Evaluation of COVAX Facility and AMC and COVAX Pillar Delivery Efforts

Zambia Case Study Final Report

April 2025

Prepared for
Gavi, WHO, UNICEF, CEPI
Prepared by
RTI International
3040 E. Cornwallis Road, PO Box 12194
Research Triangle Park, NC 27709 USA
www.rti.org

With Itad Ltd. (UK) and Genesis Analytics (S. Africa)

RTI INTERNATIONAL G:ENESIS 25 YEARS OF UNLOCKING VALUE itad

CONTENTS

EXECUTIVE SUMMARY I

BACKGROUND AND COUNTRY CONTEXT 1

COVID-19 AND COVAX CHARACTERISTICS 1

OVERVIEW OF COVAX ENGAGEMENT IN ZAMBIA 3

FINDINGS ON COVAX SUPPORT IN ZAMBIA 8

EQ 3: Was the implementation framework for the COVAX Delivery Pillar appropriate to achieve overarching objectives? 8

EQ 4: How well was the COVAX delivery pillar implemented and adapted as needed, in line with overarching objectives? 12

BROADER LESSONS OR INSIGHTS 15

CONCLUSION 16

REFERENCES 18

APPENDIX 1

Appendix A: Methods 2

Appendix B: Adapted Country Theory of Change 3

Appendix C: Country Timeline 5

FIGURES

Figure 1. Country timeline 5

Figure 2. Summary of early UNICEF support 8

Figure 4. Extract on population selection from Zambia's NVDP 10

TABLES

Table 1. Summary of approved COVAX funding to Zambia 6

Table 2. Summary of CHAZ community engagement sessions and reach 9

LIST OF ACRONYMS

AEFI	Adverse event following immunization
CDC	U.S. Centers for Disease Control and Prevention
CDS	COVID-19 Vaccine Delivery Support
CDS EA	COVID-19 Vaccine Delivery Support – Early Access
CDS NB	COVID-19 Vaccine Delivery Support – Needs-Based
CDS-3	Third round of CDS funding
CHAZ	Churches Health Association of Zambia
CIDRZ	Centre for Infectious Disease Research in Zambia
COVAX	COVID-19 Vaccine Global Access initiative
CoVDP	COVID-19 Vaccine Delivery Partnership
COVID-19	Coronavirus disease 2019 (SARS-CoV-2)
CRD	Country Readiness and Delivery
CSO	Civil society organization
DHIS2	open-source software platform for health information management
DTP	Diphtheria, tetanus, pertussis
eLMIS	Electronic Logistics Management Information System
EPI	Expanded Program on Immunization
Gavi	Gavi, The Vaccine Alliance
HPV	Human papilloma virus
ICC	Inter-Agency Coordinating Committee
ICT	Information and communication technology
IMS	Incident Management System
KfW	Kreditanstalt für Wiederaufbau
M&E	Monitoring and evaluation
MOH	Ministry of Health
NVDP	National Vaccine Deployment Plan
NVDS	National Vaccine Deployment Strategy
ODK	Open Data Kit
PHC	Primary healthcare
PPE	Personal protective equipment

RI	Routine Immunization
SAGE	Strategic Advisory Group of Experts
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
USD	United States dollar
WHO	World Health Organization
ZAMRA	Zambia Medicines Regulatory Authority
ZITAG	Zambia Immunisation Technical Advisory Group
ZNPHI	Zambia National Public Health Institute

EXECUTIVE SUMMARY

Background on Zambia's COVID-19 response

Zambia is a landlocked country in Southern Africa with a population of about 20.6 million. The country's economic performance had been declining since 2015 and the COVID-19 pandemic exacerbated economic difficulties. Despite this disruption, Zambia mounted a strong COVID-19 response, characterized by effective political leadership and community engagement that secured public adherence to infection control protocols and vaccine uptake.

By October 2023, Zambia had recorded 349,287 COVID-19 infections and 4,069 deaths. COVID-19 vaccination in Zambia began in April 2021 and five vaccines were administered over the next three years. COVAX—a multilateral partnership established to facilitate vaccine procurement for resource-constrained countries—supported the procurement and administration of the country's first AstraZeneca vaccine and enabled vaccine management and delivery systems in Zambia over the course of three years. By the end of 2021 only 1%–2% of the population had received at least one vaccine dose.

In 2022, eligibility for vaccination was extended beyond essential healthcare workers, initially to the elderly and people with co-morbidities and then to all persons aged 12 years and older. Two major national vaccination campaigns in May and October that year dramatically increased uptake. In June 2022, the coverage rate for full vaccination had risen to 48% of eligible persons, and in December of that year, 80% of the intended population were fully vaccinated, exceeding the country's target of 70%. In 2023, intensified, customized outreach activities engaged with low-performing districts and sections of the population at high risk for serious health consequences, bringing full-vaccination coverage to 87% of the eligible population by December 2023.

COVAX support received in Zambia

COVID-19 Vaccine Delivery Support funding began in December 2021 with COVAX focusing on activities essential for immediate vaccine deployment and scale-up. Key stakeholders—including the United Nations International Children's Emergency Fund (UNICEF), the World Health Organization, and the Centre for Infectious Disease Control in Zambia—worked with the Ministry of Health (MOH) and the Expanded Program on Immunization (EPI) to ensure country preparedness. They used Zambia's National Vaccine Deployment Plan as their implementation framework and prioritized vaccination of populations at high risk of disease-related complications or death. Scale-up to meet national targets for adult vaccination followed and thereafter, in 2023, attention turned to integration of COVID-19 vaccination into routine immunization and primary healthcare (PHC) as a sustainable delivery mechanism. In total, COVAX-approved funding exceeded US$20 million for technical assistance and operational support to Zambia's COVID-19 vaccination program.

Outcomes and challenges of COVAX delivery in Zambia

COVAX support strengthened logistics and enhanced the vaccine cold chain through the acquisition of ultracold storage units for all provinces, as well as other refrigeration equipment. The country's risk communication was enhanced by extensive community engagement to combat vaccine hesitancy and misinformation. The partners trained more than 15,000 community volunteers and oriented more than 15,000 local leaders—civic, religious, and traditional leaders and teachers—to enable them to address rumors, correct misinformation, and convey accurate messaging on vaccines. Human resource constraints were relieved at the national level by the secondment of staff from partner organizations to the MOH, and by capacity building and staff shifting at the district and health facility levels.

Exceeding the country's COVID-19 vaccination coverage target was a major achievement for Zambia. It was attained despite numerous challenges, including periodic mismatches between vaccine supply and demand. Misinformation and rumors about COVID-19 vaccines required strong and sustained communication to overcome the negative impact on vaccine uptake.

The financing model used by strategic partners proved to be efficient and effective in implementing COVID-19 activities, as it optimized resource allocation and minimized financial risks. However, the intense focus on COVID-19 vaccination came at a cost to routine immunization for other preventable diseases. It proved difficult to coordinate stakeholder support for routine immunization with the contending demands of COVID-19 vaccination. The final phase of the COVAX initiative focused on restoring a balance by integrating COVID-19 vaccination into the EPI and PHC systems.

Broader lessons or insights

Zambia's relative success in COVID-19 vaccination owed much to strong political will and engagement, firm commitment to the principle of "one plan, one budget, one monitoring framework," and clearly defined pillars of response. The leadership of the MOH and support of COVAX strategic partners enabled an effective response.

Zambia's achievement of 87% full-series coverage in the eligible population was due largely to clear guidance and direction from the EPI, supported by partners embedded within governance and coordination structures created by the MOH. To ensure sustained efforts and preparation for future health emergencies, the collaborative structures that were set up should remain in place and health systems strengthening through integrated approaches should be institutionalized.

