

The Strategy Behind Taiwan's COVID-19 Immunization Program: National Security and Global Solidarity

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Abstract

In mid-2020, Taiwan started its national COVID-19 immunization plan through procurement of vaccines made by Moderna, AstraZeneca, and BioNTech/Pfizer, and the mass production of vaccines developed by domestic companies. The first case was immunized on March 22, 2021. The percentage of people who had received at least one dose remained very low (0.8%) on May 15 when the Level 3 Alert was announced due to an outbreak of the Alpha variant. The initial low coverage was the result of procurement interference, delayed delivery, misinformation from China and local pro-China media, as well as vaccine hesitancy. The immunization coverage has increased rapidly since early June when Japan, the U.S., Lithuania, and the Czech Republic began to donate large quantities of vaccines to Taiwan. The Taiwan Food and Drug Administration issued emergency use authorization for the MVC-COV1901 vaccine manufactured by Medigen, a domestic company. By September 15, the percentage of people who had received at least one dose was over 50%, and is expected to approach 70% by the end of October. The dual strategy of international procurement and domestic production seems to ensure the national security of Taiwan in the COVID-19 pandemic. Global solidarity through international cooperation is the best policy to minimize the impact of vaccine nationalism.

Keywords: COVID-19, Taiwan Model, Immunization, National Security, Global Solidarity

I. Introduction

Pandemics caused by emerging infectious diseases are pose a significant threat to global health, economic growth, sustainable development, social stability, national security, and regional peace. The catastrophic COVID-19 pandemic that originated from Wuhan, China, in December 2019 is a good example. Unfortunately, the initial outbreak was not well contained in Wuhan and the delayed lockdown resulted in the spread of the virus to other provinces and cities in China, and to almost all countries in the world. Cumulatively, there were over 219 million confirmed cases with over 4.5 million deaths by August 31, 2021. Global GDP amounted to about 84.5 trillion U.S. dollars in 2020, almost 3 trillion lower than in 2019.

Before the vaccines were available in December 2020, the only strategy to control the COVID-19 pandemic was to interrupt the viral transmission through non-pharmaceutical interventions (NPIs) including border control and quarantine, contact tracking and tracing, testing of suspected cases and close contacts, isolation treatment of confirmed cases, home isolation of close contacts, practice of personal hygiene, social distancing, and avoidance of large-scale gatherings. After December 2020, another pandemic control strategy was to increase herd immunity through mass immunization.

In 2020, Taiwan was one of few countries with the lowest COVID-19 mortality and positive GDP growth in the first phase of COVID-19 containment, according to reports by the Martin School of Oxford University and U.S. National Bureau of Economic Research.¹ Taiwan's success was based on the experiences of combating pandemics such as SARS in 2002-2003 and the new H1N1 influenza in 2009-2010. Key elements of the successful epidemic control in Taiwan include prudent action, rapid response, early deployment, transparency, public trust and solidarity. The initial challenges and recent achievements of national COVID-19 prevention and vaccination programs in Taiwan are described and discussed below.

1. Joe Hasell, "Which Countries Have Protected Both Health and the Economy in the Pandemic?" September 1, 2020, *Our World Data*, <<https://ourworldindata.org/covid-health-economy>>; Jesús Fernández-Villaverde & Charles I. Jones, "Macroeconomic Outcomes and COVID-19: A Progress Report," September 23, 2020, *Brookings*, <<https://www.brookings.edu/bpea-articles/macroeconomic-outcomes-and-covid-19-a-progress-report/>>.

