KU LEUVEN

DEPARTMENT OF MICROBIOLOGY, IMMUNOLOGY AND TRANSPLANTATION

UZ LEUVEN | LABORATORIUMGENEESKUNDE

Genomic surveillance report

Update for Belgium, 15/02/2022

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Content

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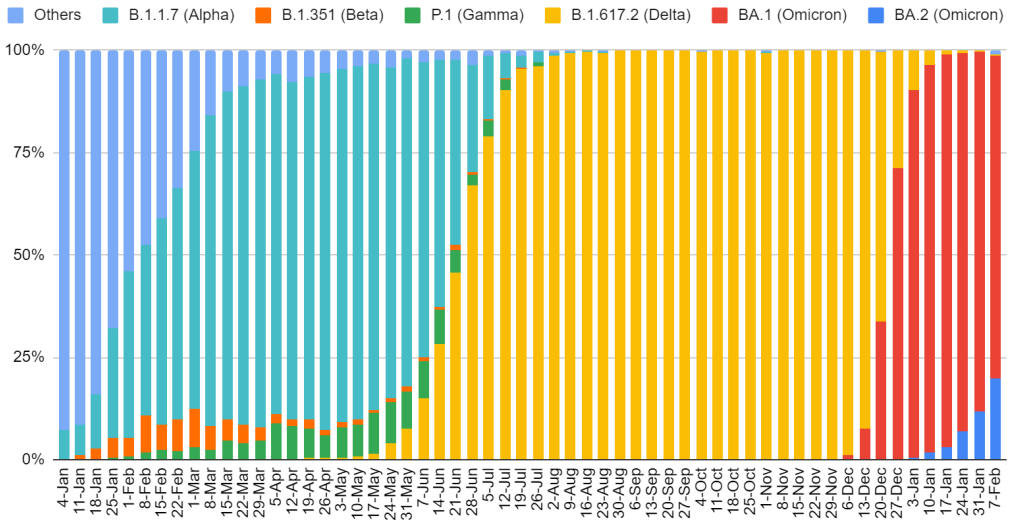
Executive summary

During the last two weeks (31/1/2022 to 13/2/2022, representing 1757 sequences at this stage), BA.1 and BA.1.1 jointly represented 85.1% of the circulating strains, while BA.2 and Delta represented respectively 14.2% (↗↗) and 0.3% (↘↘) of the strains sequenced as part of the baseline surveillance.



The share of BA.2 is increasing and approaching 30% 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 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 two weeks, but we observe no sign, at least at this stage, that this phenomenon will lead to a marked new wave of infections. The evolution will nevertheless need to be continuously monitored considering that this new variant will become dominant simultaneously with reopening of nightlife and reduction of some disease control measures. These two elements may, to some unknown extent, disrupt the current equilibrium.

1 Epidemiological context and indicators related to diagnostic activities

The current decline in the reported number of infections is associated with a continued decline in the positivity rate among diagnostic PCR tests performed at the Federal Platform Laboratories (Figure 1). This trend is consistent with a non-artificial decline, although the positivity rate remains high (30%, compared to 40% last week).

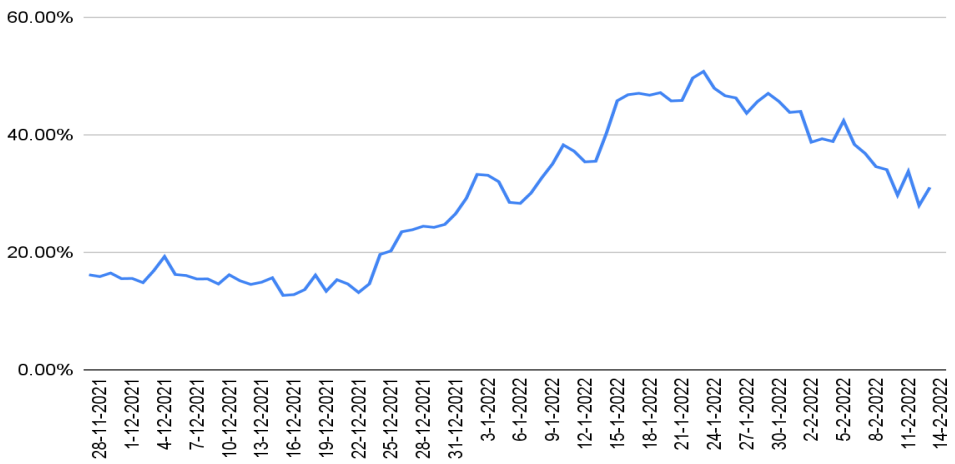


Figure 1: *Positivity rate among the Federal Platform Laboratories.*

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 72% (compared to 83% last week) of positive samples diagnosed (Figure 2).

