

Mapping Covid-19 Vaccine Diplomacy

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Executive Summary

The global response to Covid-19 has precipitated the largest ever global public policy response to a pandemic. The impact of the last two-plus years reached every aspect of society, leaving no corner of the globe untouched. The rapid development of vaccines against the virus raised the possibility of saving countless lives and ending the acute phase of the pandemic. While unprecedented efforts have been made to make vaccines globally accessible, numerous countervailing forces have repeatedly pushed the world towards an unequal distribution of vaccines that favors wealthy countries. This public health approach has fallen short as new variants continue to drive infections even in highly vaccinated countries, and has come at the expense of the world being able to live up to ideals of fairness and equity in access to healthcare.

Seeking to increase influence with chosen peer countries, to burnish international reputations, or to extract policy concessions on unrelated issues, many countries initially sought to wield access to vaccines as a diplomatic tool to advance their interests. This behavior also extended to countries who were largely shut out of the global marketplace and who sought, through diplomatic efforts, to secure needed vaccine supplies.

Ultimately, vaccine diplomacy held a limited impact as an extension of geopolitics. Vaccine donations, which can be directed to particular recipients tailored to foreign policy goals, have been dwarfed by the quantity of vaccines acquired through purchase deals with manufacturers. Most wealthy countries decided that securing early contracts with manufacturers for as many possible doses for their own population was the best way they could advance their interests. Though larger and more powerful countries initially attempted to use vaccines to advance soft power goals, the rapid evolution of the pandemic and shifting domestic priorities have made it difficult for countries to meaningfully leverage vaccine diplomacy. China's export of vaccines have all but disappeared as the country refocuses on its domestic population and purchasing countries look elsewhere to previously unavailable but more efficacious vaccines. Russia was proactive in making deals to export its Sputnik vaccine early in the pandemic, but a combination of failure to fulfill contracts and the invasion of Ukraine have all but eliminated any reputational or diplomatic favor the country hoped to curry. In the United States, the world's largest donor of vaccines to COVAX¹, the legislative branch has recently declined to continue funding for global vaccine efforts, shedding light onto the political undertones of vaccine diplomacy.

Currently, the emphasis of vaccine diplomacy has shifted away from bargaining for access to vaccines due to a combination of increasing global supply and limited uptake in many countries. In 2022, a shipment of vaccines does not hold the same diplomatic value it had in 2020. This shift in diplomatic value is largely due to the increased supply of vaccines globally and the increased rate of vaccinations in many countries. When vaccines were scarce but demand was extremely high, a shipment of vaccines, whether from manufacturer to buyer, donor to

¹ COVAX is the primary multilateral mechanism for vaccine manufacturing and distribution, specifically to ensure equitable access to vaccines globally.

beneficiary, was high in diplomatic capital. However, vaccine diplomacy is still an ongoing feature of the pandemic as states weigh their responsibilities towards achieving global equity in vaccinations and ending the pandemic on a worldwide scale, considering the fact that a significant portion of the world remains unvaccinated.

As the pandemic continues, it has become clear that global supply of vaccines is not the only constraint on vaccination rates. Vaccine hesitancy and nationalism, mis- and disinformation, distribution challenges, and a global response that privileged the interests of wealthy countries and private actors over those of the Global South have all negatively impacted the world's ability to get shots into arms. Solving these challenges, both for the remainder of this pandemic and for future pandemics, requires a concerted effort from all actors involved in the vaccine ecosystem. Any resources invested into a global response will help improve vaccine equity and therefore a more balanced, representative global health system.

In the short-term, improving global vaccination rates requires governments and multilateral entities to invest not only in purchasing or donating doses, but also in improving public health delivery systems. Namely, better communication campaigns to advertise the safety and efficacy of vaccines, along with investment in the infrastructure and capacity necessary to deliver vaccines from the tarmac to the arms of the general public. COVAX must also consider the issues of vaccine hesitancy and government capacity to receive and administer vaccines in how it plans and sequences vaccine deliveries.

In the medium term, the WHO can take action to reduce the centralization of vaccination regulatory authority in the Global North and call for increased global investment in public health infrastructure. Governments should require pharmaceutical companies to make their procurement contracts with foreign countries public to bring price transparency to the global market. Governments must also build upon current efforts to address restrictive trade practices that have hampered global production of vaccines.

In the long term, manufacturers can take steps to diversify the geographic distribution of vaccine production facilities. Developing local and regional production capacity, especially in countries with small populations, is crucial to achieving a system that can prioritize the interests of the entire globe. This action is important to staying a step ahead of political leaders who will inevitably face heavy pressure to prioritize the protection of their own domestic constituencies.

Rather than call for governments to disregard their own self interest in pandemic response, these actions will help build resilience in the global system. As a result, they will allow the international community to collectively focus on a globally optimal and equitable response to a global health crisis.

Introduction

The Covid-19 pandemic is an unprecedented global health crisis that has challenged the international community's ability to effectively respond on a global scale. Despite the stunning technological feat of developing effective and safe vaccines within a year of the discovery of SARS-CoV-2, the international community has faced difficulties implementing a global vaccination strategy to protect the world from the virus. As a result of this disunity and poor preparedness, Covid-19 has infected nearly 500 million people and has killed nearly six million people globally—numbers that continue to rise daily. Beyond the pandemic's public health impact, the spread of the virus has led to international economic, social, and national security crises, affecting people across borders, nationalities, and cultures. As the World Bank discusses, countries are likely to feel these negative effects for years to come, shedding light on the importance of country-specific and international preparedness for global health crises.²

It is widely accepted that global vaccination is key in ending the pandemic. In the pursuit of mass vaccination, countries, international organizations and the private sector have partnered and strategized to uplift the global community out of the pandemic. As such, these dynamics of diplomacy and modern international relations intersect with public health concerns.

The term vaccine diplomacy emerged to describe some of these dynamics and characterize the behavior of actors in the international system. This report analyzes vaccine development and diplomacy during the Covid-19 pandemic, focusing on bilateral and multilateral mechanisms used to combat the pandemic and the subsequent inequitable global vaccine ecosystem. International organizations initiated COVAX, an international organization whose goal is to manufacture and distribute vaccines, ensuring equitable access globally. However, this global effort has largely failed, as vaccine nationalism and state interests of high-income states have dominated multilateral mechanisms focused on equity and inclusion. This shortcoming has resulted in global inequality across states and negatively affects global health standards and status. Most notably, this report focuses on the U.S., India, China and Russia's role in the vaccine ecosystem.

Throughout the various stages of the pandemic, vaccine diplomacy has taken on a new shape, slowly shifting from bilateral and public-private mechanisms to international cooperation. Nonetheless, there are central challenges that complicate global vaccination. These include vaccine hesitancy, mis- and disinformation, vaccine distribution issues, trade policy barriers and vaccine nationalism.

As a result of the inadequate global response to this public health crisis and the impending challenges, this report sets forth three sets of recommendations for key actors to better prepare for the remainder of this pandemic and for future global health crises. These recommendations include improving vaccine delivery systems in the short term, decentralizing vaccination regulatory authority in the Global North and call for increased global investment in

² World Bank, "Pandemic Preparedness and Covid-19," 2021, <https://www.worldbank.org/en/topic/pandemics#1>.

public health infrastructure for the medium term. In the long term, we recommend diversifying the geographic distribution of vaccine production facilities to ensure equity.

Finally, the report takes a thematic approach due to the multitude of factors involved in shaping the balance between private and national interests and an equitable global response. Throughout the pandemic, all of these factors affected the course of vaccine diplomacy and were ultimately responsible for the globally fragmented and unequal reaction to the health crisis.

Methodology

This report's methodology consists of data collection and interviews. The report's analysis, conclusions, and recommendations are rooted in data sourced from Launch and Scale Faster, UNICEF and the World Bank, as well as six interviews with high-level, global health policy experts from the public, private, and civil society sectors. We are especially indebted to our interviewees:

Andrew Weber, a senior fellow at the Council on Strategic Risks' Janne E. Nolan Center on Strategic Weapons and a former Assistant Secretary of Defense for the U.S. Nuclear, Chemical & Biological Defense Programs. Mr. Weber has dedicated his professional life to countering nuclear, chemical, and biological threats and to strengthening global health security.

Donald McNeil, an American journalist and a former science and health reporter for The New York Times. Mr. McNeil reported on epidemics, including HIV/AIDS and the COVID-19 pandemic. Mr. McNeil's reporting on COVID-19 earned him widespread recognition for being one of the earliest and prominent voices covering the pandemic.

Jason Schwartz, an associate professor in the Department of Health Policy and Management at the Yale School of Public Health. Dr. Schwartz's research examines vaccines and vaccination policy, decision-making in medical regulation and public health policy, and the structure and function of scientific expert advice to governments.

Marine Buissonnière, an independent advisor in global health and humanitarian action and senior advisor to the Prevent Epidemics team at Resolve to Save Lives. Ms. Buissonnière is currently works as senior advisor to the Prevent Epidemics team at Resolve to Save Lives, where she partners with governments around the world to implement evidence-based strategies to find, stop, and prevent disease threats, with a particular focus in the past 18 months on COVID-19.

Natalia Pasternak, a Brazilian microbiologist, author, and science communicator with a PhD in bacterial genetics and a research fellow at the University of Sao Paulo. She is founder and current president of Instituto Questão de Ciência (Question of Science Institute).

Peter Hotez, a founding dean of the National School of Tropical Medicine at Baylor College of Medicine. Dr. Hotez is an internationally recognized physician-scientist with expertise in neglected tropical diseases and vaccine development. He leads the only product development partnership for developing new vaccines for hookworm, schistosomiasis and Chagas disease.

Scott Dowell, a deputy director for Surveillance and Epidemiology and coronavirus response leader at the Bill & Melinda Gates Foundation. Dr. Scott was formally recognized by the World Health Organization as a Collaborating Center and Scott was named as its first director. He led CDC's response to the earthquake and cholera epidemic in Haiti during 2010-2011, helping to rebuild the public health infrastructure and contributing to the saving of an estimated 7,000 lives.

