Evaluation of COVAX Facility and AMC and COVAX Pillar Delivery Efforts

Cameroon 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

FIGURES

TABLES

LIST OF ACRONYMS

AEFI	Adverse events following immunization
AVAT	African Vaccine Acquisition Trust
CCE	Cold chain equipment
CDC	Centers for Disease Control and Prevention
CDS	COVID-19 Vaccine Delivery Support
CDS-EA	CDS-Early Access
CASDB	Central African States Development Bank
CEPI	Coalition for Epidemic Preparedness Innovations
CHAI	Clinton Health Access Initiative
COVAX	COVID-19 Vaccine Global Access initiative
COVID-19	Coronavirus disease 2019
CoVDP	COVID-19 Vaccine Delivery Pillar
CRD	Country Readiness and Delivery
CSO	Civil society organization
DTP	Diphtheria, tetanus toxoid and pertussis vaccine
EPI	Expanded Program for Immunization
Gavi	Gavi, the Vaccine Alliance
GDP	Gross domestic product
GHS	Global health security
HPV	Human papillomavirus
NITAG	National Immunization Technical Advisory Group
NPDV	National Plan for the Deployment of COVID-19 Vaccines
PROVARESSC	Plateforme des Organisations de la Société Civile pour la Promotion de la Vaccination et le Renforcement du Système de Santé au Cameroun
SCM	Senior country manager
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

Background on Cameroon and COVAX

The Republic of Cameroon, a lower-middle income country in Central Africa, benefited from COVAX from March 2021 – December 2023. In addition to facilitating COVID-19 vaccine procurement, COVAX supported the logistical, technical, and operational aspects of COVID-19 vaccine administration.

Implementation of COVAX in Cameroon was a multi-stakeholder effort incorporating by Gavi, the Vaccine Alliance (Gavi), the Vaccine Alliance, its in-country partners, and other lead implementers like the Clinton Health Access Initiative (CHAI). Efforts centered on supporting the country's Expanded Program for Immunization (EPI) by means of direct financial support for the operational aspects of COVID-19 vaccination and technical assistance, provided Gavi partners—the World Health Organization (WHO), United Nations Children's Fund (UNICEF), and CHAI.

COVAX support received in Cameroon

Major components of COVAX support were:

- An early grant of US$660,000 to purchase cold chain equipment (CCE).
- COVID-19 Vaccine Delivery Support for Early Access (CDS-EA) funding to the value of 5.5 million USD, which enabled the initiation of COVID-19 vaccination and early engagement of communities.
- Core COVAX support through COVID-19 Vaccine Development Support 3 (CDS-3), amounting to US$19.5 million, which was received later in the pandemic to consolidate COVID-19 vaccination activities and integrate them into primary health care.
- An additional US$5 million provided through the COVID-19 Vaccine Delivery Pillar (CoVDP), to boost vaccination coverage which was still lower than 10% in Cameroon after more than a year of COVAX activities.

Outcomes and challenges of COVAX delivery in Cameroon

The key successes of COVAX support to Cameroon included increased access to and provision of COVID-19 vaccines to the local population. The country's EPI was sustainably strengthened via procurement of new CCE and the addition of specialized personnel through Gavi partners. The EPI gained more than 100 new refrigerators and freezers, including some ultracold freezers. Two health communication specialists joined the team to track and counteract vaccine rumors in the country. Furthermore, data platforms were created during COVAX delivery to capture vaccine uptake at the health facility level. Implementation brought together several government and nongovernment entities that collaborated efficiently to undertake COVID-19 vaccination.

This was the country's first national initiative to vaccinate adults and served as a learning opportunity for the EPI.

The greatest challenge to COVID-19 vaccine delivery was vaccine hesitancy. This was evident even among health care workers, half of whom did not get vaccinated. Misinformation about the vaccine circulated widely and the changing narrative on the effectiveness of COVID-19 vaccines in preventing infection exacerbated mistrust. Conspiracy theories about the origin of imported vaccines and the intentions behind them deterred many from getting vaccinated.

During the COVID-19 pandemic in Cameroon, routine EPI activities were disrupted in two hotspots, the Center and Littoral regions, where 71.4% of health districts reported declining rates of childhood immunization, as measured by Diphtheria, tetanus toxoid and pertussis vaccine (DTP) vaccine uptake. Even the newly introduced malaria and HPV vaccines did not attain the desired coverage, although it is unclear whether this was solely due to vaccine hesitancy generated by the COVID-19 pandemic.

Broader lessons or insights

Despite considerable effort, Cameroon's COVID-19 vaccine uptake remained suboptimal largely due to vaccine hesitancy. At the close of the COVAX initiative in December 2023, only 13.5% of the country's total population had received at least one dose of COVID-19 vaccine, while 11.5% had completed the primary series. However, vaccination uptake was higher among high-risk groups that were prioritized and among whom full immunization coverage was as follows: health care workers—52.7%, persons with comorbidities—16.0%, and persons aged 50 years and older—29.9%.

The COVAX experience in Cameroon suggests the country would benefit from the conduct of after-action reviews, as is usual after outbreak responses, and capitalizing on local resources—community role-players, researchers, institutions, and organizations—for future pandemic preparedness and response.

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.

Cameroon is a lower-middle income country in Central Africa with a population of about 28 million. It comprises 10 regions, eight of which are French-speaking and two English-speaking. Poverty is a major challenge and socio-political tensions in the English-speaking regions have erupted into violence since 2016. The country has experienced steady GDP growth of at least 3% annually since 2021.[1]

COVID-19 and COVAX characteristics

COVID-19

- Infection rate:0.5%
- Mortality Rate: Case fatality rate 1.6%
- Government Stringency Index average [pre-2021]: 42.2
- Government Stringency Index average [post-2021]: 26.3

COVAX

- CoVDP focus: Yes

Cameroon was more severely affected by COVID-19 than any country in the Central African sub-region. It recorded its index case in March 2020 and by December 2020 had recorded a total of 26,277 infections and 448 deaths, yielding a fatality rate of 1.7%.[2] In March 2021, daily new cases peaked at nearly 8,700.[3] However, due to limited testing capacity at the time, reported COVID-19 infections and deaths were probably substantially lower than actual incidence. Serosurveys between October and December 2020 suggested more than 2 million COVID-19 infections occurred in Cameroon's 10 regional capitals alone in 2020.[4]

Country response to COVID-19

The President of Cameroon instructed the formation of a COVID-19 taskforce under the leadership of the Prime Minister. This taskforce, established March 17, 2020 comprising experts from the medical field and other sectors, instituted several national public health measures to contain the outbreak. As the epidemic gained ground, the national COVID-19 response ramped up and included mandatory face mask use in public places from April13, 2020.[5] In 2021, COVID-19 vaccines were included in the pandemic response with the aim of vaccinating 20% of the total population.[6]

[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.

The country received its first batch of COVID-19 vaccines via a donation of 200,000 doses of Sinopharm from the Chinese government on April 11, 2021[7] and vaccination started the next day at specified centers. On April 17, 2021, after receiving an additional 391,200 doses of Covishield vaccine procured by COVAX, the country launched the first of five vaccination campaigns undertaken between April 2021 and November 2022. It was not until the last campaign, between November 18 and 27, 2022, that Cameroon attained the 10% coverage threshold for completion of the primary vaccination series.[8] The goal in this last campaign was to administer at least 3 million doses. The resulting total of 2,004,385 doses—including 341,415 booster doses—delivered represents 66.8% of the campaign target. There was fairly equal uptake among males (52.7%) and females (47.3%).[8] Of the 1,430,542 persons who completed the primary series during the campaign, 7.7% were health care workers (coverage within this subgroup was 52.7%), 56.5% were 55 years and older (30.0% coverage), and 27.2% had comorbidities (16.0% coverage).[8]

As COVID-19 incidence decreased, vaccination campaigns ceased after November 2022. However, COVID-19 vaccination was still offered by fixed and mobile teams throughout 2023. By December of that year, an estimated 13.5% of the population had received at least one dose of COVID-19 vaccine and 11.5% had completed the primary series. In the 50+ age group the latter figure stood at 29.9%.[10]

Cameroon's 11.5% coverage for full vaccination was comparable to several neighboring countries, including Congo, Equatorial Guinea, and Gabon, where the rate ranged from 11.3% to 13.1%, but far below Chad (28.0%) and the Central African Republic (43.5%).[10]

Factors that shaped the COVID-19 experience in Cameroon included high-level government commitment. Cameroon's President personally triggered the response and the national taskforce was coordinated by the Prime Minister.

The contribution of international partners was significant. These included Gavi, the vaccine alliance (Gavi) and its partners—mainly the United Nations Children's Emergency Fund (UNICEF) and the world health organization (WHO), U.S. Centers for Disease Control and Prevention (CDC), Africa CDC, the International Monetary Fund (IMF), Central African States Development Bank (CASDB), United Nations Population Fund (UNFPA), and Médecins Sans Frontières (MSF). Major local businesses, such as MTN Cameroon, Orange Cameroon, CIMENCAM and CONGELCAM, and civil society organizations under the banner of PROVARESSC contributed financially and otherwise.

