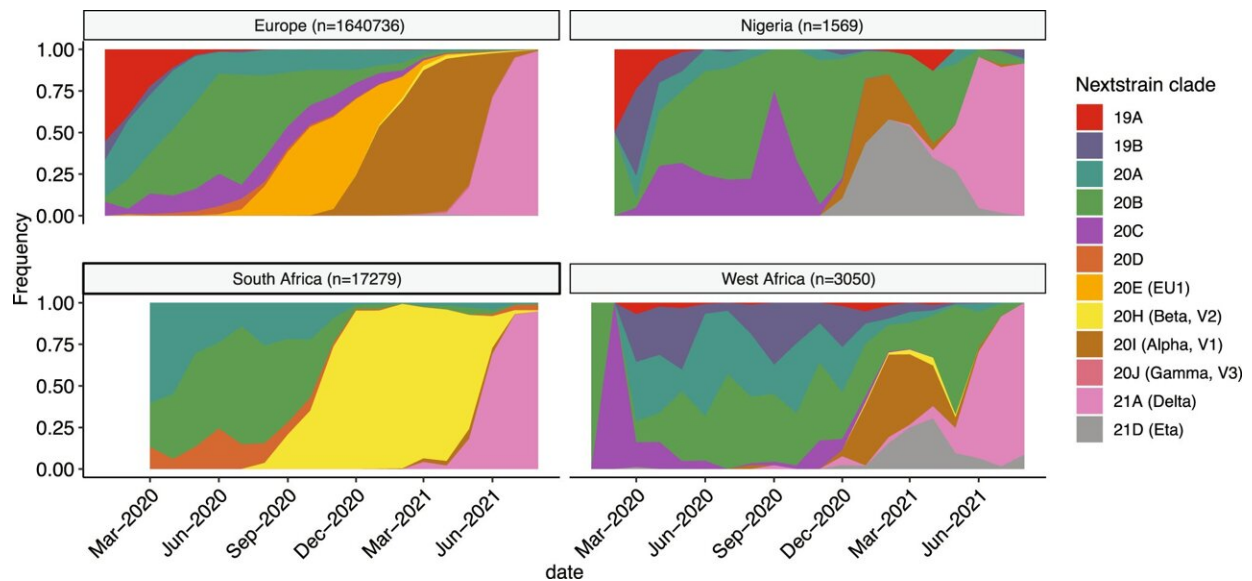


Why COVID-19 surveillance in Nigeria is critical

February 4 2022, by Marla Paul



Temporal SARS-CoV-2 clade distribution in Nigeria and West Africa. Monthly clade frequency distribution using Nextclade nomenclature for clades with a frequency >1% in both Nigeria and West Africa compared to the main clades observed in Europe and South Africa. All GISAID sequences deposited up to 30 September 2021 were used to examine the period of Delta dominance. The number of sequences used per geographical location is indicated. Nextclade nomenclature was used due to its clarity to represent major clades. Credit: DOI: 10.1038/s41467-022-28317-5

If the United States ignores COVID-19 in Nigeria, we forgo global genomic surveillance at our own peril, reports a new Northwestern

Medicine study published in *Nature Communications*.

The study found global efforts to track variants grossly underreported a probable variant of concern, Eta, circulating in Nigeria in early 2021. This was followed by the circulation of a rare delta sublineage in the region that was different from the [delta variant](#) that circulated in most other parts of the globe.

"Nigeria is the seventh-most populated country on the planet, but there was very little viral sequencing data available from Nigeria until we started this study," said co-corresponding study author Judd Hultquist, Ph.D., assistant professor of Medicine in the Division of Infectious Diseases. "The concern in having these gaps in surveillance is there may be new variants popping up in places across the globe we are not seeing. We do not want to be caught unprepared if all of a sudden a new variant with unique properties emerges onto the world stage."

Hultquist is also associate director of the Center for Pathogen Genomics and Microbial Evolution (CPGME).

"This study demonstrates the critical need for international cooperation in infectious disease surveillance in undersampled regions for the monitoring and 'early-warning' detection of new SARS-CoV-2 variants with concerning potential," said Ramon Lorenzo-Redondo, Ph.D., assistant professor of Medicine in the Division of Infectious Diseases, bioinformatics director of the CPGME and co-corresponding author of the study.

