



Evaluation of COVAX Facility and AMC and COVAX Pillar Delivery Efforts

Indonesia Case Study Final Report

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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)



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LIST OF ACRONYMS

| | |
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| ACT | Access to COVID-19 Tools |
| AEFI | Adverse Event Following Immunization |
| AMC | Advance Market Commitment |
| APBN | Local Budget |
| ASIK | A mobile application designed to help community health officers record and store health data in central data base |
| BPOM | Indonesian Food and Drug Agency |
| CCE | Cold chain equipment |
| CEPI | Coalition of Epidemic Preparedness Innovations |
| CFR | Case Fatality Rate |
| CIGAT/IGA | CCE Inventory Gap Analysis Tool |
| CoVDP | COVAX Delivery Pillar |
| CRD | Country Readiness and Delivery |
| EID | Emergent Infectious Disease |
| Gavi | The Vaccine Alliance, Gavi |
| GDP | Gross domestic product |
| GHS | Global Health Security |
| GOI | Government of Indonesia |
| JKN | Jaminan Kesehatan Nasional |
| KPC-PEN | Committee for Handling COVID-19 and National Economic Recovery |
| MOH | Ministry of Health |
| MUI | Indonesian Council of Ulama |
| NDVP | National Deployment and Vaccination Plan |
| PHEIC | Public Health Emergency of International Concern |
| PHO | Provincial Health Office |
| PPE | Personal protective equipment |
| PPKM | Pemberlakuan Pembatasan Kegiatan Masyarakat |
| RCCE | Risk Communication and Community Engagement |
| SMILE | MOH develop digital logistic system |
| RI | Routine immunization |

| | |
|--------|--|
| SII | Serum Institute of India |
| TOC | Theory of change |
| UNDP | United Nations Development Program |
| UNICEF | United Nations International Children's Emergency Fund |
| VIRAT | Vaccine Introduction Readiness Assessment Tool |
| WHO | World Health Organization |

EXECUTIVE SUMMARY

Background on Indonesia and COVAX

The first confirmed COVID-19 cases were detected in Indonesia on March 2, 2020. In July 2020, Indonesia established the Committee for Handling COVID-19 and National Economic Recovery (KPC-PEN), recognizing the inextricable link between pandemic control and economic recovery efforts.

Ten months after the first case was reported, Indonesia launched an ambitious COVID-19 vaccination program on January 13, 2021, aiming to reduce COVID-19 transmission and build herd immunity within the population. The vaccination target was 234,666,020 individuals, representing 86.85% of the total population of 270,203,917. Indonesia aimed to ensure that at least 70% of the total population received a full primary vaccination dose by the end of 2022. The COVID-19 vaccination program was highly successful, although the completion rate for subsequent doses declined. Since the beginning of 2023, the average number of hospitalizations and deaths has continued to decrease. Nationally, community immunity levels have risen, and serosurvey results indicate that 99% of Indonesians have COVID-19 antibodies. As of September 25, 2023, Indonesia reported a cumulative total of 6,813,514 confirmed COVID-19 cases and 161,920 deaths, resulting in a Case Fatality Rate (CFR) of 2.38%.

On June 21, 2023, the president lifted the pandemic status, and Indonesia transitioned from a pandemic to an endemic phase for COVID-19. The government replaced imported vaccines with domestic options (IndoVac and InaVac). COVID-19 vaccination was Indonesia's first mass adult vaccination campaign, which has now been included in the routine immunization (RI) program and could potentially expand to include influenza and pneumococcus vaccines.

Additional impacts of the COVID-19 pandemic include Indonesia's increased capacity to domestically produce personal protective equipment (PPE); the successful implementation of the Pentahelix approach, which links government, community, academics, the private sector, and health service providers in implementing immunization; and the adoption of cost-effective hybrid training to increase knowledge and skills, which proved to be suitable for Indonesia, an archipelagic country. However, further research is needed on COVID-19 complications, therapies, and potential complementary and alternative medicine treatments.

COVAX support received in Indonesia

Major components of COVAX support were:

- COVAX donated around 110 million doses to Indonesia, representing approximately 22% of the country's total vaccine requirements.
- COVAX significantly strengthened the health system through COVID-19 Vaccine Delivery Support (CDS) implemented by partners (the United Nations International Children's Emergency Fund (UNICEF), the world health organization (WHO), UNDP, and CHAI).
- The CDS funds were used to plan the vaccination program, including the development of a National Deployment and Vaccination Plan (NDVP), vaccine acceptance surveys, and the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT); enhance supply

chain capacity; implement the MOH develop digital logistic system (SMILE), which supports the transition from manual reporting to an electronic and real-time system; and conduct monitoring and evaluation through intra-action reviews and after-action reviews.

Outcomes and challenges of COVAX delivery in Indonesia

At the beginning of the COVAX delivery support in Indonesia, COVAX faced logistical and regulatory challenges, including uncertainty and administrative delays in vaccine supplies as well as vaccine indemnity and liability concerns. This was compounded by the donated vaccines' short expiration dates and pre-existing limitations of cold chain monitoring across Indonesia. Over the course of the pandemic, COVAX's delivery efforts in Indonesia have aimed to reduce these barriers through its contributions to the development of national health information management systems, improvements in supply chain and cold chain infrastructure, increased health workforce capacity, and stronger stakeholder collaboration to address national health emergencies.

Broader lessons or insights

At the national level, Indonesia should strengthen the health system, especially for SMILE Enhancement by incorporating elements from WHO's cold chain equipment Inventory Gap Analysis Tool such as waste management. On the global and regional level, the development and adoption of a pandemic simulation platform and a new global organization like the "Pandemic Fund" pandemic preparedness and response implementation, that is channeled directly to countries and partners during emergencies and utilizes existing mechanisms would be beneficial.

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 B** outlines the methods for this case study.

Indonesia is the world's largest archipelagic country, with over 17,000 islands.³ Indonesia is spread over five main islands and four archipelagos. Indonesia is divided into 38 provinces with 514 districts and cities. Indonesia is a presidential republic. After rebounding from the Asian financial crisis in the late 1990s, Indonesia regained its upper-middle-income status and is now the 16th largest economy in the world by nominal gross domestic product (GDP) valued at US\$1,371.17 billion in 2023. Health expenditure as a share of gross domestic product was 3.71%, equivalent to US\$160.6 per capita in 2021.^{4,5}

Due to Indonesia's geographical location between Asia and Australia and its more than 100 points of entry,⁶ there is a high influx of people and animals into the country. This makes Indonesia one of the most disaster-prone countries, susceptible to natural, non-natural, and social disasters.

Major epidemics since the year 2000 included dengue hemorrhagic fever in 2010 and 2016, diphtheria in 2017, SARS in 2005, H1N1 in 2010, Zika in 2015, and COVID-19 in 2020. Due to the COVID-19 pandemic, routine immunization (RI) coverage dropped by 10%,⁷ leading to outbreaks of polio, diphtheria, measles, and rubella in areas with persistently low vaccination rates.

Country response to COVID-19

After the emergence of the SARS-CoV-2 virus in Wuhan, China in January 2020, the world health organization (WHO) designated COVID-19 as a Public Health Emergency of International Concern (PHEIC) on January 30, 2020.⁸ Indonesia responded by temporarily suspending flights

COVID-19 and COVAX characteristics

COVID-19

- Infection rate: 2,497 per 100,000¹
- Mortality Rate: Case fatality rate 2.4%¹
- Government Stringency Index average [pre-2021]: 68.1
- Government Stringency Index average [post-2021]: 66.7²

COVAX

- CoVDP focus: Not eligible

^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.

to and from China on February 5, 2020, and imposed restrictions on the arrival of travelers. Despite these restrictions, the first COVID-19 case was detected in Indonesia on March 2, 2020.⁹

In response to the escalating number of COVID-19 cases in Indonesia, on March 13, 2020 a COVID-19 Task Force was established by Presidential Decree No. 7 of 2020, to boost national resilience in the health sector under the auspices of the National Disaster Management Agency (*Badan Nasional Penanggulangan Bencana/BNPB*). On March 31, 2020 national programs on health protocols were imposed.^b These included 3 M campaign (wearing masks, maintaining physical distance, and washing hands), 3 T campaign (testing, tracing, and treatment), establishment of quarantine and isolation facilities for individuals who tested positive, and large-scale physical distancing and social restrictions. Other restrictions included micro-scale activity restriction (*Pemberlakuan Pembatasan Kegiatan Masyarakat [PPKM]*), no lockdown, micro lock down, and hometown travel banned).

