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Report to Congressional Addressees

September 2023

COVID-19

USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination Goal

Accessible Version

GAO-23-105579

GAO Highlights

Highlights of GAO-23-105579, a report to congressional addressees

September 2023

COVID-19

USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination Goal

Why GAO Did This Study

To attain high population immunity from COVID-19 during the pandemic, the U.S. pledged to substantially contribute toward a 70 percent vaccination goal of the world's population, initially by the end of 2022. USAID has partnered with other U.S. agencies, multilateral organizations, and donor countries on country readiness and delivery efforts to significantly increase assistance to countries around the world to meet the vaccination goal.

The CARES Act includes a provision for GAO to monitor the federal government's response to the COVID-19 pandemic. This report examines (1) the assistance USAID has provided to support COVID-19 vaccine country readiness and delivery abroad, (2) progress USAID has made in its efforts to support COVID-19 vaccine country readiness and delivery abroad, and (3) any challenges USAID has faced and how it has addressed them.

GAO reviewed laws, funding, and guidance documents from USAID, the Department of State, the Centers for Disease Control and Prevention, and the World Health Organization. GAO analyzed publicly available data to obtain global vaccination rates. GAO also interviewed USAID officials in Washington, D.C., and USAID officials and other local stakeholders in three countries: Guatemala, Malawi, and South Africa. GAO selected these countries based on factors such as the amount of estimated country readiness and delivery assistance USAID obligated for each country.

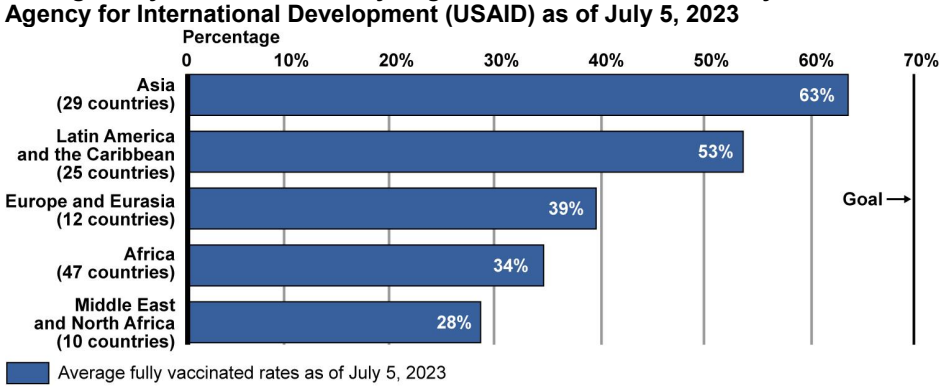
View GAO-23-105579. For more information, contact Latesha Love-Grayer at (202) 512-4409 or LoveGrayerL@gao.gov.

What GAO Found

The U.S. Agency for International Development (USAID) supports COVID-19 vaccine country readiness and delivery abroad by assisting a country's capacity to receive and administer vaccines. As of March 2023, USAID obligated an estimated $904 million to support its COVID-19 country readiness and delivery efforts in 125 countries. USAID's obligations for these efforts covered eight areas of technical assistance, including promoting demand for vaccination and supporting supply chain logistics.

USAID, together with other U.S. agencies, host governments and other entities, helped vaccinate an average of 45 percent of the population across assisted countries as of July 2023. This average was in comparison to the global goal of 70 percent vaccination in each country. Close to two-thirds of the assisted countries had vaccination rates below 50 percent, and most of those rates have leveled off. Regional vaccination rates for countries that received USAID assistance ranged from an average of 28 to 63 percent (see figure). USAID stated that it could not measure its direct contribution to countries' vaccination progress because, among other things, the agency is only one of many entities involved in these efforts.

Average Fully Vaccinated Rate by Region for Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023



Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Data for Average Fully Vaccinated Rate by Region for Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023

Region	Percent
Asia (29 countries)	63%
Latin America and the Caribbean (25 countries)	53%
Europe and Eurasia (12 countries)	39%
Africa (47 countries)	34%
Middle East and North Africa (10 countries)	28%

Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Note: Vaccination rates reflect the efforts of USAID and other entities in assisted countries. USAID officials, citing World Health Organization guidance, defined "fully vaccinated" as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. USAID assisted 125

countries; no vaccination data existed for two small USAID-assisted countries in Asia. The most recent vaccination rate data for most countries are prior to July 2023.

USAID faced demand, supply, and other challenges in providing COVID-19 vaccine country readiness and delivery assistance. U.S. agency officials in assisted countries reported that demand issues have overtaken supply issues as the greatest challenge to these efforts. Demand issues included, for example, vaccine hesitancy and barriers associated with people getting to vaccine sites. As vaccine demand diminished, USAID and other partners shifted priorities to vaccinating vulnerable groups and incorporating activities into countries' primary healthcare systems on the way to reaching the global 70 percent vaccination goal. USAID initiated several efforts to learn from these challenges, and has plans to disseminate the lessons learned, in accordance with agency guidance.

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Abbreviations

CDC	Centers for Disease Control and Prevention
COVAX	COVID-19 Vaccines Global Access
CRD	country readiness and delivery
DEC	Development Experience Clearinghouse
Global VAX	Initiative for Global Vaccine Access
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WHO	World Health Organization

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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Congressional Addressees

COVID-19 has adversely affected the health of populations around the world. The pandemic has also killed millions of people both at home and abroad. The U.S. government has prioritized mitigating the public health impacts of COVID-19, slowing the transmission of the virus, deterring the emergence of new virus variants, and saving lives through vaccination. At the height of the COVID-19 pandemic in 2021, the United States pledged to substantially contribute toward a global goal of vaccinating 70 percent of the population of each country by the end of 2022.

To stop the spread of the virus and attain high population immunity, the United States, led by the U.S. Agency for International Development (USAID), moved to the forefront of the pandemic global response. This response included building and strengthening countries' readiness for and delivery of vaccines (country readiness and delivery, or CRD).[1] To achieve the global goal of vaccinating 70 percent of the population of each country against COVID-19, the U.S. established the Global Response and Recovery Framework (the Framework) in July 2021. The Framework established a set of objectives to end the pandemic, mitigate its harms, support the global recovery, and strengthen pandemic threat readiness.[2] The first objective of the Framework was to accelerate widespread and equitable access to and delivery of safe and effective COVID-19 vaccinations. In December 2021, the USAID Administrator announced a new, whole-of-government response, guided by the Framework, called the Initiative for Global Vaccine Access (Global VAX). Global VAX combined the capabilities of USAID and a number of other U.S. government agencies to respond to the evolving COVID-19 crisis in an effort to significantly enhance assistance to many countries, especially

[1]USAID defines CRD as the support needed to ensure that the infrastructure is in place and the technical assistance is available to make certain COVID-19 vaccines can be safely delivered to all those who need them. According to USAID guidance, this assistance involves financial support, training, and technical assistance provided by USAID-funded implementing partners.

[2]White House, "U.S. COVID-19 Global Response and Recovery Framework," July 1, 2021. See https://www.whitehouse.gov/wp-content/uploads/2021/07/U.S.-COVID-19-Global-Response-and-Recovery-Framework.pdf.

low-income ones, which remained under-vaccinated and unprepared for a new variant or a surge in infections.[3]

The CARES Act includes a provision for GAO to report on ongoing monitoring and oversight efforts related to the receipt, disbursement, and use of funds made available to prepare for, respond to, and recover from the COVID-19 pandemic.[4] This report examines the (1) assistance USAID has provided to support COVID-19 vaccine CRD abroad, (2) progress USAID has made in its efforts to support COVID-19 vaccine CRD abroad, and (3) any challenges USAID has faced in its efforts to support COVID-19 vaccine CRD abroad and how it has addressed them.

To respond to these three objectives, we reviewed relevant federal laws, regulations, and USAID planning, funding, and guidance documents. We also conducted interviews with officials from USAID, the Department of Health and Human Services' Centers for Disease Control and Prevention (CDC), the Department of State, and other U.S. government officials in Washington, D.C. In addition, we selected three countries, Guatemala, Malawi, and South Africa, for a series of interviews with multiple stakeholders. These stakeholders included officials from USAID, CDC, State, other interagency partners and multilateral organizations, as well as from host government health offices and local organizations. We selected these countries based on several factors, including their receiving greater amounts of estimated CRD obligations and, in order to understand vaccination challenges, their having lower COVID-19 vaccination rates.

To identify the types of assistance provided for COVID-19 vaccine CRD abroad, we obtained data on all USAID CRD assistance funded from appropriations to prevent, prepare for, and respond to COVID-19 and other appropriations obligated to address COVID-19. We obtained and analyzed additional CRD funding data from CDC and State officials. We interviewed relevant agency officials with knowledge of global vaccine CRD obligations and types of assistance and reviewed agency responses to our questions about the data. We reviewed related documentation and

[3]The other agencies included, among others, the Department of Health and Human Services' Centers for Disease Control and Prevention, the Department of State, the Office of the Global AIDS Coordinator, the Department of Defense, the Peace Corps, the Development Finance Corporation, and the Department of the Treasury.

[4]Pub. L. No. 116-136 § 19010(b), 134 Stat. 281, 580 (2020). The American Rescue Plan Act of 2021 also includes a provision for GAO to conduct oversight of the COVID-19 response. Pub. L. No. 117-2, § 4002, 135 Stat. 4, 78. All of GAO's reports related to the COVID-19 pandemic are available on GAO's website at https://www.gao.gov/coronavirus.

performed data reliability checks, and determined that the data were sufficiently reliable for estimating obligation amounts.

To describe the progress USAID made in meeting global COVID-19 vaccination goals and to identify factors that affected the measurement of this progress, we reviewed relevant USAID documents and interviewed officials as described above. To determine the overall vaccination progress in USAID-supported countries—reflecting the efforts of USAID, the host government, and other donors and entities—we reviewed COVID-19 vaccination and other data from the Our World in Data COVID-19 vaccination dataset.[5] This dataset draws on data from the World Health Organization (WHO), United Nations World Population Prospects, direct reports from country governments, and other sources. To assess the reliability of this dataset we conducted testing to identify any missing data or logical errors. We determined that the data were sufficiently reliable for the purposes of measuring overall vaccination progress.

Finally, to identify any challenges USAID has faced in its efforts to support COVID-19 vaccine CRD abroad and how the agency addressed them, we analyzed agency documents, including surveys of U.S. overseas staff, mitigation strategies, and plans for monitoring, evaluating, and assessing lessons learned. In addition, we interviewed officials from USAID, CDC, State, WHO, United Nations International Children's Emergency Fund (UNICEF), other international partners and multilateral organizations, and host government health offices and local organizations. We asked about the challenges in CRD assistance and mitigation strategies. We also asked USAID officials about plans for developing and disseminating lessons learned from USAID's CRD efforts. We assessed USAID's efforts against its Program Cycle Operational Policy.[6] See appendix I for a full description of our scope and methodology.

We conducted this performance audit from January 2022 to September 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe

[5]Our World in Data is an open access and open source non-profit organization that vets the source data for accuracy and consistency. It provides data on multiple variables, including people fully vaccinated (total and per capita data for people who received all doses prescribed by the initial vaccination protocol), COVID-19 cases, confirmed deaths, and numerous other COVID-19-related and broader socio-economic variables.

[6]*USAID Automated Directives System* 201 *Program Cycle Operational Policy*.

that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The COVID-19 Pandemic and Global Vaccination Efforts

In response to the spread of COVID-19 globally, the WHO declared COVID-19 a public health emergency of international concern in March 2020. Since then, COVID-19 has killed millions of people, infected hundreds of millions more, and adversely affected the health of populations around the world. Providing safe and effective vaccines to protect people from COVID-19 was crucial to mitigating the public health and economic impacts of the virus and to ending the pandemic as a public health emergency. In addition to limiting severe illness and death, slowing transmission of COVID-19 through vaccination—particularly of high-risk populations—was critical to deterring the emergence of new virus variants.

The United States and global partners have assisted countries around the world to access vaccine supply and receive and administer vaccine doses. These efforts were conducted in collaboration with international partners, such as COVID-19 Vaccines Global Access (COVAX), a WHO-backed effort initiated in April 2020 to rapidly develop and provide equitable access to vaccines.[7] In October 2021, COVAX partners anticipated that once vaccine supply constraints were alleviated, other factors, such as countries' abilities to absorb and administer vaccines, as well as waning vaccination demand and vaccine hesitancy, could significantly affect vaccination efforts. In May 2023, WHO declared an end to the public health emergency phase of the COVID-19 pandemic but also stated the disease remains an ongoing global health issue. As the COVID-19 pandemic enters a new phase, ensuring equitable access to and administration of COVID-19 vaccines continues to be essential to protect vulnerable populations and to prevent surges of new variants.

U.S. Efforts to Support COVID-19 Vaccinations Abroad

Since the early stages of the pandemic response, the U.S. government, through USAID, State, CDC, and others, has supported global COVID-19

[7]In addition to WHO, other COVAX partners included the Coalition for Epidemic Preparedness Innovations; GAVI, the Vaccine Alliance; and UNICEF.

vaccination efforts. These efforts first helped to improve the equitable allocation, access, and distribution of COVID-19 vaccines across the globe and subsequently provided technical assistance in priority areas to support CRD. In March 2021, USAID established a COVID-19 Program and Operations Strategy Task Force to advance and to coordinate the administration's COVID-19 response and recovery efforts. The objectives were to coordinate USAID's development and humanitarian assistance response to COVID-19 as well as existing efforts to support global workforce well-being, safety, security, and continuity of operations amid the pandemic. The Task Force's Vaccine Access and Delivery Initiative was established to advance equitable access to and delivery of COVID-19 vaccinations globally.

Following the establishment of the task force, the White House published the U.S. government's COVID-19 Framework in July 2021. USAID, CDC, and State led the interagency development of the Framework, which provides objectives and lines of effort to guide the United States in a coordinated, strategic response to the global COVID-19 pandemic. The first objective was to accelerate widespread and equitable access to and delivery of safe and effective COVID-19 vaccinations. It had a target of substantially contributing to help achieve the global goal of vaccinating 70 percent of the population of each country, initially by the end of 2022.[8] Updated in September 2022, the Framework now places greater emphasis on vaccinating and boosting high-risk and hard-to-reach populations and integrating COVID-19 vaccines into routine primary healthcare. USAID's November *2022 Technical Priorities Update for USAID's COVID-19 Response* reinforced the 70 percent global vaccination goal but did not specify a timeframe. This update also focused on fully vaccinating priority populations, including healthcare workers and older adults, and recognizing vaccination targets set by countries.

Following the establishment of the Framework, USAID and CDC began to jointly plan COVID-19 vaccine CRD efforts once it became clear that vaccines would become available and significant resources would be needed to distribute them at scale. With USAID's announcement of the Global VAX initiative in December 2021, the U.S. government sought to

[8]This report focuses on activities and results associated with the Framework's first line of effort—specifically, USAID's efforts to support COVID-19 vaccine CRD. Other Framework objectives included reducing disease and death from COVID-19; addressing acute needs driven by COVID-19 to build resilience; bolstering economies and other critical systems affected by COVID-19; and strengthening the international health security architecture to prevent, detect, and respond to pandemic threats.

boost international coordination for vaccination assistance, such as identifying and rapidly overcoming barriers to vaccine access and demand. Global VAX encompassed efforts to increase uptake of COVID-19 vaccines in 125 countries. These efforts complemented the expansion of the global vaccine supply, but focused on ensuring that partner countries were ready to deliver and administer the donated vaccines.

CDC worked in close coordination with USAID on CRD efforts. CDC also provided technical support and assistance to national governments to support implementation of their vaccination plans.[9] State supported CRD efforts through interagency coordination of dose deliveries, engaging with host governments, and promoting messaging in support of vaccination.[10] Other interagency partners involved in CRD assistance included the Department of Defense, the Department of the Treasury, the Peace Corps, and the White House, among others. In addition, U.S. government agencies worked with implementing partners, including non-governmental organizations, local civil society organizations, and public international organizations, such as WHO and UNICEF.

[9]CDC allocated an estimated $296 million for CRD assistance from fiscal year 2020 to January 2023, according to CDC officials. Of this amount, CDC allocated about $118 million to specific countries and $178 million for cross-cutting mechanisms that supported multiple countries, according to CDC officials.

[10]State also allocated $850 million for the Bureau of Population, Refugees, and Migration, the agency office focused on humanitarian efforts, to respond to COVID-19, but could not specify how much supported CRD efforts. State also noted that it provided $280 million in funds appropriated by the American Rescue Plan Act of 2021 to WHO, a portion of which supported vaccine-related pharmacovigilance and demand generation; $170 million to UNICEF, of which $125 million was intended to support operational costs of vaccine delivery; and $75 million to the Pan-American Health Organization to help implement and monitor COVID-19 vaccinations. Additionally, State transferred about $14 million for CRD assistance to USAID, CDC, and other agencies involved in the global COVID-19 response as of February 2023, according to State officials.

USAID Provided More Than $900 Million for CRD Efforts in 125 Countries

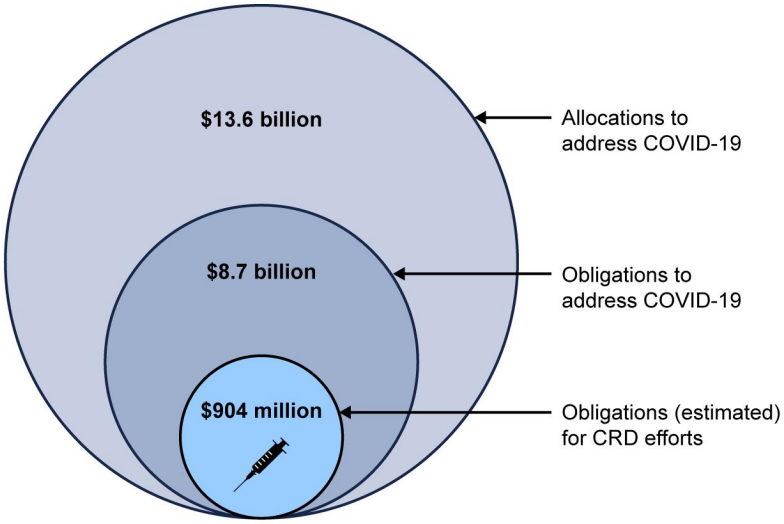
USAID Obligated about $904 Million in CRD Awards to 125 Countries

As of March 2023, USAID had obligated an estimated $904 million in awards to support CRD efforts in 125 countries.[11] USAID allocated a total of $13.6 billion for COVID-19 mitigation efforts, of which it obligated $8.7 billion in awards and $4 billion for a contribution to Gavi, the Vaccine Alliance, for vaccine procurement and delivery.[12] The $904 million in estimated CRD obligations represents about 10 percent of funds USAID obligated for COVID-19 efforts. Figure 1 shows USAID allocations to address COVID-19, its total COVID-19 obligations, and estimated obligations for CRD efforts.