BACKGROUND AND COUNTRY CONTEXT

This country case study is one of six contributing to the *Evaluation of COVAX Facility and AMC and COVAX Pillar Delivery Efforts*, with the aim of providing illustrative examples of COVAX's implementation in context and demonstrating how its implementation achieved results amidst evolving global and local contextual factors.[a] **Appendix A** outlines the methods for this case study.

Zambia comprises 10 provinces and 116 districts, which are home to an estimated 20,569,737 people, 44% of whom live in urban areas.[1]

The country experienced three major waves of COVID-19 that resulted in partial lockdowns, with limits on the size of gatherings, a two-week quarantine for travelers entering the country, and restriction of nonessential foreign travel to countries with cases of COVID-19.[2] By October 2023, Zambia had recorded 349,287 COVID-19 infections and 4,069 deaths.[3]

COVID-19 and COVAX characteristics

COVID-19

- Infection rate:2%
- Mortality Rate: Case fatality rate 1.2%
- Government Stringency Index average [pre-2021]: 50.9
- Government Stringency Index average [post-2021]: 38

COVAX

- CoVDP focus: Zambia did not request emergency funding under CoVDP

Country response to COVID-19

The Ministry of Health (MOH), through its Expanded Program on Immunization (EPI) and a range of partner organizations, provided vaccination services from April 14, 2021 as part of the country's pandemic response.

The strategic partners in this collaborative effort were the United Nations International Children's Emergency Fund (UNICEF), the World Health Organization (WHO), the Centre for Infectious Disease Research in Zambia (CIDRZ), and the Churches Health Association of Zambia (CHAZ). Cooperating partners comprised the World Bank, United States Agency for International Development (USAID), U.S. Centers for Disease Control and Prevention, German Embassy, and Japan International Cooperation Agency. Other significant partners included Akros; Jhpiego; the Center for Health, Education, and Biosecurity; PATH Zambia; Amref Health Africa; John Snow Inc.; Zambia Red Cross Society; John Snow Health Zambia; and Catholic Relief Services.

[a] COVAX, the vaccines pillar of the Access to COVID-19 Tools Accelerator (ACT-A), was launched at the end of April 2020 under immense pressure during the COVID-19 pandemic to deliver vaccines worldwide, introducing an unprecedented market mechanism at a global scale. COVAX was co-led by the Coalition for Epidemic Preparedness Innovations (CEPI), Gavi, the Vaccine Alliance (Gavi), UNICEF, and the World Health Organization (WHO). COVAX represents a partnership of 193 countries coordinating resources to secure access to a portfolio of COVID-19 vaccine candidates, aimed to provide participating countries with early access to vaccine doses sufficient to vaccinate up to half of their populations.

Zambia had access to a range of vaccines: AstraZeneca, Johnson & Johnson, Sinopharm, Pfizer-BioNTech, and Moderna obtained through COVAX and other partners.[4] On April 12, 2021, the country received its first consignment of 228,000 doses of the AstraZeneca vaccine from COVAX.[5]

During the initial vaccine rollout in mid-2021, Zambia faced significant challenges in relation to vaccine access and distribution. By the end of 2021, only 1%–2% of the population had received at least one dose. Limited vaccine supply, logistical issues, and vaccine hesitancy all presented barriers to delivery. The focus during this period was vaccinating frontline essential workers and populations with a high health risk.[6]

In 2022 and early 2023, vaccination coverage began to improve as the eligible population was expanded to include all persons aged 12 years and older. By June 2022, 48% of those eligible had been fully vaccinated, while a further 15%–20% had received one dose. At the end of that year, about 80% of the intended population had been fully vaccinated, and by December 2023, 87% had been fully vaccinated. This impressive surge in uptake was due in part to increased vaccine availability through international donations, including COVAX consignments, and in part to efforts to streamline distribution.[7]

Major vaccination campaigns in 2022 and other educational activities on vaccine safety significantly reduced hesitancy and boosted uptake, as did the deployment of mobile units and the conduct of outreach campaigns in hard-to-reach rural areas. Nonetheless, misinformation, persistent hesitancy, and logistical hurdles continued to challenge equitable vaccine distribution.

> ***"Like many countries in the region, Zambia was dealing with COVID-19 vaccine hesitancy in the start-up stage. Misinformation and rumors posed a constant threat to vaccine uptake. The spread of misinformation was exacerbated by social media platforms. [COVAX] CDS funding focused on enhancing the advocacy, communication, and social mobilization strategy by orientating community-based volunteers to sensitize their communities. In addition, spots were aired on TV and radio to counter misinformation and support demand generation." –Gavi verification notes***

The country's response to the COVID-19 pandemic was shaped by many factors, including political leadership, major financial support, social measures to curtail infection (such as social distancing and restrictions on gatherings), and demographic considerations. Strong political leadership and extensive community engagement were key in driving the public's adherence to COVID-19 protocols and vaccine uptake.

> ***"Yes, there was strong political will. We had direct link to the Head of State and this really had a strong influence." –CIDRZ, verification discussion***

Zambia's health sector at a glance

The country's health system comprises four tiers: MoH Head Office, Provincial Health Offices, District Health Offices, and Health Facilities. In December 2021, Zambia's hospital network comprised 10 level-3 and level-4 hospitals operating nationally, 36 level-2, 100 level-1, and 62 mini-hospitals located at the provincial and district levels. The primary care network comprised 1,720 health centers and 1,388 health posts at the community level. Of the 3,320 healthcare facilities, 85% are government-owned, about 12% are privately owned, and 3% are run by faith-based organizations.[8]

This arrangement provides an organized structure for service delivery, from national to community level, in all 10 provinces and 116 districts. Coordination of the health system is vested in the MOH.[9] Routine immunization is the responsibility of the country's EPI, which operates mainly through the primary healthcare (PHC) system.

The Zambian health system experienced challenges even prior to the COVID-19 pandemic. These included a lack of human resources, inadequate skills and capacity; shortages of essential medicines and medical supplies; inadequate health infrastructure, equipment, and transport; and weak harmonization of the health information system. The underlying challenge was inadequate healthcare funding, although Zambia devotes about 7.5% of gross domestic product (GDP) to healthcare.[10]

Key Country Characteristics

Population[1]

- Total population: 20,071,678 (2022)
- Urban population: 45.6%
- Population > 65 years: 3%[b]
- Population < 12 years: not available
- Health care workers: 0.3%[1]
- Migrants and refugees: 0.3%

Health care system strength[11]

- Health expenditure: 7.5% of GDP
- Health expenditure per capita: US$76
- Routine vaccine coverage 2020: diphtheria-tetanus-pertussis (DTP)1 – 94%, DTP3 – 88%. Average – 91%

Global health security[12]

- Global Health Security (GHS) Index score: 28.7
- Major epidemics since 2000: measles, cholera, listeriosis, yellow fever, influenza, typhoid, anthrax, and foot-and-mouth disease

Socioeconomic indicators[1]

