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# Current Status and Issues Surrounding the COVID-19 Vaccine

*The Expected Role of Japan*

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## Introduction

It has been a year since the first case of COVID-19 was detected in Japan, and the disease still shows few signs of abatement around the world. German Chancellor Angela Merkel announced the re-strengthening of regulations to curb the spread of COVID-19 early in the new year, while London, UK, entered a new lockdown to limit the spread of a mutated variant of the virus. In Japan, a state of emergency was declared in Tokyo and three prefectures at the beginning of the year. While the world is hoping for a quick resolution of the infection, vaccines are the only solution that we can rely on as of now.

At the end of 2020, AstraZeneca and Pfizer succeeded in developing highly effective vaccines, and, in December, the United Kingdom and the United States granted emergency licenses for their use before initiating mass immunization programs. After approval, vaccination started in Bahrain, Canada, Saudi Arabia, and Mexico as well. China and Russia have also developed domestic

vaccines and are supplying them to the Middle East, Central and South America, and Southeast Asia. Although these developments are a positive sign of control over or coexistence with COVID-19, many issues related to the supply and distribution of vaccines are yet to be addressed. This paper is an overview of the situation surrounding the COVID-19 vaccine as of February 2021, and an examination of future issues related to the vaccine and the role of Japan.

## What is a Vaccine?

Mankind's struggle against infectious diseases has been a long one, but, before vaccines, there was no effective way of dealing with them other than isolating and quarantining patients and those suspected of infection. The invention of the smallpox vaccine at the end of the 18th century was a major breakthrough. In 1796, Edward Jenner, an English physician, noticed that milkmaids would get cowpox—which is not fatal—but not the more deadly smallpox. Jenner hypothesized that the blisters on the hands of cowpox patients contained some kind of a preventive substance, and he inoculated a boy to test this hypothesis. Following that, the smallpox vaccine was put into use, and, within three years, more than 100,000 people in the UK were vaccinated.

Vaccines are intended to create immunity against viruses and bacteria (pathogens) in the body by administering detoxicated or weakened antigens derived from the pathogens, thereby making the body less susceptible to disease or alleviating symptoms when infected. The term “vaccine,” originally coined for smallpox, has been expanded since the end of the 19th century to include immunizations against other infectious diseases.

The vaccines at the time lasted only a few days at room temperature and could not be mass distributed. As a result, there were intermittent smallpox epidemics. For example, smallpox epidemics occurred in Europe's confusion after World War I, killing an estimated 250,000 people in a year. In response to this, during the 1940s and 50s, technology was developed to produce freeze-dried vaccines by freezing vaccines at low temperatures, depressurizing them below water vapor pressure to sublimate the ice, and then drying them. This made it possible to transport vaccines produced in developed countries to less-developed regions.

Since then, humanity's fight against infectious diseases has been greatly aided by vaccines. Smallpox was subsequently eradicated through a campaign of relentless vaccination in endemic areas. Based on similar efforts, 99% of people were reported to have sufficient antibodies against polio (poliomyelitis), which was prevalent in Japan after the war, through vaccination.

Thus, with the spread of the vaccine, polio was eradicated in the Western Pacific region, including Japan, in 2000.

## The Situation Surrounding the Development of the COVID-19 Vaccine

Developing vaccines is not easy. Development of conventional vaccines, such as inactivated vaccines, cannot begin until the virus is obtained, and it usually takes 5-10 years before the vaccine can be commercialized. Several diseases have no vaccines. Even 40 years after the first reported AIDS case in the United States in 1981, no effective vaccine for it exists.

Against this backdrop, the COVID-19 vaccine was introduced at an unusually rapid pace. Both the Pfizer and Moderna vaccines are artificially synthesized using intracellular genetic material (mRNA) and can be developed and manufactured once the genetic information (base sequence) of the virus is known. In addition, mRNA has the advantage of being easily replicated even if the virus mutates and can be developed and manufactured in a short period of time. In addition to the benefits of the new mRNA technology, the unusually rapid development of the vaccines was also due to the unprecedented emergency situation and the support given to pharmaceutical companies by developed countries. For example, the Trump administration in the United States initiated “Operation Warp Speed” to accelerate the development of a COVID-19 vaccine, and the German government also developed a special program to promote vaccine research and development. Last summer, China and Russia also announced their success in developing domestically produced vaccines, skipping the final stage of clinical trials and granting emergency approval for their use.

