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BRI Vaccine Partnership: The Local Production of Chinese Vaccines and the Future Network of Providing mRNA Vaccines

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China Investment Research (CIR)

Shanghai Institutes for International Studies (SIIS)

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1. Introduction

Our previous study which ended with data up until 30th June 2021 concluded that despite the world producing an estimated 30 billion doses of Covid vaccine until the end of 2022, the world appeared to have a 5-6 billion vaccine gap, focused mostly on emerging markets.¹ Our study stated that this gap can be closed by China sharing vaccines within Global Governance as well as by sharing the intellectual property of the then 3 Chinese Covid-19 vaccines with countries participating in the Belt and Road (BRI) Vaccine Partnership.

The outbreak of the Omicron variant around the world shows that if a single country is struck by the Covid-19, the rest of the world will also be affected. The Omicron variant, spotted in South Africa on 26th November 2021, spread globally and has proved to be more contagious than the previous Delta variant with the basic reproduction number between 1:8 to 1:10, 3.2 times that of the Delta variant.² Hence, it is the joint responsibility of the world to work together to prepare, prevent and combat the Covid-19 efficiently and effectively.

In this report, we will continue to study the impact of global health governance on curbing Covid-19 and trace the vaccine development, especially with regard to the Belt and Road Vaccine Partnership launched by China. The second section synthesizes the current progress of the world in combatting Covid-19. Due to mutations of Covid-19 variants (Delta and Omicron) and disparate vaccination rate among different countries, the third section will summarize challenges to global health governance. The fourth section will make proposals on how to close the vaccine gaps by boosting vaccines supplies and coordinating national policies on the re-opening time schedule.

¹ Yang Jian, Henry Tillman, Zheng Jie, and Ye Yu, Addressing the Vaccine Gap: Goal-based Governance and Health Silk Road, 28th September 2021 <http://www.siis.org.cn/UploadFiles/file/20210929/Envision%20a%20World%20Taming%20COVID-19_0929_final.pdf>.

² Fan, Li, *et al*, SARS-CoV-2 Omicron variant: recent progress and future perspectives, 28th April 2022, <<https://www.nature.com/articles/s41392-022-00997-x>>.

2. Current progress of the world in combatting Covid-19

China's six-point initiative for fighting Covid-19

China has endeavored to provide vaccines as public goods to developing countries continuously. Early in September 2021, Chinese President Xi made the pledge in a virtual summit with the leaders of Brazil, Russia, India and South Africa, that China will donate 100 million Covid-19 vaccine doses to developing countries by the end of 2021.³ In the first meeting of the International Forum on Covid-19 Vaccine Cooperation in August 2021, President Xi announced that China will strive to provide 2 billion Covid-19 vaccine doses to the world in 2021 and donate \$100 million to COVAX for the distribution of vaccines to developing countries.⁴ At the opening ceremony of the 8th Ministerial Conference of the Forum on China-Africa Cooperation in November 2021, President Xi announced that China will provide an additional 1 billion Covid vaccines to Africa to help the African Union achieve its goal of vaccinating 60% of the African population by 2022.⁵ Moreover, during a speech at the virtual World Economic Forum on 17th January 2022, President Xi pledged to send an additional 1 billion doses of Covid-19 vaccines to other countries, calling for global cooperation to tackle the pandemic and other challenges.

In order to promote the Health Silk Road and to provide vaccines as public goods, President Xi made a six-point initiative on international cooperation for fighting Covid-19 at the G20 summit in October 2021.⁶ This six-point initiative includes:

First, to strengthen vaccine R&D cooperation and support vaccine companies in conducting joint R&D and production with developing countries. China urges and encourages developed countries, including vaccine production and R&D companies, to support the production and distribution of vaccines in developing countries. China is also willing to cooperate with developing countries in this regard via its BRI vaccine partnership network.

Second, to uphold equity and justice, by providing more vaccines to developing countries to meet the global vaccination target for 2022 as set by the WHO. China urges international organizations (including the WTO, WHO and UN General Assembly) to reform the institutions

³ China to donate 100 million vaccine doses to developing countries by end of 2021, 10th September 2021, <<https://www.scmp.com/news/china/article/3148197/china-donate-100-million-Covid-19-vaccine-doses-developing-countries-end>>.

⁴ China to provide 2 billion COVID vaccines globally, 6th August 2021, <<http://www.chinadaily.com.cn/a/202108/06/WS610c6e44a310efa1bd666f81.html>>.

⁵ President Xi addresses opening ceremony of 8th FOCAC ministerial conference, <http://focac.org.cn/focacdakar/eng/zxyw_1/202112/t20211203_10462089.htm>.

⁶ Global Vaccine Cooperation Action Initiative by China at G20 Summit, 30th October 2021, <<https://thediomaticinsight.com/global-vaccine-cooperation-action-initiative-by-china-at-g20-summit/>>.

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and mechanisms to provide financial support and offer technology transfers to facilitate the production and distribution of vaccines in developing countries.

Third, to support the World Trade Organization (WTO) in making an early decision on waiving intellectual property rights on Covid-19 vaccines, and encourage vaccine companies to transfer technology to developing countries. The intellectual property rights exemption should be exceptionally adopted in Covid-19 vaccines to fight the pandemic in an efficient way.

Fourth, to scale up cross-border trade cooperation to ensure smooth trade in vaccines and related raw and auxiliary materials. Countries should work together to solve the obstacles to international trade and transportation difficulties and facilitate the flow of materials needed to fight the pandemic.

Fifth, to treat different vaccines equally and advance mutual recognition of vaccines in accordance with the WHO's Emergency Use Listing. China calls for the world to speed up the negotiation on the mutual recognition of vaccines from different countries and avoid vaccine discrimination based on political bias. At the G20 meeting, Secretary-General Guterres also expressed his concerns about the “dangerous levels of mistrust” among G20 countries and addressed the joint efforts on tackling vaccine inequality between the developed countries and developing ones.

Sixth, to provide financial support for global vaccine cooperation, especially for developing countries to access vaccines. China puts forward the initiatives to the international communities to enhance the vaccine distribution via financial support. It already started to provide investment in medical infrastructure, vaccine production and distribution along the Belt and Road countries.

Promoting mutual recognition of vaccination

The issue of mutual recognition of vaccines has been resolved between China and the United States. The WHO on 1st July 2021 held that any Covid-19 vaccine authorized for emergency use should be recognized by countries as they open their borders to inoculated travelers.⁷ In addition to vaccines by Pfizer-BioNTech, Moderna Inc., AstraZeneca, and Johnson & Johnson, the WHO has also included Chinese vaccines (Sinovac, Sinopharm, and CanSino) in its emergency list. The United States has lifted its earlier travel ban allowing travelers who are vaccinated by the accepted Covid-19 vaccine including WHO's emergency list since 8th November 2021.⁸

⁷ WHO decision challenges West to recognize Chinese vaccines, <<https://abcnews.go.com/Health/wireStory/approved-vaccine-allowed-travel-78604727>>

⁸ U.S. Accepted Covid-19 Vaccines, <<https://www.cdc.gov/coronavirus/2019-ncov/travelers/proof-of-vaccination.html#Covid-vaccines>>.

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Despite some differences over the Russian-Ukrainian conflict, China and the EU have reached a political consensus on jointly fighting the pandemic. At the 23rd EU-China summit meeting held on 2nd April 2022, Chinese and the EU leaders stated that the two sides had agreed on cooperation in the fight against the COVID-pandemic through vaccination campaigns in collaboration with the World Health Organization (WHO) and the post-pandemic economic recovery, enhancing bilateral trade, climate change, green transition, and cooperation in the field of digital technology and cybersecurity. The EU has confirmed its commitment to work with China and other member states of the WHO on a new instrument for pandemic prevention, preparedness, and response.⁹

Working on new instruments for pandemic preparedness

The World Health Organization (WHO) is working on a new instrument for the prevention, preparedness, and response to the pandemics.¹⁰ An intergovernmental negotiating body was established to draft and negotiate a WHO convention, agreement or other international instruments with mandatory legal effect. This new instrument will include establishing global access and benefit sharing for all pathogens, determining a global policy for the equitable production and distribution of countermeasures, establishing robust systems and tools for pandemic preparedness and response, and establishing a long-term plan for sustainable financing to ensure support for global health threat management and response systems.¹¹

On March 29, 2022, the UN General Assembly adopted a resolution that calls on member states to prioritize pandemic prevention, preparedness and response in a whole-of-government and whole-of-society approach, to achieve universal health coverage. It calls on member states to promote the transfer of technology and know-how, to strengthen local and regional capacities for the manufacturing, regulation and procurement of needed tools for equitable and effective access to vaccines, therapeutics, diagnostics and essential supplies, as well as for clinical trials, and to increase global supply through facilitating the transfer of technology within the framework of relevant multilateral agreements.

