Evaluation of COVAX Facility and AMC and COVAX Pillar Delivery Efforts

Uzbekistan Case Study Final Report

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Prepared for
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LIST OF ACRONYMS

CCE	Cold chain equipment
CDS	COVID-19 Vaccine Delivery Support
COVID-19	Coronavirus disease 2019
CoVDP	COVID-19 Vaccine Delivery Pillar
DTP	Diphtheria-tetanus-pertussis
EIR	Electronic immunization registry
Gavi	Gavi, the Vaccine Alliance
GDP	Gross domestic product
ICT	Information and communication technology
MOH	Ministry of Health
MIS	Management information systems
NBF	Needs based funding
NDVP	National Deployment and Vaccination Plan
NIP	National Immunization Program
PHC	Primary Healthcare
PPE	Personal protective equipment
SAGE	Strategic Advisory Group of Experts
SES	Committee for Sanitary-Epidemiological Welfare and Public Health
TA	Technical Assistance
UCC	Ultra cold chain
UNICEF	United Nations International Children’s Emergency Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

Background on Uzbekistan and COVAX

Uzbekistan, a lower-middle income country in Central Asia, benefited from COVAX from March 2021. 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 Uzbekistan was a multi-stakeholder effort incorporating Gavi, the Vaccine Alliance (Gavi); strategic implementing partners including United Nations International Children's Emergency Fund (UNICEF) and the world health organization (WHO); and in cooperation with the Ministry of Health, Committee for Sanitary-Epidemiological Welfare and Public Health, and the National Immunization Program. The initiative centered on supporting the country's vaccine delivery efforts through direct vaccine provision and demand generation campaigns, supplementing existing immunization infrastructure and overcoming logistical challenges by supporting cold chain gaps.

COVAX support received in Uzbekistan

Major components of COVAX support were:

- 13.4 million doses of COVID-19 vaccines
- Technical assistance (TA) and Non-TA activities
- US$2.4 million from COVID-19 Vaccine Delivery Support (CDS) Early Access funds for activities essential for immediate COVID-19 vaccine deployment, coordination and scale-up
- UNICEF supported COVID-19 Electronic Immunization Registry, providing trainings on antiseptics and personal protective equipment for immunization program staff and vaccine delivery
- WHO provided capacity building and technical support for Regional and District Immunization Program Offices along with monitoring and supportive supervision
- US$4.2 million from CDS 2 (Needs Based Funds) between July 2022 and June 2023 which was used for continued efforts in vaccine logistics information system, institutional capacity strengthening for coordination, and continued human resource development
- US$5.3 million from the third phase of CDS from January 2023 onward for efforts that range from streamlining coordination and support to strengthening capacity of immunization coordination offices and to communication and dissemination products to further community engagement
- Total disbursements reached US$11.8 million.

Outcomes and challenges of COVAX delivery in Uzbekistan

The key successes of COVAX support to Uzbekistan included increased access to and provision of COVID-19 vaccines to the local population. COVAX played a crucial role in financing and coordinating the procurement of COVID-19 vaccines for Uzbekistan. Through its efforts, Uzbekistan received shipments of AstraZeneca, Pfizer, and Moderna vaccines, ensuring a diverse and sustained supply. Furthermore, data platforms and registry systems were

developed for improved coordination and capturing vaccine uptake at different levels. Implementation strengthened the cold chain and logistics through procurements of walk-in freezer rooms and ultra cold chain units which ensured more efficient storage and enabled the country to manage vaccines in larger quantities, thereby strengthening overall vaccination capacity. COVAX played a crucial role in strengthening country resilience by facilitating integration of COVID-19 vaccines to its routine immunization framework. Strained human resources, vaccine hesitancy, and logistical challenges in reaching the country's geographically vast rural areas were key challenges that COVAX concentrating on overcoming through its collaboration with local and national authorities.

Broader lessons or insights

Uzbekistan's strong pre-existing immunization infrastructure facilitated rapid vaccine development which highlights the importance of investing in long-term infrastructure for improved preparedness for future pandemics. This includes investing in improved Primary Healthcare (PHC) networks and improved vaccine storage facilities both of which were supported by COVAX. Uzbekistan's PHC reform and expansion efforts helped improve vaccine distribution, especially in remote and rural areas, cushioning vaccine equity considerations. Nevertheless, urban-rural disparities remained a challenge. Strengthening PHC networks and investing in digital health infrastructure can enhance equity in vaccine and healthcare service delivery in future crises. Uzbekistan's improved vaccine coverage underscores the government's commitment and political will demonstrated by strong collaboration and high-level vaccine coverage targets.

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.

Uzbekistan is a lower-middle-income country in Central Asia. The country comprises 13 regions and Tashkent city with a population of about 36.8 million people. Uzbekistan has sustained steady economic growth over the past three decades since 1996, even as the COVID-19 pandemic disrupted the global economy.[1] Approximately 51% of the country's population lives in urban areas.

COVID-19 and COVAX characteristics

COVID-19

- Infection rate: 0.7%
- Mortality Rate: Case fatality rate 0.6%
- Government Stringency Index average [pre-2021]: 50.9
- Government Stringency Index average [post-2021]: 38.0

COVAX

- CoVDP focus: No

Prior to the COVID-19 pandemic, Uzbekistan's health expenditure in 2019 was 5.4% of the country's gross domestic product (GDP). By 2022, amidst the pandemic, the country's health expenditure grew to 7.4% of the country's GDP. This was driven by increases in government health spending during the pandemic as well as even greater household out-of-pocket spending.[1]

Uzbekistan experienced multiple waves of COVID-19, peaking in 2022. By the mid-June 2023, Uzbekistan reported 253,662 confirmed COVID-19 cases and 1,637 deaths to the World Health Organization (WHO).[2]

Country response to COVID-19

Uzbekistan declared detection of the first national COVID-19 case in March 2020. To combat the spread of the virus, Uzbekistan announced a national lockdown and introduced population quarantine and social distancing measures. All services, including education facilities, and manufacturing production were stopped until infection control improved. Within two-week's time, closure of all transportation to and from Uzbekistan was suspended and further followed by closure of all international and local borders, closure of large construction markets, and introduction of mandatory requirement for population to wear the masks. In May 2020, the

[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.

government of Uzbekistan eased lockdown in some cities and area, keeping several cities under strict quarantine.[3]

Uzbekistan's experience during the COVID-19 pandemic was shaped by several key factors, including its well-established immunization program, strong logistical infrastructure, and effective community engagement.[4] Prior to the pandemic, the country had a robust vaccination system supported by organizations like GAVI through initiatives such as the Health System Strengthening program. Increasing investments in cold chain capacity and human resources ensured that the country was prepared for large-scale immunization efforts.

