KU LEUVEN

DEPARTMENT OF MICROBIOLOGY, IMMUNOLOGY AND TRANSPLANTATION

UZ LEUVEN | LABORATORIUMGENEESKUNDE

Genomic surveillance report

Update for Belgium, 22/02/2022

Lize Cuypers, Guy Baele, Simon Dellicour, Piet Maes, Emmanuel André
See page 2 for full list of authors and participating laboratories

February 2022

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This rapport was written in collaboration with:

Louis Nevejan, Tom Wenseleers, Bram Slechten, Johan Van Weyenbergh, Els Keyaerts, Joren Raymenants, Barney Potter, Sunita Janssenswillen, Elke Wollants, Marc Van Ranst and the Belgian Sequencing Consortium.

Corresponding author: lize.cuypers@uzleuven.be (National Reference Center for Coronaviruses, UZ Leuven)

Belgian Sequencing Consortium:

Cliniques Universitaires Saint-Luc, Centre Hospitalier CHU UCL Namur, ULB, UMons, UNamur, ULiège, UGent, UZA/UAntwerpen, Jessa ZH, AZ Delta, AZ Klina, IPG, AZ St Lucas Gent, OLVZ Aalst, Briant network, ZNA, AZ St Jan Brugge, UZ Brussel, LHUB-ULB, UZ Leuven/KU Leuven and Sciensano HealthData.

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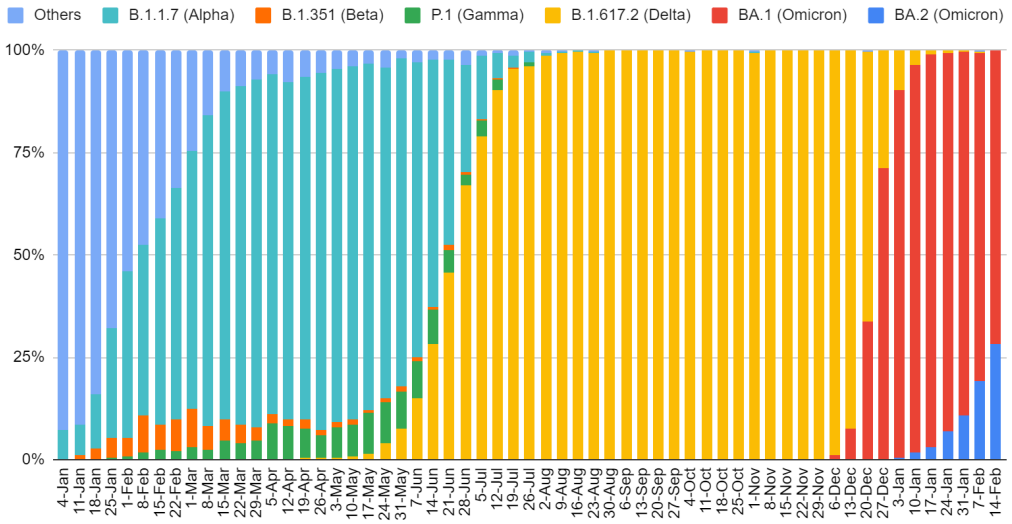
Executive summary

During the last two weeks (7/2/2022 to 20/2/2022, representing 1415 sequences at this stage), BA.1 and BA.1.1 jointly represented 78.4% of the circulating strains, while BA.2 represented 21.2% (↗↗) of the strains sequenced as part of the baseline surveillance. Only one Delta sequence (<0.1%) was reported for the last two weeks.



The share of BA.2 is increasing and reaching 40% of new cases diagnosed during the last days, as confirmed by the continuous decline of SGTF share among positive qPCR results (data federal platform labs). Nevertheless, this viral population replacement still seems at this stage to be linked to a sharp decrease in BA.1 infections rather than a tangible increase in the total number of BA.2 infections. The latter will probably become dominant in the coming week, but we observe no sign that this phenomenon will lead to an immediate new significant surge of infections.

