

Re: Vaccines Africa Brief for Congressional Research Services (CRS)

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Summary: This report is a product of the VacSafe Working Group, a group of leading scientists, vaccine and public health experts, and policymakers. Its purpose is to provide an up-to-date overview of the state of SARS-CoV-2 vaccines in Africa (54 countries and two disputed territories). This briefing comes as Africa continues to face major vaccine shortages, amid a high level of community transmission during its third wave of the COVID-19 pandemic. Information included in this briefing is drawn from private and public sources. For broader context, refer to earlier installments of the Vaccines in Africa Brief.

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VacSafe Working Group

Monthly Brief: Congressional Research Services

Vaccines in Africa (54 countries and two disputed territories)

1. SARS-CoV-2 Vaccination Status in Africa

- The Our World in Data vaccine tracker reported that as of August 29, 2021, a total of 99.57 million (of 5.31 billion globally) vaccine doses have been administered across the African continent, which has 17 per cent of the globe's population living there. 2.68% of the population has been fully vaccinated, with 4.79% given at least one dose.
- South Africa and Morocco are the only African countries on track to vaccinate at least 60% of their population by mid-2022, a timeline that an Economist Intelligence Unit (EIU) report states may prevent **GDP losses totaling \$2.3 trillion between 2022 and 2025**. Other countries in Africa are not expected to meet that goal until 2023 and beyond.

2. Emerging Variants

- Multiple variants of the virus that causes COVID-19 are circulating globally. In collaboration with a SARS-CoV-2 Interagency Group (SIG), US CDC established three classifications for the SARS-CoV-2 variants being monitored: Variant of Interest (VOI), Variant of Concern (VOC), and Variant of High Consequence (VOHC).
- The US Centers for Disease and Prevention (CDC) Global Variants Report is tracking the worldwide distribution of four variants; as of July 23, 2021, three variants are reported to be circulating in Africa:
 - Alpha (B.1.1.7): (VOC) initially detected in the UK, December 2020.
 - Verified in all African countries except: not reported in Eswatini, Lesotho, Madagascar, Mali, Tanzania and unverified in Botswana.
 - Beta (B.1.351): (VOC) initially detected in South Africa, December 2020
 - Verified in 37 African countries.
 - Delta (B.1.617.2): (VOC) initially detected in India, December 2020.
 - Verified in 27 African countries.
 - Gamma (P.1): (VOC) initially identified in travelers from Brazil, January, 2021.
 - Not verified to be circulating in Africa.
- The World Health Organization has designated four Variants of Interest (VOI). Currently, none of the VOI have been verified to be circulating in Africa.
 - Eta (B.1.525), initially detected in multiple countries, December 2020.
 - Iota (B.1.617.1), initially detected in USA, November 2020.
 - Kappa initially detected in India, October 2020.
 - Lambda (C.37). initially detected in Peru, August 2020.
- The category, Variant of High Consequence, is reserved for variants that have clear evidence that prevention measures or medical countermeasures have significantly reduced effectiveness relative to previously circulating variants.
 - Currently, there are no SARS-CoV-2 variants that rise to the level of high consequence.

3. Vaccine Efficacy, Safety, and Approval

- Moderna - WHO Emergency Use Listing and approved in Botswana, Libya, Nigeria, Rwanda and Seychelles.
- Oxford-AstraZeneca (Covishield) - Africa Regulatory Taskforce approved, WHO Emergency Use Listing and approved in 37 African countries.
- Serum Institute of India (licensed to produce and sell the Oxford-Astra-Zenca Covishield vaccine) - Africa Regulatory Taskforce (ART) approved, WHO Emergency Use Listing and approved in 13 African countries.
- Pfizer-BioNTech - WHO Emergency Use Listing, FDA approval and approved in Botswana, Cabo Verde, Libya, Nigeria, Rwanda, Tunisia and South Africa.
- Sinopharm - BBIBP-CorV - WHO Emergency Use Listing and approved in 20 African countries.
- Sinovac (CoronaVac) - WHO Emergency Use Listing and approved in Benin, Egypt, South Africa, Tanzania, Togo, Tunisia and Zimbabwe.
- Bharat Biotech (Covaxin) - approved in Mauritius and Zimbabwe.
- Gamaleya Institute (Sputnik V) - approved in 19 African countries.
- Gamaleya Institute (Sputnik Light – approved in Angola, Congo and Mauritius.
- Janssen/Johnson & Johnson (Ad26.COV2.S) - WHO Emergency Use Listing, Africa Regulatory Taskforce approved and approved in Libya, Nigeria, South Africa, Tunisia, Zambia and Zimbabwe.