- World Bank classification: lower-middle income country

OVERVIEW OF COVAX ENGAGEMENT IN ZAMBIA

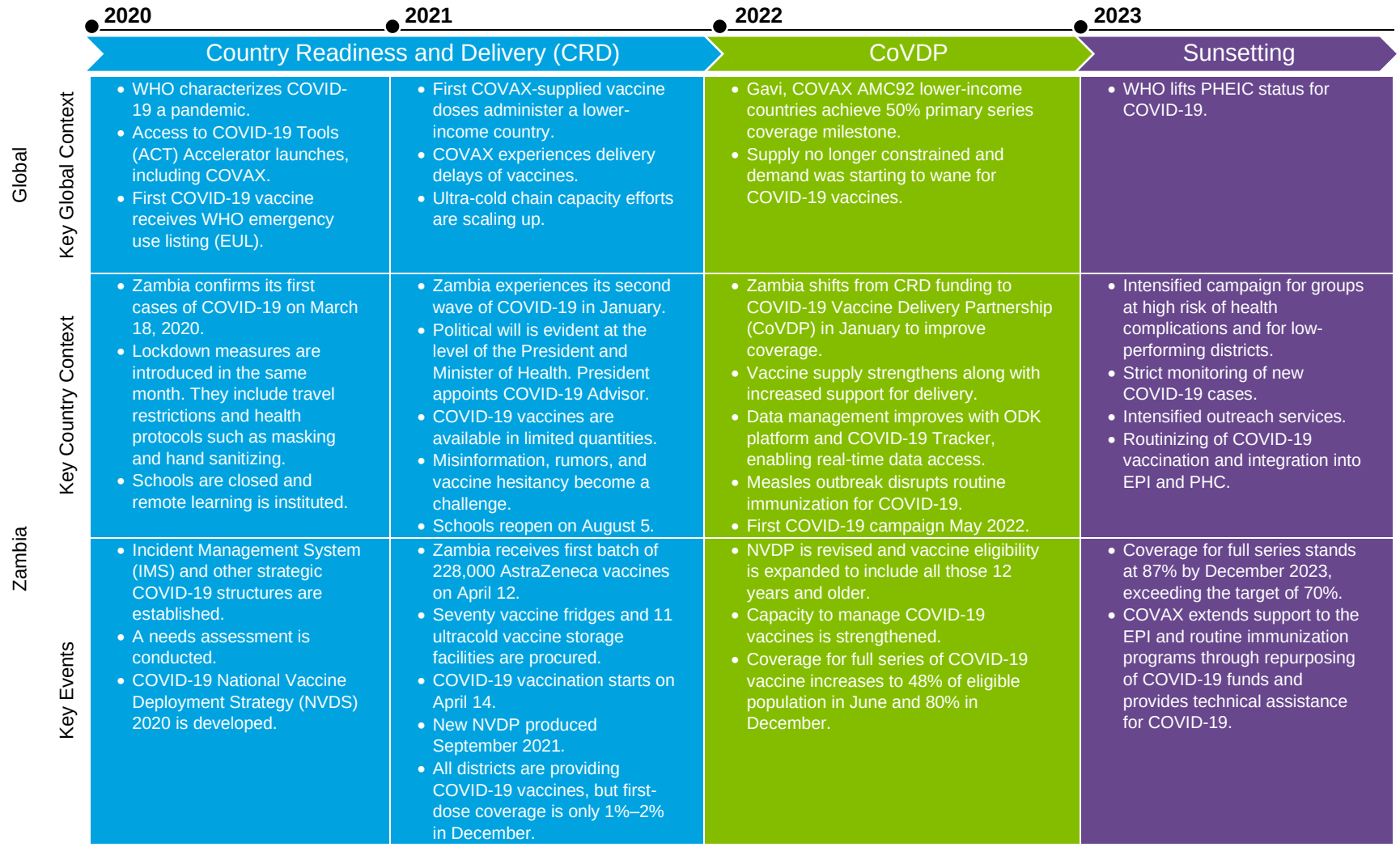
Zambia received COVID-19 vaccines through the COVAX facility on April 12, 2021, and commenced its COVID-19 vaccinations two days later with the aim of fully vaccinating 70% of the eligible population **(Figure 1)**. The initial group comprised healthcare workers, people with co-morbidities, and the elderly.[13]

In December 2021, during COVAX's Country Readiness and Delivery (CRD) phase, the COVID-19 Vaccine Delivery Support (CDS) mechanism began to provide funding to Zambia through the Early Access (CDS EA) window. This effort focused on activities essential for immediate COVID-19 vaccine deployment and scale-up.[13]

[b] National Health Strategic Plan 2022–2026.

From the early days of COVAX support, CIDRZ, UNICEF, and WHO worked closely with the MOH and other partners to perform COVID-19 vaccination activities. CIDRZ focused on improving planning and coordination and preparing health services for delivery. UNICEF provided support for logistics and facilitated advocacy and communication. WHO supported the strengthening of monitoring and evaluation (M&E), data management, and vaccine safety surveillance. Total funding approved under CDS EA amounted to 1,920,837 USD and the facility closed on December 31, 2022.[13]

Figure 1. Country timeline[c]



[c] Note that Zambia moved from the CRD phase to COVDP phase in terms of activities, however, the country did not receive COVDP associated funds.

In March 2022, Zambia's application for CDS Needs-Based (CDS NB) funding, totaling US$6,717,249, received approval.[14] During the CDS NB phase, Zambia sought to harmonize key elements of vaccine delivery, drawing on lessons learned during the CDS EA phase and aligning interventions with the updated National Vaccine Deployment Strategy (NVDS). Significant partners during this phase were CHAZ, CIDRZ, UNICEF, and WHO. Financial support focused mainly on scaling up COVID-19 vaccination services because none of the country's milestones for vaccination coverage had yet been attained.

In February 2023, the country secured approval for the third round of CDS funding (CDS-3), amounting to US$11,521,692. Funding was disbursed to grantees from May through September 2023.[7] This grant was designed to achieve three primary objectives: accelerate vaccination efforts for populations in the high- and highest risk categories as defined by the Strategic Advisory Group of Experts (SAGE), expedite vaccine delivery and scale-up to meet national targets for adult vaccination, and support the integration of COVID-19 into routine immunization as a sustainable delivery model. Implementation of CDS-3 funding was overseen by the MOH with collaborative support from CHAZ, CIDRZ, UNICEF, and WHO. **Table 1** summarizes the funding tranches for Zambia from late 2021 through early 2023.

Table 1. Summary of approved COVAX funding to Zambia

Funding stream	Approval date	Amount in USD
CDS EA	December 2021	1,920,837
CDS NB	March 2022	6,717,249
CDS-3	February 2023	11,521,249
Total		**20,159,778**

Although Zambia participated during the COVID-19 Vaccine Delivery Partnership (CoVDP) phase of COVAX, it did not receive additional funding for activities in this period as no emergency funding was requested. Gavi, the Vaccine Alliance (Gavi) set out its perspective on COVAX support to the country in a verification note:

> ***"Zambia received support for the initial CRD phase and did not request emergency funding under CoVDP. Initial CRD (CDS EA) support focused on priority activities essential for immediate vaccine deployment and scale-up of COVID-19 vaccination. CDS Needs-Based funding … intended to fill critical funding gaps for COVID-19 vaccination scale-up, while aiming to complement existing support from domestic and external resources. The third CDS window, which opened in June 2022, adjusted to the evolving COVID-19 landscape, particularly integration of COVID-19 vaccination into routine immunization in many countries. As such, this window supported three main objectives: (1) vaccine acceleration in high-risk groups, (2) reaching COVID-19 vaccination targets in the adult population, and (3) supporting COVID-19 integration with routine immunization. With the substantial evolution of COVID-19 epidemiology and updated SAGE guidance on vaccination, the CDS-3 window made provision to reduce backsliding of other antigens due to the acute focus on COVID-19 during the pandemic." –Gavi verification note***

Implementation framework

COVAX-funded activities were implemented in accordance with the National Vaccine Deployment Plan (NVDP), which was based on a needs assessment and integrated with EPI systems. Key pillars of the NVDP included planning and coordination, regulatory processes, prioritization of target groups, service delivery, M&E, vaccine distribution, cold-chain logistics,

safety surveillance, and communication strategies for demand generation. These implementation pillars were intended to achieve three main objectives:

- Ensure vaccines reached all geographical regions, from central to peripheral locations.
- Prioritize groups with high health risks for vaccination.
- Enhance overall country preparedness for vaccine distribution and administration.