1 Epidemiological context and indicators related to diagnostic activities

The recent decline in the reported number of infections has been associated with a continued decline in the positivity rate among diagnostic PCR tests performed at the Federal Platform Laboratories, from 50% one month ago to currently around 30% (Figure 1). This positivity rate remains high and did not significantly decrease during the last week (30%). Of note, considering that a significant share of the samples referred for PCR aim to confirm a positive rapid antigen test (currently 19% of the samples tested in the Federal Laboratory of Leuven), the positivity rate will remain artificially high in the future.

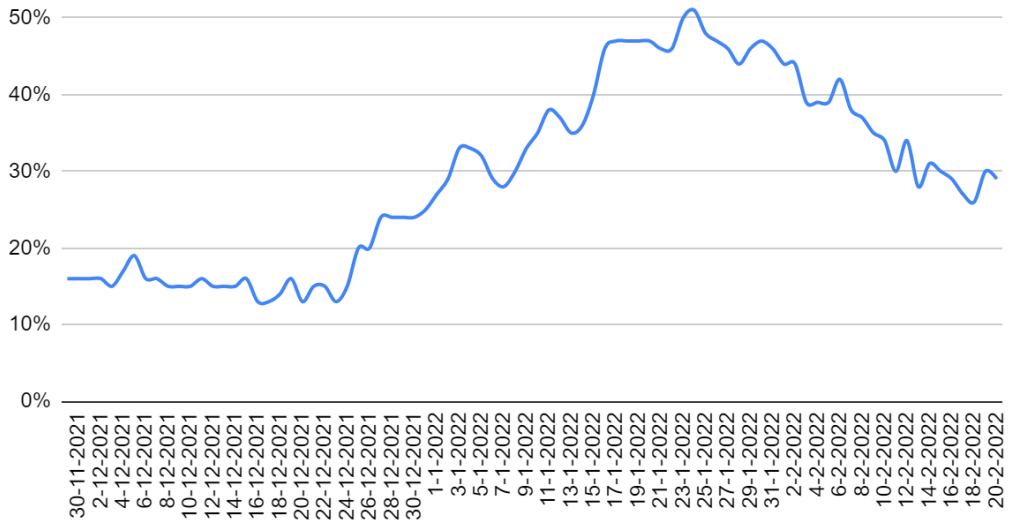


Figure 1: *Positivity rate among the Federal Platform Laboratories.*

The share of positive samples (Cq <25) presenting an S gene target failure (SGTF) reflects the share of BA.1 and BA.1.1 samples circulating in the country. Samples which are negative for this marker can be Delta or BA.2. Samples presenting SGTF currently represent 59% (compared to 72% last week) of positive samples diagnosed (Figure 2).