Despite ongoing efforts, COVID-19 continued to spread, resulting in an increasing number of cases, property loss, and a wider geographic impact. As a result, the president declared COVID-19 a national disaster on April 13, 2020. By April 25, 2020, there were 8,607 confirmed COVID-19 cases in all 34 provinces in Indonesia, with 720 deaths.¹⁰

Initially, the country focused solely on health management in response to COVID-19 pandemic. However, it soon became evident that addressing the pandemic was inextricably linked to national economic recovery efforts and on July 21, 2020, the Committee for Handling COVID-19 and National Economic Recovery (KPC-PEN) was formed.^c This committee replaced the previous COVID-19 Task Force and was directly responsible to the president.

Indonesia used a centralized Pentahelix approach to work across the country's decentralized administrative system. The Pentahelix approach to disaster risk reduction fosters collaboration among five key stakeholders: government, community, private sector, academia, and media. This multi-sector partnership aims to improve disaster management effectiveness and efficiency by developing robust and accountable policies, structures, mechanisms, programs, and activities. By leveraging collective knowledge, expertise, and experience, the Pentahelix approach builds trust and facilitates mutually beneficial solutions for disaster risk reduction.

The strategic objective of this approach was to:

- Recommend strategic policies to the president for accelerating the handling of COVID-19, as well as economic recovery and national economic transformation.
- Implement and oversee strategic policies related to COVID-19, economic recovery, and national economic transformation in a timely and effective manner.
- Monitor and evaluate the implementation of these policies.

At the global level, development of the COVID-19 vaccine began in February 2020. To secure vaccines, Indonesia explored various mechanisms, including bilateral and multilateral agreements and participation in the COVAX Facility. The primary objective of the COVID-19

^b Government Regulation No. 21/2020 establishing Large Scale Social Restriction in the effort to handle COVID-19

^c Presidential Regulation no 82/ 2020 on the Committee for Handling COVID-19 and National Economic Recovery (KPCPEN)

vaccination program in Indonesia was to reduce the transmission of the COVID-19 virus and build herd immunity within the population by:

1. Providing COVID-19 vaccines free of charge to all citizens.
2. Prioritization of vaccination programs in the 2021 budget by all officials, including the cabinet, ministries, institutions, and subnational governments.
3. Encouraging the public to continue to adhere to health protocols.

Further details on the overarching outcomes associated with the COVID-19 pandemic in Indonesia can be found in **Appendix B**.

Indonesia's health sector at a glance

The Indonesian health system has a mixture of public and private providers and financing. In 2001, Indonesia implemented a health system reform that decentralized decision-making to the district and city levels, shifting from a top-down approach previously controlled by the Ministry of Health (MOH) through a tiered structure of Provincial and District/City Health Offices.¹¹ The WHO Health Systems Framework defines six building blocks that are described in the Indonesia context in the following section: 1) service delivery, 2) health workforce, 3) information, 4) medical products, vaccines, and technologies, 5) financing, and 6) leadership.

Service delivery: Indonesia is unique in that its COVID-19 vaccination program was integrated into the existing health system from the very beginning. All implementation was led by the Public Health Centers (*Puskesmas*). Primary health services represent the initial point of contact for individuals seeking healthcare. Delivered in close proximity to communities, these services are provided by a variety of healthcare professionals, including but not limited to doctors, dentists, midwives, nurses, physiotherapists, and traditional healers. In the public sector, providers of primary health services include *Puskesmas* and their linked networks of *Puskesmas* Auxiliary (*Pustu*), mobile *Puskesmas*, village health posts and village midwives. Inpatient services are provided by public and private hospitals, *Puskesmas* with inpatient wards, and by some private specialist clinics. As of 2020, there are 2,985 hospitals, 11,347 clinics, and 10,205 *Puskesmas* in Indonesia.¹²

Health workforce: The basic health workforce available in Indonesia includes general practitioners and specialized doctors, nurses, midwives, dentists and specialized dentists, optometrists, pharmacists, psychologists, radiographers, sanitarians, nutritionists, and physical therapists. Due to the geographical condition and disparity of welfare, there was unequal distribution of human resources, with the health workforce mostly located on Java and Sumatra islands. According to the "National Immunization Program Human Resource Competency Data Collection" conducted by the MOH in September–November 2020, less than half of health care workers had attended accredited or non-accredited training.

Health Information System: The national health information system aims to integrate provincial and district/municipality health information systems. The MOH's Centre for Data and Information (Pusdatin) oversees this system. *Puskesmas*, public, and private hospitals submit monthly reports to District Health Offices, which in turn send compiled reports to Provincial Health Offices (PHOs). PHOs then forward these reports to Pusdatin. However, post-decentralization in 2001, the health information system was disrupted, leading to multiple

independent datasets at the central level and inconsistencies in data across different MOH directorates.

Medicine, Vaccines, and Health Equipment: In September and October 2020, the MOH and the United Nations International Children’s Emergency Fund (UNICEF) conducted a rapid assessment using the ONA platform to collect cold chain equipment (CCE) data from provincial and district vaccine storages. The assessment found the following gaps in the cold chain storage capacity: 110 walk-in cold rooms (WICRs) of various sizes, 1,621 ice lined refrigerators of the VLS 504A AC model for provincial and district storages, and 3,814 ILRs of the HBC260 model for *Puskesmas* were needed for COVID-19 vaccination.

Financing: Since 2004, the government budget for health has increased significantly, with goals at the national level (*APBN*) to be at least 5%, while for local budget (*APBD*) should be at least 10%. The national health insurance program (*Jaminan Kesehatan Nasional* [JKN]) commenced in January 2014, with contributions from members and the government pooled under a single health insurance. The JKN aimed to provide health care coverage for all Indonesians; to assist the poor and near-poor, insurance fees were waived either in full or partially. However, increased spending on health through the JKN has primarily focused on curative care services and the health infrastructure that supports medical care.

Leadership: The health system reform in Indonesia has shifted the responsibility for health services to local governments, empowering them to manage and provide public health services and grant more autonomy to public service organizations like hospitals. While the central MOH oversees certain tertiary and specialist hospitals, sets standards, and ensures resource availability, Indonesia’s health spending as a percentage of GDP (3.1% in 2012) is still lower than the average for low-to-middle-income countries, despite a significant increase in national health spending. At this rate, the Indonesian health system was close to collapse during pandemic despite a significant increase in national health spending.¹¹ In 2019, the Human Development Index of Indonesia was 71.92.¹³

Key Country Characteristics

Population

- Total population: 270.2 million in 2020³
- Urban population: 56.4%
- Population > 65 years: 6.7%
- Population < 14 years: 24%
- Health care workers: 1,463,452 (2020)¹²

Health care system strength

- Health expenditure: 3.71% of GDP
- Health expenditure per capita: US\$337
- Routine vaccine coverage 2020: 83.3%¹²

Global health security

- Global Health Security (GHS) Index score: 50
- Major epidemics since 2000: dengue hemorrhagic fever in 2010 and 2016, diphtheria in 2017, SARS in 2005, H1N1 in 2010, Zika in 2015, and COVID-19 in 2020

Socioeconomic indicators

- World Bank classification: upper-middle income country

COVID-19 and COVAX characteristics

As of July 2020, Indonesia had the highest number of COVID-19 cases in Southeast Asia, with 76,981 confirmed cases and 3,656 deaths (**Figure 3**). Notably, 8.1% of cases and 1.6% of deaths were among children under 18 years old. With 1,074,467 tests conducted, the country's testing rate per million population ranked low regionally: Indonesia at 3,927; Thailand at 8,648; the Philippines at 8,949; and Malaysia at 26,265.¹⁴

As of September 8, 2020, Indonesia had the second-highest number of COVID-19 cases in Southeast Asia, with 196,989 confirmed cases and 8,130 confirmed deaths. Children under 18 years old accounted for 9.5% of cases and 1.9% of deaths.¹⁴