> ***"From my experience, those pillars were followed almost to the book and I think the successes would have been difficult if they were not followed. So, I attribute the success to the fact that there was strict adherence to the government structures established. Under each of the pillars there was a group of people doing what they were supposed to be doing and reporting through established channels." –UNICEF, verification discussion***

The delivery of COVID-19 vaccines was integrated into broader PHC services, which provide preventive, curative, and rehabilitative care through established health facilities. This integration into established healthcare programs, notably the EPI, was intended to improve efficiency and effectiveness.[15]

> ***"The structure within government that was already established [was] the EPI committee …and the subcommittees that report to it. So, during COVID times, there was also a specific COVID committee that CIDRZ was chairing. So, COVID implementation … was done within the existing EPI structure of the MOH. This made it more effective and easier to implement." –CIDRZ, verification discussion***

Key structures in the coordination of COVID-19 vaccine introduction and delivery included:

- The Incident Management System (IMS) and its National Coordinating Committee, which was established with multisectoral representation as the implementation structure for the NVDP. It was replicated at all levels of the health system to ensure seamless coordination with relevant stakeholders, down to the subnational and community levels.
- The Inter-Agency Coordinating Committee (ICC) facilitated coordination among partners involved in financing COVID-19 activities. The ICC reviewed and endorsed proposals for financial support for the introduction of the COVID-19 vaccine, mobilized resources to address funding gaps, and monitored progress.
- The COVID-19 Vaccination Group, composed of diverse stakeholders, coordinated the overall immunization response, reviewing global information on COVID-19 vaccines to inform local planning and preparation.
- The Zambia Immunisation Technical Advisory Group (ZITAG) was a committee of experts tasked with providing evidence-based recommendations and policy guidance on COVID-19 vaccines. This group reviewed insights from various advisory bodies, including the SAGE and the Regional Immunization Technical Advisory Group, alongside relevant national data on COVID-19 epidemiology, confirmed cases, hospitalizations, and deaths.[16]

The role of the strategic partners in enabling the activities funded by COVAX was as follows:

- UNICEF's main responsibilities were strengthening of cold-chain management systems, supplies and logistics, demand promotion, and community mobilization.
- WHO focused on human resources, data systems, surveillance systems, and M&E.
- CIDRZ and CHAZ were involved in the actual implementation of COVID-19 vaccine delivery and in community sensitization and engagement.

FINDINGS ON COVAX SUPPORT IN ZAMBIA

This section presents our key findings, highlighting the country-level support provided through COVAX, responsiveness of COVAX partners to country needs, equity aspects, the human and financial resources provided, key challenges and successes, and the effectiveness of coordination and collaboration. It also considers how COVAX partners complemented Zambia's established health systems. These findings are based largely on evidence desk reviews with follow-up clarificatory and verification sessions—written and in-person held with the Focal Points from the strategic partners (i.e., UNICEF, WHO, CIDRZ, and Gavi). A validation session was held with stakeholders to ensure alignment and consensus. This section is structured by evaluation question (EQ).

Country-level support provided through COVAX

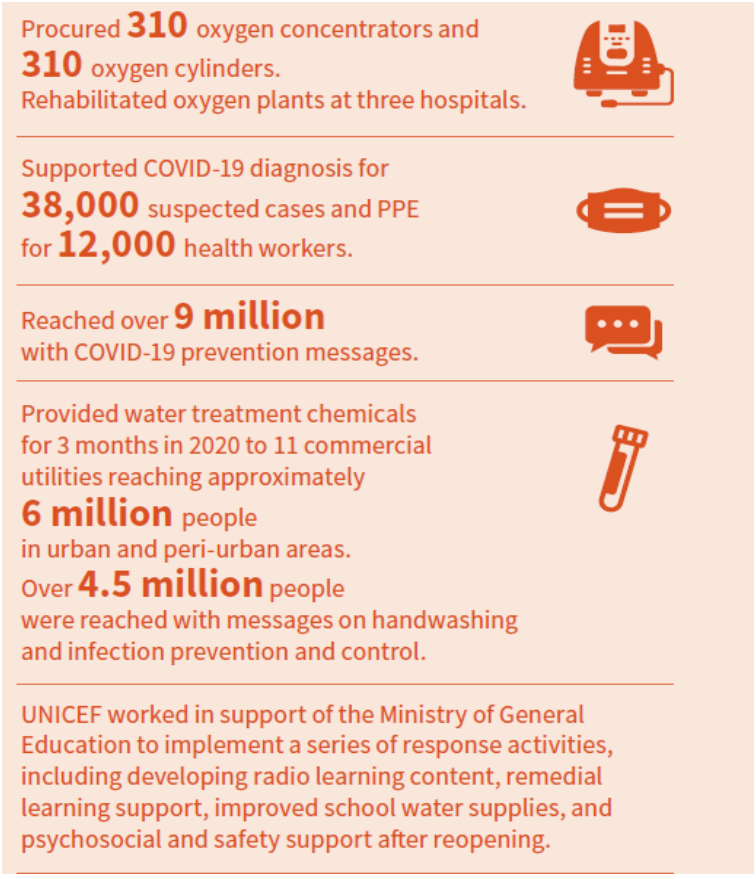
EQ 3: Was the implementation framework for the COVAX Delivery Pillar appropriate to achieve overarching objectives?

The COVAX initiative in Zambia functioned mainly by providing financial and technical assistance to build the capacity of the EPI to deploy COVID-19 vaccines.

Sub-EQ 3.1: To what extent did core delivery partners and delivery modalities respond to identified needs and priorities of (1) priority population groups, (2) national governments, and (3) COVAX stakeholders?

Finding 1: In Zambia, the main COVAX partners were WHO, UNICEF, CIDRZ, and CHAZ. These partners collaborated closely with the MOH and other government agencies, to provide nationwide support and minimize the pandemic's impact. The partners concentrated their efforts on supporting the MOH's strategic interventions to boost vaccine coverage, in accordance with the NVDP. UNICEF provided early pandemic support, delivering resources for infection prevention, diagnostic testing, and information dissemination reaching approximately 9 million people. Upon vaccine availability, UNICEF enhanced the cold chain

Figure 2. Summary of early UNICEF support[17]



capacity by procuring 11 ultracold storage facilities and 70 vaccine fridges. UNICEF also facilitated last-mile logistics, training over 1,250 health workers and supplying 3,000 vaccination cards to integrate COVID-19 and polio vaccination campaigns in selected districts. Additionally, UNICEF played a major role in facilitating community engagement through meetings, the use of radio, and the mobilization of thousands of community volunteers. As a result, the organization successfully countered vaccine hesitancy, converting at least 7,500 vaccination refusals to consent. Further, UNICEF was instrumental in integrating COVID-19 vaccinations into the routine immunization program, by developing guidelines and managing logistical aspects.

WHO role was consistent throughout, focusing on strengthening data management, disease surveillance, and adverse event following immunization (AEFI) surveillance and response. The organization provided 942 devices for data collection and two servers to host the district health information system, trained and supported 998 data entry clerks, and donated an additional 700 electronic devices for real time data collection. WHO also strengthened the AEFI management system through training health workers and AEFI focal points to timely detect, investigate, and report AEFI.