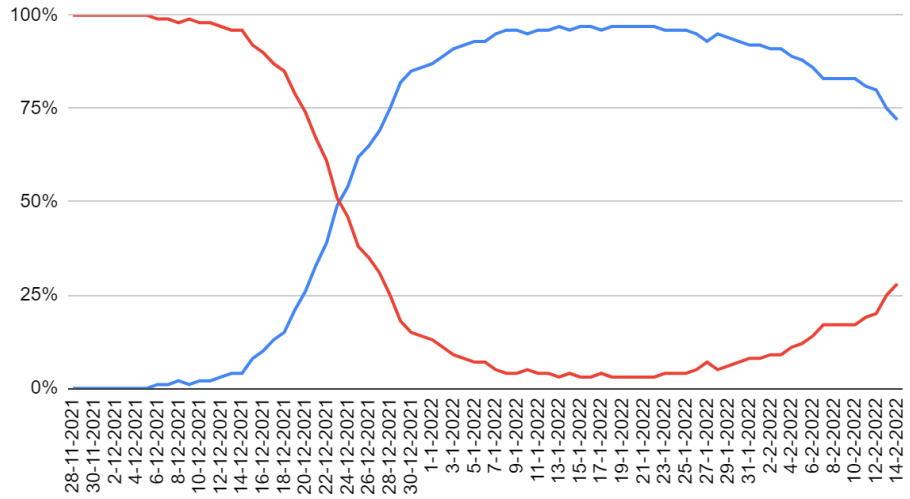


Figure 2: *S Gene Target failure (blue: BA.1 & BA.1.1) and others (red: BA.2 and Delta) among positive samples reported by the Federal Platform laboratories.*

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. We can nevertheless not fully predict the impact of an increase in the total number of high risk social interactions.

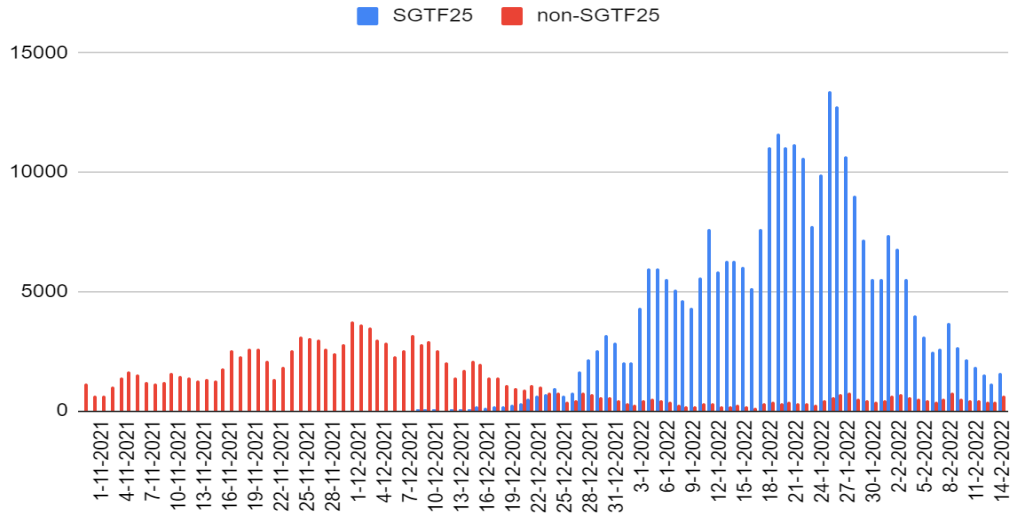


Figure 3: *Number of samples tested positive in the Federal Platform Laboratories with S Gene target failure (SGTF, blue) and without SGTF (non-SGTF, red).*

2 Monitoring of Variants of Concern in Belgium

During the last two weeks of surveillance (31/1/2022 - 14/2/2022), BA.1 and BA.1.1 jointly represented 85.1% of the circulating strains, while BA.2 and Delta represented respectively 14.2% and 0.3%.