## Challenges Around the Vaccines

There are a number of challenges that need to be addressed in order to promote vaccination and vaccine supply in the future. The first issue is highly uneven access to vaccines. As vaccines are sold as pharmaceutical products, the difference in purchasing power of each country creates a disparity of access. Some developed countries have enough vaccines to inoculate their entire population five times over. In contrast, developing countries are facing the growing crises of currency depreciation and financial difficulties due to COVID-19, and, without appropriate international support, they will be unable to procure vaccines. According to the non-profit organization Oxfam, developed countries, which account for about 13%

of the world's population, are monopolizing 51% of the promising COVID-19 vaccines.<sup>1</sup> Japan is one such developed country that made direct contact with the pharmaceutical companies AstraZeneca and Pfizer to secure its own vaccines, while also joining the global effort to achieve equal vaccine access for all.

Inequality in access to medicine is a common phenomenon. For example, AIDS antiviral drugs were introduced in the early 1990s, but it took about seven years before they became widely available in Africa, which hosts a substantial number of AIDS patients.<sup>2</sup> The World Health Organization's (WHO) efforts to ensure equitable access to the 2004 H5N1 influenza flu vaccines failed, and vaccines for the 2009 H1N1 influenza were bought up by the developed countries, leaving only surplus vaccine supplies to developing countries.<sup>3</sup> As Japan's vaccine industry has not been developed, various difficulties have been experienced in the national vaccination program. Thus, as in past crises, Japan has primarily depended on vaccines produced abroad to mitigate COVID-19.

The second challenge with vaccines is transportation. mRNA vaccines need to be stored at ultra-low temperatures of -70 degrees Celsius or lower, and even hospitals in developed countries do not have the required facilities to store them at ultra-low temperatures, let alone transporting them to remote areas. In addition to the equipment required for ultra-low temperature storage, the International Air Transport Association (IATA) estimates that 8,000 jumbo jets will be needed to distribute the vaccines worldwide.<sup>4</sup> Due to this, some believe that the inactivated vaccines from China would be preferable in the Middle East region.<sup>5</sup>

The third challenge is distrust in vaccines. As noted by Dr. Anthony Fauci, a member of the U.S. government's Coronavirus Task Force, in an interview in December 2020, 70 to 90% of the population needs to acquire immunity to the virus to bring the spread of infection under control.<sup>6</sup> However, due to the rushed development of COVID-19 vaccines, the spread of fake news, and politicians'

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<sup>1</sup> *The Telegraph*, 'Rich nations have already bought more than half of world's vaccine doses, Oxfam finds', 17 September 2020, <https://www.telegraph.co.uk/global-health/science-and-disease/rich-nations-have-already-bought-half-worlds-vaccine-doses-oxfam/>

<sup>2</sup> *Science*, 'Vaccine nationalism' threatens global plan to distribute COVID-19 shots fairly', 28 July 2020, <https://www.sciencemag.org/news/2020/07/vaccine-nationalism-threatens-global-plan-distribute-covid-19-shots-fairly>

<sup>3</sup> *Nature*, 'COVID-19 vaccines: how to ensure Africa has access', 6 October 2020, <https://www.nature.com/articles/d41586-020-02774-8>

<sup>4</sup> *BBC News*, 'Covid vaccine: 8,000 jumbo jets needed to deliver doses globally, says IATA', 10 September 2020, <https://www.bbc.com/news/business-54067499>

<sup>5</sup> *The Guardian*, 'Vaccine diplomacy' sees Egypt roll out Chinese coronavirus jab', 30 December 2020, <https://www.theguardian.com/global-development/2020/dec/30/vaccine-diplomacy-sees-egypt-roll-out-chinese-coronavirus-jab>