The nature of COVID-19, which varied in severity during successive waves, influenced the public's perceptions and experience. Vaccine hesitancy was widespread in Cameroon, fueled by rumors and misinformation mostly on social media. The socioeconomic stress of pandemic-related restrictions was undeniable, particularly on the nation's busy informal sector.[11]

Cameroon's health sector at a glance

Cameroon's health system is structured on three levels: the peripheral level that comprised 190 health districts at the time of the COVID-19 outbreak, the intermediate level consisting of 10 regional delegations for public health. and a central or strategic level comprising departments and institutions of the Ministry of Public Health. There is a huge deficit in health personnel with only 1.24 doctors and 1.90 nurses/midwives per 10,000 population.[12]

The department responsible for vaccination in the Ministry of Public Health is the Expanded Program for Immunization (EPI). It was fully functional at the central and peripheral levels prior to the COVID-19 outbreak. At a strategic level, decisions of the EPI are guided by the National Immunization Technical Advisory Group (NITAG), which consists of experts and representatives of partner organizations. Operationally, routine vaccination activities are the responsibility of health districts and are supervised by regional EPI directors who report to the national EPI.

The EPI has three main vaccine delivery strategies: routine vaccination at fixed health sites for those living within 5 km of a facility, mobile outreach services for those living further from a facility, and periodic intensification of routine immunization—or vaccination campaigns—on Child Health Days/Weeks and National Vaccination Weeks when health workers coordinate their efforts to boost vaccine coverage in a short period.

Intensification of routine immunization is the EPI's primary means of reaching unimmunized children in unstable settings like the anglophone regions.[13] Campaigns may also be mounted urgently in response to an outbreak.

Key Country Characteristics

Population

- Total population: 27,795,843 (Cameroon National institute of Statistics projections, 2022)
- Urban population: 53.0%
- Population > 50 years: 9%
- Population < 18 years: 60%
- Health care workers: 1%

Health care system strength

- Health expenditure: 3.6% of GDP[15]
- Health expenditure per capita: US$56.2[15]
- Routine vaccine coverage 2019: 75% DTP1 and 67% for DTP3[14]

Global health security

- Global Health Security (GHS) Index score: 34.4
- Major epidemics since 2000: cholera (2004, 2010/11, 2014, 2018), measles (2011/12, 2019), yellow fever (2011), avian influenza (2006, 2016/17)

Socioeconomic indicators

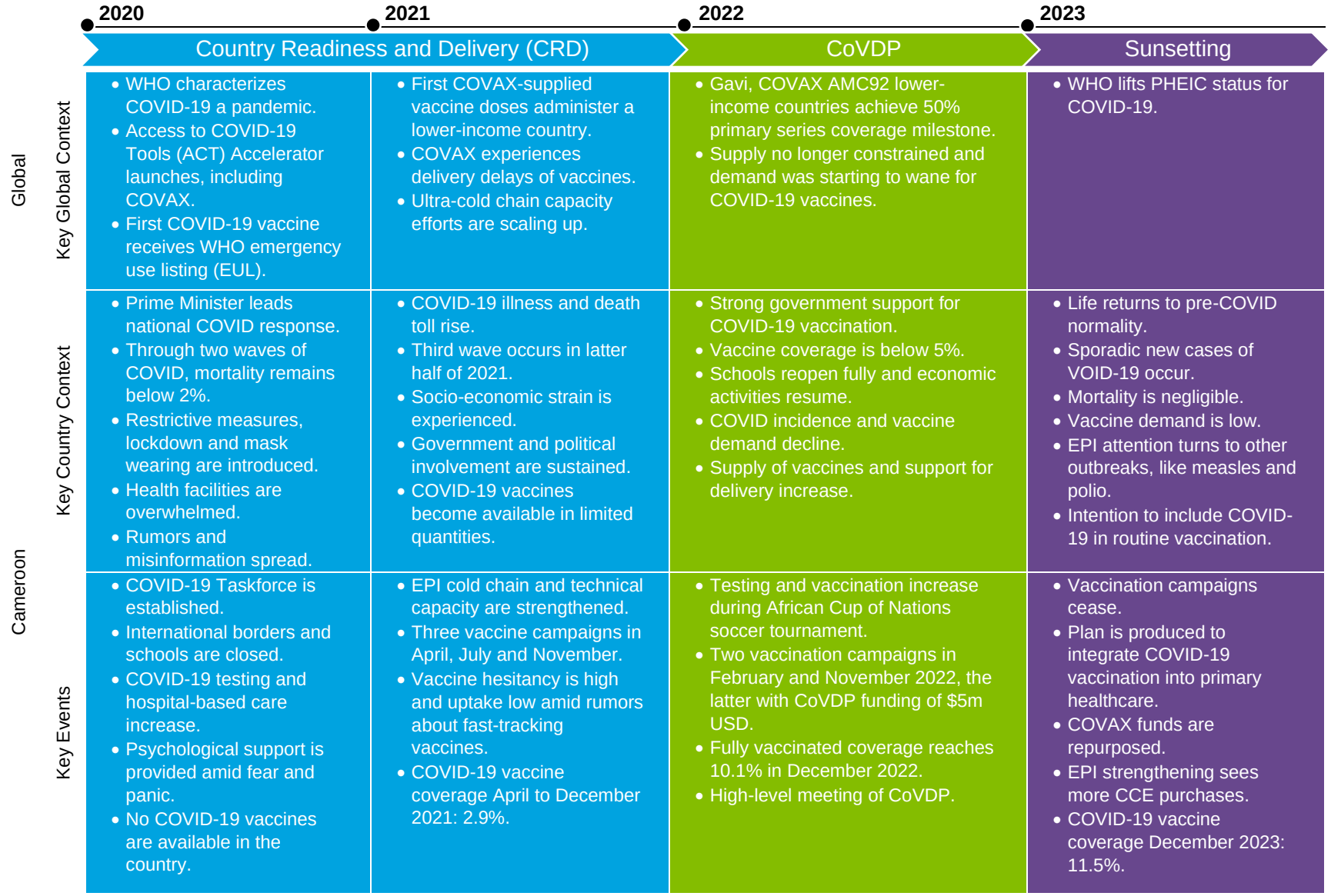
- World Bank classification: lower-middle income country
- Language: 80% francophone and 20% English-speaking
- Conflict-prone: no (however, two regions have hotspot conflict zones)

OVERVIEW OF COVAX ENGAGEMENT IN CAMEROON

Cameroon initiated COVID-19 vaccination in April 2021, a year after the index case was detected. The first consignment of COVID-19 vaccines—200,000 doses, received on April 11, 2021—was a donation from the Chinese government. A few days later, on April 17, Cameroon's engagement with COVAX resulted in the receipt of a larger consignment of Covishield vaccines, the first 391,200 doses of the 1.2 million doses promised.[7] Prior to the vaccine delivery, Cameroon had received CCE through COVAX.

There were three clear phases in the support provided by COVAX to Cameroon (**Figure 1**).

Figure 1. Country timeline



Country Readiness and Delivery (CRD) phase

Cameroon developed its first National Plan for the Deployment of COVID-19 Vaccines (NPDV) by January 2021 and subsequently revised it.[6] The NPDV was a prerequisite for Cameroon to be considered for COVAX support. The country's first documented COVAX support was CCE funding worth US$660,000 to develop systems for vaccine storage and delivery. This enabled the EPI to purchase and install 92 pieces of CCE (**Table 1**).

Table 1. Cold chain equipment purchased and installed using initial COVAX funds[17]

Equipment	Quantity purchased
Cold chambers and freezing chambers	4
SSD solar refrigerators	48
ILR refrigerators	19
Electric freezers	17
Ultracold chain equipment	4

In 2021, Cameroon also benefited from CDS-Early Access (CDS-EA) funding worth US$5,507,618 to enable COVID-19 vaccination.[17] COVAX funds generally supported technical assistance by partners and operational activities by the EPI.

Of the CDS-EA allocation, technical assistance funding amounted to US$607,194 and was distributed as follows: WHO Cameroon—US$330,202, UNICEF Cameroon—US$196,992, CHAI—US$80,000.[17] Besides using existing human resources to support the EPI, these partners also hired experts who built local workforce capacity for:

- Tracking, reporting and counteracting vaccine rumors and misinformation.
- Vaccine-related data collection and management at the health facility level.
- Monitoring vaccine-related adverse events, which reinforced the national vaccine pharmacovigilance system.