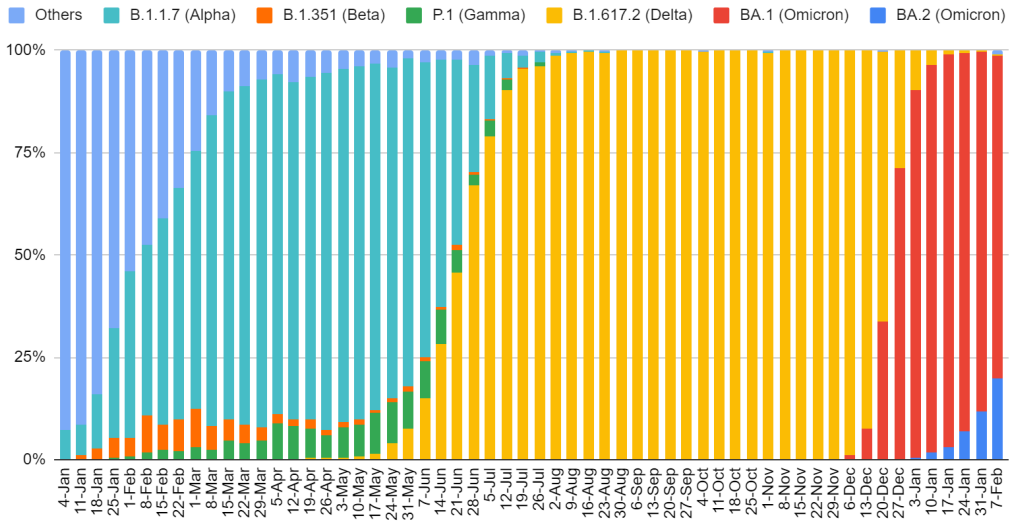


Figure 4: *Share of variants of concern per week in Belgium*

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

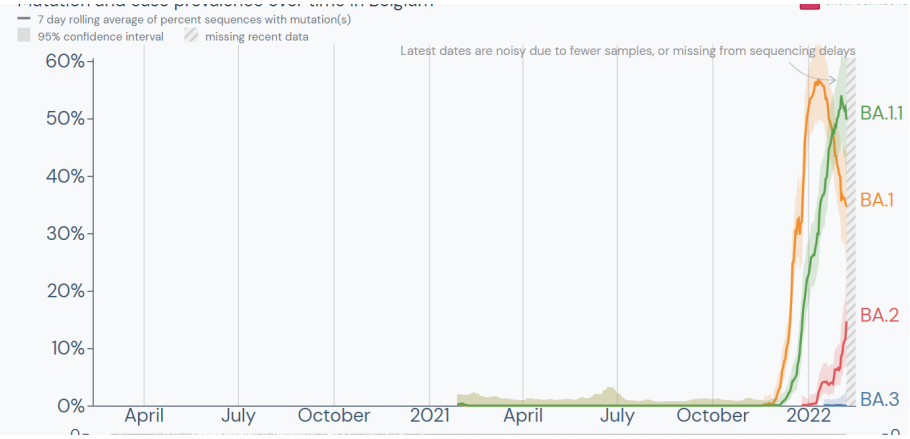


Figure 5: *Share of Omicron sublineages in Belgium (source)*

3 Situation in Denmark

The epidemiological situation in Denmark (where BA.2 has become the dominant lineage) can provide useful insights on the potential impact of the release of contact-restriction policies. In this country, a very high plateau of infections seems to be observed since a couple of weeks (Figure 6), while the total number of documented infections sharply decreases in Belgium.