4. Continental Vaccine Acquisition

With a population of 1.24 billion, Africa is dependent on three vaccine sources: (1) the WHO's COVAX scheme (co-led by The GAVI Alliance and The Coalition for Epidemic Preparedness Innovations (CEPI)); (2) the African Union (AU) via the African Vaccine Acquisition Trust (AVAT); and (3) bilateral agreements with pharmaceutical companies and/or vaccine-producing countries and donation agreements.

- COVAX:
 - With 620 million COVID-19 vaccine doses set to arrive in Africa through COVAX alone by the end of 2021, African countries are set to roll out a range of different vaccines, each with their own unique storage, transport and administration requirements.
 - Through COVAX, the United States shipped 488,370 doses of Pfizer to Rwanda on August 17, the first shipment of the 500 million doses in international donations pledged by President Joseph Biden at the G7 summit.
 - The United States has shipped more than 2.2 million doses of Pfizer/BioNTech's Covid-19 vaccine to South Africa destined to arrive there on 29 August, according to a White House official. The 2,217,150 doses are donated through the global vaccination program Covid-19 Vaccines Global Access, or COVAX, the official said. Cumulatively, the US will have donated nearly 8 million COVID-19 vaccine doses to South Africa.
 - COVAX plans to ship 100 million doses of the Sinovac and Sinopharm vaccines (50 million each), mostly to Africa and Asia, in its first global delivery of Chinese vaccines. As of July 29, deliveries are planned for 'July to September 2021.'
 - South Africa is listed by COVAX as one of Africa's largest recipients of Sinovac shipments with an allocation of 2.5 million doses, but a senior health official said the country was currently unable to accept the vaccines: 'There is not enough information on effectiveness against the Delta variant and there is no data on Sinovac in populations with HIV.'
 - Nigeria, the main recipient of Chinese shots in Africa under COVAX with an allocation of nearly 8 million Sinopharm doses, has approved the vaccines but has called it a 'potential' option for

the country's inoculation campaign.

- Officials from Kenya, Rwanda, Togo and Somalia, which are entitled to smaller shipments, said they had no concerns about the Chinese vaccines because they had been vetted by the WHO.
 - Vaccine shipments to Africa have picked up with the COVAX Facility delivering almost 10 million doses to Africa so far in August i.e. nine times what was delivered in the same period in July. The African Union has so far delivered 1.5 million doses to nine countries. Since June, the number of doses administered per 100 people in sub-Saharan Africa has increased marginally from 1.2 per 100 people to 3.4 per 100 people.
 - In late June alone, COVAX sent 530,000 doses to the UK, more than double the amount sent that month to the entire continent of Africa. Other wealthy countries to receive doses from COVAX include Australia, Canada, New Zealand, and Qatar. In the meantime, COVAX has only been able to deliver 25 million of the 700 million doses the AU expects this year.
- African Union via AVAT:
 - UNICEF will obtain and deliver COVID-19 vaccines on behalf of AVAT.
 - COVID-19 vaccine deliveries from the African Union's Africa Vaccine Acquisition Trust (AVAT) are picking up, with a projected rise to 10 million each month from September. Around 45 million doses are expected from AVAT by the year's end.
 - France will donate 10 million doses of AstraZeneca and Pfizer COVID-19 vaccines to African Union Member States over the next three months. The vaccines will be allocated and distributed by the initiative known as the Africa Vaccine Acquisition Trust (AVAT) and the COVAX global vaccine initiative.
- Significant Bilateral Vaccine Purchases & Vaccine Diplomacy:
 - China (to date): In addition to COVAX contributions, approximately 9 million doses have been donated to Africa and 47 million doses purchased by African countries.
 - 41 African countries have been receiving sales and donations of vaccines from China.

- Germany will make up to 70 million doses of COVID-19 vaccine available to African countries this year. "Germany will make available not only 30 million doses of vaccines but it will be as much as 70 million doses," Chancellor Angela Merkel told a news conference after a summit with African leaders on the G20's Compact with Africa initiative.
- The United Kingdom delivered 249,000 doses of AstraZeneca to Ghana, part of a pledge to donate 100 million doses internationally, of which 80% will be through COVAX. Nigeria, the Democratic Republic of the Congo (DRC) and Ethiopia have also received doses.
- High-income countries have ignored WHO guidelines to delay booster shots. WHO regional director for Africa, Dr. Matshidiso Moeti, warned that moves by some wealthy countries to introduce booster shots threaten the African continent's ability to fight the devastating pandemic. African countries continue to lag far behind those on other continents in inoculations, with less than 3 percent of Africa's 1.3 billion people fully vaccinated against the virus.
 - Dr. Moeti said richer countries hoarding vaccinations "make a mockery of vaccine equity." The comment comes after wealthy nations plan COVID booster shots even as much of the world is yet to receive a first dose.
 - WHO Director-General Dr. Tedros lamented "the fundamental weakness at the root of the pandemic," i.e. a broadly hesitant approach to sharing vaccines information, tech and tools.
 - In response to criticism, President Biden said: "We're providing more to the rest of the world than all the rest of the world combined... We're keeping our part of the bargain."

