

## “Omicron in Africa with emphasis on South Africa”

Lynn C. Klotz, Ph.D.

Senior Science Fellow

Center for Arms Control and Non-proliferation

820 1st Street NE, Suite LL-180

Washington, D.C. 20002

Office: 5 Duley Street

Gloucester MA 01930

E-mail: [lynnklotz@live.com](mailto:lynnklotz@live.com)

Date: June 29, 2022

### Summary

In the Summary, I am not linking any material to relevant websites. Linking will begin in the next section, Detailed Analysis. The purpose of the Summary is to provide an easy-to-read, almost lay-level description of the topic.

There are two topics I have followed closely and am writing articles on are titled “*Omicron in the United States*” and “*Omicron in Africa with emphasis on South Africa*.” This article is the second of the two. These will appear as two separate unpublished articles on the Center for Arms Control and Non-Proliferation’s website.

The goal of this study is to understand infections from and the fate of Omicron variants BA.2, BA.2.12.1 and the Omicron subvariants BA.4 and BA.5 in Africa with a focus on South Africa. BA.4 and BA.5 emerged in South Africa and are likely to dominate there and elsewhere because they are more contagious than previous variants.

South Africa is different from the United States. Scientists there have been following COVID-19 closely and have published important studies. In a timely recent publication (March 2022), a study by South African researchers found that 97% of people in that country had antibodies from either vaccination, a past infection, or both. The study, which tests both for anti-spike antibodies (10%, evidence of vaccination or infection) and anti-nucleocapsid antibodies (97%, evidence of infection). Many fewer people in the United States have had past infections. The 97% of those infected provide antibodies, B- and T-cells for some protection against infection, depending on how long ago they were vaccinated or infected.

Mutations involved in increased contagiousness likely imply additional mutations in all the 26 proteins of Omicron and its subvariants; and if my thinking is correct, the highly mutated viruses would be less virulent so would cause less illness and almost no deaths.

Quoting from a recent Nature article (May 6, 2022) linked in the next section

“We’re definitely entering a resurgence in South Africa, and it seems to be driven entirely by BA.4 and BA.5...We’re seeing crazy numbers of infections...However, scientists say it is not yet clear whether BA.4 and BA.5 will cause much of a spike in hospitalizations in South Africa or elsewhere. High levels of population immunity — provided by previous waves of Omicron infection and by vaccination — might blunt much of the damage previously associated with new SARS-CoV-2 variants.”

Since situations can change rapidly over a month, it is prudent to look at how the situation has changed from early May to late June. The number of confirmed cases had dropped dramatically from 51,547 for the week ending May 9 to 3,401 for the week ending June 20. Also, deaths have been dropping as well, but not as dramatically, from 237 to 99 over the same period. With the numbers of BA.4 and BA.5 infections increasing dramatically, the drop in confirmed cases and deaths may be interpreted as a greater number of mutations in BA.4 and BA.5, leading to less virulent viruses. As in the United States, for the near future, I am optimistic that we should not be overly concerned about Omicron infections.

A word of caution. My lack of concern over COVID infections could change quickly since it is possible that more virulent strains will develop. We may see new COVID variants possibly originating from bats that will not respond to antibodies or B- and T-cells produced by today’s vaccines or previous infection. Furthermore, for a pandemic virus different from corona viruses, such as lab-created potential pandemic pathogens, we will not be protected. We would be starting over again.

## Detailed analysis

### Introduction

Two topics I have followed closely and am writing articles on are tentatively titled “*Omicron in the United States*” and “*Omicron in Africa with emphasis on South Africa.*” These would appear as two separate unpublished articles on the [Center for Arms Control and Non-Proliferation’s website](#) in the section on Biological and Chemical Security.

World Health’s Organization websites: [WHO's COVID-19 dashboard](#), [WHO's table of nations data](#), and [WHO's graphs and weekly data](#) provide up-to-date information including graphs that are a major part of the analyses.

Quoting from a recent (May 6, 2022) article [from the journal Nature](#)

“We’re definitely entering a resurgence in South Africa, and it seems to be driven entirely by BA.4 and BA.5...We’re seeing crazy numbers of infections...However, scientists say it is not yet clear whether BA.4 and BA.5 will cause much of a spike in hospitalizations in South Africa or elsewhere. High levels of population immunity — provided by previous waves of Omicron infection and by vaccination — might blunt much of the damage previously associated with new SARS-CoV-2 variants.”