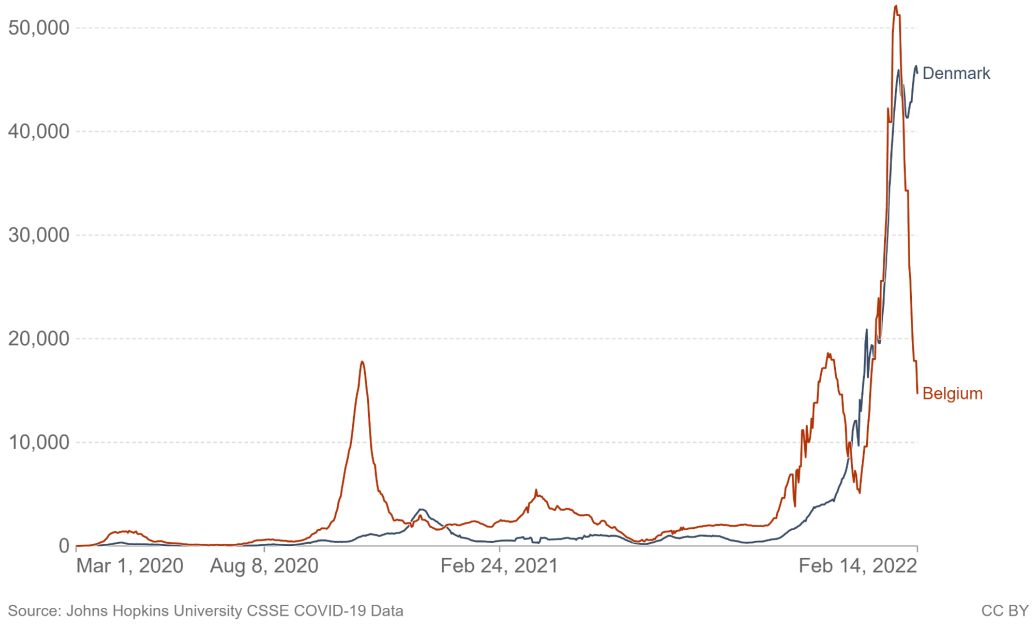


Figure 6: *Daily confirmed COVID-19 cases in Belgium and Denmark. (Source : Our World in Data)*

Measuring the impact of sustained high viral circulation on mortality is challenging, as this phenomenon remains very recent. While the total number of deaths associated with a positive COVID-19 test sharply increases, the proportion of the deaths imputed to COVID-19 remains unclear (Figure 7) and the impact on excess mortality cannot yet be fully measured due to the delay in reporting (Figure 8).

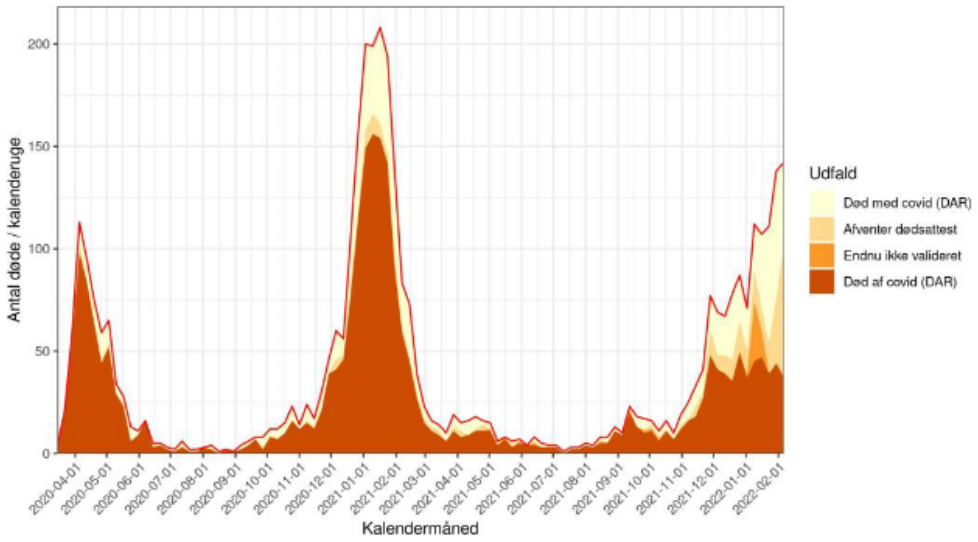


Figure 7: *Daily confirmed deaths associated with a COVID-19 diagnosis in Denmark. The deaths imputed to COVID-19 are coloured in Dark Orange and the deaths associated with a positive COVID-19 test but not imputed to COVID-19 are coloured in yellow. The light orange cases still need to be fully assessed, and the outcome of this evaluation will provide a better view on the impact of the current policies in Denmark (source: SSI.dk).*