[11]USAID officials said they were unable to isolate a specific subset of obligations for CRD activities from funding for broader COVID-19 efforts because its financial management system is not designed to track spending at this level of detail and many activities involving CRD also included non-CRD assistance. Instead, officials provided estimates of the agency's CRD obligations by analyzing regional bureaus' program records and country missions' implementation plans.

[12]Gavi, the Vaccine Alliance, is a multilateral body that increases equitable and sustainable use of vaccines. USAID made the $4 billion contribution to Gavi pursuant to direction contained in the Consolidated Appropriations Act, 2021. Pub. L. No. 116-260, 134 Stat. 1182, 1821 (2020). Amounts that USAID did not obligate for awards to address COVID-19 directly or for a contribution to Gavi went to operating expenses in support of COVID-19 response efforts, international disaster assistance programs to mitigate the impact of the pandemic on ongoing humanitarian crises, and other efforts to prevent development backsliding due to the pandemic.

Figure 1: U.S. Agency for International Development (USAID) Total COVID-19 Allocations and Obligations and Estimated Obligations for Global COVID-19 Vaccine Country Readiness and Delivery (CRD) Efforts, as of March 2023



Source: GAO analysis of USAID data. | GAO-23-105579

Data for Figure 1: U.S. Agency for International Development (USAID) Total COVID-19 Allocations and Obligations and Estimated Obligations for Global COVID-19 Vaccine Country Readiness and Delivery (CRD) Efforts, as of March 2023

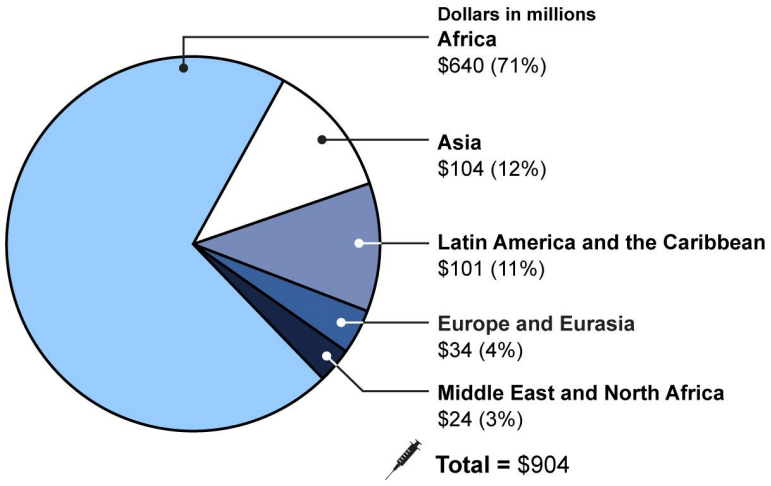
Allocations to address COVID-19	Obligations for awards to address COVID-19	Obligations (estimated) for CRD efforts
$13.6 billion	$8.7 billion	$904 million

Source: GAO analysis of USAID data. | GAO-23-105579

Note: The circles in the figure are not proportional. The $13.6 billion includes $4 billion in appropriations for vaccine procurement that, pursuant to direction contained in the Consolidated Appropriations Act, 2021, USAID contributed to Gavi, the Vaccine Alliance, a multilateral body that increases equitable and sustainable use of vaccines. Amounts that USAID did not obligate for awards to address COVID-19 or for a contribution to Gavi went to operating expenses, international disaster assistance, and other efforts.

USAID funded CRD activities in 125 countries around the world. The amount of estimated CRD obligations varied by country, from a high of about $75 million to a low of $100,000. Geographically, the vast majority of USAID's CRD funding supported countries in Africa (see fig. 2).

Figure 2: U.S. Agency for International Development (USAID) Estimated Obligations for COVID-19 Vaccine Country Readiness and Delivery by Region, as of March 2023



Source: GAO analysis of USAID documents. | GAO-23-105579

Data for Figure 2: U.S. Agency for International Development (USAID) Estimated Obligations for COVID-19 Vaccine Country Readiness and Delivery by Region, as of March 2023

Asia	Africa	Middle East	Latin America & the Caribbean	Europe & Eurasia	Total
$104M	$640M	$24M	$101M	$34M	$904 million
12%	71%	3%	11%	4%	-

Source: GAO analysis of USAID documents. | GAO-23-105579

Note: Dollars do not sum to $904 million and percentages do not sum to 100 due to rounding.

To optimize CRD assistance, the Global VAX initiative, led by USAID in close partnership with CDC, invested more of its COVID-19 vaccination financial, technical, and diplomatic efforts in a subset of 11 countries with significant need and the potential for rapid vaccination progress.[13] An estimated $379 million, or 42 percent, of USAID's CRD obligations supported these 11 Global VAX "surge" countries. All 11 countries are

[13]USAID, *COVID-19 Fact Sheet, Global VAX: An 'Initiative for Global Vaccine Access' To Turn Vaccines In Vials Into Vaccinations In Arms Around the World*, May 12, 2022. USAID previously referred to Global VAX surge countries as Tier One countries, and had identified six other countries—which the agency had designated Global VAX Tier Two countries—for intensified focus. According to USAID's *COVID-19 Global VAX Field Guide*, these six countries demonstrated high needs, regional or strategic importance to overall vaccine progress, and political or security complications that would first require diplomatic engagement followed by intensified investments.

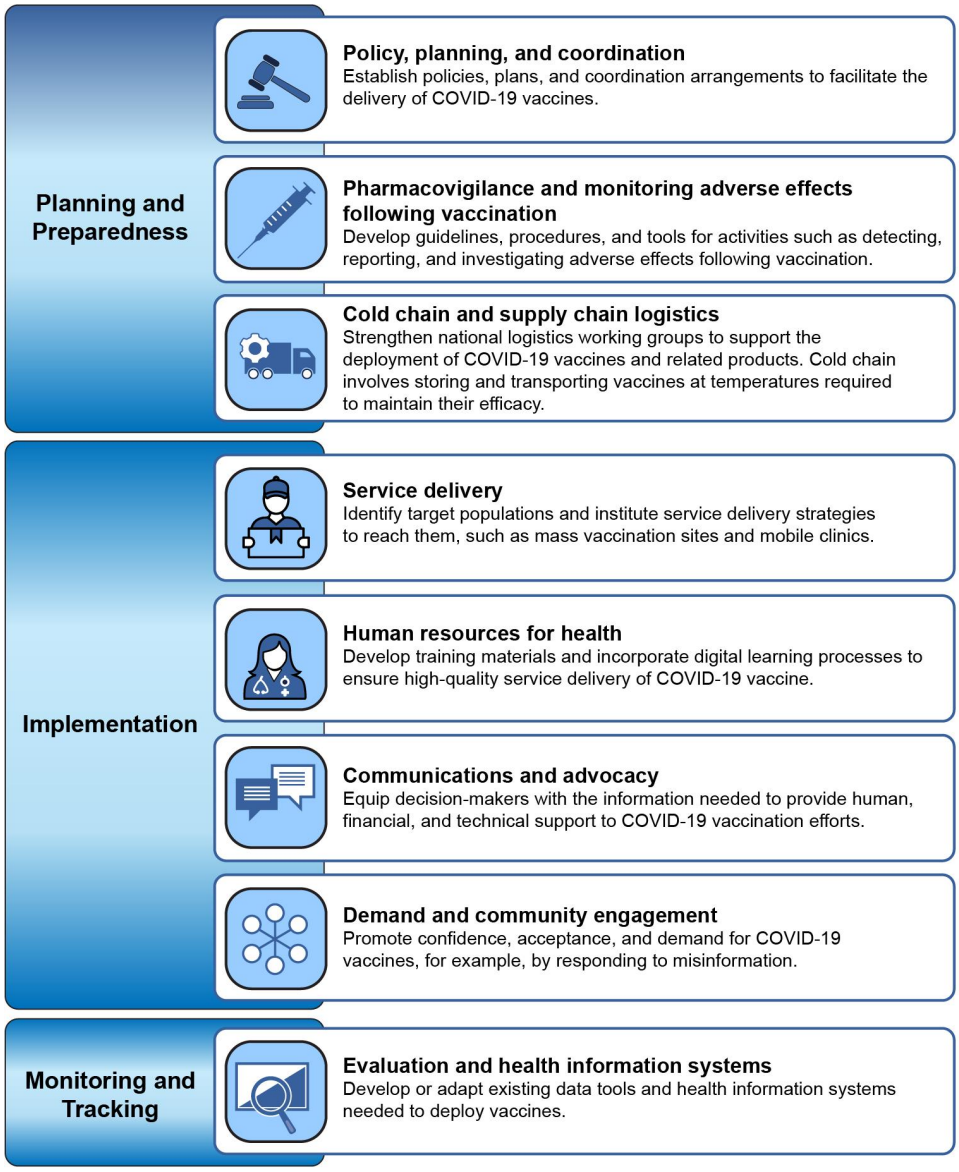
located in sub-Saharan Africa. Ten of them are classified as either low or lower-middle income by the World Bank, while one, South Africa, is classified as upper-middle income.

USAID Supported Various Forms of CRD Assistance

USAID has provided CRD assistance for eight identified areas of technical assistance to facilitate the delivery of COVID-19 vaccines.[14] The agency grouped these technical assistance areas into three categories: planning, implementing, and monitoring (see fig. 3).

[14]USAID officials said they were unable to break out the amount of funds obligated to each of these areas of technical assistance because its financial management system is not designed to track spending at this level of detail.

Figure 3: U.S. Agency for International Development (USAID) Areas for COVID-19 Vaccine Country Readiness and Delivery Technical Assistance



Source: GAO analysis of USAID and World Health Organization documents. | GAO-23-105579

Text for Figure 3: U.S. Agency for International Development (USAID) Areas for COVID-19 Vaccine Country Readiness and Delivery Technical Assistance

Planning and Preparedness	**Policy, planning, and coordination** Establish policies, plans, and coordination arrangements to facilitate the delivery of COVID-19 vaccines.
	Pharmacovigilance and monitoring adverse effects following vaccination Develop guidelines, procedures, and tools for activities such as detecting, reporting, and investigating adverse effects following vaccination.
	Cold chain and supply chain logistics Strengthen national logistics working groups to support the deployment of COVID-19 vaccines and related products. Cold chain involves storing and transporting vaccines at temperatures required to maintain their efficacy.
Implementation	**Service delivery** Identify target populations and institute service delivery strategies to reach them, such as mass vaccination sites and mobile clinics.
	Human resources for health Develop training materials and incorporate digital learning processes to ensure high-quality service delivery of COVID-19 vaccine.
	Communications and advocacy Equip decision-makers with the information needed to provide human, financial, and technical support to COVID-19 vaccination efforts.
	Demand and community engagement Promote confidence, acceptance, and demand for COVID-19 vaccines, for example, by responding to misinformation.
Monitoring and Tracking	**Evaluation and health information systems** Develop or adapt existing data tools and health information systems needed to deploy vaccines.

Source: GAO analysis of USAID and World Health Organization documents. | GAO-23-105579

To conduct CRD assistance, USAID awarded funding to implementing partners and has coordinated closely with CDC and other U.S. government agencies to support these efforts.[15] USAID and these partners align technical assistance with the countries' National Deployment and Vaccination Plans, a framework established by WHO and UNICEF to help countries plan their vaccination strategies.[16]

USAID mission staff, implementing partners, host government health ministry officials, and other stakeholders we interviewed in three countries

[15]USAID provided assistance primarily through agreements with awardees—including nongovernmental organizations and universities—that it refers to as implementing partners. International organizations such as UNICEF may also act as implementing partners for USAID.

[16]A National Deployment and Vaccination Plan constitutes a country's overall plan to deploy vaccines and deliver vaccination to identified target populations. A country can use the plan with the World Bank and other donors. Completion of a National Deployment and Vaccination Plan is a requirement to receive vaccine donations from COVAX.

identified various examples of USAID-supported CRD assistance at the country level. Some of those examples are listed below.

Encouraging Demand and Community Engagement in Malawi by Vaccinating a Community Leader Against COVID-19

U.S. Agency for International Development (USAID) implementing partners promoted demand for vaccinations by meeting with traditional leaders and by vaccinating them and other influential community members.

Source: USAID implementing partner Right to Care. | GAO-23-105579

- **Demand and community engagement:** In Guatemala, the USAID-supported Pan-American Social Marketing Organization encouraged demand and community engagement by using “micro-influencers” (such as well-known athletes and musicians in particular regions) to generate demand over social media for the COVID-19 vaccine among vaccination-hesitant youth.

Supporting Service Delivery in Guatemala by Vaccinating Indigenous Communities Against COVID-19

Guatemalan COVID-19 vaccination brigades supported by the U.S. Agency for International Development (USAID) visited indigenous communities in rural areas to vaccinate the population.

Source: USAID implementing partner Breakthrough Action. | GAO-23-105579

- **Service delivery:** In Malawi, UNICEF, acting as a USAID implementing partner, supported service delivery through Vaccinate My Village, a project that trained healthcare workers to report vaccination data by text message and provided mobile vaccination units to reach isolated communities.

- **Evaluation and health information systems:** In South Africa, USAID implementing partner Right to Care supported health information systems by developing a data registry for the National Department of Health to track vaccination progress by geography and demographics. Right to Care also created “Find My Jab,” an app which shows users the closest vaccination centers and what brands of vaccines they offer.

USAID Contributed to Vaccination Assistance That Fell Short of the Global Goal, and the Agency Faced Difficulties Measuring Its Progress

USAID Contributed to Vaccinating 45 Percent of the Population in Assisted Countries, Short of the 70 Percent Goal

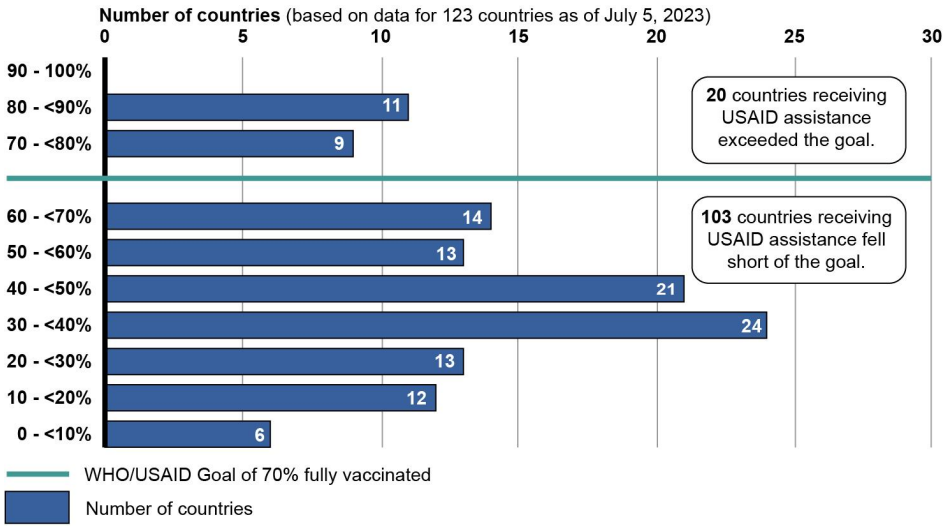
As of July 5, 2023, USAID, together with host governments, multilateral organizations, and other donors, had contributed to fully vaccinating an average of about 45 percent of the population across 123 assisted countries,[17] falling short of the global 70 percent goal.[18] Seventy-six (close

[17]No vaccination data exist for two USAID-assisted countries: the Marshall Islands and Micronesia. USAID officials noted that one implementing partner may have multiple CRD activities in one country or similar activities implemented across multiple countries, and that implementing partners may not be currently assisting all 125 countries. For example, partners in some countries may have already completed activities. According to Our World in Data, just under 65 percent of the world’s total population was fully vaccinated as of July 11, 2023.

[18]USAID officials, citing WHO guidance, defined “fully vaccinated” as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. While WHO updated its guidance in July 2022 to recommend booster doses in addition to the primary vaccine series, we are using the term “fully vaccinated” to mean the primary series only, in part because the protocol for booster doses continues to evolve. USAID issued updated guidance in November 2022 (*Technical Priorities Update for USAID’s COVID-19 Response*, last updated November 30, 2022) that was grounded in WHO’s *Global COVID-19 Vaccination Strategy in a Changing World: July 2022 Update*. The updated WHO strategy reinforced the goal of fully vaccinating 70 percent of the total population of each country, with a focus on fully vaccinating 100 percent of priority populations, including healthcare workers and older adults, and increasingly recognized vaccination targets set by countries.

to two-thirds) of these countries had vaccination rates below 50 percent (see fig. 4).

