

Production and Distribution of COVID-19 Vaccines

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Abstract

The coronavirus pandemic has disrupted the world in various ways. Its impact has taken a toll on the economic well-being of countries worldwide, and affects the well-being of individuals, families, and the global community at large. Although the world has gained some level of control over the spread of the virus, the threat is evident. The pandemic poses a threat to millions of people who are already vulnerable to food insecurity, malnutrition, and other disasters. In addition, there are frequent outbreaks of another wave of increased infections around the world. Facing the pandemic, vaccines have been instrumental in reducing infection rates and ensuring that the world is a safer place. However, the distribution of the vaccines has demonstrated that national governments are ill-equipped to deal with the pandemic. Wealthy and developed countries have more access to vaccines, compared to underdeveloped and developing countries. Ideally, equitable distribution of the vaccines can be achieved if they are categorized as GPDs. This paper explores the effectiveness of declaring COVID-19 vaccines as GPDs to manage the pandemic at a global level.

Keywords

COVID-19 Vaccines, Global Public Goods, Vaccine Nationalism

1. Introduction

Goods include a wide range of physical commodities and services that can be private or public. According to Hunter & Karim (2022), private goods require payment before consumption. Besides, once consumed, they are not available for other users. Public goods have two primary characteristics. First, they are non-rivalrous. According to Loembe & Nkengasong (2021), a non-rivalrous product is one with zero marginal cost when provided to an additional consumer. This differs from

private goods that have a positive marginal cost for producing more products. The ability of additional consumers to enjoy non-rivalrous products is not diminished by their use by others. Secondly, a public good is non-exclusive. It means that people cannot be prevented from using it. Geographically, these goods can be local, national, or international. In most cases, public goods are limited to the local and national levels. However, the properties of non-rivalry and non-excludability are applicable when they have cross-border externalities (Lee & Tipoe, 2022). These goods are categorized as Global Public Goods (GPDs).

The concept of GPDs is derived from the economic theory of public good. For instance, reducing carbon dioxide emissions would reduce global warming. In this case, all countries will benefit from this, without barring others from enjoying the benefits too. Although GPDs have significant benefits, there is no financial incentive for production (Lee & Tipoe, 2022). At the national level, governments intervene through strategies like taxation and licensing. At the global level, however, ensuring collective action is difficult due to the lack of a global government.

In the health sector, public global goods also entail policies and programs that have an impact on global health. For instance, WHO offers a wide range of GPDs. These include publications, guidelines, assessments, and frameworks (Hunter & Karim, 2022). Unlike other GPDs, those in the context of health need to be sustained through strategic planning and financing. In most cases, these strategies are coordinated through international cases. They rely on philanthropic funding from governments, companies, and individuals, since the onset of the pandemic, organizations like the World Health Organization (WHO) and the United Nations (UN) have made multiple calls for COVID-19 vaccines to be declared as GPD. If the vaccines are non-rival, administering them to a certain group of people would not reduce the amount available for anyone else.

2. Global Efforts to Foster Vaccine Equality

The initial efforts to deal with the pandemic at the national level were insufficient in many countries. Many countries lacked the manpower and resources to take care of their people. It became obvious that the world needed to work together to stop the spread and manage the health and economic effects. WHO played a significant role in directing global efforts against the virus. In April 2020, WHO and partners launched The Access to COVID-19 Tools (ACT) accelerator (Peacock, 2022). ACT was launched to improve the development, production, and distribution of COVID-19 tests, treatment, and vaccine effectiveness (Asundi, O'leary, & Bhadelia, 2021). It is also meant to facilitate equal access to these resources. The initiative is based on four work pillars. These are diagnostic, treatment, vaccines, and health systems (Gruszczynski & WU, 2021). Each of the pillars is instrumental in fostering innovation and collaboration.

COVAX was a key component of the ACT accelerator. COVAX was created by WHO in collaboration with the Coalition for Epidemic Preparedness innova-

tions (CEPI). COVAX works with governments, vaccine manufacturers, and other stakeholders to ensure that the vaccines are available worldwide (OECD, 2021). The initiative mostly focuses on the availability of vaccines in MLICs. These countries do not have the resources to manufacture their own vaccines or purchase them from global manufacturers. In 2021, COVAX had set a goal to distribute 2 billion vaccine doses to ninety-two MLICs (WHO, 2020). COVAX also urges wealthy countries to participate in the global efforts towards the pandemic. COVAX also negotiates for lower prices on behalf of deserving countries. This would help these countries coordinate with the efforts of developed and established economies.

