17 December 2021

COVID-19 Update

Omicron primer – what we know so far

Key takeaways

- We still have limited data and all estimates and conclusions are subject to changes, as more data and studies are available. Most studies are preprints and not peer-reviewed yet.
- Higher risk of re-infections and breakthrough cases because of omicron, as e.g. vaccine effectiveness against infection is much lower compared to delta. Household transmission is higher for omicron compared to delta. Non-household secondary attack rates are very similar for omicron compared to delta.
- Vaccine efficacy against symptomatic disease after two vaccine doses declines significantly for omicron compared to delta. Effectiveness is restored after the booster. We still do not know for how long protection lasts but a German study suggests protection against omicron wanes after three months, just like after the two first doses against delta.
- Still relatively high vaccine efficacy against hospitalisation after two doses of mRNA. Likely higher after the third jab. Most likely also high for previously infected.
- Many of the new treatments (Pfizer's Paxlovid, Merck's Molnupiravir and GSK's Xevudy) remain effective against omicron. Effectiveness of most current monoclonal antibodies is reduced significantly.
- It is too early to conclude that omicron is a milder variant in itself. The reason for mild-to-moderate cases may simply be due to high immunity degrees across countries where omicron is/about to become dominating. One explanation why it may spread faster but is milder is that it infects human bronchus faster than in the lung.
- Lower micro/individual risk may still lead to worse outcomes from a macro perspective. If the waves become big enough more people may be admitted to hospitals despite a weaker relationship between new cases and hospitalisations.

Key questions going forward

- How fast will omicron spread? Will the daily growth rate start to decline after the very rapid spreading in the early stage?
- Is omicron milder or are lower hospitalisations due to a higher degree of immunity from vaccines and/or infections?
- Vaccine efficacy waned quickly after two doses of Pfizer or Moderna. Is the third dose more long-lasting?
- Will countries start using updated vaccines against omicron once ready? And when are they ready?

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Details

Projections

- In South Africa, new cases have risen sharply higher reaching new record-highs. New deaths are still moving sideways. While there is definitely a few weeks lag from a new outbreak to more deaths, it may also be because omicron is milder and/or a high degree of immunity (we discuss more below). It is clear, however, that hospital admissions are rising despite a weaker relationship between new cases and hospitalisations, highlighting that although the individual risk of severe disease is lower, hospitals may still come under pressure if the wave gets big enough, see *tweet*.
- In Denmark, authorities (Statens Serum Institut) estimate that new cases are likely to move significantly above 10,000 (which is the current level). They assume omicron is 1.5 times more contagious than delta and vaccine efficacy against disease is basically 0% after two doses of mRNA. They also estimate that the risk of hospitalisations is reduced by 50%. Denmark is sequencing all positive cases and omicron is now accounting for 20% of all cases and rising.
- In Norway, *a scenario analysis from FHI (in Norwegian)* indicates new cases will increase to the range 90,000-300,000 in three weeks without new restrictions (50-200 hospital admissions per day).
- Also projections in the UK for hospitalisations are looking grim, see *Barnard et al (2021)*. The analysis is, however, based on the assumption that omicron is as severe as delta. Prime Minister Boris Johnson has warned the UK is facing a "tidal wave" of omicron infections. The UK may already have at least 200,000 omicron cases per day, see *Financial Times*.
- Denmark, Norway and the UK all estimate that omicron will dominate within 1-3 weeks.
- We would like to emphasise, however, that although omicron is more contagious (also due to more breakthrough cases both among vaccinated and previously infected, see more below), it is still very difficult to estimate exponential growth based on still small numbers. The projections are based on very high reproduction numbers (2-3 days doubling time), which have been true in the early stage of omicron, but may not continue going forward. We have seen this with previous variants as well. In Denmark, the daily growth rate of omicron has declined significantly.

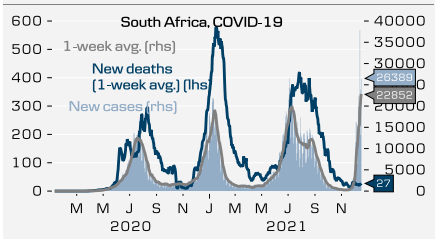
Transmissibility

- It is still very early to make firm conclusions on how contagious omicron is relative to delta, as data are still limited at this point. Premature data from the UK show that 19% of omicron cases gave rise to a secondary household case vs. 8.3% for delta (odds ratio for household transmission from an omicron case is 3.2 compared to delta). The conclusions are still very premature since the analysis is based on 72,761 delta cases vs. 121 omicron cases. Another analysis shows that secondary attack rates for non-household rates are quite similar for delta and omicron, however. For more details see *UK Technical Briefing 31*.

