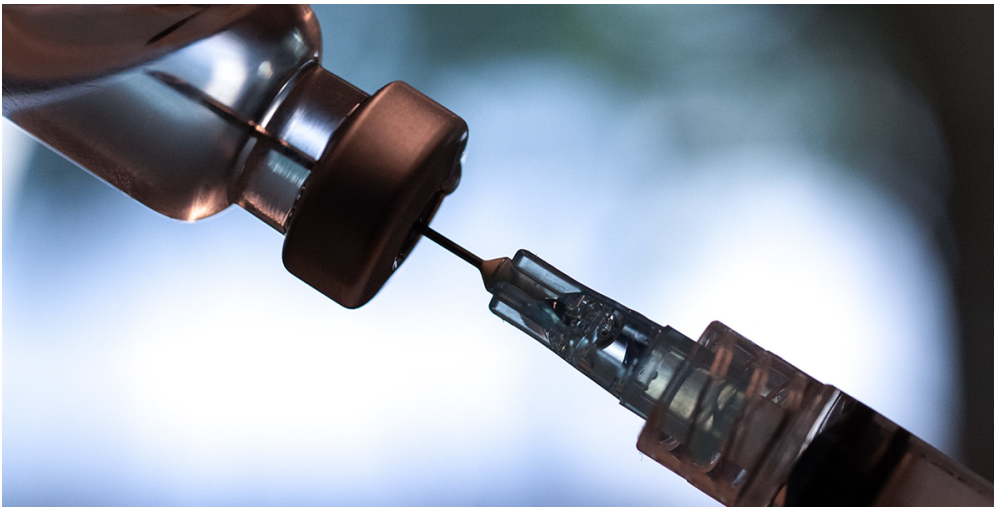


POLICY BRIEF

Managing Safe, Equitable, and Effective COVID-19 Vaccination



Regional cooperation can facilitate data sharing and harmonization of regulatory policies among countries to ensure the timely delivery of vaccines. Photo credit: ADB.

Large-scale vaccination requires a comprehensive strategy, infrastructure, human resources, monitoring systems, and a receptive public.

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Introduction

The global concerted endeavor to curb the spread of COVID-19 has brought not just one vaccine but multiple novel products with signals of efficacy and safety in less than a year since the declaration of COVID-19 as a pandemic. This is an astonishing scientific achievement. Ten vaccines^[1] have undergone regulatory reviews in their respective countries. Four vaccines—Pfizer/BioNTech, Oxford/AstraZeneca, Moderna, and Johnson & Johnson—were approved by the World Health Organization (WHO) for emergency use.

Yet, a vaccine is only a weapon in the fight against the pandemic. Immunizing billions of people requires a comprehensive strategy of prevention, logistical infrastructure, an army of vaccinators, safety monitoring and evaluation systems, and a receptive public. International cooperation is also vital to ensure fair access to vaccines, achieve global herd immunity, and end the pandemic.

With the arrival of vaccines, country efforts to address the impacts of the crisis are now centered on mass vaccination campaigns. High-income countries are already vaccinating their populations and have generally secured sufficient supply. Low- and middle-income countries are in various stages of negotiations and procurement, and some commenced inoculations in early 2021.

In Southeast Asia, mass vaccinations in most nations are not anticipated to be fully implemented until 2022. As most of the low-resource economies in the region get left behind due to the global competition over limited doses, they face the threat of dangerous new strains of the virus.

Data modelling suggests that developed countries would likewise suffer enormous human and economic costs if vaccine nationalism persists, defeating their purpose of protecting their populations. The global economic cost associated with the pandemic is approximately \$4 trillion to \$5 trillion, 49% of which are borne by the advanced economies despite universal vaccination in their countries.

This policy brief is based on the [presentation by Director General Jerome Kim of the International Vaccines Institute at the 13th Policy Actions for COVID-19 Economic Recovery \(PACER\) Dialogue](#) organized by the Asian Development Bank (ADB)

Challenges in Vaccination

The vaccine itself does not save lives; vaccination does. To conduct large-scale immunization programs, a myriad of challenges must be addressed, including supply constraints, investments in logistics and cold chain equipment, training of health personnel, and public hesitation about vaccines.

Although there are many viable COVID-19 vaccines that show efficacy and safety results, the shortage of doses is obstructing several countries' path out of the pandemic, especially for low-resource economies. The COVAX Facility is supporting the procurement of vaccines at low or no cost to provide equitable and reliable access to low- and middle-income countries, as high-income countries have largely secured sufficient vaccines to protect their citizenry. However, it covers only the vaccines with WHO approval and signed contracts with the facility.^[2] It is estimated that COVAX can deliver 2.3 billion doses this year, which will be inadequate to immediately inoculate a critical mass of population. Countries that heavily count on COVAX will have to wait for additional doses in 2022–2023.