The efforts of COVAX toward meeting the set goals have been sabotaged by various factors. First, COVAX is highly reliant on stakeholders like national governments and the private sector. In the past, COVAX has struggled to secure agreements with these stakeholders (UN News, 2022). Secondly, COVAX faces a shortage of funds. Despite the promising pledges from stakeholders, many of them do not commit to the pledges. Bureaucratic barriers have also hindered the timely disbursement of funding to vaccination programs. This has affected COVAX's ability to purchase vaccines from manufacturers. Peacock (2022) also notes that COVAX faces a power imbalance since high-income countries and pharmaceutical companies have more influence. In some cases, pharmaceutical companies have declined to make large vaccine donations.

Apart from COVAX, WHO also created the COVID-19 Technology Access pool (C-TAP). C-TAP was established to facilitate timely and equitable access to COVID-19 health products. Its formation was inspired by the medicines patent pool (MPP) which has been instrumental in increasing global access to HIV, tuberculosis, and hepatitis C treatments (Gruszczynski & WU, 2021). The platform allows vaccine developers to share data and technology across borders. It would also facilitate vaccine manufacturing in all regions, reducing dependence on developed countries and foreign aid. In June 2021, for instance, WHO supported the establishment of the first mRNA technology transfer hub in South Africa (Dhai, 2021). The facility allowed manufacturers from MLICs to get training in vaccine production and quality control. Through C-TAP, WHO hoped to increase the production of other health technologies needed by health workers to reduce deaths and prevent the spread of the virus.

Although C-TAP has the potential to facilitate equal access to COVID-19 vaccines, the platform has faced various challenges. The success of the platform relies heavily on the willingness of pharmaceutical companies to collaborate (WHO, 2020). This has been a challenge as many countries have invested in developing generic medicines. Besides, some governments have been reluctant on sharing intellectual property regarding the vaccines they are developing. Many countries also lack measures to ensure that pharmaceutical firms share their technology.

Apart from the global efforts, regional initiatives have also emerged in developing countries. A relative example is the COVID-19 Africa Vaccine Acquisition

Task Team (AVATT). AVATT was established by the African Union (AU) to execute the formulated vaccine strategy (Gruszczynski & WU, 2021). In Asia, the Asian-pacific Vaccine Facility coordinated distribution strategies in the region. At the bilateral level, countries have merged efforts to come up with more sustainable solutions (Gruszczynski & WU, 2021). For instance, Australia and New Zealand have made commitments to buy vaccines for the pacific island. Other developed countries have also promised to share unused and excess doses with developing countries.

3. Vaccine Nationalism

There is a study shows that evolution has programmed COVID-19 with an adeptness designed to debilitate key systemic defenses to secure its subsistence. To date the infectiousness of the COVID-19 pandemic is exponentially increasing, denoting the possibility of an even more dangerously elusive, inconspicuous, and sophisticated version of the disease (Sofra, 2021). Despite the global efforts fostered by various organizations, equitable access to vaccines remains an urgent global issue. Richer and more developed countries have had an upper hand right from the start. In July 2022, 24% of the people who have received at least one dose were from wealthy countries (UN News, 2022). These countries have more advanced healthcare infrastructure to manufacture vaccines. They also have the financial resources to purchase and distribute the doses to their people.

Data from Our World in Data quoted by U.S News (2022) showed that 80% of people in high-income countries had received at least one dose of the COVID-19 vaccine dose, as of the 13th of July 2022. In MLICs, however, only 19% of the population had been vaccinated. This comparison asserts the disparities in access to vaccines. The disparity was becoming more evident in the administration of booster doses. As of July 2022, wealthy countries had administered boosters to over 50% of the population. On the other hand, only 1.2% of those in MLIC had received boosters.

The disparity has been aggravated by the adoption of vaccine nationalism policies by some states. Here, many state leaders used a “my country first approach in the allocation of vaccines and other relative resources”. Dhai (2021) defines it as an economic strategy to hoard vaccines to increase supply in specific countries. One strategy used by High-income countries (HICs) was paying for many vaccine stocks beforehand. This strategy limited the capacity of manufacturers to supply globally, once the vaccine was fully developed. Most of the HICs had already paid for enough vaccines to administer to their people twice or thrice. This was the first factor that established a bias towards the population in MLICs. Besides, the prices of the vaccines inflated once they entered the market. This has left unprivileged countries struggling to pay for vaccines. It has further hindered efforts to increase global access to the vaccine.