Northwestern scientists sequenced nearly 400 nasal swabs from Nigerian COVID-19 patients, collected by collaborator Moses Adewumi, Ph.D., and his team at the University of Ibadan, who shipped the specimens to Northwestern for sequencing and analysis. The Ibadan scientists did not yet have the equipment or resources to sequence samples at their own

institution.

"What we found was really unexpected," Hultquist said.

'Gaps in surveillance leave us vulnerable'

Northwestern researchers discovered two different variants of the virus that emerged in Nigeria at different times but that went largely underreported.

"We showed one of those variants—now called Eta by the World Health Organization—had all the characteristics of a variant of concern," Hultquist said. "The spike protein of the Eta variant was more efficient at promoting infection in vitro and enhanced viral evasion of neutralizing antibody responses following natural infection. Furthermore, Eta was able to outcompete the Alpha variant in the region before the arrival of Delta.

"When Alpha was circulating, it was a major focus of concern for public health officials and was widely reported in the media. But Eta was more important in Nigeria and other West African countries, even outcompeting Alpha in these regions, and we completely missed it. These types of gaps in surveillance leave us vulnerable. How long are we willing to take the risk that an important variant pops up and we miss it until it is already here?"

Several other variants of concern, including Beta and Omicron, are suspected to have originated from Africa, emphasizing the importance of monitoring these undersampled regions. Scientists in South Africa identified the omicron variant early on and warned it might represent a new variant of concern, enabling other countries to prepare.

"They were absolutely right," Hultquist said.

The differences in the types of SARS-CoV-2 viruses found in Nigeria compared to the rest of the world suggests there is something about the region that is driving the evolution of these unique variants, which scientists don't entirely understand.

Very different viral dynamic is occurring in Nigeria. Why?

"In this study, we have observed repeated expansions of globally uncommon lineages in Nigeria, which indicates a very different viral dynamic occurring in Nigeria compared to other regions of the world," Lorenzo-Redondo said.

The country has reported relatively low numbers of hospitalization and low numbers of deaths throughout the pandemic, despite low vaccination rates and a population of over 200 million people. While it's possible the low case counts and hospitalizations could be due to underreporting, the number of deaths are thought to be more accurate. Part of the explanation for this low mortality rate might be Nigeria's younger overall population, "but most likely other complex factors not yet understood involving host immunity and/or virus-host interactions are playing a very important role," Lorenzo-Redondo said.

"The fact that we have repeatedly seen bizarre variants pop up in Nigeria suggests the virus is there and in high enough numbers to be actively evolving," Hultquist said.

To identify what variants might be problematic, scientists rely on how many times they see it and whether it is associated with increases in cases, hospitalizations or deaths. But if a [variant](#) pops up in Nigeria where there is little sequencing, scientists might miss early warning signs. By the time it spreads around the globe, it's too late, Hultquist said.

"We have to start treating this pandemic truly as a global pandemic," Hultquist said. "This study demonstrates how our lack of a dedicated, global genomic surveillance effort is resulting in skewed data with potential risks. It's important to understand what new variants are arising to inform best practices in clinical care and public health policy."

Collecting West African samples is currently too arduous

But many low- and middle-income countries need more support. The effort required to obtain the Nigerian samples shows the challenges inherent in these efforts. Researchers in Ibadan had to travel to Lagos, the biggest city in the country, to obtain dry ice, sometimes driving between four and 10 hours in poor road conditions to do so. After they returned to pack the samples in the ice, they then had to drive again to Lagos to ship them to the U.S. for a total of four often arduous trips.

Better access to sequencing equipment, supplies and training would allow more of the surveillance to be done in Nigeria. Building capacity for this type of work in other countries remains a major goal for the Center for Pathogen Genomics and Microbial Evolution and the Robert J. Havey, MD Institute for Global Health.

More information: Egon A. Ozer et al, Multiple expansions of globally uncommon SARS-CoV-2 lineages in Nigeria, *Nature Communications* (2022). [DOI: 10.1038/s41467-022-28317-5](https://doi.org/10.1038/s41467-022-28317-5)

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