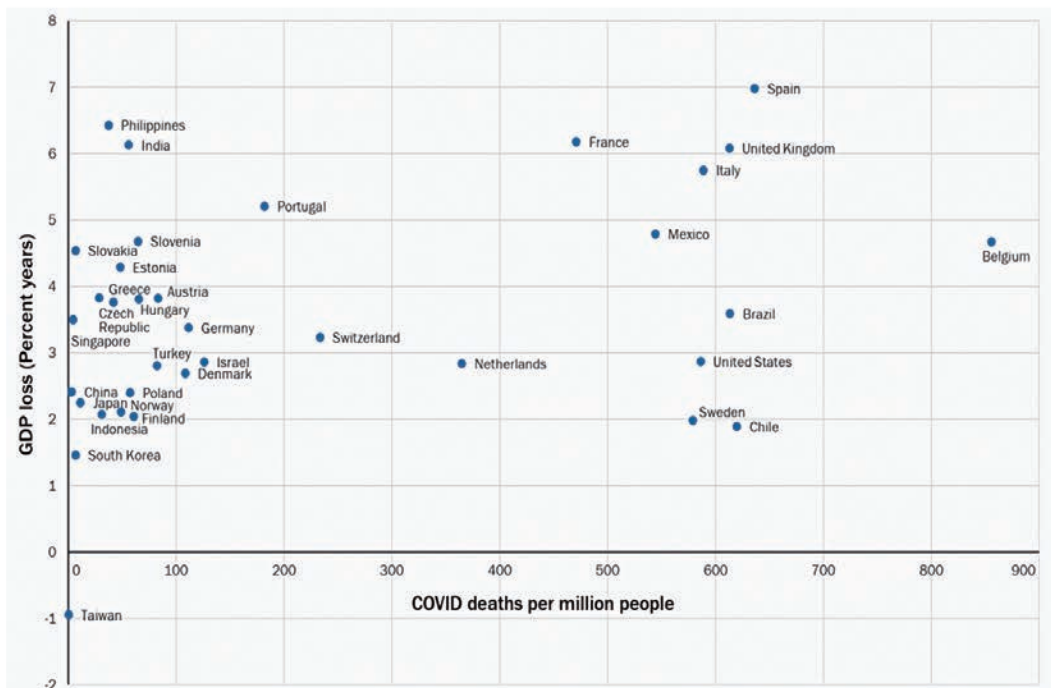
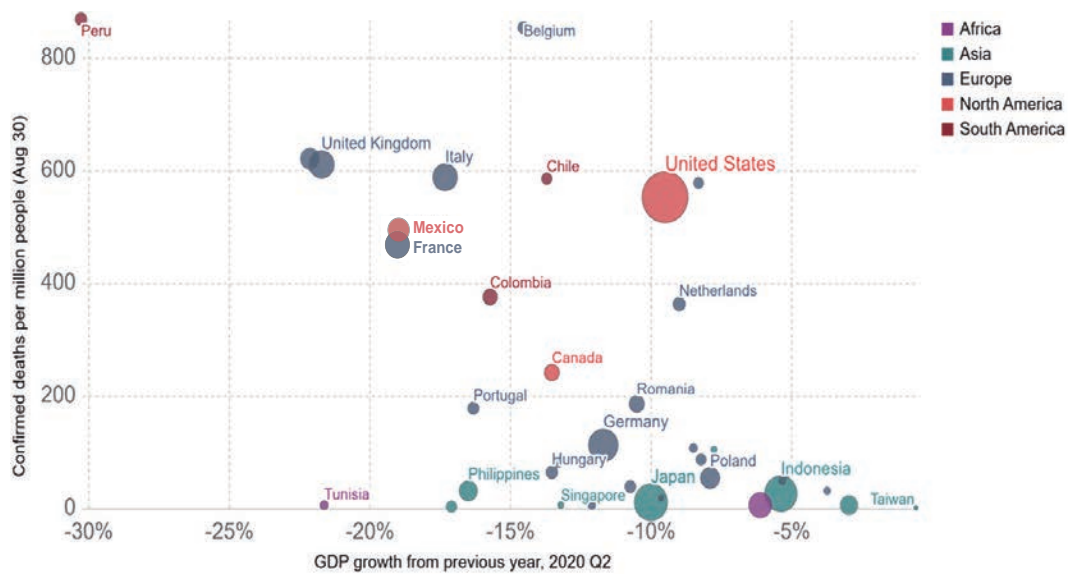


Figure 1. Percentage Decline of GDP and Confirmed COVID-19 Mortality per Million People in August (top) and September (bottom) 2020

Sources: Joe Hasell, “Which Countries Have Protected Both Health and the Economy in the Pandemic?”; Jesús Fernández-Villaverde & Charles I. Jones, “Macroeconomic Outcomes and COVID-19: A Progress Report.”

II. Taiwan Model for Containment of the COVID-19 Epidemic

The Taiwan Centers for Disease Control (CDC) learned of the potential for a COVID-19 emergency on December 31, 2019, through the stringent surveillance of emerging infectious diseases domestically and internationally from various information resources, including social media. The Taiwan CDC immediately sent an alert e-mail to the World Health Organization (WHO) and the China CDC through the International Health Regulation focal points to request clarifications about the clustering of atypical pneumonia cases in Wuhan. China subsequently reported 27 atypical pneumonia cases to the WHO. The Taiwan CDC started the on-board quarantine of all passengers from Wuhan on the same day, and strengthened hospital infection control and mobilization of healthcare system for infectious diseases.



Figure 2. President Tsai Ing-wen Held a National Security Council Meeting to Integrate Inter-ministerial Efforts to Contain the COVID-19 Epidemic

Source: Tsai Ing-wen, 〈防疫工作準備〉, January 22, 2020, *Facebook*, <<https://www.facebook.com/tsaiingwen/photos/a.390960786064/10156392141421065>>.

After the first COVID-19 case was detected in Taiwan, President Tsai Ing-wen held a National Security Council meeting and activated the Central Epidemic Command Center (CECC) to integrate and coordinate inter-ministerial efforts to contain the epidemic and maintain economic growth. President Tsai highlighted key elements of epidemic prevention including prudent action, rapid response, early deployment, transparency, public trust and solidarity based on the experiences of combating the SARS outbreak in 2002-2003 and the new H1N1 influenza in 2009-2010.