<sup>6</sup> *New York Times*, 'How Much Herd Immunity Is Enough?', 24 December 2020, <https://www.nytimes.com/2020/12/24/health/herd-immunity-covid-coronavirus.html>

expectations for vaccines as a tool to win public support, there is a widespread movement in Europe and the United States rejecting the vaccine. Between fall and winter 2020, the percentage of people who said they would get vaccinated whenever the COVID-19 vaccine became available decreased from 59% to 54% in France and from 72% to 64% in the United States. The vaccine was politicized in the United States in particular, with President Trump aiming to begin vaccination before the presidential election, which triggered widespread distrust of vaccines among the public.<sup>7</sup>

In the past, there were many cases where vaccination did not occur due to concerns about the safety of new vaccines, the spread of rumors, and the lack of a system for injury compensation. Unfounded hoaxes about the Ebola vaccine spread in the Congo, causing hesitancy towards vaccination;<sup>8</sup> the 2016 dengue fever vaccination program launched in the Philippines was found to cause serious side effects, which has also negatively impacted the public attitude towards the COVID-19 vaccine.<sup>9</sup> During the 2009 H1N1 influenza, developing countries did not have an established system to compensate for side effects, and there were movements rejecting vaccinations due to side effect concerns.<sup>10</sup> It is essential to ensure smooth communication between the manufacturer, government, and the public, through the disclosure of data showing safety and efficacy, and careful explanations from the government to the public.

## International Initiatives for Equal Access to Vaccines

Of the three challenges mentioned above, the first, ensuring fair access to the COVID-19 vaccine, is a particularly urgent issue. The COVAX Facility, the first-ever framework for equitable supply, was established to address this issue. COVAX is a global partnership of member countries to co-finance about \$20

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<sup>7</sup> Josh Michaud and Jen Kates, 'The Dangers of Vaccine Disillusionment', *Foreign Affairs*, December 2020, <https://reader.foreignaffairs.com/2020/12/02/the-dangers-of-vaccine-disillusionment/content.html>

<sup>8</sup> NBC News, 'Ebola vaccine hampered by deep distrust in eastern Congo', 25 July 2019, <https://www.nbcnews.com/health/health-news/ebola-vaccine-hampered-deep-distrust-eastern-congo-n1034441>

<sup>9</sup> *Financial Times*, 'Public trust in vaccines rises in most of Europe, study says', 11 September 2020, <https://www.ft.com/content/fd3264ea-dc97-489e-969f-a933288babbe?segmentid=acee4131-99c2-09d3-a635-873e61754ec6>

<sup>10</sup> *Reuters*, 'Under pressure, WHO plans COVID-19 vaccine insurance scheme for poor nations', 30 October 2020, <https://www.reuters.com/article/health-coronavirus-who-vaccines/under-pressure-who-plans-covid-19-vaccine-insurance-scheme-for-poor-nations-idUSKBN27E2E6>

billion to several candidate vaccines and provide two billion doses of safe and effective COVID-19 vaccines pre-approved by the WHO by the end of 2021.

Countries participating in COVAX are divided into those that can secure vaccines for their citizens at their own public expense (High-and-Middle-Income Countries), and those that cannot (Low-Income Countries). High-and-Middle-Income Countries have made contributions in advance, which are used for vaccine development and manufacturing facilities. These funds allow them to secure vaccines for up to 20% of their population for a price slightly above the cost of production. For developing countries, a framework called COVID-19 Vaccines Advance Market Commitment (COVAX AMC) has been established to supply and transport vaccines using contributions from official development assistance and donors of each country.