The Vaccine Landscape

The inequality in the vaccine landscape has existed from the very outset of vaccine research and development (R&D), leading to the subsequent inequity between the Developed North and the Global South during the pandemic. By early 2021, 289 Covid-19 vaccines were in development, and 20 were in Phase 3 clinical trials.³ However, the successful Covid-19 vaccine R&D was concentrated in select countries, funded by government and Big Pharma partnerships rather than multilateral mechanisms.

This breadth of vaccines and the speed at which they were developed is unparalleled in recent public health emergencies. Among these vaccines were a variety of widely deployed vaccine technologies, including adenovirus and recombinant protein vaccines, as well as brand new innovative technologies, notably the mRNA technology. However, countries have relied heavily on only a few of these vaccine candidates to form the bulk of global vaccine supply. By March 2022, the three largest vaccines by volume were Pfizer/BioNTech, Sinovac, and Astrazeneca/Oxford.⁴ Each has been produced in quantities exceeding 2.4 billion doses.

This portfolio of vaccines created a foundational impact on how equity is defined and pursued by both state and non-state actors. A world with multiple vaccines that all have different characteristics, price points, storage requirements, and efficacy and safety data immediately raised the possibility of "vaccine discrimination."⁵ In the pursuit of the best possible vaccines at the earliest possible moment, many governments attempted to outcompete fellow nations for vaccine access at the expense of a global approach.

Vaccine Diplomacy in the Context of Covid-19

The term vaccine diplomacy emerged at the turn of the 21st century at a time when countries began to explicitly define global public health as a part of foreign policy.⁶ The term encompasses the use of vaccines to advance foreign policy goals, global cooperation required to address infectious diseases and pandemics, and the role played by key actors involved in public health efforts.⁷ Beyond nation states, private pharmaceutical corporations, public-private

³ Wouters et al., "Challenges in Ensuring Global Access to Covid-19 Vaccines: Production, Affordability, Allocation, and Deployment," *The Lancet* 397, no. 10278 (March 2021): 1023-1034, [https://doi.org/10.1016/S0140-6736\(21\)00306-8](https://doi.org/10.1016/S0140-6736(21)00306-8).

⁴ Data on vaccine production in this paragraph from Airfinity as of January 2022.

⁵ Muhammad Adil Ashraf, Ameer Muhammad, and Yasir Shafiq, "The Politics of Covid-19 Vaccine Distribution and Recognition," *Public Health Reviews* 42, (October 2021), <https://doi.org/10.3389/phrs.2021.1604343>.

⁶ Peter Hotez, "'Vaccine Diplomacy': Historical Perspectives and Future Directions," *PLoS Neglected Tropical Diseases* 8, no. 6 (June 2014), <https://doi.org/10.1371/journal.pntd.0002808>.

⁷ Ibid.

partnerships, philanthropic organizations, and multilateral organizations have played critical roles in shaping vaccine distribution and allocation. During this pandemic, new actors emerged and played a central role in the vaccine ecosystem, most notably COVAX.

These actors were motivated by a diverse set of interests and priorities, namely vaccine nationalism, rather than an equitable global approach. The state behavior that prioritizes domestic interests in terms of vaccine access has, over the course of the pandemic, become loaded with negative implications on hoarding vaccine doses. Unsurprisingly, given the huge political pressure that decision-makers faced to vaccinate their own population and limit the impact of the pandemic, it was challenging to design a multilateral mechanism to achieve global vaccine equity.

COVAX: A New Actor in the Covid-19 Pandemic

COVAX was developed in the early months of 2020 as the primary multilateral mechanism for vaccine manufacturing and distribution, specifically to ensure equitable access to vaccines globally. The creation of COVAX also aimed to prevent previous global response failures to the 2009 H1N1 pandemic, during which a select group of high income countries gained priority access to initial vaccines at the exclusion of others.⁸

Rather than governments or the WHO, the Vaccine Alliance (Gavi) and the Coalition for Epidemic Preparedness Innovations (CEPI) conceived of COVAX. Governments and the WHO only became involved during Spring 2020 after COVAX had been in the intermediate stages of development.⁹

COVAX adopted a multi-pronged strategy to appeal to the global community.¹⁰ The appeal to wealthier countries was that they could hedge their bets by buying into COVAX's portfolio of vaccines, assuming that this would increase their chances of gaining access to a successful vaccine. Mobilizing funding from high-income countries (HIC) would allow COVAX to distribute subsidized doses to lower income countries (LICs). However, wealthy countries did not initially prioritize involvement with COVAX but rather bilateral deals with manufacturers to secure domestic vaccination needs instead.

COVAX is predicated on the ethical ideas of equity. It also sets forth a strategy that prioritizes global vaccination as the key public health policy towards ending the pandemic. As more stakeholders bought into, supported, and endorsed COVAX over the course of 2020, it became the leading global mechanism for achieving equity in global vaccine distribution. Failure to sufficiently support the goals and implementation of a global response, such as COVAX, is an important reason why vaccination rates remain low in many parts of the world and the pandemic

⁸ VaccinesWork, "Why Delivering COVID-19 Vaccines Might Be Just as Hard as Developing Them," *Gavi*, January 11, 2021,

<https://www.gavi.org/vaccineswork/why-delivering-covid-19-vaccines-might-be-just-hard-developing-them>.

⁹ Interviews with practitioners familiar with early discussions from January - March 2020 that led to the formation of COVAX. Interviews conducted between January-March 2022. Marine Buissonière, Interview by SIPA Capstone Group, Zoom, February 22, 2022.

¹⁰ Nature, "Why a Pioneering Plan to Distribute Covid Vaccines Must Succeed," *Nature* 589, (January 2021): 170, <https://doi.org/10.1038/d41586-021-00044-9>.

continues to burn out of control. Throughout the pandemic, attempts to create a unified global response were undermined by competing forces that pushed the world towards a fragmented and unequal approach.

Defining Equity

The international community has yet to reach a widely-accepted definition of equity in regards to global vaccination, which also reflects the failure to establish a coherent global response to the pandemic.¹¹ In this report, we define equity as equal access to vaccine doses globally and the distribution of limited resources based on need, rather than economic capacity and incentives to fund the vaccine manufacturing itself. Definitions of equity are not only of symbolic importance but have influenced the behavior of states in the international system and how they define their own obligations towards vaccinating the world.

The WHO's currently endorsed target for vaccination is 70% of the global population by the middle of 2022, which does not take into account challenges to vaccine access.¹² Given the difficulties with distribution and administration of shots as well as with vaccine hesitancy, global targets of equity need to be revised to focus vaccine supplies where they can do the most good and deliver shots into arms.

¹¹ KT Storeng et al., "Covax and the Many Meanings of Sharing" *BMJ Global Health* 6, (October 2021), <http://dx.doi.org/10.1136/bmjgh-2021-007763>.

¹² Independent Allocation of Vaccines Group (IAVG) of COVAX, "Achieving 70% Immunization Coverage by Mid-2022," *WHO*, December 23, 2021, <https://www.who.int/news/item/23-12-2021-achieving-70-covid-19-immunization-coverage-by-mid-2022#:~:text=%5B4%5D%20These%20targets%20were%20then%20population%20coverage%20by%20mid%2D2022>.

Vaccine Development and Diplomacy

COVAX intended to de-risk the global development of vaccine candidates for the novel virus but bilateral agreements between wealthy countries and vaccine developers and manufacturers largely stymied this effort. COVAX aimed to provide free doses to low-income countries and allow middle and high income countries to buy into a portfolio of vaccines to secure better terms with pharmaceutical companies. Nevertheless, higher income countries competed against each other to secure multiple vaccine procurement deals, squeezing out countries with lower purchasing power from early vaccine deliveries.

Most notably, the U.S. set the precedent of heavily investing funds into vaccine R&D of multiple vaccine candidates, shaping the dynamics of vaccine accessibility globally. The Trump Administration used its executive authority to allocate resources from the Provider Relief Fund¹³ and to scale up manufacturing capabilities while candidate vaccines were undergoing clinical trials. The goal was to produce 300 million doses mainly for the U.S. population by the end of 2021. Six vaccine candidates received funding from Operation Warp Speed (OWS): Moderna and Pfizer/BioNTech, Janssen and AstraZeneca, and Sanofi/GSK and Novavax. By January 2021, five of these candidates reached phase three clinical trials, of which Moderna and Pfizer received Emergency Use Authorization from the Food and Drug Administration (FDA).¹⁴

Among the manufacturing challenges vaccine producers faced, and which OWS sought to overcome, were: the limited manufacturing capability of the existing infrastructure; the disruption of global supply chains as a consequence of the lockdowns and worldwide restrictions imposed by governments in strategic resource and manufacturing countries; and the lack of skilled personnel to manage vaccine production. These challenges highlight the importance of stockpiling key inputs necessary for vaccine production and developing institutional capacity—in terms of both personnel and production capacity.¹⁵

While former President Obama promoted a focus on building capacity to rapidly deploy vaccines in the aftermath of the H1N1 pandemic, the “Warp Speed” in OWS was necessary because the U.S. needed to rapidly compensate for limited pre-existing capacity in place prior to the pandemic.¹⁶ The similar lack of an established, pre-existing, global vaccine development and distribution system that could have served as an alternative to OWS only made it easier for the U.S. to take this “go it alone” approach. At the time the U.S. was implementing OWS in summer 2020, COVAX was still a new and untested idea.

¹³ Established in the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), The Provider Relief Fund (PRF) was established to reimburse, through grants or other mechanisms, eligible health care providers for increased expenses or lost revenue attributable to Covid-19.

¹⁴ US GAO, “Operation Warp Speed: Accelerated Covid-19 Vaccine Development Status and Efforts to Address Manufacturing Challenges,” February 11, 2021, <https://www.gao.gov/products/gao-21-319>.

¹⁵ Andrew Weber, Interview by SIPA Capstone Group, Zoom, March 15, 2022.

