

Re: Vaccines Africa Brief

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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 is experiencing its third and potentially deadliest wave of the COVID-19 pandemic, pressing the need for acceleration of vaccine allocation and distribution to the continent. 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 Economist* reported that as of July 31, 2021, 32.1 million doses of COVID-19 vaccines had been distributed in sub-Saharan Africa, with 3.3% of its population above the age of 12 having received at least one dose and 1.3% having received a second.
- The Our World in Data vaccine tracker reported that as of July 31, 2021, a total of 68.53 million vaccine doses had been administered across the entire African continent, with 3.6% of the population having received at least one dose.

2. Emerging Variants

- Multiple variants of the virus which causes COVID-19 are circulating globally. In collaboration with the SARS-CoV-2 Interagency Group (SIG), the US Centers for Disease Control and Prevention (CDC) have 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 CDC Global Variants Report, which is tracking the worldwide distribution of four variants, reports that as of July 24, 2021, three of those variants were circulating in Africa:
 - Alpha (B.1.1.7) (VOC): initially detected December 2020 in the United Kingdom; verified in 35 African countries.

- Beta (B.1.351) (VOC): initially detected December 2020 in South Africa; verified in 28 African countries.
 - Delta (B.1.617.2) (VOC): initially detected December 2020 in India; verified in 22 African countries.
 - Gamma (P.1) (VOC): initially identified January 2021 in travelers from Brazil; not detected in Africa at time of publication.
- The World Health Organization (WHO) has identified seven VOI:
 - Epsilon (B.1.427/B.1.429); initially detected March 2020 in the US.
 - Zeta (P.2); initially detected April 2020 in Brazil.
 - Eta (B.1.525); initially detected December 2020 in multiple countries.
 - Theta (P.3); initially detected January 2021 in the Philippines.
 - Iota (B.1.617.1); initially detected November 2020 in the US.
 - Kappa; Initially detected October 2020 in India.
 - Lambda (C.37); initially detected August 2020 in Peru.

3. Vaccine Efficacy, Safety, and Approval

- Moderna – Received WHO Emergency Use Listing status and approved for use in Rwanda.
- Oxford–AstraZeneca (Covishield) – Approved by Africa Regulatory Taskforce (ART), received WHO Emergency Use Listing status and approved for use in 25 African countries.
- Pfizer-BioNTech – Received WHO Emergency Use Listing status and approved for use in Botswana, Rwanda, South Africa, and Tunisia.
- Sinopharm (BBIBP-CorV) – Received WHO Emergency Use Listing status and approved for use in 15 African countries.
- Sinovac (CoronaVac) – Received WHO Emergency Use Listing status and approved for use in Egypt, Tunisia, and Zimbabwe.
- Bharat Biotech (COVAXIN) – Approved for use in Botswana and Zimbabwe.
- Gamaleya Research Institute of Epidemiology and Microbiology (Sputnik V) – Approved for use in 12 African countries.
- Johnson & Johnson (Ad26.COV2.S) – Received WHO Emergency Use Listing status and approved in Tunisia, South Africa, and Zambia.

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 Global Alliance for Vaccines and Immunization (GAVI) and The

Coalition for Epidemic Preparedness Innovations (CEPI)), a worldwide initiative aimed at distributing vaccines to countries regardless of wealth; (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:
 - On June 3, the US pledged 80 million vaccine doses to poorer countries, of which Africa is to receive five million via COVAX. At the Carbis Bay G7 Summit, the US pledged a further 500 million Pfizer-BioNTech doses (200 million in 2021 and 300 million in 2022) to 92 poorer nations and the African Union — the exact details of the apportionments are undisclosed. In mid-July, the U.S. began sending the first donation of what is projected to be 25 million doses to member states of the African Union. The United Kingdom pledged the donation of 100 million doses of COVID-19 vaccine, 5 million of which will be made available to poorer nations. Similar to the US declaration, little detail on process and timing is available.
 - On July 13th, COVAX signed agreements with two Chinese pharmaceutical companies (Sinopharm and Sinovac) to buy 550 million of their COVID-19 vaccines by the first half of next year. GAVI has the option to purchase a total of 170 Sinopharm vaccines and 380 million Sinovac vaccines.
 - Under the agreements, Chinese vaccine makers Sinopharm and Sinovac will begin to make 110 million doses immediately available, according to a news release from GAVI.
- Additional financing will be needed this year for COVAX to exercise its options to purchase vaccines for 2022. COVAX and the World Bank have announced a new financing mechanism that builds on GAVI's newly designed Advanced Market Commitment (AMC) cost-sharing arrangement. This should allow AMC countries to purchase doses beyond the fully donor-subsidized doses that they are already receiving from COVAX. COVAX will now be able to make advance purchases from manufacturers based on aggregated demand across countries, using financing from the World Bank and other multilateral development banks. Bolstered by the new finance, COVAX says it should be able to make available up to 430 million additional COVID vaccine doses, or enough to fully vaccinate 250 million people, for delivery between late 2021 and mid-2022.
- The African continent is turning to other sources/mechanisms to slowly begin chipping away at the dire situation. The African Union (AU) shipped 6 million doses of the J&J vaccine during the week of July 26. This is the first shipment of doses available for purchase through the African Vaccine Acquisition Task Team (AVATT). Following the breakdown in vaccine supplies from COVAX in March, the AU signed a deal with J&J for 400 million doses, to be provided over 18 months. Next week, the 27 countries that have already paid for doses will begin to receive them. Another 18 countries are in the process of finalizing loans from the World Bank. An additional 1 million J&J doses – part of approximately 25