Severity

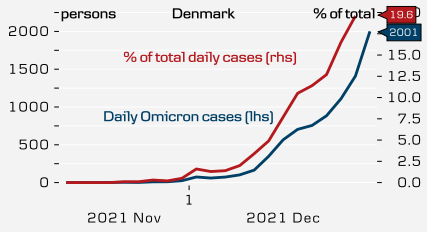
- A hot topic is whether omicron is a milder variant or not. One hypothesis is that the variant in itself is not milder but that more people are now protected, either from being vaccinated or from natural immunity. If the risk of breakthrough cases (both for

Big omicron wave but deaths not rising yet – is omicron milder or is it because of higher immunity?



Sources: WHO, Macrobond Financial

Omicron is becoming the dominating variant in Denmark



Source: Statens Serum Institut, Macrobond Financial

vaccinated and previously infected) is higher, they are most likely not going to get seriously ill due to e.g. T-cells. So the impression that omicron is milder may simply be due to a high degree of immunity, meaning that countries with lower degrees of immunity are still at risk. This is a hypothesis and more investigations are needed.

- In South Africa, real-world data indicate that most cases are mild (recovery within few days) and that proportion of high care and ICU admissions is lower compared to previous waves, see *tweet*. See also *Reuters*. But severity may be masked, as a survey shows 72% of Guateng population are previously infected, i.e. there is a high degree of immunity in South Africa already, see *Bloomberg*.
- In South Africa, the case fatality rate (CFR) has fallen sharply amid the big omicron wave. It is, however, premature to say it is milder based on CFR. The CFR may be lower simply because we are in the early stage of a new wave and because of more testing. It usually take a few weeks before we start to see more deaths. Director of the Centre for Epidemic Response and Innovation in South Africa, Tulio de Oliveira, says *"it's a little bit early to say it's mild",* see *CBS*.
- According to the *ECDC*, all cases in the EU/EEA *"were either asymptomatic or mild"* and notice that *"there have been no omicron-related deaths reported thus far".* ECDC says the number of cases is still too low to understand whether omicron differs from e.g. delta. According to the US CDC, cases in the US have also been mild-to-moderate so far, but they emphasise the lag between new variants arrive until we see more severe outcomes, see *CNN*. One person has died in the UK.
- A *new study from the LKS Faculty of Medicine, The University of Hong Kong* shows that omicron infects and multiplies 70 times faster than the delta variant in human bronchus, which may explain why the new variant spreads faster. Interestingly, the study also shows infection in the lung is significantly lower than delta, which may explain why it may be milder, as lower respiratory infections are generally more serious than upper respiratory infections. For more see also *Reuters*. It is, however, an early study and the study only looks at what happens during the first 48 hours after infection. See also chart 1 in the appendix.
- It is difficult to estimate how severe omicron is, as omicron, at least in Europe and in the US, is so far spreading mostly among younger people. Risk estimates may be revised up when older people start to get infected.
- Another thing we would like to emphasise is that although the micro/individual risk of severe illness is lower, the macro risk may increase, simply because so many more people get infected. If the waves get big enough, the absolute level of hospitalisations may get bigger than last year, despite a weaker relationship between the number of new cases and hospitalisations.
- WHO warns against dismissing the variant as a mild variant based on limited data, see *CNBC*. WHO emphasises that even if it is less severe, a very big wave may overwhelm health care systems.

Vaccine efficacy

- Preliminary UK data show that vaccine effectiveness against symptomatic disease for omicron is much lower than against delta, except for newly vaccinated (2-9 weeks ago), see chart 2 in the appendix. Vaccine efficacy after two Pfizer doses is approximately 30% (but waning over time). Vaccine effectiveness against symptomatic disease increases to 70-75% in the early period after a booster dose. The study emphasises that

effectiveness against severe disease is usually higher but it will take some weeks before it can be estimated for omicron. For more details see *UK Technical Briefing 31*.