¹⁶ In 2009, President Obama viewed the 9-month timeline to deliver a H1N1 vaccine to the American public as too slow and tasked his administration with speeding up the process. However, 11 years later it would take 12 months from December 2019 for the first Americans to receive a vaccine. Insights on Obama administration response to H1N1 are sourced from Interview with Andrew Weber on March 15, 2022.

This system played out in a predictable manner where the United States used its position to prioritize the domestic population. When Pfizer announced promising early data about its vaccine, the U.S. government placed an advanced-purchase order of 100 million doses in July 2020, with an option to purchase 500 million more.¹⁷ By contrast, COVAX lacked the early funding to place similar advance commitments and finance a portfolio of vaccine candidates on the same scale as HICs like the U.S.

COVAX reached an early agreement with AstraZeneca, which committed to making its vaccine widely available and at zero-profit during the pandemic. The AstraZeneca vaccine was co-developed with Oxford University, and its platform was based on over two decades of research and development. This vaccine was developed with 97% public and charitable funding. Among its main contributors, the European Commission (34.0%), the Wellcome Trust (20.4%) and CEPI (17.5%) were the biggest funders of research until the start of the Covid-19 pandemic.¹⁸ Soon after, the Serum Institute of India (SII)¹⁹ reached a sub-licensing agreement with the company to supply one billion COVISHIELD doses to low- and middle-income countries.²⁰ With the Emergency Use Licensing (EUL) granted by the WHO in February 2021, more than 140 countries gained access to this vaccine through COVAX. Shortly after, the first shipment of AstraZeneca vaccines arrived in Ghana, a country with low prevalence of Covid-19 in comparison to other countries at that time, and more than two months after the first doses were administered in highly-developed countries, such as the United Kingdom.²¹

For resource-limited countries, the AstraZeneca vaccine represented the most suitable option since it does not require the ultra cold-chain management required for the Pfizer and Moderna vaccines. This soon created a dependence of COVAX on this vaccine, which was seriously impacted when India banned vaccine exports while experiencing the devastating consequences of a second Covid-19 wave. Overall, AstraZeneca vaccines accounted for 95% of the doses COVAX distributed in 2021.²²

As rich countries landed early commitments from pricey vaccine producers, such as Pfizer and Moderna, China targeted countries left behind and capitalized on the slow deliveries of

¹⁷ Pfizer, “Pfizer and BioNTech Announce an Agreement with U.S. Government for up to 600 Million Doses of mRNA-based Vaccine Candidate Against SARS-CoV-2,” July 22, 2020, <https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-announce-agreement-us-government-600>.

¹⁸ Samuel Cross et al., “Who Funded the Research Behind the Oxford–AstraZeneca COVID-19 Vaccine?” *BMJ Global Health* 6, no. 12 (November 2021), <http://dx.doi.org/10.1136/bmjgh-2021-007321>.

¹⁹ The world's largest vaccine manufacturer by number of doses produced and sold globally.

²⁰ AstraZeneca, “AstraZeneca Covid-19 Vaccine Authorised for Emergency Use by the World Health Organization,” February 15, 2021, <https://www.astrazeneca.com/media-centre/press-releases/2021/astrazeneca-Covid-19-vaccine-authorised-for-emergency-use-by-the-world-health-organization.html>.

²¹ Stephanie Baker and James Paton, “The World’s Best Hope to End the Pandemic Still Needs More Doses,” *Bloomberg*, June 3, 2021, <https://www.bloomberg.com/news/features/2021-06-03/when-will-covid-pandemic-really-end-covax-says-poor-nations-need-vaccines>.

²² Muhammad Adil Ashraf, Ameer Muhammad, and Yasir Shafiq, “The Politics of Covid-19 Vaccine Distribution and Recognition.” *Public Health Reviews* 42 (2021), <https://doi.org/10.3389/phrs.2021.1604343>.

Western vaccine manufacturers.²³ China had an early-mover advantage in the race to provide vaccines. International manufacturing, marketing and distribution were state-led engagements.

In summer 2020, Chinese vaccine manufacturers extended trials outside of mainland China to non-Chinese populations. By the end of the year, China donated the first Sinopharm²⁴ doses to low- and middle-income countries. Similar to AstraZeneca, the inactivated virus technologies of Sinopharm also made them more suitable for the countries that lacked the cold chain necessary for storage of mRNA vaccines.²⁵

China accompanied these deliveries with a public diplomacy campaign to position itself as a global health leader. Beijing donated personal protection equipment, medical teams, and test kits overseas to contain the narrative condemning its government for negligence in stopping the spread of Covid-19.²⁶ China finally joined COVAX in October 2020 and invited other countries, namely the U.S., to commit to this multilateral effort.²⁷ The implication is that despite greater widespread availability of Chinese-made vaccines, potential recipient countries searched for alternatives that were more effective at protecting their population. This has somewhat lessened the impact of China's early diplomatic engagements.

Russia also achieved an early-mover advantage with its manufacturing of the Sputnik V vaccine. Russia's Direct Investment Fund²⁸ played a key role in securing deals with almost 70 countries to either grant vaccine emergency use authorization or sign advance-procurement deals.²⁹ This highlights Russian authorities' preference to work directly with countries rather than through COVAX.³⁰ Russia was especially proactive in courting Eastern European countries that were unable to secure sufficient advance access to alternative vaccines.

By October 2021, without WHO Emergency Use Licensing (EUL), the Russian government pledged up to 300 million doses to COVAX.³¹ As of April 2022, Sputnik V continues to await approval by the WHO while some recipient countries have raised concerns

²³ Seow Ting Lee, "Vaccine Diplomacy: Nation Branding and China's Covid-19 Soft Power Play," *Place Branding and Public Diplomacy*, (July 2021): 1–15, <https://doi.org/10.1057/s41254-021-00224-4>.

²⁴ China National Pharmaceutical Group Corporation (Sinopharm) is a Chinese state-owned enterprise.

²⁵ Smriti Mallapaty, "China's COVID Vaccines are Going Global - But Questions Remain," *Nature* 593, (May 2021): 178-179, <https://doi.org/10.1038/d41586-021-01146-0>.

²⁶ Kirk Lancaster and Michael Rubin, "Assessing the Early Response to Beijing's Pandemic Diplomacy," *CFR*, April 30, 2020, <https://www.cfr.org/blog/assessing-early-response-beijings-pandemic-diplomacy>.

²⁷ Ministry of Foreign Affairs of the People's Republic of China, "Foreign Ministry Spokesperson Hua Chunying's Remarks on China Joining COVAX," October 9, 2021, <https://www.mfa.gov.cn/ce/cegv//eng/zgyw/t1822631.htm>.

²⁸ The Russian Direct Investment Fund was established in 2011 by the Russian government as a sovereign wealth fund to make investments in companies of high-growth sectors of the Russian economy.

²⁹ Grace Kier and Paul Stronski, "Russia's Vaccine Diplomacy is Mostly Smoke and Mirrors," *Carnegie Endowment for International Peace*, August 3, 2021,

<https://carnegieendowment.org/2021/08/03/russia-s-vaccine-diplomacy-is-mostly-smoke-and-mirrors-pub-85074#:~:text=Russian%20scientists%20rolled%20out%20the,vaccine%20to%20lose%20its%20luster>.

³⁰ Jenny Lei Revelo, "COVAX Will be a 'Small Part' of Russia's Sputnik V Portfolio, Fund CEO says," *Devex*, January 22, 2021,

<https://www.devex.com/news/covax-will-be-a-small-part-of-russia-s-sputnik-v-portfolio-fund-ceo-says-98964>.

³¹ Vladimir Isachenkov and Tanya Titovaap, "Russia, WHO Differ on When Approval will Come for Sputnik V," *AP*, October 13, 2021,

<https://apnews.com/article/coronavirus-pandemic-business-europe-russia-pandemics-1ca0650bf5ec7b404e2490c107a40dc2>.

about the vaccine's efficacy. Moreover, other logistical challenges translated to a failure to fulfill numerous contracts, which led to negative reactions from recipient countries. Iran, Guatemala, Honduras, Mexico, Argentina, Ghana, and Angola, to name a few, expressed dissatisfaction with the Russian failure to deliver on its promised doses.³² In addition, Russia's military invasion of Ukraine has further isolated the country from key, multilateral players and may have severely reduced the chances for its vaccine to obtain EUL in the near future. Despite Russia's best efforts to maximize its influence, the country failed to effectively fill in gaps in global vaccine supply.

According to COVAX's principles, unearmarked doses were the standard to facilitate equitable access and allow flexible deployment to meet participants' needs. Requests by donors to adjust country allocation decisions were not accepted.³³ Thus, donor countries might have been dissuaded from participating, likely concerned about losing agency over recipient nations and regions. Therefore, in the early stages, vaccine-producing countries decided to bypass COVAX and arrange bilateral agreements.

By March of 2021, world leaders stressed the need to share the committed surplus doses through multilateral mechanisms.³⁴ The existing global health framework includes the WHO's restrictive list of Stringent Regulatory Authorities (SRAs) that can make abridged assessments of vaccine candidates, making the EUL authorization process more restrictive to the other National Regulatory Authorities (NRAs) not included. These regulators, located exclusively in wealthy countries, prioritized vaccines that were best suited for their own populations as the first candidates they evaluated and gave emergency authorization.

³² BBC, "Covid: Stalled Russian Vaccines Cause Global Anger," July 29, 2021, <https://www.bbc.com/news/world-europe-58003893>.