million doses donated by the USG to Africa – were delivered this week, with doses destined to Burkina Faso, Djibouti, Ethiopia, the Gambia and Senegal.

- African Union via AVAT:
 - UNICEF will obtain and deliver COVID-19 vaccines on behalf of AVAT.
 - Johnson & Johnson: 220 million doses by the end of 2022 with option of extending to purchase a further 180 million (~\$10 per dose).
 - Afreximbank has provided \$330 million to J&J as a non-refundable down payment for the doses. Countries can secure doses through the Africa Medical Supplies Platform and can participate in a payment plan of up to five years with the bank, with a subsidized interest rate between 3% and 5%.
 - The first shipment of J&J (6 million doses) vaccines began the last week of July. 35 million doses are expected to be delivered by the end of 2021.
 - 27 African countries have paid for AVAT doses and will begin to receive them in the coming weeks. 18 additional countries are finalizing World Bank loans. A Special Envoy for the African Union stated that he expects 45 member states will receive shipments by the end of August.
- Significant Bilateral Vaccine Purchases & Vaccine Diplomacy:
 - Egypt: 50 million doses of Sputnik V.
 - South Africa: 31million J&J and 30 million Pfizer BioNTech.
 - China (to date): Approximately 7.16 million doses donated to Africa and 59.55 million doses purchased by African countries. 36 African countries have been receiving sales and donations of vaccines from China.
 - Russia Vaccine Donations: >1 million doses of Sputnik V to 3 African countries (Algeria, Guinea, and Zimbabwe).

5. Vaccine Manufacturing

- In late July, Pfizer and BioNTech announced the signing of a letter of intent with the South African biopharmaceutical company, The Biovac Institute (Biovac). Through this collaboration, Biovac will conduct the final steps of vaccine manufacturing, namely the ‘fill and finish’ stage, and distribute the Pfizer vaccine. Manufacturing components will be supplied from European facilities. By the end of 2021, Biovac will be incorporated into the vaccine supply chain. The production of finished doses will begin in 2022. When utilized

fully, the Cape Town Biovac facility will be capable of producing over 100 million doses per year. All doses will go to members of the African Union.