Omicron variants BA.4 and BA.5 are indeed emerging in South Africa and are likely to dominate because they are more contagious than previous variants. This is verified by a [June 23, 2022 Nature article](#) that comes to the same conclusions that I have reached previously. In addition, the quote below from the article

“But the rise of BA.4 and BA.5 seems to stem, instead, from their capacity to infect people who were immune to earlier forms of Omicron and other variants, says Christian Althaus, a computational epidemiologist at the University of Bern. With most of the world outside Asia doing little to control SARS-CoV-2, the rise — and inevitable fall — of

BA.4 and BA.5 will be driven almost entirely by population immunity, Althaus adds, with cases increasing when protection lulls and falling only when enough people have been infected.”

The quote mentions the disappearance of BA.4 and BA.5 as due to population immunity, which is just another name for herd immunity. Invoking herd immunity is something I have been criticized for in the past by some scientists. It is encouraging for me to see that there is at least one scientist, Christian Althaus, who agrees with me that herd immunity is a reason for disappearance of a pathogen.

Mutations involved in increased contagiousness likely implies additional mutations in all the 26 proteins of BA.4 and BA.5. And if my idea holds that variants become less virulent because the highly mutated viruses would be defective (less virulent) so cause less illness and almost no deaths. BA.4 and BA.5 have led to fewer hospitalizations and fewer deaths in South Africa. Indeed, South Africa is experiencing a dramatic decline in confirmed cases and deaths.

Since situations can change rapidly over a month or two, it is prudent to look at how things have changed from early May to late June.

The [World Health Organization has published its COVID-19 dashboard](#) for cases and deaths for South Africa up to June 20, 2022. The numbers are

*For week ending in June 27:*

Confirmed cases = 0

Deaths = 0

% Deaths = 0%

*For week ending in May 9:*

Confirmed cases = 51,547

Deaths = 237

% Deaths = 0.460%

Both cases and deaths in South Africa have fallen dramatically over the period May 9 through June 20, 2022 to no cases and deaths on June 27, an astounding outcome.

Also, the WHO published a table of cases, deaths, and other data [from all the nations in the world](#), from which you can compare nations.

Unfortunately, there is a serious complication with all Omicron variants. They evade virus-disabling polyclonal antibodies produced in our body from vaccines or previous infection. The polyclonal antibodies bind to surface molecules on the Omicron virus called epitopes. If mutations are present in the epitopes, the polyclonal antibodies may not bind. Mutations are now present in nearly all to all the epitopes. In a timely article from a [Chinese researchers](#) titled “*Omicron escapes the majority of existing SARS-CoV-2 neutralizing antibodies*,” Omicron is protected from binding of 85% of polyclonal antibodies, with the remaining 15% likely providing a bit of protection against infection.

This complication implies that herd immunity cannot be approached or achieved for these variants. This is a two-edged sword. On the one edge, the Omicron variants are protected from antibodies; and on the other edge, in my opinion, the variants become less virulent causing less illness and almost no deaths.

[A study by South African researchers](#), not yet peer-reviewed, found that as many as 97% of people in that country had antibodies from either vaccination, a past infection, or both. “The weighted national prevalence of anti-nucleocapsid antibodies (evidence of infection) is 87% and an additional 10% had only anti-spike antibodies (suggesting vaccination and the lack of natural infection).”

My concern is further reduced about a major outbreak in South Africa from the highly contagious BA.4 and BA.5 variants by the [The World Health Organization](#) of June 23, 2022. “Globally, the number of new weekly cases has continued to decline since the peak in January 2022.” The authors recognize the many uncertainties in the data collected in their study.

There is more information on Africa gleaned from a different WHO report [published by The Lancet](#) on June 1, 2022. In this report, it is emphasized that “seroprevalence studies are considered the gold standard for understanding the spread of COVID-19.” In this context, seroprevalence is the proportion of a population whose bloodserum tests positive for a given pathogen (e.g., Omicron) or other blood components such as antibodies, T-cells, or B-cells. “By the end of 2022, we estimate that infections will remain high, at around 166.2 million infections, but deaths will substantially reduce to 22,563” in the WHO African region. This equals 0.013% deaths from infections, a very low number.

Also, from the WHO-Lancet report “The four-times increase in COVID-19-related deaths in 2021 is in line with anecdotal information from countries suggesting many more such deaths in 2021 than in 2020. This increase in the number of deaths from the same numbers of infections aligns with the introduction of the more transmissible Delta variant of SARS-CoV-2, suggesting Delta was more infectious to vulnerable individuals or caused more severe disease for everyone (or both)”

Does immunity fade over time as many suggest? While antibody titers fade, [B-cell immunity lasts much longer](#).