Initially, multiple organizations and individual investors worked together to find a vaccine against the virus. By the 1st of November 2021, WHO had listed 18

vaccines as candidates for assessment and prequalification (OECD, 2021). As time went by, more vaccines have entered clinical trials, and are available in the open market. As of the 8th of April 2022, WHO had assessed and approved 10 vaccines that met the efficacy criteria. These vaccines are; AstraZeneca, Johnson and Johnson, Moderna, Pfizer, Sinovac, COVAXIN, Covovax, NUvaxovid, and Cansino. Despite the development of these vaccines, a big part of the world population is yet to receive their first dose (Lee & Tipoe, 2022). Italy is a good example of countries trying to hoard vaccines as it banned the export of AstraZeneca.

Vaccine nationalism in the case of COVID-19 is also a result of the intensified competition amongst pharmaceutical companies in different states. The companies focus on financial profitability by selling the vaccines to other countries. According to Wolf, Matthews, & Alas (2022), most of the vaccines manufactured in 2020 and 2021 were made in the United States, India, China, United Kingdom, Germany, and South Korea. Pharmaceutical companies made deals to sell vaccines at a certain price, excluding impoverished countries. This also contributed to vaccine inequality at the global level.

Vaccine nationalism has multiple adverse effects. First, Bayati (2021) notes that it can prolong the duration of the pandemic. When a large population is unvaccinated, there is a greater barrier to global immunity. Thus, it takes longer to control the pandemic and lower the infection rates in these regions. Besides, lack of access to vaccines and boosted increases the adverse effects of the diseases, increasing severity and mortality rates (Zhou, 2022). Consequently, the situation overburdens health systems that are already struggling to cater to the sick.

Although some countries may try to justify vaccine stockpiling, it will be self-defeating in the long run. According to World Bank (2020), HICs have recorded more deaths than projected by epidemiologists. The prevalence of pre-existing medical conditions, the high number of elderly people, and geographical factors are some of the possible causes of more deaths in these countries. Besides, these countries have been identified as breeding grounds for new variants. For instance, Brazil and Bangladesh reported a new variant of COVID-19. The emergence of new variants makes efforts to hoard vaccines futile. Wolf, Matthews, & Alas (2022) support this by noting that vaccinating the entire population does not guarantee long-term immunity against possible vaccine-resistant variants. Besides, some more aggressive variants like the Delta Variant and Omicron variant are harder to identify using the available tests.

Research also shows that these variants can outdo the natural or vaccinated immunity. This leaves persons who have received vaccinations against old strains susceptible to new variants. In response, pharmaceutical companies have made promises to adapt the vaccines, increasing resistance against new variants (Sakena, 2020). However, the process requires a lot of time and resources, which leaves the world population exposed to more aggressive variants. The only effective solution is to create communal immunity at the global level, which requires countries to stop stockpiling vaccines.

Besides, vaccine nationalism undermines multilateral and collective approach-

es toward the global problem, as [Zhou \(2022\)](#) notes. First, the concept has directly challenged the efforts of the UN to promote equitable and fair access to vaccines. It also sabotages COVAX's initiative to get vaccines to MLICs ([World Bank, 2020](#)). Besides, many vaccine manufacturers prioritize regulatory approval in wealthy countries over donating vaccines to WHO. This further weakens whose authority regarding the production and distribution of the vaccines.

[Bayati \(2021\)](#) also notes that vaccine inequity creates a threat to global security, which is a GPD. For instance, Russia and China have been accused of using vaccine diplomacy to increase geopolitical influence. Besides, economic instability due to the pandemic results in social instability. It leaves poorer countries vulnerable to proxy conflicts by global superpowers ([Gruszczynski & WU, 2021](#)). The probability of conflict increases with the duration of the pandemic. Thus, equitable allocation of vaccines in developing countries should be perceived as a way to conflict and enhance global security.

4. COVID-19 Vaccine as a Global Public Good

The current COVID-19 strategies are sabotaged global efforts to achieve mass immunity. As a result, organizations like the United Nations Educational, Scientific and Cultural Organization (UNESCO) have called to be changed these strategies. These organizations have argued that the vaccines should be treated as GPDs, to ensure equitable availability in all countries. The recommendations were made through the international bioethics committee (IBC) and the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) ([UNESCO, 2021](#)). The two committees highlighted three main challenges.