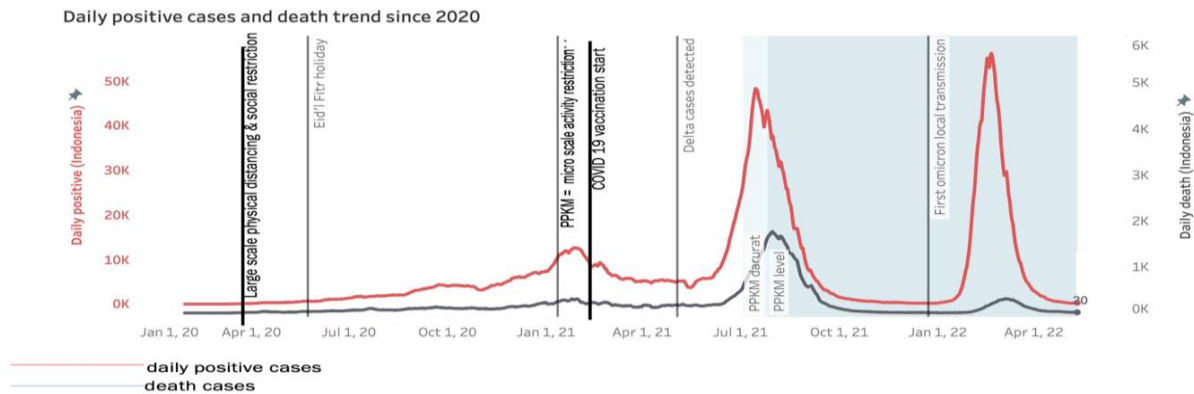
On September 16, 2020, the MOH signed an agreement with UNICEF under the COVAX Facility. The COVID-19 vaccination target was 234,666,020 people, including: 181,560,230 people aged 18 or older (health workers, essential public workers, the elderly population, and the general population), 26,705,490 adolescents aged 12-17, and 26,400,300 children aged 6-11. The targeted group represented 86.85% of the population. In line with the global target, Indonesia aimed to ensure that at least 70% of the total population receives a full primary vaccination dose by the end of 2022. The vaccination was conducted in stages:

- Stage 1 was for Health workers
- Stage 2 was for older groups, vulnerable communities including pregnant woman, Essential public workers, teachers, poor and marginalized daily wages worker, Indonesian National Armed Forces and Indonesian National Police
- Stage 3 was for Geospatial, social, and economic, vulnerable communities including breastfeeding women, refugees, Community and other economic actors. Adolescents aged 12 – 17 years old, Children aged 6-11 years old
- Stage 4 was 3rd dose/booster doses for population aged 18 years old and above and 4th dose/second booster doses for health workers

There were ten types of vaccines used in Indonesia,¹⁵ the top five type of COVID-19 vaccine used were Sinovac (266.3 million doses), Pfizer (83 million doses), Astra Zeneca (73.9 million doses), Moderna (16.8 million doses), Sinopharm (4.9 million doses) and followed by Covovax, J&J, Indovac, Zivivax and Inavac.

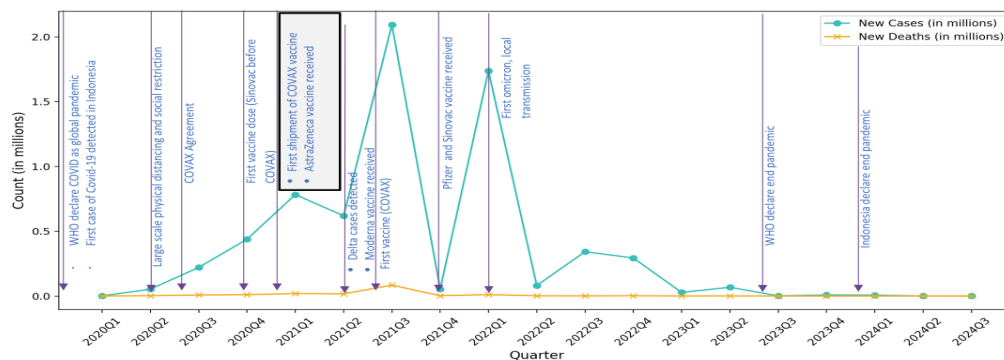
The vaccination campaign started on January 13, 2021, when the first vaccinations were administered to health workers. By March 8, 2021, following the first shipment of COVAX vaccines, cases began to decline, with 6,894 new cases reported. Despite this, the pandemic reached its most critical stage in mid-2021. A major surge occurred in July and August 2021, when the country faced its highest count of 273,891 new cases and 12,444 new deaths as the Delta variant swept through the population. This period coincided with the first vaccination phase for adolescents and booster shots for health workers. As the year ended, Indonesia saw a gradual recovery and into January 2022, the number of new cases had fallen significantly.

Figure 1. COVID-19 daily cases and death, 2020-2022



Red line = daily positive cases, black line = deaths

Figure 2. COVID-19 new cases and deaths and COVAX intervention, 2020-2023



By May and June 2023, the pandemic was largely under control, marking the formal end of the PHEIC in Indonesia as declared by the government and WHO. As of September 25, 2023, Indonesia reported a cumulative number of 6,813,514 confirmed cases of COVID-19 and 161,920 deaths reported (CFR: 2.38%). As of September 19, 2023, over 453 million doses of the vaccine have been administered, and more than 64% of the total Indonesian population has been fully vaccinated.

OVERVIEW OF COVAX ENGAGEMENT IN INDONESIA

Indonesia's engagement in global vaccine cooperation

Indonesian Minister of Foreign Affairs, Retno LP Marsudi, was elected as one of the co-chairs of the multilateral vaccine cooperation program COVAX Advance Market Commitment (AMC) Engagement Group. Indonesia has consistently advocated for the principle of equal vaccine access for all countries.

"It's high time for our collaboration to enter a new chapter. We need to turn 'vaccines' into 'vaccinations.' We need to improve our readiness in facing new and more dangerous variants." – Retno Marsudi, Minister of Foreign Affairs

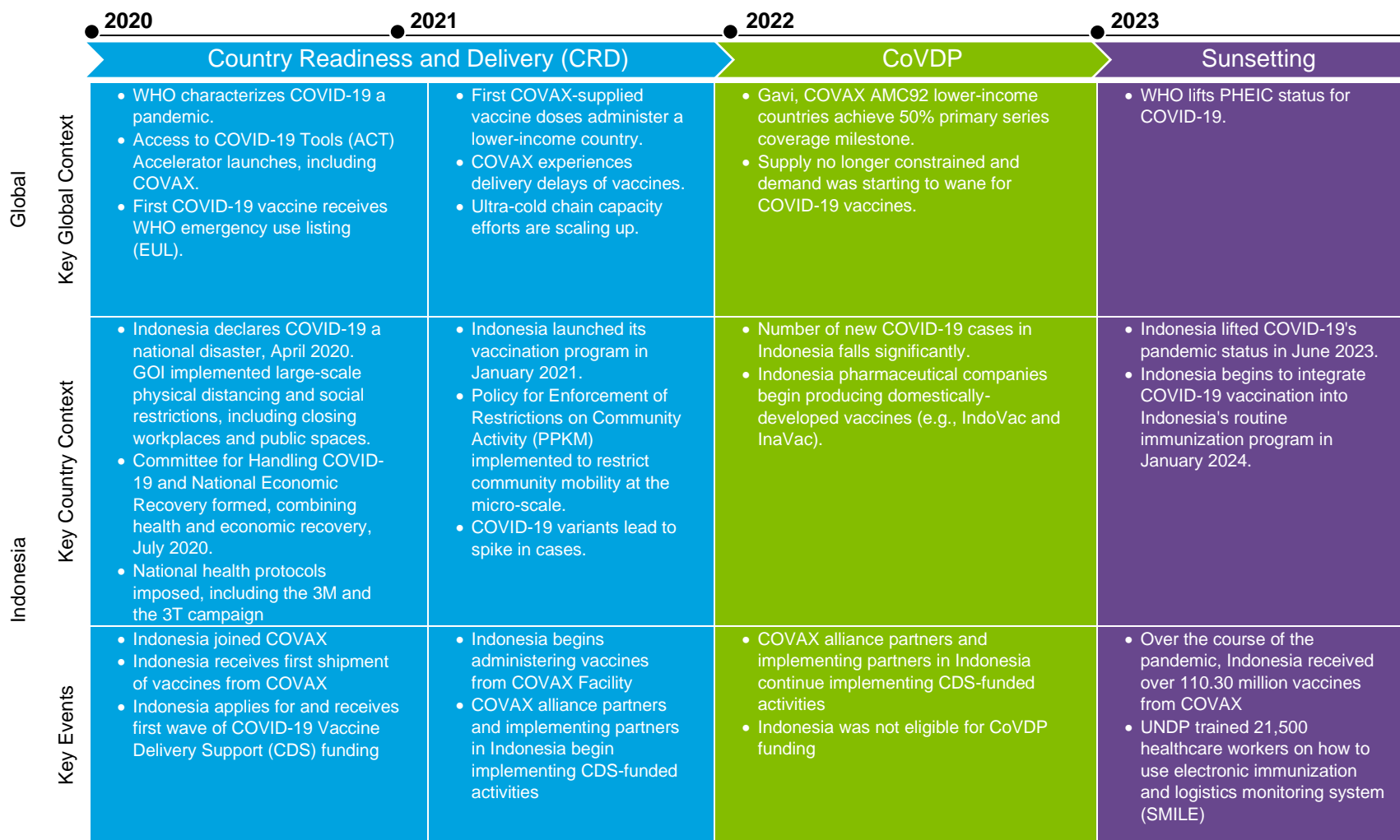
Since COVID-19 was declared a pandemic, Indonesia had actively engaged in international and multilateral collaboration, including the COVAX Access to COVID-19 Tools Accelerator, to ensure easy access, safety, and affordable vaccine prices. By joining the COVAX Facility, Indonesia was guaranteed access to affordable and high-quality COVID-19 vaccines for 20% of its at-risk population by the end of 2021.¹⁶