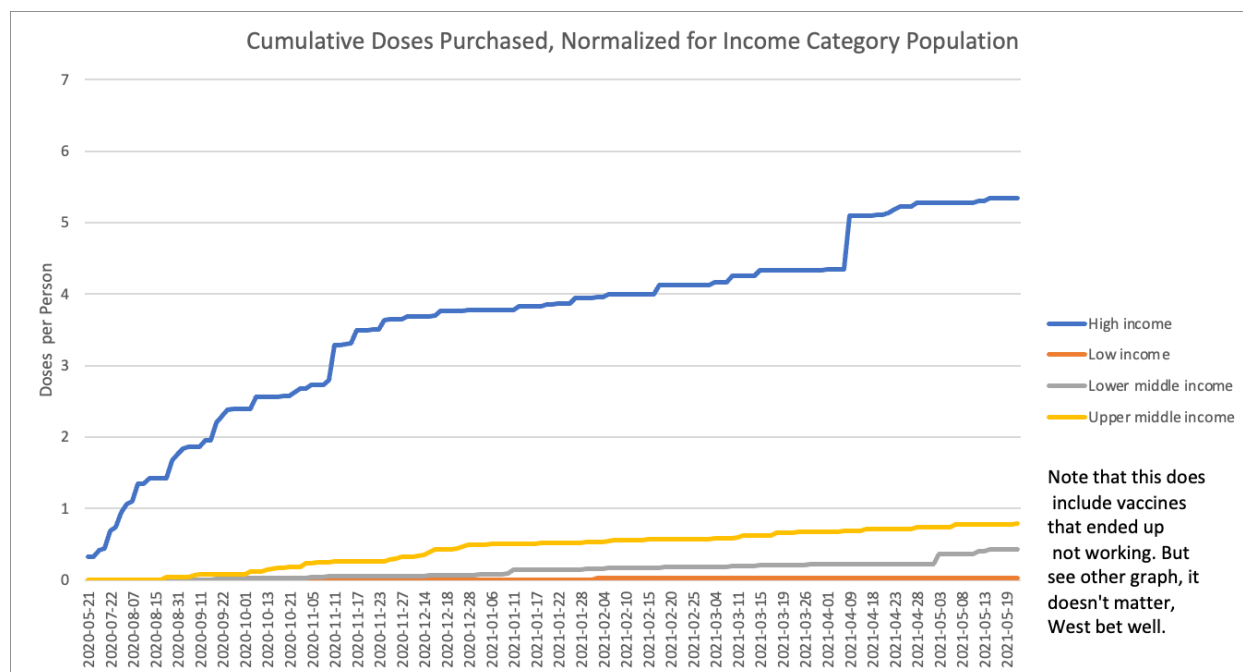
³³ COVAX, "Principles for Shared Covid-19 Doses Guide," February 3, 2020, https://www.gavi.org/sites/default/files/covid/covax/COVAX_Principles-COVID-19-Vaccine-Doses-COVAX.pdf.

³⁴ Samantha Kiernan et al., "The Politics of Vaccine Diplomacy," *Think Global Health*, June 4, 2021, <https://www.thinkglobalhealth.org/article/politics-vaccine-donation-and-diplomacy>.

Initial Vaccine Purchases, Donations, and Distribution

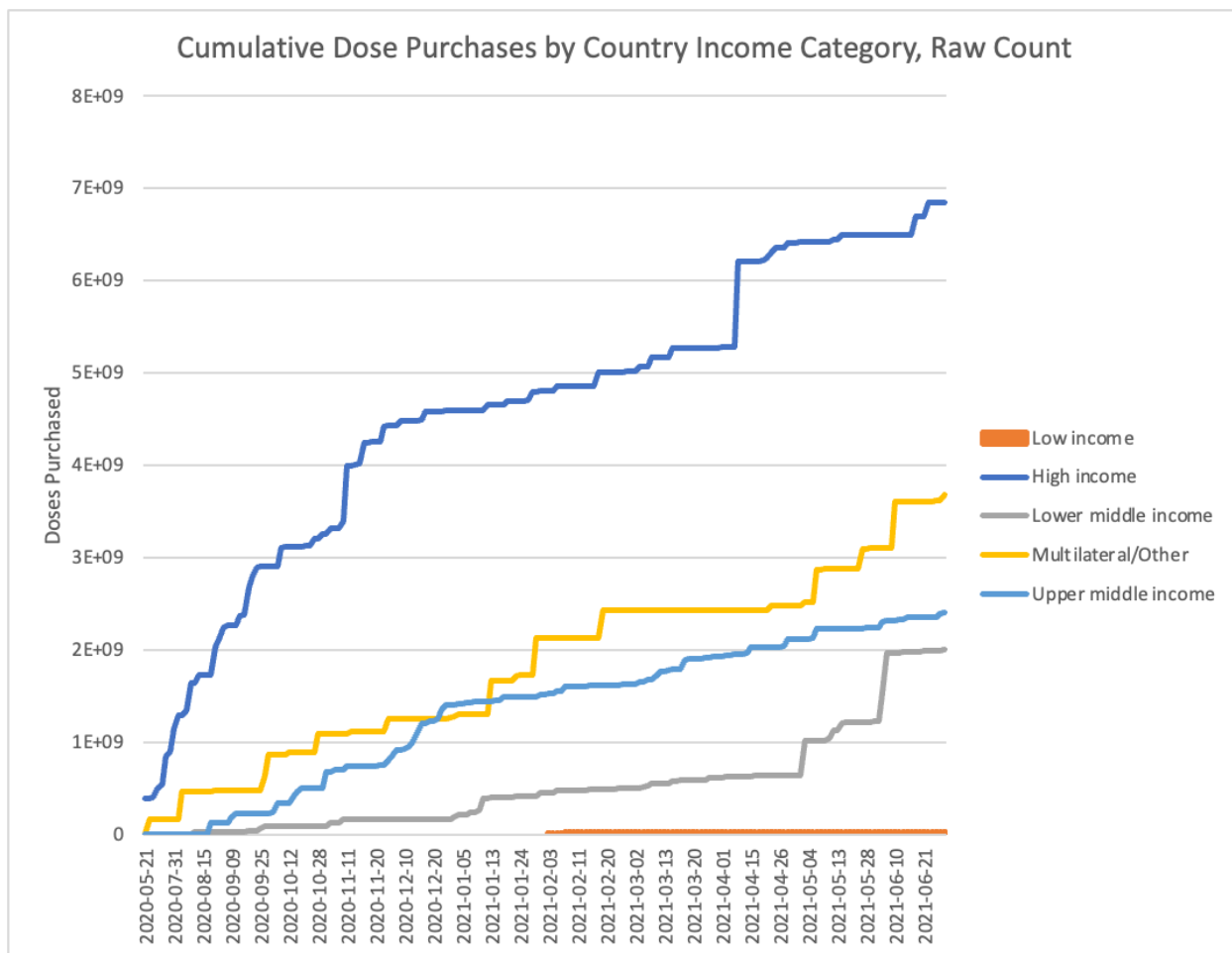
Upon approval, HICs bought up most of the stocks of the vaccines that proved to be most efficacious, while upper middle-income (UMICs), lower middle-income (LMICs), and LICs mostly relied on vaccines with lower or unclear efficacy.

Vaccination Trends



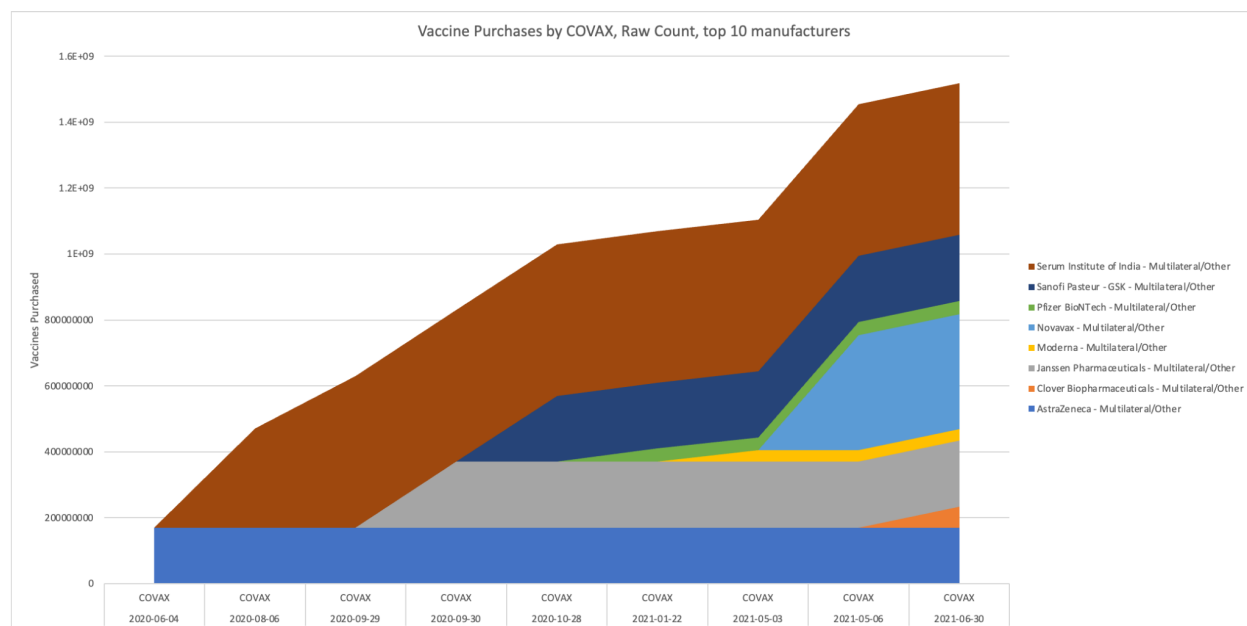
Sources: UNICEF Covid-19 Vaccine Market Data, World Bank, Launch and Scale Faster.

The figure above shows population-normalized vaccine purchase deals for all country income categories. HICs immediately made deals for far more than one dose per person and, by the end of the phase, cumulatively purchased over five doses per person. All other income categories were able to purchase far fewer vaccines during this period. The raw purchase numbers tell a similar story.



Sources: UNICEF Covid-19 Vaccine Market Data, World Bank, Launch and Scale Faster.

Multilateral purchases, mostly but not exclusively by COVAX, were significant but importantly, are not the same vaccines that high income countries purchased.