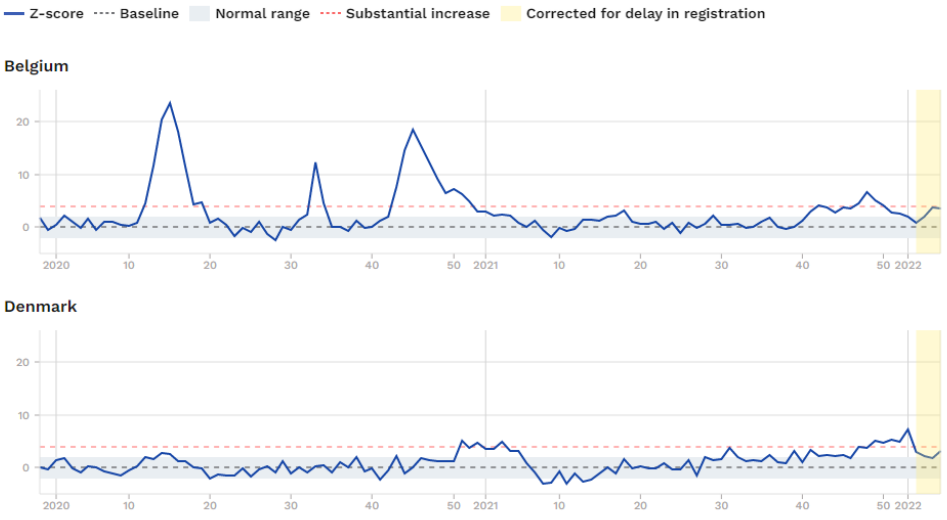


Figure 8: *Excess mortality in Belgium and Denmark. The early days of February were associated in both countries with a discreet excess mortality. The full impact of the Omicron wave in Belgium and the sustained high viral circulation in Denmark cannot yet be fully assessed due to the delay of mortality compared to infections and the delay of reporting (source: Euromomo.eu).*

4 ‘Deltacron’ emergence in the United Kingdom?

The past few days have seen several news reports bring the ‘Deltacron’ variant back under our attention. The term ‘Deltacron’ is being used to refer to a ‘hybrid’ SARS-CoV-2 strain that appears to be a mix between the Delta and Omicron variants. This ‘Delta x BA.1 Recombinant’ strain is currently listed as a variant under monitoring in the UK Health Security Agency’s (UKHSA) SARS-CoV-2 variant data update from February 11, 2022.

Earlier, when such reports had surfaced from a lab in Cyprus, experts stated that such a hybrid strain was most likely the result of lab contamination and not a new worrying variant. We will keep monitoring the information released by UKHSA to determine whether or not this is an actual novel variant. Regardless, and according to an interview with Professor Paul Hunter, an infectious disease expert at the University of East Anglia, there is currently no reason for concern because the majority of the UK population is vaccinated or have a certain level of immunity from surviving the disease. If a real variant, case numbers would also be low given the level of genomic surveillance being performed in the UK.

We would like to note that official communication / news could not be found at this time, and apart from the hybrid strain being listed by the UKHSA as a variant under monitoring, information is very scarce at the moment.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1054328/routine-variant-data-update-22-data-england-11-february-2022.pdf

5 Vaccination decreases odds and duration of long COVID

A new review by UKHSA shows that people who have had one or more doses of a coronavirus (COVID-19) vaccine are less likely to develop long COVID than those who remain unvaccinated. UKHSA performed a rapid evidence review looking at the effects of vaccination against long COVID or post-COVID symptoms, including 15 UK and international studies that were undertaken up until January 2022. Symptoms of long COVID or post-COVID syndrome can last for more than 4 weeks after their initial infection, with the 3 most common symptoms being fatigue, shortness of breath and muscle or joint pain. For most people, symptoms of long COVID are short-lived and resolve overtime. But for some, symptoms can be more severe, longer lasting and disrupting to their daily lives.

The data from some of the studies included in the review suggests that (i) people with COVID-19 who received 2 doses of the Pfizer, AstraZeneca, or Moderna vaccines or one dose of the Janssen vaccine, were about half as likely as people who had received incomplete vaccination or were unvaccinated to develop long COVID symptoms lasting more than 28 days, and (ii) that vaccine effectiveness against most post-COVID symptoms in adults was highest in people aged 60 years and over, and lowest for younger participants (19 to 35 years).