⁹ EU-China summit via video conference, 1 April 2022,

<<https://www.consilium.europa.eu/en/meetings/international-summit/2022/04/01/>>.

¹⁰ World Health Assembly agrees to launch process to develop historic global accord on pandemic prevention, preparedness and response, 1st December 2021 < <https://www.who.int/news/item/01-12-2021-world-health-assembly-agrees-to-launch-process-to-develop-historic-global-accord-on-pandemic-prevention-preparedness-and-response>>.

¹¹ First Meeting of the INB to draft and negotiate a WHO convention, agreement or other international instrument on pandemic prevention, preparedness and response, Geneva, 10th March 2022, A/INB/1/4.

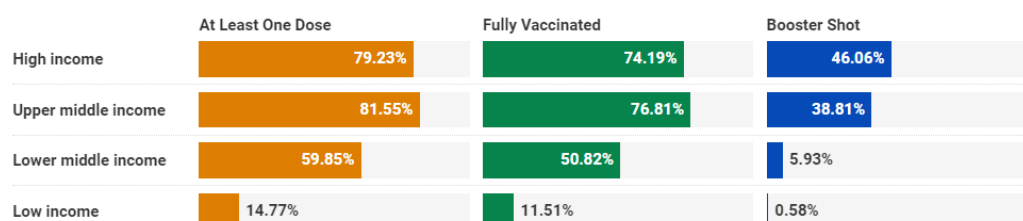
3. Challenges to global health governance: vaccination rate lagging behind

The rapid emergence of Delta and Omicron variants of Covid calls for an urgent need to achieve high levels of immunization coverage around the globe, especially for vulnerable populations. The Independent Allocation of Vaccines Group recommends a 70% coverage with Covid-19 vaccines in all countries as a global imperative by mid of 2022.¹² The major challenge to global health governance still lies in the gaps between developing countries and developed countries.

According to Our World in Data, an online publication whose research team is based at the University of Oxford, as of 12th April 2022, about 80% of people in high-income countries had received at least one vaccine dose compared to only 15% of those in low-income countries. The same disparity in vaccination rate appears in booster doses between the high-income countries and low-income countries: 46.06% of people in high-income countries had received a booster dose, compared to only 0.58% of those in low-income countries.¹³

Vaccination Status By Country Income Group

Income groups are based on World Bank income classifications.



Data as of April 12, 2022.

Chart: U.S. News & World Report • Source: [Our World In Data](#)



(Source: U.S. News)

A large majority of the population in the west has received full vaccination. In the U.S., 77% of the population have received at least one dose, 66% of the population are fully vaccinated and 30% of the population have received a booster dose.¹⁴ In the EU, as of 13th April 2022, 75.3% of the

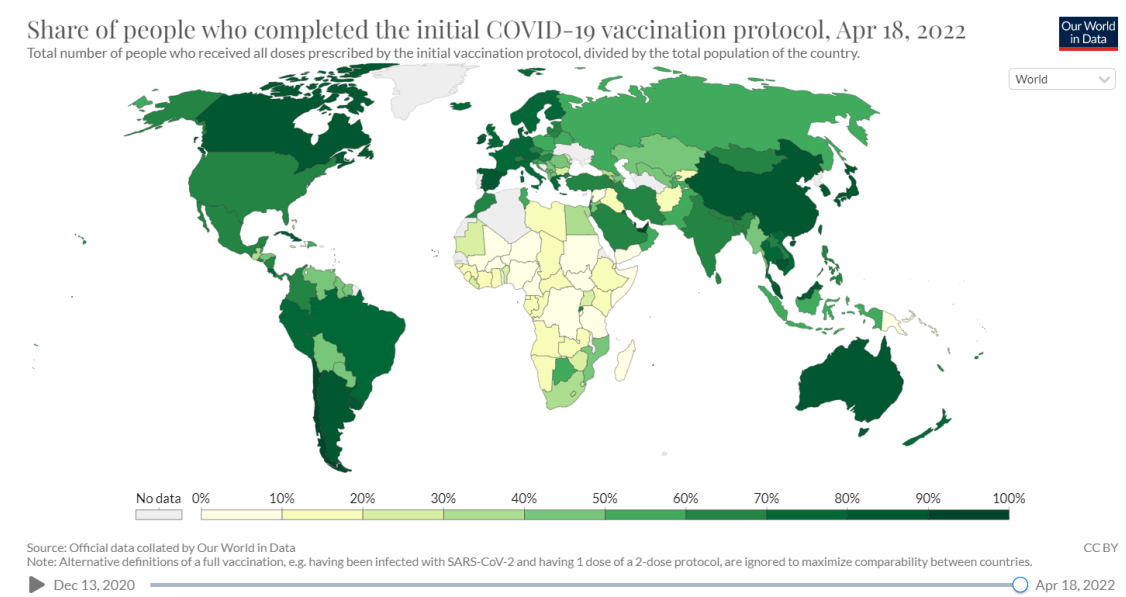
¹² Achieving 70% Covid-19 Immunization Coverage by Mid-2022, 23rd December 2021, <<https://www.who.int/news/item/23-12-2021-achieving-70-Covid-19-immunization-coverage-by-mid-2022>>

¹³ Wealthy countries are outpacing poor nations in Covid-19 vaccination rates, 13 April 2022, <<https://www.usnews.com/news/best-countries/articles/Covid-19-vaccination-rates-by-country>>.

¹⁴ US Coronavirus vaccine tracker: <<https://usafacts.org/visualizations/Covid-vaccine-tracker-states/>>.

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population have at least one dose, 72.5% of the population are fully vaccinated, and 52.9% of the population have received booster doses.¹⁵



(Source: Our World in Data¹⁶, 18th April 2022)

The vaccination rates in developing countries are not as optimistic as those in western ones. Since the launch of COVAX, the vaccine delivery effort has been hindered by pharmaceutical companies not meeting their contractual obligations, leaving COVAX with fewer doses than expected. Only 1 billion vaccine doses out of an expected 2 billion doses were delivered to COVAX in 2021. COVAX is highly dependent on charity by pharmaceutical companies and rich nations, but this mechanism lacks accountability. According to the chief executive of Gavi, COVAX will no longer be able to accept new donations that come without syringes or other components due to a lack of funds.¹⁷ Another problem with COVAX is the lack of diversity in the type of vaccines provided to the developing countries. Poorer nations have refused tens of millions of AstraZeneca Covid-19 vaccines, which COVAX had initially regarded as its main supplier, from COVAX due to their short shelf life.¹⁸ In Africa, vaccines' short shelf life, limited storage facilities, poor healthcare infrastructure, and vaccine hesitancy were among the main reasons that hampered vaccination.

¹⁵ European Centre for Disease Prevention and Control Covid-19 Vaccine Tracker:

<<https://vaccinetracker.ecdc.europa.eu/public/extensions/COVID-19/vaccine-tracker.html#uptake-tab>>.

¹⁶ Our World in Data:<<https://ourworldindata.org/Covid-vaccinations>>.

¹⁷ Covax, the UN-backed vaccine initiative, is reportedly out of money, < <https://truthout.org/articles/covax-the-un-backed-vaccine-initiative-is-reportedly-out-of-money/>>.

¹⁸ Poorer nations shun Astra-Zeneca Covid vaccine-document, < <https://www.reuters.com/business/healthcare-pharmaceuticals/poorer-nations-shun-astrazeneca-Covid-vaccine-document-2022-04-14/>>.

4. Global vaccination partnership and coordinating re-opening policies

4.1 Availability of diversified Covid vaccines

The availability of diversified Covid-19 vaccines is needed to meet the demands of different countries depending on the storage condition, logistic conditions, and technical facilities for the production and distribution of vaccines. Several different types of vaccines are available against Covid-19 virus including inactivated virus vaccines (such as Sinovac and Sinopharm), protein-based vaccines (such as Novavax, Sanofi), viral vector vaccines (such as AstraZeneca, Johnson & Johnson, CanSino) and messenger RNA (mRNA) vaccines (such as Moderna, BioNTech).