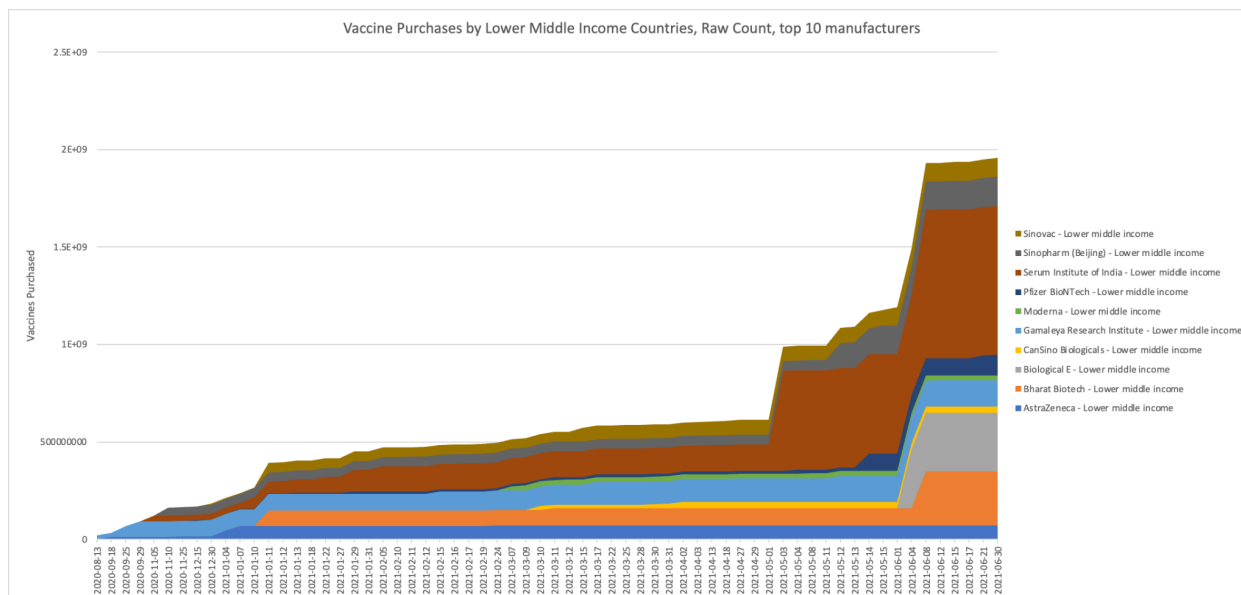


Source: UNICEF Covid-19 Vaccine Market Data, Launch and Scale Faster.

The figure above shows that the vast majority of COVAX purchases during early stages of vaccine rollout were from SII's AstraZeneca vaccines, Sanofi Pasteur, and Novavax. The latter two ultimately did not release significant numbers of vaccines until much later in the pandemic.³⁵ Multilateral donations during this period were negligible, as COVAX was unable to deliver any significant quantities of vaccine.

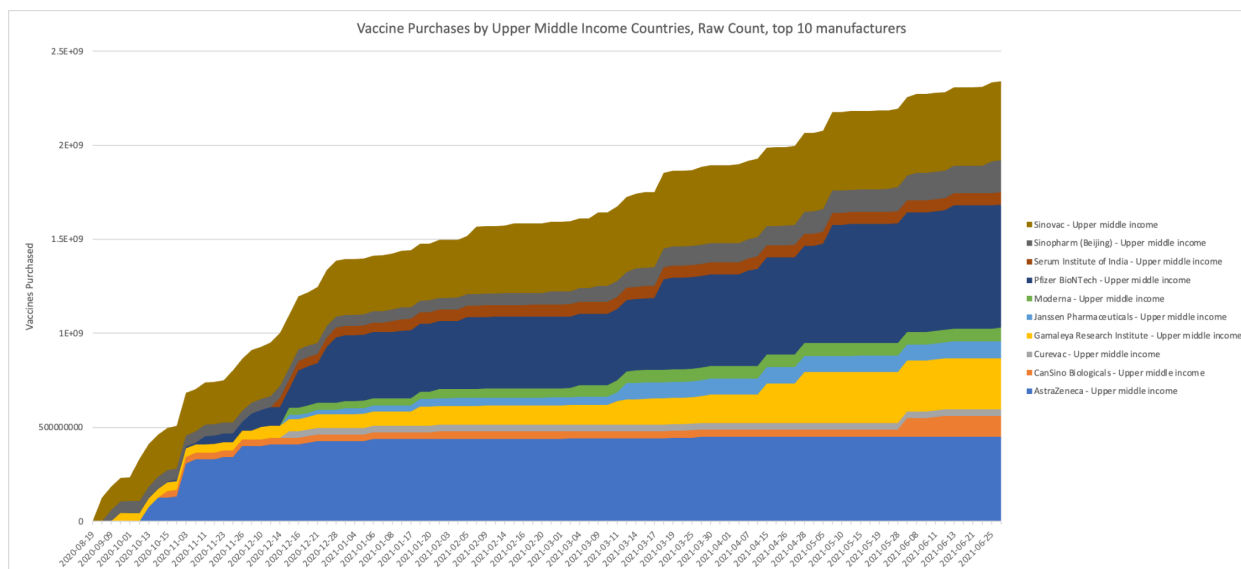
LMICs were able to buy significant, though still insufficient, quantities of vaccines, almost exclusively from China, India, and Russia. LMICs were especially reliant on Indian vaccines, making up over half of total vaccine purchases in LMICs.

³⁵ Kevin Dunleavy, "Novavax Begins Delivery of its Long-delayed Covid-19 Vaccine in Europe," *Fierce Pharma*, February 23, 2022, <https://www.fiercepharma.com/pharma/novavax-begins-delivery-its-long-awaited-Covid-19-vaccine-europe>.



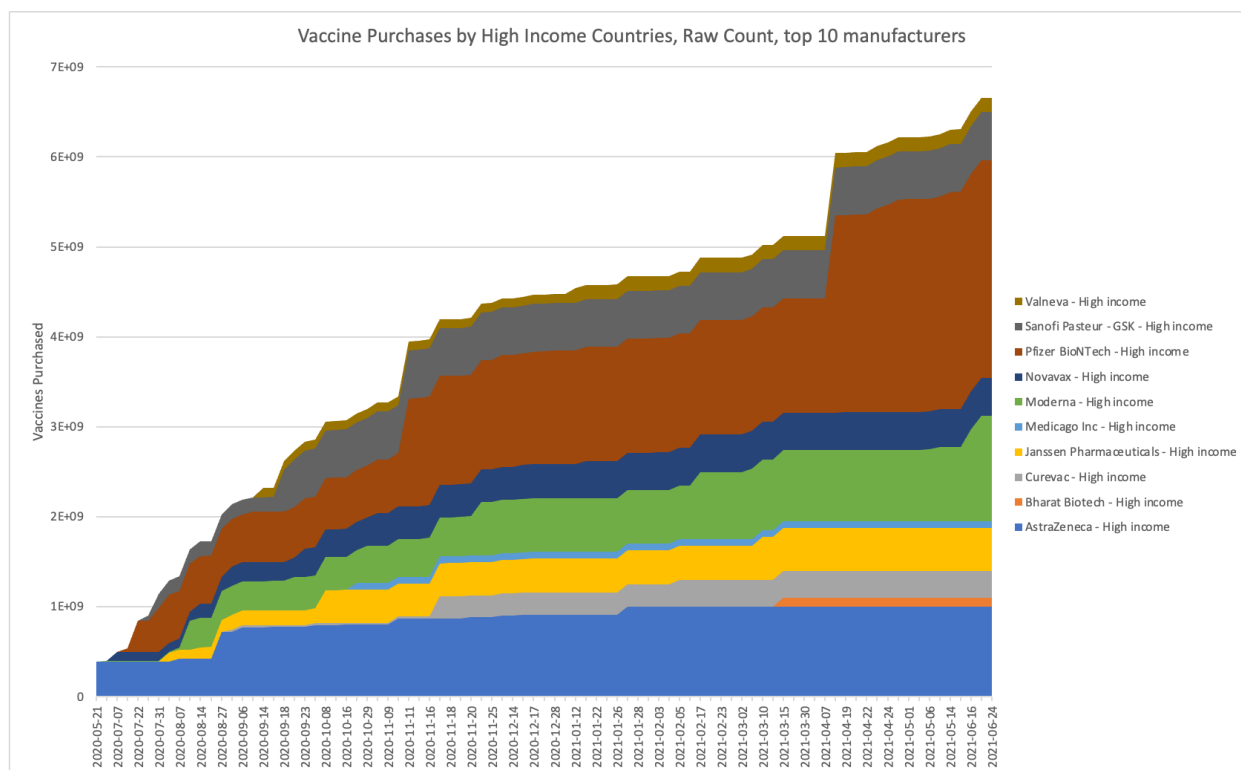
Sources: UNICEF Covid-19 Vaccine Market Data, World Bank, Launch and Scale Faster.

UMICs relied heavily on Chinese and Indian vaccines and manufacturing though they were also able to secure significant quantities of the Pfizer vaccine.



Sources: UNICEF Covid-19 Vaccine Market Data, World Bank, Launch and Scale Faster.

The vaccine distribution in high-income countries looks dramatically different.



Sources: UNICEF Covid-19 Vaccine Market Data, World Bank, Launch and Scale Faster.

As previously discussed, the discrepancy between the quantities purchased by HICS and COVAX is explained by Western countries, especially the United States, sponsoring the development of vaccines separately from COVAX and receiving preferential access. The more significant factor, however, is that wealthier countries were simply able to pay more for vaccines than COVAX and poorer countries.³⁶ Although the cold-chain requirements of mRNA vaccines are more intensive than adenovirus vaccines like Janssen or AstraZeneca, it doesn't explain why COVAX was unable to procure larger quantities of the Janssen vaccine. Simply put, manufacturers largely prioritized rich countries over COVAX.

As is clear from the figures above and previous discussion, Chinese vaccines were also critical for all non-HICs during this time. However, after the astounding efficacy results of the Moderna and Pfizer vaccines against the ancestral SARS-CoV-2 strain, the Chinese vaccines' relatively middling results made them far less desirable. During this period, it appeared that long-term vaccine effectiveness against infection, not just severe disease, was possible, and so the non-mRNA vaccines were perhaps excessively discounted in global public consciousness. Some current results suggest, for example, that the Sinovac vaccine is nearly 100% effective against severe disease, although earlier studies suggested far less.³⁷ This inaccurate perception of

³⁶ Scott Dowell, Interview by SIPA Capstone Group, Zoom, March 22, 2022; Donald McNeil, Interview by SIPA Capstone Group, Zoom, March 8, 2022.