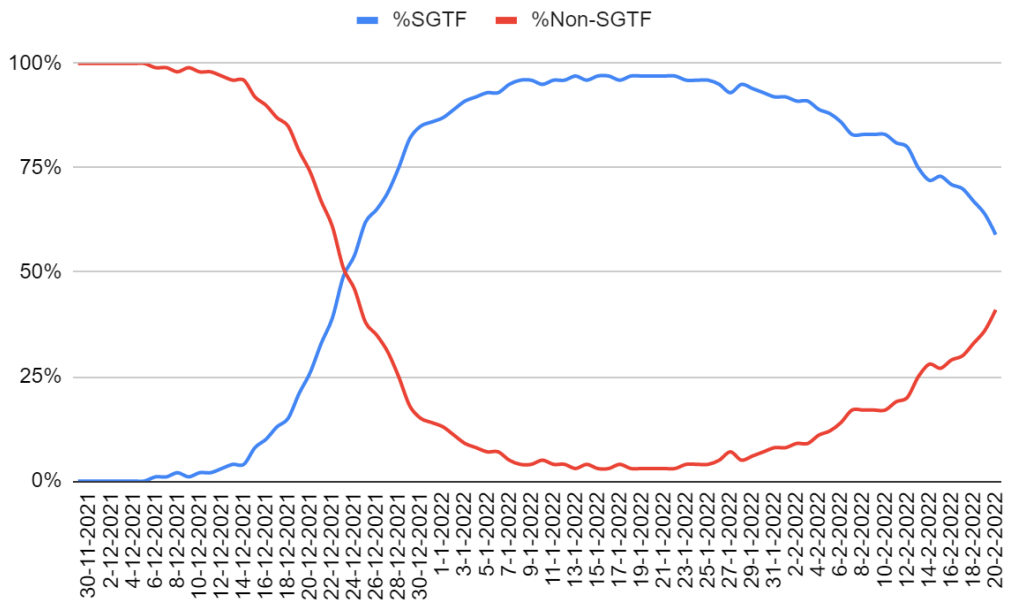


Figure 2: *S Gene Target failure (blue: BA.1 & BA.1.1) and others (red: BA.2 and Delta) among positive samples reported by the Federal Platform laboratories.*

As shown in Figure 3, the increasing share of non-SGTF positive PCR results looks clearly to be due to a steep decrease of SGTF samples, rather than to an increase of non-SGTF samples. This implies that there is currently no marked increase of BA.2 infections in the population and that the epidemiological situation should therefore not be profoundly modified (new wave of infections) when BA.2 will become dominant.

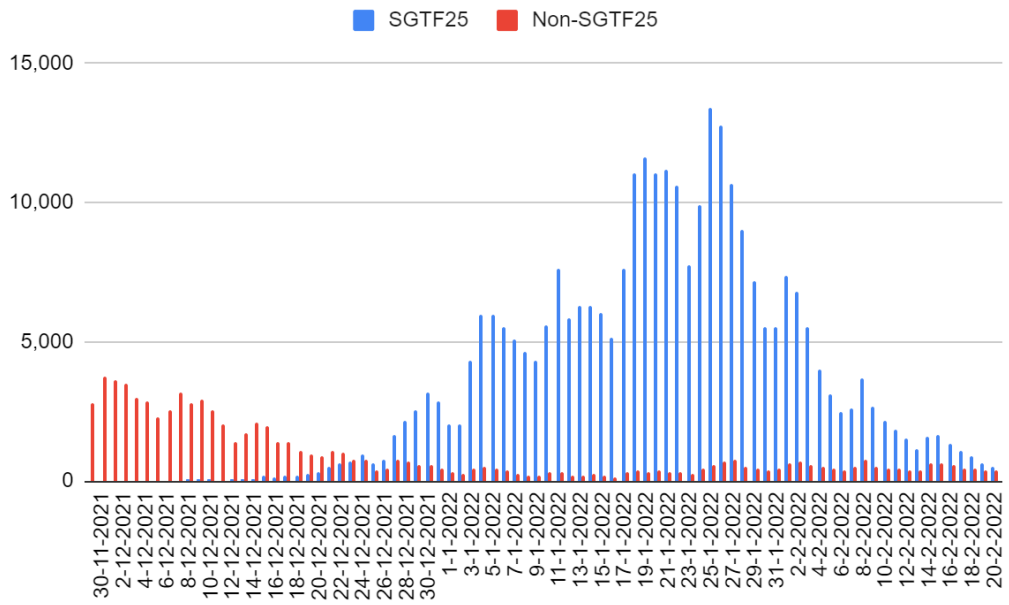


Figure 3: *Number of samples tested positive in the Federal Platform Laboratories with S Gene target failure (SGTF, blue) and without SGTF (non-SGTF, red).*

2 Monitoring of Variants of Concern in Belgium

During the last two weeks of surveillance (7/2/2022 - 20/2/2022), BA.1 and BA.1.1 jointly represented 78.4% of the circulating strains, while BA.2 represented 21.2%.