As almost all SARS cases had high fever with severe respiratory syndrome, the measurement of body temperature became a useful screening tool for early identification of SARS suspects. A campaign of body temperature measurement was launched in Taiwan. Fever screening stations and fever wards were implemented in hospitals for the isolation and treatment of SARS patients. Infrared cameras were equipped at airports and seaports to detect inbound passengers with fever. Tracking, tracing and testing of close contacts of confirmed cases were carried out to detect infected persons. Close contacts were isolated at home for 10 days. There was a total of 346 confirmed SARS cases with 37 deaths (a case fatality rate 11%) in Taiwan in 2003, showing an incidence rate much lower than in Hong Kong, Singapore, Toronto and China.

The epidemic prevention system in Taiwan was reviewed intensively and improved comprehensively after the SARS pandemic. The organization of the Ministry of Health and Centers for Disease Control (CDC) has been restructured to increase their capacity to cope with pandemics. The *Communicable Disease Control Act* and relevant regulations have been amended thoroughly. Both the national healthcare system for infectious diseases and hospital infection control program have been upgraded and accredited annually. The Taiwan CDC has formulated standard procedures to strengthen the surveillance of communicable diseases domestically and internationally. Border quarantine protocols have also been upgraded to detect imported cases. Home isolation or quarantine of close contacts or imported cases have been reinforced to prevent local transmission. A consortium of laboratories at medical centers in different geographical areas has been designated to coordinate the testing of infectious diseases. More infectious disease physicians have been recruited and teamed up for epidemic prevention at the Taiwan CDC. The National Health Command Center has been established to respond pandemic swiftly.

The Taiwan CDC responded to the new H1N1 pandemic influenza in an improved way in 2009. In addition to strengthening border quarantine, case detection and reporting, contact tracing and testing, and school closures, adequate rapid diagnostics, antivirals and vaccines were well deployed in private clinics and hospitals and reimbursed by the National Health Insurance Administration. The National Health Command Center was active as the Central Epidemic Command Center to integrate multi-sector efforts to combat the influenza pandemic. In comparison with OECD countries, the mortality rate from the H1N1 pandemic influenza in Taiwan was the third lowest among developed countries, next to Japan and Belgium.

Since January 2020, all ministries have been involved in the CECC's activities to ensure the efficacy and efficiency of the multi-sectoral collaboration. The CECC also mobilized resources for the mass production and name-based distribution of face masks and other personal protection equipment (PPE). From the very beginning of the pandemic, the government has ensured that the public has open access to COVID-19 information. The CECC has held daily press briefings since January 2020, which provide accurate news across a broad spectrum of media outlets. The CECC has quickly established its authority and earned the trust of the public. Public trust has a stabilizing influence on society, encouraging citizens to follow government guidance and rules, and making the public less vulnerable to disinformation. It has created a virtuous cycle of good governance and good citizenship. Transparency, public trust and solidarity are natural products of the vibrant democracy in Taiwan.

Non-pharmaceutical intervention (NPI) to interrupt the viral transmission was the only strategy in the first phase of pandemic prevention from December 2019 through December 2020 before vaccines were available. The response to COVID-19 was assessed by *Bloomberg Economics* and *Newsweek Japan* in May 2021 calculating epidemic damage and economic recession. Taiwan was ranked as the best country in COVID-19 containment and economic stimulus in the world.

There was no city lockdown or mass screening in Taiwan, but many smart technologies including information and communication technology (ICT) and artificial intelligence (AI) were used for to control the epidemic. Our rapid responses to the pandemic include (1) Prudent surveillance of international and domestic epidemic status using ICT, AI and big data analysis; (2) Quick announcement of travel and hot

zone warning using cellular broadcasts; (3) Stringent border control using e-quarantine systems; (4) In-depth tracing of close contacts of confirmed cases using ICT information and big data analysis; (5) Enforcement of home isolation/quarantine for close contacts/inbound passengers using digital fencing tracking and line bot systems; (6) Precision (targeted) testing of suspected cases with compatible symptoms/signs; (7) Mobilization of healthcare resources including 20,000 isolation rooms and 14,000 ventilators for isolation treatment; (8) Enhancement of infection control in hospitals and nursing homes using disinfection/delivery robots; (9) adequate supply of PPE through mass production and name-based distribution; and (10) Prompt vaccine supply through international procurement and domestic research, development and production.

