



Economic Brief

Covid-19

Resurgence of the Pandemic and Economic Uncertainties: The Global Scramble for a Vaccine

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Covid-19 - Resurgence of the Pandemic and Economic Uncertainties: The Global Scramble for a Vaccine

It has become increasingly clear that the Covid-19 pandemic is to stay longer than predicted in best case scenarios, and that no country worldwide can fully shield itself from its adverse effects. The number of active Covid-19 cases are still growing unabated, and so do deaths. The global economy shows some momentums of resumed growth, but they are not solid. There is a lot of good will, and efforts are made, for a “better recovery” from the Covid-19 crisis, and hope for a greener and digitalized economy, which will also lead to more inclusive post-Covid-19 economic order. However, as long as the pandemic pervades, investment by the private sector will remain subdued, and the recovery, including the intended better one, will be sluggish. With worsened prospects to overcome the Covid-19 pandemic by containment measures alone, the availability of medical treatment, and of a vaccine in particular, has become critical for defeating the disease. Some progress has been made in developing a vaccine, and a race among the major powers has begun for securing for themselves a large number of doses. In the short run, after the development of a vaccine, there is a real possibility that developing countries, including most of CAREC countries, will be left out in the global scramble for vaccines. Some of the CAREC countries have undertaken planning and initiatives to address this important public health concern. However, in order not to be left behind in this global scramble, plans have to be concretized, obstacles for the procurement, financing and dissemination of future vaccines must be identified before an effective vaccine is developed and ready for large scale use. Opportunities for cooperation with multilateral or bilateral partners have to be investigated and all avenues of cooperation must be leveraged to ensure that vaccines are available to CAREC countries at the earliest.

Mixed economic picture

PRC’s GDP up in Q2 2020, Kazakhstan’s, Azerbaijan’s, and the Kyrgyz Republic’s growth weakened, Russia deep in the red. The second quarter of 2020 saw some momentum of economic recovery or at least easing of the slump, globally and in the CAREC region. Data for the second quarter of 2020 are still scarce, especially for the CAREC region, but incoming data paint a rather mixed picture. The numbers for the PRC have largely returned to growth in Q2, but this is not the case for most other countries globally. The PRC’s real GDP growth rate turned to plus 3.2% yoy in Q2 from minus 6.8% yoy in Q1. The PRC’s industrial production growth accelerated from 3.9% yoy in April to 4.8% yoy in June. However, even in the PRC consumer demand remained weak during Q2. Retail sales fell 7.5% yoy in April, and still 1.8% in June. First half 2020 real GDP was 0.2% higher in Uzbekistan than in the year before¹, but 1.8% lower in Kazakhstan², 2.7% lower in Azerbaijan³, and 5.3% lower in the Kyrgyz Republic⁴. Russia, highly important for most of the CAREC region, saw a real GDP decline by 12.0% yoy in April, 10.7% in May, and still 6.4% in June.

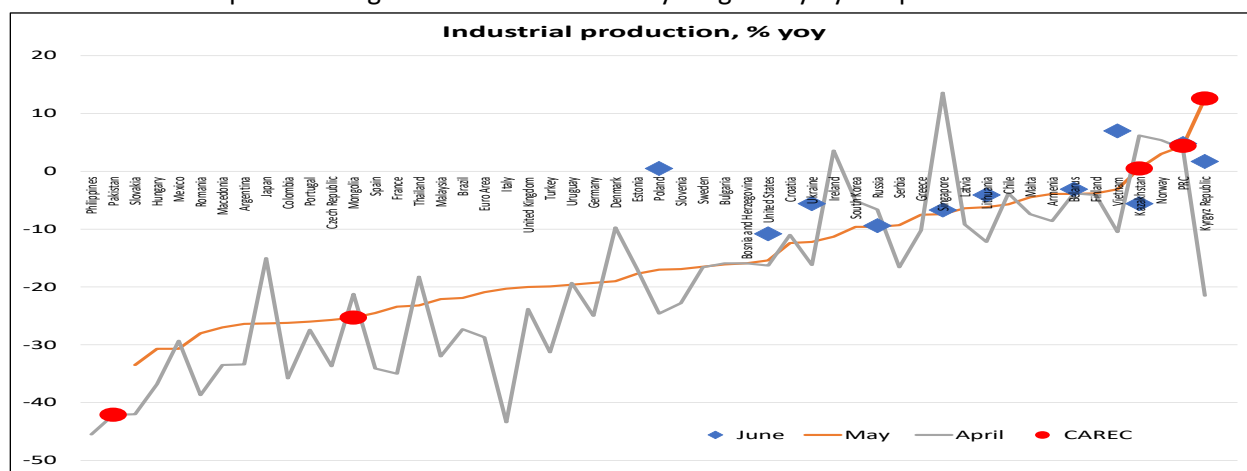
¹ <https://stat.uz/ru/>

² <http://www.finmarket.ru/database/news/5273212>

³ <https://www.stat.gov.az/news/macroeconomy.php?page=1&lang=en>

⁴ <http://www.stat.kg/ru/>

Chart 1: Industrial production growth has been severely hit globally by the pandemic



Source: TradingEconomics, author's calculations

Industrial production generally weak globally but turned positive in the PRC and the Kyrgyz Republic in June. Industrial production contracted in April and May in most countries worldwide (Chart 1), and this remained so for the majority of countries that already published data for June. However, the PRC and the Kyrgyz Republic saw positive growth rates. In Kazakhstan, industrial production fell 5.6% yoy due to a contraction in mining by 12.8% whereas manufacturing increased by 4.0% thanks to higher food production⁵. Azerbaijan's industrial output declined by 1.5% yoy in January-June⁶, and Uzbekistan's by 1.9%⁷. Pakistan's Large Scale Manufacturing Industries (LSMI) index was 24.8% lower in May than a year earlier⁸. Global international tourist arrivals, important especially for Georgia and the Kyrgyz Republic among the CAREC countries, fell by 44% yoy in January-April 2020, and by 51% yoy in the Asia-Pacific region, according to UNWTO data⁹.

