI) monitoring and evaluation team. One was on recording and reporting COVID-19 aggregate and individual-level data, while the other covered storage, retrieval, and transportation of COVID-19 data management tools.

Lessons Learned and Recommendations

Supply efforts should align with demand-generation efforts to ensure availability of vaccines when there is demand and to avoid expiry or stock-out. Demand for vaccines varied depending on the COVID-19 case numbers and hospitalization rates. When fear of the disease increased, vaccination demand increased. During periods when cases and hospitalization rates increase, demand-generation efforts should be intensified to leverage increased interest and attention to the disease.

Local ownership of emergency vaccination programs contributes to their success. Programs should engage with community leaders and health department leadership in the planning phase, subregional microplanning should be decentralized, and every level of the health system should be engaged during planning and implementation.

At the national level, MOHs should set aside contingency funds for emergency health programming to allow for rapid deployment of initial emergency operations. Short-term emergency funding should be readily available to cover operational costs, including cold-chain logistics; travel costs; training and paying vaccinators, supervisors, and support staff; improving data capture software; and logistics support. Decentralizing decision-making about emergency health funds to the extent possible will help to quickly mobilize response activities.

Mobile payment systems for field vaccinators and other staff are crucial for providing real-time payments to allow them to undertake activities in the field quickly and stay motivated. However, mobile payment systems will only work if they are established, well-functioning systems that can be monitored and audited for accuracy. Existing mobile payment systems must be improved or bolstered to allow MOHs to monitor and confirm that payments are being received by field-level vaccination staff.

In the event of another public health emergency, a multifaceted demand-generation strategy will be needed to mobilize different sections of the population for novel immunization programs. This includes community mobilization, door-to-door campaigns, traditional and social media, and engagement of trusted leaders.

Health system decision-makers need high-quality data and data visualization to inform policies and planning. Before the COVID-19 pandemic, immunization programs had collected data about children and pregnant women, but they were not set up to capture demographic or health data for the general population. For future public health emergencies, data systems must be able to capture and record data about the entire population, including adults, to facilitate planning and rollout of emergency health programs.

Integration of COVID-19 vaccination into routine immunization and primary health care is needed to ensure sustainability and manage future outbreaks. However, immunization programs are not currently set up to deliver vaccines to adult populations within primary health care systems, and demand for COVID-19 vaccines has declined as perceived risk has dropped. To ensure integration and sustainability of COVID-19 vaccination within routine primary health care services, national policies and guidelines must be in place, health care workers must be recruited and trained to administer vaccines to the general population, data systems must be updated to record and report actionable data on routine COVID-19 vaccination, appropriate supply and cold chain infrastructure must be present at facilities, and demand-generation activities must continue even as the acute threat has ended.

LMICs require sufficient infrastructure to receive and administer novel vaccines and therapies, which may be logistically challenging in rural and remote areas. The current mRNA-based COVID-19 vaccines require a continuous ultra-low temperature cold chain for distribution, which presents a challenge in LMICs. Many facilities lack the personnel, equipment, and stable electrical power for ultra-low temperature vaccine storage. Innovative solutions for storage and transport are needed, such as high-tech, insulated, reusable vaccine containers that retain ultra-cold temperatures for up to a week.

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