³⁷ WHO, "The Sinovac-CoronaVac COVID-19 Vaccine: What You Need to Know," September 2, 2021, <https://www.who.int/news-room/feature-stories/detail/the-sinovac-Covid-19-vaccine-what-you-need-to-know>.

inefficacy likely affected the rollout during this time period in countries that were heavily reliant upon Chinese vaccines.

Despite some expectations that bilateral vaccine donations would be used as a tool of diplomacy, from fall 2020 to summer 2021, a negligible quantity of vaccines was donated on a population-normalized basis. Furthermore, no significant number of vaccines were donated to any income group despite well-publicized donations by wealthy countries.³⁸ By June 2021, when wealthy countries already accepted delivery of hundreds of millions of vaccine doses, bilateral donations totaled less than 50 million globally—which, to put into perspective, is not enough to vaccinate the UK itself.³⁹

In sum, between Fall 2020 and Summer 2021, three dynamics dominated. HICs were able to acquire highly-efficacious vaccines sufficient to vaccinate their entire populations and mount successful vaccination campaigns. UMICs, LMICs, and LICs were heavily reliant on Chinese and Indian vaccine purchases (including through COVAX). Of these three mechanisms, only Chinese vaccines were delivered to non-HICs in significant quantities. While HICs ended this period with significant proportions of their populations vaccinated, other income categories of countries remained vulnerable to the virus as the more dangerous Delta variant became dominant.

Variants and Boosters

Vaccine nationalism prevailed as the dominant strategy for many countries even as new variants emerged. The emergence of the Delta and Omicron variants prompted wealthier countries to prioritize the use of booster doses as a means of protecting their populations. Of the 4 billion Pfizer vaccine doses expected for 2021, HICs purchased nearly 70 percent, contributing to further vaccine inequity.⁴⁰ Further, the WHO noted that aggressive boosting would greatly constrain supplies and predicted that the world would face a shortfall of nearly 3 billion doses.⁴¹ HICs disregarded this call and provided boosters to vulnerable segments of their populations, despite research indicating that vaccines were still highly effective against severe disease and that waning antibody levels were typical of all vaccines.⁴²

³⁸ Berkeley Lovelace Jr., "US To Share 60 Million Doses of AstraZeneca Vaccine with Other Countries," *CNBC*, April 26, 2021, <https://www.cnbc.com/2021/04/26/covid-vaccine-us-to-share-60-million-astrazeneca-doses-with-other-countries.html>.

³⁹ Samantha Kiernan et al., "The Politics of Vaccine Diplomacy," *Think Global Health*, June 4, 2021, <https://www.thinkglobalhealth.org/article/politics-vaccine-donation-and-diplomacy>.

⁴⁰ Indermit Gill and Michele Ruta, "Why global vaccine equity is the prescription for a full recovery," *Brookings Institution*, February 11, 2022, <https://www.brookings.edu/blog/future-development/2022/02/11/why-global-vaccine-equity-is-the-prescription-for-a-full-recovery/>.

⁴¹ Donato Paolo Mancini and Steven Bernard, "Covid-19 Boosters in Rich Countries will Create 3bn Jobs Shortfall, Warns WHO," *FT*, December 15, 2021, <https://www.ft.com/content/54bec909-1f06-43ff-9bc0-391202eabf9d>.

⁴² Nature, "The WHO is Right to Call a Temporary Halt to COVID Vaccine Boosters," *Nature* 596, (August 2021): 317, <https://doi.org/10.1038/d41586-021-02219-w>.

This form of vaccine nationalism was largely criticized by those who had yet to receive their initial doses as the divide in vaccination rates between HICs and LICs continued to grow. This generated an alarming disparity into early 2022: around 6 percent of individuals were fully vaccinated in LICs while 72 percent of individuals in HICs were fully vaccinated.⁴³ Despite growing research that underscored the inverse relationship between higher global vaccination rates and variant emergence, many HICs continued to stockpile their own vaccines, leaving LICs and LMICs at the mercy of donations.⁴⁴

With the surge of new variants, the Chinese and Russian-made vaccines also came under scrutiny for their overall efficacy and safety. Although initial studies supported the belief that these vaccines were safe and effective, some criticism was directed at Russian and Chinese scientists and regulating authorities for refusing to provide full access to raw data from trials as well as various inconsistencies in efficacy data.⁴⁵ Despite its early gains in vaccine diplomacy, China and Russia failed to sustain their early mover advantages.

The U.S., under a new administration, began to prioritize COVAX donations as a means of burnishing reputation by the middle of 2021. The U.S. and the EU soon became the largest contributors of vaccine doses to COVAX due to heightened manufacturing capabilities. Despite the number of doses donated falling below expectations, one of the major challenges with respect to country engagement with COVAX was the failure to fulfill pledges in a timely manner. During 2021, many governments promised to deliver vaccine doses though they were frequently undelivered.⁴⁶ For example, by the end of 2021, the U.S. had only delivered 43 percent of its pledged donations, and the UK also only delivered around 22 percent of its pledge.

Challenges in Achieving Equitable Vaccine Access

As of February 2022, fewer than 10% of citizens in LICs received at least one vaccine dose.⁴⁷ This is attributed to challenges the challenges of vaccine hesitancy, mis- and disinformation, vaccine distribution issues, trade policy barriers and vaccine nationalism.

⁴³ Chloe Taylor, “These Countries have the Lowest Covid Vaccination Rates in the World,” *CNBC*, February 2, 2022, <https://www.cnn.com/2022/02/02/these-countries-have-the-lowest-covid-vaccination-rates-in-the-world.html>. See also Our World in Data, “Coronavirus (Covid-19) Vaccinations,” accessed April 13, 2022, <https://ourworldindata.org/covid-vaccinations>.

⁴⁴ UnityPoint Health, “Why Viruses Mutate, Explained by an Infectious Disease Expert,” January 2, 2022, <https://www.unitypoint.org/article.aspx?id=db428f77-6e61-497b-91ce-1317a3396dd8>.

⁴⁵ Bianca Nogrady, “Mounting Evidence Suggests Sputnik COVID Vaccine is Safe and Effective,” *Nature* 595, (July 2021): 339-340, <https://doi.org/10.1038/d41586-021-01813-2>.

⁴⁶ BBC, “Covax: How Many Covid Vaccines have the US and the Other G7 Countries Pledged?” September 23, 2021, <https://www.bbc.com/news/world-55795297>.

⁴⁷ Indermit Gill and Michele Ruta, “Why Global Vaccine Equity is the Prescription for a Full Recovery,” *Brookings*, February 11, 2022, <https://www.brookings.edu/blog/future-development/2022/02/11/why-global-vaccine-equity-is-the-prescription-for-a-full-recovery/>.

Vaccine hesitancy

Despite the clear achievements of developing effective vaccines to combat Covid-19 in a short timespan, weakened vaccine demand due to vaccine hesitancy has emerged as a major challenge to higher global vaccination rates. Recipient populations began to question the efficacy of doses and refused to receive shots. Vaccine diplomacy, despite succeeding in guaranteeing doses through sales and/or donations, has its limitations.

Vaccine hesitancy, which existed well before the start of this pandemic and continues to grow, stems from the lack of confidence in the efficacy and safety of vaccines but also has historical, cultural, and systemic underpinnings. According to a study of 44,260 individuals across HICs, MICs and LICs,⁴⁸ the report finds that people in LMIC are considerably more willing to receive a Covid-19 vaccine. To illustrate, 80.3% reported as willing in LMIC, while 64.6% reported as willing in the US, and 30.4% in Russia.⁴⁹

Vaccine hesitancy in Africa is particularly relevant, given the continent's overall low vaccination rates. This leads to higher risk of further mutations and variants, as more people continue to become infected. Hesitancy within the continent also highlights the importance of considering the local context when implementing vaccination strategies. The history of colonial medical and vaccine research abuse largely diminishes trust in current vaccines.⁵⁰ This mistrust, combined with the lack of nuanced and culturally informed understandings of vaccine hesitancy, feeds into the challenge of getting shots into arms.

Vaccine hesitancy has also challenged the vaccine rollout in the U.S. and the EU. Despite wide availability and access to vaccines, a significant percentage of the West remains unvaccinated: 77% of the U.S. has received at least one vaccine dose; 68% in Europe; and 78% in the UK.⁵¹ While reasons for low uptake vary among and within countries, vaccines and mandates have become highly politicized issues, especially in the United States.⁵²

Mis- and Disinformation

The pandemic has also been plagued by an “infodemic”—an overwhelming amount of information in digital and physical environments during a disease outbreak.⁵³ This includes misinformation, which reiterates longstanding concerns and amplifies confusing messages to communities via social media, religious groups, and other outlets.

⁴⁸ Julio S. Solís Arce et al., “COVID-19 Vaccine Acceptance and Hesitancy in Low- and Middle-Income Countries,” *Nature Medicine* 27, (August 2021):1385–1394, <https://doi.org.ezproxy.cul.columbia.edu/10.1038/s41591-021-01454-y>.

⁴⁹ Ibid.

⁵⁰ Polydor Ngoy Mutombo et al., “COVID-19 Vaccine Hesitancy in Africa: a Call to Action,” *The Lancet* 10, no. 3 (March 2022): 320-321, [https://doi.org/10.1016/S2214-109X\(21\)00563-5](https://doi.org/10.1016/S2214-109X(21)00563-5).

⁵¹ Our World in Data, “Coronavirus (Covid-19) Vaccinations,” accessed April 13, 2022, <https://ourworldindata.org/covid-vaccinations>.

⁵² David Adler, “Stop Treating Vaccine Hesitancy Like an Afterthought,” *Foreign Policy*, December 9, 2021, <https://foreignpolicy.com/2021/12/09/covid-vaccine-hesitancy-issue-global-south-north-supplies-health/>.