Second quarter contraction in retail sales was heavy, even though their recovery was globally slightly better than that of output in June. Retail sales growth was somewhat less negative worldwide already in May and June compared to the dramatic slump in April (Chart 2). In Kazakhstan, retail sales growth became at 1.6% yoy slightly positive in June after minus 30.8% in May¹⁰, but might be hit again in Kazakhstan by the renewed lockdowns of July. Retail sales grew 0.7% yoy in January-June in Uzbekistan down from 3.8% yoy in January-March¹¹, which indicates a substantial decline in Q2. Azerbaijan saw a 1.9% decline in Jan-June.

⁵ <https://www.stat.gov.kz/official/industry/151/statistic/6>

⁶ <https://www.stat.gov.az/news/macroeconomy.php?page=1&lang=en>

⁷ <https://stat.uz/en/>

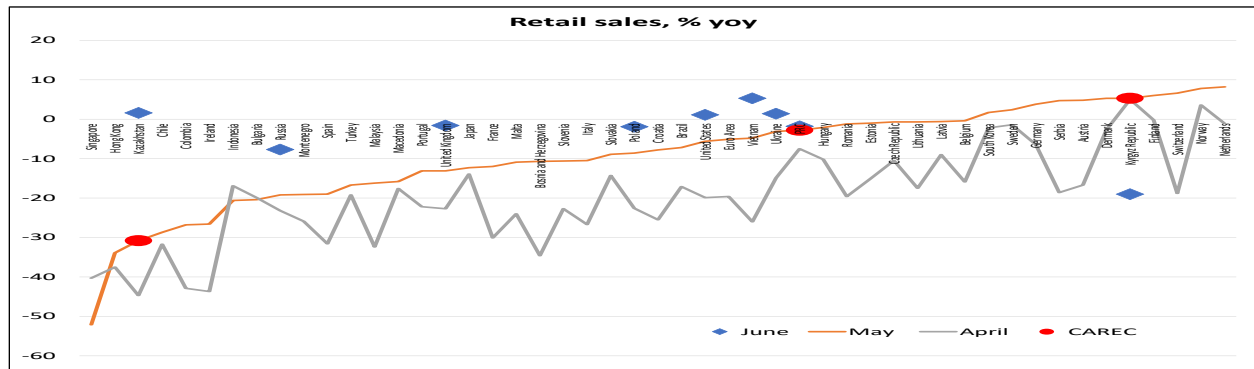
⁸ http://www.pbs.gov.pk/sites/default/files//industry_mining_and_energy/qim/2020/web_note_%20may_2020.pdf

⁹ <https://www.e-unwto.org/doi/pdf/10.18111/wtobarometereng.2020.18.1.3>

¹⁰ <https://www.stat.gov.kz/official/industry/17/statistic/6>

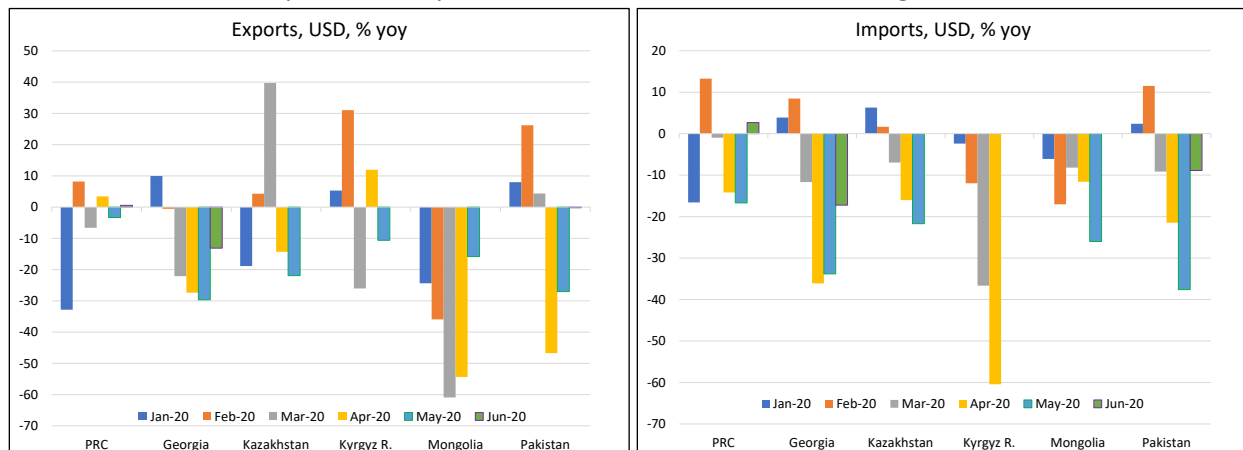
¹¹ <https://stat.uz/en>

Chart 2: Retail sales growth somewhat less negative in May and June after the dramatic slump in April