Figure 4: Percentage of Population Fully Vaccinated in Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023



Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Data for Figure 4: Percentage of Population Fully Vaccinated in Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023

Percentage of Population Fully Vaccinated	Number of Countries (based on data for 123 countries as of July 5, 2023)
90.01 - 100%	0
80.01 - 90%	11
70.01 - 80%	9
60.01 - 70%	14
50.01 - 60%	13
40.01 - 50%	21
30.01 - 40%	24
20.01 - 30%	13
10.01 - 20%	12
0 - 10%	6

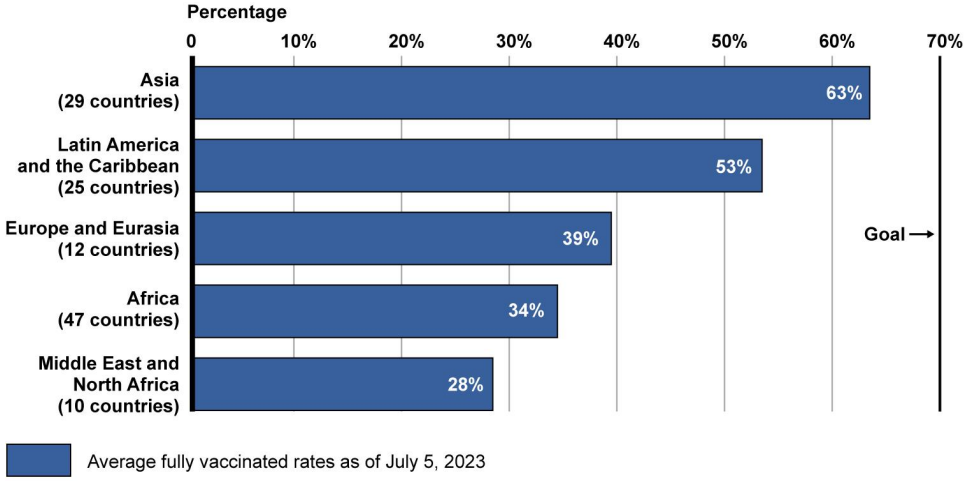
Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Note: These vaccination rates reflect the efforts of USAID, host governments, and other entities in assisted countries. USAID officials, citing World Health Organization (WHO) guidance, defined “fully vaccinated” as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. While WHO updated its guidance in July 2022 to recommend booster doses in addition to the primary vaccine series, we are using the term “fully vaccinated” to mean the primary series only, in part because the protocol for booster doses continues to evolve. USAID assisted 125 countries, but Our World in Data lacked vaccination data for two USAID-assisted countries: the

Marshall Islands and Micronesia. The most recent vaccination rate data for most countries are prior to July 2023.

Vaccination rates varied by region. Figure 5 shows average fully vaccinated rates across all USAID-assisted countries in each of five regions as of July 5, 2023. Asia had the highest average rate (63 percent), while the Middle East and North Africa had the lowest (28 percent).

Figure 5: Average Fully Vaccinated Rate by Region for Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023



Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Data for Figure 5: Average Fully Vaccinated Rate by Region for Countries Assisted by the U.S. Agency for International Development (USAID) as of July 5, 2023

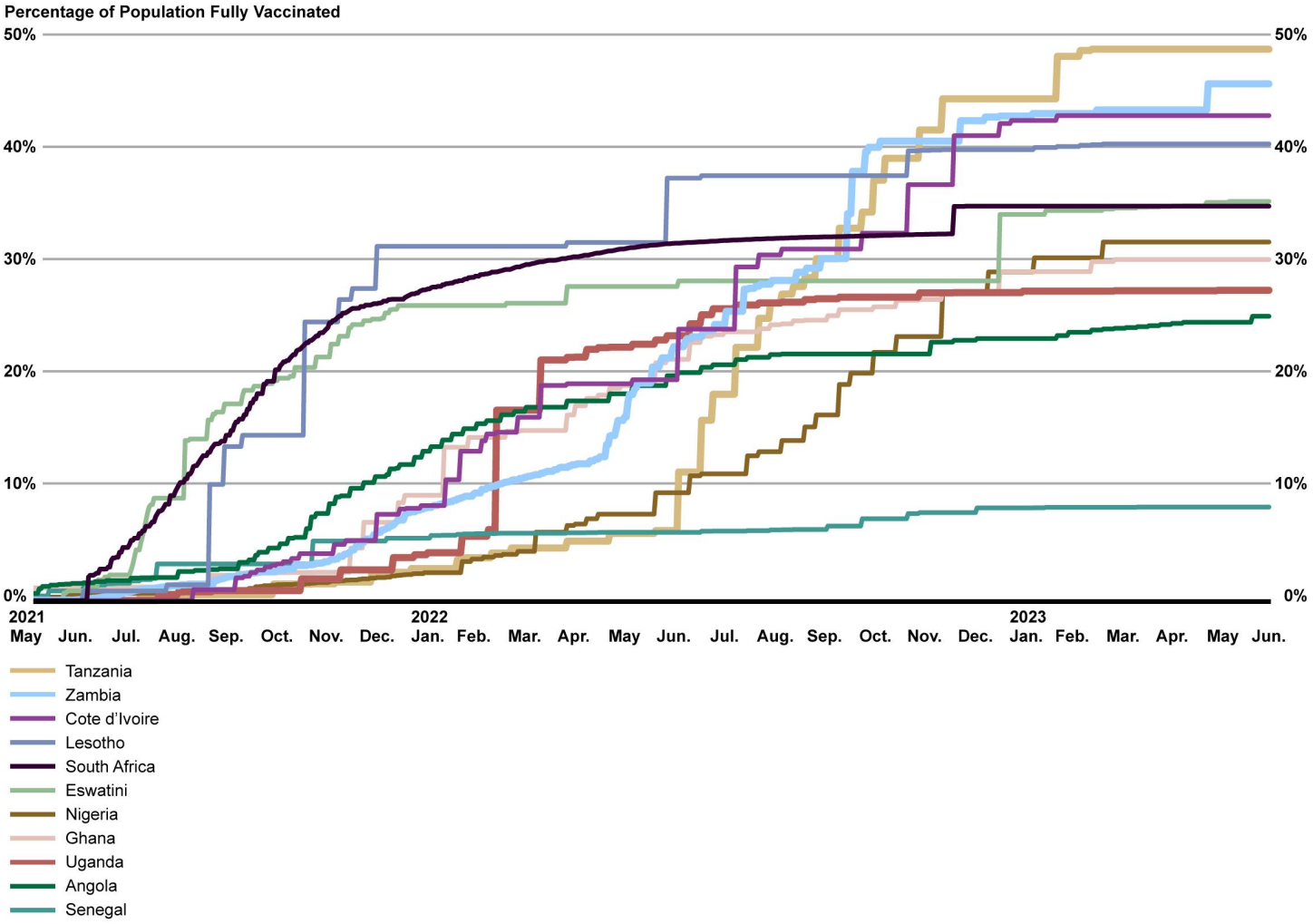
Region	Percent
Asia (29 countries)	63%
Latin America and the Caribbean (25 countries)	53%
Europe and Eurasia (12 countries)	39%
Africa (47 countries)	34%
Middle East and North Africa (10 countries)	28%

Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Note: These vaccination rates reflect the efforts of USAID, host governments, and other entities in assisted countries. USAID officials, citing World Health Organization (WHO) guidance, defined “fully vaccinated” as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. While WHO updated its guidance in July 2022 to recommend booster doses in addition to the primary vaccine series, we are using the term “fully vaccinated” to mean the primary series only, in part because the protocol for booster doses continues to evolve. USAID assisted 125 countries, but Our World in Data lacked vaccination data for two USAID-assisted countries in Asia: the Marshall Islands and Micronesia. The most recent vaccination rate data for most countries are prior to July 2023.

As of July 5, 2023, the fully vaccinated rates for the 11 Global VAX surge countries averaged 34 percent—well below the 70 percent goal—and progress had slowed in most countries. None of these countries had a vaccination rate above 50 percent as of July 5, 2023, despite the countries being the focus of roughly half (42 percent) of USAID's CRD assistance. The rates for most of the surge countries began to plateau in 2022 or early 2023. Some showed a sharp increase in their respective rates between May 2021 and December 2022, and one remained relatively flat, with a rate of less than 10 percent (see fig. 6).

Figure 6: Percentage of Population Fully Vaccinated in Global VAX Surge Countries Assisted by the U.S. Agency for International Development (USAID), May 2021–June 2023



Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Data for Figure 6: Percentage of Population Fully Vaccinated in Global VAX Surge Countries Assisted by the U.S. Agency for International Development (USAID), May 2021–June 2023

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
2021-05-31	0	0	0	0	0.65	0	0.4	0	1.12	0.03	0
	0	0	0	0	0.65	0	0.4	0	1.12	0.04	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.07	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.07	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	0.65	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	1.06	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	1.06	0	0.4	0	1.12	0.12	0
	0	0	0	0.03	1.26	0	0.41	0	1.12	0.12	0
	0	0	0	0.03	1.26	0	0.41	0	1.12	0.12	0
	0	0	0	0.03	1.26	0	0.41	0	1.12	0.12	0
	0	0	0	0.03	1.26	0	0.41	0	1.12	0.12	0
	0	0	0	0.03	1.26	0	0.85	0	1.12	0.12	0
	0	0	0	0.03	1.38	0	0.85	0	1.12	0.31	0
	0	0	0	0.03	1.38	0	0.85	0	1.12	0.31	0
	0	0	0	0.03	1.38	0	0.85	0	1.12	0.31	0
	0	0	0	0.03	1.38	0	0.85	0	1.12	0.31	0
	0	0	0	0.03	1.38	0	0.85	0	1.12	0.31	0
	0	0	0	0.03	1.44	0	0.85	0	1.14	0.31	0
	0	0	0	0.03	1.44	0	0.85	0	1.14	0.31	0
	0	0	0	0.03	1.44	0	0.85	0	1.14	0.31	0
	0	0	0	0.03	1.44	0.67	0.85	0	1.14	0.31	0
	0	0	0	0.03	1.47	0.67	0.85	0	1.14	0.46	0
	0	0	0	0.04	1.47	0.81	0.85	0	1.14	0.46	0
	0	0	0	0.04	1.47	0.86	0.85	0	1.14	0.46	0
	0	0	0	0.05	1.47	0.86	0.85	0	1.14	0.46	0
	0	0	0	0.05	1.53	0.86	0.86	0	1.14	0.53	0
	0	0	0	0.05	1.53	0.86	0.86	0	1.14	0.53	0
2021-06-30	0	0	0	0.06	1.53	0.86	0.86	0	1.14	0.53	0
	0	0	0	0.07	1.53	0.86	0.86	0	1.14	0.53	0
	0	0	0	0.08	1.53	0.86	0.86	0	1.14	0.53	0

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	0	0	0	0.1	1.53	0.86	0.86	0	1.14	0.53	0
	0	0	0	0.11	1.53	0.86	0.86	0	1.14	0.53	0
	0	0	0.85	0.11	1.58	0.86	1.16	0	1.19	0.62	0
	0	0	0.85	0.11	1.58	0.93	1.16	0	1.19	0.62	0
	0	0	0.85	0.14	1.58	1.16	1.16	0	1.19	0.62	0
	2.09	0	0.85	0.15	1.58	1.16	1.16	0	1.19	0.62	0
	2.25	0	0.85	0.17	1.58	1.16	1.16	0	1.19	0.62	0
	2.26	0	0.85	0.18	1.58	1.16	1.16	0	1.19	0.62	0
	2.26	0	0.85	0.21	1.58	1.16	1.16	0	1.19	0.62	0
	2.34	0	0.85	0.21	1.69	1.16	1.35	0	1.2	0.64	0
	2.44	0	0.85	0.23	1.69	1.16	1.37	0	1.2	0.64	0
	2.44	0	0.85	0.24	1.69	1.84	1.37	0	1.2	0.64	0
	2.8	0	0.85	0.27	1.69	1.84	1.37	0	1.2	0.64	0
	2.8	0	0.85	0.29	1.69	1.84	1.37	0	1.2	0.64	0
	2.8	0	0.85	0.31	1.69	1.84	1.37	0	1.2	0.64	0
	2.8	0	0.85	0.32	1.69	2.1	1.37	0	1.2	0.64	0
	2.82	0	0.85	0.33	1.78	2.1	1.5	0	1.21	0.64	0
	2.98	0	0.85	0.34	1.78	2.1	1.5	0	1.21	0.64	0
	2.98	0	0.85	0.34	1.78	2.28	1.5	0	1.21	0.64	0
	3.6	0	0.85	0.38	1.78	2.28	1.5	0	1.21	0.64	0
	3.8	0	0.85	0.38	1.78	2.28	1.5	0	1.21	0.64	0
	3.8	0	0.85	0.44	1.78	2.28	1.53	0	1.21	0.64	0
	3.86	0	0.85	0.44	1.78	2.28	1.53	0	1.21	0.64	0
	3.86	0	0.85	0.47	1.78	2.28	1.54	0	1.21	0.64	0
	4.31	0	0.85	0.56	1.78	2.28	1.54	0	1.21	0.64	0
	4.31	0	0.85	0.59	1.78	2.28	1.54	0	1.21	0.64	0
	4.73	0	0.85	0.65	1.78	2.28	1.54	0	1.21	0.64	0
	4.73	0	0.85	0.7	1.78	2.28	1.54	0	1.21	0.64	0
2021-07-31	4.73	0	0.85	0.74	1.78	2.28	1.54	0	1.21	0.64	0
	4.73	0	0.85	0.77	1.78	2.28	1.54	0	1.21	0.64	0
	4.98	0	0.85	0.77	1.78	2.3	1.54	0	1.21	0.64	0
	5.36	0	0.85	0.79	2	2.72	1.75	0	1.21	0.64	0
	5.36	0	0.85	0.82	2	3.2	1.75	0	1.21	0.64	0
	5.56	0	0.85	0.86	2	3.86	1.75	0	1.21	0.64	0
	5.56	0	0.85	0.9	2	4.51	1.75	0	1.21	0.64	0

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	5.56	0	0.85	0.94	2	4.51	1.75	0	1.21	0.64	0
	5.97	0	0.85	0.94	2	4.51	1.75	0	1.21	0.64	0.16
	5.97	0	0.85	0.97	2.03	5.21	1.87	0	1.21	0.65	0.16
	6.21	0	0.85	1	2.03	5.75	1.87	0	1.21	0.65	0.16
	6.21	0	0.85	1.03	2.03	6.37	1.87	0	1.21	0.65	0.16
	6.61	0	0.85	1.03	2.03	7.08	1.87	0	1.21	0.65	0.16
	6.61	0	0.85	1.06	2.03	7.8	1.87	0	1.21	0.65	0.16
	6.61	0	0.85	1.06	2.03	8.33	1.87	0	1.21	0.65	0.16
	6.82	0	0.85	1.07	2.03	8.53	1.87	0	1.21	0.65	0.16
	7.01	0	0.85	1.07	2.04	8.55	1.97	0	1.21	0.65	0.33
	7.01	0	0.85	1.09	2.04	9.12	1.97	0	1.21	0.65	0.33
	7.48	0	0.85	1.12	2.04	9.12	1.97	0	1.21	0.65	0.33
	7.73	0	0.85	1.14	2.04	9.12	3.26	0	1.21	0.65	0.33
	7.98	0	0.85	1.14	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	7.98	0	0.85	1.19	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	8.07	0	0.85	1.19	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	8.32	0	0.85	1.21	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	8.58	0	0.85	1.24	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	8.58	0	1.4	1.24	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	8.58	0	1.4	1.26	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	9.35	0	1.4	1.29	2.05	9.12	3.26	0.51	1.21	0.65	0.33
	9.35	0	1.4	1.31	2.05	9.12	3.26	0.51	1.21	0.65	0.47
	9.35	0	1.4	1.31	2.05	9.12	3.26	0.51	1.21	0.65	0.47
	9.71	0	1.4	1.32	2.05	9.12	3.26	0.51	1.21	0.65	0.47
2021-08-31	9.99	0	1.4	1.32	2.05	9.12	3.26	0.51	1.21	0.66	0.47
	10.26	0	1.4	1.32	2.59	9.12	3.26	0.78	1.21	0.66	0.47
	10.52	0	1.4	1.39	2.59	9.12	3.26	0.78	1.21	0.66	0.47
	10.52	0	1.4	1.41	2.59	9.12	3.26	0.78	1.21	0.66	0.47
	10.52	0	1.4	1.41	2.59	9.12	3.26	0.78	1.21	0.66	0.47
	10.84	0	1.4	1.41	2.59	14.26	3.26	0.78	1.21	0.7	0.47
	10.84	0	1.4	1.41	2.59	14.26	3.26	0.78	1.21	0.72	0.47
	11.27	0	1.4	1.46	2.59	14.26	3.26	0.78	1.21	0.72	0.47
	11.27	0	1.4	1.46	2.59	14.4	3.26	0.78	1.21	0.72	0.47
	11.5	0	1.4	1.46	2.59	14.4	3.26	0.78	1.21	0.72	0.47
	11.94	0.97	1.4	1.46	2.59	14.4	3.26	0.78	1.21	0.72	0.47

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	12	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.72	0.53
	12.02	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.77	0.53
	12.24	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.77	0.53
	12.48	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.77	0.53
	12.7	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.78	0.53
	12.91	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.78	0.53
	12.91	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.78	0.53
	12.91	0.97	1.4	1.46	2.69	14.4	3.26	0.78	1.21	0.78	0.53
	13.21	0.97	1.4	1.46	2.76	16.09	3.26	0.78	1.21	0.81	0.53
	13.21	0.97	10.35	1.46	2.76	16.09	3.26	0.78	2.26	0.81	0.53
	13.54	0.97	10.35	1.46	2.76	16.09	3.26	0.78	2.26	0.81	0.53
	13.74	0.97	10.35	1.46	2.76	16.61	3.26	0.88	2.26	0.81	0.53
	13.93	0.97	10.35	1.82	2.76	16.61	3.26	0.88	2.26	0.81	0.53
	13.96	0.97	10.35	1.82	2.76	16.79	3.26	0.88	2.26	0.81	0.53
	13.96	0.97	10.35	1.82	2.76	16.79	3.26	0.88	2.26	0.85	0.53
	14.01	0.97	10.35	1.91	2.83	16.79	3.26	0.88	2.26	0.85	0.53
	14.19	0.97	10.35	1.92	2.83	16.79	3.26	0.88	2.26	0.85	0.53
	14.19	0.97	10.35	1.96	2.83	16.79	3.26	0.88	2.26	0.85	0.53
	14.19	0.97	13.72	2	2.83	17.51	3.26	0.88	2.26	0.85	0.53
2021-09-30	14.72	0.97	13.72	2.05	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	14.72	0.97	13.72	2.08	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	14.72	0.97	13.72	2.13	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	15.15	0.97	13.72	2.13	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	15.15	0.97	13.72	2.13	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	15.64	0.97	13.72	2.13	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	15.91	2.02	13.72	2.13	2.83	17.51	3.26	0.88	2.26	0.89	0.53
	15.91	2.02	13.72	2.23	2.83	17.51	3.26	0.88	2.45	0.99	0.53
	16.17	2.02	13.72	2.26	3.4	17.51	3.26	0.88	2.45	0.99	0.53
	16.17	2.02	13.72	2.29	3.4	17.51	3.26	0.88	2.45	0.99	0.53
	16.17	2.02	14.72	2.29	3.4	18.29	3.26	0.88	2.45	0.99	0.53
	16.55	2.16	14.72	2.31	3.4	18.73	3.26	0.88	2.45	0.99	0.53
	16.55	2.16	14.72	2.34	3.4	18.73	3.26	0.88	2.45	0.99	0.53
	17.06	2.16	14.72	2.37	3.4	18.73	3.26	0.88	2.45	0.99	0.53
	17.06	2.16	14.72	2.4	3.63	18.73	3.26	0.88	2.45	1.08	0.53
	17.6	2.49	14.72	2.44	3.63	18.73	3.26	0.88	2.45	1.08	0.53