Scaling up production capacity that adheres to high standards of quality is no easy feat. The number of doses is also contingent on the availability of materials for manufacturing as well as ancillary vaccine supplies. Pfizer/BioNTech, for instance, encountered production delays when early batches of raw materials failed to meet quality standards.

It is anticipated that some products in the vaccine pipeline will eventually get approved for emergency

use, thereby helping to boost the supply of doses. Still, countries need contingency plans as the possibility of quality control and supply chain problems may arise.

Equally important to availability of supply is the logistics for distribution as different types of COVID-19 vaccines have different handling and storage requirements.^[3] Adding to the complexities of logistics is limited air transport capacity due to disruptions to flights and airport operations during the pandemic. According to the International Air Transport Association, 8,000 cargo jumbo jets would be needed to deliver a single dose to each of the world's 7.8 billion people.

Beyond cold chain and transport infrastructure, safe storage and handling of vaccines depend on the knowledge and practices of health personnel. Countries need to allocate resources for the training of technicians and medical staff on prevailing guidelines, administering different types of vaccines, the systematic monitoring of any adverse events, and the efficacy of vaccines administered against emerging virus mutations. Health systems also face the challenge of adjusting existing delivery strategies that have largely been focused on child immunization as they shift to adult vaccinations and significantly expanded coverage.

Finally, vaccine hesitancy poses a major threat to the collective goal of getting the COVID-19 pandemic under control. Concerns about safety should be alleviated by explaining the science behind the COVID-19 vaccines and addressing the factors that drive mistrust around vaccines, including an enabling environment, social influences, and motivation.

Policy Options

Multi-stakeholder planning with prioritization of doses

Strategic planning with the involvement of multiple stakeholders across sectors is fundamental to the success of vaccine delivery efforts. This process entails planning for scenarios, developing a national vaccine strategy, and organizing the operational aspects of vaccine introduction.

Due to the lack of doses, strategy development requires prioritization of target groups and distribution of vaccines in a phased manner. Although the priority allocation models of different countries may vary based on their local conditions, the common framework focuses on health workers and segments with health vulnerabilities as the priority recipients. Countries may also prioritize essential workers aside from those in the health sector to jumpstart their economies.

Investments in infrastructure and human resources

Along with financing for the acquisition of vaccines, countries need to allocate investments in distribution and delivery systems, such as cold chain equipment. Fortunately, most of the vaccines that have emergency use authorization only need conventional cold chain, but investments are still necessary for ramping up distribution especially in remote areas.

Efforts should also include strengthening the capacity of personnel and enforcing proper cold chain

management practices. It is important to have a system for tracking the safety of vaccines administered and for identifying the vaccine product associated with an adverse event as well as its batch or lot number.

Connectivity, border management, and security

With the restricted movement of people and goods during the pandemic, governments need measures to prioritize the entry of approved vaccines in their country. Border processes should include expedited clearance procedures for COVID-19 vaccines and tariff relief to facilitate their shipment.

Since customs requirements and varying trade regulations can hamper the timely distribution of vaccines, there should be streamlined and transparent border processes. At the same time, appropriate security protocols must be in place to thwart deviation and counterfeiting. Because COVID-19 vaccines are highly in-demand commodities, it is imperative to deploy security solutions that prevent tampering or theft throughout the supply chain.

Partnerships and regional cooperation

The immense undertaking of delivering billions of doses calls for strategic partnerships and collaboration with the international community. In Asia, regional cooperation can be instrumental in facilitating data sharing and harmonizing regulatory policies, which can aid in reducing time lags in vaccine delivery. Since the region is home to vaccine manufacturing hubs, governments should form partnerships to accelerate the production of doses and consider donating their excess supply to other countries that are still experiencing uncontrolled outbreaks.

The private sector is also critical to scaling up and strengthening medical supply chains to preserve the integrity of vaccines and deliver them in a timely manner. Capitalizing on the networks of shipping, airline, and logistics companies, alongside their strong infrastructure and information technology-enabled supply chains, will allow governments to optimize distribution and ensure transparency on every shipment.

Transparency and communications

Advocacy and communications should be incorporated in the strategic plans of governments for vaccine deployment and delivery. Governments may consider partnering with influential people who can advocate for COVID-19 vaccination drives and support the efforts of governments to reach target groups.

There should be timely and frequent communications, and when adverse events occur, governments should openly and transparently communicate with the public. Similarly, governments should be upfront about the unknowns at this stage. Since the immunity duration from COVID-19 vaccines is still unclear, it is advisable for governments to let the public know that the length of protection from vaccination still requires further study.

Policy Implementation and Outcomes

According to Our World in Data, more than 1 billion doses of COVID-19 vaccines have been administered globally. Distributions in rich countries are outpacing those in lower-income economies.