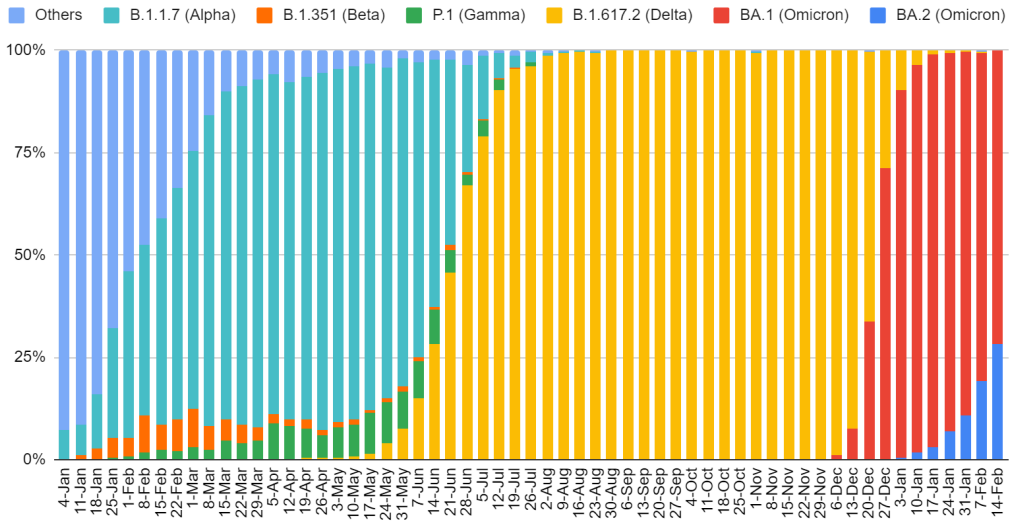


Figure 4: *Share of variants of concern per week in Belgium*

The Omicron lineage currently consists of 4 main sublineages (BA.1, BA.1.1, BA.2 and BA.3). While BA.1 and BA.1.1 infections currently decline and BA.3 detections remain anecdotal, the share of BA.2 lineages continues to rise (Figure 5).

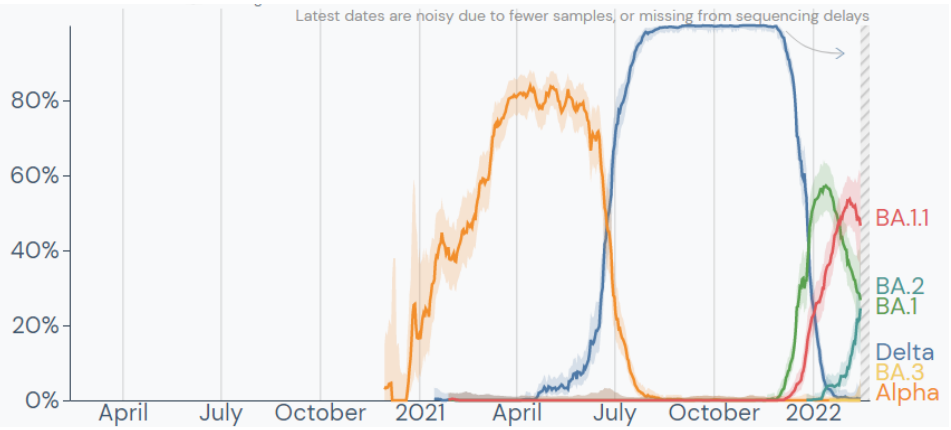


Figure 5: *Share of Variants of Concern, including Omicron sublineages (BA.1, BA.1.1, BA.2 and BA.3) in Belgium (outbreak.info)*

3 Comparative epidemiological analysis with Denmark

The epidemiological situation in Denmark can provide useful insights on the potential impact of the release of contact-restriction policies in a highly vaccinated population and in the context of BA.2 circulation. In this country, BA.1 became dominant around 19/12/2021, and was taken over by BA.2 around 13/1/2022 before any decline in the number of reported infections. By the end of January 2022, while the number of infections had peaked, most disease control measures were lifted. The combination of these two dynamics had led to a very high plateau of infections which was maintained for two weeks. Since one week nevertheless, we observe a constant decrease in the number of reported infections.