To systematically address the COVID-19 pandemic, the country developed the National Deployment and Vaccination Plan (NDVP) in 2021 which was revised quarterly to adjust to developing situation. The NDVP detailed strategies, interventions and activities as well as readiness of the various components of the national immunization system for the roll-out of the COVID-19 vaccine. Uzbekistan prioritized vaccinating older adults (65+ years), health care workers, school and preschool teachers, and people living with chronic disorders.[5]

When the COVID-19 Omicron-variant wave hit Uzbekistan in January 2022, the government reinstated some quarantine measures such as social distancing and transitioning schools and universities until February 24, 2022. To streamline interventions and activities for better protection of vulnerable groups, the NVDP was revised in February 2022 to align with the world health organization (WHO) Strategic Advisory Group of Experts' (SAGE) key recommendations for prioritizing COVID-19 vaccines. The new strategy included increasing vaccine coverage among high-risk population groups, increasing coverage of the adult population, and integrating the COVID-19 vaccine into the national routine immunization program and schedule.[6]

Over the course of the pandemic response, Uzbekistan undertook targeted interventions and policy adjustments to facilitate the seamless import of COVID-19 vaccines. These efforts have significantly enhanced the service delivery capacity of frontline service providers and involved substantial investments in upgrading cold chain and logistics infrastructure to improve efficient vaccine management and nationwide availability at vaccination sites.

Despite the country's size, Uzbekistan achieved relatively high coverage rates, with the government treating COVID-19 vaccination as part of its routine immunization work and aiming for a 95% coverage rate. Additionally, strong community engagement played a crucial role with medical brigades and health workers serving as the main communicators, reinforcing trust and targeting widespread vaccine coverage.

Uzbekistan's health sector at a glance

Uzbekistan's health system is primarily a public system, led by the ministry of health (MOH), and organized into three levels: national, regional and district or city level. While historically centralized, Uzbekistan's health system is decentralizing administrative functions while expanding its private sector. State health services, including a basic health benefits package, are funded through national taxation.[7] Uzbekistan's health system has contended with low public spending on health, geographic human resource gaps, and high out-of-pocket spending.[7,8]

To address these challenges, Uzbekistan has made new public financial investments and commitments to health system reform prior to the COVID-19 pandemic. In 2018, Uzbekistan

passed legislation to reform the health system's financing system and develop a framework for a community-oriented primary health care model. Government spending on health grew in 2019 with focus on expanding human resource and infrastructure capacity.[7,8]

Coverage for basic immunization services has stood out as a strength of Uzbekistan's health systems.[7] In 2018, the country's high immunization coverage was attributed to: strong political commitment, the quality of vaccine management, strong disease surveillance system, increased domestic financing for vaccine procurement, and collaboration and coordination between the MOH and partners.[9] In light of Uzbekistan's transition away from Gavi's financial support for immunization services, there was documented need to strengthen the national immunization's program management, service delivery and immunization coverage monitoring efficiency, human resource capacity building, and the supply chain, including reinvesting in cold chain equipment (CCE).[9]

Key Country Characteristics

Population[10]

- Total population: 36.99 million in 2024
- Urban population: 51% (2024)
- Population > 60 years: 9.4%
- Population < 18 years: 35.1% (2024)
- Health care workers (physicians and nurses): 1.3% (2023)

Health care system strength

- Health expenditure: 7.4% of GDP (2022)[11]
- Health expenditure per capita: US$169 (2022)[11]
- Routine vaccine coverage 2020: 96% for diphtheria-tetanus-pertussis (3rd dose) (DTP3) and 99% for measles (1st and 2nd dose)[12]

Global health security

- Global Health Security (GHS) Index score: 34.3[13]
- Major epidemics since 2000: None

Socioeconomic indicators

- World Bank classification: lower-middle income country

OVERVIEW OF COVAX ENGAGEMENT IN UZBEKISTAN

Uzbekistan's collaboration with the COVAX Facility has been instrumental in its COVID-19 vaccination campaign, facilitating the acquisition and distribution of vaccines to combat the pandemic effectively. The strategic implementing partners in this collaborative effort included UNICEF and the WHO in joint cooperation with the MOH, Committee for Sanitary-Epidemiological Welfare and Public Health (SES), and the National Immunization Program (NIP).

In March 2021, Uzbekistan received its first shipment from COVAX, comprising of 660,000 doses of the AstraZeneca vaccine. This delivery was part of an initial allocation of two 256,000

doses designated for the country. By July 2021, 3 million doses of the Moderna vaccine were contributed through COVAX. Later, in October 2021, an additional 2 million Pfizer doses were delivered. The vaccine supply continued into January 2022, when 500,400 Moderna doses arrived, funded in part by the European Union. Finally in March 2022, 200,000 doses were provided to Uzbekistan through COVAX, further strengthening the country's immunization efforts.[14] According to representatives of Uzbekistan's Committee for SES, COVAX also suppled Uzbekistan with the necessary vaccination materials, such as personal protective equipment (PPE), syringes, and antiseptics.

There were three clear phases in the support provided by COVAX to Uzbekistan:[15-17]

In March 2021, COVID-19 Vaccine Delivery Support (CDS) began to provide support to Uzbekistan through the CDS Early Access (EA) funding window. While this effort focused on activities essential for immediate COVID-19 vaccine deployment, coordination and scale-up, UNICEF and WHO also facilitated various supportive activities. UNICEF focused on supporting COVID-19 Electronic Immunization Registry (EIR), providing trainings on antiseptics and PPE for immunization program staff and vaccine delivery. WHO provided capacity building and technical support for Regional and District Immunization Program Offices along with monitoring and supportive supervision. In this phase the total amount of funding was US$2.4 million.

During the CDS Needs Based Funding (NBF) window the total amount of funding was US$4.2 million between July 2022 and June 2023. Activities under CDS NBF were implemented by the key implementing partners UNICEF and WHO. During this phase, Uzbekistan sought to improve vaccine logistics information system at the regional level through user trainings, support institutional capacity around information systems to improve coordination, and continued support for scaling up of delivery through human resource development, improved surveillance and response systems, and improved outreach.