Vaccine shipment, funding support, and implementation

In total, COVAX shipped 110 million doses of vaccine to Indonesia, representing approximately 22% of the country's total requirements. COVAX also supported vaccine management by providing the COVID-19 Vaccine Delivery Support (CDS) funding package through partner organizations. The first wave of CDS funds was channeled through UNICEF, WHO (non-monetary), United Nations Development Programme (UNDP), and CHAI, during 2020–2021.

The Indonesian national government did not apply for subsequent COVAX funding as the application was resource intensive and funding went to UNICEF and other implementing partners rather than the MOH to support established national systems. The third wave of CDS, offered in July 2022, aimed to integrate COVID-19 into RI. Indonesia did not apply for this funding as it lacked a plan for such integration at the time. It was not until January 2024 that Indonesia implemented the integration of COVID-19 vaccination into RI.

Figure 3. Country timeline⁴



⁴ Note that Indonesia 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 INDONESIA

Country-level support provided through COVAX

This section describes the structures that underpinned COVAX's support to Indonesia, 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 (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).

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

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: UNICEF, WHO, UNDP, and CHAI were key partners in the implementation and monitoring of COVID-19 immunization coverage.

UNICEF: UNICEF facilitated the procurement and distribution of vaccines through UNICEF Supply Division and strengthened CCE capacity by providing 17 ultra-cold chain units for Pfizer vaccine storage via COVAX Facility, including training for the health workers in operating these units. UNICEF supported country's CCE capacity gap analysis using the sizing tools which was later used as base for the CCEs procurement to improve the vaccine storage capacity in Indonesia. Moreover, UNICEF provided technical assistance through the embedded staff, 36 consultants and UN volunteers that were placed across 32 out of the 34 provinces at national and provincial levels, helping the government officials develop and implement COVID-19 response plans, including protocols and guidelines.

The main supports included strategy development and advocacy; supply-side readiness preparation; public health campaigns with risk communication and community engagement (RCCE) approached to build trust in COVID-19 vaccines and combat misinformation; inter-sectoral coordination on COVID-19 responses among government institutions and partners as well as strengthened routine immunization services in the context of wider public health system. This included conducting an online COVID-19 Vaccine Acceptance Survey to gauge public perceptions of vaccines and supporting the digitization of the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT), a tool by WHO, that helps countries assess their readiness for COVID-19 vaccine rollout, areas needing support and allows authorities to prioritize actions. Moreover, UNICEF supported the MOH and its partners in vaccine importation from various donor countries to Indonesia, while at sub-national level. UNICEF also supported data management, surveillance, epidemiological investigations, the establishment of isolation centers, and improved the capacity of health workers in detecting, referring, managing COVID-19 cases, as well as in infection prevention and control.

WHO: Without COVAX funding, the WHO supported specific COVID-19 vaccination activities in 20 provinces. These activities included technical assistance for the vaccine rollout, support for

the Behavioral and Social Drivers COVID-19 Vaccination Survey and the Papua COVID-19 Vaccination Monitoring and Evaluation Meeting, NDVP updates, and COVID-19 Post-Introduction Evaluation. WHO also supplied 6,000 sets of vaccine carriers, electronic freeze indicators, and 30-day temperature monitoring devices, and supported the COVID-19 Vaccination Coverage Survey in Bali.

Alongside these activities, WHO also provides continuous assistance to the MOH in improving access to quality health services. This includes policy and guidance development and dissemination, healthcare worker capacity building, program monitoring and evaluation, and coordination with national stakeholders, including the National Immunization Technical Advisory Group, expert committees, the national AEFI committee, and professional organizations. WHO also promotes national strategies and global goals for vaccine preventable disease control, elimination, and eradication. A dedicated WHO team of international, national, and subnational technical officers and data assistants is key in developing data-driven planning and monitoring.

UNDP: UNDP has been supporting the MOH through the development of the SMILE logistics system, including strengthening human resource capacities for the SMILE System to ensure the effective and efficient management of stock, notification of near-expiry products, real-time logistics data on consumption and timely supply of vaccines during the COVID-19 pandemic up to health facility levels. Adapted from India, SMILE was customized to meet Indonesian needs. As an open-source system, it is interoperable with the Vaccine Management and Distribution System from Biofarma and a mobile application designed to help community health officers record and store health data in central data base (ASIK) from the MOH. SMILE will create a real-time indicator of available and occupied cold chain capacity at all entities (*Puskesmas*, Health Offices, and the MOH), based on the net storage capacity and vaccine volumes kept in each cold chain across Indonesia. This information will be generated automatically by the system and presented as a dashboard that is accessible in real-time for health facilities, health offices, and the MOH from more than 10,000 health facilities. SMILE could be used by all distributors lacking supply chain systems, and also for other health equipment like masks, gloves, and medicines. UNDP was also tasked with ensuring improved vaccine quality by installing remote data loggers in 4,000 vaccine cold chain storage units.

CHAI: CHAI conducted rapid assessments of service delivery models for COVID-19 vaccination, reviewed vaccination coverage and routine immunization, recommended cold chain maintenance plans, and identified drivers and barriers to vaccine acceptance in selected priority population groups. The assessment results can be used to advocate for human resource roles and responsibilities divisions, as well as for funding advocacy. The coordination meeting that has been started can be continued as a regular data review meeting to review coverage and other immunization program needs. CCE maintenance recommendations can be used for all CCE procured through COVID-19 funding and government funding.

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: The MOH COVID-19 dashboard provides vaccination target and realization data for various groups, but this data is not disaggregated by gender. However, a COVID-19 pre-vaccination acceptance survey conducted by the MOH, found nearly equal acceptance rates between male and female respondents, with slightly higher hesitancy among men (10%) compared to women (less than 5%).¹⁷

Finding 3: Beyond gender equity, other primary challenges included vaccine access in remote areas due to limited infrastructure, cold chain capacity, and human resources. Marginalized groups and refugees also encountered difficulties due to a lack of identification documents, necessitating special procedures to ensure accountable vaccine administration. Furthermore, COVAX's suboptimal vaccine delivery, with near-expiry doses requiring distribution only to areas near the Jakarta point of entry, exacerbated access inequities.

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

Finding 4: Indonesia used more than ten types of COVID-19 vaccines.¹⁵ COVAX supported the MOH through key implementing partners (UNICEF, WHO, UNDP) with extensive training using online or hybrid methods. As of July 2022, more than 177,935 additional health workers had been trained for the implementation of COVID-19 vaccination.¹⁸ The training covered micro-planning, cold chain management, safe injection techniques, AEFI management and surveillance, recording and reporting, and monitoring and evaluation. UNDP conducted training on the use of SMILE for approximately 21,500 healthcare workers.

