First real-world data from Africa on immune response to AZ/Oxford COVID-19 vaccine

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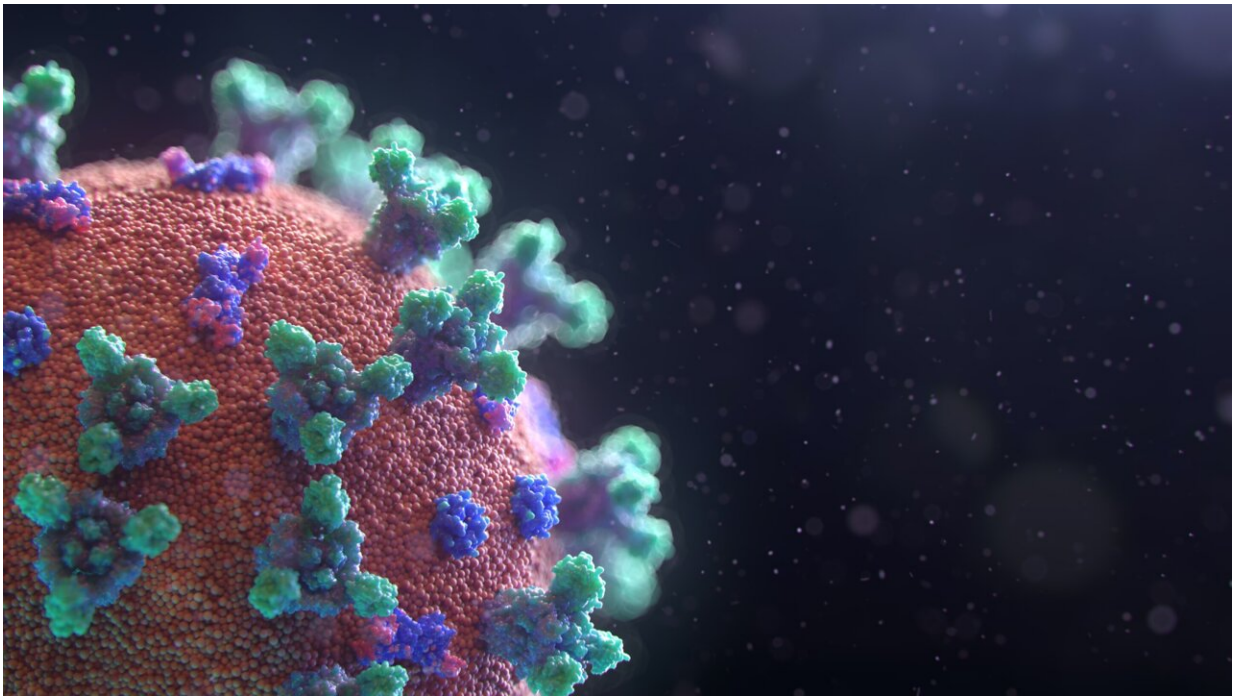

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Scientists have released the first real-world data from Africa on the effectiveness of two doses of AstraZeneca/ChaAd0x-1 COVID-19 vaccination, showing that while protective against SARS-CoV-2, immunity against the delta and omicron variants was lower, even in the context of prior infection or infection after vaccination.

In a pre-print—which has yet to be peer-reviewed—scientists from Nigeria and the U.K. analyzed data from 140 healthcare workers at the Nigerian Institute of Medical Research and Federal Medical Center, Ebute Metta, and two private hospitals in Lagos. All participants had received two doses of the AstraZeneca vaccine administered between Jan and July 2021, with 12 weeks between doses.

According to the World Health Organization, around two-thirds of people in Africa are thought to have been exposed to SARS-CoV-2, the virus that causes COVID-19, with more than 250,000 deaths. Yet, since the rollout of the AstraZeneca COVID-19 vaccine in mid-2021, there has been no real world data on its effectiveness.

Vaccine rollout across the African continent has been mixed, with less than one in six (16%) of the eligible population receiving both doses and only around one in 75 (1.3%) receiving a booster dose.

The team tested the participants, looking for evidence of antibodies specifically found in individuals who had previously been infected, rather than those raised by the vaccine. They initially found that 62 participants tested positive (44%).

In a subset of 49, they then tested serum samples taken from volunteers against pseudoviruses—synthetic viruses that mimic the behavior of SARS-CoV-2 and its variants, but which are safe to study in the laboratory—to see whether vaccinated individuals were able to neutralize the virus.

The team found that on average, one month after vaccination the delta and omicron variants required a 4.7-fold and 9.6-fold increase in the concentration of serum antibody in order to neutralize the virus, compared to the "wild type" virus (the original strain). This indicates likely poor protection from infection by the omicron variant, despite two

doses of vaccine and infection before or during the study.

To look for evidence of vaccine breakthrough—where the virus is able to infect vaccinated individuals—the team looked at those individuals who had shown no evidence of previous infection and found that 14% became newly-infected between one and three months post-vaccination. This occurred during the delta wave, and participants showed excellent immunity against delta but persistently suboptimal immunity to omicron.

Dr. Adam Abdullahi, a Cambridge-Africa Research Fellow from the Institute of Human Virology, Abuja, Nigeria, and the University of Cambridge, said: "Despite being the most widely-deployed vaccine, until now there's been very little information on how effective the AstraZeneca vaccine is at protecting people in Africa from omicron, nor even on levels of infections before and following vaccination using accurate lab tests.

"In our study, among healthcare workers in Nigeria, we found that nearly 50% had been infected prior to their first dose of the vaccine in early 2021."

Professor Babatunde Lawal Salako, Director of the Nigeria Institute of Medical Research, Lagos, said: "There was some good news, in that the AstraZeneca vaccine was effective at protecting people against the virus, at least initially. But with the emergence of the delta and omicron variants, we were beginning to see the ability to neutralize the viruses fall, and almost one in five individuals who had received two doses were infected in the three months following vaccination. This could lead to severe disease in those with suppressed immune systems or who are medically vulnerable."

Professor Ravi Gupta, lead investigator from the Cambridge Institute of

Therapeutic Immunology and Infectious Disease at the University of Cambridge added: "Given recent data suggesting that a third 'booster' dose with an mRNA vaccine increases and broadens protection against omicron, we urgently need more longer term follow-up studies in west Africa, including trials of booster doses. If we are going to control this virus, we will only do so by ensuring that everyone eligible is protected against current and future variants that may be more pathogenic and severe."

More information: Adam Abdullahi et al, Antibody responses to AZD1222 vaccination in West Africa (2022). DOI: 10.1101/2022.05.04.22274668

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