Source: TradingEconomics, author's calculations

Charts 3 and 4: Both exports and imports were weak in Q2 in the CAREC region*



* There are no monthly data for the CAREC countries not in the charts

Source: TradingEconomics, author's calculations

Exports and imports subdued. Except for the PRC in April and June, and the Kyrgyz Republic in April, export revenues were significantly lower in Q2 2020 than a year earlier, with June data only available for the PRC, Pakistan, and Georgia yet (Chart 3). The decrease was in part due to worse production conditions during the pandemic, but mostly reflects weaker demand by trading partners. This is especially visible in the case of Mongolia, which ships more than 90% of exports to the PRC. May figures for Mongolia came in already slightly less negative after the huge contraction in the months before. Lower export prices also played a crucial role for the contraction in export revenues. In the case of Kazakhstan, for example, export prices were 31.9% lower in May 2020 than a year earlier, according to Kazakhstan's Statistic Committee, mostly reflecting the decline in oil prices.

Weak imports in the CAREC region in Q2 (Chart 4) are mainly the result of reduced domestic economic activity, and certainly of the fall in real incomes, for which no data have been published yet, however. For net oil importers such as Pakistan, the dramatic fall in oil prices in 2020 together with sluggish demand in Q2, substantially reduced the import bill. There are no reliable data available about the size of unemployment. Due to the still large weight of rural populations in the CAREC region, unemployed often return to their villages and are counted as self-employed or agricultural workforce or are not counted at all. This is also the case for returning migrant workers. Kazakhstan reported an unemployment rate of 4.8% in June, unchanged since January 2019, the Kyrgyz Republic a 3.1%

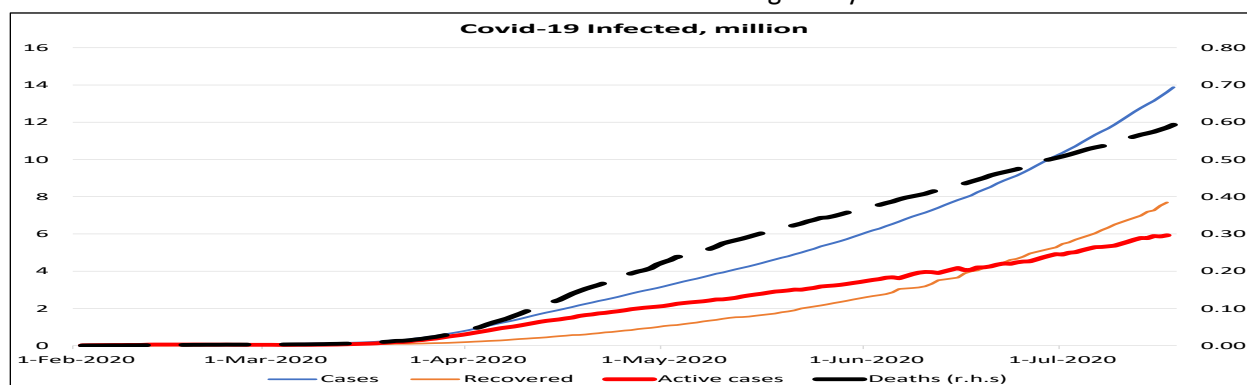
unemployment rate in April. However, judging from the slowdown in economic activity, losses of jobs must have been substantial, and the related decline in household incomes as well. Other CAREC countries do not report unemployment rates monthly, except for the PRC, which published a rate of 5.7% for June after 5.9% for May. The loss in real incomes resulted in lower consumption, as indicated by the decline in retail sales, including the consumption of imported goods.

Uncertainty remains high. While there are a few causes for optimism for a global recovery, such as less stringent containment measures and higher consumer demand after the ending of lockdowns, uncertainty about the required time for an economic recovery globally, as well as in the CAREC region, remains high as it hinges upon the time frame for overcoming the health crisis. International and national support programs give much needed life support to economies but cannot substitute a real economic recovery based on strong demand, increase in global production and supply to pre-pandemic level and full resumption of global trade. These objectives will not be achieved without a substantial easing of the pandemic.

Rising number of infections and death

Baseline forecast scenarios hinge on a relatively successful containment of the pandemic. In its June 2020 World Economic Outlook, the IMF expects the global economy to shrink by 4.9% in 2020, the PRC's economy to grow by 1%, while Kazakhstan is projected to see a real GDP decline by 2.7%, and Pakistan by 0.4%¹². The forecasts for 2020 in ADB's Asian Development Outlook supplement (June 2020)¹³ for the CAREC countries range from minus 5% for Georgia and Tajikistan to plus 3.2% for Turkmenistan. The economic growth forecasts of the IMF, the ADB, and most other institutions assume that a second wave of the pandemic and related lockdown measures can be largely avoided, or measures would be at least substantially less severe.