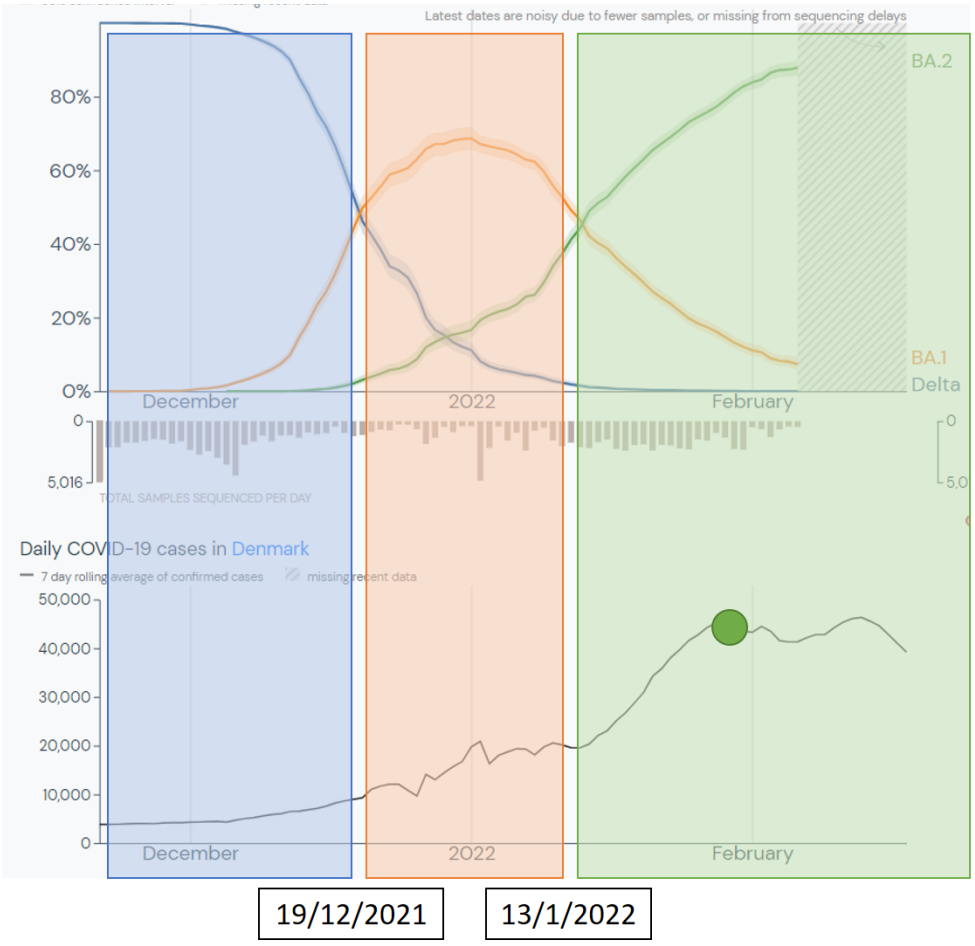


Figure 6: *Share of variants of concern (Delta: blue; Omicron BA.1: Orange; Omicron BA.2: Green) and evolution of daily confirmed COVID-19 cases in Denmark. The large green dot represents the moment when most disease control restrictions were released. (Modified from Outbreak.info)*

In comparison: while BA.1 (and BA.1.1) has become dominant in Belgium only a few days after Denmark, BA.2 has yet to become dominant (expected in the coming days). This longer interval between the two variants has allowed the BA.1 wave to return to very low levels of infections and deaths before BA.2 will take over. This epidemiological situation, is concomitant with a release of contact restriction measures (reopening of night life, no-mask policy in primary schools, restart of on-site work, …).

