

How a Harvard-affiliated lab in Botswana became the first to identify the Omicron variant

By [Felice J. Freyer](#) Globe Staff, Updated November 29, 2021, 8:13 p.m.



The main building of the Harvard-Botswana partnership is in Gaborone, Botswana. BOTSWANA HARVARD AIDS INSTITUTE PARTNERSHIP

As the rows of multicolored letters lit up his computer screen at the Botswana-Harvard AIDS Institute Partnership, Sikhulile Moyo looked on in surprise. The letters represented the genetic codes from thousands of coronavirus samples. But one line stuck out: It looked like a swath of multiple mutations.

It was Friday, Nov. 19. Moyo's lab in Gaborone, Botswana, a city just over the northern border of South Africa, had been sequencing the genomes of about 95 coronavirus samples every week to track mutations, the natural changes that occur in virus genes. But he'd never seen anything like this before.

While other Harvard affiliates, including the Broad Institute and the major Boston hospitals, have seized the limelight in coping with COVID-19, this little-known African outpost would end up playing a critical role as the first lab to identify the new variant that has transfixed the world.

"This sequence really shocked us," Moyo, the laboratory director, said in an interview Monday. He showed it to a colleague, who agreed it looked like nothing seen before in Botswana. Could it have come from somewhere else?

Over the next few days, comparing the findings with international databases of coronavirus genomes from around the world, Moyo's team confirmed that the mutations, found in four samples, had not been seen anywhere else in the world. And there were a lot of them, about 50.

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"When you see a constellation of mutations you begin to wonder what kind of virus this is and what kind of impact it might have," he said.

On Nov. 23, Moyo's team deposited their findings into an open international database, available to scientists worldwide. A few hours later, a separate group in South Africa reported similar findings, and another group in Hong Kong was not far behind.

And by Thanksgiving morning in the United States, the world learned about the coronavirus variant now known as Omicron.

Like most scientists, Moyo says it's too soon to tell whether the virus will prove to be more transmissible, more deadly, or more likely to overcome vaccination than variants currently in circulation. Some of the Omicron mutations have been linked to greater transmissibility and to the ability to infect vaccinated people. But he noted that when there are that many mutations, they may cancel each other out and "make the virus wimpy."

"It's possible that that may happen. But I think there's every reason to be worried about so many mutations in one virus," he said. Still, he added that vaccinated people will probably continue to enjoy protection, although perhaps not at the same level.

Established in 1996 as a collaboration between the Harvard School of Public Health and the Botswana Ministry of Health, the Botswana Harvard Partnership aimed to build the country's ability to research and treat AIDS in Africa. The partnership conducts research into HIV and associated illnesses and developed the guidelines on how to prevent HIV transmission from mother to child.

The partnership has focused on training and mentorship. It is funded by the National Institutes of Health, while the government of Botswana built the building that houses it. Moyo studied biostatistics and public health at Harvard. He returned to Africa inspired "to do great science."

Now with about 350 full-time employees, the partnership has grown and strengthened over the years, with local researchers taking the lead and Harvard starting to step back, said Dr. Shahin Lockman, a site director for the partnership and an infectious disease

physician at Brigham and Women's Hospital.

Thus the laboratory was well-positioned to pivot quickly to COVID-19 when the pandemic struck, switching to PCR testing and genome sequencing within two weeks, Lockman said.

"The infrastructure was there," she said. "All of that could be ramped up very quickly because of training and investment. This type of investment is really important and it really pays dividends. You can't start sequencing overnight."

That's why Moyo, Lockman, and others were frustrated by the decision by the United Kingdom, the United States, and others to ban travel from southern Africa. They call the decision punitive and one that may discourage scientists in the future from sharing their discoveries.

"What is sad is that while we've worked hard around the clock to share the data with the world, it seems that we are being rewarded by blacklisting," Moyo said. "You make a discovery and that leads to major economic consequences."

The virus, he said, doesn't recognize passports or borders.

"The pandemic has really shown us that the world is a single global economy, a global community," Moyo said. "And we need to find ways on how we can help the scientists do the work and the policymakers use the evidence in a way that doesn't discourage the scientists."

Through it all, Moyo has a source of comfort. In addition to being a scientist, he is a [gospel singer and songwriter](#).

"I am passionate about singing," he said. "I have songs that are now in iTunes that I believe are contributing to the social fiber of our being, and it's not all about viruses and work."

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