Cameroon became the first COVAX country to transfer its pharmacovigilance data from the national database to the international Vigiflow database.[17]

The remaining CDS-EA funds were used for operational activities such as procuring additional CCE worth US$113,196,[17] creating and sustaining 244 fixed vaccination centers, deploying teams to these centers and 1,255 mobile facilities, deploying 5,263 social mobilizers for community engagement, and conducting national vaccination campaigns.[7] Uptake of COVID-19 vaccine increased among target groups following this early funding from COVAX. For instance, among health care workers it rose from 8% to 53%.[17]

COVID-19 Vaccine Delivery Partnership (CoVDP) phase

CDS-EA funding was fully utilized by July 2022.[17] Despite a government-funded vaccination campaign in April 2021 and two COVAX-funded vaccination campaigns in July and November 2021, coverage remained low and only 2.5% of the total population had completed the primary series by year end.[8] As this fell well short of the 10% minimal target, Cameroon became eligible for the COVID-19 Vaccine Delivery Partnership (CoVDP) initiative.

CoVDP was a global consortium including GAVI, WHO African Region, UNICEF and the Coalition for Epidemic Preparedness Innovations (CEPI). The consortium made US$5 million available from WHO Afro to support COVID vaccination in Cameroon.[18] An additional US$700,000 was provided by USAID.[9] This substantial funding, coupled with support from 22 WHO Afro experts, enabled the following activities that boosted vaccine coverage significantly:

- A pre-campaign qualitative study of more than 2,600 participants conducted in the COVID-19 hotspot of Douala to identify social drivers of COVID-19 vaccination.
- Community mobilization, which utilized door-to-door visits in addition to traditional media.
- The use of caravans to attract crowds and broadcast messages on vaccination in the large cities of Yaoundé and Douala.
- Advocacy meetings with opinion leaders at national and sub-national level.
- Increasing vaccination teams from 1,900 to 6,000, so they could cover more ground and vaccinate in homes, markets, bars, and places of worship, work and learning.[9]

During the fifth national vaccination campaign, the generous budget allowed for mobilization and vaccination teams to receive per diem allowances and compensation for transportation, communication, and data costs, and this motivated them to perform. Civil society organizations (CSOs) and leaders supported the campaign although they were not funded by CoVDP.

At the end of 2022, 10.1% of the Cameroon population was fully vaccinated.[8] Funding for COVID-19 vaccination from 2023 was through CDS-3 and US$19,499,752 was approved.[19]

Sunsetting (Alliance) phase

COVID-19 vaccines were readily available in the latter part of 2023 but demand was decreasing. Other outbreaks, including measles, cholera, polio, and yellow fever, required vaccination interventions and claimed the EPI's attention. Nevertheless, COVAX continued to help strengthen the Cameroon health system. Of the approved CDS-3 budget, an amount of US$4,185,704 was earmarked for the procurement of CCE equipment to strengthen the EPI beyond COVID-19.[19] There were no vaccination campaigns from 2023 and the focus was integrating COVID-19 vaccination into primary health care from 2024 as a routine Ministry of Public Health activity. By December 2023, the draft integration plan had been written and was awaiting approval.[19] The possibility of repurposing remaining CDS-3 funds for routine childhood vaccination of zero-dose children born during the pandemic was under consideration.

FINDINGS ON COVAX SUPPORT IN CAMEROON

This section describes the structures that underpinned COVAX's support to Cameroon, planning processes and equity considerations, the resources provided at different times, and the complementary roles of Alliance partners and the country stakeholders. These findings are based on multiple sources of evidence, integrating the perspectives and experiences of a range of partners. Data collection methods included desk reviews and key informant interviews, with the findings reflecting areas of convergence across stakeholder input and supporting documentation. 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

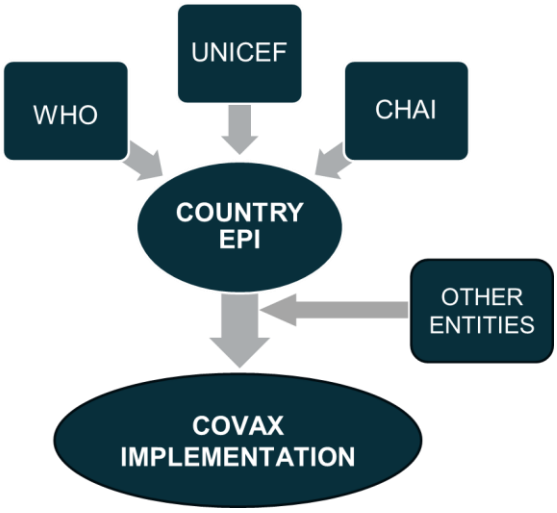
EQ 3: Was the implementation framework for the COVAX Delivery Pillar appropriate to achieve overarching objectives?

The COVAX initiative in Cameroon functioned mainly by building the capacity of the EPI to deploy COVID-19 vaccines through the provision of financial and technical assistance.

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: At the country level, the main COVAX delivery partners were the country offices of WHO and UNICEF, and CHAI Cameroon. Other important role-players were CSOs, like PROVARESSC, that mobilized communities to undergo vaccination (**Figure 2**).

Figure 2. COVAX delivery partners supporting Cameroon's EPI



COVAX delivery partners aligned with the goals of Cameroon's EPI, which were in harmony with the objectives of COVAX. The comprehensive nature of the NPDV[6] meant that COVAX-related activities were accommodated under its 12 main pillars and delivery partners were able to implement collaboratively and synergistically by following the guidance provided by the plan.

WHO's role centered on COVID-19 vaccination advocacy and planning with the Cameroon government, regulatory preparation for the receipt and deployment of vaccines, vaccine safety and managing adverse events following immunization (AEFIs). UNICEF assumed the role of the great logistician, facilitating acquisition and delivery of vaccines and CCE.

Both WHO and UNICEF contributed to communication and community engagement and provided experts to work with the EPI for COVAX delivery.

> ***"We do not get involved at the operational level, but we support the EPI to implement the vaccination activities using its own framework. As partners, we received COVAX funding mainly for technical assistance." –COVAX delivery partner***

Finding 2: The existence of a well-organized EPI was key to COVAX delivery in Cameroon. The EPI required only minimal assistance to achieve preparedness for COVID-19 vaccination. It had sufficient know-how to initiate drafting of the NPDV before receiving Alliance support.

> ***"We distributed the different chapters of the NPDV among ourselves and started developing the document right here at the EPI [national] office. The WHO country office only came later with technical assistance, when the draft was already advanced." –National Ministry of Health (MoH)***

CHAI helped develop data management for COVID-19 vaccination, supporting the EPI in improving data completeness, timeliness, and quality when recording vaccine uptake in the district health system (DHIS2). CHAI also assisted with digital microplanning to support vaccine interventions at the operational level,[20] deriving learnings from COVAX delivery activities, and supporting the EPI to integrate COVID-19 vaccination into primary health care.

> ***"[Integrating COVID-19 vaccination into primary healthcare] cannot happen just like that. Given our expertise in supporting learnings and piloting approaches… there was a need to find out how do we get to the target populations. So we did a mapping of high-risk populations and also conducted assessments to see how ready the EPI was to integrate COVID-19 vaccination in its routine activities. The next step was to support the EPI to integrate these (findings) into digital micro-plans. Finally, we contributed to drafting the initial integration plan for COVID-19 vaccines." –COVAX delivery partner***

Finding 3: Although not funded by COVAX, PROVARESSC—a consortium of CSOs that assist the Ministry of Public Health with implementation—played a significant role in the COVID-19 response.[21] It did so as a civic duty, in response to the Prime Minister's call to join forces against COVID-19. The strength of CSOs lay in their close ties with communities, which facilitated them gaining communities' trust in relation to COVID-19 vaccines.

> ***"They [government officials] sit in their offices… But it is us who know the population, and we had to regain their trust during the COVID-19 pandemic." –CSO***

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 4: The important aspect of equity in COVAX delivery was fulfilled as follows:

a. Cameroon prioritized for vaccination specific groups deemed vulnerable to COVID-19: health care workers, persons with comorbidities, and those aged 50 years and older.[6] Strategies were adopted to ensure other vulnerable groups, like prisoners and refugees, also got the vaccine.[22] Although vaccine coverage was low overall, it was higher among these high-risk groups.[8]
b. A literature review established that COVID-19 vaccines reached all 190 health districts within the first month of receiving them. A regional EPI representative confirmed a "reach all districts" approach ensured geographic equity during routine COVID-19 vaccination and campaign mode. Attaining 100% geographical coverage was more difficult in the two English-speaking regions, where violence erupted in 2016 due to grievances among the anglophone minority and a separatist movement subsequently arose. The resulting armed conflict has displaced about a million people internally and seriously disrupted health care, including vaccination programs.[23] In parts of the anglophone North-West region, health authorities and community health workers reached an understanding with some warring factions on allowing the deployment of vaccines. However, several parts of

the North-West and South-West regions were considered very unsafe and were not covered by the COVAX vaccination effort.

c. There was equitable administration of vaccine doses among males (52.7% of administered doses) and females (47.3%).[b,8] It is unclear whether specific strategies were used to achieve this. However, the deployment of mobile vaccination teams to homes and marketplaces may have increased the vaccination of women.