Even without Russia and the United States, COVAX has seen tremendous progress. Japan joined the COVAX program in the summer of 2020 and has already contributed a large sum of money. At the ACT Accelerator 4th Facilitation Council held in February 2021, the Japanese Minister of Foreign Affairs Toshimitsu Motegi announced that Japan would increase its contribution to the COVAX Advance Market Commitment to a total of \$200 million.<sup>11</sup>

At the end of last year, the Bill and Melinda Gates Foundation, the EU, Canada, Norway, and others pledged additional contributions and loans to the COVAX AMC, and funds exceeding the initial target were collected.<sup>12</sup> The vaccine is expected to be available through the COVAX AMC in the first half of this year. At the end of last year, the United States also decided to contribute \$4 billion to the Gavi Vaccine Alliance in 2021 to help achieve equitable access.<sup>13</sup> In January 2021, the Biden administration joined the COVAX program, while the G7 summit held in February 2021 announced that it would double the funding for Gavi COVAX AMC to support lower-income economies to obtain life-saving vaccines against COVID-19, ensuring greater equity in the fight to end the acute phase of the pandemic.

In addition, as mentioned above, there were earlier cases where vaccination was impeded due to the lack of an established system for injury compensation following vaccine side effects. Taking this into consideration,

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<sup>11</sup> Ministry of Foreign Affairs, 'Video message by Minister for Foreign Affairs MOTEGI At the ACT Accelerator 4th Facilitation Council', 10 February 2021, [https://www.mofa.go.jp/press/release/press4e\\_002974.html](https://www.mofa.go.jp/press/release/press4e_002974.html)

<sup>12</sup> Health Policy Watch, 'Two Billion Doses Secured For COVAX Vaccine Facility – Distribution Will Begin in First Quarter 2021 To High Risk Groups in Low- And Middle-Income Countries', 18 December 2020, <https://healthpolicy-watch.news/covax-vaccine-2021-2-billion/>

<sup>13</sup> Health Policy Watch, 'US Congress Allocates \$4B To Support Gavi Vaccine Equity Plan', 23 December 2020, <https://healthpolicy-watch.news/us-congress-4-billion-covax-gavi/>

COVAX established a compensation fund for adverse reactions to the vaccine for developing countries. Despite the lack of U.S. leadership and the conspicuous tendency of countries to put their own citizens first, the framework for equitable access to vaccines has made steady progress.

## The Impact of Vaccine Access Disparities and International Political Order

Despite this progress, simply establishing a system to ensure equitable access to vaccines is not enough to deal with the challenges surrounding vaccines. The COVAX AMC has raised the necessary funds for supply, as mentioned above, but there is immense uncertainty about the quantity of essential vaccines that can be secured. Failure to ensure equitable access to vaccines will have several consequences from the perspective of the international order.

The first is that it will delay the containment of the infection, further inhibiting the recovery of the global economy. A laboratory at Northeastern University in the United States compared two scenarios: (1) monopolization of two billion doses of vaccine by the 50 industrialized countries, and (2) distribution of the vaccine in equal proportions as per the population of each country. Scenario (1) resulted in more than double the number of deaths and continued infection as compared to Scenario (2).<sup>14</sup> The Eurasia Group estimated through a simulation that developed countries could suffer trillions of dollars in economic losses over the next five years without equitable access to vaccines, and the Duke Global Health Institute also estimated that developed countries would lose about \$120 billion without equitable access.<sup>15</sup> RAND EUROPE, a non-profit research organization in the UK, estimated that, if developed countries invested in equitable access to vaccines, the economic return would be about four times that of the investment.<sup>16</sup> This shows that equitable access to vaccines is necessary not only from a humanitarian perspective, but also from a practical perspective, such as containing the outbreak and restoring the global economy.

The second impact of inequitable access is the promotion of conflict between developing and developed countries. At the meeting of the Council on

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<sup>14</sup> *Financial Times*, 'Vaccine fairness will make us all safer', 15 September 2020, <https://www.ft.com/content/f999c4e4-78a2-4f83-9beb-91c15dccc0b8?segmentid=acee4131-99c2-09d3-a635-873e61754ec6>

<sup>15</sup> *Reuters*, 'Ensuring global COVID-19 vaccine access seen worth billions to rich nations', 3 December 2020, <https://www.reuters.com/article/us-health-coronavirus-vaccine-gdp-trfn/ensuring-global-covid-19-vaccine-access-seen-worth-billions-to-rich-nations-idUSKBN28D217>