5. Vaccine Fill & Manufacturing

- Up to 10 million J&J doses partially produced by South African manufacturer Aspen are being exported to Europe in August and September, and millions more were exported in recent months. Meanwhile, South Africa is yet to receive the overwhelming majority of the 31 million doses it ordered from J&J, one of the reasons why only 9.7% of its population is fully vaccinated. The government was reportedly forced to waive its right to impose vaccine export restrictions in the confidential contract it signed with the company. Facing backlash, the EU says import of J&J vaccines from South Africa is temporary. The EC explained it had reached such an agreement after criticism of the scheme.
- The team behind Sputnik V. has said that plans have already been put in place to adapt the formula based on genetic sequencing from the new Delta variant. Alexander Gintzburg, who heads up Moscow's Gamaleya Institute stated that a modified version of Sputnik V had already been created. Morocco has established manufacturing agreements with several leading vaccine contenders including Russian ones.

6. Vaccine Distribution

- COVAX has initiated five rounds of vaccine allocation to participant countries:
 - Tanzania has received one million doses of the Johnson & Johnson vaccine sent from the US under COVAX. Doses are being distributed at 550 vaccination centers nationwide. Tanzania has placed another order for the vaccine through the African Union as part of its plan to initially target more than 60% of the population.
 - Nigeria approved the Sinopharm COVID-19 vaccine and expects to receive 7.7 million doses via COVAX.
- AVAT
 - President Cyril Ramaphosa of South Africa announced the start of monthly shipments of vaccines acquired by the AU / African Vaccine Acquisition Trust (AVAT) to the AU Member States on. An initiative by the AU Member States to pool their purchasing power, the AVAT, on 28 March 2021, had signed the historic agreement for the purchase of 220 million doses of the Johnson & Johnson single-shot COVID-19 vaccine, with the potential to order an additional 180 million doses.
 - The Johnson & Johnson vaccine was selected because: (1) as a single-shot vaccine it is easier and cheaper to administer; (2) the vaccine has a long shelf-life and favourable storage conditions; (3) the vaccine is partly manufactured on the African continent, with fill-finish activities taking place in South Africa
 - 6.4m doses shipped in August to several AU Member States. Monthly shipments will continue and be continually ramped up, with a target of delivering almost 50m vaccines before the end of December. By January, the number of vaccines being released will be in excess of 25m per month. In collaboration with the Africa Medical Supplies Platform (AMSP), UNICEF is providing logistical and delivery services to the Member States.
- West Africa has to date received around 29 million vaccine doses—almost the same amount as East and Southern Africa. However, the rollout has been slow, with 38% of the doses administered compared with 76% in East and Southern Africa and 95% in North Africa. West Africa has delivered 2.4 doses per 100 people. In East and Southern Africa, the figure stands at 4.8 doses per 100 people.

7. Vaccine Licensing/Intellectual Property

See appendix for a diagram of vaccine patent architecture (Figure 1)

- The Medicines Patent Pool (MPP), WHO, Afrigen Biologics, Biovac, the South African Medical Research Council (SAMRC) and Africa CDC have signed a letter of intent to address the global imbalance of manufacturing capacity for COVID-19 vaccines. The letter sets out the terms of the collaboration and responsibilities between the organizations for the development of a tech transfer hub. To get the hub up and running in a year, its partners still need help from the pharmaceutical sector - but neither Moderna nor Pfizer has signaled interest in working with the facility. The due diligence, which was conducted by both by the MPP and by WHO indicates at this moment that there is no IP barrier in South Africa for the production of mRNA vaccines (i.e., there is currently no patent application for an mRNA vaccine in the country, even though a patent application could still emerge). So other companies could go ahead and produce mRNA in South Africa - but of course time is of the essence and this would take longer than if the originators shared the technology.
- Through public investment in development of the NIH-Moderna COVID-19 vaccine, the US government has the vaccine recipe in its possession and has rights under contract to share key information with the rest of the world to facilitate increased vaccine production, according to a new report by Public Citizen. The US has so far chosen not to exercise these rights. The action or inaction of the US in this respect would have considerable implications for end-to-end vaccine manufacturing in the developing world including Africa.
- BioNTech also hopes it can follow up its global COVID-19 success with the world's first mRNA vaccines against malaria and tuberculosis. While still under development, the German biotech is already eyeing Rwanda and Senegal to support future production of the two vaccine hopefuls, the company said on August 27. The sites would provide 'end-to-end vaccine supply solutions on the African continent.' This is striking to read as similar deals have been excluded for Covid vaccines.
- In Senegal, the Institut de Pasteur in Dakar is building a manufacturing plant in the hopes of starting production of COVID-19 vaccines later this year. Its goal is to produce 25 million doses per month by the end of 2022. The facility received 6.75 million euros from EU countries and institutions, and the USG's International Development Finance Corporation (DFC) has also committed \$3.3 million towards it. So far DFC has struck deals with India's Biological E, South Africa's Aspen and Senegal as part of its aim to help Vx producers in poorer countries.