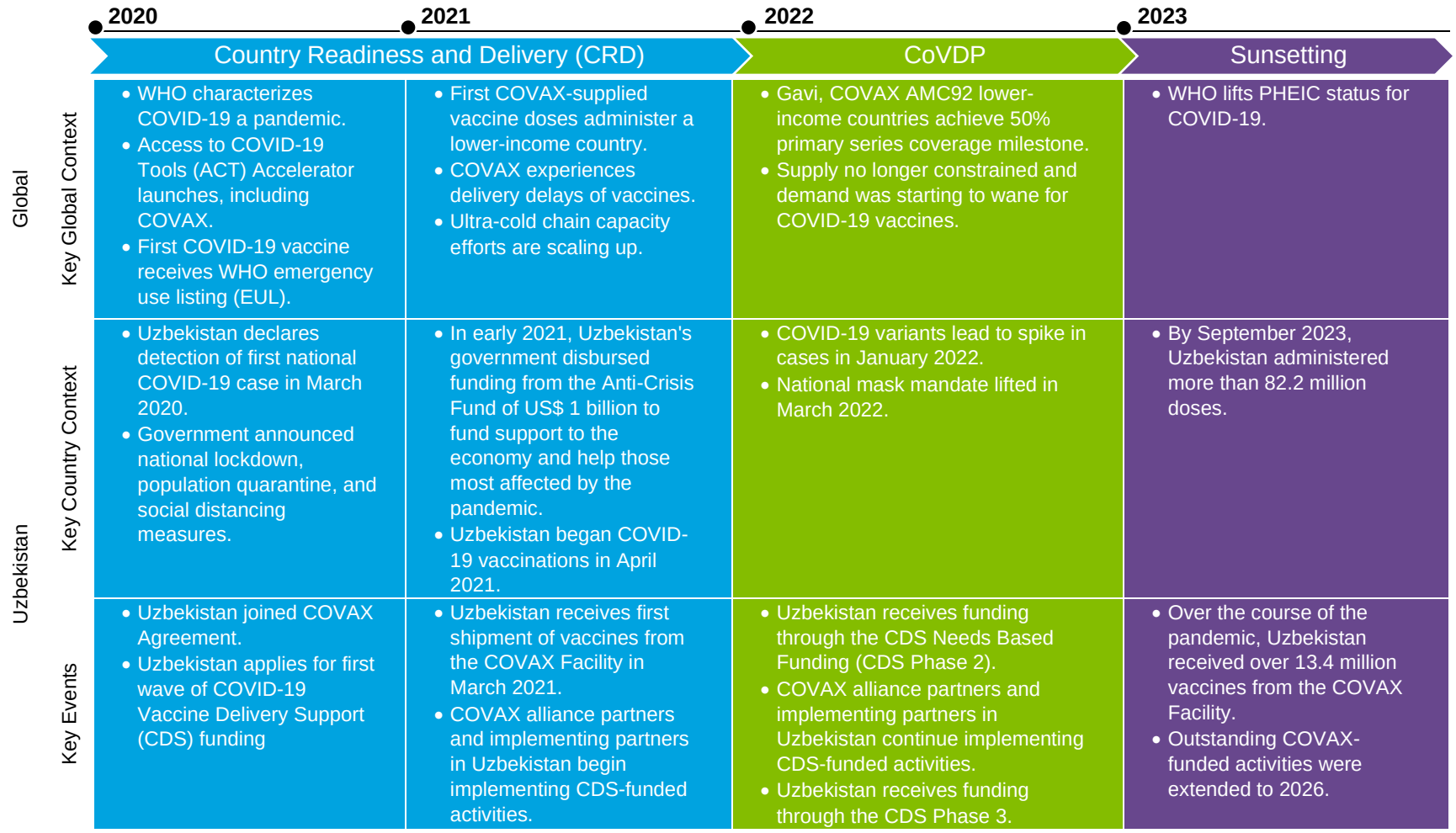
The country secured additional funding under the CDS-3 phase starting from January 2023. In this period, COVAX supported a series of technical assistance (TA) and non-technical assistance (non-TA) activities. TA activities focused on streamlining coordination and support, institutionalizing initiatives such as management information systems (MIS) or training curricula by the staff at all levels, reviewing and updating the national legislative base and reporting forms for financial sustainability, procurement and improved custom clearance for COVID-19 vaccines. Non-TA activities under CDS-3 targeted strengthening the capacity of immunization coordination offices through trainings for logistics and management tools and improved software for coordination for cold chain/vaccine management systems, in addition to communication and dissemination products. Some of the funding under CDS-3, originally scheduled for completion by December 2023, will now continue until June 2026. These activities focus on enhancing the capacity of national immunization managers in mapping, monitoring, and managing service delivery for high-risk groups and on strengthening the capacity of patronage nurses in immunization service delivery to accelerate the vaccination process. The total amount of funding for this period is amounted to US$3.5 million.

Table 1. Summary of approved COVAX funding to Uzbekistan

Funding stream	Approval date	Amount in USD
CDS EA	01 July 2021	2,404,057.00
CDS NBF	27 June 2022	4,156,334.60
CDS-3	14 December 2022	5,276,262.00
Total		**11,836,654.60**

The country prioritized certain populations in the early stages of its COVID-19 vaccination campaign. The country followed a phased approach, ensuring that the most vulnerable and high-risk groups received vaccines first. The priority groups included healthcare workers (frontline medical personnel to ensure continuity of services), elderly population (people aged over 65 for higher risk of severe illness), people with chronic diseases (individuals with underlying health conditions such as diabetes, cardiovascular diseases, and respiratory illnesses), teachers and education staff (given their high exposure to large groups), law enforcement and military personnel, and social workers and essential service providers. As vaccine availability increased, the government expanded eligibility to the general population. Vaccines were provided in mobile brigades, in hospitals, home visits, at places of work, and patronage depending on the risk group.

Figure 1. Country timeline[18,19,b]



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

FINDINGS ON COVAX SUPPORT IN UZBEKISTAN

This section presents the evaluation 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 Uzbekistan's established health systems. 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 (KIIs), 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?

Beyond the allocation of vaccines, The COVAX initiative in Uzbekistan focused on providing financial support and technical assistance to strengthen the health system's ability to respond to the COVID-19 pandemic.

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: As Uzbekistan's pandemic response needs and priorities shifted over the course of the pandemic, the COVAX delivery partners had to adapt the resources and modalities of support to meet these needs. At the start of the pandemic, COVAX's support to strengthen the country's vaccine delivery system focused on laying the groundwork for the vaccine rollout. Implementing partners, including the country and regional offices of UNICEF and the WHO, provided technical support to expand vaccine data management systems and train staff on foundational immunization skillsets needed to administer the new COVID-19 vaccines.[17]

As the pandemic progressed and challenges to existing systems emerged, COVAX funding not only supported assessments of how to improve current systems, but made efforts to revitalize aging equipment, expand system capacity, and create new healthcare worker training resources.[17]

For example, Uzbekistan's outdated waste management system in healthcare facilities was overtaxed by the biomedical waste generated from PPE, COVID-19 tests, hospital treatment, and mass vaccinations against COVID-19. To mitigate the risk of infection, community transmission and plastic pollution, UNICEF conducted a quality assessment to identify bottlenecks in biomedical waste management and the best ways to reduce the strain on healthcare facilities and communities. With contributions from CDS NBF, UNICEF procured new equipment for renovated waste management facilities in Uzbekistan in districts that the Uzbekistan MOH identified as most affected and at risk related to the possible community and hospital transmission of COVID-19 and environmental pollution from the waste.[15]

Ultimately, the pre-existing close collaboration between the COVAX delivery partners and the Uzbekistan's government facilitated more efficient use of COVAX funding to support activities that had already been identified as critical to strengthening the short and long-term capacity of country's healthcare system.

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: Uzbekistan's size and geographic distribution poses a significant challenge to equitably immunizing the population. By leveraging the country's extensive experience with immunization and the use of mobile outreach initiatives to immunize highly vulnerable population groups, the country was able to use the support provided by COVAX to make strides in equitably respond to the pandemic.

Uzbekistan identified vaccine priority populations based on recommendations provided by the WHO SAGE Roadmap for prioritizing population groups for vaccines, the European Technical Advisory Group of Experts on Immunization, Uzbekistan's national immunization technical advisory group, as well as the strategy put forth by the COVAX Advanced Market Commitment Initiative.

At the initial phase of the COVID-19 vaccine introduction, the vaccination was organized in two stages. The first priority group were frontline health workers and people 70 years or older. The second priority group included people between the ages 65 and 70 years, other non-frontline health workers, security and social support officials, people with the chronic diseases who are immunocompromised, and teachers at schools and pre-school institutions. Gender equity was not a primary focus in Uzbekistan's COVAX delivery support. Gender disaggregated data is not available.