In China, most of the Covid vaccines currently available are inactivated virus vaccines. Unlike the mRNA vaccines, the inactivated virus vaccines do not need to be kept at ultracold temperatures, enabling export abroad. CanSinoBio's Vaccine (Convidecia), produced in China using recombinant viral vector technology, can be stably transported and stored between 2°C and 8°C, making it more accessible to regions with insufficient storage facilities and medical resources. CanSinoBio has seen encouraging data in the trial of a booster dose of Convidecia for people inoculated with two doses of the vaccine. The single-dose vaccine received approvals in at least 10 markets including China, Mexico, Ecuador, Chile, Argentina, Hungary, Kirghizstan, Pakistan, Indonesia and Malaysia.

Meanwhile, Chinese pharmaceutical companies are also currently investing in local R&D for mRNA vaccines due to current efficacy advantages seen with this vaccine technology compared to other technologies. (See **Table 1**). For instance, a study by the University of Hong Kong earlier this year made a comparative study on the effectiveness of China's Sinovac vaccine (inactivated virus) with the mRNA vaccine developed by BioNTech against the Omicron variant.¹⁹ Both vaccines work at three doses to offer over 90% protection against severe disease and death across all age groups. But the mRNA vaccine offered better protection at one and two doses.²⁰

¹⁹ McMenamin, Nealon *et al*, Vaccine effectiveness of two and three doses of BNT162b2 and CoronaVac against COVID-19 in Hong Kong, 22th March 2022, <<https://www.medrxiv.org/content/10.1101/2022.03.22.22272769v1.full>>.

²⁰ How China's Sinovac compares with BioNTech's mRNA vaccine, 19th April 2022, <<https://www.economist.com/graphic-detail/2022/04/19/how-chinas-sinovac-compares-with-biontechs-mrna-vaccine>>.

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Table 1. Chinese domestic mRNA vaccines						
Vaccine Name	Clinical Trial Phase	Study period	Countries	Testing population	Age group	Comment
1. Walvax mRNA						
ChiCTR 2100041855	Phase 2	11/01/21-31/03/22	China	420 A,B,C (120 each) Placebo (60 each)	18-59	A leading candidate/frontrunner.
NCT04847102	Phase 3	22/07/21-30/05/23	Indonesia, Mexico	28000	18-59; ≥60	Can manufacture 400 mn/yr (1)
2. CanSino Ad5-nCoV-IH						
NCT05204589	Phase 3	22/01/22-01/09/22	China	10420 A,B,C	≥18	04/22 NMPA granted approval for the clinical trial application in China (2)
NCT05169008	Phase 3	20/02/22-20/08/23	Chile, Mexico	2000	≥18 1000; 1000 children (6-12 years)	
NCT05124561	Phase 3	15/12/21-20/08/22	N/A	13000	≥18	
3. AIM LVRNA009						
NCT05364047	Phase 1	29/07/21-10/22	China	144	≥18	01/22 - AIM Vaccine phase I clinical trial data results (3)
NCT05352867	Phase 2	09/03/22-08/23	China	420	18-59	
4. CSPC SYS6006						
NCT05354089	Phase 1	26/04/22-01/10/23	China	60	18-59	04/22- China's medical product regulator approved "SYS6006" trial (4)
5. Stemirna mRNA Covid19 Vaccine						
ChiCTR2100045984	Phase 1	25/03/21-25/05/22	China	240	≥18	Candidates focused on Delta and Omicron variants (5)
NCT05144139	Phase 2	03/12/21-30/12/22	Lao	640	≥18	
<p>(1) Trialing ARCoV in China as a booster for those who received non mRNA vaccines. In 02/22, a small study showed ARCoV's neutralizing activity against the omicron variant was weaker; however, two altered versions induced antibodies comparable to mRNA efficacy: https://www.reuters.com/business/healthcare-pharmaceuticals/chinas-mrna-covid-vaccine-candidates-2022-02-28/</p> <p>(2) Pre-clinical trial results showed that CanSinoBIO's COVID-19 mRNA vaccine can induce high-titer neutralizing antibody levels against multiple SARS-CoV-2 variants of concern (VOC) identified by the WHO, including the Omicron variant, a highly transmissible and the most dominant strain circulating in China and globally: https://www.biospectrumasia.com/news/37/20005/china-approves-clinical-trial-for-cansinobios-covid-19-mrna-vaccine-.html</p> <p>(3) Prof. Qin Xiaofeng (Chinese Academy of Medical Sciences & Peking Union Medical College) and Suzhou Institute of Systems Medicine- the phase I clinical trial data of AIM mRNA vaccine: With few adverse reactions and high neutralizing antibody titer, this product has great prospects.": https://www.acnnewswire.com/press-release/english/72367/phase-i-clinical-trial-of-aim-mrna-covid-19-vaccine-(lvrna009)-won-the-praise-of-the-industry-for-high-safety-and-well-tolerance</p> <p>(4) https://www.bloomberqint.com/markets/two-chinese-mrna-covid-vaccines-move-toward-clinical-trials</p> <p>(5) Delta variant mid stage trial in Laos; also applying for an updated version showing early promise in Omicron variant.</p>						

Table 1 Chinese domestic mRNA Vaccines (Developed within China)

Chinese vaccine manufacturer Walvax Biotechnology is jointly developing the mRNA vaccine (ARCoV) with private vaccine manufacturer Suzhou Abogen Biosciences and the Chinese Academy of Military Sciences. It is approved for Phase III trials in China, Mexico, Indonesia, and Nepal. Walvax's facilities have an annual capacity to make a total of 400 million doses of the vaccine in the form of bulk substances.²¹

Other possible Chinese domestic mRNA vaccines candidates include vaccines from AIM, CSPC, and Stemirna. AIM vaccine, in January 2022, held a meeting releasing the analysis results of the

²¹ China's Walvax says has most participants for large mRNA Covid Vaccine trial, 27th January 2022, <<https://www.channelnewsasia.com/asia/china-walvax-says-has-most-participants-large-Covid-19-mrna-vaccine-trial-2464376>>

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phase I clinical trial data of its mRNA Covid-19 vaccine, indicating high safety and well tolerance.²² CSPC Pharmaceutical Group, said preclinical studies showed its vaccine candidate can generate high neutralizing activity against Covid-19 variants including the Omicron and Delta strains. The product can be stored for long term at 2-8 degrees Celsius. In April 2022, Stemirna Therapeutics gained approval from the National Medical Products Administration to launch clinical trials for its Covid-19 mRNA vaccine in China. The company has set up factories in Shanghai's Pudong New Area and Fengxian district to guarantee the mass production of the vaccine. The yearly output of the vaccine in the two factories is expected to hit 400 million doses. Nevertheless, none of the Chinese mRNA vaccines are likely to be disbursed to the 1.4 billion population prior to November of 2022 (second half of 2022) and more likely in the first quarter of 2023.

In addition to domestic Chinese mRNA vaccines, there is also a market for joint cooperation in the production of international mRNA vaccines between Chinese companies and foreign pharmaceuticals as seen in the cooperation between Fosun and BioNTech, between Everest and Providence (see **Table 2**).

Table 2. Status of international mRNA vaccines to be authorized for trial/development in China					
Vaccine Name	Clinical Trial Phase	Study period	Countries	Age group	Comment
1. BioNTech Comirnaty BNT162b2					
NCT04649021	Phase 2	12/04/2020-01/09/2022	China	18-85	Approved in 144 countries (including Hong Kong, Macau, and Taiwan) Trials across a number of vaccines
2. Providence PTX-Covid19-B					
PRO-CL-002, NCT05175742	Phase 2	17/08/21-31/03/23	Canada, South Africa	18-64	Phase 1 showed similar outcomes to Pfizer/BioNTech

Table 2 International mRNA vaccines to be authorized for trial/development in China

²² Phase I Clinical Trial of AIM mRNA COVID-19 Vaccine (LVRNA009) Won the Praise of the Industry for High Safety and Well Tolerance, < <https://www.benzinga.com/pressreleases/22/01/a25009943/phase-i-clinical-trial-of-aim-mrna-covid-19-vaccine-lvrna009-won-the-praise-of-the-industry-for-hi>> 11 January 2022.