> ***"For WHO, it was mainly surveillance... of what problems would arise because of the intervention itself—there were some people that would react to these vaccines. WHO also supported the management of data through the procuring of tablets, data bundles, and training of the data teams. So, disease surveillance, adverse (event) surveillance, data management." –UNICEF verification discussion***

CIDRZ provided crucial technical assistance at all health system levels, supporting the coordination and functioning of national EPI activities and enhancing the immunization supply chain. It established 1,850 vaccination sites and conducted technical supervision in 57 districts. CIDRZ also supported training in microplanning for 534 health facilities and reached 1,689 health facilities in 65 districts through monitoring visits and mentorship.[7]

CHAZ played a key role in providing communication training to civil society organizations (CSOs) and mobilizing community volunteers, religious leaders, and civic leaders to conduct outreach in 39 low-coverage districts.[7] In the latter half of 2023, CHAZ conducted sensitization and outreach activities in communities, churches, and refugee camps.[7] The significant scale of these activities is reflected in **Table 2.**

Table 2. Summary of CHAZ community engagement sessions and number of people reached

Setting	2022		2023	
	Sensitization sessions	Number reached	Sensitization sessions	Number reached
Community	778	1,662,566	1,994	1,068,116
Market	710	222,710	559	133,724
Churches	3,038	389,355	669	118,417
Refugee areas	20	6,455	43	6,137
Total	**4,546**	**2,281,086**	**3,265**	**1,326,394**

Sub-EQ 3.2: To what extent and how were (1) in- and intra- country equity and (2) gender equity considerations integrated into delivery modalities?

Finding 2: Equity was defined as focusing on reaching the most marginalized, isolated, and unreached communities in rural and urban areas with COVID-19 and other vaccines and essential health interventions. Zambia aspired to protect groups experiencing a greater burden of COVID-19 disease regardless of their legal status.[15]

a. Zambia's identification of eligible populations was based on the WHO SAGE Values Framework for prioritization of COVID-19 vaccination and the WHO SAGE road map for use of COVID-19 vaccines in the context of limited supply.[15] The ZITAG coordinated this process through extensive consultation with stakeholders and the use of local epidemiological data to identify groups at increased risk of COVID-19 illness or death due to societal, geographic, or biomedical factors.[15] This effort produced a classification system comprising a high priority-use group—adults aged 18–49 years with co-morbidities, adults aged 50 and older, those caring for or cohabiting with the foregoing, frontline and outreach health workers, and pregnant women; a medium priority-use group—populations in congregate settings such as refugee settlements, confined market spaces, or correctional facilities, as well as adolescents with co-morbidities; and low priority-use groups—adolescents and adults not in the other groups.[15] This classification was further differentiated to produce the tiers set out in the Zambian NVDP of 2022 **(*Figure 4).***

Figure 3. Extract on population selection from Zambia's NVDP [15]

Tier A. Essential health care workers and support staff – Medical doctors, nurses, clinical officers, pharmacists, midwives, environmental health technicians, community health care workers, health facilities support staff, nursing and medical schools' students and staff.

Tier B. Maintaining core societal functions – Immigration officers; port staff; police and security; teachers; key political, religious, administrative, traditional leaders; public service transporters (truck, bus and taxi drivers); market and cross-border traders.

Tier C. Populations at risk of severe illness or death – Patients with co-morbidities, hypertension, dermatomyositis malignancies, cardiovascular disease, diabetes, tuberculosis, HIV; those aged 65 and older; United Nations staff and those from other related organizations.

Tier D. Congregate settings – Healthy persons aged 18–64 years not included in the above category and living in highly dense areas, refugees, and disabled populations; persons living in army barracks, police camps, prisons, and university or college campuses (excluding those handled in above tiers).

Tier E. Rest of the population aged 18 or older – Remains critical in facilitating allocation of resources, procuring vaccines, planning deployment, and measuring vaccination coverage achievements to ensure equity in vaccine access.

b. COVAX partners contributed to geographic equity by supporting mobile vaccination units and community outreach programs that prioritized underserved areas. These methods were part of government's intensified vaccination effort and drove substantial gains in vaccination coverage by June 2023. Efforts to gain the support of influential local figures—such as traditional and religious leaders and businesspersons—reduced gatekeeping and improved access, particularly in rural areas.[18] However, the MOH experienced major transportation challenges—shortages of vehicles, including motorbikes—and the condition of roads constrained many health facilities from

conducting vaccination outreach activities and limited the efforts toward geographic equity.

c. Zambia included gender equity in the deployment of COVID-19 vaccines within the approach of "leaving no one behind." The needs-based prioritization of vaccine deployment meant gender-related barriers should not block access for members of groups with high levels of health risk.[19] Whereas Zambia implemented COVID-19 vaccine delivery in a gender-sensitive way, it had no specific gender plan or strategy. It developed the capacity to provide gender-disaggregated vaccination data by late 2023 and recognized that addressing gender-specific barriers to vaccine deployment was an area for improvement.

> ***"According to the [COVAX] CDS guidelines, gender mainstreaming strategies included (1) the development of innovative service delivery models, including differentiated vaccine delivery strategies to effectively reach women, men, and gender-diverse people, (2) disaggregating data on COVID-19 vaccination coverage to include gender, and (3) tackling gender barriers to vaccine deployment." –Gavi verification note***

Sub-EQ 3.3: Were human and financial resource allocations to delivery modalities (1) adequate, (2) defined, (3) coordinated, and (4) agreed?

Finding 3: In Zambia, COVAX partners did not recruit additional human resources but seconded some specialists already in their employ to the MOH and the Zambia National Public Health Institute. Although this supplementation had a positive impact, it did not fully offset the human resource deficits, which existed at all levels of the health system. For example, the MOH had limited capacity to coordinate the pandemic response in the early months of COVAX support and, without direction, implementing partners were not clear how they could participate. WHO was able to second three staff members to the MOH as part of COVAX to strengthen vaccination planning, coordination and logistics, and vaccine safety.

Healthcare workers on the ground faced increased workloads, prompting measures like staff shifting, capacity building, and mentorship initiatives. For example, Northern Province diverted staff from its district hospitals to work in COVID-19 community centers.[20]

Finding 4: COVAX funding valued at US$20,159,778 was provided under three financing agreements between the end of 2021 and late 2023. Additional contributions were made on a bilateral basis by a range of national development agencies and, to a lesser extent, by the private sector.

> ***"The scale of funding for the COVID-19 vaccine and related activities was much higher than usual. For example, grants from Gavi for the introduction of routine vaccines were typically a couple hundred thousand dollars. In contrast, the pandemic response brought in millions of dollars to support vaccine campaigns, indicating an extraordinary level of investment. In addition, there were new partners and stakeholders which meant more funding … During COVID-19, major new players like the USAID and the World Bank, which traditionally don't fund vaccine activities, stepped in." –CIDRZ verification discussion***

The financing model for COVAX in Zambia, produced with assistance from UNICEF, WHO, CIDRZ, and CHAZ, proved to be very effective in supporting essential, impactful COVID-19 activities. The investment in upskilling health workers, procuring cold chain equipment, bolstering health information systems, and improving community relations will benefit the EPI and the Zambian health system more broadly well into the future.

Implementation and adaptation of COVAX support

EQ 4: How well was the COVAX delivery pillar implemented and adapted as needed, in line with overarching objectives?

Sub-EQ 4.1: What were the key enablers and barriers relative to successes achieved and challenges encountered?