- On July 26, Aspen Pharmacare, a pharmaceutical company based in South Africa, supplied its first batch of Johnson & Johnson vaccine doses to South Africa. The late stage of manufacturing was conducted locally, with drug components sourced from Europe. Vaccine doses will be distributed to other African member states through the Africa Vaccine Acquisition Task Team/African Union platform.
- As of July 12, the Prime Minister of Egypt stated that the Egyptian Holding Company for Biological Products and Vaccines (VACSERA) produced 1 million doses of the Sinovac vaccine using imported raw materials. Egypt expects to locally produce 5 million doses by August and 40 million doses of Sinovac within a year. These doses will be distributed to Africa and the Middle East. Additionally, in April, Egypt's Minapharm entered into an agreement with the Russian Direct Investment Fund to locally produce over 40 million doses of Sputnik V per year for global distribution.
- On July 26, Algeria announced that it will begin producing the Sinovac vaccine locally. Algeria already has an agreement to locally produce the Sputnik V vaccine, with production commencing in September.
- On July 6, pharmaceutical firm Sothema of Morocco announced they will begin locally producing 5 million Sinopharm vaccine doses per month. Additionally, the Moroccan government signed a deal with the Swedish pharmaceutical company Recipharm to construct a Morocco-based plant to produce other essential vaccines.
- The WHO and COVAX partners are working with a South African consortium comprising Biovac, Afrigen Biologics and Vaccines, a network of universities, and the Africa CDC to establish Africa's first COVID mRNA vaccine technology transfer hub.
- WTO's ED Ngozi Okonjo-Iweala said Africa was also working with the EU and other partners to help create regional vaccine manufacturing hubs in South Africa, Senegal and Rwanda, with Nigeria under consideration.
- Uganda's President Museveni announced a vaccine-making facility that is set to begin production in six months. Museveni's decision to commission the Biological Drugs and mRNA vaccine facility comes at a time when African countries are being hit the hardest and Uganda struggles to find a COVID-19 vaccine supplier.
- Momentum is building for the African Medicines Agency (AMA), which could boost local manufacturing of health products and protect consumers against counterfeits. The Treaty for the Establishment of the AMA requires ratification from 15 member states to go into effect. In June, Algeria became the 9th state to ratify the treaty. In mid-July, Egypt signed on to the AMA and expressed desire to be the home base for the agency's headquarters. The

AMA is expected to be approved in the upcoming 35th African Union Summit, to take place in early 2022.

- Africa uses roughly 25% of the annual global vaccine supply (representing approximately 1.3 billion doses). 99% of those doses are imported.

6. Vaccine Distribution

- COVAX has initiated five rounds of vaccine allocation to participant countries (See Appendix Table 1 for country-level vaccine allocation and doses received in the AFRO region).
 - The first round of allocation was announced in early February and outlined an exceptional distribution of 1.2 million doses of the Pfizer/BioNTech vaccine to healthcare workers and high-risk populations; distribution of these doses took place during Q1 of 2021.
 - The second round of allocation covered 237 million doses of the Oxford AstraZeneca (Covishield) vaccine. Many of these doses are being manufactured by the Serum Institute in India. Distribution was intended to be completed in May, but rising COVID-19 cases in India and bans on the export of the Oxford–AstraZeneca vaccine have caused significant delays.
 - The third round of allocation covered 14.1 million doses of the Pfizer-BioNTech vaccine. Distribution took place between April and June 2021.
 - The fourth round of allocation covered 17,366,400 doses of the Oxford AstraZeneca vaccine. This round is focused on participants that have experienced delays due to Round 2 disruptions in supply.
 - The fifth round of allocation provides 72,190,170 doses of the Pfizer-BioNTech vaccine. Distribution will take place between July and September 2021.
- COVAX has met only 7.67% of its goal to deliver two billion doses by the end of 2021, though a significant increase in supplies is expected by early 2022. Thus far, 153.4 million doses have been distributed to 137 participating countries. Managing Director of the COVAX office, Aurelia Nguyen, recently stated that deliveries will continue to be “very lean through July and August.”
- A temporary pause on exports of the AstraZeneca vaccine from India and stockpiling of vaccine doses in wealthy countries have significantly delayed vaccination timelines in Africa.

- Based on current projections, COVAX will make delivery of 200 million vaccination doses by October 2021. About three-quarters of the 70 million doses African countries have received have already been administered, according to the WHO.
 - 200 million vaccine doses would be enough to fully vaccinate only 7% of the population.
- Beyond COVAX, other sources are also beginning to accelerate their delivery timelines:
 - Vaccine deliveries from the AU Africa Vaccine Acquisition Trust (AVAT) have started this month (6 million doses), with a projected rise to 10M each month from September. Around 45 million doses are expected from AVAT by the year's end.
 - Tanzania has finally started to administer COVID-19 vaccines. Tanzania's vaccine rollout is the result of a donation of 1,058,000 doses of the J&J vaccine from the USG. President Samia Suluhu publicly received the vaccine on Wednesday, a sharp contrast to her predecessor, John Magufuli, who died in March after months of denying the existence of COVID in the country. Burundi and Eritrea are now the two African countries that have not started to vaccinate their citizens against COVID-19, though Burundi did say on Wednesday that it will accept vaccine donations with support from the World Bank.
 - With doses making their way to the African continent in the coming weeks, the WHO AFRO's Dr. Moeti has expressed concerns about fast-approaching expiration dates, which could place governments under pressure to administer shots before time runs out. The bulk of doses that the UK is now sending to lower-income countries will expire in September.
- As of July 26, 2021, Bridge Consulting in Beijing recorded that approximately 41 million of 66 million pledged Chinese vaccines have been delivered in Africa.