Finding 3: Reaching populations in Uzbekistan's rural areas was a significant challenge to vaccination efforts.[28] Strategies for vaccinating these priority groups included mobile health teams of medical brigades or patronage nurses (i.e. those with a bachelor's degree in nursing), home visits, or fixed site delivery (for healthcare workers only).

To more effectively reach these vulnerable groups, COVAX funds were used to assess and reduce existing barriers. Through COVAX's support for the expansion and revitalization of CCE in more facilities across the country, including the three walk-in-freezer rooms and eight ultracold chain units (UCC) that were installed in the Republican Cold Chain Warehouse, access to vaccines became more geographically equitable (**Table 2**). COVAX delivery partners in Uzbekistan also worked with different stakeholder groups, including non-governmental organizations, to identify at-risk populations and develop outreach strategies and communication material to increase the acceptability and demand for vaccines.

Table 2. Cold chain equipment purchased and installed using initial COVAX funds

Equipment	Quantity purchased
Walk-in Freezer Room	3
UCC	8
Total	**11**

Finding 4: Uzbekistan identified that the country's elderly population and people living with HIV had comparatively low immunization coverage levels compared to the general population. As a

result, in the CDS-3 application, there was a desire to use funding support from COVAX implement a new approach to reach older adults who were most vulnerable to COVID-19. The complex approach includes communication activities on dissemination COVID-19 vaccination awareness materials, training of Primary Healthcare (PHC) medical staff on the necessity of COVID-91 vaccination, nurse education, and implementation of "zero-dose" program to better detect missed adults.[16] To improve immunization rates among the elderly, UNICEF also completed extensive work for the development of behaviorally informed solutions to promote COVID-19 vaccination among the population above the age of 65. Behaviorally informed messages were disseminated through mass media campaigns across the country in 2022.

> ***"Elderly people over 65 years old were one of the groups with whom we had problems in carrying out vaccination and the coverage at the beginning was only 34%. Then we decided to work on joint work with the Red Crescent employees in our country [to deliver vaccines to the elderly at home]. As for vaccination in hard-to-reach areas of Uzbekistan, 35 such points were identified. The work was carried out through local authorities and communities to ensure access to vaccination even in mountainous or border areas of the country. These lists were given to the UNICEF team, specialists were trained with the involvement of leaders, the mahalla committee [community-led neighborhood institutions], and aksakals [community elders]." –Government Health Official***
>
> ***"We went to mahalla committees and gathered older people. They have a different approach to life and other questions. It was difficult to answer their questions… We worked with medical workers and with the population. This is a completely different approach. The difference lies in simpler questions. Religious figures carried out explanatory work from a religious point of view. At Friday prayers, the mufti spoke and promoted the need for vaccination, and this had a very good effect." –Regional Government Epidemiologist***

WHO collaborated with the National Center for HIV/AIDS Control and local non-government organizations to map communities of people living with HIV (PLWHIV). This approach aimed to ensure service accessibility and mobilize PLWHIV communities to promote COVID-19 vaccination.

Finding 5: Based on Uzbekistan's efforts to ensure an equitable COVID-19 response, the vaccine delivery activities COVAX supported contributed to the country's long-term capacity to:

- Build capacity of immunization managers at all levels of the immunization system in:
  - Mapping and registration of the underserved population groups (un- and under-vaccinated groups)
  - Monitoring and management of the service delivery to the underserved groups.
- Strength the capacity of service providers for increasing vaccination coverage of the high- and highest- risk population groups with the primary doses and the booster dose of the COVID-19 vaccine through delivery of the high-quality services, that are custom-tailored to the needs of target groups and are based on the evidence and analysis of the reasons for the initial low-uptake of vaccination services.

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

Finding 6: At the start of the pandemic, the CDS EA funds were focused on Uzbekistan's emergency response efforts and urgent needs, such as technical assistance, procuring healthcare equipment, or providing immediate frontline healthcare worker training. The focus of the resources provided through COVAX eventually transitioned to enhancing the long-term strength of the health system that would improve the country's capacity for pandemic

preparedness and response. Human and financial resource needs were identified through communication between national health agencies as well as COVAX delivery partners, UNICEF and WHO's country and regional offices.

In 2020, the COVAX technical assistance plan for 2021 included financial support for staff or technical consultants that COVAX delivery partners (UNICEF, WHO) could recruit to support the country's pandemic response. Human resources were identified based on their key responsibilities, location (national), and if position was skill transfer or gap filling for local TA support. Financial resources were allocated based on key activities and detailed by consultant costs, travel, workshop and training costs, and other staff costs.[19,20]

Table 3. Details of CDS-3 approved technical assistance budget for Uzbekistan[16]

Budget category	Main fund recipient	Key Activities	Amount approved (USD)
Technical assistance	WHO	• Review and update national legislative resolutions and documents to provide financial sustainability, procurement, custom clearance of COVID-19 vaccines and vaccination • Partnership with the National Center for HIV/AIDS Control for Implementation of the specific vaccination strategy for immunocompromised population groups • Partnership with the National Center for HIV/AIDS Control for Mobilizing PLWHIV communities and promoting immunization for increasing uptake of immunization services • Assess the workload and timing of vaccinators, immunization program managers and key immunization service providers in primary health care using observational studies to set standards and economic sustainability • Project administration and WHO Program support costs for technical assistance	850,115
Technical assistance	UNICEF	• Develop training materials and facilitation of trainings • Alignment of infection, prevention, and control (IPC) and social behavior change (SBC) training curricula to the national curricula and coordination of institutionalization of the new training curricula • Maintenance and regular update of the Internet of Good Things part according to the WHO and MOH guidance • Update of standard operating procedures and regulatory documents related to the components of the immunization system • Conduct inventory and tag CCE • Support and capacity building in application of the electronic MIS by the staff at all levels • Cooperation with religious leaders in promotion of COVID-19 vaccination among the elderly • Maintenance and regular update of the U-Report chat bot according to the WHO and MOH guidance • Day to day management of implementation, administration and finances by immunization officer and SBC officer • UNICEF Program Support Costs for technical assistance	627,450
Total approved technical assistance budget for CDS-3 (Round 1 and Round 2)			**1,477,565**

Finding 7: In 2023, Uzbekistan continued to face human resource challenges to vertically and horizontally coordinate immunization efforts and data collection in the field. A common difficulty in implementing CDS funded activities was related to issues attracting specialists of the required technical level and education. Implementing field training programs or conducting supervisory visits requires significant planning efforts and mobilizing significant human resources, a significant risk in the context of ongoing routine vaccination and vaccination against COVID-19. As a result, the support the CDS funding provided to the country's immunization program and the implementation of the COVID-19 vaccination program mainly involved implementation of activities related to the engagement of a wide range of human resources (trainers, facilitators, field specialists, focal point specialists, etc.).

Beyond addressing Uzbekistan's human resource challenges, COVAX funding also supported procurement of equipment, building data system capacity, and the development of new vaccine demand and community outreach strategies.