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	17.6	2.49	14.72	2.46	3.63	18.73	3.26	0.88	2.45	1.08	0.53
	17.96	2.49	14.72	2.46	3.63	19.1	3.26	0.88	2.45	1.08	0.53
	17.96	2.49	14.72	2.48	4.04	19.1	3.26	0.88	2.45	1.23	0.53
	18.43	2.73	14.72	2.49	4.04	19.1	3.26	0.88	2.45	1.23	0.53
	18.43	2.73	14.72	2.52	4.31	19.1	3.26	0.88	2.45	1.23	0.53
	18.43	2.73	14.72	2.54	4.31	19.1	3.26	0.88	2.47	1.26	0.53
	18.43	2.73	14.72	2.55	4.31	19.1	3.26	0.88	2.47	1.26	0.53
	19.28	2.73	14.72	2.55	4.31	19.1	3.26	0.88	2.47	1.32	0.53
	19.28	2.99	14.72	2.55	4.31	19.32	3.26	0.88	2.47	1.32	0.53
	19.53	2.99	14.72	2.55	4.31	19.32	3.26	0.88	2.47	1.32	0.53
	19.53	2.99	14.72	2.55	4.68	19.32	3.26	0.88	2.47	1.32	0.53
	19.53	2.99	14.72	2.55	4.68	19.32	3.26	0.88	2.47	1.32	0.53
	19.53	3.13	14.72	2.55	4.68	19.32	3.26	0.88	2.48	1.36	0.53
	19.53	3.13	14.72	2.55	4.68	19.59	3.26	0.88	2.48	1.36	1.47
	20.55	3.13	14.72	2.55	4.68	19.59	3.26	0.88	2.48	1.36	1.47
2021-10-31	20.57	3.26	14.72	2.68	4.68	19.59	3.26	0.88	2.48	1.41	1.47
	20.57	3.26	14.72	2.69	4.68	19.81	3.26	0.88	2.48	1.41	1.47
	20.93	3.26	14.72	2.69	5.06	19.81	3.26	0.88	2.48	1.41	1.47
	21.07	3.26	14.72	2.69	5.06	19.81	3.26	0.88	2.48	1.41	1.47
	21.27	3.47	14.72	2.69	5.06	19.81	3.26	0.88	2.49	1.43	1.47
	21.27	3.47	14.72	2.81	5.06	19.81	3.26	0.88	2.49	1.43	1.47
	21.38	3.47	14.72	2.81	5.06	19.81	3.26	0.88	2.49	1.43	1.47
	21.39	3.47	14.72	2.81	5.56	19.81	3.26	0.88	2.49	1.43	1.47
	21.6	3.47	14.72	2.81	5.56	19.98	3.26	0.88	2.49	1.43	1.47
	21.76	3.74	14.72	2.81	5.56	19.98	3.26	0.88	2.49	1.43	1.47
	21.91	3.74	14.72	2.81	5.56	19.98	3.26	0.88	2.5	1.44	1.47
	21.91	3.74	14.72	3.13	5.63	20.77	3.26	0.88	2.5	1.46	1.47
	22.25	3.74	14.72	3.13	5.63	20.77	3.26	0.88	2.5	1.46	1.47
	22.33	3.74	14.72	3.13	5.63	20.77	3.26	0.88	2.5	1.46	1.47
	22.38	4.18	14.72	3.13	5.63	20.77	3.26	0.88	2.5	1.46	1.47
	22.53	4.18	14.72	3.13	5.63	20.77	3.26	1.93	2.5	1.46	1.47
	22.68	4.18	14.72	3.13	5.63	20.77	3.26	1.93	2.5	1.46	1.47
	22.83	4.18	24.82	3.13	5.63	20.77	3.26	1.93	2.5	1.46	1.47
	22.97	4.18	24.82	3.13	6.41	20.77	3.26	1.93	2.51	1.51	1.47
	22.97	4.18	24.82	3.19	6.41	20.77	3.26	1.93	2.51	1.51	1.47

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	23.16	4.18	24.82	3.19	6.41	20.77	3.26	1.93	2.51	1.51	1.47
	23.17	4.18	24.82	3.19	7.45	20.77	3.26	1.93	2.51	1.56	1.47
	23.29	4.18	24.82	3.21	7.45	20.77	5.3	1.93	2.51	1.56	1.5
	23.43	4.18	24.82	3.24	7.45	20.77	5.3	1.93	2.51	1.56	1.5
	23.57	4.18	24.82	3.33	7.76	21.7	5.3	1.93	2.52	1.58	1.5
	23.57	4.18	24.82	3.33	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	23.82	4.18	24.82	3.33	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	23.86	4.18	24.82	3.35	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	23.86	4.18	24.82	3.35	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	24.02	4.18	24.82	3.46	7.76	21.7	5.3	1.93	2.52	1.61	1.5
2021-11-30	24.17	4.18	24.82	3.46	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	24.31	4.18	24.82	3.46	7.76	21.7	5.3	1.93	2.52	1.61	1.5
	24.74	4.18	24.82	3.55	8.63	21.7	5.3	1.93	2.52	1.65	1.5
	24.74	4.18	24.82	3.66	8.63	22.84	5.3	1.93	2.52	1.73	1.5
	24.93	4.18	24.82	3.66	8.63	22.84	5.3	1.93	2.52	1.73	1.5
	24.96	5	24.82	3.66	8.63	22.84	5.3	1.93	2.52	1.73	1.5
	25.08	5	24.82	3.7	9.22	22.84	5.3	1.93	2.52	1.73	1.65
	25.22	5	24.82	3.73	9.22	22.84	5.3	1.93	2.52	1.73	1.65
	25.35	5	26.82	3.94	9.22	23.54	5.3	1.93	2.52	1.73	1.65
	25.35	5	26.82	3.94	9.32	23.54	5.3	2.73	2.52	1.76	1.65
	25.6	5	26.82	3.94	9.32	23.54	5.3	2.73	2.52	1.76	1.65
	25.6	5	26.82	4.1	9.32	23.54	5.3	2.73	2.52	1.76	1.65
	25.64	5.35	26.82	4.15	9.32	23.54	5.3	2.73	2.52	1.82	1.65
	25.73	5.35	26.82	4.19	9.32	23.54	5.3	2.73	2.52	1.82	1.65
	25.83	5.35	26.82	4.27	9.32	24.3	5.3	2.73	2.52	1.82	1.65
	25.93	5.35	26.82	4.39	10	24.3	5.3	2.73	4.68	1.84	1.65
	26.02	5.35	27.8	4.52	10	24.58	5.3	2.73	4.68	1.84	1.65
	26.02	5.35	27.8	4.52	10	24.58	5.3	2.73	4.68	1.84	1.65
	26.02	5.35	27.8	4.78	10	24.58	5.3	2.73	4.68	1.84	1.65
	26.04	5.35	27.8	4.85	10	24.58	5.3	2.73	4.68	1.84	1.65
	26.04	5.35	27.8	4.89	10	24.58	5.3	2.73	4.68	1.9	1.65
	26.19	5.35	27.8	5.03	10	24.58	5.3	2.73	4.68	1.9	1.65
	26.19	5.35	27.8	5.19	10	24.58	5.3	2.73	4.68	1.94	1.65
	26.19	5.35	27.8	5.19	10.51	24.93	5.3	2.73	6.97	1.94	1.65
	26.32	5.35	27.8	5.48	10.51	24.93	5.3	2.73	6.97	1.94	1.65

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	26.32	5.35	27.8	5.48	10.51	24.93	5.3	2.73	6.97	1.94	1.65
	26.32	5.35	27.8	5.48	10.51	24.93	5.3	2.73	6.97	1.94	1.65
	26.32	5.35	27.8	5.48	10.51	24.93	5.3	2.73	6.97	2	1.65
	26.38	5.35	27.8	5.48	10.51	25.07	5.3	2.73	6.97	2	2.51
	26.44	5.35	27.8	5.85	10.51	25.07	5.3	2.73	6.97	2	2.51
	26.44	5.35	27.8	5.85	11.04	25.07	5.3	2.73	6.97	2	2.51
2021-12-31	26.44	7.68	31.55	6.08	11.04	25.07	5.3	2.73	6.97	2.05	2.51
	26.5	7.68	31.55	6.08	11.04	25.07	5.3	2.73	6.97	2.05	2.51
	26.5	7.68	31.55	6.08	11.04	25.07	5.3	2.73	6.97	2.05	2.51
	26.55	7.68	31.55	6.29	11.04	25.16	5.3	2.73	6.97	2.05	2.51
	26.68	7.68	31.55	6.29	11.04	25.16	5.3	2.73	6.97	2.05	2.51
	26.68	7.68	31.55	6.37	11.04	25.62	5.3	2.73	6.97	2.05	2.51
	26.68	7.68	31.55	6.47	11.22	25.62	5.56	2.73	6.97	2.09	2.51
	26.81	7.68	31.55	6.47	11.22	25.62	5.56	2.73	6.97	2.09	2.51
	26.81	7.68	31.55	6.65	11.73	25.91	5.56	2.73	6.97	2.09	2.51
	26.84	7.68	31.55	6.65	11.73	25.91	5.56	2.73	6.97	2.19	2.51
	26.84	7.68	31.55	6.73	11.73	25.95	5.56	3.83	6.97	2.19	2.51
	26.84	7.68	31.55	6.91	11.73	25.95	5.56	3.83	6.97	2.19	2.51
	26.84	7.68	31.55	7.04	11.8	25.95	5.56	3.83	6.97	2.23	2.51
	26.84	7.68	31.55	7.17	11.8	26.28	5.56	3.83	8.72	2.23	2.51
	26.84	8.15	31.55	7.17	12.11	26.28	5.56	3.83	8.72	2.26	2.51
	26.84	8.15	31.55	7.17	12.11	26.28	5.56	3.83	8.72	2.26	2.51
	26.84	8.15	31.55	7.17	12.11	26.28	5.56	3.83	8.72	2.29	2.51
	26.99	8.15	31.55	7.62	12.11	26.28	5.56	3.83	9.37	2.29	2.51
	27.07	8.22	31.55	7.76	12.11	26.28	5.56	3.83	9.37	2.32	2.51
	27.15	8.22	31.55	7.84	12.11	26.28	5.56	3.83	9.37	2.32	2.51
	27.22	8.22	31.55	7.84	12.11	26.28	5.56	3.83	9.37	2.32	2.51
	27.3	8.22	31.55	7.9	12.11	26.28	5.56	3.83	9.37	2.32	2.85
	27.32	8.22	31.55	7.9	12.11	26.28	5.56	3.83	9.37	2.38	2.85
	27.32	8.22	31.55	7.9	12.76	26.28	5.56	4.08	9.37	2.39	2.85
	27.4	8.22	31.55	8.01	12.76	26.28	5.56	4.08	9.37	2.39	2.85
	27.4	8.22	31.55	8.06	12.76	26.28	5.56	4.08	9.37	2.39	2.85
	27.55	8.22	31.55	8.06	12.76	26.28	5.56	4.08	9.37	2.39	2.85
	27.61	8.46	31.55	8.15	12.76	26.28	5.56	4.08	9.37	2.39	2.85
	27.67	8.46	31.55	8.15	13.3	26.28	5.56	4.08	9.37	2.39	2.85

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	27.67	8.46	31.55	8.25	13.3	26.28	5.56	4.08	9.37	2.49	2.85
	27.7	8.46	31.55	8.25	13.3	26.28	5.56	4.08	9.37	2.49	2.85
2022-01-31	27.76	8.46	31.55	8.3	13.3	26.28	5.56	4.26	9.37	2.49	2.85
	27.76	8.46	31.55	8.3	13.3	26.28	5.56	4.26	9.37	2.49	2.85
	27.87	8.46	31.55	8.3	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.92	8.46	31.55	8.43	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.92	8.46	31.55	8.48	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.92	8.46	31.55	8.48	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.99	8.46	31.55	8.48	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.99	8.46	31.55	8.56	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	27.99	8.46	31.55	8.6	13.71	26.28	5.8	4.26	9.37	2.49	2.85
	28.13	8.46	31.55	8.65	14.3	26.28	5.82	4.26	9.37	2.49	2.85
	28.13	8.46	31.55	8.69	14.3	26.28	5.82	4.26	13.65	2.49	2.85
	28.22	10.76	31.55	8.69	14.3	26.28	5.82	4.26	13.65	2.49	2.85
	28.23	10.76	31.55	8.78	14.3	26.28	5.82	4.26	13.65	2.49	2.85
	28.25	10.76	31.55	8.78	14.3	26.28	5.82	4.26	13.65	2.49	2.85
	28.28	10.76	31.55	8.83	14.3	26.28	5.82	4.26	13.65	2.49	2.85
	28.28	10.76	31.55	8.83	14.83	26.28	5.82	4.26	13.65	2.49	2.85
	28.37	10.76	31.55	8.93	14.83	26.28	5.82	4.26	13.65	2.49	2.85
	28.42	10.76	31.55	8.93	14.83	26.28	5.82	4.26	13.65	2.49	2.85
	28.42	10.76	31.55	9.05	14.83	26.28	5.9	4.26	13.65	2.49	3.63
	28.49	10.76	31.55	9.05	14.83	26.28	5.9	4.26	13.65	2.49	3.63
	28.5	13.3	31.55	9.14	14.83	26.28	5.9	4.26	13.65	2.49	3.63
	28.5	13.3	31.55	9.16	14.83	26.28	5.9	5.73	13.65	3.48	3.63
	28.6	13.3	31.55	9.23	15.31	26.28	5.94	5.73	13.65	3.48	3.63
	28.65	13.3	31.55	9.29	15.31	26.28	5.94	5.73	13.65	3.48	3.81
	28.65	13.3	31.55	9.29	15.31	26.28	5.94	5.73	13.65	3.48	3.81
	28.77	13.3	31.55	9.29	15.31	26.28	5.94	5.73	14.54	3.48	3.81
	28.77	13.3	31.55	9.29	15.31	26.28	5.94	5.73	14.54	3.48	3.81
	28.79	13.3	31.55	9.3	15.31	26.28	5.94	5.73	14.54	3.7	3.81
2022-02-28	28.79	13.3	31.55	9.51	15.31	26.28	5.94	5.73	14.54	3.7	3.81
	28.89	13.3	31.55	9.58	15.31	26.28	5.96	5.73	14.54	3.7	3.81
	28.89	13.3	31.55	9.58	15.76	26.28	5.96	5.73	14.54	3.7	3.81
	28.89	13.3	31.55	9.58	15.76	26.28	5.96	5.73	14.54	3.7	3.81
	29.03	13.3	31.55	9.58	15.76	26.28	5.96	5.73	14.54	3.7	3.81

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	29.04	14.23	31.55	9.91	15.76	26.28	5.96	5.73	14.54	3.7	3.81
	29.05	14.23	31.55	9.91	15.76	26.28	5.96	5.73	14.54	3.87	3.81
	29.09	14.23	31.55	9.91	15.76	26.28	5.96	5.73	14.54	3.87	3.81
	29.09	14.84	31.55	10.03	16.02	26.28	5.96	5.73	14.54	3.87	3.81
	29.13	14.84	31.55	10.06	16.02	26.28	5.98	6.32	14.54	3.87	3.81
	29.17	14.84	31.55	10.06	16.02	26.28	5.98	6.32	14.54	3.87	3.81
	29.26	14.84	31.55	10.18	16.02	26.28	5.98	6.32	14.54	3.87	4.24
	29.26	14.84	31.55	10.18	16.02	26.28	5.98	6.32	14.54	3.87	4.24
	29.27	14.84	31.55	10.18	16.02	26.28	5.98	6.32	14.54	4.01	4.24
	29.27	14.99	31.55	10.31	16.02	26.28	5.98	16.96	14.54	4.01	4.24
	29.31	14.99	31.55	10.31	16.02	26.28	6	16.96	14.54	4.01	4.24
	29.35	14.99	31.55	10.41	16.02	26.28	6	16.96	14.54	4.01	4.24
	29.39	14.99	31.55	10.41	16.55	26.28	6	16.96	14.54	4.01	4.24
	29.43	14.99	31.55	10.46	16.55	26.28	6	16.96	14.54	4.12	4.24
	29.48	14.99	31.55	10.54	16.55	26.28	6	16.96	14.54	4.12	4.24
	29.49	14.99	31.55	10.54	16.55	26.49	6	16.96	15.09	4.12	4.24
	29.49	14.99	31.55	10.59	16.55	26.49	6	16.96	15.09	4.12	4.24
	29.49	14.99	31.55	10.59	16.55	26.49	6	16.96	15.09	4.12	4.24
	29.54	14.99	31.55	10.7	16.55	26.49	6	16.96	15.09	4.12	4.68
	29.6	14.99	31.55	10.75	16.55	26.49	6	16.96	15.09	4.12	4.68
	29.66	14.99	31.55	10.75	16.84	26.49	6	16.96	15.09	4.12	4.68
	29.71	14.99	31.55	10.75	16.84	26.49	6	16.96	15.09	4.12	4.68
	29.72	16.33	31.55	10.75	16.84	26.49	6	16.96	15.09	4.38	4.68
	29.72	16.33	31.55	10.87	16.84	26.49	6	16.96	15.09	4.38	4.68
	29.78	16.33	31.55	10.87	16.84	26.49	6	16.96	15.15	4.38	4.68
	29.83	16.33	31.55	10.9	16.84	26.49	6	16.96	15.15	4.38	4.68
2022-03-31	29.88	16.33	31.55	10.98	16.84	26.49	6	16.96	15.15	4.38	4.68
	29.94	16.33	31.55	10.98	17.22	26.49	6	16.96	15.15	4.38	4.68
	29.94	16.33	31.55	11.06	17.22	26.49	6	16.96	15.15	4.38	4.68
	29.94	16.33	31.55	11.06	17.22	26.49	6	16.96	15.15	4.38	4.68
	29.99	16.33	31.55	11.1	17.22	26.49	6	16.96	15.15	4.38	4.68
	30.02	16.33	31.55	11.13	17.22	26.49	6	16.96	15.15	4.38	4.68
	30.05	16.33	31.55	11.18	17.22	26.49	6	16.96	15.15	4.38	4.68
	30.09	16.33	31.55	11.22	17.22	26.49	6	16.96	15.15	6.09	4.68
	30.13	16.33	31.55	11.22	17.22	26.49	6	16.96	15.15	6.09	4.68