<sup>16</sup> *The Telegraph*, 'Vaccine nationalism could cost the global economy trillions of dollars, new analysis finds', 29 October 2020, <https://www.telegraph.co.uk/global-health/science-and-disease/vaccine-nationalism-could-cost-global-economy-trillions-dollars/>

Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO), India and South Africa argued that compulsory licensing of the COVID-19 vaccine should be allowed to enable the production of affordable vaccines, while Switzerland, the UK, and the United States, which have major pharmaceutical companies, maintained their opposition. The conflict between developing and developed countries regarding the handling of patent rights of the COVID-19 vaccine continues. Non-governmental organizations are also putting pressure on developed countries on this issue, and the WTO received about 900,000 signatures related to this matter in early December 2020.<sup>17</sup> If the gap between developed countries, where vaccination is progressing, and developing countries, where it is not, widens in the future, there is no denying the possibility of distrust and conflict between nations.

The third impact of inequality in access to vaccines is the rise of China. As mentioned above, there is a lot of uncertainty about whether COVAX will work well, and China and Russia are exporting domestically produced vaccines to developing countries in response to this uncertainty. For example, in August 2020, Chinese Premier Li Keqiang promised to provide Chinese-made vaccines to the five member countries of the Mekong Development Cooperation on a priority basis.<sup>18</sup> At this point in time, China has also promised priority supply to Brazil, Indonesia, and the Philippines. Vaccines are more scarce than masks, and it appears that China intends to use the supply of vaccines as a diplomatic tool to gain support for its actions in the South China Sea.<sup>19</sup> In October, China's Minister of Foreign Affairs Wang Yi expressed his intention to support the research, production, and supply of vaccines in Indonesia during a meeting with Indonesia's Coordinating Minister for Maritime and Investment Affairs.<sup>20</sup> Toward the end of the year, China also signed vaccine sales contracts in Latin America and the Middle East, and in December, Chinese vaccines were approved

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<sup>17</sup> *Reuters*, 'WTO delays decision on waiver on COVID-19 drug, vaccine rights', 11 December 2020, <https://www.reuters.com/article/us-health-coronavirus-wto/wto-delays-decision-on-waiver-on-covid-19-drug-vaccine-rights-idUSKBN28K2WL>

<sup>18</sup> *South China Morning Post*, 'China promises its Mekong neighbours priority access to a coronavirus vaccine developed in China', 24 August 2020, <https://www.scmp.com/news/china/diplomacy/article/3098610/china-promises-its-mekong-neighbours-priority-access>

<sup>19</sup> *Wall Street Journal*, 'China Seeks to Use Access to Covid-19 Vaccines for Diplomacy', 17 August 2020, <https://www.wsj.com/articles/china-seeks-to-use-access-to-covid-19-vaccines-for-diplomacy-11597690215>

<sup>20</sup> *Jakarta Post*, 'Indonesia can be manufacturing hub for COVID-19 vaccine, says Chinese foreign minister', 13 OCTOBER 2020, <https://www.thejakartapost.com/news/2020/10/12/indonesia-can-be-manufacturing-hub-for-covid-19-vaccine-says-chinese-foreign-minister.html>



in the UAE and Bahrain. China is reported to be considering setting up vaccine manufacturing plants in Morocco and Egypt to serve as regional supply bases.<sup>21</sup>

Russia also approved its COVID-19 vaccine in early August 2020 and has been actively providing vaccines to various Southeast Asian countries where access is expected to be delayed. The Philippines government has been exploring ways to reduce its dependence on the United States and its allies and to maintain a reasonable distance from China; meanwhile, some analysts believe that Russia is taking advantage of such aspirations and is “passionate about becoming a major player in Asia.”<sup>22</sup>

Furthermore, sufficient data supporting the safety and efficacy of vaccines produced in China and Russia not been disclosed, and if there is a problem with efficacy, it could mean that people are being vaccinated with ineffective vaccines, which could hinder the efforts toward global convergence.<sup>23</sup>