### *Omicron infections in the world*

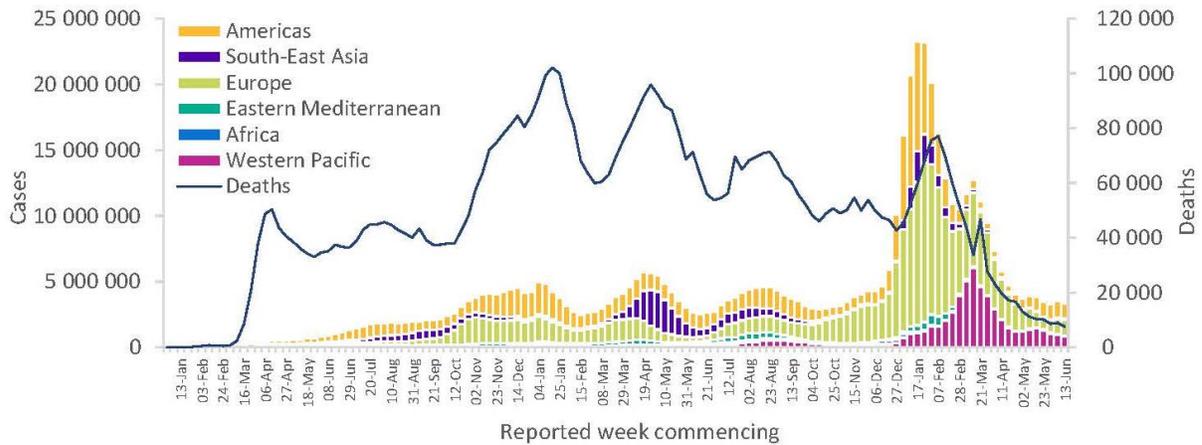
[The World Health Organization](#) reports cases similar to that the CDC sees in the U.S., an increase in infections, sometimes rapid, followed by a decrease occurring in many parts of the world.

“Globally, the number of new weekly cases has continued to decline since a peak in January 2022. During the week of 23 until 29 May 2022, over 3.3 million cases were reported, an 11% decrease as compared to the previous week... The number of new weekly deaths also continues to decline, with over 9 600 fatalities reported, representing a 3% decrease as compared to the previous week.

At the regional level, the number of new weekly cases increased...in the African Region (+15%)...while decreasing trends were observed in the remaining three regions.”

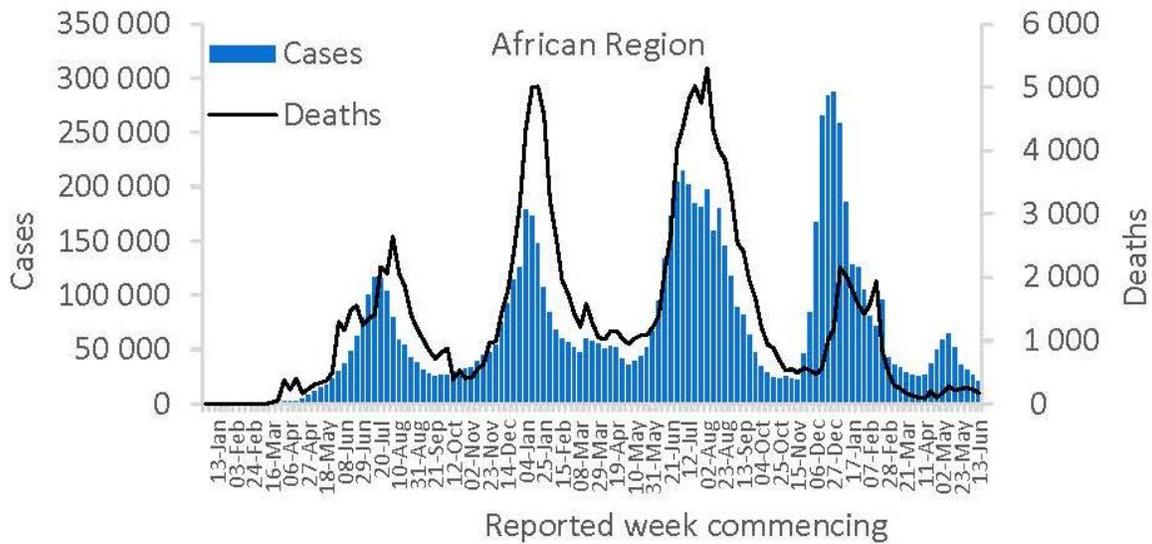
In Figure 1 is a graph of COVID-19 cases and deaths over two and a half years for various parts of the world.