7. Vaccine Licensing/Intellectual Property

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

- A World Trade Organization (WTO) Council for Trade-Related Aspects of Intellectual Property Rights (TRIPS) meeting took place on July 20th. Members remained divided on fundamental issues but agreed to continue discussion on a potential temporary waiver of particular TRIPS provisions in efforts to better respond to COVID-19. This proposed waiver has been co-sponsored by many countries and groups, including Kenya, Eswatini, Mozambique, Zimbabwe, Egypt, and the African Group. The next TRIPS Council informal meeting will take place in September with the next formal meeting scheduled to take place in October.

- The move was the latest in a series of incremental advances on the initiative by India and South Africa. The UK parliament came out in support of the waiver, but the UK is still opposed. Same for the EU as a bloc. France, Japan, China came out in support. The EU proposal – which has proposed alternative measures to expand medicines and vaccines production – will remain on the table side by side with the waiver proposal as part of the overall negotiations. The EU alternative, under heavy fire from medicines access groups since it was published in early June, calls for the better use of existing WTO measures permitting countries to issue compulsory licenses. It also calls upon IP holders to step up their issuance of voluntary licenses for COVID-related health products in short supply.
- WTO General Council Chair Dacio Castillo of Honduras has selected Ambassador David Walker of New Zealand to be the facilitator responsible for leading WTO members in finding a multilateral response to the COVID-19 pandemic. According to some of those pushing for the waiver, the WTO's future now rests on what happens next: “The credibility of the WTO will depend on its ability to find a meaningful outcome on this issue that truly ramps-up and diversifies production,” says Ms. X. Mlumbi-Peter, South Africa's ambassador to the WTO. Meanwhile, the EU continues to push for a declaration at WTO, in parallel with waiver efforts.
- The Medicines Patent Pool (MPP) launched a new patents database devoted to COVID-19 vaccines. VaxPaL builds on MPP's 10-year experience in mapping patents on key health technologies. As of now, VaxPaL provides patent information on COVID-19 vaccines compiled into an Excel workbook. In the coming months, VaxPaL will be turned into a fully searchable online database.
- Gayle Smith, President Biden's head of global Covid-19 response, has called on pharmaceutical companies to share vaccine technology so the US can help create regional manufacturing hubs in the global south.
- The UN Special Rapporteur on health, Dr Tlaleng Mofokeng, weighed in on the status of collaboration to produce Vaccines on the continent: “We're filling vials. Not manufacturing... There's no scientific knowledge sharing. There's no Intellectual Property transfer. Just getting product to fill in vials and label.”
- The People's Vaccine Alliance, which includes Oxfam, Amnesty International, and dozens of other organizations, say Moderna and Pfizer/BioNtech have reaped massive profits by charging up to \$41 billion over the estimated cost of producing the vaccines. The 2 companies have sold over 90% of their vaccines to wealthy countries so far, garnering up to 24 times the potential cost of production.