## Future Prospects

In an international society that has discrepancies in economic and technological power, it is inevitable that disparities in access to the COVID-19 vaccine will arise. In particular, it is natural for countries in a crisis situation to strive to secure vaccines for their own citizens above all else. The question is how to strike a balance between securing such national interests and maintaining international public interest in the midst of this crisis. We can consider it inevitable that developed countries with superior purchasing power and technological capabilities will gain access to vaccines earlier than others. However, we must avoid a situation where developed countries with an unusable amount of vaccines have to dispose of them before they can be used, and efforts should be made to distribute unused vaccines to those who should be prioritized, such as medical personnel in countries that do not have ready access to vaccines. It is important to note that this is not only from a humanitarian perspective, but as already mentioned, it also brings the benefit of quicker convergence and economic recovery.

Unfortunately, the reality is that some developed countries have secured an amount of vaccines that they will not be able to consume. However,

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<sup>21</sup> *The Guardian*, 'Vaccine diplomacy' sees Egypt roll out Chinese coronavirus jab', 30 December 2020, <https://www.theguardian.com/global-development/2020/dec/30/vaccine-diplomacy-sees-egypt-roll-out-chinese-coronavirus-jab>

<sup>22</sup> *Nikkei*, 'Russia's vaccine diplomacy towards Philippines', 13 September 2020, <https://www.nikkei.com/article/DGKKZO63734660R10C20A9TM5000>

<sup>23</sup> *Financial Times*, 'Anxiety clouds China's rush to vaccinate parts of the world', 20 December 2020, <https://www.ft.com/content/d8d9a691-831f-4942-a8f2-9b6f80f43b0b?shareType=nongift>

we should examine the background of this selfish act. Besides the virus representing an emergency for every nation, most developed countries are democratic countries in which the ruling government cannot keep their seats without people's support. In Japan, where general elections are expected to happen in the autumn of this year, the Suga administration wants to have as many people inoculated as possible before the summer Olympics and make the Olympics successful. Germany, which is also expecting general elections this autumn, has expectations quite similar to that of Japan regarding vaccines.

Even though vaccine nationalism is closely linked to such domestic situations in democratic countries, it cannot justify their selfishness. Fortunately, there are various efforts to address the uneven access to vaccines. Last month, G7 leaders pledged to intensify co-operation on COVID-19 and increase their contribution to the COVAX facility. In the middle of March, QUAD countries (Japan, the United States, Australia, and India) announced the establishment of a new cooperative framework to supply Indian vaccines to developing countries. I think world leaders should realize that their national interests are closely linked to the world distribution situation and involve themselves in such efforts.

In the future, further efforts to achieve equal access to vaccines will be necessary. I would like to propose three rules to ensure equal access to vaccines. The first is to increase the efficacy of COVAX by convincing countries of the importance of equitable access, calling for their participation, and convening international conferences to raise funds. Political leadership is required to boost COVAX. The reality, however, is that there is nearly no leadership. The United States is too busy seeking to control its domestic pandemic, having only joined COVAX in January 2021. China, which is also a member of COVAX, spends more energy on vaccine diplomacy than on its commitment to COVAX. Under such circumstances, the expectations from Japan as a facilitator and booster for COVAX are increasing.

The second is to develop an international approval system for vaccines. At present, the approval system differs from country to country, and some countries approve the vaccine with little data. So, it is necessary to entrust the approval process to a multilateral framework such as an international organization or an international panel of experts. Such a system would pave the way for utilizing not only Western vaccines but also non-Western vaccines and help to achieve equal access to vaccines. Japan is expected to play a leading role in establishing such a system.

The third is to make various efforts to promote vaccine production and ensure equal access to vaccines. Recently, Japan, the United States, Australia, and India agreed to establish a cooperative framework to supply Indian vaccines to developing countries. In the proposed framework, Japan, the United States, and

Australia finance the project, and India will produce the vaccine and supply it to developing countries. Furthermore, Japan should promote vaccine production similar to how the Biden administration brokered a pact between Johnson & Johnson and Merck for the former's coronavirus vaccine production. If Japan works toward these efforts, it would greatly help the world have equal access to vaccines.



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