	総合評価			コロナ被害				経済被害		
	点数	順位	順位の変化	感染者数 対1万人	点数	致死率 %	点数	GDP損失 %	点数	
台湾	145.0	1	(±0)	0.3	10	0.9	9	1.2	10	
韓国	128.3	2	(±0)	11.9	9	1.5	8	▲3.1	10	
ノルウェー	123.3	3	(±0)	92.0	7	0.9	9	▲3.1	10	
トルコ	108.8	4	(↓2)	262.4	5	0.9	9	▲1.2	10	
日本	108.0	5	(↑2)	18.8	9	1.4	8	▲5.5	7	
ニュージーランド	108.0	5	(±0)	4.3	10	1.2	8	▲5.5	6	
フィンランド	100.0	7	(↑1)	65.3	8	1.6	7	▲4.3	8	
ベトナム	99.8	8	(↑1)	0.2	10	2.4	5	▲3.4	9	
デンマーク	94.3	9	(↑5)	281.3	5	0.8	9	▲5.1	8	
タイ	94.3	9	(↑2)	1.0	10	0.9	9	▲8.6	3	
シンガポール	93.0	11	(↑1)	101.6	7	0.0	10	▲6.3	5	
パキスタン	89.3	12	(↓2)	23.1	8	2.1	5	▲3.4	9	
香港	87.5	13	(±0)	11.7	9	1.7	7	▲7.5	5	
マレーシア	77.5	14	(↑1)	34.2	8	0.4	10	▲9.6	2	
UAE	77.5	14	(↑5)	187.6	6	0.3	10	▲8.2	4	
アイルランド	76.0	16	(±0)	183.2	6	2.4	4	▲1.0	10	
ロシア	74.8	17	(±0)	213.0	5	1.8	6	▲4.5	8	
サウジアラビア	74.8	17	(±0)	104.3	7	1.7	6	▲5.9	6	
イスラエル	69.8	19	(±0)	458.8	2	0.8	10	▲5.3	7	
オーストラリア	63.8	20	(↑1)	11.0	9	3.2	2	▲4.6	8	
ドイツ	63.3	21	(↑1)	211.7	5	1.9	6	▲5.9	6	
スイス	62.5	22	(↑5)	523.1	1	1.7	7	▲4.2	9	
カタール	62.0	23	(±0)	513.3	1	0.2	10	▲5.2	7	
中国	61.8	24	(±0)	0.6	10	5.4	1	▲3.5	9	
オランダ	60.8	25	(↑1)	461.2	2	1.4	8	▲5.3	7	
エジプト	58.5	26	(↓2)	13.6	9	5.5	1	▲4.1	9	
インド	54.0	27	(↓23)	74.3	7	1.4	8	▲11.3	1	
スウェーデン	52.5	28	(±0)	416.2	2	2.0	5	▲4.2	8	
ポーランド	52.5	28	(±0)	341.1	4	2.2	5	▲5.6	6	
インドネシア	48.8	30	(±0)	27.6	8	3.0	2	▲6.8	5	
フィリピン	47.3	31	(±0)	43.5	8	1.9	5	▲14.8	1	
カナダ	46.8	32	(±0)	153.7	6	2.7	3	▲7.1	5	
米国	46.0	33	(±0)	609.1	1	1.8	6	▲5.4	7	
ブラジル	42.8	34	(↑1)	363.1	3	2.5	4	▲6.1	6	
南アフリカ	42.5	35	(↑1)	177.2	6	2.7	3	▲7.7	4	
ポルトガル	37.5	36	(±0)	403.2	3	1.7	7	▲9.0	3	
オーストリア	34.5	37	(±0)	405.4	2	1.7	6	▲8.2	4	
メキシコ	32.5	38	(↑3)	110.6	7	8.8	1	▲9.1	3	
チェコ	31.3	39	(↑1)	672.0	1	1.6	7	▲8.0	4	
ギリシャ	30.0	40	(↑3)	129.8	6	3.5	2	▲10.2	2	
ハンガリー	30.0	40	(↑1)	330.7	4	3.0	2	▲8.0	4	
チリ	29.8	42	(↓2)	313.0	4	2.7	3	▲8.6	3	
コロンビア	28.5	43	(↑1)	322.9	4	2.6	4	▲10.1	2	
アルゼンチン	25.5	44	(±0)	358.1	3	2.7	3	▲8.8	3	
フランス	23.8	45	(±0)	402.6	3	2.5	4	▲9.4	2	
ベルギー	22.5	46	(↑2)	562.7	1	3.0	2	▲7.6	5	
イタリア	19.5	47	(↑1)	349.5	4	3.5	1	▲9.3	2	
ベルギー	19.5	47	(↑1)	303.1	5	3.7	1	▲14.2	1	
英国	17.0	49	(±0)	370.1	3	3.0	3	▲11.2	1	
スペイン	14.3	50	(±0)	414.8	2	2.6	4	▲12.4	1	

Figure 3. Assessment of Responses to COVID-19 in 50 Countries by *Newsweek Japan* on May 12, 2021

Source: 高山武士, <コロナ禍を上手く乗り切っているのはどの国か? - 50か国ランキング (2021年5月更新版)>, *Newsweek Japan*, May 12, 2021, <<https://www.nli-research.co.jp/report/detail/id=67765?site=nli>>.

In the ranking of COVID-19 control in 75 emerging and frontier economies by *Bloomberg Economics* and the assessment of the responses to COVID-19 in 49 Countries by *Newsweek Japan*, Taiwan was ranked as the best country to prevent pandemic and economic damages. The president, vice president and digital minister of Taiwan were selected as “People Who Are Making Things Better” by The WIRED 25 for sustaining the longest period without domestic cases (253 days) in Taiwan.