> ***We also set up vaccination centers in places that were not health facilities. That could be the market, the cultural center. Our big markets in Douala and Yaoundé, sports complexes, places where people generally meet, those were the sites where these vaccination centers were set up." –National MoH***

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

Finding 5: Cameroon received several amounts from GAVI for COVAX delivery:

- US$100,000 was directed to the EPI for technical assistance to develop and revise the NPDV. This came mainly via the WHO country office and has been spent.
- US$660,000 (COVAX CCE) for cold chain procurement. This amount was spent.
- US$5,507,618 (CDS-EA) to support early access. This amount was spent.
- US$5,000,000 (CoVDP), provided by WHO Afro. This amount was spent.
- US$19,499,752 (CDS-3). This amount was approved (see **Table 2**); however, only 37.7% was used and 62.3% was under consideration for reprogramming.[19]

Table 2. Details of CDS-3 approved budget for Cameroon

Budget category	Main executor of budget	Jobs/consultant positions planned	Amount approved (USD)
Operational: high-risk populations	MoH – EPI	0	1,258,479
Operational: other adult population	MoH – EPI	0	6,687,804
Operational: routinize COVID vaccination	MoH – EPI	0	9,025,750
Technical assistance	WHO	15	1,031,159
Technical assistance	UNICEF	22	793,800
Technical assistance	CHAI & others	10	702,760
Total approved budget for CDS-3			**19,499,752**

Finding 6: Funds for technical assistance to the EPI were sent directly to Alliance partners, mainly WHO, UNICEF, and CHAI. Operational funds for the EPI to implement vaccination were not sent directly to the Cameroon government. An audit in 2018 had revealed weaknesses in Cameroon's management of GAVI funds (8.5% of audited expenses were unjustified) and, as a temporary measure, operational funds from GAVI were sent to the WHO country office and only transferred to the Ministry of Public Health upon receipt of appropriate justification.[17]

[b] Considering the 52.7% and 47.3% of vaccines administered to males and females respectively, this deviates only slightly from the roughly 50:50 sex distribution of Cameroonians as of 2022. The deviation for both sexes is only about 2.5 - 3%, which is not significant.

Finding 7: The EPI (and by extension, the government of Cameroon) did not use COVAX funds to recruit new personnel. Only the Alliance partners used COVAX technical assistance funding to hire additional staff. A total of 47 positions were created by the WHO, UNICEF and CHAI country offices and some other organizations for experts to support COVAX delivery. They provided technical assistance to the EPI on aspects of COVID-19 vaccination, including risk communication, community engagement, tracking rumors, management of adverse events, data management, and application of learnings. Some consultants were hosted in the national EPI office.

> ***"We used some of the COVAX funds to hire consultants who assisted the EPI in COVAX delivery. For example, the community managers who were brought in to track COVID-19 rumors and formulate responses for the public, there were two of them that we hired, who had their offices in the EPI and continue to work there even now… They are currently involved in the deployment of malaria and HPV vaccines." –COVAX delivery partner***

Both the EPI and Alliance partners repurposed some existing staff members to strengthen the pandemic response, including vaccination. For instance, many personnel working in the polio program or HIV care at WHO and UNICEF were pulled into the COVID-19 response team.

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?

COVAX delivery in Cameroon encountered some challenges and various adaptations were made over time.

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

Finding 8: Key challenges

a. Public hesitancy in relation to COVID-19 vaccines was the greatest obstacle to COVAX delivery in Cameroon. Prior to COVID-19, vaccine hesitancy was already a concern. This hesitance was considered the primary cause of the low vaccination coverage in the country. During the COVID-19 pandemic, this reluctance was further fueled by misinformation and rumors, and exacerbated by a lack of trust due to changing vaccination guidance on vaccination.

> ***"I have never witnessed such resistance to a vaccine like in the case of COVID-19. At the beginning I was minimizing it and thought it will blow over once we engage in communication, but it persisted." –COVAX delivery partner***

Communication about the vaccines was problematic in that the message kept shifting—from vaccines preventing infection, to only preventing severe disease, and to the need for booster doses to achieve optimal protection.

> ***"It became difficult to explain to people that the vaccine was useful since they saw vaccinated people still get sick. There were also questions about the COVAX vaccines being produced in India, whereas the developed economies produced theirs in their own countries." –National MoH***

GAVI commented on a common perception that vaccines produced in India are of lower quality.

> ***"There may be an Indian intermediary who manufactures the vaccines because it has huge production capacity and can move quickly … As you know, India and China are the world's laboratories. Even the United States and the Europeans source their supplies from India and China … Tomorrow, this same issue may come up again. People will say, 'Is a vaccine made in Dakar safe? Wouldn't I prefer a vaccine made in Seattle or London?' So, you see, this is something we really must fight against because it's false information." –COVAX delivery partner***

b. Initially, there was a challenge storing the Pfizer-BioNTech vaccine as it requires an ultracold chain system. This was addressed by procuring adequate cold chain equipment using COVAX funds.

c. An issue highlighted by sub-national EPI personnel was stock-outs of COVID-19 vaccines. This most likely arose during the early months of COVID-19 vaccination when the supply was limited. With more doses available from the CoVDP period onward, the problem of vaccine shortages was resolved. The challenge of stock-outs could also point to a weak in-country system for the prompt distribution of vaccines from the center to the periphery.

d. Some role-players felt abandoned due to a lack of funding for the activities they conducted during vaccination. This was the case for CSOs that worked hard in mobilizing the general population, and academics involved in operational research to create an evidence base on COVID vaccination in the domestic setting.

> ***"We did not receive any financial support from COVAX, but we still did our best to mobilize the communities because we saw the need. The government should learn to leverage the extensive network of CSOs for such activities because we are closest to the communities." –CSO***

e. In the conflict-stricken North-West region, security concerns restricted access to vaccination. The armed conflict has resulted in killings and kidnappings, looting of health facilities, disruption of health service delivery, and a decline in all EPI indicators.[13] There were reports of health care workers being attacked or kidnapped during COVID-19 vaccination. While local health authorities and community health workers negotiated with some parties to the conflict to allow vaccination.[24]

> ***"Obviously there were some places where we could not go because it was not safe." –Regional MoH***

f. COVID-19 vaccination represented the first large-scale adult vaccination initiative in Cameroon, and this proved to be a hurdle to overcome.

> ***"Cameroon is not used to adult vaccination, so this was something new." –COVAX delivery partner***

g. The detail of data capturing required during the vaccination intervention also presented a challenge to vaccinators who were not used to disaggregating data by individual.

> ***"The individual data collection system lasted for about a year, after which we had to revert to aggregated reporting using the DHIS2." –National MoH***

Despite these difficulties, individuals experiencing AEFIs were followed up and their progress documented individually.

h. Although COVAX funds had been sent to the country, they were not readily available to the EPI. Delays in obtaining the funds on time for vaccination activities was flagged as a major concern by the EPI.

> ***"Theoretically, it's said that it [disbursement of funds] can be done in a month, but there are delays that have exceeded three months. There are even delays that have exceeded four months. And, when you receive the money, I think you have three months to justify it." –National MOH***

These delays were due to the requirement that any financial request from the EPI must be approved by WHO Cameroon and the procedure of depositing funds in the Ministry of Public Health's account before transferring it to the EPI. The requirement for WHO approval stems from the GAVI 2018 audit when the EPI performed poorly.

i. Expiration of vaccines was a problem. Expiration dates on the first batch of Covishield vaccine provided by COVAX in April 2021 were July to August 2021. It was reported that 4,880 doses of the AstraZeneca vaccine expired.[25] EPI records show that 341,836 COVAX-supplied doses expired.

> ***"Many doses had to be destroyed because they expired." –National MoH***

j. Finally, between 2022 and 2023, Cameroon experienced a rapid shift in its health landscape with the emergence of cholera, polio, and measles outbreaks. These redirected the EPI's attention and resources, and it was no longer fully on board to pursue all intended COVAX activities. By the close of COVAX, the EPI and Alliance partners were considering repurposing remaining CDS funds.

> ***"When we were thinking about routinization of COVID-19 vaccination and integration into primary health care … it wasn't with the expectation that the interest would drop so drastically. Unfortunately, some things which we believe were really important might end up not being done, and probably we might not derive the learnings that we could have pulled from those activities." –COVAX delivery partner***

Finding 9: Key successes

a. The biggest achievement of COVAX was increasing access to COVID-19 vaccination by providing large quantities of Covishield and Pfizer-BioNTech vaccines. Without COVAX-procured vaccines, Cameroon would have relied solely on limited bilateral donations of Sputnik-V from Russia and Sinopharm from China and on Africa CDC, which provided Johnson & Johnson vaccines via the African Vaccine Acquisition Trust (AVAT).

b. COVAX also strengthened Cameroon's logistics by providing freezers, coolers, and refrigerated vehicles, enabled training of EPI staff on tracking rumors and managing AEFIs, and supported community mobilization and engagement activities. These included door-to-door sensitization and mobilization of 19,000 local leaders in 1,985 health areas under CDS-3.[19]

> ***"COVAX really brought a lot of vaccines to Cameroon, which we could not have bought ourselves. The EPI also gained cold chain equipment and technical assistance." –National MoH***

c. The collaboration between the Ministry of Public Health—mainly the EPI—and various governmental and nongovernmental role-players was a further success. This "all-hands-on-deck" dynamic spread from the general COVID-19 response to the vaccination intervention.

d. Another major success was the involvement of top government officials, such as the Prime Minister and other national and local authorities, which encouraged the population to get vaccinated. This was facilitated by the high-level meeting with Cameroonian authorities spearheaded by GAVI during the CoVDP phase.