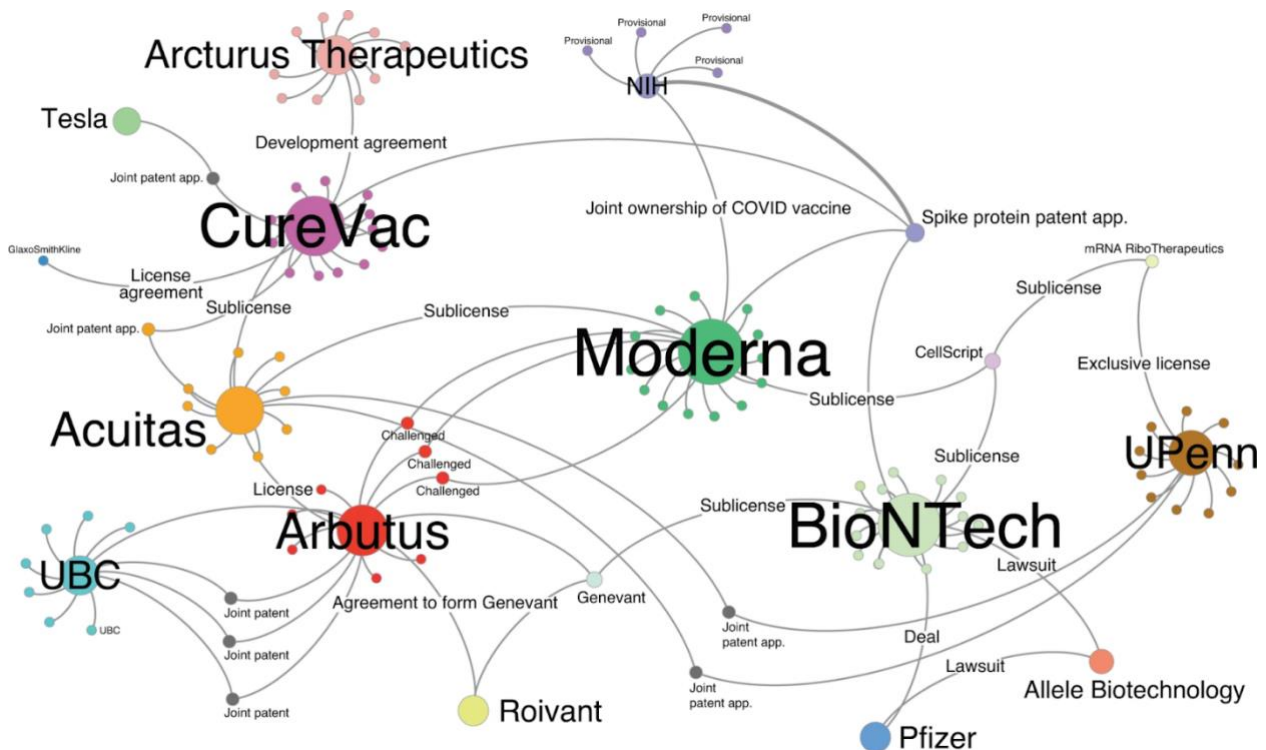
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Figures and Supplemental Information

VacSafe Working Group Website

The VacSafe Working Group recently launched a website that 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)

Figure 2: Africa's Vaccine Value Chain Entities and Status

Source: *Expanding vaccine manufacturing in Africa* (February 2021, Great for Growth: UKAID)

Africa's vaccine value chain players by value chain step⁵ 2020, total = ~10

 Current  Planned

































Manufacturer	Products	Value Chain Steps				
		R&D	Drug substance mfg	Fill & finish	Pack & label	Import for distribution
 Institut Pasteur Dakar	Yellow Fever					
 Egy Vac (Vacsera)	BCG-T, Tuberculin, Tetanus, DTP, Typhoid, Cholera					
 Institut Pasteur Tunis ²	BCG					
 Biovac	BCG ⁶ , Measles ⁶ , Pneumococcal conj. ³ , Hepatitis B ³ , Hexavalent Vaccine ⁷					
 Aspen Pharmacare	Covid-19 candidate					
 Institut Pasteur Morocco	BCG, DT, Yellow Fever, Typhoid Fever, Influenza, Rabies					
 EPHI: Eth Public Health Institute	Plan to produce vaccines ⁴					
 Biovaccines	Plan to produce Hep-B Plan to produce Tetanus Plan to produce DTP+Hep-B Plan to produce Yellow Fever Plan to produce Measles					
 Innovative Biotech	HIV					
 Institut Pasteur Algeria	Rabies					

Table 1: To-date COVAX Allocation and Delivery of Vaccine Doses in WHO AFRO Region by Country and Manufacturer