Finding 5: Key challenges

Despite the enormous injection of funds for COVID-19 vaccination, reasonable access to vaccines, various leaders' commitment, and the collaborative environment, significant challenges remained. These include:

a. Vaccine uptake was low initially and gathered pace slowly, largely due to misinformation about the COVID-19 vaccines, spread mainly through social media.
b. Vaccine stockouts occurred periodically during the COVID-19 vaccination program. Government and partners faced delays in the start-up period due to stockouts of the Pfizer-BioNTech vaccine and delayed funding disbursements.
c. Coordination and planning were weak during the CRD phase but strengthened after WHO seconded staff to the MOH under the COVAX partnership. This initiative enabled the mapping of stakeholders, development of a deployment plan, and costing of COVID-19 activities.
d. The limited availability of human resources at subnational levels, arising from an already overstretched healthcare system, made it challenging to secure healthcare workers to deliver COVID-19 vaccines.
e. The occurrence of other vaccine-preventable diseases, such as measles, cholera, and polio, caused delays in the implementation of the COVID-19 vaccination campaign due to coordination challenges.
f. The MOH faced significant transportation challenges, particularly a shortage of motorbikes and other vehicles, which hindered outreach activities and service delivery, especially in hard-to-reach areas.
g. Technical support supervisory visits were conducted by MOH in collaboration with UNICEF and WHO. These visits identified instances of suboptimal knowledge and skills among health workers, inadequate guidelines and monitoring tools, and a lack of resources for outreach.
h. Nonpayment or delayed payment of healthcare workers involved in the COVID-19 response caused low morale among district and facility-level staff.
i. Although the country had adapted data collection tools to include vaccine surveillance data points, there was limited—and in some case no—orientation of district surveillance officials or facility focal points on the updated tools, and no sensitization to the importance of collecting and reporting such data.
j. The stringent financial management systems sometimes created delays in implementation. It was difficult to balance fiscal requirements and timely disbursement of funds against the sheer number of subnational payments generated by outreach activities, including COVID-19 vaccination, routine immunization, and responses to smaller outbreaks, such as polio.

Finding 6: Key successes

Whereas Zambia's COVID-19 vaccination effort took some time to deliver results, its performance from 2022 was impressive, especially in the light of health system constraints. COVAX partners, in collaboration with the MOH, played an important role in enabling this response.

a. There was strong political will and effective multisectoral support for the country's response to COVID-19, and this set the stage for a successful vaccination program.
b. COVAX, through UNICEF, strengthened collaboration across the provinces by applying the principle of "one plan, one budget, and one monitoring framework." This approach was key to ensuring that vital information and support were distributed efficiently across different levels of government and communities.
c. COVAX provided significant support for vaccine campaigns through its CDS fund. During the second campaign alone, more than 1.8 million people received a first, second, or booster dose of COVID-19 vaccine.[15] This achievement hinged upon strong coordination between the MOH and strategic partners and additional support from other donors: the European Union; the German KfW development bank, the Global Partnership for Education, the Government of Ireland, Standard Chartered Bank, the Swedish International Development Cooperation Agency, the United Kingdom's Foreign, Commonwealth and Development Office, and USAID.
d. Central to the success of the COVID-19 vaccination campaigns was the strengthened planning and coordination capability provided by WHO through the secondment of appropriate staff. The team responsible had the expertise required to plan, manage and coordinate such large and complex operations. Team members' ability to "manage up" (with higher authorities) and "manage down" (with subcommittees and frontline workers) ensured that all parts of the campaign aligned behind common goals.
e. Multistakeholder collaboration was a powerful ingredient in successful COVID-19 programming in Zambia. Not only were the four COVAX strategic partners (UNICEF, WHO, CIDRZ, and CHAZ) able to function harmoniously among themselves, they also sustained positive relationships with the MOH at all levels and across several divisions and agencies. These productive relationships rested on clear role definition and respect for MOH leaders. The core collaboration was expanded by the participation of an array of other stakeholders—international, regional, national and local—that fulfilled specific roles. COVAX's injection of additional coordination capacity into MOH headquarters provided the direction that these role-players required to maximize their contribution. For example, with technical support from partners, the country developed guidelines for private sector participation in delivering COVID-19 vaccines. The private sector responded by filling roles in vaccine procurement and delivery, as well as waste treatment and disposal.
f. COVAX, through WHO, enabled a comprehensive stakeholder mapping, which was important for coordination and implementation of the country's COVID-19 vaccination campaigns.
g. WHO, as a COVAX partner, created multiple channels for reporting AEFI, including direct calls to dedicated phone lines, emails, and the Medsafety app. This contribution enabled self-reporting, timely investigation, and causality assessment for AEFI related to COVID-19 vaccination.
h. WHO used its emergency use listing procedure to review the Zambia Medicines Regulatory Authority (ZAMRA). It conducted assessments and submitted inspection reports that enabled ZAMRA to accelerate its approval of vaccines for import to Zambia.

WHO also conducted capacity-building sessions for ZAMRA staff. These efforts saw the approval time for import permits drop from 90 days to just five working days.

i. COVAX, working through its strategic partners and in collaboration with MOH, supported the establishment of key structures for coordinating COVID-19 vaccination, including the IMS, the COVID-19 Vaccination Committee, and various COVID-19 subcommittees.
j. Real-time monitoring of COVID-19 was a great advantage, made possible through effective use of the district health information software, DHIS2. The COVID-19 Tracker—enhanced data visualization and management. In addition, access to the Open Data Kit (ODK) platform used by the WHO was expanded through staff training and the provision of tablets. These efforts strengthened data collection and analysis, ultimately improving decision-making and the overall pandemic response.

Sub-EQ 4.2: Did adaptations to delivery modalities in response to the changing context enable countries to prepare, introduce, and scale up vaccines in a timely and effective manner?

Finding 7: The development of the pandemic and changes in understanding of vaccine performance demanded responsiveness and adaptation by the MOH and COVAX partners. Each phase focused on specific priorities, based on the prevailing situation.

The approach in the CRD phase (2021) involved gaining an understanding of the country context, prioritizing essential activities, and adapting to policy and regulatory changes. ZAMRA's noteworthy improvement of turnaround times for the issue of vaccine importation permits from 90 days to five days was an example of a COVAX partner (WHO) working with a local institution to adapt swiftly to the demands of the pandemic.

The CoVDP phase (2022 and first half of 2023) marked the transition from preparation to active vaccine deployment. Rapid adjustments were required to meet the growing demand for vaccines. Key adaptations occurred in communication, messaging, and outreach. Access to data improved as a result of access to the ODK platform and integration of COVID-19 data into the DHIS2 system. The latter enabled real-time monitoring of vaccination progress and informed decision-making as vaccination eligibility expanded to include a wider population.

> ***"There were some innovations under M&E, like the introduction of the COVID Tracker. We have never had an electronic tracker before. The M&E Department, ICT [Information and Communication Technology Unit] and EPI developed [this method] for analysis of the data. We used that also for HPV [human papilloma virus] last year when we did the multi-age cohort." –CIDRZ verification discussion***

The Alliance phase (July to December 2023) was characterized by an increase in tailored interventions in low-performing districts and for groups at high risk of serious illness or complications. Another priority was sustaining COVID-19 vaccination through normal service delivery with the objective of stopping the spread of the virus. The third focus was developing the COVID-19 vaccination integration plan, drawing together key aspects of Zambia's National Health Strategic Plan, the National Immunization Strategy, and the NVDP. This plan was the key to integrating COVID-19 vaccines sustainably into the PHC system and the EPI.