To date, Israel and recently Seychelles are the fastest to roll out inoculations with about 60% of their populations fully vaccinated. While rapid deployment of vaccines has been facilitated by Israel's adequate resources and quality health care systems, its wealth of data has served as a valuable currency to secure doses from Pfizer/BioNTech. With the country's digitized health systems, the government has agreed to exchange extensive data on its inoculation program with Pfizer/BioNTech, which is crucial to generate insights into the long-term safety and efficacy of the vaccine.

In the United States, the rollout initially encountered some hurdles but is now accelerating. Pharmacies have played a critical role in delivering COVID-19 shots by making it easier for people to get vaccinated. In addition to proximity, pharmacies are optimal for the mass vaccination drive because Americans are already accustomed to getting their flu shots in such locations.

In Asia, Maldives, Bhutan, Mongolia, and Singapore are leading in the vaccination drive, with 73.92, 62.27, 46.75, and 37.84 doses administered for every 100 people. The People's Republic of China is also one of the countries rapidly accelerating its inoculation efforts with 19.45 doses administered for every 100 people. This is followed by Azerbaijan (14.96), Cambodia (14.77), India (11.31), Kazakhstan (8.31), and Indonesia (7.38). These positive developments, particularly in South Asian countries, could be attributed to their manufacturing capabilities and regional cooperation.

In Bhutan, its vaccination campaign was only launched at the end of March and yet more than 90% of its adult population had already been given the first shot of Oxford/AstraZeneca vaccines donated by India. Granted that the country's small population size gives it an advantage over other nations, dedicated volunteers and a robust healthcare system are the key factors propelling rapid vaccine rollout.

In Asia and the Pacific, the Asian Development Bank (ADB) launched the Asia Pacific Vaccine Access Facility (APVAX) to support efforts of developing member countries (DMCs) to procure safe and effective vaccines. This \$9-billion initiative includes a rapid response component that provides timely support for critical vaccine diagnostics, procurement, and transport from the place of purchase to DMCs and a project investment component to support investments in systems for delivery and administration of vaccines along with associated investments in capacity building, community outreach, and surveillance. The program may also help develop or expand vaccine manufacturing capacity in the DMCs.

In Indonesia, for example, its state-owned vaccine supplier, Bio Farma, will be provided financing through APVAX for vaccine procurement. ADB's \$450 million assistance will also help the government and Bio Farma to improve logistics management and deliver vaccines more effectively.

Public-private partnerships are also proving valuable in distributing COVID-19 vaccines at scale. UNICEF and the World Economic Forum signed a charter with shipping, airlines, and logistics companies, such as DHL and Maersk, to support the distribution of COVID-19 vaccines, with

prioritization and solutions for international and in-country distribution of vaccines and related supplies on behalf of COVAX.

Singapore partnered with DHL to ship its first batch of vaccines from Belgium. Technologies, such as temperature trackers equipped with GPS, are placed in thermal shipper boxes to enable full visibility throughout the shipment's entire journey.

The Government of Ghana has forged partnerships with UPS Foundation and Zipline, a medical drone delivery company. Up to 2.5 million doses will be delivered via drones to vaccination sites to not only improve the speed of distribution but also expand the scope of vaccination efforts, increasing access to hard-to-reach areas.

In the Philippines and other parts of Asia, Zuellig Pharma has expanded its cold storage warehouse capacity in response to the storage and distribution demands of COVID-19 vaccines. Its cold chain management uses eZTracker—a blockchain solution enabling full traceability during the distribution of the vaccine to ensure integrity.

Within the health care sector, there are notable alliances that are driving the expansion of manufacturing capacities across various countries. The Serum Institute of India's partnership with AstraZeneca is helping to scale up production of Oxford/AstraZeneca vaccine doses, which many low-income countries depend on. Bio Farma has teamed up with Sinovac to provide the technology licensing of CoronaVac for production in Indonesia. Merck is working with Johnson & Johnson to help boost the supply of its single-shot COVID-19 vaccine, which got emergency authorization from the US Food and Drug Administration and WHO.

To boost public trust in COVID-19 vaccines, politicians and influential figures have used their platforms to share their own experiences in getting vaccinated. For instance, the heads of the governments of the US, Israel, Indonesia, and India received shots publicly to create a degree of confidence for the public. Similarly, celebrities are playing their part to spread awareness on the importance of getting vaccinated.

Recommendations

An unprecedented challenge calls for whole-of-government and whole-of-society approaches

The various components and complexities of vaccine distribution—including determining priority groups, dealing with the variance in storage and logistical requirements of different vaccines, engaging with communities, and collecting information—require the participation of multiple actors to carry out a task of this magnitude. Multi-sectoral approaches can enable policy coherence to facilitate the timely, effective, and efficient distribution and administration of vaccines.