Chart 5: Constant rise in the number of active cases and deaths globally



Source: TradingEconomics, author's calculations

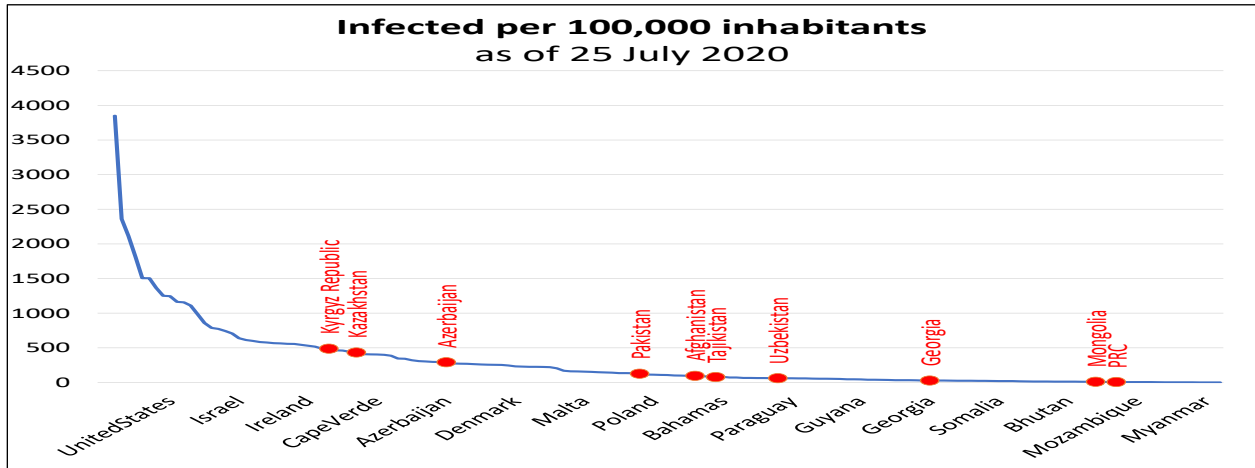
However, the global increase in the number of infected and deaths obscures the outlook. Infections are rising fast in many countries of the world, leading to an almost linear rise in the number of active cases and deaths since the end of March (Chart 5). Some countries, including Kazakhstan and Uzbekistan, have reinstated stringent containment measures in July.

¹² There are no June 2020 forecasts for other CAREC countries available.

<https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020>

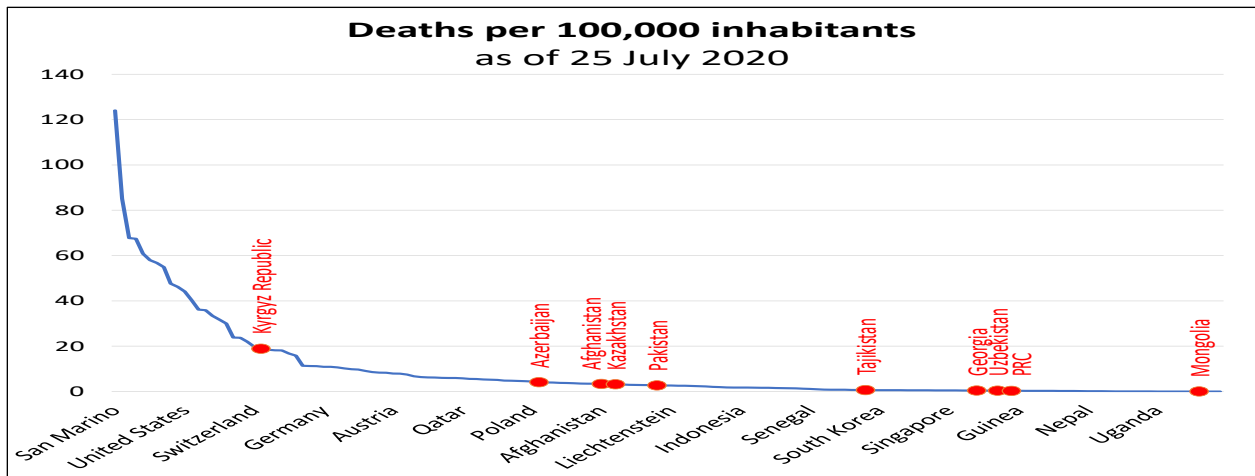
¹³ <https://www.adb.org/sites/default/files/publication/612261/ado-supplement-june-2020.pdf>

Chart 6: The Kyrgyz Republic and Kazakhstan lead CAREC in confirmed infected persons per capita



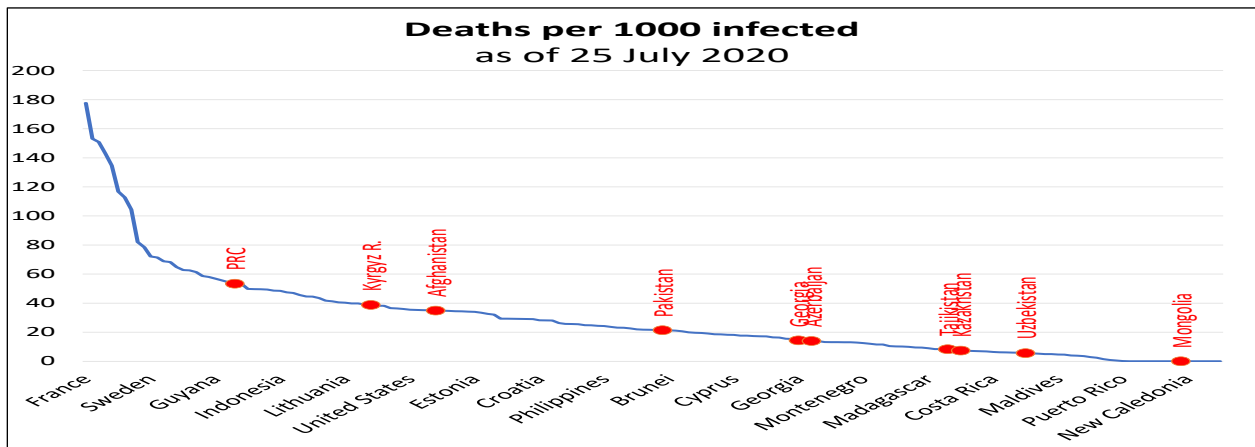
Source: TradingEconomics, Undata, author's calculations (no data for Turkmenistan)