Sub-EQ 4.3: How well did WHO and UNICEF country offices coordinate and collaborate to support Pillar delivery objectives relative to specific country needs?

Finding 8: During the COVID-19 response, effective coordination and collaboration were achieved through the establishment of vital structures, including the IMS, the ICC, the COVID-

19 Vaccination Group, and ZITAG. COVAX partners were represented in each of the structures and they often served as chair or co-chair.

These structures played a central role in ensuring a unified approach. Additionally, coordination was enhanced through partner mapping, which helped to identify and align stakeholder efforts.

> ***"There were specific COVID committees were put in place, so CIDRZ was a chair or co-chair of the COVID-19 Vaccination Group, Zambia IMS Structure and ICC. So, from a coordination perspective, IMS was involved in all aspects of planning. Generally, this strengthened and improved coordination and collaboration in terms of planning and implementation of activities." –UNICEF verification discussion***

Finding 9: At the district level, the four strategic partners, collaborating with the MOH, conducted monitoring visits and provided mentorship to ensure adherence to COVID-19 vaccination protocols. Special tools were designed to guide these processes and to ensure uniformity in implementation. District teams, made up of healthcare workers across EPI pillars (such as service delivery, logistics and cold chain, advocacy, communication and social mobilization, and M&E) played a critical role in sustaining local collaboration.

Sub-EQ 4.4: To what extent did delivery modalities complement existing health systems and routine immunization systems to jointly respond to the needs of priority population groups?

Finding 10: Several strategies, including the use of fixed vaccination sites, outreach activities, and temporary or mobile clinics, were adopted through COVAX with the aim of complementing existing healthcare systems. These innovations were ultimately successful in delivering COVID-19 vaccinations.

Finding 11: Prior to COVAX, the country lacked ultracold vaccine storage capacity at both the national and provincial levels. These facilities were procured with COVAX funding. These ultracold chain units contributed to efficient distribution of vaccines from the central level to peripheral health facilities and enhanced Zambia's EPI.[15]

Finding 12: The range of capacity-building activities involving various categories of healthcare workers has strengthened the health system, building knowledge and skills that are relevant to vaccine implementation more broadly. This training, along with technical advice, technical supervision, and mentorship, have equipped health workers with expertise to respond to future pandemics.[15]

Finding 13: The COVAX initiative also enabled the procurement of essential ICT hardware, including servers, tablets, and computers. Generally, the investment in ICT infrastructure, data systems, and skills of personnel improved the efficiency, timelines, and effectiveness of data collection, management, and analysis for evidence-based decision-making.[15] These enhancements are already being put to good use in other immunization initiatives in Zambia.

BROADER LESSONS OR INSIGHTS

Strong political will—exemplified by the Presidential appointment of a Special Advisor for COVID-19, sustained political engagement, collaboration through a pillar-driven response, and commitment to the principle of "one plan, one budget, one monitoring framework"—led to Zambia's relative success in COVID-19 vaccine rollout. This leadership and collaboration gave

rise to an effective response, underpinned by robust supply chains and logistics that enabled delivery through fixed vaccination sites, mobile units, and outreach programs.

Zambia's achievement was also attributable to clear guidance and direction from the MOH, and specifically the EPI, supported by partners who were embedded in the national structures governing the national response. To ensure sustained efforts and preservation of the gains of this historic global partnership, it will be vital for Zambia to keep the structures for collaboration in place and to institutionalize the health system strengthening that was achieved. This groundwork will ensure that the country is better prepared for future health emergencies.

- Robust coordination mechanisms that provided necessary guidance and direction at national and subnational level should be institutionalized for further pandemic preparedness and response.
- The capabilities that reside within community structures, including CSOs, community-based organizations, religious communities, and educational institutions, should be leveraged for surveillance and outbreak early warning systems and for the optimization of service delivery at community level.
- Risk communication and community engagement should be essential components of all routine immunization activities and pandemic preparedness.
- The revised vaccine regulatory and registration framework should be adopted along with the AEFI reporting systems developed during the COVID-19 pandemic.

CONCLUSION

Conclusion 1: In Zambia, COVAX support commenced in December 2021, with funding directed at activities crucial for the immediate deployment and scaling up of COVID-19 vaccination. This contribution was implemented through a partnership framework agreement with four strategic partners supporting Zambia's MOH in its leadership of the national vaccination mobilization.

UNICEF focused on enhancing cold-chain management, supply logistics, demand generation, and community mobilization, while WHO concentrated on human resources, guideline reviews, regulatory processes, M&E systems, and strengthened surveillance. These agencies also supported planning and coordination.

Under the guidance of the MOH—and specifically the EPI—CIDRZ and CHAZ played an important role in on-the-ground implementation, focusing on the mechanics of vaccine delivery and, with the assistance of CSOs, mobilizing a critical level of support within communities. CIDRZ's established working relationship with the MOH enabled it to undertake this operational role with sensitivity to policy and strategic considerations.

Conclusion 2: The initial vaccine rollout in mid-2021 faced significant challenges, due mainly to misinformation and resulting mistrust among the public. The eventual attainment of full-vaccination coverage of 87% of the target population attests to Zambia's ability to surmount such challenges. This achievement was due to strong political leadership at a national level, financial commitments, extensive community activation, and the collaboration of partners with strong technical ability who worked under the leadership of the MOH.

The national health system was strengthened in terms of planning and coordination, human resource capacity, cold-chain management, information management systems, regulatory frameworks, communication, and advocacy—all of which resulted in enhanced service delivery. As the focus turned to campaigns specifically for low-performing districts and populations at high risk for serious disease consequences, national vaccination targets were exceeded and there was progress toward the strategic goal of integrating of COVID-19 vaccination into routine immunization undertaken by the EPI and PHC facilities.

REFERENCES

1. World Bank Group. World Bank Data Bank. *https://data.worldbank.org/country/zambia* https://data.worldbank.org/country/zambia.
2. Mudenda, S. *et al.* Zambia's Response to the COVID-19 Pandemic: Exploring Lessons, Challenges and Implications for Future Policies and Strategies. *Pharmacol Pharm* **13**, 11–33 (2019).
3. World Health Organization 2023 data.who.int, WHO Coronavirus (COVID-19) dashboard > Cases [Dashboard]. https://data.who.int/dashboards/covid19/cases.
4. *Guidelines for the Integration of COVID-19 Vaccination into Routine Immunisation & Primary Health Care Services*. (2024).
5. *Integration of COVID-19 Vaccination Into RI PHC Guidelines - Draft 0*. (2023).
6. *COVID-19 Vaccination Coverage in Zambia WHO Report.* (2021).
7. *Zambia CDS Programmatic Reporting July - December*. (2023).
8. *Health Facility Listing*. (2021).
9. *National Health Strategic Plan 2017-2021*. (2020).
10. *National Health Strategic Plan 2022-2026*. (2022).
11. *Immunization Regional Snapshot Eastern and Southern Africa*. (2019).
12. *Global Health Security Index: Building Collective Action and Accountability*. (2019).
13. *Zambia CDS Programmatic Reporting July - December*. (2022).
14. *Zambia CDS Programmatic Reporting January - June*. (2023).
15. *Zambia COVID-19 Vaccination Preparedness Plan V7*. (2021).
16. *National COVID-19 Vaccine Deployment Strategy 2021-2023*.
17. *Response and Resilience in 2020: Zambia*. https://www.unicef.org/zambia/media/2431/file/Zambia -COAR-summary-2020 (2021).
18. *Integration of COVID-19 Vaccination Into RI PHC Guidelines* . (2024).
19. *Draft Consolidated Update Zambia NVDS V15*. (2022).
20. *What Has COVID-19 Brought to My Province*. (n.d.)