> ***"The high-level meeting with the authorities was very successful as we were able to further advocate with the government and bolster its support regarding COVID-19 vaccination." –COVAX delivery partner***

e. The fact that the North-West region achieved higher vaccine coverage than some conflict-free areas was due, at least in part, to the personal intervention of the top health authority in the region.

> ***"I really very much appreciate the personal involvement of Regional Delegate for Public Health in this, because he took it as a personal problem that health care workers should be vaccinated." –Regional MoH***

f. The campaign mode of vaccination, though costly, achieved some success as it accounted for about 70% of all vaccinated persons in Cameroon.[26] However, all individuals interviewed questioned the cost-effectiveness of vaccination campaigns.

> ***"When we look at the amount of money invested in the campaigns and the number of people vaccinated, I'm not sure it is very cost-effective" [Interview with COVAX delivery partners]. "Even while preparing the fifth vaccination campaign, we were thinking of moving to new strategies, like integrating COVID-19 vaccination into primary health care." –COVAX delivery partner***

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 10: The success of COVAX was related to its agility and adaptability in the context of an evolving pandemic and unique local conditions.

a. In the troubled North-West region, the community's trust in government was compromised even prior to the pandemic. To minimize refusals, vaccination mobilization made little or no mention of government's role and emphasized international institutions like WHO. While it is difficult to quantify the impact of this on uptake, data from November 2022[8] show coverage in the North-West region was 8.9%, outperforming the anglophone South-West region (7.3%) and two major COVID-19 hotspots, the Center region (8.8%) and Littoral region (5.5%).
b. Community engagement strategies moved from prioritizing mass media communication to a more personal approach. This was exemplified by the last vaccination campaign for COVID-19, when a home-to-home interpersonal sensitization strategy was employed to

allow more social contact with the population. There was 2.5-fold increase in vaccine uptake compared to the four previous vaccination campaigns.[8]

c. The growing COVID-19 infodemic prompted the EPI and partners to set up a national system for tracking rumors. Personnel were trained at the health districts, and community managers at the national EPI scouted the social media space to identify rumors. This information shaped messaging in communication to the general public in order to counter rumors before they gained much ground.

> ***"Under the leadership of the EPI and with support from UNICEF, we [WHO] … put in place community managers to monitor the social media and identify the rumors in order to respond to them. Now in the community, we had focal points in the districts that filled in a form on rumors and provided feedback to the central level." –COVAX delivery partner***

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 11: With the EPI at the center, Alliance partners and other entities worked synergistically toward the country's COVID-19 vaccination goals. The development of the initial NPDV relied on effective collaboration across stakeholders.

Interviewees indicated that personnel from one partner institution could substitute for another partner where needed.

> ***"For example, … (if) WHO had to carry out a vaccination training somewhere remote where (they) don't have any staff, but we realize that someone from UNICEF is present, (they) can negotiate to have him (or her) conduct the training on our behalf. And vice-versa." –COVAX delivery partner***

The major Alliance partners in Cameroon are also part of NITAG and had jointly advised the EPI on COVID-19 vaccination.

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 12: Interviewees were unanimous about the benefits of COVAX in terms of acquisition of CCE for the EPI. This radically upgraded its capacity for vaccine transportation and storage. Technical experts built the capacity of vaccination staff in areas such as data management and surveillance of adverse events.

Prior to COVAX, there was a gap in the monitoring of community perceptions and the impact of rumors on vaccination. COVAX funding allowed for the hiring of two community managers to focus on this activity. Focal points were also set up at district level. The EPI retained the community managers beyond COVAX and they continue to track vaccine-related perceptions and rumors, particularly in respect of the newly introduced malaria and HPV vaccines.

COVAX enabled Cameroon to undertake its first large-scale adult vaccination program and the sustained communication about adult vaccines shifted perceptions positively. When people with comorbidities were tagged as a priority group for COVID-19 vaccination, CHAI mapped the distribution of these individuals nationally and this information can be utilized to plan other health interventions for this group.

> ***"We did a mapping of COVID-19 high-risk populations. We did a desk review and we tried to also identify the different barriers to vaccine access and utilization among the high-risk populations …This is still something which is really very relevant, because we are gradually***

moving into an era where a lot of adult vaccines are coming into the package offered by the country." –COVAX delivery partner

Results of COVAX

EQ 6: To what extent have the intended results of the Delivery Pillar been achieved?

Sub-EQ 6.1: To what extent were COVAX Pillar delivery efforts outcomes and goals achieved, and were related targets and timelines appropriate?

Finding 13: Table 3 summarizes the COVID-19 coverage achieved in Cameroon by population subgroups as of December 2023. A major weakness of the analysis is our inability to differentiate COVAX and non-COVAX vaccine coverage in these priority groups. However, it remains evident that Cameroon would not have attained the coverage it did without COVAX support, which was valued especially for procuring vaccines, strengthening CCE, and developing capacity for vaccine administration within the EPI.

The first COVID-19 vaccination campaign in April 2021 was supported by the Cameroon government and vaccinated 43,651 individuals, 61.8% with Covishield vaccines from COVAX, and 38.2% with Sinopharm vaccine donated by China. During the four subsequent vaccination campaigns, funded through COVAX, a total of 3,478,441 doses were administered.[6] In the last campaign in November 2022, COVAX procured only 2.0% of 2,019,118 doses administered.[8] The majority of the vaccines came from the Africa CDC (86.4%) and 11.5% from China.[8] It is plausible that the population preferred the Johnson & Johnson (J&J) vaccine provided by Africa CDC to the Pfizer-BioNTech vaccine provided by COVAX because the former is a single-dose regimen.

"There are some considerations for the choice of the vaccine … An individual may prefer J&J because it is a single dose. Once I take it, I'm done." –COVAX delivery partner

Table 3. COVID-19 vaccination coverage in priority groups in Cameroon

Population group	Estimated number	Percentage of total population	Vaccine coverage[c]
Health care workers	270,768	1%	52.7%*
Individuals with comorbidities	1,299,687	5%	16.0%*
Individuals 50 years and older	2,625,384	9%	29.9%**
Individuals 18 years and older	11,118,337	40%	27.9%***
Individuals younger than 18 years	16,677,506	60%	Not applicable

We estimate that COVAX contributed to at least 70% of the COVID-19 vaccination coverage in Cameroon through campaign and non-campaign modalities. In some instances, COVAX might be wholly financially responsible for an individual receiving the COVID-19 vaccine—as when

[c] *Estimations from the fifth vaccination campaign, November 2022[8]
**Estimations from the US-CDC, December 2023[10]
***Estimations from WHO Cameroon, April 2023.[27] Assumes all 3,104,141 fully vaccinated individuals are in this age group.

COVAX provided the vaccine and paid both the community health worker who mobilized uptake and the health worker who administered the dose. In other instances, there was partial COVAX funding, where the vaccine was provided by AVAT or the Chinese government but COVAX paid for community engagement and vaccination.

Sub-EQ 6.2: Were equitable results achieved?

Finding 14: The coolers and refrigerated vehicles procured via COVAX ensured that vaccines were rapidly transported to all health districts to ensure geographical equity. The campaigns supported by COVAX were national and inclusive, with every eligible person having equal access to the vaccine regardless of gender or social status. In Cameroon, COVID-19 vaccination was totally voluntary and there were no negative consequences of declining. A health official in the North-West region felt forcing the vaccine on people might have increased vaccine hesitancy as the public might have suspected the government of ulterior motives.

> ***"Making the COVID-19 vaccine obligatory would have backfired!" –Regional MoH***

Sub-EQ 6.3: Did delivery modalities strengthen national and local systems and capacities?

Finding 15: COVAX contributed to the resilience of health systems in Cameroon in several ways:

a. Providing durable CCE to the EPI.
b. Improving transportation of health personnel involved in routine immunization, especially in remote rural settings. For instance, reports confirm that COVAX funded the purchase of motorcycles to facilitate health worker access to distant communities during vaccination in conflict zones.[23]
c. Providing technical assistance to the EPI staff and others involved in vaccination on subjects like management of AEFIs and tracking rumors.
d. Providing expert human resources to the EPI, such as the community managers hired to monitor and respond to vaccine-related rumors.
e. Supporting the mapping of persons with comorbidities by CHAI, which also contributed to microplanning for the integration of COVID-19 vaccination into primary health care.
f. Stimulating inter-sectoral collaboration by organizing a high-level meeting that brought together health role-players and other sectors of the government.
g. Initiating the inclusion of an adult vaccine, COVID-19, in primary health care.
h. Allowing the repurposing of COVAX funds to address other EPI priorities, such as vaccinating zero-dose children with routine vaccines, as COVAX drew to a close. This indicates the flexibility of COVAX funding which allowed recipients to re-assess issues on the ground and prioritize needs that were urgent at any point in time.