Chart 7: The most deaths per inhabitant are confirmed in the Kyrgyz R., Azerbaijan, and Afghanistan



Source: TradingEconomics, Undata, author's calculations (no data for Turkmenistan)

Chart 8: Tajikistan, Kazakhstan, and Uzbekistan report rather low death per infected ratios

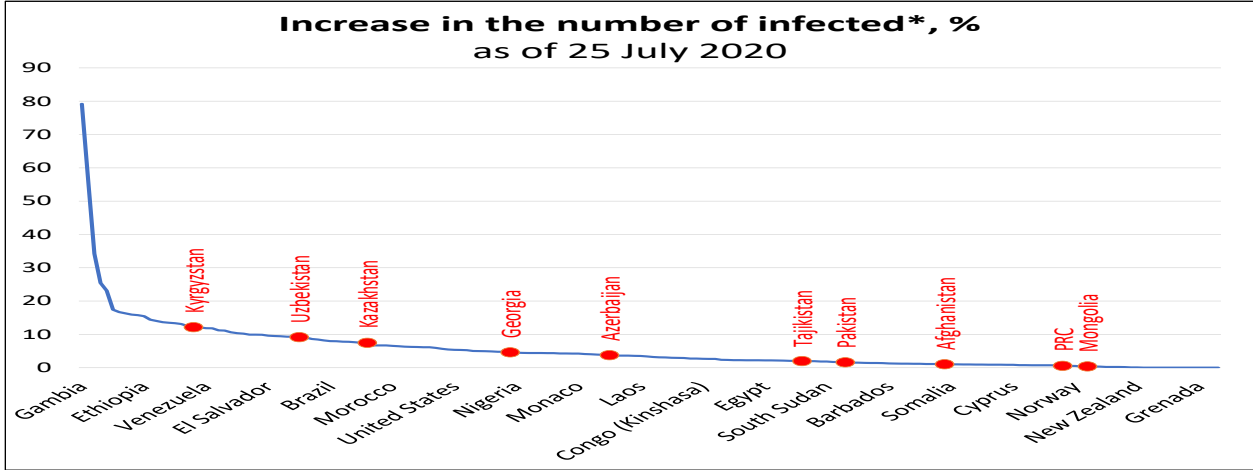


Source: TradingEconomics, Undata, author's calculations (no data for Turkmenistan)

Among the CAREC countries, the Kyrgyz Republic and Kazakhstan lead in the number of infected persons per 100,000 inhabitants, followed by Azerbaijan (Chart 6). The number of confirmed Covid-19 infected per 100,000 persons reached 487 in the Kyrgyz Republic by 25 July, 433 in Kazakhstan, 291 in Azerbaijan. Georgia, Mongolia and the PRC are the least affected. The highest number of deaths per 100,000 persons are reported by the Kyrgyz Republic, Azerbaijan, and Afghanistan at 19, 4 and 3, respectively (Chart 7).

Tajikistan, Kazakhstan, and Uzbekistan have rather low death per infected ratios compared to other CAREC economies (Chart 8). While this might be the result of a better handling of the situation by their health systems, anecdotal evidence does not confirm this, and it is more likely that this is due to deaths cause classifications that differ from other countries or that the death ratio will still rise when the pandemic will last longer. (Mongolia has no reported deaths, but this is due to very low infection rates.)

Chart 9: The Kyrgyz R., Uzbekistan, and Kazakhstan have the fastest infection growth currently



* To smooth random daily fluctuations growth rates are calculated as numbers of infected in the last three days over the number of infected in the previous three days. A 10% increase thus means 10% more cases every three days.

Source: Center for Systems Science and Engineering (CSSE) at Johns Hopkins University, author’s calculations

Infections will continue to increase substantially for some time in some countries. There are positive developments such as the decrease in daily new infected in Pakistan from a peak of 4,339 on 2 July to 996 on 28 July. However, the Kyrgyz Republic, Uzbekistan, and Kazakhstan still experience high growth rates (Chart 9), and for the other CAREC economies the pandemic is not over as well. This will further raise the death toll and hurt the economies. Temporary renewed tightening of containment measures thus cannot be excluded and are happening already.