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BioNTech (Germany)/Pfizer (Comirnaty)²³

In March 2020, China's Fosun Pharma and BioNTech entered into a 15-year license agreement JV valued at \$135 million providing Fosun Pharma the right to sell and distribute the vaccine in Greater China including Hong Kong, Macau and Taiwan. Fosun invested \$50 million in BioNTech shares and agreed to milestone payments of up to \$85 million.

In January 2021, Hong Kong authorized the use of the BioNTech Comirnaty vaccine.²⁴ In February 2021, the Macau Government followed suit, authorizing the use of the BioNTech Comirnaty vaccine.

In May 2021, Fosun Pharma signed a JV with BioNTech to manufacture mRNA vaccine in China with the capacity to manufacture 1 billion doses of the vaccine. Fosun will invest \$100 million to build the facility for its 50% share of the JV, while BioNTech will contribute its proprietary manufacturing technology, which it values at \$100 million.²⁵

In September 2021, 930,000 doses of Pfizer-BioNTech vaccines arrived in Taiwan. Previously, the Taiwan Centers for Disease Control released a statement announcing that the BioNTech vaccine would be prioritized for those between the ages of 12 and 17, with leftover doses administered to those between 18 and 22.²⁶ This was in addition to 15 million BioNTech vaccine donated to Taiwanese government in the summer of 2021 by Taiwanese companies Foxconn and TSMC through related charities and the Tzu Chi Foundation, a Buddhist organization.

From the period 2021-Q1 2022, BioNTech/Pfizer doses (million) by region:

Hong Kong	7.9
Taiwan	15.7
Macau	0.3
Total	3.9

²³ On August 23, 2021, FDA announced the first approval of a COVID-19 vaccine. The vaccine has been known as the Pfizer-BioNTech COVID-19 Vaccine, and will now be marketed as Comirnaty, for the prevention of COVID-19 in individuals 16 years of age and older, < <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/comirnaty-and-pfizer-biontech-covid-19-vaccine> >.

²⁴ On 25 January and 18 February 2021 respectively, the Secretary for Food and Health authorized the COVID-19 vaccine by Fosun Pharma/BioNTech (Comirnaty) and that by Sinovac Biotech (Hong Kong- CoronaVac) for emergency use in Hong Kong in accordance with the Regulation, <<https://www.covidvaccine.gov.hk/en/vaccine>>.

²⁵ <<https://www.biospectrumasia.com/news/91/18178/fosun-biontech-invest-200-m-to-manufacture-covid-19-vaccine-in-china.html>>

²⁶ <https://www.nytimes.com/2021/09/02/world/asia/taiwan-receives-its-first-batch-of-pfizer-biontech-vaccines-after-a-months-long-delay.html>

Providence Therapeutics (Canada)/Everest Medicines (Hong Kong)

A possible addition to Pfizer and Moderna's existing mRNA vaccines is Calgary based Providence Therapeutics Holdings Inc., which has two candidates, PTX-COVID19-B that acts in a similar manner to their other vaccines and PTX-COVID19-LT, which is being developed to have a longer-lasting immune response.²⁷

In September 2021, Providence Therapeutics announced two separate definitive agreements with Everest Medicines, to (i) license rights to Providence's mRNA COVID-19 vaccine candidates in emerging markets in Asia, including Greater China, Southeast Asia and Pakistan, and (ii) establish a broad, strategic partnership to develop mRNA products globally (including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste and Vietnam²⁸) leveraging Providence's cutting-edge mRNA technology platform.

Providence's lead mRNA COVID-19 vaccine candidate, PTX-COVID19-B, currently in Phase 2 clinical trials, demonstrated outcomes in Phase 1 studies that compared favourably or better to currently approved mRNA vaccines at similar trial stages.

Providence and Everest also agreed to enter a 50/50 global collaboration under which the parties will develop prophylactic or therapeutic products in two additional indications. The collaboration includes full technology transfer of Providence's current and future manufacturing processes to Everest. In April 2022, China Resources Pharmaceutical Group, a subsidiary of a state-owned enterprise, formed a pact with Everest Medicines to advance the mRNA vaccine of Providence in China.

It is worth noting that June 2021 India's Biological E. announced that it had entered into a licensing agreement with Providence Therapeutics Holdings to manufacture the Canadian company's mRNA COVID-19 vaccine in India. Providence agreed to sell up to 30 million doses of PTX-COVID19-B, to Biological E., and will also provide the necessary technology transfer of the shot, with a minimum production capacity of 600 million doses in 2022 and a target capacity of 1 billion doses.

²⁷ <https://scrip.pharmaintelligence.informa.com/SC145187/Providences-COVID-19-mRNA-Vaccine-Challenger-Seen-In-Phase-III-In-Q1>

²⁸ It is interesting to note the overlap of these countries named in the agreement and those named in the BRI Vaccine Agreement <https://providencetherapeutics.com/press-details/providence-therapeutics-enters-into-comprehensive-agreements-with-everest-medicines-to-advance-mrna-vaccines-and-therapies-including-covid-19-vaccines-in-emerging-markets-in-asia.html>

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Biological E, which also has a separate deal to produce about 600 million doses of Johnson & Johnson's COVID-19 shot annually, will run a clinical trial of Providence's vaccine in India and seek emergency use approval for it.²⁹

4.2 BRI vaccine partnership development (update since July 2021)

Our last report “Addressing the Vaccine Gap: Goal-based Global Governance” has followed up the cooperation between China and its vaccine partners in local production and facilities construction until 30th June 2021. There were 29 countries participating in the initial launch of the Belt and Road Vaccine cooperation (Indonesia, the Philippines, Vietnam, Thailand, Malaysia, Cambodia, Laos, Singapore, Brunei, Pakistan, Bangladesh, Myanmar, Nepal, Sri Lanka, Maldives, Afghanistan, Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan, Kyrgyzstan, Saudi Arabia, UAE, Columbia, Chile, Fiji, Solomon Islands, China, Mongolia).

One critical miscalculation from COVAX is its reliance on a single or several production sites with limited supply and logistic availability. In March 2021, India halted all vaccine exports due to an outbreak of Delta variant within the country, largely reducing the speed of COVAX. The BRI vaccine hubs are a useful experience in vaccine sharing and distribution among countries. This could reduce the risks of delivery delays for vaccines due to a certain country or region being hit by Covid virus.

Currently, 9 BRI vaccine participating countries (Indonesia, Pakistan, Russia, Myanmar, Uzbekistan, Malaysia, Chile, UAE, and Singapore) have launched the vaccine production with the cooperation of Chinese companies (See **Table 3**) and another 8 BRI countries (Brazil, Bangladesh, South Africa, Argentina, Cambodia, Hungary, Sri Lanka, and Laos) are in the progress of negotiating with Chinese companies or setting up plants (See **Table 4**).

²⁹ <https://www.reuters.com/business/healthcare-pharmaceuticals/indias-biological-e-make-providence-therapeutics-mrna-covid-19-vaccine-2021-06-01/>

Table 3 BRI Vaccine Partnership Initiative (Initial List)

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BRI Vaccine Partnership Initiative (Table 3)

Chinese Vaccines International Production – BRI Selected Countries Initial List

Country	Population (m)	Partners	COVID Vaccine Doses		Other Vaccines
			2022 (m)	2023+ (m)	
Indonesia	276	Bio-Farma-Sinovac / PT Etna-Walvax	195/D	195/TB D	Bio Farma: 1.7 billion vaccine doses/yr largest in Southeast Asia ⁽¹⁾
Pakistan	220	Searle Livzon (PakVac) AJM Pharma – CanSino Bio	ND 36/ND	N/D ND/ND	Searle Pak- linked w/Western countries. NIH a leading regional vaccine manufacturer ⁽²⁾
Russia	146	Petrovax Pharma – CanSino Bio	120	120	Vaccines, medicines, generics and health products ⁽³⁾
Myanmar	55	Myancopharm-Sinopharm	8	12	anti-venom, other vaccines ⁽⁴⁾
Uzbekistan	34	Jurabek Labs – Zhifei Longcom Biopharma	100	ND	leading and largest Uzbek pharma organisation ⁽⁵⁾
Malaysia	33	Pharmaniaga-Sinovac / Solution Group – CanSino Bio	12	ND	Pharmaniaga -Malaysia's largest integrated pharma group. Solution Group has both a biotics and engineering business.
Chile	19	Sinovac	20	50	Covid 19, Hepatitis A, chicken pox, polo and influenza ⁽⁷⁾
UAE	10	Julphar (Group 42) – Sinopharm (HayatVax)	200	200	wide range of medicines, injections and consumer healthcare ⁽⁸⁾
Singapore	5	Innova (USA) Pasaca (USA) – Sinopharm	TBD	TBD	Innova -global antigen testing; Pasaca Capital -PE Fund ⁽⁹⁾



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(1) In 2020, China signed contracts to send 125 million doses of Sinovac, 50 million doses of Sinopharm and 20 million of CanSinoBio all in 2021. Etna and Walvax plan to produce 70 million doses of the mRNA once it is approved.