In terms of financial support, Indonesia benefited from 110.3 million vaccines from COVAX free of charge, which played a significant role in helping Indonesia recover earlier from the pandemic and the first wave of CDS funding in 2020-2021 of around US\$3.4 million for COVID-19 vaccination support that was used until 2023.¹⁹

Implementation and adaptation of COVAX support

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

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

Finding 5: Key challenges in COVAX support

- a. **Vaccine arrival information:** Delayed or limited notice of plane arrivals from UNICEF often caused problem for Biofarma to pick up vaccines from the point of entry.
- b. **Registration and authorization delays:** Some vaccines arrived without complete supporting documents, which was required for emergency use authorization review by Indonesian authorities.
- c. **Distribution costs:** COVAX only covered the expenses of transporting vaccines up to the point of entry. Indonesia had to bear the transportation costs to regions.
- d. **Shorter expiration dates:** COVAX vaccines often had short expiration dates, this caused problems in selecting areas that could quickly absorb the vaccine.
- e. **Uncertainty in vaccine allocation to Indonesia:** In the COVAX coordination meeting, the number of vaccines that would be offered to Indonesia was not provided, which was important for planning.
- f. **Indemnity and liability concerns:** The government was responsible for any adverse events related to COVID-19 vaccines received from COVAX, absolving COVAX and manufacturers of liability, which was in contrast for vaccines purchased directly from businesses or manufacturers.

- g. **Unbundled syringe supply:** Syringes were originally intended to be bundled with the vaccines in a single package. However, for the COVAX vaccine, this was not the case. As a result, MOH had to provide additional syringes. Fortunately, MOH had sufficient stock, and vaccinations were not delayed. Nevertheless, the late arrival of the expected syringes has led to an accumulation of unused syringes, creating storage challenges for MOH.
- h. **Limitations of cold chain monitoring:** COVAX supported the provision and installation of remote data loggers in cold chain storage through UNDP. Unfortunately, the locally produced data loggers were not WHO prequalified. Not all refrigerators were equipped with data loggers, so Indonesia could not claim having a comprehensive temperature monitoring system.

Finding 6: COVID-19 impacted Indonesia's health system in the following aspects:

- a. **Human resources:** Many health care workers and government officials succumbed to COVID-19, overburdening the remaining health care personnel who were forced to take on multiple roles at health facilities. To address the severe shortage of health care personnel in responding to the COVID-19 pandemic and achieving vaccination targets, Indonesia recruited contract workers, including medical and non-medical administrative staff. Specifically for vaccinator roles, medical professionals such as doctors, midwives, nurses, and final-year medical students, as well as non-medical personnel like D3-level health workers, were recruited. As these contract workers were not civil servants, some of the training provided by the MOH and its partners may not have been retained.
- b. **Online training:** Online training reached a wider audience but was less effective due to several factors: 1) infrastructure challenges: internet infrastructure in Indonesia is still developing, with many regions lacking adequate network coverage. 2) high internet costs: internet data plans in Indonesia are relatively expensive compared to other Southeast Asian countries, limiting the duration of online training sessions, and potentially compromising their effectiveness. 3) participant engagement: online training participants often remain passive and may not consistently connect or listen due to distractions in their environment. This lack of engagement makes it difficult for instructors to gauge participant understanding of the material.
- c. **Digital system:** Digital culture and compliance with data entry remain underdeveloped. The digital gender gap in Indonesia, primarily due to inadequate access to digital devices, internet infrastructure, and digital skills,²⁰ also happens in the health sector, since women constitute approximately 60% of all health care workers. This gap is further exacerbated by the reliance on manual reporting and the challenges faced by female health workers in balancing work-life responsibilities and acquiring digital literacy. As a result, real-time data for informed decision-making is limited. Over half (53%) of health care facilities rely on hybrid systems (manual and electronic) for vaccination and reporting^e, a time-consuming process that increases the risk of inaccuracies in the KPC-PEN and SMILE systems.
- d. **Cold chain capacity:** There were significant gaps in CCE and infrastructure, despite the MOH allocating funds for vaccine refrigerators and receiving grants from COVAX (for ultra-low temperature freezers), Unilever, the Vaccine Alliance, Gavi (Gavi), Japan, and

^e The COVID-19 Post Introduction Evaluation (cPIE)

Japan International Cooperation Agency. Vaccine distribution in Indonesia faces geographical challenges, with uneven distribution of storage capacity and overcrowding in some warehouses. Additionally, there were issues with temperature monitoring during vaccine transport, inadequate cold chain management at the health facility level, and improper storage of vaccines in household refrigerators. Some ultra-low temperature freezers were malfunctioning or not monitored, and CCE often failed due to neglect. Furthermore, a lack of human resources and capacity hindered effective cold chain management in certain regions. Reporting on cold chain conditions in various regions was suboptimal, necessitating a re-evaluation of procurement plans to safeguard vaccine quality. Moreover, the management of vaccine storage and preparation by health workers needs improvement, as evidenced by the close proximity of training and implementation periods, which limited the effectiveness of training programs.⁶

- e. **Hoaxes and misinformation:** Rumors and conspiracy theories were based on distorted and misleading information.²¹ A significant portion of energy was expended on combating rumors and misinformation on social media.
- f. **Halal and Haram vaccine:** Indonesia has the world's largest Muslim population, making halal certification a common practice. In Islam, the concepts of halal (permissible) and haram (forbidden) guide a devout Muslim's decisions. The religion emphasizes careful choices to ensure spiritual well-being in the afterlife. The Indonesian Council of Ulama (MUI) is the authority responsible for issuing halal certifications. One of MUI's decisions was to declare the AstraZeneca vaccine as haram, though it could be used in emergencies.²² This halal-haram issue was exploited by the anti-vaccine movement on social media.

Finding 7: Key successes

Critical funding and political commitment were key to Indonesia's success. Indonesia employed a Pentahelix approach to combat COVID-19. Below are key lessons learned:

- a. Centralized management in a decentralized nation: The KPC-PEN, led by the Coordinating Minister of Maritime Affairs, closely monitored implementation at subnational levels.
- b. Health system: Vaccinations were provided in all health facilities, both public and private.
- c. Strategic maneuver to fill the HR gap: In addition to enhancing vaccination training for existing vaccinators to carry out vaccination services, Indonesia addressed its shortage of vaccinators by recruiting support from the army, police, and the private sector.
- d. Robust information system: To track vaccination efforts, Indonesia developed several applications, including Peduli Lindungi, covid-19.go.id, ASIK and a platform of integration and standardization of health data services in Indonesia (SATUSEHAT).
- e. Collaborative supply management: All stakeholders were invited to provide essential supplies, including ventilators, oxygen, generators, polymerase chain reaction tests, reagents, rapid test kits, PPE, masks, and non-health logistics.
- f. Comprehensive vaccination strategy: Various strategies were used to achieve vaccination coverage:
 - Reaching the elderly: "Buy one, get one" promotions for those accompanying the elderly, provided two people with vaccine, even if one was not in the priority age group.

- Mandatory vaccination: Strict enforcement through the Peduli Lindungi app, which served as a requirement for travel and entering malls.
- Incentive programs: Discounts from food companies were provided for vaccinated individuals.
- Flexibility: Vaccinations were offered outside of working hours in offices, malls, and on beaches for fishermen.
- Military and police support: For remote areas, slums, and areas with low coverage, in addition to vaccinations, these groups provided gifts (noodles and rice) to encourage participation.

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?

Indonesia only received the first wave of CDS funding and did not participate in the second and third wave of CDS fundings.

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

Finding 8: While COVAX CDS funding did not support specific coordination and collaboration activities, key stakeholders found that Indonesia’s Pentahelix approach, which COVAX alliance and implementing partners participated in, was effective at coordinating the intersectoral pandemic response. While key informants from multilateral and bilateral organizations shared that it was challenging to work with ministries and decision makers outside the MOH at first, there was consensus among the key informants that the intersectoral approach facilitated a more collaborative and efficient pandemic response. Additionally, COVAX alliance partners indicated that rather than trying to address all aspects of the pandemic response as individual organizations, it was helpful to focus their resources on specific tasks the government requested support for.

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 9: The SMILE system, which was initially planned to be a RI logistical system, was used for COVID-19. Indonesia adopted SMILE and issued regulations for the system to be used as a logistical system at the national and subnational level. It is also used by the KPC-PEN to monitor vaccination throughout Indonesia. However, SMILE will need government support, commitment, regulation, and adherence to input data.