- A real-world data from South Africa show that two doses of Pfizer reduce the risk of hospitalisation by 70% compared to unvaccinated people (versus 93% for delta), see *tweet* and *tweet*. See also chart 3 in the appendix. Protection is lower for elderly, probably due to a combination of earlier vaccinations and weaker immune response to vaccines in general, see *tweet*. Vaccine effectiveness against infection is 33% for omicron versus 80% for delta (waning over time, see *tweet*).
- Another study shows there would be 73% protection against symptomatic disease from omicron and 95% against severe infections for those who had been vaccinated and previously infected, see *Bloomberg*.
- A study by *Mandelboim et al (2021)* finds neutralisation titers (for more on what neutralisation titers are see *News Medical* but basically it is a way to measure the level of antibodies) against omicron increase 100-fold (4-fold reduction compared to delta) after the third Pfizer dose. The same study finds that there are no neutralisation against omicron five months after the second Pfizer dose. See also chart 4 in the appendix. The findings are supported by *Kok et al (2021).* Also see *Reuters*.
- A study by *Montefiori et al (2021)* finds that neutralisation titers also increase significantly after the third Moderna dose (approximately 12-fold improvement).
- A study by *Balazs et al (2021)* finds that the level of neutralisation titers after a booster shot is quite similar for Moderna and Pfizer. Neutralisation titers for Johnson & Johnson boosted by Moderna also increase but not to the same level. The study also supports the findings that neutralisation against omicron after two doses are low or none. See also chart 5 in the appendix.
- Pfizer says a third dose of the Pfizer vaccine *"increases the neutralizing antibody titers by 25-fold compared to two doses against the Omicron variant; titers after the booster dose are comparable to titers observed after two doses against the wild-type virus which are associated with high levels of protection"* , see *press release*.
- Also the effectiveness of the Chinese SinoVac vaccine declines significantly because of omicron and researchers in Hong Kong urge people to get a booster shot as soon as possible, see *Reuters*.
- A *study by Corti et al (2021)* finds that neutralisation of omicron declines significantly across vaccine types. See also chart 6 in the appendix.
- An analysis by Alessandro Sette shows that 88% of CD4* and 95% of CD8* T cell epitopes are conserved for Omicron, see *tweet*. In other words, *"it seems likely that T cell activity will be far less impacted than neutralizing antibody responses*". This explains why the vaccines are still effective against severe disease despite the significant decline in effective against symptomatic disease. See also chart 7 in the appendix. Pfizer says *"As 80% of epitopes in the spike protein recognized by CD8+ T cells are not affected by the mutations in the Omicron variant, two doses may still induce protection against severe disease"*, see *press release*.
- The Johnson & Johnson vaccine is seemingly still effective against severe disease. South African Medical Research Council president Glenda Gray said that *"And as of today we have had no one who has died from Omicron from the J&J study, so that's the good news, it shows again that the vaccine is effective against severe disease and death"*, see *Reuters*.

- A big unknown is how quickly vaccine effectiveness against disease wanes after the third dose. Unfortunately, a German study suggests that effectiveness against omicron disease declines somewhat three months after the booster shot, see *tweet* or *Ciesek et al (2021)*. See also chart 8 in the appendix.
- Another question is whether countries will adopt updated vaccines once ready. We will know more about updated vaccines within 1-3 months. Pfizer says it expects to have it *"available by March in the event that an adaption is needed"*, see *press release*. Moderna also expects to have an updated vaccine ready by March, see *Reuters*.

Reinfection risk

- Preliminary data from the UK find that the risk ratio of reinfection for omicron is 5.2. For more details see *UK Technical Briefing 31*.
- In South Africa, the relative risk of reinfection is 40% for people infected with delta and 60% for people infected with beta, see *tweet*. See also chart 9 in the appendix. The risk has increased especially for people infected with the original strain or the beta variant compared to just a few months ago.

Treatments

- Pfizer says its Paxlovid pill, which reduces the risk of hospitalisation or death by 89% for high-risk adults, remains effective against omicron, see *press release*. Merck says the same thing about its Molnupiravir pill, although we have not seen a study so far, see e.g. *Bloomberg*. The reason is that the treatments do not target the spike protein.
- Also GSK says its treatment Xevudy remains effective against omicron based on early data, see *Reuters*.
- Many monoclonal antibody treatments show little effect on omicron, see *Klein et al (2021)* or *tweet*.