⁵³ WHO, “Infodemic,” https://www.who.int/health-topics/infodemic#tab=tab_1.

The spreading of false claims through social media, particularly, do not recognize that concerns and conspiracies are shaped by political environments and individuals' own interpretations of vaccine policies and politics.⁵⁴ The global flow of information and disinformation on social media is generating the same hesitancy that has stymied vaccination efforts in the West.⁵⁵ As a partial result of media messaging, vaccine brand consciousness and loyalty has emerged for the first time in vaccine history.⁵⁶ These factors reinforce and add an additional layer of complexity to vaccine hesitancy.

Vaccine distribution challenges

COVAX sought to diversify its vaccine portfolio to mitigate distribution challenges and complicated cold-chain requirements of some vaccines. This diversification included both single and double-dose vaccines. The single-dose vaccine better serves populations in developing countries, rural areas, refugee camps and other harder-to-reach places. This is largely due to the complications of the same patient accessing a vaccination site twice, within the recommended window of time. On the other hand, the double-dose vaccine is less problematic for areas with more access to doctors offices, pharmacies and city centers because patients have an easier time accessing vaccination sites twice.

Even when low-income countries receive Covid-19 vaccine doses, distribution difficulties have prevented them from being used and thus go to waste. For reference, in pre-Covid-19 vaccination campaigns in the developing world, over one third of vaccine doses were wasted due to supply chain and distribution issues.⁵⁷ Some recipient countries were less prepared to accept the doses and administer them before they expire, contributing to wastage. Timing, therefore, is crucial and made difficult by the provisions accompanying donations or bilateral deals. Questions regarding transparency in decision-making have also emerged, as observers believe doses are being earmarked according to political objectives.

Trade policy barriers

Restrictive trade policies have contributed to further delays in the transport of inputs and goods necessary for vaccine production and distribution.⁵⁸ Export restrictions on medical products have widened the disparity in vaccination rates. The EU and the U.S. have most notably

⁵⁴ Melissa Leach et al., "Vaccine Anxieties, Vaccine Preparedness: Perspectives from Africa in a Covid-19 Era," *Social Science & Medicine* 298, (April 2022), <https://doi.org/10.1016/j.socscimed.2022.114826>.

⁵⁵ Stephanie Nolen, "As Vaccines Trickle Into Africa, Zambia's Challenges Highlight Other Obstacles," *NYT*, December 11, 2021, <https://www.nytimes.com/2021/12/11/health/covid-vaccine-africa.html>.

⁵⁶ Donald McNeil, Interview by SIPA Capstone Group, Zoom, March 8, 2022.

⁵⁷ Mario Songane, "Challenges for nationwide vaccine delivery in African countries," *International Journal of Health Economics and Management* 18, (October 2017): 197–219, <https://doi.org/10.1007/s10754-017-9229-5>.

⁵⁸ Indermit Gill and Michele Ruta, "Why Global Vaccine Equity is the Prescription for a Full Recovery," *Brookings Institution*, February 11, 2022, <https://www.brookings.edu/blog/future-development/2022/02/11/why-global-vaccine-equity-is-the-prescription-for-a-full-recovery/>.

adopted such regulations. The U.S. defended its use of the Defense Production Act,⁵⁹ which calls for private companies to fulfill their U.S. contracts before committing any vaccines to other recipients.⁶⁰

Similarly, in January 2021, the EU adopted Regulation 2021/111, which stipulated that the export of certain products required an export authorization; this applied to both Covid-19 vaccines as well as “active substances including master and working cell banks used for the manufacture of such vaccines.”⁶¹ Despite receiving criticism, the EU urged companies to fulfill their initial pledges to EU countries before thinking of exporting to other regions.

States’ national interests and vaccine nationalism

Vaccine nationalism has stifled international cooperation to effectively respond to the pandemic and vaccinate the global population. At the outset of the Covid-19 pandemic, high-income states largely engaged in nationally-focused vaccine efforts before engaging with the international community, hurting their soft power and hindering a global response. This pattern of behavior has posed a major challenge to achieving a quick and effective global response to the pandemic.

The Covid-19 pandemic isn’t over

As deaths, hospitalizations, and caseloads become uncoupled in wealthy countries, parts of the world remain essentially unvaccinated; less vaccinated countries will bear a much higher hospitalization and death burden than vaccinated Western countries. Covid-19 continues to spread globally with over 6.1 million reported deaths and over 482.3 million confirmed cases.⁶² Places like New Zealand, Australia, Singapore, Thailand, and South Korea that took early action to control the spread of Covid-19 remain challenged by cases from abroad because the rest of the world didn’t take similar actions. In mainland China, the “zero-Covid” strategy and recent uptick in daily Covid-19 cases raise concerns about rising economic costs and implications for cases globally.

While vaccines have proven to protect against serious disease and death, the expectation that Covid-19 will transition to endemicity means that the virus will not disappear. The idea of herd immunity—where enough immunity to infection and transmission would cause the virus to no longer circulate—is not feasible as was hoped earlier in the pandemic. On top of securing an

⁵⁹ Through the Defense Production Act, the President holds the authority to “expedite and expand the supply of materials and services from the U.S. industrial base needed to promote national defense.”

⁶⁰ Aime Williams and Kiran Stacey, “Is there a Ban on Covid Vaccine Exports in the US?” *FT*, May 1, 2021, <https://www.ft.com/content/82fa8fb4-a867-4005-b6c2-a79969139119>.

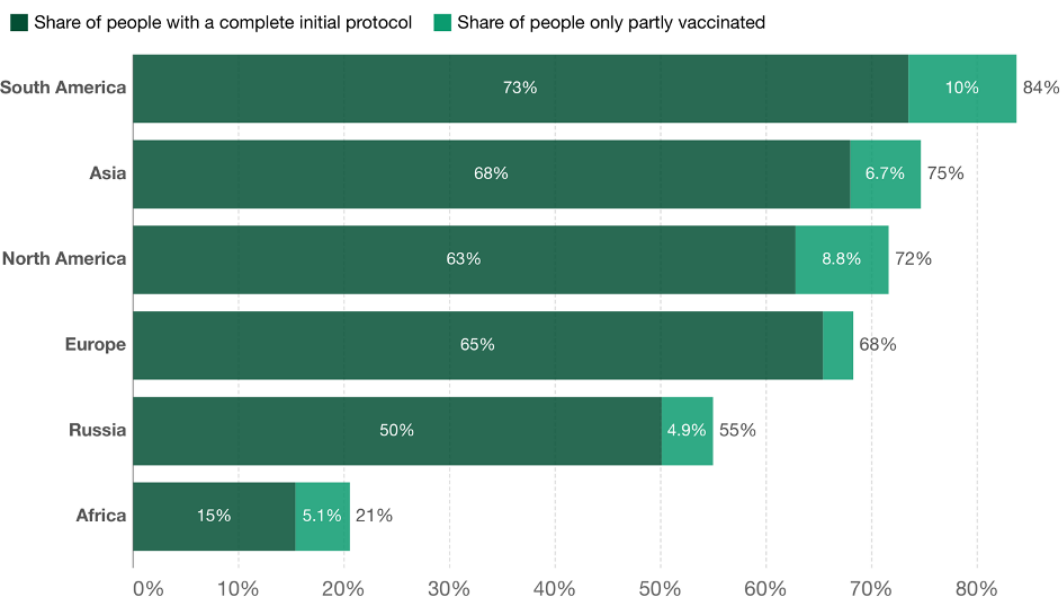
⁶¹ European Union, “COMMISSION IMPLEMENTING REGULATION (EU) 2021/111 of 29 January 2021 making the exportation of certain products subject to the production of an export authorisation,” January 29, 2021, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0111&from=EN>; Imad Antoine Ibrahim, “Overview of Export Restrictions on COVID-19 Vaccines and their Components,” *ASIL Insights* 25, no. 10 (2021), <https://www.asil.org/insights/volume/25/issue/10>.

⁶² The Visual and Data Journalism Team “Covid map: Coronavirus Cases, Deaths, Vaccinations by Country,” *BBC*, Accessed March 29, 2022, <https://www.bbc.com/news/world-51235105>.

adequate pipeline of doses, logistical capacity and vaccine hesitancy remain barriers to getting shots into arms.

Share of people vaccinated against COVID-19, Apr 13, 2022

Our World
in Data



Source: Official data collated by Our World in Data

Note: Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries.

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Many countries around the world began lifting restrictions like mask mandates and vaccine passports after prioritizing booster shots for their domestic populations. For many in the West, this sense of returning to normal has preemptively suggested that the pandemic is over globally.

Recommendations

Over the course of the pandemic, wealthier countries have monopolized the global supply of vaccines and ultimately left the Global South behind. In order to mitigate the harmful impacts of this phenomenon on the ongoing global response to Covid-19 and the impact on future pandemics, all actors in the vaccine ecosystem—including manufacturers, governments, multilateral organizations, philanthropic foundations, and activist groups—must take concerted action. A system that succeeds in achieving equity in vaccine allocation and distribution must address the inherent tension between prioritizing domestic populations and achieving a globally equitable response.

Near Term Recommendations

Prioritizing Improvement of Current Vaccination Efforts:

Achieving a greater level of vaccine equity in the remaining months of 2022 is essential to bringing the Covid-19 pandemic to a close. National governments must invest in their public health platforms and build public trust to tackle vaccine hesitancy among unvaccinated segments of the population. This includes targeted programs to increase vaccine uptake, campaigns to combat Covid-19 mis- and disinformation, government funding to monitor long-term safety, and data collection. Efforts are essential in the short term while there is political will to tackle the Covid-19 pandemic and must be coordinated through guidelines from the WHO.

Delays in taking action now risk the threat from the pandemic being perceived as receding or being overshadowed by other concerns such as the impacts of Russia's invasion of Ukraine. Within regions facing low vaccination rates, the most pressing needs are addressing vaccine hesitancy and the logistical challenges that prevent doses from getting into arms.