(2) Searle and Livzon signed an April 2021 deal to license and manufacture Livzon vaccine. Since signing no dosages were made available. In June 2021, NIH and CanSinoBio signed a deal to manufacture PakVac. No additional dosage information has been public except to state that Pakistan expected to save 25% on vaccine cost, or \$250 million in 11 months.

(3) Petrovax is a leading Russian biopharma company; contract is for 10 million doses/month

(4) During 2021, China sold/granted 6 million doses of Sinovac. In March 2022, launched semi-finished local production for 1 million doses/month (2022-2023). Sinopharm's 1st international plant in Asia-Pacific

(5) In August 2021, agreed to produce 10 million doses locally of the Zhifei vaccine/yr

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(6) In January 2021, signed a fill and finish deal with Sinovac, which produced 12 million doses in H1 2021. Also distributed to hospitals in Myanmar. 2022/2023 deals not public. In February 2022, Solutio Biologics signed a (3.5 million dose) filling and finishing of CanSino's single-dose vaccine Convidecia

(7) In May 2022, Sinovac launched construction of its \$100 million Santiago plant to fill and finish vaccines; 50 million doses/yr will be produced once operational (pre 2023). Chile previously ordered 60 million doses 2021-2023.

(8) Julphar launched 2021 programme, 1st in MENA. Haya Biotech (SEZ) began producing Sinopharm protein-based booster 12/21. Began testing Walvax targeting Omicron 04/22

(9) In November 2021, Singapore based Sino-Innovax Biotech JV was launched; 51% Sinopharm; 49%. The JV to initially focus on the manufacturing and global distribution of Sinopharm's existing vaccines but will include other vaccines in development by CNBG

Table 4 BRI Vaccine Partnership Initiative (BRI countries not yet launched)

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BRI Vaccine Partnership Initiative (Table 4)

Chinese Vaccines International Production – BRI Countries Not Yet Launched

Country	Population (m)	Partners	COVID Vaccine Doses		Other Vaccines
			2022 (m)	2023+ (m)	
Brazil	215	Butantan Institute – SinoVac	ND	100	Brazilian State lab; rabies, zika, Hep AB ⁽¹⁾
Bangladesh	168	Incepta-Sinopharm	60	60+	Regional pharma group; (mostly) generics ⁽²⁾
South Africa	60	Numolux Group - Sinovac	TBD	120	spectrum of vaccinations ⁽³⁾
Argentina	46	Institute Biological Products (IBP) - Sinopharm	TBD	52	IBP owns 6 Chinese inactivated virus vaccine production plants ⁽⁴⁾
Cambodia	16	Combodian Company – Sinopharm	TBD	TBD	Local partner name not disclosed ⁽⁵⁾
Hungary	10	National Vaccine Plant - Sinopharm	TBD	TBD	Local vaccines ⁽⁶⁾
Sri Lanka	8	Kelun Life Science – Sinovac State Pharma Corp. (SPC) -Sinovac	13 9	13 9	Kelun Life Sciences: saline specialist ⁽⁷⁾ SPC: 2,000 drugs; sole supplier of pharmaceuticals ⁽⁷⁾
Laos	7	Pharmaceutical Factory No. 3	TBD	TBD	Pharma 3: restructuring to focus on innovation ⁽⁸⁾

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(1) Vaccine production centre launched in March 2022 and becomes operational by 2023 (100 million doses/yr of CoronaVac). More than 112 million doses of CoronaVac vaccine have been administered in Brazil since the beginning of the vaccination campaign in 2021, mostly among Brazilian children and adolescents

(2) On 17 May, the Bangladesh Govt signed a deal with Sinopharm and Incepta in which 5m doses of vaccine will be bottled, labelled, dispensed locally/month. To date, China has provided 2.1 million doses of Sinopharm vaccine as gift to Bangladesh, 3.4 million doses under the Covax facility and 8 million as part of a large commercial purchase.

(3) In September 2021, Sinovac and Numolux Group (South Africa) were discussing building a local manufacturing facility in which Numolux Group would handle bottling and labelling-- Phase one of a new facility. Numolux Group also said that China will make available up to 10 million doses of its Sinovac vaccine for South Africa. In April 2022, representatives from Sinovac and Numolux discussed collaborating with University of the Western Cape (UWC) at its new vaccine manufacturing plant in Saldanha.

(4) In February 2022, announced that Argentina and China were in negotiations to start local production of the Sinopharm vaccine to be produced by the Sinergium Biotech laboratory with a capacity up to one million doses/ week. Sinovac was first approved in Argentina in February 2021, since then Argentina has bought over 30 million doses of Sinovac

(5) In December 2021, a senior official from Cambodia's Ministry of Health stated that a Cambodian company signed an agreement with Sinopharm for a plant to manufacture the vaccine locally in Cambodia either by the end of 2022 or in 2023. In March 2022, President Xi committed another 20 million Covid-19 vaccine doses to Cambodia, five million in March.

(6) In February 2021, Hungary became the first EU country to use Chinese vaccines. In May, the Hungarian government announced plans to produce Sinopharm locally in a planned €157 million new national vaccine plant. In September 2021, Hungary signed a MoU to build the national plant with a goal to be operational by 2023. Representatives of the UAE were present at this signing.

(7) In June 2021, Kelun Lifesciences was permitted to secure 13 million Sinovac doses from its 2018 JV with Sinovac. In August, Sri Lanka's State Pharmaceutical Corporation and Sinovac were reportedly close to a deal to manufacture up to 9 million doses of vaccines in the pharma zone within Hambantota.

(8) In August 2021, Laos' Minister of Health and Stemirna Therapeutics (mRNA) met to discuss the possible construction of a factory /use of Pharmaceutical Factory No. 3 to serve as a central facility for the production of vaccine and also for the storage of imported vaccines. In January

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2022, China handed over 1.5 million doses of Chinese vaccines; China has now provided 8.9 million doses to Laos.

Another four African countries (Egypt, Algeria, Morocco, and Serbia), none of which were included in the original 29 BRI Vaccine Partner countries, have kicked off vaccine production in cooperation with the Chinese companies (See **Table 5**). On 9th May 2022, China exported the largest vaccine production plant to Morocco via a multipurpose heavy list vessel to enable the manufacture of Covid-19 vaccines in Africa. The production plant, with a total volume of close to 40,000 cubic meters, will enable the manufacture of up to 20 different vaccines, including three Covid-19 vaccines, reaching more than 60 percent of demand on the continent.³⁰ Twenty-one African countries representing a population of 1.5 billion will likely benefit from 2.5-3.0 billion doses by 2023 via this joint collaboration with China.

While our paper focuses on developments within the BRI Vaccine Partnership since its launch at the end of Q2 2021, including both existing vaccines produced and/or bottled within the countries and prospective China-based mRNA vaccines which are likely to be used in these countries in the future, we also did not want to exclude these countries (the Philippines, Vietnam, Thailand, Columbia, Afghanistan, Saudi Arabia, Nepal) which are currently using China produced vaccines and are not yet produced/bottled locally. We therefore list these 7 major countries in the **Appendix I**, which have a combined population of over 435 million, representing 5.5% of the world's total population and 8.2% of the world's population outside of China and India. By the end of 2023, these 28+ hubs of the BRI vaccine partnership will be producing in excess of 4-5 billion doses per year.

³⁰ Equipment for vaccine production plant heads for Morocco, 9th May 2022, <<http://www.ecns.cn/news/cns-wire/2022-05-09/detail-ihayamfc5322436.shtml>>.