Figure 4. The President, Vice President and Digital Minister of Taiwan Were Named “People Who Are Making Things Better” by The WIRED 25

Source: “Meet This Year’s WIRED 25: People Who Are Making Things Better,” *WIRED*, September 9, 2020, <<https://www.wired.com/story/wired25-2020-people-making-things-better/>>.

III. Mass Production, Name-based Distribution and Humanitarian Donation of PPEs and Pharmaceuticals

At the beginning of 2020, the production and equal rationing of face masks remained a challenge in Taiwan. A national mask team was organized to expand 92 production lines in 73 requisitioned manufacturing factories. The new production lines implemented in the factories were procured by the government. The daily production of face masks increased from 1.8 million in January to 21 million in May. A name-based rationing system was implemented to ensure that every citizen could obtain adequate face masks at low prices. An online name-based distribution system was also implemented for people to order online, pay by credit card/ATM and get the masks at over 10,000 convenience stores, such as 7-Eleven and Family Mart. Similar policies were applied to companies producing sanitizers, thermometers, thermal imaging cameras, and ventilators. Taiwan also donated over 50 million surgical masks and other PPEs to more than 80 countries in 2020.



Figure 5. Taiwan Donated over 50 Million Surgical Masks and Other Personal Protection Equipment to over 80 Countries Worldwide

Source: Ministry of Foreign Affairs, 〈外交部宣布啟動第二波國際抗疫人道援助行動〉, April 9, 2020, *Ministry of Foreign Affairs*, <https://www.mofa.gov.tw/News_Content.aspx?n=8742dce7a2a28761&s=e04f52ea8ba075f0>.

Academia Sinica, the National Health Research Institutes, research universities and biomedical industry in Taiwan have organized research teams specialized in the research and development of rapid diagnostics, antivirals and vaccines for emerging infectious diseases since the SARS outbreak in 2003. A share of the government budget has been allocated for researcher training, laboratory equipment, novel research and mission-oriented pharmaceutical development. After the WHO designated COVID-19 as a new infectious agent, all relevant public and private research organizations immediately shifted their focus on the new virus. Taiwan also collaborated with the U.S. and EU countries to develop rapid diagnostics, antivirals and vaccines.

The COVID-19 pandemic accelerated the research, development and production of pharmaceuticals in 2020. New platforms for vaccine development and manufacturing had been well developed by the biomedical industry, national drug regulatory agencies have adopted emergency use authorization (EUA) to facilitate the prompt supply of pharmaceuticals with safety and efficacy, and national disease control agencies have purchased antivirals and vaccines through an advance procurement plan (APP).

IV. National COVID-19 Vaccination Program

The dual strategy of COVID-19 containment through the NPI to interrupt viral transmission and universal immunization was very well recognized in Taiwan in early 2020. Securing the adequate supply and equal distribution of vaccines was considered a very important strategy for national security and public health. In addition to procuring vaccines from international vaccine companies, it is also very important to promote the development and production of domestic vaccines.

In view of this urgency, Taiwan's national immunization program involved a dual strategy of international procurement and domestic production. This program was implemented in consideration of the fact that it was competing to procure adequate and promptly delivered vaccines from international companies, and with the knowledge that Taiwan's vaccine companies are very capable of developing and producing protein subunit vaccines. The decision was therefore made to procure mRNA vaccines from BioNTech/Pfizer and Moderna as well as adenovirus vaccines from AstraZeneca; and to invite domestic vaccine companies including Medigen, UBI and Adimmune to engage in the research, development and production of protein subunit vaccines.

The Taiwan CDC ordered 10 million doses of vaccines from AstraZeneca and 4.76 million doses from COVAX respectively in September and October 2020. In February 2021, another 5.05 million doses were procured ordered Moderna. The Taiwan CDC also issued an advance procurement plan of 5 million doses each to Medigen and UBI on May 28, 2021. An additional 36 million doses of Moderna vaccines were procured by the Taiwan CDC, and 15 million doses of BioNTech/Pfizer vaccines were procured and donated to the Taiwan CDC by three private organizations: TSMC, Foxconn, and the Tzu Chi Foundation in July 2021. In other words, a total of over 80 million doses of COVID-19 vaccines had been procured by August 2021.

In the initial procurement of international vaccines, Taiwan had made successful deals with AstraZeneca in the UK and Moderna in the U.S., and was engaged in talks with Germany's BioNTech for the Pfizer vaccine. Taiwan had almost completed the contract signing with the German manufacturer at one point, but this was delayed due to China's interference. Many countries, especially the United States and Japan, did their best to help Taiwan secure an adequate supply of COVID-19 vaccines.

At this writing, Taiwan has received 3.4 million doses of AZ vaccines donated by Japan, 2.5 million doses of Moderna vaccines donated by the U.S., 400,000 doses of AZ vaccines donated by Poland, 20,000 doses of AZ vaccine donated by Lithuania, and 30,000 doses of Moderna vaccines from the Czech Republic. These vaccines donated by like-minded countries have significantly accelerated the rapid increase in immunization coverage in Taiwan since June.