APPENDIX

Appendix A: Methods

The overall evaluation design is grounded in understanding the intention of COVAX (defined by its theory of change) and comparing this intention with its implementation and its adaptations over time. At the country level, we have drawn on this theory-based design to establish the logic and intended strategy for vaccination delivery in Zambia. The Zambia case study differed from others in terms of methods applied and questions covered. Only evaluation questions 3 and 4 were addressed. The approach largely was desk-based (focused on documentation, data, and past assessments), with in-person follow-up sessions with the focal points of strategic partners UNICEF, WHO, and CIDRZ for purposes of clarification and verification. Gavi contributed written comments to this last activity. The country case study comprised three phases, outlined below, and used a country case study workbook that included templates to guide the outputs of each phase.

Phase 1 – Desk review. The first phase involved identifying and reviewing various documents using the workbook template. An initial report was developed on the country's COVID-19 response and the integration of COVAX. The goal of this phase was to establish a solid foundation for understanding the context for COVAX support and its key focus areas within the country. Focal points provided the primary documents reviewed and the consultant identified additional documents—for example, statistical data on the country, COVAX strategy documents at country level, and assessments related to vaccination delivery and uptake.

Phase 2 – Informal consultation with country focal points. This phase involved holding clarification and verification sessions with key focal points. Three sessions were conducted with UNICEF, WHO, and CIDRZ to facilitate informal consultations on the context and evolving areas of focus for COVAX. Gavi provided written feedback. Multiple attempts were made to engage with the MOH, without success. The clarification process was intended to be supplemented with data from Ipsos field interviews; however, the data were not available within the time frame for completing the Zambia country case study.

Phase 3 – Analysis, synthesis and report compilation. Phase 3 involved us synthesizing the data from phases 1 and 2 using a standardized analysis template. This template allowed new themes to be identified but retained a focus on comprehensive answers to evaluation questions. We reviewed the initial findings with the evaluation team to ensure that they were articulated appropriately and presented with relevant evidence. Findings were then incorporated into a draft country case study report and shared with stakeholders at a validation session, to ensure consensus before finalization of the country case study report.

Appendix B: Adapted Country Theory of Change

Workstreams	Illustrative COVAX activities	Outputs	Comments
COVID-19 vaccine planning	COVAX supported the development of NVDS and NVDP, mobilized funds, established the IMS and other strategic COVID-19 committees, conducted a needs assessment, and strengthened the systems for COVID-19 vaccination data management and AEFI.	NVDP finalized. IMS and COVID-19 subcommittees functioning. First AstraZeneca vaccine doses (228,000) received on April 12, 2021. Vaccination started April 14, 2021, prioritizing healthcare workers.	Guided the implementation of COVID-19 vaccination.
Human resources	Mobilized and utilized existing healthcare workforce and volunteers for COVID-19 vaccination. Integration with routine immunization compensated for the shortage of health personnel and increased the effectiveness of campaigns.	High-level technical staff seconded to MOH headquarters and ZNPHI. Capacity building for MOH health workers—training, technical support, and mentorship—to develop competencies to provide the COVID-19 vaccine.	Improved COVID-19 service delivery and integrated COVID-19 into routine immunization delivered through PHC system.
Suppliers and logistics	Leveraged the EPI system, supply-chain framework, and inventory management. Supported national and subnational supply-chain teams. Supported vaccine forecasting and stock control. Integrated vaccine inventory systems to accommodate multiple COVID-19 vaccines. Supported distribution of vaccines and consumables.	The supply and logistics system were strengthened by COVAX resources. Improved vaccine management and stock forecasting.	Efficient vaccine delivery.
Cold chain	Provided 70 vaccine refrigerators and 11 ultracold storage facilities. This procurement enabled the effective storage and distribution of vaccines, including Pfizer-BioNTech.	Enhanced cold-chain capacity, including ultracold storage capacity at the national and provincial levels.	Effective storage and reduced wastage of vaccines.
Demand creation and community mobilization	Conducted two major vaccination campaigns and outreach to hard-to-reach areas and populations at high risk of severe health complications. Undertook extensive community mobilization and engagement	Improved public awareness and demand creation for COVID-19 vaccines.	Increased COVID-19 vaccine uptake. By December 2023, 87% of the eligible population (aged 12

Workstreams	Illustrative COVAX activities	Outputs	Comments
	through multiple communication channels. Trained or oriented 15,000+ community volunteers and 15,000+ local leaders to communicate with the public in support of the vaccination drive.		years and older) were fully vaccinated.
Monitoring and evaluation	Strengthened DHIS2, integrated COVID-19 into DHIS2, and introduced ODK data management system. Provided large numbers of data collection devices/tablets and two servers for DHIS2. Supported 998 data entry clerks and strengthened data visualization, reporting, and monitoring systems.	DHIS2 strengthened by donations of digital hardware and staff training. Access to ODK platform. Improved data collection, monitoring, and reporting.	Real-time data usage and data-driven decision-making.
Prioritization, selection, and AEFI surveillance	Priority groups were defined according to WHO guidance and their coverage rates documented via disaggregation of data by age, gender, presence of co-morbidity, occupation, etc. Established a range of channels for AEFI reporting and trained staff to assess causality.	Increased vaccination coverage. Improved AEFI management capacity.	By December 2023, 87% of the eligible population (aged 12 years and older) fully vaccinated. Target of 70% exceeded.

Appendix C: Country Timeline

	Trend, event, or intervention, and outcome	Time period
Global context	COVID-19 becomes a public health emergency of global concern, with high morbidity and mortality. Lockdown measures are implemented worldwide. First COVID-19 vaccines become available. Supply is constrained; demand is high. COVAX has limited vaccine supplies. Vaccine conspiracy theories, speculation, and misinformation are widespread.	2020–2021 (CRD phase)
	Supply of vaccines increases. Vaccination coverage increases, especially in developed countries. A gradual shift in narrative about the vaccines occurs as they show some efficacy. Vaccine demand begins to wane. COVID-19 pandemic slows down and global emergency is lifted.	2022–mid-2023 (CoVDP phase)
	Vaccines are readily available. Demand is very low. Life begins to return to pre-COVID-19 normality.	Mid-2023–end of 2023 (Alliance phase)
Country context	Zambia implements lockdown measures. Travel restrictions are activated, health protocols are put in place, and schools close and shift to online learning. COVID-19 vaccination starts.	2020–2021 (CRD phase)
	Vaccines become available and major vaccination campaigns boost uptake. COVID-19 preventive measures are relaxed.	2022–mid-2023 (CoVDP phase)
	Intensified outreach focuses on low-performing districts. COVID-19 vaccination is integrated into routine immunization and PHC.	Mid-2023–end of 2023 (Alliance phase)
COVAX engagement	COVID-19 NVDS is developed.	2020–2021 (CRD phase)
	COVID-19 NVDS is revised. CDS NB funding is approved. Two major national COVID-19 vaccination campaigns launch.	2022–mid-2023 (CoVDP phase)
COVAX results	COVAX CDS EA window funding begins in December 2021, focusing on activities essential for immediate vaccine deployment and scale-up of COVID-19 vaccination.	2020–2021 (CRD phase)
	By June 2022, 48% of eligible population are fully vaccinated.	2022–mid-2023 (CoVDP phase)
	By December 2023, 87% of eligible population are fully vaccinated, exceeding the target of 70%.	Mid-2023–end of 2023 (Alliance phase)