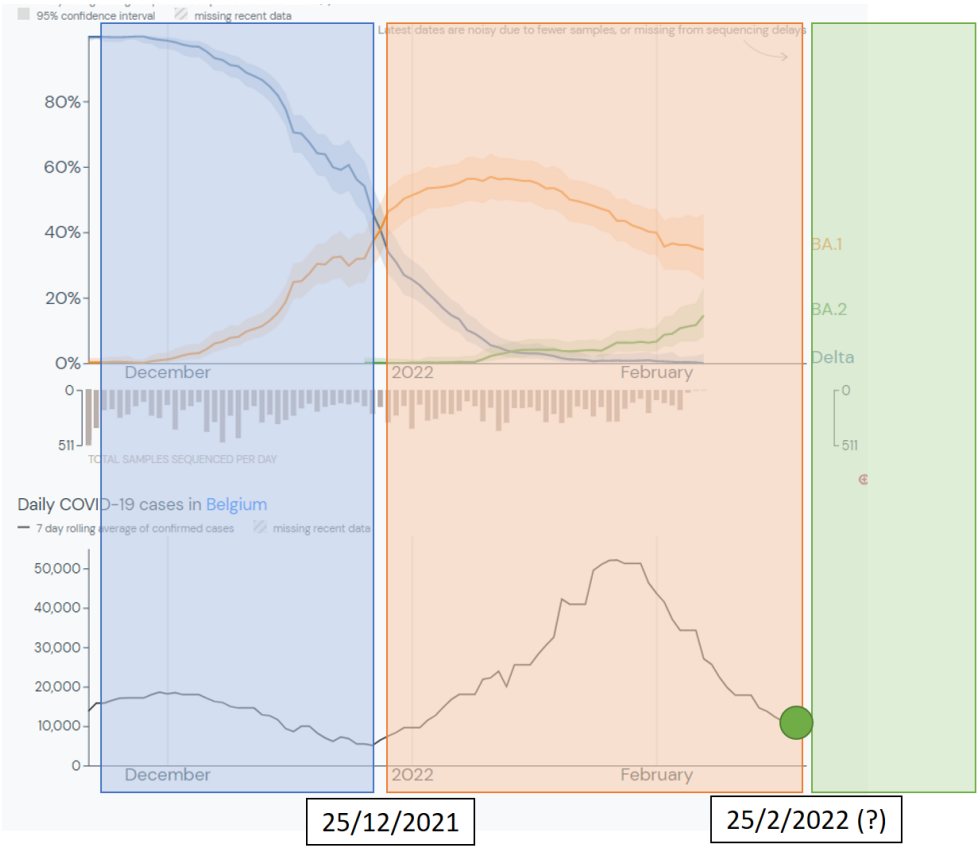


Figure 7: *Share of variants of concern (Delta: blue; Omicron BA.1: Orange; Omicron BA.2: Green) and evolution of daily confirmed COVID-19 cases in Belgium. The large green dot represents the moment when most disease control restrictions are released.(Modified from Outbreak.info)*

4 Heart-disease risk soars after COVID, even with a mild case (and without underlying risk factors)

A recently published massive study (Xie et al., 2022, Nature Medicine) shows a long-term, substantial rise in risk of cardiovascular disease, including heart attack and stroke, after a SARS-CoV-2 infection. Even a mild case of COVID-19 can increase a person's risk of cardiovascular problems for at least a year after diagnosis. Xie et al. found that rates of many conditions, such as heart failure and stroke, were substantially higher in people who had recovered from COVID-19 than in similar people who hadn't had the disease. What's more, the risk was elevated even for those who were under 65 years of age and lacked risk factors, such as obesity, diabetes, being or having been a smoker.

The authors based their research on an extensive health-record database curated by the United States Department of Veterans Affairs (VA). The researchers compared more than 150,000 veterans who survived for at least 30 days after contracting COVID-19 with two groups of uninfected people: a group of more than five million people who used the VA medical system during the pandemic, and a similarly sized group that used the system in 2017, before SARS-CoV-2 was circulating.

People who had recovered from COVID-19 showed stark increases in 20 cardiovascular problems over the year after infection. For example, they were 52% more likely to have had a stroke than the contemporary control group, meaning that, out of every 1,000 people studied, there were around 4 more people in the COVID-19 group than in the control group who experienced stroke. The risk of heart failure increased by 72%, or around 12 more people in the COVID-19 group per 1,000 studied. Hospitalization increased the likelihood of future cardiovascular complications, but even people who avoided hospitalization were at higher risk for many conditions.

The authors cautions that the study's observational nature comes with some limitations. For example, people in the contemporary control group weren't tested for COVID-19, so it's possible that some of them actually had mild infections. And because the authors considered only VA patients — a group that's predominantly white and male — their results might not translate to all populations. Regardless, the study again points to the importance of protection against COVID-19, both in terms of the short and long term implications on one's health.