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	30.16	16.33	31.55	11.22	17.22	26.49	6	16.96	15.15	6.09	4.68
	30.18	19.16	31.55	11.34	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.18	19.16	31.55	11.34	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.21	19.16	31.55	11.41	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.25	19.16	31.55	11.46	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.28	19.16	31.55	11.51	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.31	19.16	31.55	11.51	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.31	19.16	31.55	11.51	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.31	19.16	31.55	11.51	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.31	19.16	31.55	11.65	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.32	19.16	31.55	11.65	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.35	19.16	31.55	11.69	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.38	19.16	31.55	11.81	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.42	19.16	31.55	11.86	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.46	19.16	31.55	11.86	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.46	19.16	31.55	11.86	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.46	19.16	31.55	11.86	17.22	26.49	6	21.43	15.15	6.09	4.68
	30.5	19.31	31.9	11.86	17.78	27.97	6.04	21.66	16.53	6.69	5.29
	30.54	19.31	31.9	11.98	17.78	27.97	6.04	21.66	16.53	6.69	5.29
	30.55	19.31	31.9	11.98	17.78	27.97	6.04	21.66	16.53	6.69	5.29
	30.59	19.31	31.9	12.09	17.78	27.97	6.04	21.66	16.53	6.69	5.29
2022-04-30	30.62	19.31	31.9	12.09	17.78	27.97	6.04	21.66	16.53	6.69	5.29
	30.63	19.31	31.9	12.09	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.63	19.31	31.9	12.17	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.63	19.31	31.9	12.19	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.67	19.31	31.9	12.19	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.7	19.31	31.9	12.19	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.74	19.31	31.9	12.19	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.77	19.31	31.9	12.19	17.78	27.97	6.04	21.69	17.35	6.82	5.29
	30.77	19.31	31.9	12.19	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.77	19.31	31.9	12.19	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.81	19.31	31.9	12.44	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.84	19.31	31.9	12.44	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.88	19.31	31.9	12.44	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.92	19.31	31.9	12.57	17.78	27.97	6.05	22.37	18.01	7.29	5.29

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	30.95	19.31	31.9	12.61	17.78	27.97	6.05	22.37	18.01	7.29	5.29
	30.96	19.31	31.9	12.61	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	30.96	19.31	31.9	12.81	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	30.99	19.31	31.9	12.81	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	31.03	19.31	31.9	12.81	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	31.06	19.31	31.9	12.81	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	31.1	19.31	31.9	13.89	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	31.13	19.31	31.9	13.89	17.78	27.97	6.07	22.53	18.3	7.7	5.29
	31.14	19.31	31.9	14.66	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.14	19.31	31.9	14.71	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.17	19.31	31.9	14.71	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.2	19.31	31.9	14.71	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.24	19.31	31.9	15.37	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.27	19.31	31.9	16.04	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.3	19.31	31.9	16.04	18.42	27.97	6.07	22.57	18.91	7.7	5.98
	31.31	19.31	31.9	16.04	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.31	19.31	31.9	16.04	18.42	27.97	6.07	22.57	19.15	7.7	5.98
2022-05-31	31.33	19.31	31.9	16.35	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.36	19.31	31.9	16.35	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.39	19.31	31.9	17.66	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.42	19.31	31.9	18.36	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.44	19.31	31.9	18.36	18.42	27.97	6.07	22.57	19.15	7.7	5.98
	31.44	19.67	31.9	18.36	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.45	19.67	31.9	18.8	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.47	19.67	31.9	18.94	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.5	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.52	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.55	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.57	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.58	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.58	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.6	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.63	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.65	19.67	31.9	19.37	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.65	19.67	31.9	20.81	19.14	27.97	6.07	22.84	19.15	7.7	5.98

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	31.67	19.67	31.9	20.81	19.14	27.97	6.07	22.84	19.15	7.7	5.98
	31.67	19.67	31.9	20.81	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.68	19.67	31.9	20.81	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.7	19.67	31.9	20.81	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.72	19.67	31.9	21.28	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.74	19.67	31.9	21.63	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.76	19.67	31.9	21.63	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.78	19.67	31.9	21.63	19.14	27.97	6.07	23.21	21.18	9.6	6.23
	31.78	19.67	37.63	21.63	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.78	19.67	37.63	21.63	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.79	19.67	37.63	21.63	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.81	19.67	37.63	22.27	20.03	27.97	6.07	23.59	21.49	9.6	6.23
2022-06-30	31.82	19.67	37.63	22.62	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.83	19.67	37.63	22.62	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.84	19.67	37.63	22.62	20.03	27.97	6.07	23.59	21.49	9.6	6.23
	31.84	24.18	37.63	22.62	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.84	24.18	37.63	22.62	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.85	24.18	37.63	22.62	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.87	24.18	37.63	22.62	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.88	24.18	37.63	23.1	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.89	24.18	37.63	23.32	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.9	24.18	37.63	23.32	20.31	28.47	6.07	23.59	21.49	9.6	11.45
	31.9	24.18	37.63	23.32	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.9	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.91	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.92	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.93	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.94	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.95	24.18	37.63	23.5	20.31	28.47	6.07	24.65	22.98	11.11	11.45
	31.95	24.18	37.85	23.5	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	31.95	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	31.96	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	31.97	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	31.98	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	32	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	32.01	24.18	37.85	24.04	20.78	28.47	6.18	25.46	23.54	11.29	16.06
	32.01	24.18	37.85	24.04	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.01	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.02	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.03	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.05	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.06	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
	32.07	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.68	11.29	18.38
2022-07-31	32.07	24.18	37.85	24.59	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.07	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.08	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.09	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.1	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.11	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.12	24.18	37.85	25.77	21.01	28.47	6.19	25.99	23.93	11.29	18.38
	32.12	29.72	37.85	25.77	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.12	29.72	37.85	25.77	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.13	29.72	37.85	25.77	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.13	29.72	37.85	25.77	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.14	29.72	37.85	25.77	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.15	29.72	37.85	27.74	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.16	29.72	37.85	27.74	21.46	28.47	6.19	26.32	23.93	11.29	22.56
	32.16	29.72	37.85	27.74	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.16	29.72	37.85	27.82	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.17	29.72	37.85	27.82	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.18	29.72	37.85	27.82	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.19	29.72	37.85	27.82	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.2	29.72	37.85	28.01	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.2	29.72	37.85	28.01	21.67	28.47	6.23	26.32	23.93	12.89	22.56
	32.2	30.79	37.85	28.01	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.2	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.21	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.22	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.23	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.24	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	32.24	30.79	37.85	28.19	21.67	28.47	6.23	26.51	24.21	13.26	25.14
	32.24	30.79	37.85	28.19	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.24	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.25	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
2022-08-31	32.26	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.27	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.27	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.28	30.79	37.85	28.52	21.91	28.47	6.29	26.51	24.57	13.26	26.49
	32.28	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.28	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.29	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.29	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.3	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.31	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.32	31.31	37.85	28.52	21.96	28.47	6.3	26.58	24.65	14.25	27.3
	32.32	31.31	37.85	28.52	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.32	31.31	37.85	28.52	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.32	31.31	37.85	29.24	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.33	31.31	37.85	29.24	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.34	31.31	37.85	29.24	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.34	31.31	37.85	29.24	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.34	31.31	37.85	29.24	21.96	28.47	6.33	26.58	24.92	14.25	27.97
	32.35	31.31	37.85	29.24	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.35	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.35	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.36	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.36	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.37	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.37	31.31	37.85	29.61	21.96	28.47	6.33	26.81	24.98	15.47	28.77
	32.37	31.31	37.85	29.61	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.37	31.31	37.85	29.61	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.38	31.31	37.85	29.61	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.38	31.31	37.85	30.46	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.39	31.31	37.85	30.46	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.39	31.31	37.85	30.46	21.96	28.47	6.33	26.89	24.98	16.53	30.45

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
2022-09-30	32.39	31.31	37.85	30.46	21.96	28.47	6.33	26.89	24.98	16.53	30.45
	32.39	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.39	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.4	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.4	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.41	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.41	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.42	31.31	37.85	30.46	21.96	28.47	6.64	26.89	25.37	16.53	30.45
	32.42	31.31	37.85	30.46	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.42	31.31	37.85	30.46	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.42	31.31	37.85	30.46	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.43	31.31	37.85	30.46	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.43	31.31	37.85	30.46	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.44	31.31	37.85	34.45	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.44	31.31	37.85	34.45	21.96	28.47	6.64	27.02	25.91	19.25	33.17
	32.44	31.31	37.85	34.45	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.44	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.45	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.46	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.46	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.47	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.47	31.31	37.85	38.24	21.96	28.47	6.64	27.02	25.91	20.25	33.17
	32.48	32.73	37.85	38.24	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.48	32.73	37.85	38.24	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.48	32.73	37.85	39.99	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.49	32.73	37.85	39.99	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.49	32.73	37.85	40.38	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.5	32.73	37.85	40.38	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.5	32.73	37.85	40.38	21.96	28.47	7.29	27.02	25.91	20.25	34.6
	32.5	32.73	37.85	40.38	21.96	28.47	7.29	27.02	26.16	22.11	37.44
2022-10-31	32.5	32.73	37.85	40.38	21.96	28.47	7.29	27.02	26.16	22.11	37.44
	32.51	32.73	37.85	40.38	21.96	28.47	7.29	27.02	26.16	22.11	37.44
	32.51	32.73	37.85	40.38	21.96	28.47	7.29	27.02	26.16	22.11	37.44
	32.52	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	37.44
	32.52	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	37.44

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	32.53	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	37.44
	32.53	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.53	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.53	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.54	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.54	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.55	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.56	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.16	22.11	39.39
	32.56	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.56	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.56	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.57	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.57	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.58	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.58	32.73	37.85	40.92	21.96	28.47	7.29	27.02	26.74	23.52	39.39
	32.59	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.59	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.59	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.59	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.6	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.61	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.61	37.04	40.06	40.92	21.96	28.47	7.75	27.02	26.74	23.52	39.39
	32.61	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.61	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.61	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
2022-11-30	32.62	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.63	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.63	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.63	37.04	40.1	40.92	21.96	28.47	7.83	27.41	26.82	23.52	41.92
	32.64	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.64	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.64	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.64	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.65	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.65	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	32.65	37.04	40.13	40.92	23.02	28.47	7.83	27.41	26.82	23.52	41.92
	32.65	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.65	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.65	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.66	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.66	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.66	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	32.66	37.04	40.16	40.92	23.02	28.47	7.83	27.41	27.43	27.39	44.69
	35.11	41.41	40.16	40.92	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	40.92	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	40.92	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	40.92	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.11	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
2022-12-31	35.13	41.41	40.16	42.74	23.19	28.47	7.83	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	42.74	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	27.39	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	35.13	41.41	40.16	43.07	23.34	28.47	8.25	27.43	27.43	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.49	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.43	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
2023-01-31	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.16	43.15	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.16	43.38	23.34	34.39	8.25	27.56	29.3	29.27	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.39	8.27	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	35.13	42.77	40.35	43.38	23.34	34.74	8.31	27.56	29.3	30.53	44.69
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.61	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
2023-02-28	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.45	43.38	23.9	34.74	8.31	27.56	29.3	30.53	48.48
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.56	43.38	23.9	34.74	8.31	27.56	29.3	30.53	49
	35.13	43.2	40.61	43.38	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.38	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.38	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.7	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.7	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.7	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.61	43.7	24.1	34.74	8.31	27.56	30.19	30.53	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	35.13	43.2	40.68	43.7	24.19	34.88	8.31	27.56	30.19	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
2023-03-31	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.25	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.32	34.97	8.31	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.4	35.05	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.49	35.06	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	35.13	43.2	40.68	43.7	24.59	35.11	8.33	27.6	30.38	31.94	49.11
2023-04-30	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.69	35.14	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.16	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	43.7	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.6	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
2023-05-31	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11

Date	Percentage of Population Fully Vaccinated										
	South Africa	Cote d'Ivoire	Lesotho	Zambia	Angola	Eswatini	Senegal	Uganda	Ghana	Nigeria	Tanzania
	35.13	43.2	40.68	46.03	24.79	35.46	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	24.79	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11
2023-06-28	35.13	43.2	40.68	46.03	25.32	35.56	8.33	27.64	30.38	31.94	49.11

Source: GAO analysis of vaccination and population data from Our World in Data. | GAO-23-105579

Note: Global VAX surge countries are 11 African countries USAID identified as having significant need and the potential for rapid acceleration of vaccine uptake. These vaccination rates reflect the efforts of USAID, host governments, and other entities in assisted countries. USAID officials, citing World Health Organization (WHO) guidance, defined “fully vaccinated” as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. While WHO updated its guidance in July 2022 to recommend booster doses in addition to the primary vaccine series, we are using the term “fully vaccinated” to mean the primary series only, in part because the protocol for booster doses continues to evolve. The most recent vaccination rate data for most countries are prior to July 2023.

According to USAID officials, various factors contributed to the vaccination rate trends in these countries. For example:

- **Tanzania:** USAID officials stated that vaccination efforts in Tanzania had a slow start because at the time vaccines became available, political leadership had cast doubt on the safety of vaccines and prohibited them from entering the country. This trend changed when a new president was sworn into office in March 2021 and the country received its first tranche of over one million U.S. government-donated vaccine doses.[19] The officials said a series of USAID-supported music events in five regions from late July through August 2022 drove demand for more than 40,000 vaccinations in 5 weeks. According to an article in The Lancet, the Tanzanian government began an intensive campaign to vaccinate all eligible adults older than 18 years of age in September 2021.[20]
- **Lesotho:** USAID officials said that anticipated regional travel regulations in Lesotho restricting border crossings for the unvaccinated may have contributed to an increase in the country's vaccination rate in late 2021. The officials said vaccination coverage leveled off in mid-2022, due in large part to the government's lifting of all COVID-19 restrictions, including masking and proof of vaccination for traveling, prior to the fall elections. As a result of these changes, officials said that people no longer perceived COVID-19 as a threat. According to the officials, the country's national COVID-19 coordinating body also disbanded in mid-2022, leaving its work to the health ministry, which has many other responsibilities.
- **Senegal:** USAID officials attributed the relatively low, flat vaccination rate in Senegal to a change in the way the government managed COVID-19 vaccination efforts. The officials said resources committed to these efforts declined when those resources were moved from an emergency operations center—which coordinated activities across all relevant ministries and with local leaders—to the country's national vaccination program, which lacked this level of coordination. Low demand and data backlogs also contributed to the country's stagnant vaccination rate, according to USAID officials. For example, they said perceptions among people that COVID-19 posed minimal risk, due in

[19]Tanzania has a population of 65 million people, according to Our World in Data, which sources its population data from United Nations World Population Prospects.

[20]The Tanzanian government's campaign to vaccinate all eligible adults focused on combatting vaccine hesitancy, especially among healthcare workers, and included one-on-one engagements with stakeholders to address concerns, surge staffing to maximize the effect of vaccination drives, and U.S. government agencies' leveraging of existing HIV, tuberculosis, and other service delivery infrastructure to provide vaccinations nationwide. See *Tanzania's COVID-19 vaccination strategy: lessons, learning, and execution, The Lancet*, Vol 401, May 20, 2023, p.1649.

part to low case rates, depressed demand. They also said strikes among healthcare workers reduced the reporting of COVID-19 vaccination data, and thus the reported vaccination rate.

USAID officials also provided detailed information on factors affecting vaccination progress in two non-Global VAX surge countries. For example:

- **Malawi:** USAID officials in Malawi credited policy changes and vaccine campaigns for the country's improved vaccination rate, which rose from 6.4 percent of the targeted population in March 2022 to almost 20 percent in the fall of that year.[21] The USAID officials noted that policy changes allowed individuals who received a first dose from one vaccine manufacturer to receive a second dose from another manufacturer and lowered eligibility for the Pfizer vaccine from 18 to 12 years of age. The vaccine campaigns included a shift from administering vaccines at fixed vaccination sites to door-to-door campaigns and mobile clinics that brought the vaccine to individuals where they live.
- **Haiti:** Persistent political instability, high levels of gang violence, and fuel shortages contributed to Haiti's lack of vaccination progress by creating a difficult operating environment for providers, according to USAID officials. The officials said the August 2021 earthquake and tropical storm, followed by a late 2022 cholera outbreak, posed additional challenges and redirected scarce resources away from COVID-19 vaccination. They noted that low demand due to widespread misinformation and disinformation also slowed Haiti's vaccination rate, which remained below 4 percent as of July 5, 2023.

More broadly, USAID officials attributed variation in vaccination rate trends across countries to a variety of factors, including the strength of their underlying healthcare systems; physical environment, such as transportation infrastructure, electricity grid, geography, and natural disasters; and demographic characteristics, such as population mobility, median age, density, and displacement. Officials added that conflict and instability can depress vaccinations and outbreaks of other diseases can

[21]Malawi's national vaccine task force, on which USAID, its implementing partners, and other donors serve, facilitated these policy changes. The targeted population consisted of groups at high risk of contracting COVID-19 and experiencing hospitalization and death from the disease, such as healthcare workers, social workers, and individuals with underlying medical conditions that put them at increased risk of severe disease from COVID-19, and those 60 years of age and older. According to Our World in Data, Malawi's fully vaccinated rate as a percentage of the country's total population rose from just under 5 percent in March 2022 to about 15 percent in the fall of that year and to just over 20 percent in July 2023.

shift priorities and redirect resources. They also noted that political leadership is an important factor, as it can lend credibility to vaccination drives by marshaling resources to support them, or undermine them by helping to spread misinformation.