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 10: COVAX provided funding for SMILE through UNDP, which supported the transition from manual reporting to an electronic and real-time system. This enabled Indonesia to track vaccine quantities and distribution for evidence-based decision-making. However, the creation of a system requires support from various parties, including regulatory support and recommendations from trusted experts. This ensures the system's trustworthiness, disciplined use, and regular data entry. Without such support, even the best system will not be effective.

Hence, SMILE was later adopted by the GOI to record the supply chain of COVID-19 vaccines and was strengthened with regulations and close monitoring for data submission.

Finding 11: COVAX also supported capacity building for health care workers through all implementing partners for planning, COVID-19 vaccination, cold chain management, safe injection techniques, AEFI management and surveillance, recording and reporting, and monitoring and evaluation. The COVID-19 vaccination campaign marked the first adult immunization program in Indonesia. This is a tangible contribution from COVAX to Indonesia's immunization program, which may lead to adult immunizations for influenza and pneumonia.

Sub-EQ 6.2: Were equitable results achieved?

Finding 12: Gender equality: SMILE and other trainings online conducted by UNICEF, WHO, and UNDP under COVAX CDS funding improved capacity building for the health workforce. As 60% of the health workforce are women, this further supports gender equality and opportunities in Indonesia to improve their digital literacy as it is used for mandatory training and reporting. Due to the various types of vaccines, health care workers received extensive training on different vaccine platforms, enhancing their knowledge and skills in immunization.

Finding 13: Indonesia targeted the most at-risk populations first, such as frontline health workers, elderly people, people working in public services, and other vulnerable groups, before being scaled up to the general population.

Table 1. COVID-19 vaccination coverage in priority groups in Indonesia by July 31, 2022²³

| Population group | Estimated number | Percentage of total population | Vaccine coverage (First Dose) | Vaccine coverage (Second Dose) |
|---------------------------|------------------|--------------------------------|-------------------------------|--------------------------------|
| Health workers | 1.47 million | 0.54% | 138.45% | 135.02% |
| Older people | 21.55 million | 7.9% | 84.11% | 68.34% |
| Essential public workers | 17.33 million | 6.41% | 105.77% | 47.30% |
| Adolescents (12-17 years) | 26.7 million | 9.88% | 95.47% | 82.53% |
| Children (6-11 years) | 26.4 million | 9.77% | 81.47% | 64.72% |

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

Finding 14: COVAX strengthened the Indonesian health system in various ways:

- a. Information system: SMILE improved the logistic system and COVAX increased capacity for health care workers through training, meetings, digitizing the recording and reporting of vaccine distribution, vaccination, and case management.
- b. Health infrastructure: Additional CCE support through COVAX, specifically the provision of ultra-low temperature freezers, has increased the capacity of the vaccine supply chain. This enhancement benefits not only the current COVID-19 pandemic response but also future pandemic preparedness and RI programs.
- c. Evidence-based decision-making: With the support of partners and stakeholders, COVAX has implemented various initiatives, including vaccine acceptance surveys; the COVID-19 VIRAT; and developing data-driven planning and monitoring tools such as the NDVP and the SMILE application to track vaccine distribution from manufacturing to national

and health facility levels. All these initiatives provide data-driven insights to support evidence-based decision-making by leaders.

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 15: COVAX has, at times, shipped vaccines with short expiration dates. However, leveraging stability data provided by vaccine manufacturers for Emergency Use Authorization, COVAX facilitated the process of extending vaccine expiration dates with the Indonesian Food and Drug Agency (BPOM). This data, which met established requirements for drug and vaccine expiration extensions, was evaluated by BPOM, which then granted approval for extensions when appropriate. These extensions have proven beneficial.

Other challenges included managing medical waste from vaccinations and the disposal of expired vaccines. Furthermore, key informants noted that diverting resources to COVID-19 resulted in reduced funding for RI.

Finding 16: COVAX support unintendedly has resulted in positive results, such as:

- Essential medicine: Increased opportunities to produce vaccines and other health essentials in country. COVAX has strengthened partnerships between Indonesia and CEPI, whose mission is to accelerate the development of vaccines and other biological responses to the threat of epidemics and pandemics, ensuring they reach everyone who needs them, and to enable the rapid and sustainable production of vaccines. Indonesia's election to CEPI's board for the period 2022-2025 and Bio Farma's selection as a manufacturing partner open new opportunities for Indonesia's pharmaceutical industry to contribute to global vaccine development and production.
- Governance and leadership: Involved all partners in developing the COVID-19 vaccine roadmap and technical guidelines, and overseeing implementation at the subnational level.

BROADER LESSONS OR INSIGHTS

Key country-level lessons for pandemic preparedness

Strengthening health system preparedness and service delivery: Given the barriers and system limitations that hampered the immunization distribution at the start of the COVID-19 pandemic, conducting routine periodic emergent infectious disease (EID) and pandemic response simulations involving multiple sectors at national and subnational levels would inform and update EID and pandemic contingency plans. Mapping the capacity of health services will be key to develop a mechanism for providing facilities, infrastructure, and adaptive health equipment to prepare for future pandemics.

Health workforce development: During the pandemic, a critical component of Indonesia's COVAX delivery support included healthcare worker training programs on vaccination protocols, micro-planning, cold chain management, safe injection techniques, AEFI management and surveillance, reporting, and monitoring and evaluation. As Indonesia expanded the vaccine management system (SMILE) during the pandemic, training healthcare workers on how to use this was also key to ensuring long-term adoption. Continuous capacity building for health-related human resources is necessary to improve skills, knowledge, and digital literacy for new

vaccines, planning, and other emerging infectious disease response areas. Strengthening digital behavior and culture is crucial to ensure timely information flow and reporting. While online trainings were useful for reaching a wider audience of healthcare workers, underdeveloped digital infrastructure in remote communities, high internet costs, and lower participant engagement in online classes present challenges to health workforce pandemic preparedness.

Health information systems: The expansion of the customized real-time SMILE vaccine management logistics system in Indonesia supported the national management of COVID-19 vaccines and cold chain capacity. It has demonstrated its potential to support distributors lacking supply chain systems, and for other health equipment like masks, gloves, and medicines. SMILE could also be improved by incorporating elements from the CCE Inventory Gap Analysis Tool (CIGAT/IGA) from the WHO, expanded to manage biomedical waste from pandemic response, and integrated into existing national digital health logistics.

Risk communication and community engagement: A notable challenge to vaccine demand in Indonesia was the widespread disinformation about vaccines. To address these rumors, public health campaigns with RCCE were used to build trust in COVID-19 vaccines and combat misinformation on social media. Community engagement should also include engaging with faith leaders, who can advise on ways to improve the public acceptability of vaccines. Over the course of the pandemic response, Indonesia developed novel community outreach strategies to improve vaccination coverage, including elderly vaccine promotions and incentive programs. Future pandemic responses should develop behavior change initiatives, strengthen community empowerment programs, and increase infodemic management capacity to combat vaccine skepticism and hoaxes.

Leadership and governance: Indonesia's pandemic response successfully implemented the Pentahelix approach, which engages government, community, academics, the private sector, and health service providers in developing and implementing society-wide immunization strategies. The Pentahelix approach has proven crucial to collaboration, enforcement, and regular monitoring during the pandemic. Multilateral and bilateral stakeholders who have historically worked with the Indonesia's MOH learned that during a pandemic response they should be prepared to work with decision makers across different sectors.

Financing: As Indonesia's health system reform has shifted responsibility for public health services to local governments, the need to finance and engage with subnational health stakeholders has been critical to Indonesia's pandemic response. To prepare for future emergent infectious diseases and pandemics, increased advocacy and assistance to subnational governments are crucial for planning pandemic preparedness budgets and immunization program implementation at the subnational level.

Key regional and global level lessons for coordinating and planning

Simulation: Learning from the COVID-19 pandemic, simulations at the global or regional level led by the WHO would enhance coordination among international health regulation authorities, improve information sharing and alerts regarding new threats, and help assess health system capacity.

Financing preparedness: Based on Indonesia's experience with the COVAX Facility, future funding mechanisms for vaccine procurement are best supported by funding for pandemic preparedness and response initiatives. During emergencies, these funds should be directly channeled to countries and partners, leveraging existing funding mechanisms. For instance, in Indonesia, the Financial and Development Supervisory Board could conduct audits, and

COVAX or similar organizations could follow these procedures to streamline processes and avoid duplication of effort.