Xie et al. Long-term cardiovascular outcomes of COVID-19. Nature Medicine (2022).
https://www.nature.com/articles/s41591-022-01689-3
https://doi.org/10.1038/d41586-022-00403-0

5 Booster effectiveness wanes after 4 months (but still protects against the risk of hospitalization)

Booster shots of the Pfizer-BioNTech and Moderna vaccines lose substantial effectiveness after about four months — but still provided significant protection in keeping people out of the hospital during the omicron surge, according to a study published on February 11th by the Centers for Disease Control and Prevention. Researchers found the booster shots remained highly effective against moderate and severe COVID-19 for about two months after a third dose. But their effectiveness declined substantially after four months, rekindling debate on the need for additional boosters.

During the time when the Omicron variant dominated, the Pfizer or Moderna COVID-19 vaccine was 87% effective at preventing emergency and urgent care visits and 95% effective at preventing hospitalizations in adults who received a third dose in the prior two months. Four months after the booster shot, effectiveness dropped to 66% against emergency (ER) visits and 78% against hospitalizations.

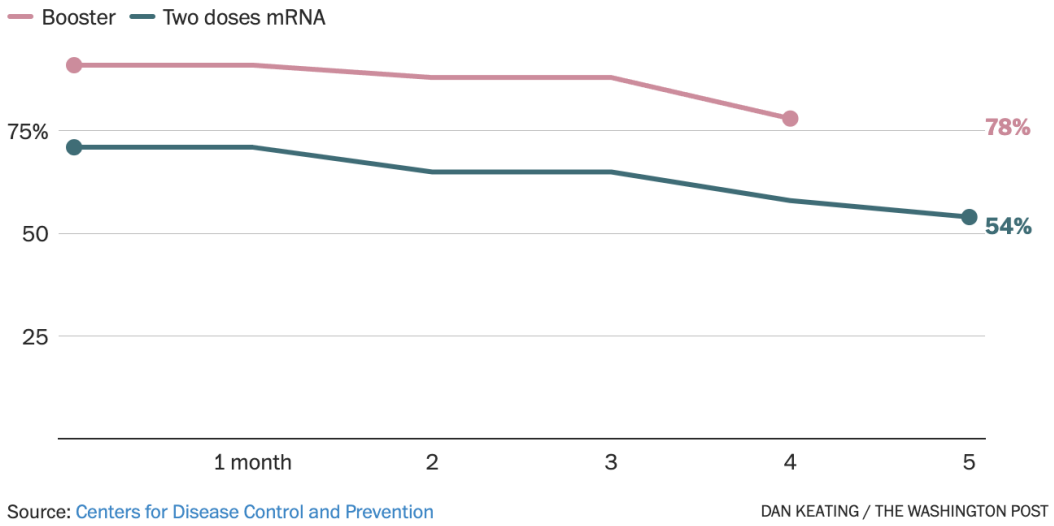


Figure 9: *With the Omicron variant, the reduction in risk of hospitalization provided by vaccines declined steadily, according to analysis by the Centers for Disease Control and Prevention. By the fourth month, booster vaccines were less effective, as well.*

The study published in the CDC's Morbidity and Mortality Weekly Report looked at 241,204 emergency department visits and 93,408 hospitalizations in 10 states from August 2021 to Jan. 22, 2022. The CDC said about 10% of the people were boosted and more than half the people hospitalized were over 65. A third dose was more effective than a second dose but less effective over time, the study found.

The study was no surprise because previous research showed vaccine and booster effectiveness wanes over time, but it appears the booster effectiveness against the Delta variant was stronger than against Omicron, the CDC said. The highly transmissible Omicron variant now accounts for almost 100% of COVID cases in the United States. The findings about the period when Omicron dominated were based on a small sample of fewer than 200 patients who'd gotten the booster at least four months earlier. Overall, the study provides more proof that vaccines work and keep people out of the hospital.

In a separate study reported on February 11th, adverse reactions were less frequent after a third dose than a second dose in adults who received the same COVID-19 vaccine for all their doses.

https://www.cdc.gov/mmwr/volumes/71/wr/mm7107e2.htm?s_cid=mm7107e2_w
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