Sub-EQ 6.4: Did unintended consequences arise during the implementation of the COVAX Pillar delivery efforts? Were they directly or indirectly related to the pillar activities, or due to external factors?

Finding 16: Negative unintended outcomes resulting from COVAX

Both the primary and secondary data collected in this case study confirm that COVID vaccine hesitancy spilled over to other routine vaccines.[28] While it is difficult to link this specifically to COVAX, all activities promoting COVID-19 vaccines inevitably caused the population to reconsider vaccination in general. A study found that after the introduction of COVID-19 vaccines, Cameroonian caregivers were less willing to vaccinate their children against polio as they believed health care workers might trick them and administer the COVID-19 vaccine

instead.[29] Hesitancy also spread to malaria and HPV vaccines that were introduced into Cameroon post-COVID and for which uptake was unexpectedly low.

> ***"Take malaria vaccines for example. We just introduced the vaccine and since February [2024] the coverage is below what we expected. We might resort to a boosting campaign." – COVAX delivery partner***
>
> ***"Because of COVID-19 vaccination, people have become more critical of many health interventions especially vaccines from outside the country, with clear repercussions for HPV and malaria vaccines uptake." –Researcher***

Health system disruptions caused by the COVID-19 pandemic also led to reduced coverage of routine immunization. In two major COVID-19 hotspots, the Center and Littoral regions, 71.4% of health districts experienced a decline in DTP immunization, which is taken as an indication of a general drop in childhood immunization.[28] The fact that COVAX funding focused on the EPI made it difficult for other relevant entities, such as CSOs and the research division of the Ministry of Public Health, to benefit from COVAX resources despite contributing valuable expertise.

> ***"The secretariat from the Scientific Committee for Public Health emergency during the COVID-19 Pandemic response attended some meetings even with the EPI but we received no funding from COVAX, causing the members to become … less willing to participate in future consultations in event of other outbreaks." –National MoH***
>
> ***"We did what we could to support the COVID-19 response and vaccination, but no funding was allocated for CSOs. This should be considered next time." –CSO***

Another unintended consequence was that vaccination teams were overwhelmed by the initial requirement for reporting individualized data. This was not sustainable, and teams eventually reverted to reporting aggregated data.

> ***"To collect individual data, health personnel needed to spend about 15–30 minutes with each person. There were just too many variables to collect and it was not feasible, especially with poor internet connection." –National MoH***

Finding 17: Positive unintended outcomes resulting from COVAX

COVAX funding was sufficient to activate several on-the-ground teams for vaccination. This resulted in greater engagement and motivation of community health workers serving as mobilizers and local health care workers serving as vaccinators, an impact that extended beyond the COVID-19 outbreak. Teams could go the extra mile, even in settings like the North-West region where there are security concerns, because they had per diem allowances, transport reimbursement, and support for mobile communication.

> ***"Some campaigns were well funded and when the teams received all this financial support, they became very motivated to participate in vaccination activities." –Regional MoH***

Communication activities conducted under COVAX made Cameroonians more aware that adults could benefit from vaccination. The EPI also gained valuable experience with adult vaccination, which should facilitate the introduction of future adult vaccines.

BROADER LESSONS OR INSIGHTS

The lessons based on the findings of this case study are applicable not only to Cameroon but may have strategic relevance for the region and beyond.

Country-level challenges and priorities

Lessons for pandemic preparedness

- Government should systematically conduct after-action reviews following every local outbreak to derive learnings, identify country strengths and weaknesses, and generate relevant resources for future epidemic response.
- The EPI should be developed further in terms of its cold chain, logistics, and data management capacities. A well-functioning EPI would pave the way for a swift and efficient response during future vaccine-preventable outbreaks.
- Strengthening the EPI's network in the community is also essential. This may require the formal institutionalization of key community role-players, such as mobilizers and community health workers, so they become a permanent part of the health system. They are trusted by communities and indispensable to a bottom-up response. The Cameroon government acknowledges that the lack of institutionalization puts future community-based health interventions at risk and has developed a plan to address this.[30]
- To reduce vaccine hesitancy, the country should establish a system for continuously monitoring vaccine-related rumors and sensitizing the public to false information. This may require that the EPI's communication team receive specific training in public health communication and community engagement during routine immunization and outbreaks.
- Social science-based surveys should be undertaken to understand perceptions and attitudes to vaccines in the community—and among health care workers, about half of whom displayed vaccine hesitancy during COVID-19 instead of championing vaccination. The success of the fifth COVID-19 vaccination campaign indicated how pre-intervention research can shape an effective response.[9]
- Government should deploy advocacy and diplomacy in conflict zones to persuade all parties to agree on the necessity for immunization activities. If the health needs of the people in affected areas are not safeguarded, progress in public health—including immunization programs—would be jeopardized.
- The authorities should facilitate the procurement of vaccines and other pharmaceutical products, preferably via locally established pharmaceutical companies to avoid the population's mistrust and rejection of foreign products.
- The government should encourage and create avenues for collaboration with a wide range of national and international institutions when responding to public health emergencies. The potential contribution of local institutions, economic role-players, researchers, nongovernmental organizations, CSOs, and non-EPI health professionals must be recognized and accommodated. These partnerships should be built in advance to ensure a prompt response to outbreaks.

Lessons for response to future pandemics

- Large public health interventions would benefit from the early involvement and funding of CSOs and health researchers.

> ***"We are always open when it comes to the health system. The participation of CSOs and communities in strategic thinking is necessary to ensure that plans incorporate reality." – CSO***

- The government should strengthen its disbursement and procurement processes to optimize the country's response during health emergencies. It is crucial to speed up the processes for making money available for operational purposes. According to EPI reports,[17] some COVAX funds took up to 124 days from the time of request to availability. This was largely due to the temporary requirement by GAVI that funds for Cameroon's EPI transit via the WHO country office. In addition to minimizing bureaucratic funding bottlenecks, the EPI must take care to manage funds properly to get a positive evaluation during the next GAVI audit.
- Clear, honest, and transparent communication with health care workers and the community is key to achieving trust. In the era of social media and widespread access to information, government manipulation of information would only increase mistrust.

> ***"We should not think that people will just accept everything that is announced officially. There was also little anticipation regarding the rumors. People were hearing things, and we needed to clarify the situation ... We had to be honest with them that we don't understand everything about the vaccine, but at this time it is the best weapon we have against this disease." –Researcher***

- Pandemics require a multi-sectoral response, extending beyond the Ministry of Public Health to other government departments. This approach was adopted during the COVID-19 response[26] but the remaining challenge is proper coordination of several high-level entities around a common goal.

Regional and global-level coordination and planning

Lessons for COVAX on coordination and country engagement

- Provide context-specific feedback to individual countries about the successes, challenges, and overall achievements of major interventions like COVAX. This will build trust with countries and facilitate collaboration for future regional and global efforts.
- Engage simultaneously with political and scientific parties to ensure smooth collaboration, implementation, and evaluation of the desired activity. As with the high-level mission of GAVI to Cameroon during the CoVDP phase, lobbying to address a public health problem is more likely to succeed when both decision-makers and scientists are on board.

> ***"So it was also important that there should be support from … scientists, from people who are in the field, and who would add their voice to that of the [politicians in the] country, so that it is heard more." –COVAX delivery partner***

- Propose a co-creation strategy for the intended intervention(s). Strategies to be implemented in a given country must not be entirely foreign but adapted to the context, culture, and realities of the people by collaborating with local role-players.

Key lessons on design of future pandemic responses

- Establish early collaboration with regional health institutions such as Africa CDC and WHO Afro. These institutions can help bring countries on board and achieve rapid regional uptake of and adherence to a given public health measure. In the case of COVAX, a joint statement with Africa CDC was only released in November 2021, several months after the official launch of the initiative.[31]
- Use the country's existing health system and strengthen it for the intended activity while respecting its autonomy. Cameroon's major strength during COVAX was the existence of an active EPI, which only needed a boost to deploy COVID-19 vaccination. Such an approach is more sustainable and may shorten the duration of external support.
- Conduct high-level meetings with country authorities, as in Cameroon.

> ***"An objective of this high-level mission with the Cameroonian authorities [was] to lobby, strengthen advocacy and raise awareness. With all the preparation and communication that went into it, I think it was able to better engage both the authorities and the public." – COVAX delivery partner***

CONCLUSION

Conclusion 1: Although COVAX was not the sole procurer of the COVID-19 vaccines administered in Cameroon (others were provided by the Africa CDC, China, and Russia), its delivery pillar had a cross-sectional impact in ensuring the population received vaccines, regardless of the donor.

Conclusion 2: COVID-19 prompted the first adult vaccination initiative in Cameroon, a difficult undertaking under pandemic conditions. Local actors found ways to adapt their strategies according to the realities on the ground. A notable achievement was the synergistic collaboration between Cameroon's EPI and the Alliance's partners—WHO, UNICEF, and CHAI.