Our current COVID-19 view

We expect the COVID-19 outbreaks in the Northern Hemisphere to get worse before they get better. The virus has better conditions for spreading over the winter (as we spend more time indoors) and we know vaccine-induced immunity is waning over time. Boosters are needed, especially for elderly and people in high-risk groups, in order to ensure that the relationship between new cases, hospitalisations and deaths remain weaker compared to previous waves.

It is too early to make firm conclusions about omicron. Based on the limited information we have so far, base case is "more (breakthrough?) infections, but less severe", probably because immunity against severe illness is high due to vaccines and previous infections in many countries. Omicron seems to be more contagious than delta. Vaccines are still effective against severe disease but less effective against symptomatic disease. New treatments seem to remain effective as well. That said, if the waves get big enough, hospital capacity may come under pressure, despite a weaker relationship between new cases and hospitalisations (which is what we see in Gauteng in South Africa at the moment).

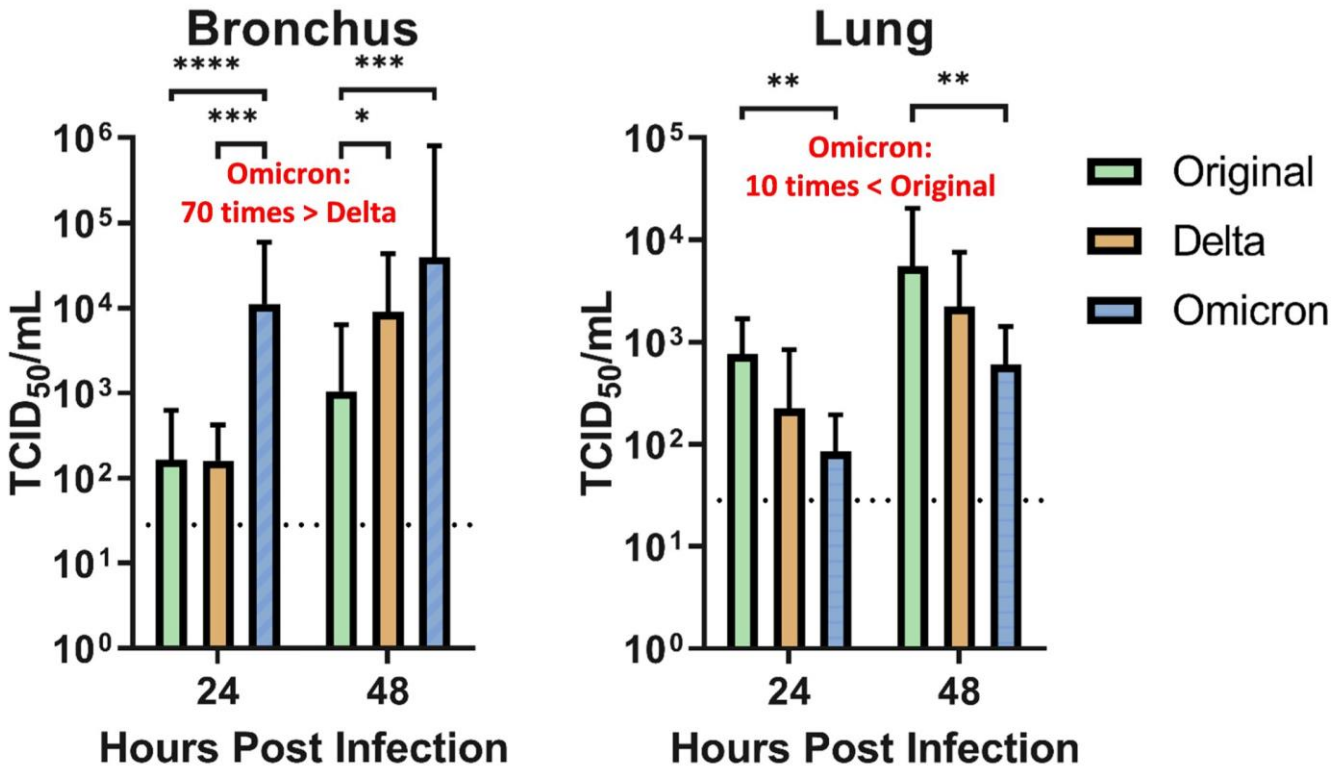
In general, countries with low vaccine uptakes are imposing tougher restrictions than countries with high vaccine uptake. Near-term risk is that more countries will lockdown again over the winter but we think there will be bigger differences in how to handle new outbreaks across countries this wave. Growth is set to be negatively affected by the new waves, either because of (partial) lockdowns or because the fear factor increases.