-Appendix-

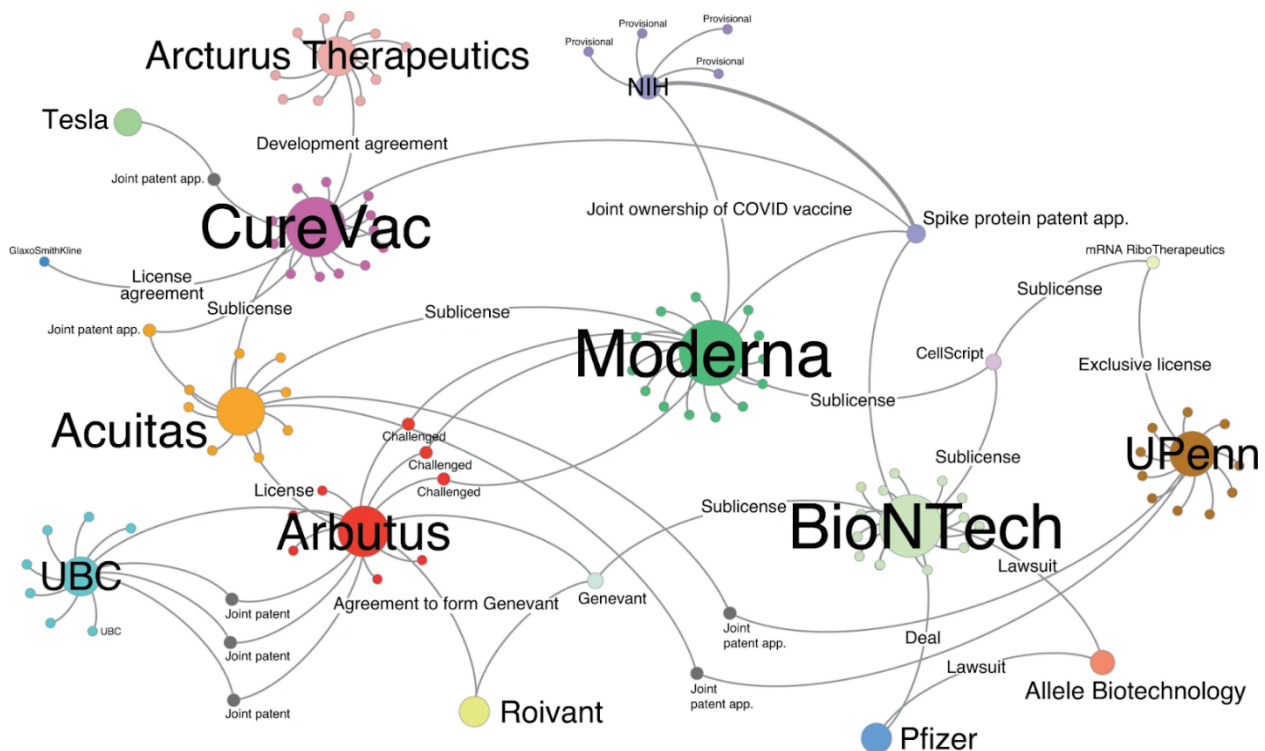
Figures and Supplemental Information

VacSafe Working Group Website

The VacSafe Working Group website houses publicly facing versions of these briefings, an interactive map that tracks COVID-19 vaccination rates and their correlates in Africa, and up-to-date information on the working group's convenings and projects. The website can be found at www.vacsafe.columbia.edu.

The interactive map is hosted at <https://vacsafe.columbia.edu/content/vacsafe-africa-map>.

Figure 1: Complexity of Vaccine Patent Architecture



Source: "A Network Analysis of COVID-19 mRNA Vaccine Patents" - *Nature Biotechnology* Vol. 39 no. 5 (May 1, 2021)

Key upcoming dates

- September 20-25: UN General Assembly
- September 25: [Global Citizen Live](#)
- October 12-17: World Bank-International Monetary Fund Annual Meetings
- October 30: G20 Leaders Summit
- November 17-21: ASTMH 2021 Annual [meeting](#)

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