In hindsight, it is apparent that gaps in communication and community engagement allowed misinformation to circulate too long, creating vaccine hesitancy that undermined uptake. Looking forward, the government needs to reach beyond Ministry of Public Health staff and leverage the country's rich resources—CSOs, researchers, and community activists—to anticipate and respond optimally to outbreaks. It should prioritize properly understanding the health problem at hand and providing timely information to the public using advanced public health communication approaches suited to the context. In the longer term, locally owned health solutions and products are likely to be accepted by the public and deployed with less resistance.

Conclusion 3: COVAX delivery in Cameroon did not achieve the anticipated results. The primary series uptake of 11.5% was significantly lower than the desired 20%. However, COVAX support boosted COVID-19 vaccination coverage significantly among the general population and more so among priority groups, that is health care workers, persons with comorbidities, and the elderly.

Cameroon's COVID-19 vaccination coverage rate of 11.5%, measured at the close of COVAX in December 2023, fell in the bottom half of performance by countries in the Central Africa sub-region. Coverage in Cameroon stalled below 10% before the CoVDP-sponsored efforts boosted vaccine uptake during the largest national vaccination campaign in November 2022.

REFERENCES

1. World Bank. GDP growth (annual %) - Cameroon. In: World Bank Open Data [Internet]. 2024 [cited Oct 28, 2024]. Available: https://data.worldbank.org

2. UNOCHA. Cameroon: COVID 19 Emergency Situation Report No. 13 - December 2020 | OCHA. Dec 31, 2020 [cited Sep 19, 2024]. Available: https://www.unocha.org/publications/report/cameroon/cameroon-covid-19-emergency-situation-report-no-13-december-2020

3. World Health Organization. Cameroon Country Overview. Dec 2023 [cited Oct 28, 2024]. Available: https://www.who.int/countries/cmr

4. Sachathep K, Harris T, Duong Y, Reid G, Dokubo EK, Shang J, et al. Seroprevalence of SARS-CoV-2 in 10 regional capitals of Cameroon, October - December 2020. 2023. doi:10.22541/au.168319263.36814253/v1

5. Cameroon Tribune. Fight against Coronavirus : Government takes additional measures. [cited Dec 19, 2020]. Available: https://www.cameroon-tribune.cm/article.html/31736/en.html/fight-against-coronavirus-government-takes

6. MINSANTE. Plan National de Deploiement et de Vaccination COVID-19. Cameroon: Ministry of Public Health. Feb 2022

7. Amani A, Djossaya D, Njoh AA, Fouda AAB, Ndoula S, Abba-Kabir HM, et al. The first 30 days of COVID-19 vaccination in Cameroon: achievements, challenges and lessons learned. Pan Afr Med J. 2022.41: 201. doi:10.11604/pamj.2022.41.201.30218

8. Amani A, Njoh AA, Atuhebwe P, Ndoula S, Nembot R, Mbossou F, et al. Beyond the numbers: An in-depth look at Cameroon's fifth national COVID-19 vaccination campaign through geographical and gender lenses. Vaccine. 2023.41: 5572–5579. doi:10.1016/j.vaccine.2023.07.062

9. WHO Afro. COVID-19 vaccination in the WHO African Region - November 2022. Dec 2022. Report no 10. Available: https://apps.who.int/iris/bitstream/handle/10665/365353/CV-20221210-eng.pdf

10. Doshi RH. COVID-19 vaccination coverage - World Health Organization African Region, 2021 - 2023. MMWR Morb Mortal Wkly Rep. 2024.73. doi:10.15585/mmwr.mm7314a3

11. Ngono AM, Ongo Nkoa BE, Yazid HS, Jean T, Jean-Marie G. Socio-economic impact of the COVID-19 pandemic in Cameroon: An assessment of poverty, underemployment and inequality levels. Rochester, NY. 2023. doi:10.2139/ssrn.4356583

12. Cameroon Healthcare System. In: WHO [Internet]. 2021 [cited Oct 5, 2024]. Available: https://data.who.int/countries/120

13. Njoh AA, Saidu Y, Bachir HB, Ndoula ST, Mboke E, Nembot R, et al. Impact of periodic intensification of routine immunization within an armed conflict setting and COVID-19 outbreak in Cameroon in 2020. Confl Health. 2022.16: 29. doi:10.1186/s13031-022-00461-1

14. UNICEF. Immunization regional snapshot 2019: West and Central Africa. 2019. Available: https://data.unicef.org/wp-content/uploads/2020/04/1-Immunization-Profile-WCAR-2019.pdf

15. World Bank. World Bank Open Data - Cameroon. In: World Bank Open Data [Internet]. [cited 19 Sep 2024]. Available: https://data.worldbank.org/country/cameroon

16. Cameron EE, Nuzzo JB, Bells JA. Global Health Security Index. 2019. Available: https://ghsindex.org/wp-content/uploads/2019/10/2019-Global-Health-Security-Index.pdf

17. EPI Cameroon. Rapport programmatique des financements anticipés pour le soutien à la distribution des vaccins contre la COVID-19 (CDS-Early Access). Yaounde, Cameroon: Ministère de la Santé Publique. 2022

18. COVID-19 Vaccine Delivery Partnership. Situation Report October 2022. 2022. Report No.: UNICEF/UN0684324/Dejongh. Available: https://www.who.int/docs/default-source/coronaviruse/covdp-sitrep_issue-8_october.pdf

19. EPI Cameroon. Rapport programmatique des financements pour le soutien à la distribution des vaccins contre la COVID-19 (CDS-3). Yaounde, Cameroon: Ministère de la Santé Publique. Dec 2023

20. Athiyaman A, Ajayi T, Mutuku F, Luwaga F, Bryer S, Giwa O, et al. Recovering from the unprecedented backsliding in immunization coverage: Learnings from country programming in five countries through the past two years of COVID-19 pandemic disruptions. Vaccines. 2023.11: 375. doi:10.3390/vaccines11020375

21. PROVARESSC. Rapport d'activites Exercice 2020. Cameroon. 2020.

22. EPI Cameroon. Revue Intra-Action (RIA) de la vaccination contre Covid-19. Yaounde, Cameroon: Ministry of Public Health Cameroon. 2022 Jun.

23. FHI 360. Cameroon increases reach to zero-dose children through microplanning and communication. GAVI. 2023. Available: https://zdlh.gavi.org/sites/default/files/2023-09/Cameroon%20Increases%20Reach%20to%20Zero-Dose%20Children%20through%20Microplanning%20and%20Communication.pdf

24. ReliefWeb. Cameroon: North-West and South-West Health Cluster COVID-19 Epidemiological Bulletin (July, 2021). Cameroon. Aug 2021. Available: https://reliefweb.int/attachments/cae91586-dc32-3665-8add-fa44cd309196/nwsw_covid_bulletin_july_2021.pdf

25. EPI Cameroon. Withdrawal of 4880 expired AstraZeneca vaccine doses. Aug 2021 [cited 13 Nov 2024]. Available: https://my.visme.co/view/768rygpx-withdrawal-of-4880-expired-astra-zeneca-vaccine-doses

26. WHO Cameroon. Rapport d'evaluation de la reponse sanitaire a la COVID-19 au Cameroun: Mars 2020 a Decembre 2021. Cameroon. Jun 2022

27. WHO Cameroon. COVID-19 response April 2023 report. Yaounde, Cameroon. 2023 Apr. Available: https://www.afro.who.int/sites/default/files/2023-06/Rapport%20COVID-19%20AVRIL%202023_def.pdf

28. Saidu Y, Di Mattei P, Nchinjoh SC, Edwige NN, Nsah B, Muteh NJ, et al. The hidden impact of the COVID-19 pandemic on routine childhood immunization coverage in Cameroon. Vaccines. 2023.11: 645. doi:10.3390/vaccines11030645

29. Lorenzetti L, Alam CMP, Namey E, Monj C, Tsegaye A, Ateeq N, et al. "Build back the confidence": Qualitative exploration of community experiences with polio vaccination in the Covid-19 context in Cameroon and Ethiopia. BMC Public Health. 2024.24: 2532. doi:10.1186/s12889-024-19860-5

30. MINSANTE. Plan Stratégique National 2021-2025 de la Santé Communautaire au Cameroun. Cameroon: Ministry of Public Health. 2021. Available: http://cdnss.minsante.cm/sites/default/files/02-71.pdf

31. Africa CDC. Joint statement on dose donations of COVID-19 vaccines to African countries. In: Africa CDC [Internet]. 29 Nov 2021 [cited 28 Oct 2024]. Available: https://africacdc.org/news-item/joint-statement-on-dose-donations-of-covid-19-vaccines-to-african-countries/

APPENDIX

Appendix A: Methods

The evaluation design was grounded in understanding the intention of COVAX, defined by the theories of change (TOC), and comparing this to its actual implementation and adaptations over time. At a country level we have drawn on this theory-based design to establish the logic and intended strategy for delivery pillar activities in the country. To complement this approach, we have integrated a systems lens to drive an emphasis on context and to narrow the focus on areas of the vaccine delivery system in the country. Within this overarching framework we have followed a mixed-methods approach. This has included supplementary data collection and analyses at the country level, with a focus on key informant interviews (KIIs) and a data/document review to gain a comprehensive understanding of the implementation and results achieved by COVAX in a real-life setting. The country case study (CCS) followed a four-phased approach as outlined below. To guide this, a CCS workbook was developed, which included templates specifying the outputs of each phase of the CCS. The country engagement approach was integrated into each phase of this CCS, with focal points officially appointed from each of the UNICEF and WHO country offices as well as Gavi, and the government. These focal points played a key role in document transfer, consultation on TOCs, workshop coordination, result reviews, validation, lesson sharing, and dissemination.