Finding 8: Although COVAX resource allocation met many of Uzbekistan's pandemic response needs, Uzbekistan worked concurrently with other development stakeholders to meet wider immunization program and health system needs. For example, while Uzbekistan received COVAX CCE support for upgrading the cold-chain system capacity to receive, store, and distribute COVID-19 vaccines and all routine immunization vaccines, COVAX CCE Support applications would not allow countries to apply for CCE at the primary health care level. Instead, Uzbekistan received support from the US Agency for International Development (USAID) to procure and deploy CCE at the primary health care level, supporting Uzbekistan's goal of reinforcing the primary health care system and improving distribution and access to immunizations across the country.[20,21]

Over the course of the pandemic, COVAX CDS funding was valued at US$11.8 million between the end of 2021 and late 2023. Although the WHO declared COVID-19 was no longer a Public Health Emergency of International Concern May 23, 2023, the COVAX Facility allowed Uzbekistan to extend funding to continue remaining COVAX-funded delivery support activities through June 2026.[22]

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 9: Key challenges

Despite the country's relatively well-established infrastructure and immunization program, political commitment, and collaborative environment, Uzbekistan faced several challenges.

a. **Human resources.** A key issue has been the difficulty in attracting specialists with the necessary technical expertise and education. This challenge was exacerbated by the simultaneous rollout of COVID-19 vaccination alongside routine immunization programs, placing a heavy burden on existing healthcare staff. The introduction of a new vaccine

required rapid upskilling, necessitating intensive coaching and mentoring at a high technical level within a limited timeframe. Furthermore, the shortage of human resources extended beyond direct service delivery to critical functions such as coordination, data collection, and both vertical and horizontal communication in the field. While regional headquarters for COVID-19 response were established, early reliance on paper-based reporting and the demand for daily reports for multiple agencies-including SES, MOH, and Cabinet of Ministers- further strained the already limited workforce. These factors collectively created substantial operational hurdles in the effective implementation of CDS funded activities.[15,16]

b. **Communication.** There have been challenges in ensuring vaccination coverage for priority populations, particularly in rural areas, due to the limited effectiveness of conventional awareness and demand-generation strategies. In Uzbekistan, older populations primarily rely on medical staff as their most trusted source of information regarding immunization. The shortage of healthcare personnel in the field has further constrained efforts to raise awareness and promote vaccine uptake, particularly among vulnerable groups. With limited alternative channels for disseminating accurate information, misconceptions and a lack of understating about vaccine have persisted, ultimately affecting immunization rates in these high-risk populations.

c. **Mapping of under-immunized population groups.** Challenges related to effectively mapping and registering underserved population groups due to the limited capacity of immunization managers at various levels impacted COVID-19 vaccination process and hindered the achievement of target coverage rates.[6]

d. **Organization of service delivery to the high and highest-risk groups.** The organization of service delivery for high-risk groups, particularly immunocompromised populations, faced important challenges. The complexity of identifying and reaching immunocompromised individuals, along with the need for specialized care and tailored vaccination approaches, made it difficult to ensure timely and effective immunization for these vulnerable groups.[6]

Finding 10: Key successes

Despite challenges, particularly during the early stages of vaccine roll-out, Uzbekistan's COVID-19 vaccination effort was marked by key successes where COVAX implementing partners, in collaboration with MOH, played an important role.

a. **Timely vaccine supply.** Gavi played a crucial role in financing and coordinating the procurement of COVID-19 vaccines for Uzbekistan. Through its efforts, Uzbekistan received shipments of AstraZeneca, Pfizer, and Moderna vaccines, ensuring a diverse and sustained supply. WHO provided regulatory support, ensuring that all vaccines met safety and efficacy standards before distribution.

b. **Capacity building (human resources).** WHO and UNICEF worked together to train healthcare workers on vaccine administration, adverse event monitoring, and data management. WHO provided technical guidelines and training modules, while UNICEF facilitated hands-on training sessions and distributed materials. Key stakeholders, ranging from government officials to clinic providers, have indicated that this upskilling

ensured that frontline workers were better equipped to handle large-scale immunization efforts more efficiently.

c. **Electronic immunization registry.** Through close collaboration with key stakeholders—including the MOH, its digitalization focal point IT-Med/Uzinfocom, the Republican Sanitary and Epidemiological Service, and software developers for the Vaccine Logistics Management Information System—UNICEF has facilitated the development and deployment of an EIR. The system has been seamlessly integrated with the Government's Civil Registry and the One-Stop Governmental Services Portal, ensuring streamlined access to immunization records. As of 2024, the EIR is fully operational at all vaccination points nationwide. With support from Gavi and USAID, UNICEF has also procured 3,000 tablet computers, 2,300 desktop computers, and 3,800 Wi-Fi routers, enhancing universal access to digital immunization systems and ensuring reliable connectivity across the country.

d. **Strengthened Cold Chain and Logistics.** To accommodate the storage requirements of different vaccine types, COVAX contributed to efforts to upgrade Uzbekistan's cold chain infrastructure. This included the installation of ultra-cold freezers necessary for storing vaccines and expanding refrigerated storage at central and regional levels. This upgrade ensured more efficient storage and enabled the country to manage vaccines in larger quantities, thereby strengthening overall vaccination capacity.

e. **Public awareness and demand generation.** WHO supported the development of trainings and communication materials such as handbooks for COVID-19 vaccination while UNICEF leveraged its expertise in community engagement, worked closely with local authorities to disseminate accurate information through various channels. Work focused on outreach and communication materials through TV, social media posts, IPC communication materials, immunization waste management and communication.

f. **Integration with routine immunization.** COVAX played a crucial role in strengthening resilience by facilitating the seamless integration of COVID-19 into the country's existing immunization framework. The strong partnership yielded significant results, as routine immunization efforts remained largely stable, the human papillomavirus vaccine was successfully introduced despite social lockdowns, and nine COVID-19 vaccines were rapidly deployed and administered.

g. Global collaboration and support. The success of COVAX in Uzbekistan was driven by strong multistakeholder collaboration between international and national stakeholders. Gavi, WHO, and UNICEF worked closely with the MOH and local health authorities to ensure effective planning, monitoring, and reporting of vaccine rollout efforts. The Uzbekistan government played a key role in policy implementation and mobilizing healthcare infrastructure to support mass vaccination efforts.

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 11: Each phase of the COVAX delivery support evolved based on specific priorities. The first phase, the CDS focused on identifying initial urgent country needs. The second phase focused on comprehensive assessments of emerging issues due to the pandemic. The third phase focused on long-term integration of COVID-19 response into the healthcare system. This

adaptive strategy aligned with the pandemic's progression, shifting from uncertainty to a clearer understanding of vaccination priorities.

A key adaptation to COVAX in Uzbekistan was the funding provided to procure CCE. The successful integration of COVID-19 vaccination into the Routine Immunization Program requires a robust cold-chain and vaccine logistics management system.

COVAX-funded training in Uzbekistan evolved throughout the pandemic, initially focusing on foundational immunization skills and vaccine delivery. In later phases, support expanded to training of trainers for expanded program on immunization managers and vaccinators, cascade training for nurses, and the development of reference materials for healthcare workers. Emphasis then shifted toward institutionalizing immunization training curricula, including infection prevention, SBC, and regulatory updates. COVAX also provided training on new systems and equipment, such as the Vaccine Transport Management Information System and CCE and their integration into the existing health system.