First, they noted that pharmaceutical companies have a responsibility to share intellectual property. Ideally, this would allow facilitating better access to the vaccines. They also stressed on the role the importance of investing in factories that can manufacture vaccines with the highest efficacy. According to [WTO, WIPO & WHO \(2020\)](#), access to vaccines by the larger population should not be the sole reason for making them GPDs. Other ethical factors should also be considered. They include the need to protect people from vulnerability and prioritize the best interest of children. The distribution of vaccines should also include dialogue with people who are hesitant about vaccination ([UNESCO, 2021](#)). This is yet another step towards achieving communal immunity. Vaccines as a GPD will help overcome vaccine inequality stemming from the challenges of access and delivery in developing countries. [Bayati \(2021\)](#) estimates that a failure to overcome these challenges might jeopardize global recovery from the pandemic. It might also hinder the integration of the global economy, as [Nhamo, Chikodzi, Kunene & Mashula \(2021\)](#) note. There are also concerns that delayed access to the vaccine might deepen inequalities both within and between countries. The challenges faced by developing countries can be solved by making the vaccine a GPD. The availability of vaccines became crucial. Despite the implemented steps by WHO and other health partners, the demand for the vaccines

outstrips the supply. Besides, most of the vaccines have already been pre-ordered by wealthy countries, which limited the supply to other countries (WTO, WIPO, & WHO, 2020). Making the vaccines non-rivalrous will ensure that HICs do not hoard vaccines and lower supply in the global market. Besides, some countries have banned the export of vaccines to other countries. As GPDs, all vaccines will be non-excludable, allowing all countries to use them. This will help increase the availability of vaccines in these countries.

The second challenge involves overcoming cost barriers. According to Riaz et al. (2022), the cost of vaccines remains high in many developing nations. In 2020, the World Bank launched a plan to provide USD 12 billion to developing countries. The funds were allocated to help finance the purchase and distribution of tests, vaccines, and other treatments. Wealthy countries have also made some efforts in donating funds towards filling the financial gap in MLICs. Despite the efforts, however, the funds are inadequate (Sakena, 2020). By making the vaccine a public good, pharmaceutical companies will stop focusing on making profits. It will also foster global cooperation, enhancing the willingness to support vulnerable populations.

Other challenges include a barrier to local production as well as logistics and infrastructure challenges. Local production is hindered by intellectual property rights (IPRS). Also, reluctance to share technological knowledge has affected efforts toward overcoming the current crisis. In the past, global health has been recognized as a GPD. In the case of COVID-19, however, G20 called for pharmaceutical companies to voluntarily share intellectual property (United Nations, 2021). WHO also suggested a partnership model where companies would offer non-exclusive licenses for their products.

Some MLICs also made similar propositions. In October 2020, for instance, India and South Africa called upon the World Trade Organization (WTO) to suspend intellectual property right for COVID-19 vaccines. This would increase accessibility, for the duration of the pandemic. Later on, BRICS countries like Brazil and Russia also pleaded for a patent Waiver on COVID-19 vaccines amid a second wave of the pandemic (United Nations, 2021). The proposal was rejected by HICs like the United Kingdom, the USA, Canada, and Norway. They argued that IP rights were instrumental in incentivizing the invention of new vaccines and treatment options.

Privatizing vaccines will continue to interfere supply chain and economic stability in developing nations. The only way to reestablish the national and global economy is by increasing access to vaccines in developing countries. Riaz et al. (2022) highlight the need for the private sector to generate sustainable and inclusive recovery programs. The programs should also consider the well-being of vulnerable countries. According to the World Economic Forum (n.d), the lack of vaccines in Africa has created a weak link in the global production value chains. The value chains cannot be strengthened without the countries getting access to resources that will facilitate recovery from COVID-19. As Nhamo, Chikodzi,

Kunene & Mashula (2021) note, the ongoing fragility could have long-term impacts on vaccine supply chains in poorer regions. As a GPD, the vaccines will be exempted from export restrictions and tariffs, facilitating more access.

Lastly, categorizing vaccines as public goods would help solve issues caused by shortcomings in logistics and infrastructure. Although the world has the capacity to avail vaccines for everyone, distributing them in developing countries presents new challenges. For instance, these countries have fewer health care workers compared to wealthy companies. Wolf, Matthews, & Alas (2022) predict that countries in Africa, Southern Asia, and the eastern Mediterranean will face a shortage of 18 million health care workers by 2030. This could pose a long-term threat to global health security. Enhancing health services in developing nations will reduce the disruption of vaccination programs. Ultimately, this will help reach more people.