**Figure 1. COVID-19 cases reported weekly by WHO Region, and global deaths, as of 19 June 2022\*\***



**Figure 1.** Cases of COVID-19 and deaths for various parts of the world from January 13, 2020 through June 19, 2022. At the [the World Health Organization](https://www.who.int) website, press Download that leads to a pdf which contains the graph. Deaths throughout the world are on a steady decline.

We now turn our focus to Africa. The African data in Figure 1 is obscured, so in Figure 2, another page from the WHO report, the graph for Africa is presented.



**Figure 2.** Cases and deaths from COVID-19 for Africa from the [the World Health Organization](https://www.who.int) report from December 30, 2020 through the week commencing on June 13, 2022.

Over the years, Figure 2 shows many steep rises followed by steep declines for both cases and deaths. Since mid-May cases are steadily declining. From about February 2022 thru June 20, 2022, there is a leveling-off of deaths. Deaths could increase again if cases surge, but for now cases are decreasing.

Also, from the same [The World Health Organization](#) link

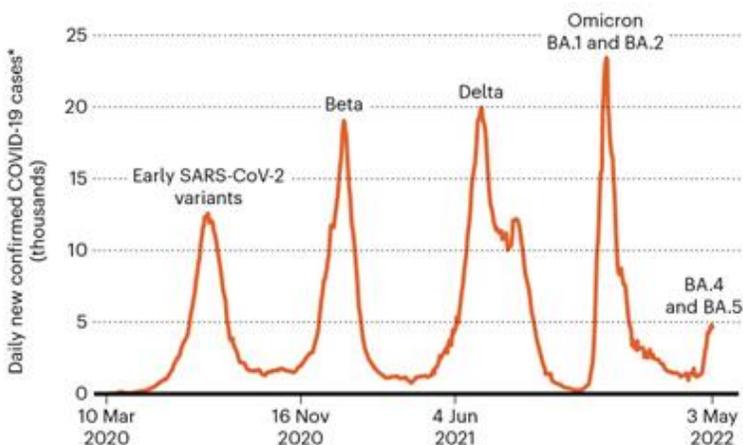
“The African Region reported 22 000 new cases, a 21% decrease as compared to the previous week...The highest numbers of new deaths were reported from South Africa (121 new deaths).”

Compared to the previous week where deaths were 211 deaths, so were cut in half.

Figure 3 is a graph [from the journal Nature](#) showing only cases (not deaths). The graph covers the period from March 10, 2020 through May 3, 2022, where it shows an uptick in the more contagious BA.4 and BA.5 variant that could become a full-blown outbreak; however, the recent June data shows both cases and deaths declining. This is one more illustration that numbers can change over a month or two, so we must be aware of not under or over interpreting data. But we are dealing with a moving target here, so all of us may make errors.

### OMICRON'S NEW IDENTITIES

Cases of COVID-19 are rising again in South Africa, after the emergence of Omicron variants called BA.4 and BA.5.



BA.4 and BA.5 spread faster than previous Omicron variants and are accounting for a growing proportion of COVID-19 cases in South Africa.

**Figure 3.** New cases of COVID-19 variants over time in South Africa [from the journal Nature](#).

From the Nature article, some interesting facts and thoughts from researchers have emerged.

- It is not yet clear whether BA.4 and BA.5 will cause much of a spike in hospitalizations. High levels of population immunity — provided by previous waves of Omicron infection and by vaccination — might blunt much of the damage.
- One possibility as to why BA.4 and BA.5 are more contagious is that they are just inherently better at transmitting. The other possibility is that the variants are better at eluding immune responses such as antibodies, allowing the variants to infect people with prior immunity.

- It is too soon to tell whether BA.4 and BA.5 will put much pressure on health-care systems.
- Experts speak of mutations as being drivers of new variants. For instance, immune-evading mutations could come to resemble that of other respiratory infections, such as seasonal influenza.

Despite the concern over a major outbreak in South Africa, the World Health Organization put together a very long technical report released on June 2, 2022 [published by The Lancet](#). The report concludes that the number of Covid-19 deaths in Africa will fall sharply this year, compared with 2021. The report is difficult to read, but the [New York Times](#) has a good summary:

“W.H.O. scientists reported that the agency’s statistical modeling forecast about 23,000 Covid deaths in 2022 in the 47-nation region, which includes most of the African continent. That would be a decline of more than 90 percent from the roughly 350,000 deaths the organization now estimates occurred in 2021...One important factor contributing to the expected decline, Dr. Moeti said, was that vastly more people in Africa have had past coronavirus infections than the official case counts would indicate — and therefore, many more people have some level of immunity that could protect them from severe illness or death...”