Collecting data is crucial to vaccine prioritization and post-market surveillance

COVID-19 has magnified the value of data in policymaking. Prioritizing the allocation of vaccines

demands investments in effective and efficient data collection to provide a better understanding of which groups have underlying health conditions. Data are likewise integral to monitoring outcomes after the COVID-19 vaccination and investigating any adverse effects in relation to different types of vaccine.

Influential figures could be strong assets in public health campaigns

A large-scale vaccination drive may require innovative approaches to public health communications. Campaigns could be more effective by involving celebrities or influencers that resonate with communities exhibiting low confidence in COVID-19 vaccines. Not only should these vaccine campaigns be engaging and comprehensible but also anchored in science. Public health communication strategies should be customized to connect with people of different age groups that reach them through the right channels.

Continue to uphold standards for COVID-19 infection prevention even after vaccination

Because it is still unclear whether the available vaccines can prevent COVID-19 transmission, it is essential to remind the public about maintaining infection control measures, such as wearing of masks and social distancing. Data suggest that the vaccines can protect people from developing serious symptoms of the disease, but transmissions could still occur. It is also important to note that only a portion of the population will be vaccinated in the early stages of the rollout. Thus, governments must urge the public to still follow prevention protocols.

[1] Pfizer, Moderna, Astra Zeneca, Johnson & Johnson, Gamaleya, Sinopharm (2), Sinovac, Novavax, Bharat, and CanSino.

[2] Pfizer/BioNTech, Oxford/AstraZeneca, and Johnson & Johnson COVID-19 vaccines are part of COVAX and approved by WHO for emergency use.

[3] Pfizer/BioNTech and Moderna COVID-19 vaccines require -25°C to -15°C and -20°C , respectively, for storage temperature. Oxford/AstraZeneca, Gamaleya Sinopharm, Sinovac, Novavax, Johnson & Johnson, and CanSino vaccines need to be kept at $2-8^{\circ}\text{C}$.

Resources

Centers for Disease Control and Prevention. [Understanding the Federal Retail Pharmacy Program for COVID-19 Vaccination.](#)

C. O'Donnell. 2020. [Pfizer Says Supply Chain Challenges Contributed to Slashed Target for COVID-19 Vaccine Doses in 2020.](#) Reuters. 4 December.

C. Park et al. 2021. [Getting Ready for the COVID-19 Vaccine Rollout.](#) *ADB Briefs*. No. 166.

International Air Transport Association (IATA). 2020. [Guidance for Vaccine and Pharmaceutical Logistics and Distribution: Edition 2.](#) 16 December.

J. Kim. 2021. [COVID-19 Vaccines Update. Presented at the Policy Actions for COVID-19 Economic Recovery Dialogues of the Asian Development Bank](#). Webinar. 24 February.

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J. Wallen. 2021. [How Bhutan Managed to Vaccinate More than Half Its Citizens in a Single week](#). *The Telegraph*. 7 April.

M. Prabhu. 2021. [Drone delivered COVID-19 vaccines take to the air](#). Gavi. 4 March.

Our World in Data. 2021. [Coronavirus \(COVID-19\) Vaccinations](#).

Pfizer. 2021. [Real-World Evidence Confirms High Effectiveness of Pfizer-BioNTech COVID-19 Vaccine and Profound Public Health Impact of Vaccination One Year After Pandemic Declared](#). News release. 11 March.

P. Joi, J. Fulker. 2021. [COVAX Supply Forecast Reveals Where and When COVID-19 Vaccines Will Be Delivered](#). Gavi. 29 January.

Sinovac. 2020. [Sinovac Signs Agreement with Bio Farma Indonesia for COVID-19 Vaccine Cooperation](#). News release. 25 August.

S. Lupkin. 2021. [Merck Will Help Manufacture Johnson & Johnson's COVID-19 Vaccine](#). National Public Radio. 2 March.

The New York Times. 2021. [Coronavirus Vaccine Tracker](#).

T. Padilla. 2021. [Supplying Safe and Effective COVID-19 Vaccines](#). Presented at the Policy Actions for COVID-19 Economic Recovery Dialogues of the Asian Development Bank. Webinar. 24 February.

UNICEF. 2020. [UNICEF and the World Economic Forum Sign Charter with 18 Shipping, Airlines and Logistics Companies to Deliver COVID-19 Vaccines](#). News release. 21 December.

World Health Organization. 2021. [COVID-19 vaccine doses shipped by the COVAX Facility head to Ghana, marking beginning of global rollout](#). News release. 24 February.

Zuellig Pharma. 2020. [Zuellig Pharma Expands Cold Storage Warehouse Capacity Across Key Markets in Asia in Preparation for COVID-19 Vaccine](#). News release. 19 November.



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