Participant	SFP/AMC	Round 1: Pfizer/BioNTech (Exceptional Distribution, Q1 2021)	Round 2: AZ & SII/AZ (Feb - May 2021)		Round 3: Pfizer/BioNTech (April - June 2021)	Round 4: AZ/Oxford	Round 5: Pfizer/BioNTech (July - September 2021)	Doses Received (As of July 26, 2021)	Percentage of Allocated Doses Received (as of July 26, 2021)
Algeria	AMC	-	1,881,600	AZ	-	-	760,500	1,123,200	42.51%
Angola	AMC	-	2,172,000	SII/AZ	100,620	129,600	630,630	624,000	20.57%
Benin	AMC	-	792,000	SII/AZ	-	93,600	332,280	144,000	11.82%
Botswana	SFP	-	100,800	AZ	19,890	-	-	82,290	68.18%
Burkina Faso	AMC	-	1,380,000	SII/AZ	-	-	1,107,990	0	0.00%
Cabo Verde	AMC	5,850	108,000	SII/AZ	-	-	-	0	0.00%
Cameroon	AMC	-	1,752,000	SII/AZ	-	391,200	861,120	391,200	13.02%
Central African Republic	AMC	-	312,000	SII/AZ	-	-	100,620	0	0.00%
Chad	AMC	-	1,080,000	SII/AZ	100,620	-	888,030	0	0.00%
Comoros	AMC	-	108,000	SII/AZ	-	12,000	-	12,000	10.00%
Congo, Dem. Rep.	AMC	-	5,928,000	SII/AZ	-	-	331,110	1,700,000	27.16%
Congo, Rep.	AMC	-	360,000	SII/AZ	-	-	4,696,380	0	0.00%
Cote d'Ivoire	AMC	-	1,740,000	SII/AZ	100,620	355,200	629,460	504,000	17.84%
Eswatini	AMC	-	108,000	SII/AZ	-	-	100,620	12,000	5.75%
Ethiopia	AMC	-	7,620,000	SII/AZ	-	1,792,800	3,105,180	2,184,000	17.45%
Gambia, The	AMC	-	156,000	SII/AZ	-	36,000	100,620	187,200	63.97%
Ghana	AMC	-	2,052,000	SII/AZ	-	249,600	100,620	600,000	24.98%
Guinea	AMC	-	864,000	SII/AZ	-	194,400	402,480	194,400	13.31%
Guinea-Bissau	AMC	-	120,000	SII/AZ	-	28,800	100,620	28,800	11.55%
Kenya	AMC	-	3,564,000	SII/AZ	-	765,600	271,440	1,020,000	22.17%
Lesotho	AMC	-	132,000	SII/AZ	-	-	100,620	0	0.00%
Liberia	AMC	-	324,000	SII/AZ	-	96,000	183,690	0	0.00%
Malawi	AMC	-	1,260,000	SII/AZ	-	360,000	372,060	360,000	18.07%
Mali	AMC	-	1,332,000	SII/AZ	-	396,000	382,590	396,000	18.76%
Mauritania	AMC	-	300,000	SII/AZ	-	-	104,130	100,700	24.92%
Mauritius	SFP	-	100,800	AZ	-	-	76,050	0	0.00%
Mozambique	AMC	-	2,064,000	SII/AZ	-	276,000	1,226,160	492,000	13.80%
Namibia	SFP	-	108,000	AZ	-	-	100,620	24,000	11.50%
Niger	AMC	-	1,596,000	SII/AZ	-	254,400	859,950	355,000	13.10%
Nigeria	AMC	-	13,656,000	SII/AZ	-	3,924,000	3,577,860	3,924,000	18.55%
Rwanda	AMC	102,960	744,000	SII/AZ	100,620	-	100,620	342,960	32.72%
Sao Tome and Principe	AMC	-	96,000	SII/AZ	-	-	39,780	0	0.00%
Senegal	AMC	-	1,104,000	SII/AZ	-	139,200	265,590	660,000	43.74%
Sierra Leone	AMC	-	528,000	SII/AZ	-	96,000	287,820	96,000	10.53%
South Africa	SFP	117,000	2,426,400	AZ	1,275,300	-	1,181,700	0	0.00%
South Sudan	AMC	-	732,000	SII/AZ	-	60,000	482,040	132,000	10.36%
Togo	AMC	-	540,000	SII/AZ	100,620	-	100,620	156,000	21.05%
Uganda	AMC	-	3,024,000	SII/AZ	-	-	1,027,260	864,000	21.33%
Zambia	AMC	-	1,212,000	SII/AZ	-	-	580,320	228,000	12.72%
Zimbabwe	AMC	-	984,000	SII/AZ	-	-	774,540	0	0.00%
non-UN Member States	-	-	1,125,600	AZ	-	-	-	-	-

Source: <https://www.gavi.org/covax-vaccine-roll-out>

KEY:

SFP - Self-Financing Participant | AMC - Advance Market Commitment | AZ - AstraZeneca | SII - Serum Institute of India

Key upcoming dates

- **September 20-25:** UN General Assembly
- **October 12-17:** World Bank-International Monetary Fund Annual Meetings
- **October 30:** G20 Leaders' Summit

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