Figure 6. Japan Has Donated over 3.3 Million AZ Vaccines to Taiwan

Source: Central Epidemic Command Center.

V. COVID-19 Vaccine Development in Taiwan

In her inaugural address on May 20, 2020, President Tsai announced the launch of a Six Core Strategic Industries Program to turn Taiwan into a critical force for the global economy and global health. The research, development and production of epidemic prevention-related products, including PPE, diagnostics, antivirals and vaccines, is a major component of Taiwan's Six Core Strategic Industries Program. The vaccine industry is considered essential to maintaining public health and national security in Taiwan. In addition to establishing the platforms for research and development of new drugs and vaccines with safety, efficacy and, contract development and manufacturing organization (CDMO) for vaccine and pharmaceutical production are also being promoted.

In view of the importance and urgency of developing COVID-19 vaccines domestically, in April 2020 the Taiwan Food and Drug Administration (TFDA) started the "CDE can Help" program to help the Center for Drug Evaluation (CDE) monitor the weekly progress and provide immediate consultation to three vaccine companies. The TFDA approved phase 1 clinical trials for Adimmune on August 17, UBI on

August 28, and Medigen on August 31. The criteria for the approval of phase 2 clinical trials and EUA were discussed and approved by the TFDA on October 14. The TFDA approved phase 2 clinical trials for Medigen on December 30, 2020, and UBI on January 28, 2021. The Medigen vaccine, MVC-COV1901, was granted EUA from the TFDA on July 19 and gained approval from the Advisory Committee on Immunization Practices (ACIP) to be included in the national vaccination program on July 25.

In line with the WHO-ICMRA joint statement on the need for improved global regulatory alignment on COVID-19 medicines and vaccines,² the TFDA adopted the concept of immunobridging for the EUA approval of MVC-COV1901.³ Taiwan was the first country to issue EUA for a COVID-19 vaccine based on correlates of protection.⁴ The average neutralizing antibody levels for participants in clinical trials 28 days after a second dose of MVC-COV1901 was 3.4-fold the level elicited in subjects who had received two doses of the AstraZeneca vaccine. The efficacy of MVC-COV1901 was considered at least not inferior to the AstraZeneca vaccines.

Among the three vaccines developed in Taiwan, MVC-COV1901 has the lowest percentage of suspected severe adverse reaction and deaths after immunization than AstraZeneca and Moderna. By September 12, a total of 7,967,003 AstraZeneca doses, 3,779,909 Moderna doses and 715,280 MVC-COV1901 doses had been administered in Taiwan. Suspected severe adverse reactions were 0.0304%, 0.0204% and 0.0144% respectively; and deaths after vaccination were 0.0074%, 0.0042% and 0.0017% for AstraZeneca, Moderna and MVC-COV1901 respectively.

2. "WHO-ICMRA joint statement on the need for improved global regulatory alignment on COVID-19 medicines and vaccines," November 6, 2020, *World Health Organization (WHO)*, <<https://www.who.int/news/item/06-11-2020-who-icmra-joint-statement-on-the-need-for-improved-global-regulatory-alignment-on-covid-19-medicines-and-vaccines>>.

3. Jon Cohen, "Can Immune Responses Predict Which Vaccines Work Best?" *Science*, Vol. 373, Issue 6551, July 2021, pp. 142-143; David S. Khoury, Deborah Cromer, Arnold Reynaldi, Timothy E. Schlub, Adam K. Wheatley, Jennifer A. Juno, Kanta Subbarao, Stephen J. Kent, James A. Triccas, & Miles P. Davenport, "Neutralizing Antibody Levels Are Highly Predictive of Immune Protection from Symptomatic SARS-CoV-2 Infection," *Nature Medicine*, Vol. 27, July 2021, pp. 1205-1211.

4. Andrew Silver, "Why Taiwan approved its own vaccine before phase III trials," *BMJ*, September 2021, Vol. 374, No. 2104.



Figure 7. President Tsai Ing-wen Receives the MVC-COV1901 Vaccine Made by Medigen, A Domestic Vaccine Company in Taiwan

Source: Tsai Ing-wen, “At NTU Hospital,” August 23, 2021, *Facebook*, <<https://www.facebook.com/tsaingwen/photos/a.390960786064/10157656248351065>>.

VI. Coverage of COVID-19 Immunization in Taiwan

COVID-19 immunization in Taiwan was launched on March 22. However, the percentage of people who had received at least one dose remained very low (0.8%) on May 15 when the Level 3 Alert was implemented due to the outbreak of the Alpha variant. Taiwan was reported to be persistently targeted for political and COVID-19-related misinformation/disinformation attacks as well as vaccine procurement interference by China and pro-China media and politicians.⁵ Vaccination hesitancy resulted from the interference with procurement, while disinformation regarding potential severe adverse reactions to the AstraZeneca vaccine slowed down the vaccination among high-risk populations in Taiwan.