Enhancing vaccine procurement efficiency and coordination: During the vaccine procurement process, the COVAX Facility in Indonesia experienced vaccine allocation uncertainties, vaccine delivery delays, missing documentation, and short expiry dates. As such, there is a need to improve the speed of vaccine procurement and stock acquisition and provide faster information on vaccine availability and allocation to countries. Better coordination with vaccine producers regarding supporting documents and distribution scheduling can expedite the registration process and prevent inequalities in access to vaccines due to short expiration dates.

Indemnity and Liability: As there are preexisting indemnity and liability regulations in Indonesia (government regulation no 72/1998 on Security of Pharmaceutical Supplies and Health Equipment), a key challenge to the procurement and delivery of the vaccines through COVAX was the indemnity and liability policy. For future pandemic response vaccines, key informants have indicated that indemnity and liability should be shared with manufacturers.

CONCLUSION

Indonesia's success in combating COVID-19

Indonesia's successful management of the COVID-19 pandemic in a relatively short period can be attributed to its strong political will, critical funding, and strategic approach. By leveraging the existing health system, limited health care personnel, ambitious targets, and collaboration from all stakeholders, including COVAX, donors, partners, the army, police, and the private sector, Indonesia achieved significant progress.

COVAX's contributions

The provision of 22.6% of vaccines, exceeding the initial COVAX commitment of 20%, undoubtedly contributed to Indonesia's quicker recovery from the pandemic. The COVID-19 vaccination campaign marked the first adult immunization program in Indonesia, this is a tangible contribution from COVAX to Indonesia's immunization program, which hopefully will lead to adult immunizations for influenza and pneumonia, or even life-course immunization.

The country did not apply for funding during the third wave of CDS offered in July 2022, aimed to integrate COVID-19 into RI because it lacked a plan for such integration at the time. It was not until January 2024 that Indonesia integrated COVID-19 vaccination into RI. National government stakeholders have also indicated that the decision not to apply for subsequent COVAX funding was due to the Facility's intensive application process. The government was further disincentivized to apply as funding went to implementing partners rather than directly to the MOH.

Strengthening the health system

Indonesia received valuable support from COVAX and various donors, in strengthening the health system in terms of infrastructure, such as cold rooms and cold chains, as well as human resource capacity. Beyond vaccine distribution, COVAX significantly strengthened the health system by developing SMILE, technical guidelines and training through implementing partners using the CDS fund.

Critical priorities for next steps

The COVID-19 pandemic had a direct impact on RI, leading to a decline of around 10% as resources were focused on the COVID-19 response. To address this, the world should consider combining several vaccines into multivalent formulations, such as combining the COVID-19 vaccine with the influenza vaccine. The impact of long COVID on former sufferers needs to be carefully considered. Research is required to understand the long-term effects of long COVID and develop appropriate strategies to manage them.

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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 15 identified key stakeholders. They included stakeholders from Implementing Partners, MoH/Government of Indonesia, District Health Authorities, Technical Assistance Agencies and Academic Institutes.

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: Overarching outcomes associated with the COVID-19 pandemic

Ten months after the first case of COVID-19 was reported, Indonesia launched its vaccination program on January 13, 2021, using the Sinovac vaccine, which had not yet been approved by WHO. President Joko Widodo was the first person to receive the vaccine and marked the beginning of Indonesia's national vaccination efforts to combat the COVID-19 pandemic.

“I also want to reiterate that I will be the first recipient of the COVID-19 vaccine. This is to instill trust and confidence in the public that the vaccine is safe.” – Joko Widodo, President of Indonesia

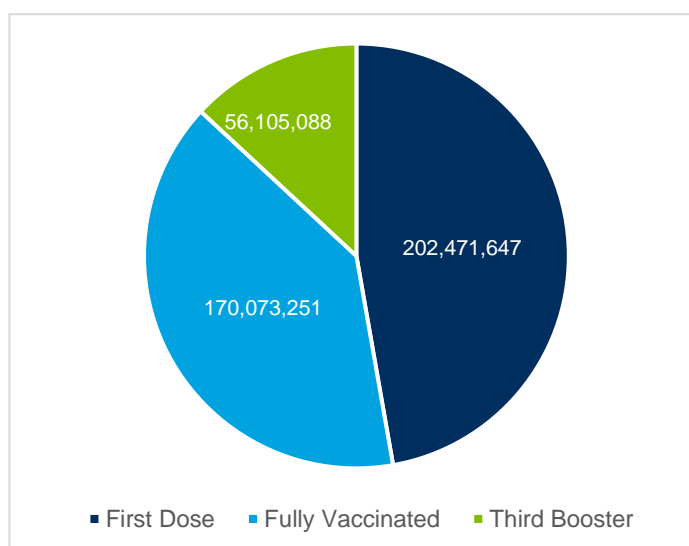
The number of vaccines received was 487.8 million doses, sourced from purchases with state budget (APBN) funds totaling 349.8 million doses and grants amounting to 137.9 million doses. Of the 137.9 million doses, COVAX supported the government of Indonesia (GOI) by facilitating the arrival of over 110.3 million COVID-19 vaccines. The GOI allocated more than US\$650 million for COVID-19 vaccination costs (including procurement).

As of July 31, 2022, Indonesia had administered more than 428 million doses across the country, with 75% of the total population receiving a first dose, 63% of the total population fully vaccinated (one dose of Janssen or two doses of other COVID-19 vaccines), and 21% of the total population receiving a third dose as boosters.²³

The COVID-19 vaccination program was highly successful, although the completion rate for subsequent doses has declined, with 75.5%, 64.7%, 39.0%, and 1.98% of the population receiving doses 1, 2, 3, and 4, respectively. COVID-19 control indicators have improved nationally and community immunity levels have risen. A serosurvey conducted in January 2023 revealed an increased proportion of the population with SARS-CoV-2 antibodies. The proportion of Indonesians with antibodies is now 99.0% (95% [CI 98.6-99.3%]), which was up from 87.9% (95% [CI 86.6-89.0%]) in December 2021.¹⁸ During the pandemic, the GOI, in collaboration with COVAX alliance partners, developed a National Deployment and Vaccination Plan for COVID-19 vaccines (NDVP) to coordinate data-driven planning and monitoring.

The pandemic response also increased the capacity of health care workers and health professional organizations. The COVID-19 Vaccine Management Training followed a curriculum designed to ensure standardized training implementation and vaccinator competence nationwide. As of July 2022, more than 177,935 additional health workers had been trained for the implementation of COVID-19 vaccination. The training covered topics such as micro-

Figure 4. COVID-19 vaccines administered as of July 31, 2022



planning, cold chain management, safe injection techniques, adverse effect following immunization (AEFI) management and surveillance, recording and reporting, and monitoring and evaluation²³. The support from professional organizations, such as the Indonesian Medical Association (*Ikatan Dokter Indonesia/IDI*) to help train for health workers was very helpful. Shortages of cold storage at health centers was solved by the distribution of 1,400 refrigerators across all 34 provinces, procured through government funding mechanisms and charitable grants (e.g., the Uniliver grant) in 2021.

Indonesia uses an electronic-based recording and reporting system. During the pandemic response, Indonesia developed its health information system to increase its data quality and capacity for surveillance and vaccine delivery. An integrated system provided complete vaccination population target data and was linked to the following systems to organize information related to the implementation of the COVID-19 vaccination strategy:

- Population and Civil Registry Service as the provider of the National Identification Number
- Peduli Lindungi system which unifies and processes all data on vaccination service targets
- PCare system as a vaccination service recording system
- Electronic Health Logistics Inventory Monitoring System (SMILE) as a recording and monitoring system for vaccines and vaccination logistics

The KPC-PEN also developed a dashboard to disseminate and display this combined COVID-19 vaccination data.

Beyond implementing specific health promotion and pandemic prevention programs, the GOI implemented comprehensive fiscal and monetary policies to stimulate economic recovery. Additionally, in 2020, US\$ 49 billion (IDR 695.2 trillion)²⁴ was allocated from the APBN to support this effort. The recovery strategy focused on boosting domestic consumption, increasing business activity, and maintaining economic stability through monetary expansion. These policies were implemented in coordination with various institutions involved in fiscal and monetary policy.