USAID Faced Difficulties Measuring Its Contribution to Vaccination Progress

USAID faced difficulties measuring its direct contribution to vaccination progress. According to USAID, as of September 30, 2021, at least 7.7 million people had received a first recommended dose of an approved COVID-19 vaccine and at least 2.9 million had received a last recommended dose[22] with USAID direct support (those injections that would not have occurred without USAID).[23] By December 31, 2022, the number of people receiving these two types of doses with the agency's direct support rose to at least 158 million and 167 million respectively.[24] USAID faced several difficulties measuring its contribution, some of which

[22]The initial COVID-19 vaccine protocol requires two doses for most vaccines and does not include booster doses. USAID implementing partners report to USAID on the number of people who received a first recommended dose and the number of people who received a last recommended dose with USAID direct support. According to USAID, its implementing partners use a variety of systems to record vaccinations at different sites, and many countries have deployed vaccination cards similar to those used in the United States. USAID officials noted, however, that these cards may not be consistently used, retained, or tracked.

[23]USAID's *COVID-19 Saving Lives Now & Global Vaccine Access Initiative Indicators: a Compendium of Indicator Reference Sheets for COVID-19 Reporting by USG Projects*, updated in February 2023, defines "USAID direct support" as operational support to vaccine delivery sites, provided in part or in full by a U.S. government-funded implementing partner, to strengthen service delivery approaches required to reach target populations equitably and rapidly. The *Compendium* states that without U.S. government support, the site would not be able to operate. It further states that this support may include but is not limited to the establishment and operation of alternative vaccination sites; provision of items such as syringes, personal protective equipment, and masks; rental costs; and monetary or non-monetary support for personnel. It does not include indirect support for vaccine service delivery, such as guidance and technical assistance, planning, training, and supervision.

[24]According to USAID, the number of last doses reported exceeded the number of first doses reported because individuals may have received their last dose at a USAID-supported site, where doses administered were captured in USAID implementing partner reporting. However, these individuals may have received their first dose in a government-run or other setting not directly supported by USAID, where doses administered were not included in implementing partner reporting. In addition, a number of implementing partners reported the single-dose Johnson & Johnson vaccine as a last dose only, contributing to the higher number of recorded last doses.

it had anticipated before it began providing support. The anticipated issues included:

- **The unprecedented nature of COVID-19.** USAID had to establish a new set of indicators for its COVID-19 support that could provide detail but also evolve over time, according to USAID officials.
- **Attribution.** According to USAID's Annual Evaluation Plan for Fiscal Year 2022, it would be difficult for USAID to precisely quantify or attribute the impact of its support because of the complexity of the pandemic and the international response, as well as challenges to establishing valid baseline information. For example, USAID officials in Malawi noted that the pandemic created an emergency situation in which it was difficult for donors and others engaged in CRD activities to measure the progress of vaccination campaigns because they were focused on vaccinating people as quickly as possible, rather than distinguishing implementer efforts, ascertaining baselines, and setting targets.

According to USAID, the agency also faced other difficulties measuring vaccination progress once it began providing CRD support. These issues included:

- **Incomplete vaccination information.** Implementing partners were unable to determine, with full accuracy, the number of individuals who received all recommended doses of an approved COVID-19 vaccine with USAID direct support, according to USAID officials. The officials said that with few exceptions, USAID implementing partners did not have the information needed to determine if the people they supported in receiving a last dose also received a first dose with USAID direct support. For example, implementing partners generally do not collect the personally identifiable information used to track the people that they helped the country's government vaccinate because doing so is expensive and therefore not sustainable.
- **Voluntary reporting.** One of the reasons USAID was unable to determine how many people received vaccine doses with its direct support was because it made COVID-19 vaccination reporting by implementing partners voluntary. This approach meant that reporting

was therefore limited.[25] USAID opted to keep reporting voluntary because of the high estimated cost and technical difficulties of producing mandatory, high-frequency reporting and a determination that doing so would have yielded marginal results.[26] However, according to USAID, reporting rates were low. To address the gap in data, USAID transitioned to mandatory reporting in April 2023 for a subset of large awards in Global VAX surge countries and seven additional countries. The seven countries—Ethiopia, Haiti, Liberia, Madagascar, Malawi, Mozambique, and the Philippines—received the highest estimated CRD obligations of non-Global VAX surge countries in fiscal year 2022.

- **Multiple entities supporting CRD efforts.** USAID was unable to isolate its contribution to a country's vaccination rate and to measure its progress independent of other actors because it is one of many entities involved in CRD activities. These entities included the host government, other bilateral donors, and multilateral, private-sector, and nongovernmental organizations.
- **Difficulties determining vaccination results from indirect support.** According to USAID, the agency cannot link certain CRD activities to specific vaccination results. For example, USAID reported progress for CRD activities that might indirectly contribute to people getting vaccinated, such as those designed to generate demand for vaccination or to provide training in COVID-19 vaccine-related topics.[27] However, agency officials said they were unable to measure

[25]According to USAID, the agency's vaccination progress data "significantly undercount" the number of people who received first or last doses with USAID direct support because reporting by implementing partners is voluntary. In addition, doses administered by public international organizations, such as UNICEF, are not generally included in the totals—even when they are acting as a USAID implementing partner—because public international organizations are not required to report this information, according to agency officials.

[26]USAID's Automated Directives System 201.3.5.1 allows for exceptions to otherwise applicable monitoring requirements. USAID documented the voluntary reporting decision in an October 25, 2021, Action Memo approved by the Executive Director of the agency's COVID Task Force. USAID officials said that, according to an agency assessment, the largest implementing partners with the greatest volume of programming typically submit progress reports on CRD indicators.

[27]According to USAID, the number of people reached through USAID-supported mass media and social media with COVID-19 vaccine-related messaging increased from 37 million in September 2021 to almost 178 million in November 2021. Similarly, the number of people trained in COVID-19 vaccine-related topics with USAID support increased from about 33,000 healthcare workers and other staff in October 2021 to more than 127,000 in November 2021.

how many people actually received vaccinations as a result of these activities. For instance, it was not possible for USAID to determine how many people were motivated to get vaccinated by USAID-supported radio messages. The officials also said USAID faced difficulties quantifying how its technical assistance for policy and training contributed to an increase in vaccination.

USAID Shifted Its Priorities in Response to CRD Challenges, and Plans to Disseminate Its Lessons Learned

USAID Faced CRD Challenges Related to Countries' Vaccine Demand, Supply, and Other Issues

According to multiple stakeholders,[28] USAID, together with other U.S. government partners, host governments, multilateral organizations, and other donors, faced a variety of challenges in providing COVID-19 vaccine CRD assistance. These challenges varied by country and evolved over time. For example, initially, supply issues were the largest challenge. However, by mid-2022, U.S. agency officials in assisted countries reported that demand issues had overtaken supply issues as the greatest challenge to CRD efforts. A July 2022 survey of U.S. overseas staff found that the most frequently cited challenge was a decrease in vaccine demand caused by vaccine hesitancy and a perceived low risk of COVID-19 transmission. An earlier survey in January 2022 had found that supply chain logistics such as cold chain storage were the most frequently cited challenges, which hindered delivery to vaccination sites. Ultra-cold chain storage (for the Pfizer vaccine, which must be kept at a very low temperature) in some countries was limited at the national level and in others at the local level. Even when such storage was available, challenges existed with staff expertise and reliable electricity or backup power.

The various types of challenges USAID and other entities faced included the following:

[28]These included USAID, CDC, and State officials; USAID implementing partners; host government officials; and other bilateral donors in the three countries we selected, as well as headquarters-based USAID, CDC, WHO, and UNICEF officials.

- **Demand challenges** hampered the demand and community engagement area of CRD technical assistance. These challenges included:
  - misinformation and disinformation
  - mistrust of government efforts
  - “COVID fatigue” (vaccine hesitancy and apathy because of a perceived low risk of infection or severe disease and the lifting of COVID-19 prevention policies by some governments)
  - refusal of some healthcare workers to be vaccinated
  - initial exclusion from vaccination planning of trusted local, religious, and traditional leaders in certain communities
  - confusion over evolving vaccine protocols and changing COVID-19 messages
  - dissemination of outdated information
  - lack of information in local languages
  - travel costs and lost income associated with getting to vaccination sites

Meeting Supply Challenges in Malawi by Storing COVID-19 Vaccines at Required Temperatures

The National Vaccine Storage Facility in Malawi contains ultra-cold chain equipment needed to store COVID-19 vaccines at required temperatures. Such equipment was provided with assistance from the U.S. Agency for International Development (USAID).

Source: USAID. | GAO-23-105579

- **Supply challenges** constrained the human resources for health, service delivery, and cold chain and supply chain logistics areas of CRD technical assistance. These challenges included shortages of trained healthcare workers, expiration of vaccine doses, difficulties storing vaccines at required temperatures because of unreliable power grids, and limited tracking of vaccine doses as they moved through the

supply chain, according to stakeholders we interviewed in the three selected countries and documents we reviewed. In addition, we found that in Malawi healthcare workers were stretched thin due to competing outbreaks of cholera and polio.

- **Other challenges** affected the policy planning and coordination and the evaluation and health information systems areas of CRD technical assistance. These challenges included host country laws and regulations, data backlogs, and weak information management systems, according to multiple stakeholders. In Guatemala, for example, USAID and implementing partner officials said laws and regulations made it difficult for the government to obtain WHO-approved vaccines in a timely manner, lowering trust in the government's provision of vaccine doses that were not approved by WHO. By the time some vaccines were received, they were near expiration, which further lowered public trust and demand. In addition, multiple stakeholders in Guatemala stated that, in some cases, laws holding vaccine suppliers—from national procurement officials to local healthcare workers—liable for expired doses reduced the willingness of these suppliers to obtain new doses, thereby decreasing the supply of doses at both the national and local levels.

USAID Shifted Its Priorities and Adjusted Its Approaches in Response to CRD Challenges

In late 2022, as vaccine demand diminished and worldwide vaccination rates began to plateau, USAID shifted its global COVID-19 CRD priorities in line with WHO guidelines.[29] These priorities included vaccinating vulnerable populations and incorporating COVID-19 vaccination activities into countries' primary healthcare systems, on the way to reaching the global 70 percent vaccination goal. To support this shift in priorities, USAID adjusted its approach to its areas of CRD technical assistance and modified indicators for some of them.

[29]WHO, *Global COVID-19 Vaccination Strategy in a Changing World: July 2022 Update*.

Vaccinating Vulnerable Populations by Administering COVID-19 Vaccine to an Elderly Man in Malawi

The U.S Agency for International Development (USAID) supported vaccination of elderly and other vulnerable populations.

Source: USAID implementing partner Right to Care. | GAO-23-105579

Consistent with WHO guidelines, USAID is working with assisted countries to incorporate the new COVID-19 priorities of vaccinating vulnerable populations and integrating CRD activities into countries' healthcare systems.[30] USAID is prioritizing vaccination of healthcare workers, older adults, and other groups most at risk for severe disease from COVID-19, in part to mitigate demand challenges related to low perceived risk of infection or severe disease among the general population. It has also begun incorporating COVID-19 vaccinations into routine immunization and primary healthcare systems to mitigate service delivery challenges, such as healthcare worker shortages. As the pandemic has drawn personnel and other resources away from countries' immunization and healthcare systems, USAID is seeking to make those systems more efficient and sustainable over the long term, as discussed below. Officials have stated that these efforts will benefit both the current COVID-19 response and future pandemic responses.[31]

[30]See WHO, *Global COVID-19 Vaccination Strategy in a Changing World: July 2022 Update*, and USAID, *Technical Priorities Update for USAID's COVID-19 Response*, Last Updated November 30, 2022.

[31]UNICEF officials stated that a significant number of countries are now redirecting efforts away from the pandemic response toward addressing systemic issues, such as reversing the rollback of routine immunization coverage, which was significantly affected by the impact of the pandemic on healthcare systems.

USAID adjusted its approach to CRD assistance as a result. In November 2022, to reflect updates to the Framework in response to the pandemic's changing nature and evolving global needs, USAID identified four technical approaches that focus on increasing vaccination coverage among vulnerable populations and integrating vaccination activities into countries' primary healthcare systems.[32] According to USAID, these approaches are meant to prioritize remaining resources to help countries achieve their vaccination goals and do not eliminate or replace any of the eight priority areas of technical assistance. The four approaches are as follows:

Generating Demand for COVID-19 Vaccination in Johannesburg, South Africa

The U.S. Agency for International Development (USAID) supported events in urban and rural communities to promote demand for COVID-19 vaccination.

Source: USAID. | GAO-23-105579

- **Advocacy** to counter low risk perception from COVID-19 among host government officials, encourage sustained support for COVID-19 vaccination, support updating national vaccine policies to include all vulnerable groups, and prioritize the vaccination of these groups.
- **Demand generation, risk communication, and community engagement** to address challenges like disinformation and perceived low risk of infection or of severe disease. For example, generating demand is critical to reaching vulnerable elderly and other populations now being prioritized for vaccination, according to USAID officials. USAID documented that it can be more difficult to reach these groups, who may require more tailored messaging because they might live in isolated rural areas and be less able to access fixed vaccination sites, and less able or inclined to use social media.

[32]USAID, *Technical Priorities Update for USAID's COVID-19 Response*, Last Updated November 30, 2022.

Addressing Difficulties with Fixed Vaccination Sites Faced by Both Men and Women by Using a Mobile Clinic in Malawi

The U.S. Agency for International Development (USAID) supported mobile clinics that use vans to bring vaccines to isolated communities.

Source: USAID implementing partner Right to Care. | GAO-23-105579

- **Ensuring the integration of gender equity into COVID-19 vaccination activities** to address challenges like gender-specific misinformation campaigns and difficulties accessing vaccination sites. For example, USAID reported that targeted misinformation campaigns, such as false claims about COVID-19 causing infertility or sterility, have contributed to vaccine hesitancy, and gender-specific issues have added to difficulties for both men and women using fixed vaccination sites.[33]
- **Strengthening data access, management, and utilization** to address challenges like identifying and reaching priority populations, integrating COVID-19 vaccination data into countries' existing health information systems, and eliminating data backlogs.[34]

In addition, USAID modified indicators for some CRD areas of technical assistance and did not create indicators for others. USAID officials said the agency did not create indicators to collect information for three areas of technical assistance: policy, planning and coordination; communications and advocacy; and evaluation and health information systems. The officials said USAID made this decision because indicators for these areas would provide no useful data and increase the reporting

[33]Specifically, USAID reported that women often work in the informal market, or are the primary caretakers of their families, which makes it hard for them to take time off for travel to fixed sites. Similarly, USAID reported that in some countries men work extended or odd hours, which makes it difficult for them to get to fixed sites during the hours of operation.

[34]According to UNICEF, there is limited population and coverage data for priority groups, which makes it difficult to locate and track vaccination progress for elderly and other vulnerable individuals. UNICEF also flagged countries' weak health information systems and their struggle to manage large data backlogs that accumulated during the pandemic.

burden on implementing partners. Officials stated that they have modified indicators since their introduction in fiscal year 2021 to align with changes in the pandemic and the COVID-19 response, such as the introduction of booster doses, or simply to improve indicator quality. These changes have included, among others, adding an indicator to capture the number of people who have received a booster dose with USAID direct support, and revising an indicator that tracked the number of vaccine sites established with USAID support to one that tracked sites operating with ongoing USAID support.

USAID Has Taken Some Actions to Identify Lessons Learned and Plans to Disseminate Them

USAID has developed plans to learn from its CRD challenges, including plans to document and disseminate some lessons learned. USAID guidance states that lessons learned should be incorporated at several stages of agency project activities, including strategy development, implementation, and close-out.[35] The guidance also requires these lessons and related information be posted to the Development Experience Clearinghouse (DEC), an agency repository of development assistance information.[36] USAID maintains this clearinghouse as its primary institutional resource to provide staff and development partners with accurate, comprehensive, and timely information to support strategic planning.

Given this agency guidance, we asked USAID for information about lessons learned. In response, USAID officials outlined several underway or completed efforts to learn from its provision of CRD assistance and to answer the following questions:

- What factors have affected widespread access to safe and effective COVID-19 vaccinations?
- How has USAID contributed to equitable vaccine distribution and delivery?

[35]See *USAID Automated Directives System* 201.3.2.9; 201.3.2.18.B; and 201.3.4.12.

[36]*USAID Automated Directives System* 540.3.2.3.b. This information includes, for example, reports that describe progress and accomplishments or document significant evaluation findings, lessons learned, development results, performance measures, or evaluative information and observations. See https://dec.usaid.gov/dec/home/Default.aspx.

- What approaches have been successful in combating disinformation and misinformation and in promoting vaccine uptake within and across diverse population segments?

USAID officials said in May 2023 that they plan to deliver the results of these efforts in reports, slide decks, data sets, a blog post, and a draft paper for submission to a peer-reviewed publication, among others. USAID officials also stated that the agency plans to make the results of these efforts available on the DEC once they are completed.[37]

Given the challenges U.S. agencies and others have identified in implementing CRD assistance, USAID's plans to use the DEC to disseminate lessons learned are an important step in making this information readily available in a centralized, designated place where agency staff and other stakeholders know how to access it. For example, UNICEF officials said they would welcome the opportunity to review key lessons learned with USAID to identify recommendations that can help improve routine immunization, primary healthcare measurement indicators, and public health emergency preparedness and response. Using the DEC as planned to disseminate lessons learned will help USAID's headquarters staff, mission management, and global partners ensure they are better able to apply these lessons when responding to a future global health emergency.

Agency Comments

We provided a draft of this product to USAID, CDC, and State for review and comment. We received written comments from USAID (reproduced in appendix III) in which the agency highlighted its efforts to help countries vaccinate vulnerable groups and countries' eligible populations. In addition, we received technical comments from USAID and CDC, which we incorporated as appropriate. State did not submit any comments.