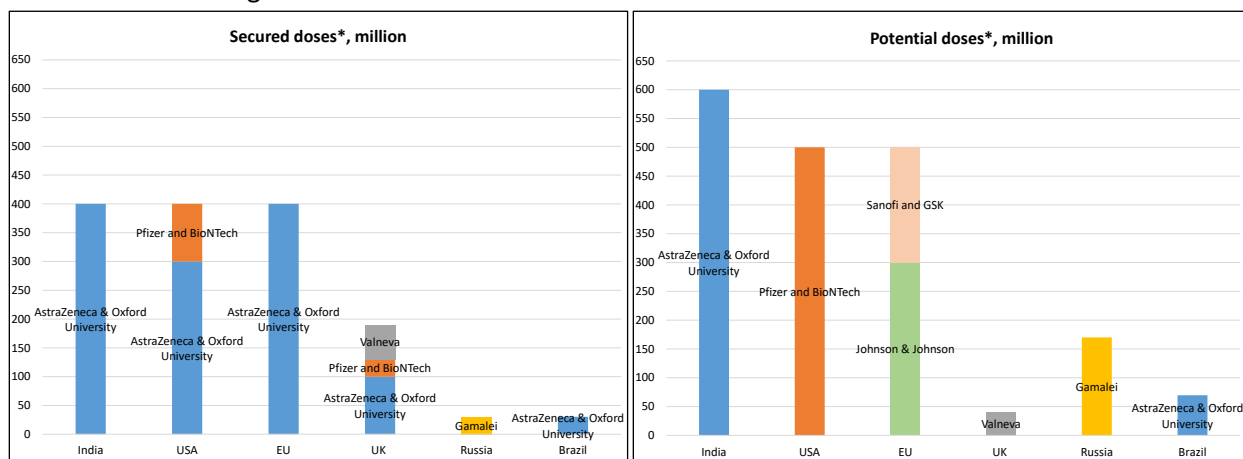
The race for a vaccine

Securing appropriate supplies of future vaccines is vital. With worsened prospects that the Covid-19 pandemic will recede any soon, the availability of a vaccine or medical treatment for the pandemic has become paramount for restoring the confidence of governments and populations to ease containment measures. To this end, securing adequate supplies of future vaccines and broad and effective immunization programs for the population are crucial, not only for preserving health and lives, but also for economic recovery. Moreover, the very nature of this pandemic makes it imperative that vaccination

is available in sufficient quantities for all countries to constitute an effective global response for this unprecedented global health crisis.

A global race has begun among countries to secure for themselves a sufficiently high number of doses once a vaccine against the SARS-CoV-2 virus is developed and commercially available. [Annex 1](#) gives an overview of those vaccines under development that have made it to testing phases I, II, and III¹⁴. Chart 10 shows the number of doses that major economies have already secured for themselves by agreement, broken down by the developers of the vaccine. Chart 11 shows the number of doses of vaccines major economies tentatively secured for themselves, if the vaccines prove to be successful. Most of major economies made statements that they would support developing countries in their efforts to obtain vaccines¹⁵. However, the own populations would be served first. Global challenges of equitable access to Covid-19 vaccines will be exacerbated by emerging fractures in global unity on issues as urgent as global health, as evident from withdrawal of the USA from the World Health Organization.

Charts 10 and 11: Big economies secure vaccine doses for themselves



* "Secured dose": Signed deal/agreement or planned vaccine production in 2020

"Potential dose": Planned vaccine production in the next few years or with options to acquire doses, if the vaccines prove to be successful

Source: See multiple sources in [Annex 2](#)

The CAREC countries also have securing vaccines for themselves on their agenda. Kazakhstan's "Draft National Plan for the Protection of the Life and Health of Kazakhstan in the Context of a Pandemic as of 12.07.20", for example, contains the item "Placing an order / preliminary contracts for the production of

¹⁴ The Phases shall answer the following questions: Phase I: Is the vaccine safe?; Phase II: Is there an immune response?; Phase III: Does the vaccine provide protection?

¹⁵ Dr Cyrus Poonawalla, chairman of Poonawalla Group – which includes the Serum Institute of India (SII) - said, for example: "We have committed to manufacture at least one billion doses after getting required approvals. The government has promised to grant over Rs 1,000 crore for the same, and we want to make the vaccine available at the lowest price possible, so even the poor can afford it. Besides India, we also want to make it available in underdeveloped countries like Africa," <https://www.msn.com/en-in/news/other/committed-to-producing-1-billion-doses-of-vaccine-after-approvals-dr-poonawalla/ar-BB1718yC>; and: "However, if the vaccine trials succeed, India will gain access to the doses as it will also be the requirement of the Government of India. And we are certain that everybody will respect if the substantial volumes go to India," <https://health.economictimes.indiatimes.com/news/pharma/serum-institute-investing-usd-100-million-on-potential-covid-19-vaccine/76291628>

an antiviral vaccine”¹⁶. Special Assistant to the Pakistani Prime Minister on Health, Dr Zafar Mirza, tweeted: "We have formed National Vaccine Taskforce, which will develop and execute our strategy to ensure early, equitable and reliable access to COVID19 vaccine(s) in Pakistan,"¹⁷.

Initiatives to facilitate the access of developing countries. While richer, more powerful countries are definitely in a better position to gain access to future vaccines, not least due to better financing options and advanced scientific capacities, there are initiatives to facilitate also the access of developing countries to them, and there is potential for cooperation between CAREC and other countries on the development of a vaccine. Chinese Sinopharm Group, for example, has proposed to conduct Phase III trials for the coronavirus vaccine developed by its subsidiary company “China National Biotec Group” in Uzbekistan¹⁸. Sinopharm has also invited the Pakistani National Institute of Health (NIH) to collaborate in conducting clinical trials for its vaccine under development¹⁹. Russian Minister of Health Mikhail Murashko announced that talks are being held among SCO member countries²⁰ about the supply of Russian coronavirus vaccines to the countries of the Shanghai Cooperation Organization (SCO)²¹.

“Developing a vaccine against COVID-19 is the most pressing challenge of our time - and nobody wins the race until everyone wins.”, Gavi, the Vaccine Alliance wrote.²² 75 countries have submitted expressions of interest to join the COVAX Facility as of 15 July 2020, “a mechanism designed to guarantee rapid, fair and equitable access to COVID-19 vaccines”. The 75 countries, which would finance the vaccines from their own public finance budgets, intend to partner with up to 90 lower-income countries that could be supported through voluntary donations to Gavi’s COVAX Advance Market Commitment (AMC).²³ However, there is a looming risk developing countries, including most of CAREC countries, might find themselves in a disadvantageous position in terms of timely availability of sufficient quantities of Covid19 vaccine (whenever developed), at affordable cost.