On June 21, 2023, the president lifted the pandemic status for COVID-19 and Indonesia entered an endemic period. This decision was taken in line with the revocation of the PHEIC status for COVID-19 by the WHO on May 5, 2023.²⁵ Even though Indonesia had transitioned from COVID-19 pandemic to endemic status, the SARS-CoV-2 virus was still a global health concern. Therefore, the COVID-19 vaccines were included in the RI program. Additionally, the GOI has shifted towards domestically produced vaccines, such as IndoVac vaccine produced by state owned BioFarma and InaVac vaccine manufactured by University of Airlangga and PT Biotis Pharmaceutical Indonesia, which are believed to have fewer side effects compared to imported options.²⁶

Other outcomes associated with COVID-19 pandemic were:

- Indonesia now has domestic production and distribution of N95 masks and other personal protective equipment (PPE) to counter dependency on other economies.²⁷
- There is experience in employing strategic measures, such as utilizing strategic public places, public and private offices, and engaging the private sectors for routine vaccination process.

- The concept of remote work/working from home had a notable impact on corporate culture and productivity. The increased flexibility has improved employee retention, access to the new talent, heightened productivity, and enhanced staff motivation.²⁸
- Negative impact was on the informal sector of the economy, which was significantly affected by the COVID-19 pandemic. Many of the people who work in this sector rely on social assistance.
- COVID-19 complications, therapy, and potential complementary and alternative medicine need to be addressed: respiratory symptoms, cardiovascular, neurological, (neuro)psychiatric, dermatologic, long COVID as the lingering and prolonged consequences of SARS-CoV-2 infection.^{29–35}

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Appendix C: Adapted Country Theory of Change

Theory of Change

Goal : To achieve herd immunity, thereby reducing COVID-19 transmission, mortality, and morbidity, and facilitating the country's social and economic recovery.

Input

Vaccines, Funding, Human Resources, Infrastructure, Public Communication, Technology (digital platforms)

Activities

1. Vaccine Procurement and Distribution
2. Public Awareness Campaigns
3. Training Healthcare Workers
4. Mass Vaccination Drives
5. Monitoring and Evaluation

Outputs

Vaccine Availability, Increased Public Awareness, Trained Personnel Widespread, Vaccination Coverage, Data and Insights

Outcomes

Short-term

Increased vaccination rates, reduced COVID-19 transmission, and public confidence in the vaccination program.

Medium-term

Achieving herd immunity, fewer COVID-19 cases, hospitalizations, and deaths, and improved public health outcomes.

Long-term

Economic recovery, resumption of normal social activities, and strengthened healthcare infrastructure for future public health challenges.



Appendix D: Country Timeline

| | | |
|----------------------|---|--|
| 2020–2021 | <i>Country Readiness and Delivery (CRD) Phase of COVAX</i> | <i>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.</i> |
| 2022–mid-2023 | <i>COVID-19 Vaccine Delivery Partnership (CoVDP) Phase of COVAX</i> | <i>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.</i> |
| Mid-2023–End of 2023 | <i>Alliance Phase of COVAX</i> | <i>Supply of vaccines highly available and very low demand. Life returning to pre-COVID normalcy.</i> |

| 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 | WHO characterizes COVID-19 a pandemic. | Indonesia's president established COVID-19 Task Force, which was led by the National Disaster Management Agency (<i>Badan Nasional Penanggulangan Bencana</i> , BNPB). National health protocols imposed, including the 3M campaign (physical distancing, wearing masks, and washing hands) and the 3T campaign (testing, tracing, and treatment). | | |

| Time Period / Duration | Global Context | Country Context | COVAX Engagement | COVAX Results |
|------------------------|---|---|---|---------------|
| April 2020 | Access to COVID-19 Tools (ACT) Accelerator launches, including COVAX. | Indonesia declares COVID-19 a national disaster. Government implemented large-scale physical distancing and social restrictions (<i>Pembatasan Sosial Berskala Besar</i>), which included closing workplaces and public spaces. | Indonesia joined COVAX Agreement (2020 – Q2). | |
| May 2020 | | MOH Decree no HK.01.07/MENKES/209/2020 on National COVID-19 Coordination Team for Health sector. | | |
| June 2020 | Global Vaccine Summit 2020: Gavi COVAX AMC launches. | | | |
| July 2020 | | Committee for Handling COVID-19 and National Economic Recovery (KPC-PEN) formed, combined health and economic recovery efforts, replacing the COVID-19 taskforce. | | |
| 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. | | | |
| September 2020 | | COVID-19 vaccine acceptance survey 1st Vaccine Introduction Readiness Assessment using VIRAT. | MoH and UNICEF agreement on the procurement of the COVID-19 vaccine under the COVAX Facility. | |

| Time Period / Duration | Global Context | Country Context | COVAX Engagement | COVAX Results |
|------------------------|---|---|---|---------------|
| October 2020 | Gavi Board approves \$150m to jump-start Gavi COVAX AMC countries' readiness to deliver COVID-19 vaccines. | Presidential Regulation no 99/2020 on vaccine procurement and vaccinations for COVID-19. | | |
| December 2020 | First COVID-19 vaccine is approved by stringent regulatory authority: Pfizer/BioNTech by UK's Medicines and Healthcare products Regulatory Agency. First COVID-19 vaccine receives WHO Emergency Use Listing: Pfizer/BioNTech. | | | |
| January 2021 | | Indonesia launched its vaccination program. 1st vaccination for health workers. Policy for Enforcement of Restrictions on Community Activity (<i>Pemberlakuan Pembatasan Kegiatan Masyarakat</i> , PPKM) implemented to restrict community mobility at the micro-scale. | | |
| February 2021 | COVAX ships its first doses: 600k doses of AstraZeneca/Oxford vaccine for SII. | 1st vaccination for priority groups administered. 2nd vaccination for health workers administered. | | |
| March 2021 | First COVAX-supplied vaccine doses are administered in Africa. COVAX experiences delivery delays of vaccines from SII | 2nd vaccination for priority groups administered. | Indonesia receives first shipment of COVAX vaccine. | |

| Time Period / Duration | Global Context | Country Context | COVAX Engagement | COVAX Results |
|------------------------|---|--|--|---------------|
| | and AstraZeneca due to COVID-19 surge in India. | | | |
| April 2021 | COVAX ships its 38 millionth dose, reaching 100 economies. | COVID-19 variants lead to nationwide spike in cases. | Indonesia begins administering vaccines from COVAX Facility (2021 – Q2). | |
| May 2021 | COVAX deal with Johnson & Johnson for 200m doses. | | | |
| June 2021 | Gavi COVAX AMC Summit raises \$2.4b. 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. | 1st vaccination for adolescents administered. | | |
| July 2021 | Ultra-cold chain 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-subsidized doses they are already receiving from COVAX. | | | |
| August 2021 | | 3rd vaccination for health workers administered. | | |

| 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. | | | |
| December 2021 | | 1st vaccination for children administered. | | |
| January 2022 | | 3rd vaccination for priority groups and general population (min 6 mo after 1st vaccination) administered. Serosurvey results showed 99% Indonesians have COVID-19 antibodies, | Indonesia receives first wave of COVID-19 Vaccine Delivery Support (CDS) funding. COVAX alliance partners (UNICEF and WHO) and implementing partners (UNDP and CHAI) in Indonesia begin implementing CDS-funded activities (2020-2021). | |
| 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. | | | |
| June 2022 | Gavi Board extends administration of COVAX Facility through 2023. | | Indonesia paused vaccine procurement other than from COVAX. | |
| August 2022 | Gavi COVAX AMC 92 lower-income countries achieve 50% primary series coverage milestone against global coverage of 62.5%. | | | |
| October 2022 | | Indonesia pharmaceutical companies begin producing domestically developed | | |

| Time Period / Duration | Global Context | Country Context | COVAX Engagement | COVAX Results |
|------------------------|---|---|------------------|--|
| | | vaccines (e.g., IndoVac, InaVac). | | |
| 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. | | | Indonesia received over 110.30 million vaccines from the COVAX Facility (2020-2022). UNICEF and WHO supported Indonesia Ministry of Health develop and update technical guidelines and online and hybrid training modules to guide COVID-19 vaccination implementation. (2020-2022). UNDP trained 21,500 healthcare workers on how to use electronic immunization and logistics monitoring system (SMILE) (2020-2022). |
| May 2023 | WHO lifts PHEIC status for COVID-19. | | | |
| June 2023 | | Indonesia lifted COVID-19's pandemic status. | | |
| January 2024 | | Indonesia begins to integrate COVID-19 vaccination into Indonesia's routine immunization program. | | |