5. Chunhui Chi, “Taiwan and the Politics of Vaccine Warfare,” *East Asia Forum*, August 13, 2021, <<https://www.eastasiaforum.org/2021/08/13/taiwan-and-the-politics-of-vaccine-warfare/>>.

Both the United States and Japan sensed the political crisis in Taiwan and began donating vaccines in June. *“These are not just biological vaccines — they are political vaccines to stabilize a vibrant democracy from external interference, and economic vaccines to maintain a stable supply of semiconductor chips to the world.”*⁶

The vaccination coverage increased rapidly after early June when Japan, the U.S., Lithuania, and the Czech Republic started to donate large quantities of vaccines to Taiwan. The percentage of people who had received at least one dose reached 42% by September 1. The cumulative COVID-19 vaccine coverage in Taiwan is lower than that in Singapore, the UK, Israel, Lithuania, the U.S., Japan, the Czech Republic, and Poland, but it is higher than that in Thailand and Vietnam. Taiwan is expected to receive the prompt delivery of procured vaccines in the coming months, and for at least 70% to have received at least one dose by the end of October 2021.

In 2020, Taiwan donated over 50 million surgical masks, other PPEs, sanitizers, ventilators, thermometers, infrared thermal sensors, oxygen tanks, and pharmaceuticals to more than 80 countries. When Taiwan encountered a shortage of vaccine supply in 2021, six countries donated over 6.3 million doses to Taiwan in return. Many other countries helped Taiwan receive prompt procurement and delivery of vaccines from AstraZeneca, Moderna and Pfizer/BioNTech. “Help each other” is the best policy to combat the COVID-19 pandemic together. “One for all, and all for one” reflects the spirit of global solidarity.

The percentage of people who have received at least one dose of COVID-19 vaccine was 42% globally by September 12, 2021. There was a significant variation in immunization coverage in different regions. It was less than 6% in Africa, 42% in Oceania, 48% in Asia, 55% in North America and Europe, and 57% in South America. No country should be left out of the network of immunization protection. The COVID-19 virus will continue to mutate in any country with low immunization coverage and a high transmission rate. A new variant originating in any country can cause another surge of cases worldwide. The international community should try its best to assist countries with low coverage to increase the immunization rate as soon as possible.

6. Chunhuei Chi, “Taiwan and the Politics of Vaccine Warfare.”

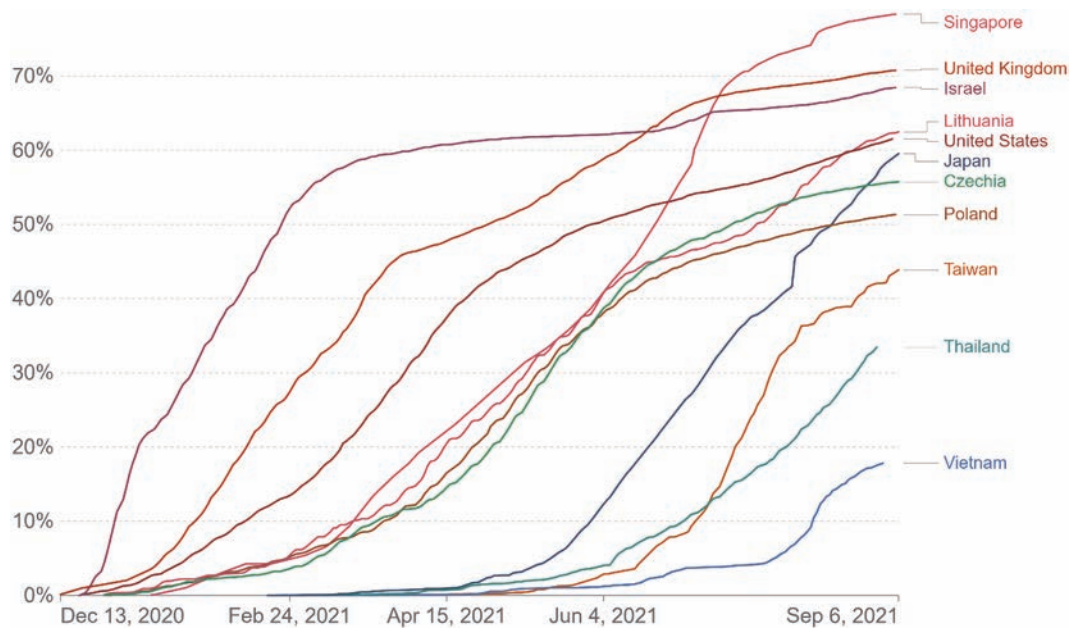


Figure 8. Cumulative COVID-19 Immunization Coverage from December 2020 to September 2021 in Taiwan and Other Countries

Source: Our World in Data, “Share of people that have received at least one dose of the COVID-19 vaccine,” September 9, 2021, Accessed, *Our World in Data*, <<https://ourworldindata.org/covid-vaccinations>>.