New waves are, in our view, inflationary in nature. From a demand perspective, it means goods consumption will remain elevated, either because people are afraid of participating in the service economy (higher fear factor) or because of restrictions. From a supply perspective, it means people will not return to the labour force, people will isolate at home due to infection, possible local shutdowns in China etc. From a central bank perspective, new waves worsen the trade-off between high inflation and still subdued employment. Pressure will grow on central banks to tighten sooner and faster.

We still believe 2022 will be the end of the pandemic. We do not think COVID-19 will go away (it is likely to become endemic) but a combination of better vaccines and better treatments mean that we should be able to handle new outbreaks, just like we have done with influenza year after year.

Appendix

Chart 1: Omicron infects and multiplies faster in bronchus than in the lung compared to delta – may explain why it spreads faster but is milder

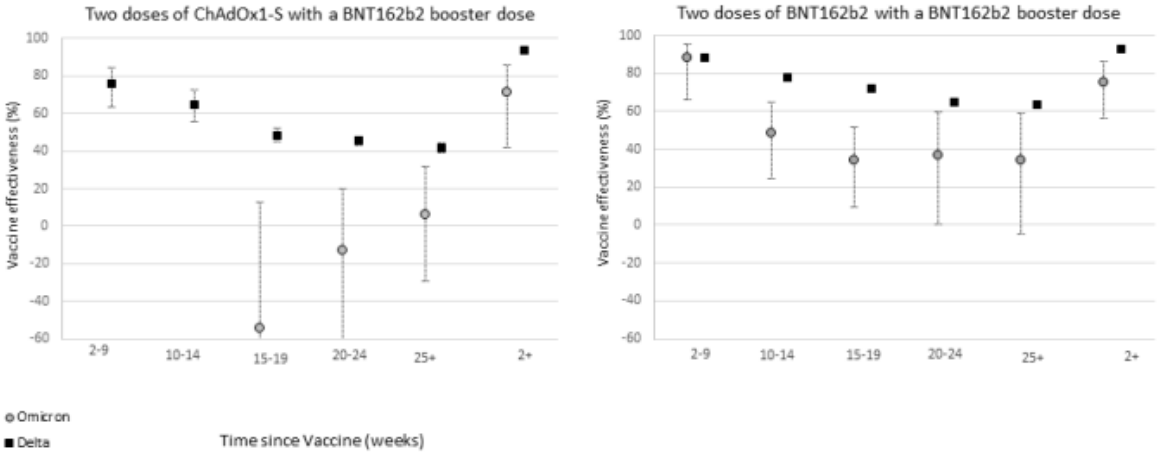


Source: LKS Faculty of Medicine, The University of Hong Kong https://www.med.hku.hk/en/news/press/20211215-omicron-sars-cov-2-infection

Chart 2: Vaccine effectiveness against symptomatic diseases for delta and omicron