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 12: COVAX technical assistance plan provided a framework for collaboration and coordination. UNICEF focused on planning and coordination, vaccines, cold chain and logistics support, demand generation and communication while WHO focused on prioritization, targeting and COVID-19 surveillance, safety surveillance, training and supervision along with monitoring and evaluation, resource generation and funding and service delivery.

Participants receiving Pfizer vaccines as part of CDS-3 (2022) were encouraged to reach out to UNICEF and WHO offices on guidance on tailoring CDS request to Pfizer supply requirements. In collaboration with WHO, UNICEF is working with the MOH and ministry of finance to advocate better financing for technical maintenance starting from the 2024 fiscal year.

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 13: Building on the historical collaboration between Uzbekistan's national immunization stakeholders, the country was able to utilize the existing health systems strengths and ongoing initiatives to improve Uzbekistan's COVID-19 pandemic response.

The range of capacity-building activities for 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 and technical supervision have equipped health workers with expertise to respond to future pandemics. The expansion of immunization training programs for healthcare workers, including training of trainers, will also support future PHC services will contribute to Uzbekistan achieving its ongoing health reform agenda.

Finally, Uzbekistan's newly elaborated National Immunization Strategy 2021-2025 highlighted the need for increased financing to improve the sustainability of the NIP throughout the country. As the strategy required reinforced legislative and policy documents, COVAX funding has supported technical assistance to review and update national legislation for improvements in routine childhood vaccination and adult vaccination, including the integration of the COVID-19 vaccine into the routine immunization program.[15]

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 14: Uzbekistan had access to a range of vaccines including AstraZeneca AB (AZD1222), Moderna (mRNA-1273), Pfizer (BNT162b2/COMIRNATY), Sinovac (SARS-CoV-2 Vaccine (Vero Cell), Inactivated), Sputnik V, Sputnik Light, and Zifivax (ZF-UZ-VAC2001). By June 2023, a total of nearly 80 million vaccine doses have been administered, including those provided by the COVAX facility. Approximately 21 million individuals (or 62.2% of the total population) in Uzbekistan were vaccinated with at least one dose of the COVID-19 vaccine, and 18.8 million people (53.9% of the total population) received a complete series of vaccine. Uzbekistan's COVID-19 vaccination coverage levels were slightly lower than those across other lower-middle income countries.[2] A booster and additional dose were received by approximately 17.9 and 9.3 million people (or 51.4% and 26.8% of the total population).[2] **Table 4** provides the number of people by age and priority groups who received the complete primary series of the COVID-19 vaccine (two doses) or the complete series with booster/s as of June 2023 and the population coverage of COVID-19 vaccines. A major weakness of the analysis is the inability to differentiate COVAX and non-COVAX vaccine coverage in these priority groups. However, it remains evident that Uzbekistan would not have attained the coverage it did without COVAX support, which was valued especially for procuring vaccines, developing digital systems to improve coordination for evidence-based decision making, or strengthening its cold chain and logistics for equitable distribution of the vaccines.

Table 4. COVID-19 vaccination coverage by priority and age groups in Uzbekistan[2]

Population group	Estimated number of people **vaccinated**	**Percentage of total population**	Vaccine coverage
Individuals 65 years and older (two doses)	1,072,949	3.1%	66.0%
Individuals 18 years and older (two doses)	17,612,219	50.3%	87.9%
Individuals 5-17 years (two doses)	1,247,786	3.6%	36.8%
Healthcare workers (with booster/s)	471, 864	1.3%	102%

Sub-EQ 6.2: Were equitable results achieved?

Finding 15: COVAX helped ensure that COVID-19 vaccines reached all regions, including rural and hard-to-reach areas. By securing millions of doses from diverse manufacturers and providing UCCs and walk-in freezers COVAX facilitated widespread and timely distribution, decreasing rural-urban disparities in vaccine availability. This was especially important for vulnerable groups, including healthcare workers, the elderly, and individuals with comorbidities, who were prioritized in the early phases of vaccination.

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

Finding 16: COVAX funding helped address key health system gaps in Uzbekistan by procuring ultracold vaccine storage units, improving vaccine distribution, and strengthening the national immunization program. It also supported healthcare waste management solutions, the

development of an Electronic Immunization Information Systems, and information and communication technology (ICT) infrastructure, enhancing data collection, analysis, and evidence-based decision-making.[21]

These investments not only improved Uzbekistan's COVID-19 response but also strengthened the country's long-term health system resilience. By enhancing cold chain capacity, waste management, and digital infrastructure, COVAX contributed to a more efficient and sustainable immunization framework for future public health challenges.

> ***"The pandemic was a real school for our system. Thanks to the support of COVAX, we have achieved good results in combating the pandemic. I can say with full responsibility that we are ready for any turn, any changes. Our employees have experience, and it will help in any situation. Now we can remotely monitor the temperature of refrigerators anywhere. Sitting at the workplace, we can monitor the temperature of refrigerators, which we have never had before. The COVAX program taught us the right approach to immunization in an emergency period, for example, if the power goes out, we have generators, they allow us to maintain the required temperature in warehouses. Tablets and routers improve internet communications and have been delivered to both district SES and health care facilities. I think that the lessons learned in recent years will be used in emergency situations." –Regional Government Immunization Official***

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 17: The rapid introduction of multiple vaccine types raised concerns among the public about vaccine safety, efficacy, and potential side effects. The availability of different vaccines with varying dosing schedules and perceived effectiveness led to confusion and mistrust, particularly when some vaccines were preferred over the others due to misinformation or misconceptions.[22]

Finding 18: Advancements in digital health and data management with COVAX support led to development of management information systems and procurement of ICT equipment to improve vaccine tracking and reporting. These digital innovations enhanced data collection and decision-making, benefiting the broader public health sector.

Uzbekistan's engagement with COVAX facilitated stronger partnerships with global health organizations, including UNICEF, WHO, and GAVI. This increased the country's capacity to secure additional funding and resources for long-term healthcare improvements.

BROADER LESSONS OR INSIGHTS

Uzbekistan's experience with COVAX during the COVID-19 pandemic offers valuable insights into the strengths and challenges of national and global vaccine distribution efforts. The country's well-established immunization infrastructure, proactive policy adjustments, and strong government commitment played a crucial role to cushion specific challenges arising from strained human resources, logistical issues in reaching geographically vast rural areas, and communication challenges to overcome vaccine hesitancy.

- Uzbekistan had a strong pre-existing immunization infrastructure that facilitated rapid vaccine deployment. The country achieved improved outcomes through COVAX engagement in improved existing cold chain capacity, trained healthcare workforce, and

streamlined logistical and vaccine management networks. This highlights the importance of investing in long-term immunization infrastructure to improve preparedness for future pandemics.