Table 5 BRI Vaccine Partnership Initiative (selected other countries launched)

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BRI Vaccine Partnership Initiative (Table 5)

Chinese Vaccines International Production – Selected Other Countries Launched

Country	Population (m)	Partners	COVID Vaccine Doses		Other Vaccines
			2022 (m)	2023+ (m)	
Egypt	106	VASCERA-Sinovac	100	225	only producer of vaccines & sera in Egypt ⁽¹⁾
Algeria	45	Saidal Laboratories– Sinovac	96	96	influenza and poliomyelitis vaccines ⁽²⁾
Morocco	36	SENSYD Pharmatech Sinopharm	–	116	20 different vaccines, bio therapeutic products ⁽³⁾
Serbia	7	Hemofarm (STADA) – Sinopharm	27	30	historically focussed on generics/OTC meds ⁽⁴⁾



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(1) In April 2021, VACSERA and Sinovac signed agreements to produce the Sinovac COVID-19 vaccine locally in Egypt under the name Sinovac/VACSERA for both domestic use and export to African countries. Egypt started mass production of Sinovac/VACSERA in August 2021. By September 2021, VASCERA was producing 9 million doses/ month, but expected to raise capacity to produce 15-18.5 million doses/month after the opening of its new production facility located in El Dokki in Sixth of October in November. In January 2022, VASCERA and Sinovac signed a new cooperation agreement to establish a fully automated vaccine-storing complex at VACSERA factories in Giza's 6 October City (near Cairo) that can store 150 million doses of vaccines. The facility is also equipped with automatic loading and unloading docks, which will be a qualitative leap in cooling systems for vaccine preservation. This facility is planned to be completed and ready for operation by June 2022. In February 2022, 500,000 doses of Vacsera-Sinovac manufactured vaccines were exported to Gaza.

(2) In late September 2021, Algeria inaugurated manufacturing Sinovac vaccines with Saidal Group, in Constantine (Algeria's 3rd largest city). This production lines aims to produce 96 million doses in 2022 and each year thereafter. Saidal laboratories is capable of producing 200 million doses annually, enough to meet the needs of Algeria, as well as much of Africa. In February 2020, Algeria was one of the first countries to send medical donations to China, which in return has also sent several batches of medical aid and experts to Algeria.

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(3) In January 2022, King Mohammed VI chaired a ceremony launching the construction of Africa's largest vaccine manufacturing unit in Benslimane, on the outskirts of Casablanca. Inaugurated under the name of SENSYO Pharmatech, a PPP project including Recipharm (Sweden), seeks to guarantee Morocco's vaccine self-sufficiency. The project's production capacity is set to reach 116 million units by 2023. On 5th May, a ship left Shanghai carrying to Morocco the first shipment of Chinese vaccine production equipment: this was after two months for the overall planning, (conceptual and detailed design), and four months for manufacturing. It will take about another two months for final assembly, commissioning, and verification after arriving at the site, thus on course for July trials.

(4) In September 2021, Serbian, Chinese and UAE officials laid the foundations of a factory near Belgrade, worth € 30 million, designed to mass-produce Chinese Sinopharm vaccines. Serbian President Vucic said the factory would produce 30 million vaccine doses/ year (capacity is 40 million doses), which is, he said, "enough for Serbia, the region and everyone who is interested". Vucic also said that the first plant where the Chinese vaccines will be filled will be completed by the end of March 2022, by which time the bottling of Sinopharm vaccines will be done in Hemofarm's company in Serbia, which is owned by Stada (Germany).

4.3 Coordinated re-opening policies based on vaccination rate

When the Omicron variant firstly occurred in November 2021, most of the states closed their gates to travelers from the eight African countries where the variant was first identified. After that, the lifting measures of travel ban and re-opening policies vary among different countries.³¹

The Biden administration in the U.S. lifted restrictions on the Southern African countries early in December 2021 after a scientific study that the current vaccines are effective against the Omicron variant, especially for those who received a booster dose.³² Most western countries were also easing pandemic-related measures in February 2022 as a result of their high vaccination rates. European Commission chief Ursula von der Leyen announced that 50% of all adults in the EU have received a booster shot against the virus. Countries like the UK, France, Sweden, Norway, Finland, and Austria have also decided either to remove Covid-19 measures or ease restrictions.³³

³¹ Omicron variant leads to border closing, restrictions, 29th November 2021,

<<https://learningenglish.voanews.com/a/omicron-variant-leads-to-border-closing-restrictions/6332299.html>>

³² Biden to lift travel restrictions on southern African countries that were put in place due to Omicron, 24th December 2021, < <https://new.qq.com/omn/20220307/20220307A043VU00.html>>.

³³ Despite record omicron cases, Europe lifts pandemic measures, 1st February 2022, < <https://www.aa.com.tr/en/europe/despise-record-omicron-cases-europe-lifts-pandemic-measures/2490795>>

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In contrast, a more cautious approach, known as the “zero-tolerance policy”, was taken in China as a result of the low vaccination rate among the elderly population. China has strictly closed its border and only allow Chinese citizens or foreigners with a work permit to enter the country with strict quarantine policies in place. As of 7th February 2022, 87.1% of the population have received full vaccination while 32% of the population have received a booster dose.³⁴ Despite a high vaccination rate in adults, the vaccination rate of the elderly population is below 40%.³⁵ This is because China prioritized people aged between 18 to 60 years for vaccines as they are more likely to be infected and spread the virus. The vaccine rollout for people aged 60 only started in March 2021. Although the zero-tolerance policy has been criticized for its high economic cost and limitation on people’s movement, China insists on this policy because of the uncertainties of Covid variants and the irreversible economic and social crisis that may take place due to the mutation of the virus. As China has a population of 1.4 billion people and a gigantic market, it cannot take such risk by a total lifting of screening and lock-down measures.

Nevertheless, the diverging reopening policies around the world shall not become hurdles to mutual understandings and global cooperation of different nations in combatting Covid-19. Instead, countries should enhance information exchanges of national countermeasures in curbing Covid-19 and coordinate re-opening policies taking into account comprehensive factors of a nation’s population, age group, healthcare system, and vaccination rate. Moreover, the vaccines that are authorized by the WHO emergency use listing shall be used to promote equal treatment of vaccines and cross-border movement of citizens.

³⁴ China fully vaccination rate over 87%, 5th March 2022, < <http://www-chinanews-com-cn.vpn.sdnu.edu.cn/gn/2022/03-05/9693377.shtml>>.

³⁵ The vaccination rate of elderly population less than 40%, 7th March 2022, < <https://new.qq.com/omn/20220307/20220307A043VU00.html>>.

5. Conclusion

This is the third report following our first report on “Health Silk Road 2020: A Bridge to the Future for Health to all” and the second report on “Addressing the Vaccine Gap: Goal-based Governance and Health Silk Road 2021” to keep track of the latest development in Health Silk Road and global health governance.³⁶ The coronavirus variants including Delta and Omicron have challenged the global health governance due to an uneven distribution of vaccines and vaccination rates, even with the existence of international mechanisms such as COVAX. The world economies and global trade have also been affected by the pandemic and divergent national countermeasures against the virus. The world cannot get recovered if a single country is struck by the virus.

Since the launch of local production of Chinese vaccines in the second half of 2021 until the time of publishing this report, a total 9 of the original 29 BRI Vaccine Partnership countries, represents an excellent start. In addition, there are 8 of the original 29 countries where agreements are in place to launch during 2022, as well as 4 additional countries which have launched but were not part of the original 29 in the BRI Vaccine Partnership. Collectively, these countries represent circa 3 billion of the world’s population. There are another 7 countries, with a combined population of 430 million, listed as in the **Appendix I** which are not far enough along in the local production process to include in the analysis, but still in receipt of Chinese vaccines.

Once the Chinese mRNAs are authorized (likely within the next 6 months), these can be shared (along with the Providence mRNA) with many of the BRI countries vaccine hubs. This is all evidence confirming that China is on track to deliver what President Xi said in his May 2022 speech on the 70th anniversary of CCPIT and Global Trade and Investment Promotion Summit on reforming the global governance system that “the first priority is to enable international cooperation on vaccine R&D, production and distribution, bolster global public health governance, and work for a global community of health for all.”³⁷

³⁶ Henry Tillman, Ye Yu and Yang Jian, Health Silk Road 2020: A Bridge to the Future for All, February 28 2021, <http://www.siiis.org.cn/Research/EnInfo/5278>. Yang Jian, Henry Tillman, Zheng Jie, and Ye Yu, Addressing the Vaccine Gap: Goal-based Governance and Health Silk Road, 28th September 2021 < http://www.siiis.org.cn/UploadFiles/file/20210929/Envision%20a%20World%20Taming%20COVID-19_0929_final.pdf>.

