

Letter to the Editor

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COVID-19; Mexico; Omicron BQ.1, XBB, and XBB.1.5; SARS-CoV-2; vaccinated people

Abbreviations:

COVID-19, Coronavirus disease 2019; SARS-CoV-2, Severe acute respiratory syndrome coronavirus 2; WHO, World Health Organization

Corresponding author:

Sergio Isaac De La Cruz-Hernández;
Emails: delacruz.hernandez.si@gmail.com;
sergio.delacruz@salud.gob.mx

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The End of the COVID-19 Pandemic in Mexico: Omicron Sublineages BQ.1 and XBB Trigger the Sixth Wave of Infections

Sergio Isaac De La Cruz-Hernández PhD¹  and Ana Karen Álvarez-Contreras PhD²

¹Department of Virology, Institute of Epidemiological Diagnosis and Reference (InDRE), Ministry of Health of Mexico, Mexico City, Mexico and ²Department of Microbiology, National School of Biological Science, National Polytechnic Institute, Mexico City, México

In early 2020, the World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) a public health emergency of international concern. A month later, this disease was declared a pandemic.¹ Throughout the three years of the pandemic, new variants, lineages, and sublineages of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have emerged, provoking several waves of infections around the world.^{2,3}

In November 2021, Omicron appeared in the world and has been the variant that has caused the most COVID-19 cases worldwide, partly because of all the highly contagious lineages and sublineages that have arisen from this.^{2–4}

During 2022 and 2023, the last Omicron sublineages BQ.1, XBB, and XBB.1.5 spread rapidly through the world, becoming a new public health challenge, due to its ability to evade the therapeutic antibodies and herd immunity induced by vaccination or previous SARS-CoV-2 infection. These properties could be explained by containing additional spike mutations. The sublineage BQ.1 is derived from BA.5, whereas the sublineage XBB.1.5 evolved from XBB, which resulted from a recombination of two BA.2 lineages: BA.2.10.1 and BA.2.75.^{2,5,6}

In Mexico, the Omicron sublineages BQ.1, XBB, and XBB.1.5 were detected in late 2022 and early 2023, but only the sublineages BQ.1 and XBB were responsible for increasing the number of cases of COVID-19 and triggering the sixth wave of infections in our country ($r = 0.4012$, $P = 0.0013$; $r = 0.3618$, $P = 0.0048$, respectively). However, taking into account the number of daily cases, this wave was not as high as previous waves of infections. On the other hand, this has been the wave with the fewest daily deaths reported during the pandemic (Figure 1). It is noteworthy that until this sixth COVID-19 wave, people who had received at least one dose of the vaccine in Mexico represented 76% of the population, and this percentage was practically reached during the fifth wave of COVID-19 (see Figure 1).^{7,8}

It is important to consider that since the Omicron variant appeared in Mexico, the population has been exposed to several lineages and sublineages of this variant of concern. Nevertheless, only Omicron BA.1, BA.5, BQ.1, and XBB have been responsible for increasing the number of COVID-19 cases during the last waves of infection in our country. In other words, not all the lineages and sublineages of the Omicron variant provoked an increase either in the number of infections or in the number of deaths in Mexico (see Figure 1). Perhaps, part of the population has developed a hybrid immunity through a combination of vaccination and the SARS-CoV-2 infection, which has provided better protection that has helped prevent new infections from some lineages and sublineages.⁹ Although the main role of this protection has been to decrease the risk of developing a severe form of disease, hospitalization, and especially the risk of death, which has decreased with each COVID-19 wave (see Figure 1).¹⁰ Herd immunity may have been finally reached in Mexico.¹¹ Part of this important achievement was due to the vaccination campaign against COVID-19, which was successfully coordinated by the Government of Mexico, which declared the end of the extraordinary action on general health to prevent, control, and mitigate the COVID-19 in our country.¹² This decree was made a few days after the WHO statement, announcing that COVID-19 is no longer a public health emergency of international concern.¹³ It is a fact that SARS-CoV-2 will continue to circulate in the coming years and new variants, lineages, and sublineages could emerge. Nevertheless, we must take into account all the knowledge and experience gained during this pandemic, which can help us prepare for the next one.