- Despite the actual vaccine coverage remained lower compared to other lower income countries, the government's high-level commitment to achieving a 95% vaccination target demonstrated the importance of political will in pandemic response efforts. Strengthening coordination between national and local authorities ensured improved vaccine accessibility. Future health emergency responses should continue fostering intergovernmental collaboration to ensure improved implementation.
- Community engagement is essential for overcoming vaccine hesitancy. Despite having a strong immunization system, Uzbekistan faced public scepticism and misinformation about COVID-19 vaccines. Future vaccination campaigns should incorporate stronger public awareness initiatives and proactive engagement to combat misinformation.
- Preparedness for cold chain challenges is necessary. Although Uzbekistan had a relatively strong cold chain system, introducing certain types of vaccines required ultra-cold storage which posed logistical hurdles. This experience highlights the importance of continuously upgrading cold chain infrastructure to accommodate new vaccine technologies.
- Uzbekistan's PHC reform and expansion efforts helped improve vaccine distribution, especially in remote and rural areas. However, urban-rural disparities in healthcare access remained a challenge. Strengthening PHC networks and investing in digital health infrastructure can enhance equity in vaccine and healthcare service delivery in future crises.
- Addressing challenges regarding organization of service delivery to the high and highest-risk groups requires a more robust system for identifying, tracking, and delivering vaccines to immunocompromised individuals, along with enhanced monitoring systems to ensure continued protection.

CONCLUSION

Conclusion 1: Uzbekistan's engagement with the COVAX Facility demonstrated the country's ability to integrate global health initiatives into its existing immunization framework. The country leveraged a relatively well-established vaccination infrastructure, efficient supply chain mechanisms, and a highly committed health workforce to ensure broad vaccine coverage. Strategic partnerships through COVAX Facility played a pivotal role in securing vaccine doses at critical moments of the pandemic, helping to mitigate supply shortages and accelerate immunization efforts. Political commitment at both national and subnational levels ensured that COVID-19 vaccination was prioritized as part of routine immunization activities, reinforcing the country's proactive approach to public health crises.

Conclusion 2: Uzbekistan's experience also highlighted several challenges that underscore the need for further investments in national health security. Vaccine hesitancy and misinformation presented obstacles to achieving full coverage, demonstrating the need for stronger public awareness campaigns and community engagement to build trust in immunization programs. Disparities in healthcare access between urban and rural areas further complicated vaccination efforts, reinforcing the importance of expanding PHC networks and improving last-mile vaccine delivery for equitable access across the country.

Conclusion 3: Despite challenges, Uzbekistan still managed to achieve a relatively high coverage rate compared to many other countries. Uzbekistan's engagement with the COVAX facility showcased the value of strong immunization system, effective logistics, political commitment, and international partnerships in pandemic response. Challenges related to vaccine hesitancy, and healthcare access disparities underscore community engagement and healthcare system resilience to better prepare for future global health emergencies.

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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 17 identified key stakeholders. They included stakeholders from the MoH/Government of Uzbekistan (12) and Implementing Partners (5).

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	Illustrative COVAX activities	Outputs	Comments
COVID-19 vaccine planning	A National Plan for Vaccine Deployment (NPVD) was developed by the Uzbekistan government to outline all COVID-19 vaccination procedures and protocols, including the target populations and expected coverage to be attained. Supported by WHO and UNICEF. NPVD was revised in June 2023. Country had also developed National Immunization Strategy of Uzbekistan (2022-2025), which build off of comprehensive multi-year immunization plans (5-year cycles).	The NPVD was a necessary requirement to receive COVAX support. NPVD was finalized in July 2021 and Uzbekistan applied for COVAX CDS Early funding in August 2021. NPVD 2023 version NIS 2022-2025	UNICEF and WHO were among the implementers of NPVD related activities. Gavi HSS program and other platforms/programs, USAID, Asian Development Bank all contributed funding for NDVP implementation.
Human resources	Capacity building and technical support were activities under COVAX to regional and district immunization program offices. Implementers (UNICEF and WHO) provided technical support. WHO hired an external consultant to provide technical assistance to the review and amendment of the national legislation on immunization in Uzbekistan and the development of a Resolution of the Cabinet of Ministers. Training participants were from national, oblast, and district levels and detailed list of participants can be found in NDVP. Trained on immunization service delivery and immunization safety. In 2022, NICEF and WHO supported the adaptation and translation of WHO's Standard Operating Procedures (SOPs) and training materials on Pfizer COVID-19 pediatric dose management and	COVAX funds allowed partner institutions (UNICEF, WHO) to provide technical support and training to country workforce. Creation and dissemination of novel vaccination training materials Managers of 209 cold stores (100%) can handle, store and transport Pfizer COVID-19 pediatric vaccine in accordance with the manufacturer's recommendations. All vaccination point workers trained to administer Pfizer COVID-19 pediatric vaccines.	COVAX ensured country's workforce was adequately trained, equipped, and mobilized to deliver COVID-19 vaccines effectively

Workstreams	Illustrative COVAX activities	Outputs	Comments
	administration. The SOPs were translated into local languages (Uzbek, Karakalpak, Russian), and 5,000 sets were distributed to 3,138 vaccination points (100%) across the country. In October 2022, UNICEF continued supporting the nationwide cascade training at the district level on proper administration and handling of the Pfizer COVID-19 pediatric vaccine. Additionally, UNICEF trained 7,420 vaccination point workers (100%) on the updated SOPs for Pfizer COVID-19 pediatric dose management and administration CDS-3 application noted there was a need for extensive training for new vaccinators and nurses on immunization practices, outreach work, and demand generation.		
Suppliers and logistics	The Vaccine Logistics Management Information System (VLMS) was launched. Healthcare workers were trained to use VLMS.	Vaccination supply and logistics system were strengthened by COVAX resources. Improved vaccine management and stock forecasting. As of July 2023, 150 healthcare workers were trained on using VLMS and enhanced their digital literacy skills. The system is being used at 50 vaccination points in the Bukhara region that serve 115,000 children. VLMS was fully integrated with the Civil Registry Database and Death and Birth Registry.	Improvements in country logistics for COVID-19 and routine vaccine distribution

Workstreams	Illustrative COVAX activities	Outputs	Comments
Cold chain	COVAX supplemented existing cold chain equipment with COVAX-procured equipment. Unprecedented amount of investment in cold chain over the previous 5 years (since 2023) requires financing for technical maintenance. UNICEF and WHO were working with MoH and MoF to advocate for better financing for technical maintenance for 2024 fiscal year.	Under the COVAX assistance, Uzbekistan has received three Walk-in-Freezer Rooms and eight UCC units that were all installed at the National Cold Store and in the Tashkent City vaccine cold store	Effective vaccine cold chain storage and reduced wastage of vaccines.
Demand creation and community mobilization	UNICEF supported capacity building of more than 40 public communication specialists of the Republican Sanitary Epidemiological Service (SES) at national and regional levels on social behavior change for health including immunization. The training was focused on sensitization of the participants about the key principles and pillars of SBC for health and behavior change models and tactics for health promotion including immunization. CDS technical assistance supported communication campaigns to raise awareness about COVID-19 vaccines, address vaccine hesitancy, and promote vaccine acceptance among the population. This included developing targeted messaging and engaging with communities to address their concerns and questions, increasing capacity of front-line health workers in COVID-19 awareness and inter-personnel communication skills. Sharing behaviorally informed messages through social media channels is being implemented in line with the SM plan. In view of the upcoming school opening, messages targeting teachers, one of the priority groups for COVID-19 vaccination,	Increased capacity of public communication specialists Communication campaigns held Social media posts developed Partnerships established to reach remote regions with low COVID-19 vaccine uptake. Capacity of local media representatives improved	Communities mobilized and demand generated