Four studies specifically compared long COVID symptoms before and after vaccination. Three of these studies suggested that more people with COVID-19 reported an improvement than a worsening in symptoms after vaccination, either immediately or over several weeks. Another 3 studies of unvaccinated people with long COVID compared ongoing symptoms in those who either went on to receive a vaccination or remained unvaccinated. These studies suggested that those who were vaccinated were less likely to report long COVID symptoms after vaccination than people who remained unvaccinated over the same period. In one study, of those participants who reported having long COVID, a greater proportion of vaccinated participants said their symptoms improved compared to unvaccinated participants (23.2% compared to 15.4%, respectively).

UKHSA's review points to these studies as adding to the potential benefits of receiving a full course of the COVID-19 vaccination. Vaccination is the best way to obtain protection from serious symptoms upon infection and may also help to reduce the longer-term impact. People who received 2 doses of a vaccine against COVID-19 were less likely to develop long COVID symptoms or experience symptoms for a shorter time, compared with those unvaccinated. Individuals who received a vaccination after being infected with COVID-19 also reported that the duration of post-COVID symptoms was less than for those who were unvaccinated. Two doses of the COVID-19 vaccination provide a high level of protection against long COVID, compared to one dose or no doses.

https://www.gov.uk/government/news/ukhsa-review-shows-vaccinated-less-likely-to-have-long-covid-than-unvaccinated

6 Vaccination followed by breakthrough Omicron infection improve cross-neutralization of VOCs

A preprint study (therefore to be looked at with precautions at this stage) from South-Africa entitled “SARS-CoV-2 Omicron triggers cross-reactive neutralization and Fc effector functions in previously vaccinated, but not unvaccinated individuals” (Richardson et al.) suggests that Omicron-triggered neutralization is not extensively cross-reactive to previous VOCs, with 20 to 43-fold reductions in titer. In contrast, vaccination followed by breakthrough Omicron infection improved cross-neutralization of those VOCs, with titers exceeding 1:2,900. This has important implications for the vulnerability of unvaccinated Omicron-infected individuals to reinfection by circulating and potentially emerging VOCs.

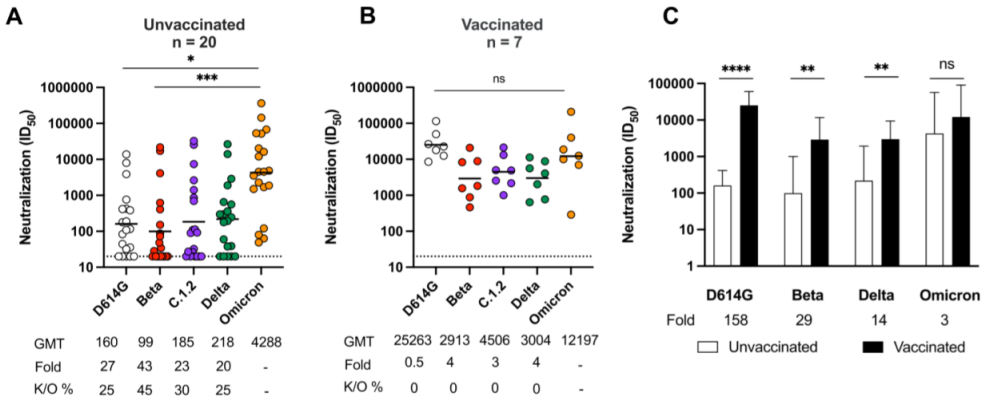


Figure 9: *Neutralization titer (ID50) of Omicron-infected plasma against D614G, Beta, C.1.2, Delta and Omicron pseudoviruses shown for (A) unvaccinated individuals (n=20) or (B) individuals vaccinated with either one dose of Ad26.CoV.2S or two doses of BNT162b2 (n=7). Lines indicate geometric mean titer (GMT) also represented below the plot with fold decrease and knockout (K/O) of activity for other variants as a percentage relative to Omicron. Dotted lines indicate the limit of detection of the assay. Statistical significance across variants is shown by Friedman test with Dunns correction. (C) Bars show geometric mean neutralization titers for vaccinated (black) and unvaccinated (white) individuals against variants of concern with error bars showing standard deviations with fold decreases relative to vaccinated individuals indicated below the plot. Statistical significance between vaccinated and unvaccinated samples by the Mann Whitney test. *p<0.05; **p<0.01; ***p<0.001; ****p<0.0001 and ns = non-significant. All data are representative of two independent experiments* (https://www.medrxiv.org/content/10.1101/2022.02.10.22270789v1)