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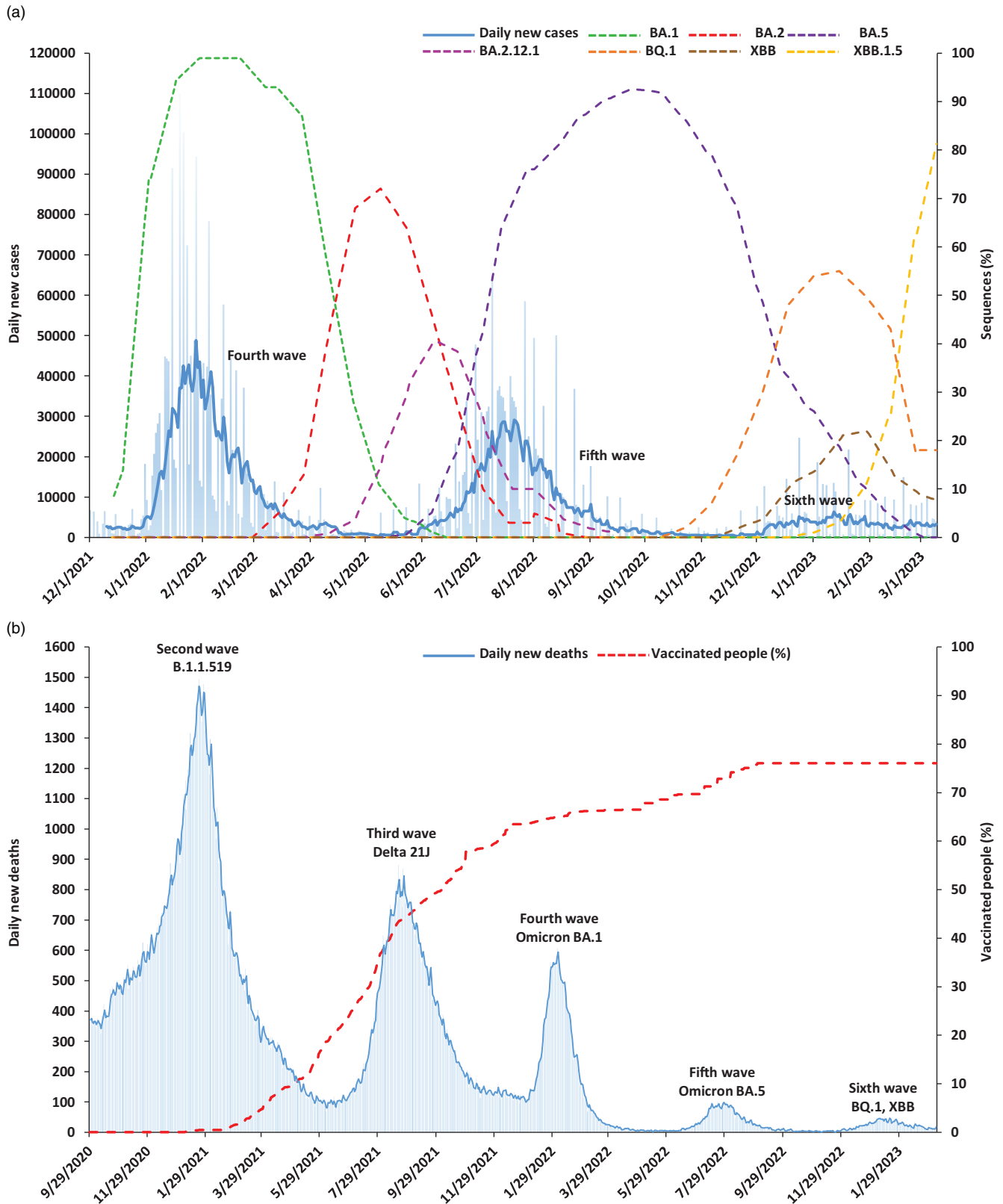


Figure 1. Daily new cases caused by Omicron lineages and sublineages; and daily new deaths registered through the immunization of people by vaccination during the last COVID-19 waves in Mexico. All daily reports of new cases (a) and deaths (b) were obtained from Johns Hopkins University & Medicine, Coronavirus Resource Center.³ Pearson's correlation coefficient was used to test the association between daily new cases with the proportion of reported sequences of the Omicron sublineages BQ.1 and XBB, from the beginning to the peak of the sixth COVID-19 wave. The proportions of sequences [(not cases) indicated by dashes lines in (a)] of the Omicron BA.1, BA.2, BA.2.12.1, BA.5, BQ.1, XBB, and XBB.1.5, along with all the information about SARS-CoV-2 variants of concern from Mexico, were obtained from CoVariants, Enabled by data from GISAID.² Proportions of vaccinated people [indicated by dashed lines in (b)] were obtained from Our World in Data.⁸

Ana Karen Álvarez-Contreras obtained and analyzed all the data from the Johns Hopkins University & Medicine, Coronavirus Resource Center, along with other sources such as Our World in Data and CoVariants/Enabled by data from GISAID; and she created the figure.

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