Workstreams	Illustrative COVAX activities	Outputs	Comments
	are being disseminated through MoH, Republican Sanitary-Epidemiological Service (SES) and UNICEF social media channels. The number of views for one week of posting reached around 280,000. A partnership was formalized between the Red Crescent Society of Uzbekistan and the "Yuksalish" Nationwide Movement to conduct community dialogues in the remote areas of Uzbekistan. Under the guidance of the Republican SES, around 60 remote regions with relatively low COVID-19 vaccine and booster dose uptake are identified. Built the capacity of local media representatives to fight misinformation by providing the tools and techniques for fact-checking, creating appealing content, and promoting the use of reliable sources of information for content generation.		
Monitoring and evaluation	The Vaccine Logistics Management Information System (VLMS) was launched. Technical assistance supported the establishment of monitoring (Supportive supervision) and evaluation (zero-dose program) systems to track the progress of the vaccination program. This includes monitoring vaccine coverage rates, identifying gaps or challenges, and implementing corrective measures if needed.	VLMS was launched and integrated with Uzbekistan's Civil Registry Database M&E systems were established to track vaccination program progress.	Systems allows health workers from manually entering data that was previously the norm. Zero dose program aimed to identify and include people missed by vaccination in immunization program.
Prioritization, selection, and AEFI surveillance	CDS TA assisting in developing robust data management systems to ensure accurate and timely reporting of vaccination data (by hiring local specialist and supporting C19 management centers). This helps in tracking vaccine supply, monitoring adverse	Data management system developed to report vaccination data.	

Workstreams	Illustrative COVAX activities	Outputs	Comments
	events, and assessing the overall impact of the vaccination program. The "zero dose" program aimed to ensure that everyone, including those who were missed initially, had access to vaccination. This highlights the importance of vaccine equity and ensuring accessibility for all segments of the population, regardless of their socio-economic status or geographical location.	Zero dose program launched to identify individuals who missed vaccinations.	

Appendix C: Country Timeline

2020-2021	*Country Readiness and Delivery (CRD) Phase of COVAX*	*COVID-19 becomes a public health emergency of international concern; first COVID-19 vaccines become available.* *Supply is constrained while demand for vaccines is high. COVAX is limited.* *Prevailing conspiracy theories, speculations, and misinformation about COVID-19 vaccines.*
2022-mid 2023	*COVID-19 Vaccine Delivery Partnership (CoVDP) Phase of COVAX*	*Increased supply of vaccines; vaccination coverage increases, especially in developed countries.* *Gradual shifting narratives about the vaccine as it shows some efficacy.* *Vaccine demand begins to wane COVID-19 epidemic slowing down.*
Mid 2023 – End of 2023	*Alliance Phase of COVAX*	*Supply of vaccines highly available and very low demand. Life returning to pre-COVID normalcy.*

Time period / duration	Global Context	Country Context	COVAX Engagement	COVAX Results
January 2020	WHO declares COVID-19 a public health emergency of international concern (PHEIC).			
March 2020	World Health Organization (WHO) characterizes COVID-19 a pandemic.	Uzbekistan declares detection of first national COVID-19 case in March 2020. Government announced national lockdown, population quarantine, and social distancing measures.		
April 2020	Access to COVID-19 Tools (ACT) Accelerator launches, including COVAX.			
June 2020	Global Vaccine Summit 2020: Gavi COVAX AMC launches.			

Time period / duration	Global Context	Country Context	COVAX Engagement	COVAX Results
August 2020	COVAX deal for upfront capital to Serum Institute of India (SII) for 100m doses for Gavi COVAX AMC. 172 economies now engaged with COVAX Facility.			
October 2020	Gavi Board approves $150m to jump-start Gavi COVAX AMC countries' readiness to deliver COVID-19 vaccines.			
December 2020	First COVID-19 vaccine is approved by stringent regulatory authority (SRA): Pfizer/BioNTech by UK's Medicines and Healthcare products Regulatory Agency (MHRA). First COVID-19 vaccine receives WHO Emergency Use Listing (EUL): Pfizer/BioNTech.			
January 2021		Uzbekistan's government disbursed funding from the Anti-Crisis Fund of US$ 1 billion to fund support to the economy and help those most affected by the pandemic.		
February 2021	COVAX ships its first doses: 600k doses of AstraZeneca/Oxford vaccine for SII.			

Time period / duration	Global Context	Country Context	COVAX Engagement	COVAX Results
March 2021	First COVAX-supplied vaccine doses are administered in Africa. COVAX experiences delivery delays of vaccines from SII and AstraZeneca due to COVID-19 surge in India.		Uzbekistan receives first shipment of vaccines from the COVAX Facility.	
April 2021	COVAX ships its 38 millionth dose, reaching 100 economies.			
May 2021	COVAX deal with Johnson & Johnson for 200m doses.			
June 2021	Gavi COVAX AMC Summit raises $2.4bn. USA announces procurement of 500m Pfizer/BioNTech vaccine doses for COVAX. Gavi Board approves approximately $800m for COVAX delivery funding for AMC-eligible economies. COVAX Humanitarian Buffer opens application system to cover refugees, internally displaced people, and asylum seekers.			
July 2021	Ultra-cold chain (UCC) capacity efforts are scaling up, ultimately establishing facilities in 47 countries by year end. Cost sharing with World Bank launches, allowing Gavi COVAX AMC countries to purchase doses beyond fully donor-subsidised doses they are already receiving from COVAX.		Uzbekistan received CDS-Early Access funds	

Time period / duration	Global Context	Country Context	COVAX Engagement	COVAX Results
November 2021	COVAX Humanitarian Buffer delivers first doses to Iran. COAVAX releases joint statement with African Union and Africa CDC on dose donation standards.			
January 2022		COVID-19 variants lead to spike in cases in January 2022.		
February 2022	COVAX ships its one billionth dose to Gavi COVAX AMC countries, meeting its 2021 target of providing doses to protect 20% on average.			
March 2022		National mask mandate lifted in March 2022.		
June 2022	Gavi Board extends administration of COVAX Facility through 2023.			
July 2022			Uzbekistan receives funding through the CDS Needs Based Funding (CDS Phase 2).	
August 2022	Gavi COVAX AMC 92 lower-income countries achieve 50% primary series coverage milestone against global coverage of 62.5%			
December 2022	One year after support launched for 34 countries furthest behind in COVID-19 vaccination only 7 countries remain below 10% primary series coverage.		Uzbekistan receives funding through the CDS Phase 3.	

Time period / duration	Global Context	Country Context	COVAX Engagement	COVAX Results
May 2023	WHO lifts PHEIC status for COVID-19.			
July 2023				As of July 2023, the Vaccine Logistics Management Information System (VLMS), developed with funds from COVAX, was in use at 50 vaccination points in the Bukhara region that served 115,000 children.
September 2023		By September 2023, Uzbekistan administered more than 82.2 million doses, including vaccines allocated to Uzbekistan by COVAX.		