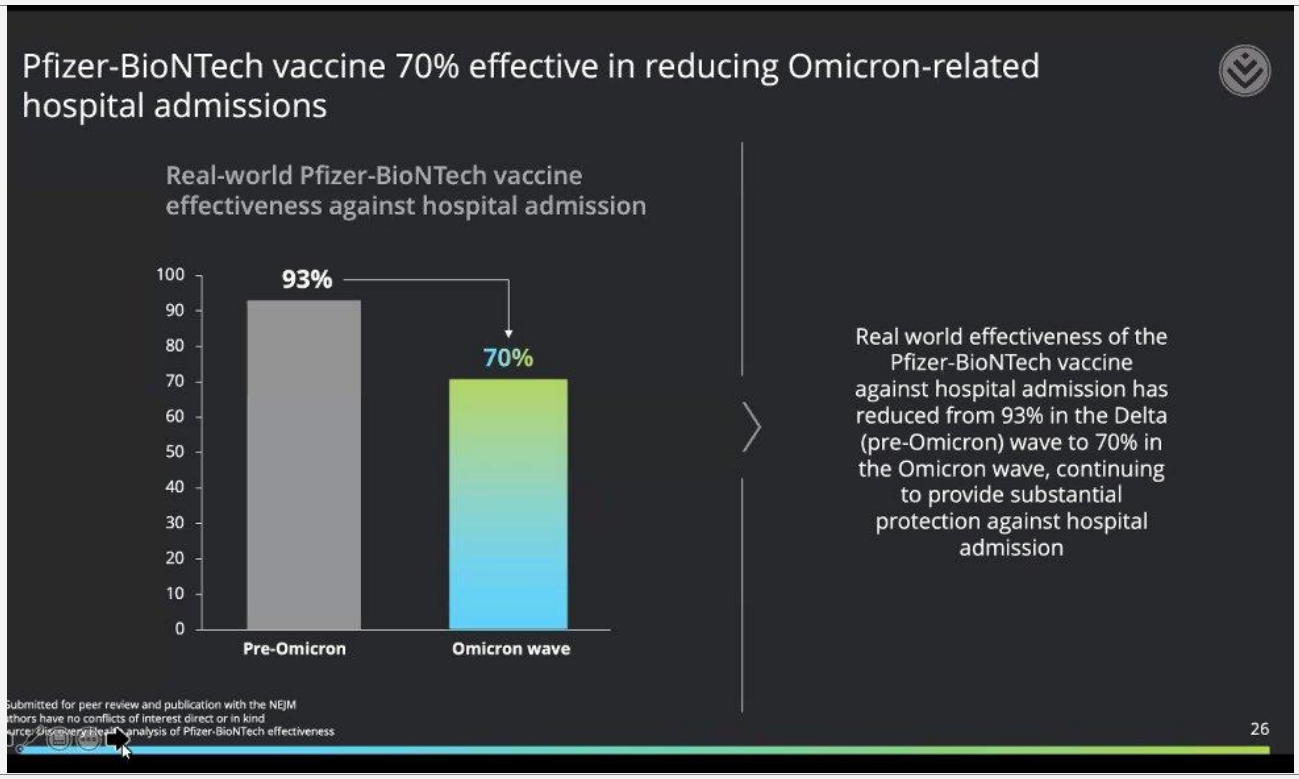
Figure 7: Vaccine effectiveness against symptomatic diseases by period after dose 1 and dose 2 for Delta (black squares) and Omicron (grey circles) for (A) recipients of 2 doses of AstraZeneca vaccine as the primary course and a Pfizer as a booster[1] and (B) recipients of 2 doses of Pfizer vaccine as the primary course and a Pfizer as a booster

Supplementary data are not available for this figure.



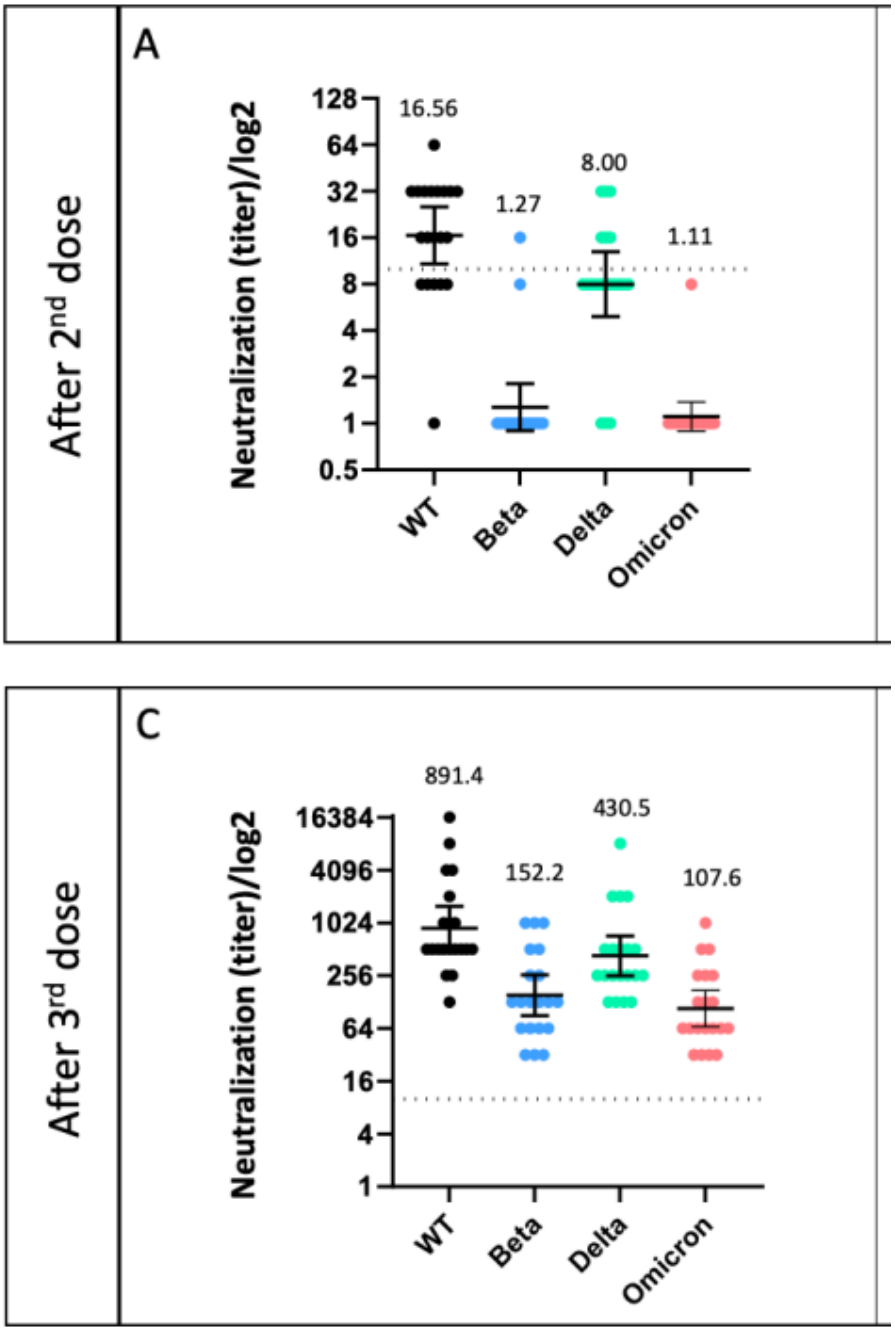
Source: UK Technical Briefing 31
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040076/Technical_Briefing_31.pdf