5. Vaccine Effectiveness and the Longevity of Immunity

When rolling out the plan to make COVID-19 GPDs, policymakers and other regulatory bodies should consider certain factors. First, they should evaluate vaccine effectiveness (Asundi, O'leary, & Bhadelia, 2021). It entails identifying if the vaccines need redevelopment or modification, and at what cost. This concern is based on the emergence of variants that continue to hinder the efficacy of existing vaccines. Researchers should take into account inter-generational and ethnic factors that may affect immune response. UN News (2022) notes that most of the available vaccines are designed for the adult population. This may be problematic in developing nations where the larger population is made up of children and the youth.

Secondly, responsible parties should consider the longevity of immunity which dictates herd immunity. According to United Nations (2021), the duration of immunity remains unclear, with more people taking boosters. However, the duration is subject to the evolution of the virus in the future. Pharmaceutical companies, researchers, and other stakeholders should work together to stay ahead of mutations and ensure that the world remains safe. The social acceptability of vaccines remains a threat to global immunity. Apart from making the vaccines available globally, community engagement is also necessary. The efforts should target marginalized groups who are skeptical about the Pandemic (Sakena, 2020). Some people are also misinformed on the validity of the vaccines. Sensitizing the masses will enhance understanding of the benefits of the vaccine. This may motivate more people, especially in, to accept the vaccines, boosting equitable uptake.

According to Wolf, Matthews, & Alas (2022), developing scientific-based strategies can help discourage vaccine nationalism and promote the collective effort. The current situation is influenced by the passive role that many global policymakers play in health economics. International collaboration fosters efforts to increase the supply of vaccines without sacrificing their efficacy and

safety effectiveness (Asundi, O'leary, & Bhadelia, 2021). Besides, scientists and governments in targeted regions should work together to facilitate rapid vaccination of high-risk individuals. These include health care workers and patients with preexisting medical conditions. International cooperation will also boost coherence between domestic and international policies which will help fill the inequality gaps. UN News (2022) notes that a collective global response will strengthen initiatives like COVAX and the ACT Accelerator. Apart from increased funding, cooperation will also increase transparency on bilateral contracts.

Although making the vaccines a GPD may promote equitable distribution, successful implementation may take years. Besides, it is unclear whether all people in excluded countries will accept the vaccines. Based on this argument, Nhamo, Chikodzi, Kunene & Mashula (2021), encourage policymakers to acknowledge that the endeavor may be more challenging than expected. There is a possibility that the available vaccines might be viable for a limited duration. Therefore, policy maker should put more effort toward testing, tracing, and treatment in developing countries as the world awaits safer vaccines.

6. Conclusion

The development of COVID-19 vaccines has helped the global community to reduce the number of new infections. However, vaccine inequality has left MLICs in a worse situation. According to the above discussion, making the vaccines as GPDs will help overcome current challenges. GPDs are both non-rivalrous and non-excludable. Since the outbreak of the pandemic, various stakeholders have made efforts to ensure that MLICs have equal access to vaccines. This has been executed through global and regional initiatives like COVAX, C-TAP, and AVATT. The success of these initiatives has been hindered by vaccine nationalism, where wealthy countries hoard vaccines for domestic use. It has created disparities between high-income and MLICs. If left unresolved, it will prolong the duration of the pandemic since it undermines collective global efforts. Besides, it may result in wastage of resources when the vaccines no longer offer immunity. The disparity also creates a threat to global security by increasing the risk of conflict.

As a GPD, the vaccine would enhance communal immunity by allowing more access to MLICs. It will also help MLICs overcome challenges that hinder the successful vaccination of the larger population. They include issues like availability, cost, production, and logistics. To achieve this, policymakers should re-examine various aspects of the available vaccines. This will ensure that the vaccines will meet the set objectives once MLICs can easily access them. They should address concerns on sustainability and efficacy in targeted regions. Although the concept of GPD may solve the current issues, the successful implementation may take time. Therefore, policymakers should focus on other measures to prevent the further spread of the virus.

By way of argument I can conclude that the promotion of vaccines as a GPD is

beneficial both in terms of global well-being and the overall long-term interests of countries. Since 2020, we can be clear about the fundamental consensus of world as both an economic community and a destiny community, which no country can achieve alone in the context of globalisation. Countries of origin and countries of production, export and import, infected and non-infected areas, developed and other countries, the implications of any kind of bilateral relationship are enormous in scope. It is short-sighted to focus only on the interests of small groups or countries. Only by enabling vaccine become GDP as soon as possible can the world recover from the epidemic, can the channels of globalisation be reopened and can the world order be restored.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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