¹⁶ <https://www.gov.kz/memleket/entities/dsm/documents/details/49694?lang=ru>

¹⁷ <https://www.thenews.com.pk/latest/690896-sapm-dr-mirza-says-covid-19-vaccine-unlikly-to-emerge-this-year>

¹⁸ <https://www.gazeta.uz/ru/2020/07/21/vaccine/>

¹⁹ <https://www.dawn.com/news/1551432/chinese-pharma-offers-to-conduct-clinical-trials-of-covid-19-vaccine-in-pakistan>

²⁰ The SCO comprises eight member states: India, Kazakhstan, the PRC, the Kyrgyz Republic, Pakistan, Russia, Tajikistan, Uzbekistan; four observer states: Afghanistan, Belarus, Iran, Mongolia; six dialogue partners: Azerbaijan, Armenia, Cambodia, Nepal, Turkey, Sri Lanka.

²¹ <https://ru.sputnik.kg/video/20200724/1049123028/vakcina-koronavirus-postavki-shos-peregovory.html>

²² Gavi is a public-private partnership that helps vaccinate children against deadly diseases. “The Vaccine Alliance brings together developing country and donor governments, the World Health Organization, UNICEF, the World Bank, the vaccine industry, technical agencies, civil society, the Bill & Melinda Gates Foundation and other private sector partners.” <https://www.gavi.org/covid19/covax-facility>

²³ “COVAX is the vaccines pillar of the Access to COVID-19 Tools (ACT) Accelerator. The ACT Accelerator is a global collaboration to accelerate the development, production, and equitable access to COVID-19 tests, treatments, and vaccines. COVAX is co-led by Gavi, the Coalition for Epidemic Preparedness Innovations (CEPI) and WHO. The 75 countries submitting expressions of interest include Argentina, Armenia, Brazil, Canada, Czech Republic, Estonia, Finland, Iceland, Ireland, Israel, Japan, Kuwait, Luxembourg, Mauritius, Mexico, Monaco, Montenegro, New Zealand, North Macedonia, Norway, Portugal, Qatar, Republic of Korea, San Marino, Saudi Arabia, Singapore, Switzerland, United Arab Emirates and the United Kingdom. The proposed list of 90 AMC-eligible countries is subject to approval by the Gavi Board and will be released once approved. <https://www.gavi.org/news/media-room/more-150-countries-engaged-covid-19-vaccine-global-access-facility>

Conclusion

CAREC countries should speed up initiatives and multilateral or bilateral cooperation on vaccines in order not to be left behind in the global scramble for a Covid-19 vaccine. Contingency actions include timely procurement efforts and securing appropriate financing for large scale Covid-19 vaccination programs. Moreover, there might be the need to adjust domestic legislation such as for licensing new medicines, including compulsory licensing to take maximum advantage of possible universal patenting of Covid-19 vaccines.

Methods and channels of dissemination of vaccines have to be upgraded. Even if a vaccine is made available, CAREC countries will still face the challenge to reach the population in a fast and comprehensive way. Methods and channels of dissemination of vaccines, together with information for the population, have to be (re)designed, presenting a new challenge to healthcare systems already weighed down by the Covid-19 pandemic. Many more challenges will emerge at operational level even if a vaccine becomes available in sufficient quantities, like nation-wide cold chains for unprecedented quantities.

Fields, which need clarification and actions, and where also the CAREC Institute could potentially be of help, include:

- Identification of best ways to secure the timely procurement of potential vaccines
- Identification of financing options for the procurement
- Identification of main barriers/bottlenecks in legislation, government programs and vaccine distribution channels
- Identification of potential international cooperation partners
- Better coordination of procurement and dissemination initiatives among relevant ministries, agencies, private sector companies (pharma, pharma importers, distributors) and medical institutions
- Capacity building in relevant ministries and agencies related to the topic.

Annex 1: Vaccines that made it from Pre-clinical trials at least to Phase I*.