VII. Real World Data of COVID-19 Immunization Effectiveness

All COVID-19 vaccines approved by the WHO for emergency use listing have been tested for their quality, safety and efficacy through randomized clinical trials. Vaccines are required to have an efficacy rate of 50% or above to be approved. After approval, they have to be monitored for ongoing safety and effectiveness. The efficacy is derived from a controlled clinical trial to measure how much the vaccine lowered the risks of getting sick. If a vaccine has high efficacy, a lot fewer people in the group who were vaccinated will get sick than among people in a group who received a placebo.

Vaccine effectiveness is a measure of how well vaccines work in the real world. Effectiveness may differ from the efficacy measured in a trial, because we cannot predict exactly how effective vaccination will be for a much larger and more variable population getting vaccinated in more real-life conditions.

The effectiveness of COVID-19 immunization may be assessed in countries where vaccination was launched in December 2020. Both incidence and mortality rates of COVID-19 decreased significantly along with the increase in the immunization coverage in the UK, the U.S. and Israel, where AstraZeneca, Pfizer/BioNTech, Moderna, and Johnson & Johnson vaccines were used for immunization. However, the COVID-19 incidence and mortality did not decline with the increased immunization coverage using the Sinopharm vaccine in Chile. The effectiveness of national immunization programs using various vaccines well reflects their efficacy observed in clinical trials. It is therefore essential for all countries to provide clear and transparent data for the assessment of the effectiveness and safety of medicines, biologics, and vaccines against COVID-19.

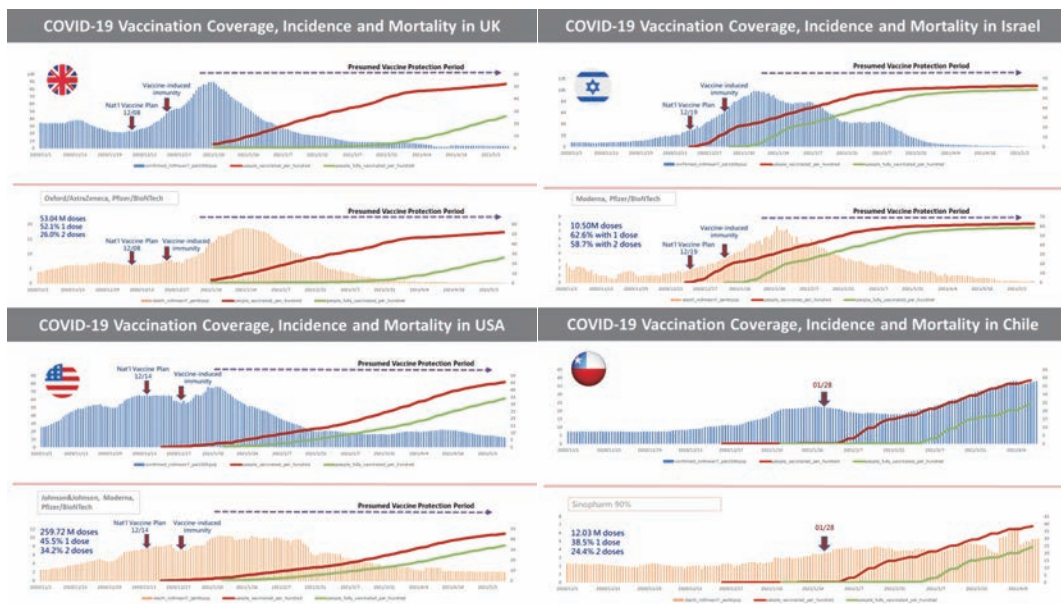


Figure 9. COVID-19 Vaccination Coverage, Incidence and Mortality in the UK, U.S., Israel and Chile from November 2020 to April 2021

Source: Central Epidemic Command Center.

VIII. Vaccine Equity and Global Solidarity

Viruses respect no border. No nation can fight against pandemics alone. International collaboration is urgent to ensure that everyone in every countries can receive adequate support and aid to recover from the pandemic. However the global COVID-19

immunization campaign is characterized by uncertainty, complexity, and urgency. We have to make sure that COVID-19 vaccines are accessible to everyone, irrespective of ethnicity, nationality, gender, sexual orientation, race and religion. Vaccine equity and global solidarity are the key to contain the pandemic, for economic revitalization and societal restoration.

After the surge of the Delta variant around the world, some countries are trying to give a third or even fourth vaccine dose to their people. Two doses of vaccine have already been documented to have a high efficacy to protect a vaccinated person from severe disease and death, and to secure the optimal function of the healthcare system. Whether it is necessary to give a booster dose to the entire population or only to vulnerable groups needs further consideration. What is known is that the equal and rapid distribution of vaccines to the entire world is urgently need. The World Health Organization should play a more active role to ensure the provision of vaccines to low-income countries. Pandemic containment can never be achieved unless most people in the world are immunized.

Taiwan always tries its utmost to be a good partner in global health. After the immunization coverage reaches the threshold of herd immunity in 2021, Taiwan could begin to donate vaccines to countries in need in 2022, just as it donated face masks and PPEs to more than 80 countries in 2020.