[A study by South African researchers](#), published recently but not yet peer-reviewed found that as many as 97% of people in that country had antibodies from either a past infection, vaccination, or both. Even so, many still became infected in the nation’s latest virus wave, which began in April and was driven by BA.4 and BA.5. New deaths remained far lower, though, than previous waves’ peaks.

Given the possibly that more than 97% of the population had antibodies from early versions, from Omicron, and from the newer BA.4 and BA.5 variants, it is perhaps not surprising that deaths have declined more than 90% in 2022 compared to 2021. To explain this decline, I have an explanation for evading antibodies in my document *“Omicron in the United States.”* Supporting my explanation, a large group of researchers [published in Nature](#) (February 24, 2022) that Omicron epitopes have mutations that prevent polyclonal antibodies from binding. For me, this was a timely publication.

The Lancet-WHO report adds considerable insight. Here, I have extracted a small part of the report taken from many different pages and presented here in one long paragraph. I hope that I have not biased my inclusions. From this long paragraph, I will extract some pieces of information that merit further discussion.

“Between Jan 1, 2020, and Dec 31, 2021, our model estimates the number of SARS-CoV-2 infections in the African region to be 505.6 million...inferring that only 1-4%...of SARS-CoV-2 infections in the region were reported... By the end of 2022, we estimate that infections will remain high, at around 166.2 million... but deaths will substantially reduce to 22,563...Our model suggests that the current approach to SARS-CoV-2 testing is missing most infections. These results are consistent with findings from representative seroprevalence studies...The true burden of the pandemic in 2020, at 24% of the population infected and 84 620 deaths, is within the range of an earlier prediction...The estimated deaths represent an infection fatality rate of 0.09%... The four-times increase in COVID-19-related deaths in 2021 is in line with anecdotal information from countries suggesting many more such deaths in 2021 than in 2020. This increase in the number of deaths from the same numbers of infections aligns with the introduction of the more transmissible delta variant of SARS-CoV-2, suggesting delta was more infectious to vulnerable individuals or caused more severe disease for everyone (or both)...The current evidence is mixed, regarding the strength and duration of the antibody response from vaccination versus natural infection, with reputable (yet conflicting) evidence for both natural immunity and vaccination being stronger irrespective of the source of immunity, the potential severity of subsequent SARSCoV-2 infections is presumed to be reduced in those with immunity...Finally, our predictions suggest that 2022 will have 73% of the number of SARS-CoV-2 infections seen in in 2021, but with 6-4% of the deaths... although seroprevalence studies are considered the gold standard for understanding the spread of

COVID-19, we recognise the specific challenges of using data from seroprevalence studies conducted in Africa, which are often based on specific population subgroups (eg, blood donors, urban populations, or adults). Appropriate seroprevalence studies would be fully representative of the population at national level; however, such studies are scarce in the region, given their resource intensive requirements.”

The statement that “seroprevalence studies are considered the gold standard for understanding the spread of COVID-19” requires defining seroprevalence in this context. Seroprevalence is the proportion of a population whose bloodserum tests positive for a given pathogen or other blood components such as antibodies, T-cells, or B-cells.

- At the end of 2022, the report estimates for the WHO African region infections of 166.2 million with deaths of only 22,563 which equals 0.013%, a very low number for percentage of deaths.
- The four-times increase in COVID-19-related deaths in 2021 compared to 2020 aligns with the appearance of the more transmissible Delta variant of SARS-CoV-2 suggesting that Delta was more infectious to vulnerable individuals or caused more severe disease for everyone.
- Current evidence differs regarding the strength and duration of the antibody response from vaccination versus recovered from infection, with conflicting evidence for vaccination or recovered from infection being stronger.

The authors of the Lancet-WHO study recognize the many uncertainties in the data collected in their study. In particular, the authors recognize the specific challenges of using data from seroprevalence studies conducted in Africa, which are often based on specific population subgroups (e.g., blood donors, urban populations, or adults). Appropriate seroprevalence studies would be fully representative of the population at national level; however, such studies are scarce in the region given their resource intensive requirements.

Does immunity fade over time? While antibody titers fade over time, [both T-cell and B-cell immunity last much longer](#).

### *Conclusion*

As I predicted, Omicron variants are so contagious that they cause infections rapidly throughout the world. To me, mutations involved in contagiousness imply mutations in all 26 proteins of BA.4 and BA.5. And if my thinking holds that variants become less virulent because of all the mutations, the highly mutated viruses would be defective so cause less illness and almost no deaths. So far, the low percentage of deaths in South Africa seems to support my thinking.