Developer / Researcher	Product Category	Stage of Development	Funder	Date Last Updated
Wuhan Institute of Biological Products/ Sinopharm	Inactivated virus	Phase III	Unknown	7/17/2020
Consortium of the Jenner Institute, Oxford Biomedica, University of Oxford, Vaccines Manufacturing and Innovation Centre, Pall Life Sciences, Cobra Biologics, HalixBV, Advent s.r.l., Merck KGaA, the Serum Institute, Vaccitech, and AstraZeneca/IQVIA	Non-replicating viral vector	Phase III	Coalition for Epidemic Preparedness Innovations (CEPI)/ UK Government/ Biomedical Advanced Research and Development Authority (BARDA)/ Gavi, the Vaccine Alliance	7/21/2020
Beijing Institute of Biological Products/ Sinopharm	Inactivated virus	Phase II	Unknown	6/12/2020
Institute of Medical Biology, Chinese Academy of Medical Sciences	Inactivated virus	Phase II	Unknown	6/23/2020
Sinovac/ Instituto Butantan	Inactivated virus	Phase II	Unknown	7/8/2020
CanSino Biologics/Beijing Institute of Biotechnology/ Canada's National Research Council	Non-replicating viral vector	Phase II	Unknown	7/8/2020
Moderna/ NIAID/ Lonza/ Catalent/ Rovi	RNA-based vaccine	Phase II	Coalition for Epidemic Preparedness (CEPI)/ Biomedical Advanced Research and Development Authority (BARDA)	7/16/2020
Genexine Consortium (GenNBio, International Vaccine Institute, Korea Advanced Institute of Science and Technology (KAIST), Pohang University of Science and Technology (POSTECH)/ Binex	DNA-based	Phase I	Unknown	7/1/2020
Inovio Pharmaceuticals/Beijing Advaccine Biotechnology/VGXI Inc./ Richter-Helm Biologics/Ology Bioservices	DNA-based	Phase I	Coalition for Epidemic Preparedness (CEPI) / Gates Foundation / US Department of Defense	7/17/2020
Zydus Cadila Healthcare Limited	DNA-based	Phase I	Unknown	7/16/2020
Gamaleya Research Institute	Non-replicating viral vector	Phase I	Unknown	6/23/2020
Clover Biopharmaceuticals Inc./ GSK/ Dynavax	Protein subunit	Phase I	Coalition for Epidemic Preparedness (CEPI)	7/14/2020
Novavax/ Emergent BioSolutions/ Praha Vaccines/Serum Institute of India/ AGC Biologics	Protein subunit	Phase I	Coalition for Epidemic Preparedness (CEPI)/ US Department of Defense	7/8/2020
University of Queensland/CSL/Seqirus	Protein subunit	Phase I	Coalition for Epidemic Preparedness (CEPI)/Queensland Government/Federal Government (Australia)/Paul Ramsay Foundation	7/15/2020
Vaxine Pty Ltd/ Flinders University/ Oracle/ Medytox/ Sypharma	Protein subunit	Phase I	Unknown	7/10/2020
BioNTech/ Fosun Pharma/ Pfizer	RNA-based vaccine	Phase I	Unknown	7/23/2020
CureVac	RNA-based vaccine	Phase I	Coalition for Epidemic Preparedness (CEPI); European Commission; Gates Foundation; Defense Advanced Research Projects Agency (DARPA); German Government; European Investment Bank (EIB)	7/10/2020
Imperial College London/ VacEquity Global Health	RNA-based vaccine	Phase I	UK Government	7/10/2020
Medicago Inc.	Virus-like particle	Phase I	Unknown	7/17/2020

* Phase I: Is it safe?; Phase II: Is there an immune response?; Phase III: Does the vaccine provide protection?

Source: Milken Institute, Covid-19 Tracker

<https://airtable.com/shrSAI6t5WFwqo3GM/tblEzPQS5fnc0FHfYR/viwDBH7b6FjmIBX5x?blocks=bipZFzhJ7wHPv7x9z>

Annex 2: COVID-19 Vaccine procurement of selected countries/region (doses, million)

Country	Secured dose	Vaccine developer	Potential dose	Vaccine developer
India	400 ^{*24}	AstraZeneca & Oxford University	600 ^{*25}	AstraZeneca & Oxford University
The US	300 ²⁶	AstraZeneca & Oxford University	500 ²⁷	Pfizer and BioNTech
	100 ²⁸	Pfizer and BioNTech		
The EU	400 ²⁹	AstraZeneca & Oxford University	200 ³⁰	Johnson & Johnson
			300 ³¹	Sanofi and GSK
The UK	100 ³²	AstraZeneca & Oxford University	40 ³³	Valneva
	30 ³⁴	Pfizer and BioNTech		
	60 ³⁵	Valneva		
Russia	30 ³⁶	Gamalei	170 ³⁷	Gamalei
Brazil	30.4 ³⁸	AstraZeneca & Oxford University	69.6 ³⁹	AstraZeneca & Oxford University

Sources: See the footnotes below

²⁴<https://economictimes.indiatimes.com/industry/healthcare/biotech/pharmaceuticals/astrazeneca-serum-institute-of-india-sign-licensing-deal-for-1-billion-doses-of-oxford-vaccine/articleshow/76202016.cms?from=mdr>

²⁵ ibid

²⁶<https://www.fiercepharma.com/manufacturing/astrazeneca-unveils-massive-750m-deal-effort-to-produce-billions-covid-19-shots>

²⁷<https://www.msn.com/en-au/lifestyle/wellbeing/us-to-pay-pfizer-195-billion-to-produce-millions-of-doses-of-covid-19-vaccine/ar-BB172QPz>

²⁸ ibid

²⁹<https://www.euroweeklynews.com/2020/06/13/europe-astrazeneca-agrees-to-supply-eu-countries-with-400-million-doses-of-covid-19-vaccine/#.Xv1UCaMzapo>

³⁰<https://finance.yahoo.com/news/exclusive-eu-talks-moderna-biontech-113643000.html>

³¹ ibid

³²<https://www.fiercepharma.com/manufacturing/astrazeneca-unveils-massive-750m-deal-effort-to-produce-billions-covid-19-shots>

³³<https://finance.yahoo.com/news/britain-signs-deals-pfizer-biontech-060801083.html>

³⁴ ibid

³⁵ ibid

³⁶<https://www.hospimedica.com/covid-19/articles/294783538/russia-to-produce-30-million-doses-of-experimental-covid-19-vaccine-in-2020.html>

³⁷ ibid

³⁸<https://apnews.com/f4f2da3f36fcac74314a7af7bd66fba3>

³⁹ ibid