Phase 1. Building context, planning country-specific CCS scope, and updating or validating country-specific TOC.

The first phase of the CCS focused on understanding the country context and developing a country-specific scope for the CCS (including the development of the TOC) in order to prepare for data collection (Phase 2). The phase began with a kick-off meeting to establish the process and goals of the evaluation, and an introductory meeting with the country focal points. Using the CCS workbook templates, a robust data and document review was undertaken. Consultations with the focal points were conducted to assist in building context to produce a country context specific TOC from the “generic” country TOC developed during the inception phase of the evaluation. These consultations helped identify country-level learning questions within the general scope of our evaluation and were prioritized throughout the CCS. At the completion of Phase 1, a validation session was hosted with the focal points to ensure the updated TOC reflected and was aligned with the context and focus of COVAX’s work in the country.

Phase 1 activities

- Country kick-off meeting with local consultant.
- CCS methods workshop with local consultant.
- Data/document review to build background and context for work.
- Engagement with country focal points/primary stakeholders to gather information for TOC update.
- Identification of country-level learning questions and areas where COVAX support was focused (focus areas).
- TOC validation workshop with focal points/primary stakeholders.

Phase 2. Planning for and conducting primary data collection.

This phase involved tailoring and adapting data collection instruments to fit the country context and focus areas, as well as initially defined country learning priorities. Drawing on a predeveloped “generic” evidence matrix and data collection instruments, interview questions were made country-specific using insights gathered in Phase 1. Additionally, a stakeholder list of interviewees was mapped to ensure that appropriate perspectives and expertise were included. This list was validated with the focal points prior to conducting interviews. Interviews were scheduled and conducted with 12 identified key stakeholders. They included stakeholders from the National MoH (n=3), UNICEF Cameroon (n=1), WHO Cameroon (n=1), GAVI (n=1), CHAI Cameroon (n=2), regional MoH (n=2), academic/researcher (n=1), and CSO representative (n=1).

During data collection, a structured evidence matrix was populated with the primary data to account for evidence gathered and to direct and focus remaining data collection activities. Quality-controlled interview transcripts were prepared following all interviews.

Phase 2 activities

- Phase 2 CCS data collection session (tailoring and adapting instruments to country context and focus areas of COVAX).
- Development of stakeholder list for KIIs.
- Scheduling and conducting KIIs/focus group discussions.
- Developing quality-controlled interview transcripts.

Phase 3: Analysis, synthesis, and report compilation.

Phase 3 involved the analysis of the interview data collected in Phase 2 and the development of findings using a standardized analysis template. This template allowed for new themes to be identified but retained a focus on comprehensive answers to evaluation questions and learning priorities. Initial findings were reviewed with the evaluation team to ensure that they were articulated appropriately and presented with relevant evidence. Findings were incorporated into a draft CCS report and shared with stakeholders in a validation session to ensure consensus before finalizing the document. Further clarification was then sought from the MOH and all additions incorporated in the report.

Phase 3 activities

- Conduct of thematic analysis of key takeaways.
- Compilation of findings into complete CCS report.
- Final validation session with key stakeholders.
- Facilitation of a consensus conversation with Ministry of Health.
- Finalization of CCS report.

Appendix B: Adapted Country Theory of Change

Workstreams and illustrative activities	Comments on workstreams and illustrative activities	Outputs	Comments on outputs
COVID-19 vaccine planning: Development and updating of deployment and vaccination strategies.	A National Plan for Vaccine Deployment (NPVD) was developed by the Cameroon government to outline all COVID-19 vaccination procedures and protocols. It included target populations and expected coverage. NPVD development and review were mainly supported by GAVI, (via WHO and UNICEF) and others (USAID, World Bank).	The NPVD was a requirement for receiving COVAX support. It was finalized in January 2021 and Cameroon started receiving COVAX support from April 2021.	The EPI single-handedly did most of the work to develop the draft NPVD. External support came later and was more useful for its validation and eventual update.
Human resources: National guidance for vaccine delivery HR developed.	While no new staff were hired specifically for COVID-19 vaccination in Cameroon, COVAX resources were used to provide technical assistance to the EPI on various matters pertaining to COVID-19 vaccination in Cameroon.	COVAX funds allowed partner institutions (such as WHO, UNICEF, CHAI) to hire paid consultants who worked with the EPI at national and sub-national levels.	COVAX ensured the country's workforce was adequately trained, equipped, and mobilized to deliver COVID-19 vaccines effectively.
Suppliers and logistics: Service providers and input suppliers linked to health care centers.	Existing systems were used to distribute the COVID-19 vaccines, coordinated by the country's EPI. The "reach all districts" approach was implemented.	All 190 health districts were covered within the first month of COVID-19 vaccine deployment.	Vaccines were received at Yaoundé International Airport and transported to other parts of the country by road.
Cold chain: Cold chain equipment and technology procured and operationalized.	Existing cold chain equipment (CCE) was used and supplemented by COVAX equipment procured with COVAX CCE funding. COVAX was the first to provide mobile ultracold equipment to Cameroon's EPI specifically for the transport of Pfizer-BioNTech vaccines. Cold chain optimization was costed using the COVAX costing tool. CDS-EA funding included a budget to capacitate regional logisticians in cold chain practices.	Cameroon's logistics and cold chain were strengthened to facilitate the distribution of COVID-19 vaccines across the national territory.	UNICEF served as the master logistician to procure the cold chain equipment requested by the EPI.

Appendix C: Country Timeline

	Trend/Event/Intervention/Outcome	Time period
Global context	COVID-19 declared a public health epidemic of international concern (PHEIC) with high morbidity and mortality. Lockdown measures introduced worldwide. First COVID-19 vaccines become available. Supply is constrained, demand is high. COVAX supplies limited. Vaccine conspiracy theories, speculation, and misinformation are widespread.	2020–2021 (CRD phase)
	Increased supply of vaccines. Increased vaccination coverage especially in developed countries. Shifting narratives about the vaccine as it shows some efficacy. Vaccine demand begins to wane. COVID-19 epidemic slowing down and global emergency is lifted.	2022–mid-2023 (CoVDP phase)
	Supply of vaccines plentiful. Demand very low. Life begins to return to pre-COVID normality.	Mid-2023–end of 2023 (Alliance phase)
Country context	Top government authorities involved in COVID response. Three waves of COVID-19 but mortality remains <2%. Restrictive measures with lockdown and masking. Health facilities overwhelmed. Rumors and misinformation. COVID-19 vaccines become available (April 2021) but supply is limited and hesitancy high.	2020–2021 (CRD phase)
	Strong government support for COVID-19 vaccination. Hesitancy persists and vaccine coverage is <5% throughout 2022. Full reopening of schools and economic activities. Decreasing COVID incidence and vaccine demand.	2022–mid-2023 (CoVDP phase)
	Sporadic new cases of COVID, negligible mortality. Low vaccine demand. Other outbreaks (measles, polio) require EPI's attention. Plans to routinize COVID-19 vaccination in primary health care activities.	Mid-2023–end of 2023 (Alliance phase)
COVAX engagement	Contribution to country preparedness: • Support for NPDV development and review. • Procurement of cold chain equipment for EPI. • Sourcing of COVID-19 vaccines for Cameroon. • Support for vaccine administration and reporting.	2020–2021 (CRD phase)
	• Continued support of COVID-19 vaccine delivery. • Advocacy with top leadership to promote vaccination. • Funding of the fifth national vaccination campaign.	2022–mid-2023 (CoVDP phase)
	• Support for the integration of COVID-19 vaccination into primary health care. • Support for non-COVID EPI activities.	Mid-2023–end of 2023 (Alliance phase)

	Trend/Event/Intervention/Outcome	Time period
COVAX results	• NPDV validated by MoH and approved by GAVI. • EPI receives 92 items of cold chain equipment. • COVAX-procured vaccines delivered to Cameroon. • Three national vaccination campaigns effectively conducted in 2021.	2020–2021 (CRD phase)
	Two more vaccination campaigns conducted in 2022. The last campaign increases coverage to 10.1%.	2022–mid-2023 (CoVDP phase)
	• Plan developed for integrating COVID-19 vaccination into primary health care. • Tracking and routine vaccination of zero-dose children whose access to childhood vaccines was disrupted during the pandemic.	Mid-2023–end of 2023 (Alliance phase)