In its comments, USAID stated that it and other U.S. government partners initially aligned vaccination targets with WHO's goal to vaccinate 70 percent of the total population in each country. USAID added that as the virus and pandemic evolved, WHO released an updated global COVID-19

[37]USAID has posted one completed, publicly available study to the DEC—a report that assessed the efficacy of different interventions used to encourage vaccinations in South Africa. We verified that this report is on the DEC. We found the report by typing into the DEC's search bar the exact title that USAID provided. Since stakeholders may be aware of the report but may not recall the exact title, we also used keywords like "South Africa" and "COVID-19" to try to locate it but were unable to do so.

vaccination strategy that reduced focus on the 70 percent target and prioritized vaccinating healthcare workers and high-risk populations. We note in our report USAID's efforts to vaccinate these populations, but also that USAID reinforced the 70 percent goal in its November 2022 *Technical Priorities Update*. We therefore compared country vaccination rates to the 70 percent goal.

USAID also provided new information regarding vaccination rates for healthcare workers, older adults, and eligible populations in the 11 Global VAX surge countries. We did not use USAID's information for two reasons. First, these rates relied on information provided by USAID country teams, which was not independently verifiable by GAO. Second, as we note in appendix I, age cutoffs for vaccinating eligible populations may vary by country and over time as COVID-19 vaccine protocols change, making it difficult to arrive at comparable vaccination rates for eligible populations across countries. We therefore used the total population data compiled by Our World in Data, which allowed us to calculate comparable vaccination rates across countries.

In addition, USAID described the impact of its support for countries' vaccination targets. We note, however, that agency officials said it is not possible to isolate, attribute, or measure USAID's direct contribution to countries' COVID-19 vaccination progress for a variety of reasons, including that the agency is one of multiple entities involved in these efforts.

We are sending copies of this report to the appropriate congressional committees, the USAID Administrator, the Secretary of Health and Human Services, the Acting Director of CDC, the Secretary of State, and other interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-4409 or LoveGrayerL@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

Latesha Love-Grayer
Director, International Affairs and Trade

List of Addressees

The Honorable Patty Murray
Chair
The Honorable Susan Collins
Vice Chair
Committee on Appropriations
United States Senate
The Honorable Ron Wyden
Chairman
The Honorable Mike Crapo
Ranking Member
Committee on Finance
United States Senate
The Honorable Bernard Sanders
Chair
The Honorable Bill Cassidy
Ranking Member
Committee on Health, Education, Labor, and Pensions
United States Senate
The Honorable Gary C. Peters
Chairman
The Honorable Rand Paul, M.D.
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Committee on Homeland Security and Governmental Affairs
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The Honorable Kay Granger
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House of Representatives
The Honorable Cathy McMorris Rodgers
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The Honorable Frank Pallone, Jr.
Ranking Member
Committee on Energy and Commerce
House of Representatives
The Honorable Michael McCaul
Chairman
Committee on Foreign Affairs
House of Representatives
The Honorable Mark E. Green, M.D.
Chairman

The Honorable Bennie G. Thompson
Ranking Member
Committee on Homeland Security
House of Representatives
The Honorable James Comer
Chairman
The Honorable Jamie Raskin
Ranking Member
Committee on Oversight and Accountability
House of Representatives
The Honorable Jason Smith
Chairman
The Honorable Richard Neal
Ranking Member
Committee on Ways and Means
House of Representatives

The Honorable Robert Menendez
United States Senate

Appendix I: Objectives, Scope, and Methodology

The CARES Act includes a provision for GAO to report on ongoing monitoring and oversight efforts related to the receipt, disbursement, and use of funds made available to prepare for, respond to, and recover from the COVID-19 pandemic.[1] This report examines the (1) assistance the U.S. Agency for International Development (USAID) has provided to support COVID-19 vaccine country readiness and delivery (CRD) abroad; (2) progress USAID has made in its efforts to support COVID-19 vaccine CRD abroad; and (3) any challenges USAID has faced in its efforts to support COVID-19 vaccine CRD abroad and how it has addressed them.[2]

To respond to these three objectives, we reviewed relevant federal laws and regulations, and planning, funding, and guidance documents from USAID, the Department of Health and Human Services' Centers for Disease Control and Prevention (CDC), and the Department of State. We also conducted interviews with officials from USAID, CDC, State, and other U.S. government officials in Washington, D.C., to examine the extent of their global COVID-19 CRD efforts. In addition, we interviewed multiple stakeholders in three countries USAID supports with COVID-19 CRD assistance. These stakeholders included USAID, CDC, State, and other U.S. government officials, and officials from USAID implementing partners, beneficiaries, host governments, multilateral organizations, and other bilateral and private-sector donors. We also reviewed written responses to our questions from World Health Organization (WHO) officials in Geneva and United Nations International Children's Emergency Fund (UNICEF) officials in New York.

For all three objectives, we selected for in-depth analysis a non-generalizable sample of three case study countries that had received

[1]Pub. L. No. 116-136 § 19010(b), 134 Stat. 281, 580 (2020). The American Rescue Plan Act of 2021 also includes a provision for GAO to conduct oversight of the COVID-19 response. Pub. L. No. 117-2, § 4002, 135 Stat. 4, 78. All of GAO's reports related to the COVID-19 pandemic are available on GAO's website at https://www.gao.gov/coronavirus.

[2]USAID defines CRD as the support needed to ensure that the infrastructure is in place and the technical assistance is available to make certain COVID-19 vaccines can be safely delivered to all those who need them. According to USAID guidance, this assistance involves financial support, training, and technical assistance provided by USAID-funded implementing partners.

CRD assistance: Guatemala, Malawi, and South Africa. In selecting these countries, we primarily considered the following factors: (1) those with greater amounts of estimated CRD funds obligated by USAID through the first half of fiscal year 2022; (2) those with lower COVID-19 fully vaccinated rates, based on publicly available data sources;[3] (3) countries that represented regional diversity; (4) demographic features, such as population and socio-economic status; (5) severity of the COVID-19 pandemic in each country, as expressed through total cases and deaths per population; and (6) countries recommended as case studies by USAID, CDC, and State officials, as well as other stakeholders with relevant expertise. We determined, based on these considerations, that the three countries we selected were reasonable for the purposes of our reporting objectives. Following our country selection, we conducted audit work for all three objectives in Washington, D.C., and virtually, through video-conferencing, in Guatemala, Malawi, and South Africa.

To identify the types of assistance provided for COVID-19 vaccine CRD abroad, we obtained data on all USAID CRD assistance funded from appropriations to prevent, prepare for, and respond to COVID-19 and other appropriations obligated to address COVID-19 as of March 2023. We obtained and analyzed additional CRD funding data from CDC and State officials. We worked with the agencies to identify their estimated CRD-related obligations. To describe the types of CRD assistance USAID provided, we examined USAID policy and guidance documents, and agency presentations on global COVID-19 vaccination progress. We also interviewed agency officials to clarify information about this assistance.

To assess the reliability of USAID, CDC, and State funding data, we reviewed agency responses to our questions about data reliability, noting the specific labeling required for COVID-19 vaccination funding. We also reviewed related documentation and performed data reliability checks (such as examining the data for missing values and checking values against other documentation). We interviewed relevant agency officials with knowledge of global CRD assistance from each agency's appropriations, obligations, and types of assistance supported by the obligations. We also interviewed these officials to corroborate our

[3]We chose countries that received larger amounts of estimated CRD funds. To ensure we chose countries that were experiencing vaccination challenges, we eliminated countries with more than a 50 percent vaccination rate. USAID officials, citing WHO guidance, defined "fully vaccinated" as a complete primary series, which may be one or two doses depending on the vaccine manufacturer. While WHO updated its guidance in July 2022 to recommend booster doses in addition to the primary vaccine series, we are using the term "fully vaccinated" to mean the primary series only, in part because the protocol for booster doses continues to evolve.

interpretation of the data. From these steps, we determined that the data were sufficiently reliable for the purposes of this reporting objective.

To describe the progress USAID made in meeting its global COVID-19 vaccination goals, and to identify factors that affected the measurement of this progress, we reviewed relevant USAID policies, procedures, reports, and guidance documents. We also interviewed USAID officials in Washington, D.C., and our three case study countries, as well as other stakeholders in these countries. Through the documentation and interviews, we were able to identify (1) USAID's global vaccination goals; (2) how USAID defines "fully vaccinated"; (3) the indicators it uses to assess progress for the types of CRD assistance it provides and difficulties measuring progress against them; (4) how it defines "directly supported by USAID"; and (5) factors affecting the measurement of USAID's progress.

To determine the overall COVID-19 vaccination progress in USAID-supported countries—reflecting the efforts of USAID, host governments, and other donors and entities—we obtained and analyzed publicly available data. First, we obtained and analyzed COVID-19 vaccination and other data from WHO's COVID-19 Dashboard. The Dashboard provides information about cumulative total vaccines administered and vaccine mix by country.[4] Second, we obtained and analyzed COVID-19 vaccination data from the Our World in Data COVID-19 vaccination dataset.[5] We ultimately decided to use the Our World in Data dataset because it is a more comprehensive source, drawing on data from WHO, United Nations World Population Prospects, direct reports from country governments, and other sources.

We reviewed the reliability of both the WHO Coronavirus Dashboard and the Our World in Data dataset and determined that both are sufficiently reliable for the purposes of this reporting objective. Specifically, we cross checked the relevant fields in both sources and found no discrepancies. We also conducted manual and electronic testing to identify logical errors such as outliers and higher vaccination rates followed by lower rates—since the percentage of people vaccinated cannot decrease but only

[4]WHO pools data from numerous sources, including direct reports from member states and other publicly available official data collated by third-party sites.

[5]Our World in Data is an open access and open source non-profit organization that vets the source data for accuracy and consistency. It provides data on multiple variables, including people fully vaccinated (total and per capita data for people who received all doses prescribed by the initial vaccination protocol), COVID-19 cases, confirmed deaths, and numerous other COVID-19-related and broader socio-economic variables.

increase or stay the same over time—and found none. Using the Our World in Data website, we reviewed detailed information regarding sources, vetting, accuracy, completeness, consistency, and limitations. We also reviewed USAID documents that use Our World in Data as a source for country COVID-19 vaccination rates,[6] as well as scientific studies on COVID-19 vaccination that use Our World in Data.

We used data showing fully vaccinated rates per capita from Our World in Data for each country that received USAID CRD assistance[7] to (1) determine the number of countries falling within certain vaccination rate ranges, (2) arrive at average vaccination rates for these countries by region, and (3) produce vaccination trend lines for 11 countries identified by USAID as Global VAX surge countries.[8] Finally, we interviewed USAID officials to corroborate our interpretation of the data presented from this source.

To identify any challenges USAID has faced in its efforts to support COVID-19 vaccine CRD abroad and how the agency addressed them, we reviewed policy and guidance documentation from USAID and WHO. We also reviewed other documentation from USAID and its implementing partners, surveys of U.S. overseas staff compiled jointly by State, USAID, and CDC,[9] and written responses to our questions from WHO and UNICEF. In addition, we interviewed USAID officials in Washington, D.C., and in our three case study countries, as well as CDC and State officials, USAID implementing partners, host government officials, other bilateral donor officials, representatives from private sector donors and local organizations, and other stakeholders in these countries. We derived the

[6]These rates reflect the COVID-19 vaccination efforts of all entities in a given country, including the host government, USAID, other donors, and other entities.

[7]Our World in Data has vaccination data for 123 of the 125 USAID-assisted countries. There are no data for the Marshall Islands or Micronesia.

[8]Countries have been vaccinating their populations over a certain age, according to COVID-19 vaccine protocols and their own guidelines. However, age cutoffs for eligible populations may vary by country and over time as protocols change. Our World in Data's total population data, drawn from United Nations World Population Prospects, and its country vaccination data, drawn from host governments, WHO, and other sources, allowed us to arrive at comparable vaccination rates across countries.

[9]We reviewed the results of two surveys, one based on responses received as of January 24, 2022, and the other, based on responses received as of July 30, 2022. The earlier survey was administered to officials in 111 countries and officials in 80 countries responded. The later survey was administered to officials in 63 countries and officials in 51 countries responded.

information on foreign law in this report from interviews and not from our original analysis.

We reviewed these documents and interviews using content analysis to identify demand, supply, and other challenges, along with more specific challenges within each of these categories. To conduct the content analysis, two analysts independently identified examples of the challenges in the documents and interviews, and a third checked their findings.[10] In addition, we reviewed USAID's mitigation strategies, including its plans for monitoring, evaluating, and lessons learned. We compared USAID's efforts to its internal guidance, which states that lessons learned should be incorporated at several stages of agency project activities, including strategy development, implementation, and close-out,[11] and requires that these lessons and related information be posted to the Development Experience Clearinghouse, an agency repository of development assistance information.[12] We assessed USAID's efforts to systematically document and disseminate lessons learned against this guidance.

We conducted this performance audit from January 2022 to September 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[10]Specifically, we conducted a content analysis of our interviews with multiple stakeholders in our three fieldwork countries and written responses from headquarters officials at USAID, CDC, WHO, and UNICEF. We did so to identify challenges in implementing COVID-19 vaccination country readiness and delivery activities in the three countries (and worldwide, in the case of responses from headquarters officials). We iteratively identified patterns to develop a set of three broad challenges—demand, supply, and other challenges—and more specific challenges within each broad category. Two analysts coded the interviews and responses to group the challenges within each broad category and in more specific themes within each category. A third analyst independently reviewed and verified this organization of the challenges into these broad categories and subcategories.

[11]See *USAID Automated Directives System* 201.3.2.9; 201.3.2.18.B; and 201.3.4.12.

[12]*USAID Automated Directives System* 540.3.2.3.b. This information includes, for example, reports that describe progress and accomplishments or document significant evaluation findings, lessons learned, development results, performance measures, or evaluative information and observations.

Appendix II: Countries Receiving U.S. Agency for International Development COVID-19 Vaccine Country Readiness and Delivery Assistance

The U.S. Agency for International Development (USAID) provided COVID-19 vaccine country readiness and delivery (CRD) assistance to 125 countries in five regions.[1] Table 1 shows the countries receiving USAID's CRD assistance for COVID-19 by region.

Table 1: List of Countries Receiving USAID Assistance for COVID-19 Global Country Readiness and Delivery, by Region, 2023

USAID-assisted regions	Countries									
Africa (47)	Angola Benin Botswana Burkina Faso Burundi	Cameroon Cape Verde Central African Republic Chad Comoros	Cote d'Ivoire Democratic Republic of the Congo Djibouti Eswatini Ethiopia	Gabon Gambia Ghana Guinea Guinea-Bissau	Kenya Lesotho Liberia Madagascar Malawi	Mali Mauritania Mauritius Mozambique Namibia	Niger Nigeria Republic of the Congo Rwanda Sao Tome and Principe	Senegal Seychelles Sierra Leone Somalia South Africa	South Sudan Sudan Tanzania Togo Uganda	Zambia Zimbabwe
Asia (31)	Afghanistan Bangladesh Cambodia Federated States of Micronesia Fiji	India Indonesia Kazakhstan Kiribati Kyrgyzstan	Laos Malaysia Maldives Marshall Islands Mongolia	Myanmar Nauru Nepal Pakistan Papua New Guinea	Philippines Sri Lanka Solomon Islands Tajikistan Thailand	Timor-Leste Tonga Tuvalu Uzbekistan Vanuatu	Vietnam			

[1]USAID defines CRD as the support needed to ensure that the infrastructure is in place and the technical assistance is available to make sure COVID-19 vaccines can be safely delivered to all those who need them. According to USAID guidance, this assistance involves financial support, training, and technical assistance provided by USAID-funded implementing partners.

Appendix II: Countries Receiving U.S. Agency for International Development COVID-19 Vaccine Country Readiness and Delivery Assistance

USAID-assisted regions	Countries				
Latin America and the Caribbean (25)	Antigua and Barbuda	Colombia	El Salvador	Honduras	Saint Kitts and Nevis
	Bahamas	Costa Rica	Grenada	Jamaica	Saint Lucia
	Barbados	Dominica	Guatemala	Nicaragua	Saint Vincent and the Grenadines
	Bolivia	Dominican Republic	Guyana	Paraguay	Suriname
	Brazil	Ecuador	Haiti	Peru	Trinidad and Tobago
Europe and Eurasia (12)	Albania	Kosovo	Serbia		
	Armenia	Moldova	Ukraine		
	Bosnia and Herzegovina	Montenegro			
	Bulgaria	North Macedonia			
	Georgia	Romania			
Middle-East and North Africa (10)	Algeria	Libya			
	Egypt	Morocco			
	Iraq	Syria			
	Jordan	West Bank and Gaza[a]			
	Lebanon	Yemen			

Source: GAO analysis of US Agency for International Development (USAID) information. | GAO-23-105579

[a]The West Bank and Gaza are territories not recognized by the U.S. as independent states.

Appendix III: Comments from the U.S. Agency for International Development

Latesha Love-Grayer
Director
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20226

Re: COVID-19: USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination Goal (GAO- 23-105579)

Dear Ms. Love-Grayer:

I am pleased to provide the formal response of the U.S. Agency for International Development (USAID) to the draft report produced by the U.S. Government Accountability Office (GAO) titled, COVID-19: USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination (GAO-23-105579).

While the report contains no recommendations for USAID, the Agency remains committed to continuing to work with its multilateral and bilateral partners to ensure that the investments in and lessons learned from global COVID-19 vaccine delivery efforts lay the foundation for stronger and more resilient health systems that can meet the routine health needs of people at every stage of life and can adapt quickly to the demands of future global health emergencies.

I am transmitting this letter and the enclosed comments from USAID for inclusion in the GAO's final report. Thank you for the opportunity to respond to the draft report, and for the courtesies extended by your staff while conducting this engagement. We appreciate the opportunity to participate in the complete and thorough evaluation of our efforts to support COVID-19 vaccine country readiness and delivery efforts.

Sincerely,
Colleen R Allen
Colleen Allen
Assistant Administrator
Bureau for Management

Enclosure: a/s

1

COMMENTS BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT ON THE DRAFT REPORT PRODUCED BY THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE (GAO) TITLED, COVID-19: USAID PLANS TO SHARE LESSONS LEARNED FROM EFFORTS TO MEET GLOBAL VACCINATION GOAL (GAO-23-105579)

The U.S. Agency for International Development (USAID) would like to thank the U.S. Government Accountability Office (GAO) for the opportunity to respond to this draft report. We appreciate the extensive work of the GAO engagement team.