³⁷ Chinese President Xi Jinping’s address at the conference of the 70th anniversary of CCPIT and Global Trade and Investment Promotion Summit, 19th May 2022, < https://en.qstheory.cn/2022-05/19/c_754005.htm>.

Appendix 1. Selected BRI Vaccine Programme Countries- No Local Chinese Production

1. The Philippines (112.5 million population)

Sinovac

At the end of February 2021, 600,000 doses of Sinovac COVID-19 vaccines donated by China arrived in Manila: 500,000 doses of COVID-19 vaccines donated by Chinese government to the Philippine government and 100,000 doses donation from the Chinese Military to the Armed Forces of the Philippines. This was the first batch of COVID-19 vaccines that the Philippines had received and arrived one day prior to the launch of the Philippines' mass inoculation campaign(1)

The second batch of Sinovac vaccines (CoronaVac) donated by China arrived in the Philippines on 24 March. By that time The Philippines has approved the emergency use for Sinovac vaccines, along with the vaccines made by Pfizer, AstraZeneca, and Russia's Sputnik V vaccines. (2)

In May, The Philippines received 1.5 million more doses of the Sinovac COVID-19 vaccine, its largest delivery to date in the country. By that time, The Philippines had received over 5.54 million doses of COVID-19 vaccines, including 5 million from Sinovac. (3)

By August, the Philippines had received more than 25.5 million doses vaccines from China. In addition, in August, China committed to increasing the vaccine supply by 10 million doses which would hopefully alleviate the shortage of vaccines there. China's vaccine was not only the first Covid vaccine to arrive in the Philippines, but also become the major source of Philippine vaccination. (4)

At the end of October, China donated another batch of Sinovac CoronaVac vaccines to the Philippines. To date, the Philippines had received more than 97.67 million doses of COVID-19 vaccines from different vaccine makers. China remained its biggest vaccine supplier. (5)

In mid-December, The Philippines received an additional batch of Sinovac vaccines donated by the Chinese government. The majority of these vaccines were to be distributed widely throughout the country: people are considering this Chinese vaccine as a booster shot. To date, the Philippines had received more than 158.5 million doses of COVID-19 vaccines from different vaccine makers, with China being its biggest vaccine supplier. (6)

At the end of January 2022, The Qatari government announced that The Qatar Fund for Development provided the Filipino government \$450,000 to purchase 50,000 doses of the Sinovac vaccine. Around 77% of the Qatari population is vaccinated against COVID-19, while in the Philippines, the figure is around 50%, according to the Oxford-based Our World in Data. (7)

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Hayat-Vax

In early August, The Philippine Food and Drug Administration (FDA) approved the emergency use of the Hayat-Vax, which is identical to the Sinopharm vaccine from China. The jab will be administered to people aged 18 and above. On 11 August, the Philippines received 100,000 doses of the Hayat-Vax COVID-19 vaccine donated by the UAE Government. (8)

LivzonBio

At the end of August, a recombinant COVID-19 fusion protein vaccine (V-01) developed and manufactured by the Institute of Biophysics under the Chinese Academy of Sciences and Livzon Pharmaceutical Group Inc. (LivzonBio) in China was approved for phase-III clinical trials in the Philippines. Phase I and II trials (results published in China) showed that with regard to immunogenicity, the seroconversion rate of the neutralizing antibody reached over 97 percent after two doses of V-01. Meanwhile, the vaccine also underwent testing of neutralizing activities against virus variants. The results showed that V-01 could effectively neutralize the Delta variant.(9)

(1) <https://www.mfa.gov.cn/ce/ceph/eng/sgdt/t1857373.htm>

(2) http://english.www.gov.cn/news/international/exchanges/202103/24/content_WS605aa10fc6d0719374afb4ee.html

(3) <https://www.aa.com.tr/en/health/philippines-receives-15m-doses-of-chinas-sinovac-vaccine/2232522>

(4) <https://www.fmprc.gov.cn/ce/ceph/eng/sgdt/t1900680.htm>

(5) http://www.news.cn/english/2021-10/24/c_1310265899.htm

(6) http://www.news.cn/english/2021-12/14/c_1310372307.htm

(7) <https://www.al-monitor.com/originals/2022/01/qatar-helps-philippines-purchase-chinese-covid-19-vaccines>

(8) <https://www.khaleejtimes.com/coronavirus/covid-19-100000-uae-made-hayat-vax-vaccines-arrive-in-philippines>

(9) http://www.news.cn/english/2021-08/30/c_1310155999.htm

2. Vietnam (99 million population)

In late June 2021, Vietnam received a shipment of 500,000 Sinopharm vaccine doses donated by China (1), after being approved for emergency use in early June.

In September, the Vietnamese government approved the purchase of 20 million doses of China's Vero Cell Covid-19 vaccine. Vietnam had received around 45 million Covid-19 vaccine doses to date, of which Vero Cell, produced by Sinopharm, accounted for around 20 million doses. By September, Vietnam had administered 35.6 million Covid-19 doses. At 6.9 million people, 7.2% of the population had been fully vaccinated against the targeted 70% (2)

In February 2022, The Vietnamese Ministry of National Defense received the second batch of Sinopharm COVID-19 vaccine presented by the People's Liberation Army (PLA) of China in Hanoi.

At the handover ceremony, Chinese Ambassador to Vietnam Xiong Bo said cooperating to combat COVID-19 is currently a priority in China-Vietnam cooperation, and that China has by far provided Vietnam with a total of 52 million doses of COVID-19 vaccines, contributing to Vietnam's master plan for both epidemic control and socio-economic development.

(1) <https://www.reuters.com/world/asia-pacific/vietnam-receives-500000-sinopharm-covid-19-vaccine-doses-donation-china-2021-06-20/>

(2) <https://e.vnexpress.net/news/news/vietnam-to-buy-20-million-chinese-vaccine-doses-4360543.html>

3. Thailand (66.9 million population)

On 22 February 2021, Thailand Food and Drug Administration (FDA) gave emergency use authorisation for the COVID-19 vaccine of Sinovac, paving the way for the country's first coronavirus inoculations. (1)

Two days later, the first batch of COVID-19 vaccines that Thailand ordered from China's Sinovac Biotech arrived in Bangkok effectively kickstarting Thailand's national inoculation program.

The 200,000 doses represented the first shipment among 2 million doses Thailand ordered from Sinovac. The first batch of the Sinovac vaccines were to be distributed to 13 provinces, including Bangkok, and administered to at-risk groups, including medical workers, close contacts with COVID-19 patients and people with certain chronic illnesses.

A second batch of 800,000 doses of the Sinovac vaccines was scheduled to arrive in Thailand in March, followed by a third batch of the remaining 1 million doses. This is aligned with Thailand's

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three-staged national inoculation program, aiming to vaccinate enough of the general population to create herd immunity. Besides the Sinovac vaccines, it would also use AstraZeneca vaccines. (2)

In July 2021, it was reported that The Sinovac vaccine, the first COVID-19 vaccine that entered Thailand, helped Thailand kick-start its national inoculation program as it was the primary vaccine in the national roll-out. At that time, China had provided to Thailand 17 batches of vaccines, totalling 17.5 million doses.(3)

On 17th August, the Thai government announced that it will purchase 12 million vaccines from Sinovac due in part to local production problems. Thai company Siam Bioscience, owned by the King of Thailand, was awarded a license by AstraZeneca I 2020, aiming to become a local production and distribution centre of the COVID-19 vaccine. However, in July 2021, it became evident that the production targets of the factory would not be met at a time when Thailand is still far from reaching herd immunity.(4)

In mid-October , a senior Public Health Ministry official stated that Thailand will stop using the Covid-19 vaccine of China's Sinovac when its current stock finishes, having used the shot extensively in combination with Western-developed vaccines. Thailand used over 31.5 million Sinovac doses since February, starting with two doses to frontline workers, high-risk groups and residents of Phuket, which opened to tourists in July in a pilot scheme.(5)