To combat hesitancy, key stakeholders such as national governments, private sector companies, and civil society organizations should collaborate to produce more consistent messaging that highlights the benefits and importance of vaccines. Acknowledging the importance of logistical and storage considerations, it is also crucial to prioritize vaccines without onerous and unachievable storage requirements in distribution efforts.

Enhancing Cooperation with COVAX:

National governments must also increase their cooperation and coordination with COVAX. This increased cooperation should take three forms.

First, increasing the number of doses that wealthy countries donate through COVAX as opposed to through bilateral mechanisms. Rather than define a specific percentage target, it is important that COVAX be the primary mechanism by which countries seek to distribute doses internationally.

Second, the use of contingent donations where doses are earmarked for particular countries should be avoided. Wealthy governments must seize the current moment of excess domestic supply (e.g. before an additional booster dose is deemed necessary for the entire

population) in order to prioritize exports and donations. Recognizing that domestic political support for vaccine donations may be contingent on focusing donations on countries within the donor's sphere of influence, these countries should at a minimum coordinate with each other. With proactive coordination, the motivation to prioritize spheres of influence in vaccine donations can be mitigated because, in sum, wealthy donor countries have spheres of influence that cover almost the whole globe.

Third, both COVAX and donor country governments must take greater responsibility for their role in the success of the vaccine donation process. COVAX and authorities from donor countries must work to promote information and data sharing so that the vaccines provided are not nearing their expiration date, their quality is being monitored during the transportation process, and it is logistically feasible to deliver and administer them within a realistic time frame.

Rethinking Definitions of Equity

Multilateral organizations, including the WHO, should factor vaccine hesitancy into definitions of equity and targets for 2022 delivery of doses. Targeting 70% vaccination by mid-2022 does not recognize the current constraints on getting shots into arms, particularly, but not exclusively, in sub-Saharan Africa. It is also clear that this target will not bring about herd immunity as was hoped earlier in the pandemic. Such a target fails to provide actionable guidance on how to distribute vaccines in a manner that will lead to an increase in vaccination rates, particularly among the most vulnerable populations.

A more focused target for the near-term should take into account a given country's risk factors (e.g. size of vulnerable populations, the current national context in terms of vaccine hesitancy and logistical capacity for local distribution and administration of shots). As the pandemic continues, definitions of equity must take into account evolving understandings of the threat of the virus and the limitations of our current vaccines in order to maximize impact of vaccines.

Medium Term Recommendations

Public Health Investment

The WHO should facilitate the establishment of a target level of investment— as a percentage of GDP—that governments must dedicate to invest in public health infrastructure. This 'infrastructure' includes long-term trust and relationship-building with the public and a mechanism and network of providers that can deliver a population-wide medical intervention, like a Covid-19 vaccine. The WHO can facilitate establishment of this target by expanding upon previous recommendations it has made for the level of investment required as a % of GDP to achieve universal health coverage, focusing on the need for public health infrastructure to respond to pandemics.

Governments can in turn embed this target in national policy by enshrining such a funding target in national law. Civil society and the media will play an important role in holding governments accountable for transferring international norms into national law and policy

practice. However, this is only effective in governance systems where civil society and media play a central role in public opinion and can affect government action.

Transparency in Procurement Contracts

Transparency and accountability for how manufacturers choose to prioritize orders from different countries is essential. One potential solution is for countries to require greater transparency for foreign deals, as opposed to domestic ones. If enough manufacturing countries abide by this scheme, the overall environment will become much more transparent in a way that is politically palatable.

Addressing Restrictive Trade Policies

Actors must also consider the negative implications of restrictive trade policies that impede the effective transfer of key inputs and goods critical for vaccine production and distribution. As vaccine manufacturers scale up production, it becomes critical that supply networks, which have become increasingly globalized and complex, allow for the easy flow of those key inputs and goods across borders. To address this challenge, trade leaders like the WTO must prioritize the establishment of regulatory trade frameworks that are better harmonized. The WTO and its member states need to revise the existing Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and reassess the role of IP waivers and compulsory licensing to face future health crises. Countries like India and South Africa, key to the global supply of vaccines, have stated that vulnerable countries would require waiver periods until widespread vaccination is available. In preparation for future public health emergencies, both the WTO and the WHO must coordinate multilateral efforts with support from developed and middle-income countries to expedite approval of TRIPS waivers and streamline technological transfer to ramp up vaccine production in the global South. This must be supplemented by additional efforts to bolster industrial and development policy that can incentivize development of vaccine manufacturing facilities.

Growing the Number of Globally Trusted Regulatory Authorities

The WHO must work to expand the list of countries that can conduct abridged assessment of vaccines for WHO prequalification. The current list, a subset of Stringent Regulatory Authorities (SRAs), excludes the Global South from participating in rapid global benchmarking of vaccines in a pandemic. The WHO must partner with additional strategic countries and diversify the international regulatory and procurement community beyond the global high-income bracket. Two large vaccine manufacturers, India and China, are apparent candidates. Furthermore, it would be prescient to include at least one, if not more, countries in both Latin America and Africa. The expansion must consist of National Regulatory Authorities (NRAs) that can identify and approve vaccines that are best suited for their national and regional context, streamlining vaccine authorization for vaccines that can be developed, produced, and/or distributed beyond the Global North. The expansion of the list is a matter of capacity and

trust-building among selected NRAs, public health officials, and the wider international community. The diversification of this list will not occur if it is not a policy priority within the WHO. Successfully expanding the SRAs will require convincing regulators in developed countries that additional partners can be relied upon to assess vaccine candidates for prequalification. Furthermore, these multilateral efforts need to encourage national ownership of international standard-making and inclusion within the domestic legal frameworks for ensuring that all governments comply with the future recommendations that NRAs elaborate in close cooperation with multilateral mechanisms.

Long Term Recommendations

Strategic Placement of Vaccine Manufacturing

Manufacturers, in setting up new production ventures, should locate vaccine manufacturing capacity in countries with small populations. In the event of a new pandemic, it is easier to vaccinate a small domestic population quickly, clearing the way for the vast majority of production to be exported and delivered where it is most needed globally. Manufacturers can take lessons from experiences of the current pandemic in this regard, including how Moderna experimented with this approach by locating their European headquarters in Switzerland. Beyond locating manufacturing facilities in smaller countries, a successful global vaccine ecosystem would have manufacturing hubs spread across regions. In building new infrastructure, broadening the regional distribution of vaccine manufacturers requires a concerted cooperative effort between governments and vaccine manufacturers to create the regulatory and business environments necessary to build new vaccine manufacturing facilities in countries where they currently do not exist.

Strengthening Long-term Manufacturing Capacity

Vaccine production cannot quickly be scaled. Investments must be made to establish vaccine manufacturing capacity outside of crisis moments in a pandemic. For example, the development of the Serum Institute in India took over 20 years. This requires innovative financing mechanisms and partnerships between governments and private sector pharmaceutical countries. It also requires prioritizing vaccination technologies that are financially viable outside the context of the Covid-19 pandemic. In this context, mRNA vaccines look less viable than other vaccine technologies, such as recombinant protein vaccines, that are currently produced in multiple regions of the world and can be relatively easily retooled to make a new vaccine in the event of a new pandemic.

This reality necessitates an investment approach from donors—including governments, multilateral entities like GAVI and COVAX, and philanthropic donors—to broaden the portfolio of vaccine technologies in which they invest. A specific feature of these investment portfolios must be a consideration of the existing technology and vaccine production capabilities in less developed countries.

Overreliance on multinational pharmaceutical companies located in the Global North will inevitably privilege vaccines that are tailored to the needs of wealthier countries; the Global North has specialized manufacturing and health infrastructure, such as expensive cold storage chains, that are not widespread globally. Moreover, international funding mechanisms need to strengthen the vaccine development and production ecosystem by encouraging broader research and development, particularly in research institutes in middle-income and potentially vulnerable countries.

Conclusion

More than two years after the WHO's pandemic declaration, and despite the back-to-business normalcy that countries around the world are currently experiencing, multiple signs indicate that the challenges the international community will continue to face to contain the spread of Covid-19 are substantial. As of May 2022, China continues to enforce full or partial lockdowns, following a strict zero-Covid policy in an effort to contain the virus. Consequently, these restrictions affect millions of people, and the economic and social consequences reach beyond China's borders.

Vaccines played a critical role in reducing the number of lives lost to Covid-19, but the increasing fatigue is becoming more evident as the worldwide demand for doses decreases. The reduced demand will significantly shift the incentives that once spurred governments and pharmaceutical companies into swiftly developing a cure and producing enough doses to protect vulnerable populations. With an increased probability of a future pandemic, the ongoing health crisis reminds us that the international system has yet to establish reliable and efficient mechanisms to respond to public health crises.

At the outset of the pandemic, there was a majority opinion about how Covid-19 posed a significant threat to all countries, regardless of their income level, and that a coordinated response was required to limit the spread. However, this report has elaborated on how the multilateral strategy was critically restricted due to the domestic forces that pulled decision-makers to become inward-looking and prioritize national needs over international solidarity. Nevertheless, it soon became clear that the only way out of the pandemic was by limiting the speed of the spread and the variations of the virus, a goal that can only be achieved by vaccinating a critical portion of the world's population.

Vaccination is key to successfully protecting those who continue to be vulnerable to this virus. Still, it needs to be accompanied by adequate international policy and framework that allows for efficient coordination between governments, pharmaceutical companies, and multilateral mechanisms investing time and resources. In the case of the Covid-19 pandemic, it is evident that not all countries and pharma developers had the same means at their disposal. This imbalance led to a widening gap between those who could secure doses multiple times the size of the population and those who were left waiting for access to life-saving vaccines.

The ongoing pandemic reminded us how deeply interconnected the world is. This interdependence needs to drive public and private sector leaders into designing creative solutions for future challenges. As people around the world adapt and adjust to a new reality, decision-makers must reassess their past performance and identify those critical issues that ought to be reassessed in preparation for the next big crisis. Our best chance is that stakeholders and societies have all learned from the shortcomings during this and past pandemics. Hopefully, when the next challenge arises, the international community will rise to the occasion.