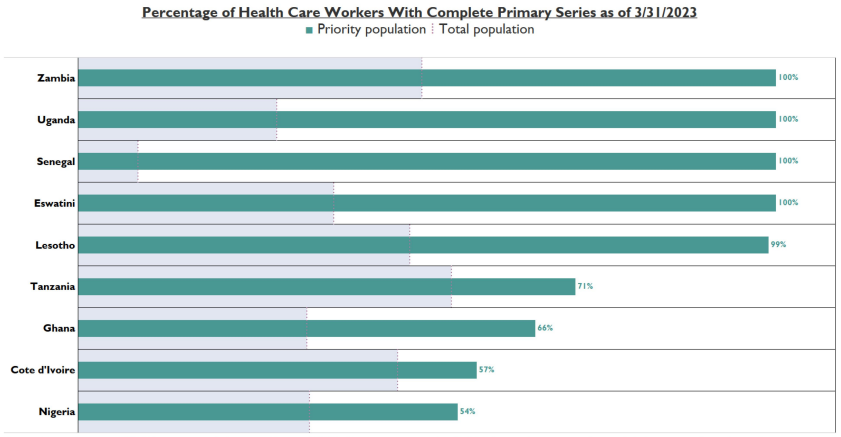
The United States has been a bold leader in the global fight against COVID-19. As global COVID-19 vaccine supply surged in 2021 following historic donations from the United States, USAID, working with partner U.S. government agencies, ramped up support and expanded its leadership by launching the Initiative for Global Vaccine Access, known as Global VAX. Driven by the primary objective to increase equitable COVID-19 vaccine uptake, through Global VAX, USAID leveraged decades of leadership and investment in global health and diplomatic partnerships to support partner countries to deliver lifesaving COVID-19 vaccines to millions of people. These efforts complemented the expansion of the global vaccine supply by focusing on ensuring that partner countries were ready to deliver and administer the donated vaccines. As of July 2023, USAID has helped vaccinate an average of 45 percent of the population across more than 120 countries.

USAID and USG interagency partners initially aligned Global VAX COVID-19 vaccination targets with the World Health Organization's goal to vaccinate 70 percent of the total population in each country. As the virus and pandemic continued to evolve, in 2022, WHO released an updated global COVID-19 vaccination strategy that reduced focus on the 70 percent target and instead prioritized vaccinating health care workers and the highest-risk populations with primary and booster doses, with the aim of reducing deaths and ensuring economies could function as transmission continued. This was particularly relevant in places like Africa where almost half of the population is under 18 years old and turned out to be at much lower risk of poor outcomes.

In line with this global shift, USAID supported countries to achieve their coverage goals for high-priority populations, including those most at risk for morbidity and mortality from COVID-19. By March 31, 2023, Global VAX surge countries had greatly accelerated vaccination coverage levels among health care workers, pregnant women, and older adults.

Figure 1 shows the percentage of health care workers who have completed the COVID-19 primary series as of the end of March 2023 in select Global VAX surge countries. Zambia, Uganda, Senegal, and Eswatini achieved 100 percent vaccination of their health care workers, with Lesotho at 99 percent, and Tanzania, Ghana, Côte d'Ivoire, and Nigeria all above 50 percent.

Figure 1

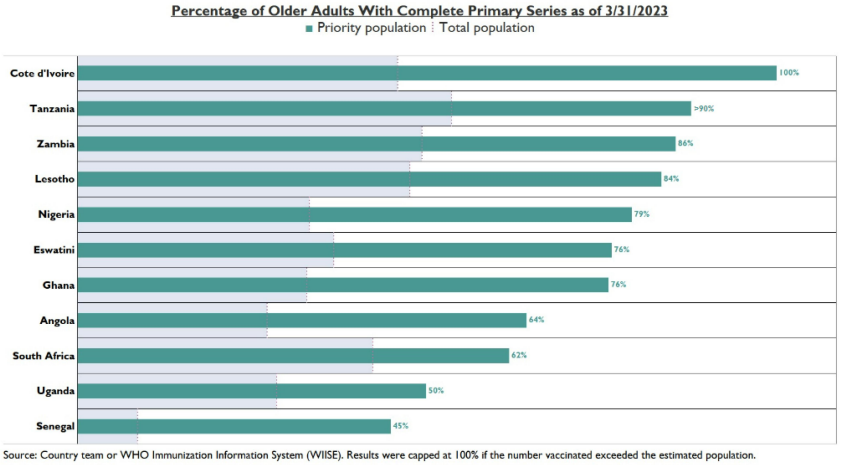


Source: Country team or WHO Immunization Information System (WIISE). Results were capped at 100% if the number vaccinated exceeded the estimated population. Recent coverage data was not available for Angola or South Africa.

Figure 2 shows the percentage of older adults who have completed the COVID-19 primary series as of the end of March 2023 in select Global VAX surge countries. USAID supported Cote d'Ivoire to achieve a 100 percent coverage rate in older adults, with Tanzania not far behind and Zambia, Lesotho, Nigeria, Eswatini, Ghana, Angola, South Africa, and Uganda all above 50 percent coverage with lifesaving protection for this vulnerable population.

Figure 2

3

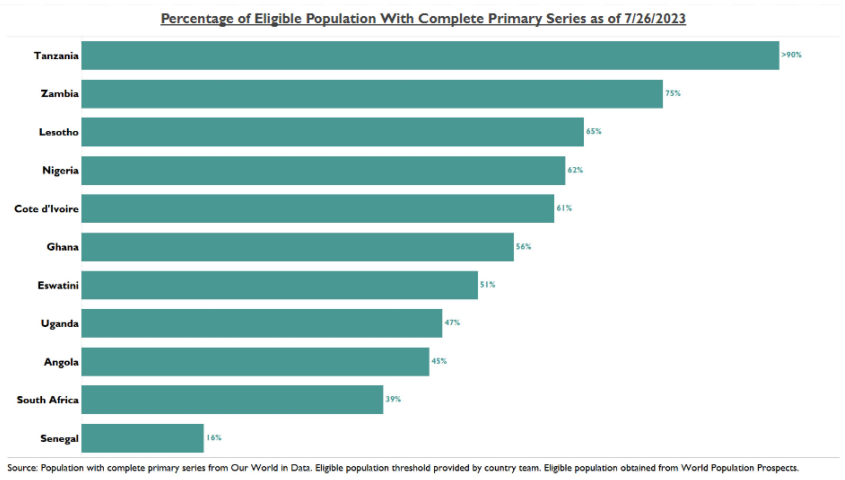


Impact of USAID Support for Country-Specific Targets

Each country USAID partnered with set its own policies for vaccine eligibility, informed by WHO guidance, with most focused on adults aged 18 and older, and, in some cases, adolescents. Relatively few countries extended vaccination eligibility to children under 12, even when that age cohort comprised a significant percentage of the overall population. Working with partner countries, USAID was able to help bring about significant increases in vaccination of eligible populations. Based on country-specific eligibility criteria (with the majority using the 18 and older age threshold), USAID's support for the acceleration of vaccination coverage rates in Global VAX surge countries is even more evident. **Figure 3** shows the percentage of eligible populations with complete primary series as of the end of July 2023.

4

Figure 3



With the shift away from the original 70 percent coverage goal among total populations, USAID supported countries to achieve context-specific targets for COVID-19 national vaccination programs, with particular focus on high priority populations at highest risk for morbidity and mortality associated with COVID-19. Below are examples from Global VAX surge countries receiving intensive USAID support that showcase acceleration of vaccination rates among eligible and high priority populations.

- In **Tanzania**, with support from USAID, rapid progress was made in expanding its vaccination coverage among the eligible population, now standing at over 90 percent fully vaccinated with the complete primary series. Vaccinations increased from an average of 106,000 weekly doses administered in January 2022 to more than one million weekly doses administered each week during July and August 2022. In just seven months, coverage increased from 15 percent in June 2022 to over 90 percent by December 2022 – far surpassing the country's goal to vaccinate 70 percent of the eligible population by the end of the year. Prioritizing those at highest risk for severe outcomes of COVID-19 infection, USAID also supported 100 percent COVID-19 vaccination coverage among eligible populations in the refugee camps of Nyarugusu and Nduta in Kigoma Region and 97 percent coverage of eligible populations in the 11 PEPFAR-supported regions of Tanzania, where HIV prevalence is the highest.

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- In **Zambia**, over 75 percent of their population aged 12 and older has now been vaccinated with the complete primary series (see **Figure 3**), up from 43 percent in July 2022. The Zambian Government started its COVID-19 vaccine rollout in April 2021, setting a national target of fully vaccinating 70 percent of the eligible population by the end of 2022. USAID's intensive support was critical in targeting high priority populations and in enabling the Ministry of Health to administer COVID-19 vaccines through HIV treatment clinics and other health service providers.
- In **Côte d'Ivoire**, with support from USAID, the country has continued to demonstrate its strong commitment to controlling COVID-19 nationally. The country originally set a vaccination target of 70 percent of the 28.5 million eligible population (people aged 18 and older) by the end of December 2022, and in March 2022, Côte d'Ivoire expanded COVID-19 vaccination eligibility to include adolescents and teenagers aged 12 to 17, subsequently increasing their national vaccination target for number of people fully vaccinated from 14,570,259 to 19,971,080. With intensive support from USAID, by the end of July 2022, 42 percent of the eligible population had been fully vaccinated, and as of June 30, 2023, over 61 percent of the eligible population had completed their primary series.
- In **Uganda**, with USAID support, from November 2021 to May 2023, vaccination coverage among the eligible population of those aged 18 and older receiving at least one dose of the COVID-19 vaccine rose from 20 percent to 82 percent.
- In **Ghana**, with intensive support from USAID, vaccination rates rapidly increased from 12.4 percent fully vaccinated in December 2021 to 59.5 percent fully vaccinated in August 2023 among the eligible population (18.2 million people aged 15 and older).
- In **Nigeria**, as of May 15, 2023, the government had administered 116 million COVID-19 vaccinations with about 69.7 million people fully vaccinated (37.1 percent of the eligible population) (Source: WHO data). U.S. government vaccine donations, logistics support, and other implementation support, were key in improving the country's availability of vaccines at the state level. As of now, August 2023, only three months later, the country has achieved 62 percent complete vaccination of the eligible population.

These examples highlight how USAID and our implementing partners worked closely with host country governments, other multilateral and donor partners, and local experts to prioritize the support and approaches that would best enhance country-led programs and work toward country goals for vaccinating those at highest risk of COVID-19. By partnering with governments in support of their individual COVID-19 vaccination targets and goals, USAID supported countries in strengthening local planning and leadership, helping to streamline coordination and to create effective programs that not only reached people with COVID-19 vaccines but would also bolster national health systems over the long term.

Global VAX Led to Acceleration of COVID-19 Vaccinations and Strengthening of Health Systems

USAID efforts through Global VAX contributed to an unprecedented acceleration in COVID-19 vaccine delivery, demand, and uptake globally. When Global VAX launched in December 2021, upper-middle-income countries had vaccinated 65 percent of their populations with a complete primary

series against COVID-19, while lower-middle-income countries (LMIC) had vaccinated just 27 percent and low-income countries (LIC) had reached only three percent of their populations with a complete primary series of a COVID-19 vaccine.

Since then, support from USAID and its partners to accelerate COVID-19 vaccine supply and delivery has helped to unlock extraordinary progress in both LICs and LMICs. As of June 1, 2023, COVID-19 vaccine complete primary series coverage exceeded 59 percent in LMICs and had increased by nearly 25 percentage points in LICs since the launch of Global VAX. In Africa specifically, COVID-19 vaccination rates have increased more than sixfold during this time, from 4.5 percent of the population having received a COVID-19 vaccine complete primary series to 30 percent in June 2023.

Moving forward, countries must be prepared to handle COVID-19 as a manageable respiratory illness. This means that the COVID-19 response needs to be integrated into primary health care (PHC). This transition offers a transformative opportunity to strengthen health system resiliency through thoughtful and coordinated integration of intensive COVID-19 immunization and programming into PHC and essential health services.

As part of this transition, USAID is increasingly focused on supporting countries in integrating COVID-19 vaccination efforts into health systems to enable the delivery of essential health services that can respond to a patient's changing needs across their lifespan. Many countries have limited experience vaccinating individuals across their lifespans and do not have systems in place to reach adolescents and adults with routine immunizations needed after childhood. Consistent with countries' own integration priorities, USAID's integration efforts will help countries to equitably reach vulnerable communities with COVID-19 vaccines while applying the lessons learned and strategic investments from the COVID-19 response to help strengthen PHC and health systems.

Text for Appendix III: Comments from the U.S. Agency for International Development

Latesha Love-Grayer
Director
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20226

Re: COVID-19: USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination Goal (GAO- 23-105579)

Dear Ms. Love-Grayer:

I am pleased to provide the formal response of the U.S. Agency for International Development (USAID) to the draft report produced by the U.S. Government Accountability Office (GAO) titled, COVID-19: USAID Plans to Share Lessons Learned from Efforts to Meet Global Vaccination (GAO-23-105579).

While the report contains no recommendations for USAID, the Agency remains committed to continuing to work with its multilateral and bilateral partners to ensure that the investments in and lessons learned from global COVID-19 vaccine delivery efforts lay the foundation for stronger and more resilient health systems that can meet the routine health needs of people at every stage of life and can adapt quickly to the demands of future global health emergencies.

I am transmitting this letter and the enclosed comments from USAID for inclusion in the GAO's final report. Thank you for the opportunity to respond to the draft report, and for the courtesies extended by your staff while conducting this engagement. We appreciate the opportunity to participate in the complete and thorough evaluation of our efforts to support COVID-19 vaccine country readiness and delivery efforts.

Sincerely,

Colleen Allen
Assistant Administrator
Bureau for Management

Enclosure: a/s

COMMENTS BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT ON THE DRAFT REPORT PRODUCED BY THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE (GAO) TITLED, COVID-19: USAID PLANS TO SHARE LESSONS LEARNED FROM EFFORTS TO MEET GLOBAL VACCINATION GOAL (GAO-23-105579)

The U.S. Agency for International Development (USAID) would like to thank the U.S. Government Accountability Office (GAO) for the opportunity to respond to this draft report. We appreciate the extensive work of the GAO engagement team.

The United States has been a bold leader in the global fight against COVID-19. As global COVID-19 vaccine supply surged in 2021 following historic donations from the United States, USAID, working with partner U.S. government agencies, ramped up support and expanded its leadership by launching the Initiative for Global Vaccine Access, known as Global VAX. Driven by the primary objective to increase equitable COVID-19 vaccine uptake, through Global VAX, USAID leveraged decades of leadership and investment in global health and diplomatic partnerships to support partner countries to deliver lifesaving COVID-19 vaccines to millions of people. These efforts complemented the expansion of the global vaccine supply by focusing on ensuring that partner countries were ready to deliver and administer the donated vaccines. As of July 2023, USAID has helped vaccinate an average of 45 percent of the population across more than 120 countries.

USAID and USG interagency partners initially aligned Global VAX COVID-19 vaccination targets with the World Health Organization’s goal to vaccinate 70 percent of the total population in each country. As the virus and pandemic continued to evolve, in 2022, WHO released an updated global COVID-19 vaccination strategy that reduced focus on the 70 percent target and instead prioritized vaccinating health care workers and the highest-risk populations with primary and booster doses, with the aim of reducing deaths and ensuring economies could function as transmission continued. This was particularly relevant in places like Africa where almost half of the population is under 18 years old and turned out to be at much lower risk of poor outcomes.

In line with this global shift, USAID supported countries to achieve their coverage goals for high-priority populations, including those most at risk for morbidity and mortality from COVID-19. By March 31, 2023, Global VAX surge countries had greatly accelerated vaccination coverage levels among health care workers, pregnant women, and older adults.

Figure 1 shows the percentage of health care workers who have completed the COVID-19 primary series as of the end of March 2023 in select Global VAX surge countries. Zambia, Uganda, Senegal, and Eswatini achieved 100 percent vaccination of their health care workers, with Lesotho at 99 percent, and Tanzania, Ghana, C?te d'Ivoire, and Nigeria all above 50 percent.

Figure 2 shows the percentage of older adults who have completed the COVID-19 primary series as of the end of March 2023 in select Global VAX surge countries. USAID supported Cote d'Ivoire to achieve a 100 percent coverage rate in older adults, with Tanzania not far behind and Zambia, Lesotho, Nigeria, Eswatini, Ghana, Angola, South Africa, and Uganda all above 50 percent coverage with lifesaving protection for this vulnerable population.

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With the shift away from the original 70 percent coverage goal among total populations, USAID supported countries to achieve context-specific targets for COVID-19 national vaccination programs, with particular focus on high priority populations at highest risk for morbidity and mortality associated with COVID-19. Below are examples from Global VAX surge countries receiving intensive USAID support that showcase acceleration of vaccination rates among eligible and high priority populations.

● In Tanzania, with support from USAID, rapid progress was made in expanding its vaccination coverage among the eligible population, now standing at over 90 percent fully vaccinated with the complete primary series. Vaccinations increased from an average of 106,000 weekly doses administered in January 2022 to more than one million weekly doses administered each week during July and August 2022. In just seven months, coverage increased from 15 percent in June 2022 to over 90 percent by December 2022 – far surpassing the country's goal to vaccinate 70 percent of the eligible population by the end of the year. Prioritizing those at highest risk for severe outcomes of COVID-19 infection, USAID also supported 100 percent COVID-19

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and strategic investments from the COVID-19 response to help strengthen PHC and health systems.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Latesha Love-Grayer at (202) 512-4409 or LoveGrayerL@gao.gov

Staff Acknowledgments

In addition to the contact named above, Joyee Dasgupta (Assistant Director), Carolina Morgan (Analyst in Charge), Eli Dile, Kay Halpern, Kathleen Monahan, Jason Bair, Gergana Danailova-Trainor, Mark Dowling, Justin Fisher, Christopher Keblitis, Danny Lee, Amanda Miller, and Aldo Salerno made key contributions to this report.

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