In February 2022, Thailand's FDA said that it has approved the use of China's Sinovac and Sinopharm COVID-19 vaccines for people 6 years of age and older. Previously, the FDA only permitted the two vaccines to be used on people aged 18 and above. In December 2021, Thailand's FDA authorised usage for children aged 5 to 11 of the Pfizer COVID-19 vaccine.(6)

(1) <https://www.reuters.com/business/healthcare-pharmaceuticals/thailand-allows-emergency-use-sinovacs-covid-19-vaccine-2021-02-22/>

(2) http://www.xinhuanet.com/english/2021-02/24/c_139764002.htm

(3) http://www.xinhuanet.com/english/asiapacific/2021-07/25/c_1310083893.htm

(4) <https://warsawinstitute.org/chinese-vaccines-head-thailand/>

(5) <https://www.bangkokpost.com/thailand/general/2199827/thailand-to-cease-sinovac-vaccine-use-when-stocks-end-this-month>

(6)<https://english.news.cn/20220205/bbac09b7699c4ed582ee391c3ed62901/c.html>

4. Colombia (51.9 million population)

Sinovac

In late February 2021, the first batches of China-produced COVID-19 vaccines arrived in both Colombia and Mexico, following both countries authorising Sinovac usage earlier in February.(1)

On 20 March 2021, 2.5 million doses of Sinovac vaccines arrived in Colombia (which had previously signed already an agreement with Sinovac to acquire 7.5 million doses).(2)

In April 2021, A new batch of 500,0000 doses of Sinovac arrived at the Colombian capital to help keep the country's National Vaccination Plan against COVID-19 on track. The Sinovac doses will be used to continue vaccinating healthcare workers and people aged above 70 in the country but most of it will be used to apply second doses (3)

At the end of October 2021, Colombia received a new batch of COVID-19 vaccines from Sinovac Biotech, supplied through the United Nations-backed COVAX vaccine distribution mechanism (4).

Zifivax

In January 2022, Chongqing Zhifei Biological Products received the official emergency use authorization from the Colombian authorities for its recombinant novel coronavirus vaccine (CHO Cell), Zifivax, produced by its subsidiary Anhui Zhifei Longcom Biopharmaceutical Co Ltd

Before the latest authorization in Colombia, the vaccine was officially certified for public use in Uzbekistan in March 2021, becoming the world's first recombinant subunit vaccine to be officially registered. It was also approved for emergency use in China in March 2021 and in Indonesia in October 2021 which approved the use of Zifivax as booster shots for inactivated vaccines (5)

(1) <https://www.globaltimes.cn/page/202102/1216056.shtml>

(2)http://www.chinatoday.com.cn/ctenglish/2018/ii/202106/t20210623_800250337.html

(3) http://www.xinhuanet.com/english/2021-04/12/c_139874887.htm

(4) <https://newsaf.cgtn.com/news/2021-10-28/Colombia-receives-new-supply-of-Sinovac-COVID-19-vaccines-14IbPG94Hmg/index.html>

(5) <https://www.globaltimes.cn/page/202201/1246703.shtml>

5. Afghanistan (40.6 million population)

Afghanistan received the first 500,000 doses of Oxford–AstraZeneca’s COVID-19 (Covishield) vaccine from India in February 2021 (1). However, the first vaccines under the COVAX program arrived on March 8, 2021, consisting of 468,000 doses of Covishield vaccines. Additionally, other 700,000 doses of Sinopharm-BBIBP vaccines, from China arrived in Afghanistan on June 12, 2021.

In early December, China, via Wang Yu, pledged to provide three million doses of Covid-19 vaccine to Afghanistan as part of the humanitarian support. During the ceremony it was announced that 1 million doses would arrive that week, 800,000 doses in the 1st arrival, 200,000 doses in the second.

Wang Yu also announced that “We have announced another three million doses of vaccine to Afghanistan and some other medical supplies. So, all together, China has announced around \$40 million (worth) of aid, including vaccines, including medical supplies, food, rice and winter coats”. (2)

Western financial support was pulled from Afghanistan following the Taliban takeover in August, resulting in widespread medical shortages and the threat of famine. The aid came amid a serious economic crisis that has also severely affected the Afghan health sector. Officials at the Afghan-Japan hospital said that the hospital has recently struggled with a shortage of medical supplies. “The Afghan-Japan hospital lacks sufficient medical supplies, and even food supplies are not sufficient, and now we are facing further challenges,” said Zalmay Rishteen, head of the hospital. (3)

In April 2022, during a Speech by Chairman Luo Zhaohui at the Afghanistan Conference 2022, he stated that “the Chinese government has provided Afghan people winter materials and vaccines worth 250 million RMB. The local authorities and NGOs of China also provided in-kind assistance of 50 million RMB. All the above-mentioned assistance has been put in place (4).

Furthermore, China will cooperate with relevant UN agency to arrange \$2 million food aid to Afghanistan immediately. We will also implement as soon as possible, the bilateral grant of 1 billion RMB announced by Chinese leader”.

(1) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8592178/>

(2) <https://www.scmp.com/video/asia/3159121/taliban-gets-800000-covid-19-vaccine-doses-part-chinas-aid-afghanistan>

(3) <https://tolonews.com/afghanistan-175801>

(4) http://en.cidca.gov.cn/2022-04/01/c_729778.htm

6. Saudi Arabia (34.8 million population)

In August 2021, Saudi Arabia approved two additional COVID-19 vaccines, Sinovac and Sinopharm. The Ministry of Health authorised entrance into the country for those who had completed their vaccination programme with Sinopharm or Sinovac, provided they had received a booster shot of a vaccine that was approved in the country.

At that time, there was only 4 other vaccines approved for use in the Kingdom; AstraZeneca, Pfizer-BioNTech, Johnson& Johnson and Moderna. (1)

By March 2020, the Ministry of Health had granted approval for nine COVID-19 vaccines for traveling into the country; Pfizer, Moderna, Oxford AstraZeneca, Johnson and Johnson, Sinopharm, Sinovac, Covaxin, Sputnik and Covovax. (2)

(1) <https://www.arabnews.com/node/1916756/saudi-arabia>

(2) <https://saudigazette.com.sa/article/617715>

7. Nepal (30.1 million population)

On 26 May 2021, China committed to a grant of 1 million doses of a COVID-19 vaccine to Nepal, as it scrambles to secure vaccines amid a surge in infections that has overwhelmed its health system. (1)

On 2nd June, Nepal received a consignment of 800,000 doses of the 1 million Chinese grant. The remaining 200,000 doses to be provided to Nepal by the Government of the Tibet Autonomous Region of China. Also on 2nd June, 50,400 doses of the vaccine and syringes were handed over to the Ministry of Health and Population, while another batch of 50,400 vaccines and syringes is scheduled to arrive in Kathmandu later that day. The consignment of remaining 99,200 vaccines and syringes will arrive in Kathmandu on 3rd June. Through this rapid response, Nepal was able to start its inoculation drive from June 8 targeting the elderly population (in the 60-64 age group).(2)

In August 2021, The Ministry of Health and Population said that it has been working to purchase an additional 6 million doses of the Vero Cell vaccine from China and were in talks with the Asian Development Bank to secure funds for the procurement.

Nepal had already purchased 10 million doses of Vero Cell or BBIBP-CorV vaccine developed by the Sinopharm: 4 million doses were purchased in June under a NDA and an additional 6 million

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doses were purchased a few weeks previously, with 1.6 million already delivered and the remaining doses expected within the coming days.

China has also provided 1.8 million doses of Vero Cell vaccine under grant assistance and has decided to provide an additional 1.6 million doses, which is expected to be delivered soon. (3)

By mid-September, Nepal had received all 6 million doses the government purchased from China in August, local media reported. The chief of the National Immunisation Programme under the Ministry of Health and Population, also told Xinhua that Nepal have inoculated the largest number of people with Chinese made Vero Cell vaccine.(4)

(1) <https://www.reuters.com/business/healthcare-pharmaceuticals/china-gift-1-million-covid-19-vaccine-doses-nepal-2021-05-26/>

(2) https://www.business-standard.com/article/current-affairs/nepal-receives-800-000-doses-of-coronavirus-vaccine-from-china-121060200071_1.html

(3) <https://kathmandupost.com/health/2021/08/22/government-to-purchase-additional-6-million-doses-of-vero-cell-vaccine>

(4) http://www.xinhuanet.com/english/asiapacific/2021-09/19/c_1310197917.htm