Chart 3: Pfizer vaccine 70% effective in reducing omicron-related hospital admissions, according to South African data



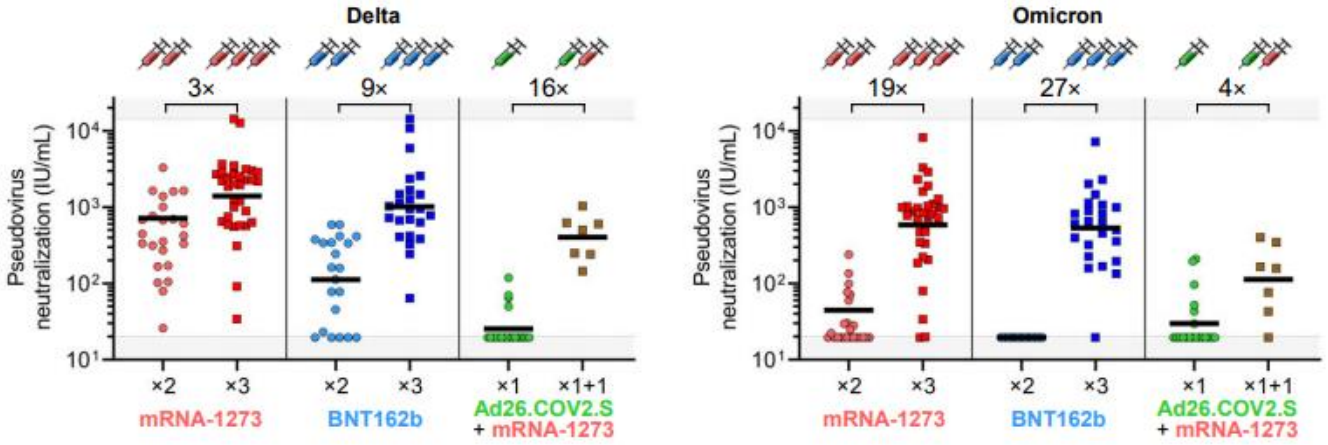
Source: https://twitter.com/miamalan/status/1470712673629261837

Chart 4: Neutralisation titers after 2 and 3 Pfizer doses



Source: Mandelboim et al (2021)

Chart 5: Neutralisation against delta and omicron



Source: Balazs et al (2021)

Chart 6: Neutralisation titers decline significantly for all vaccine types

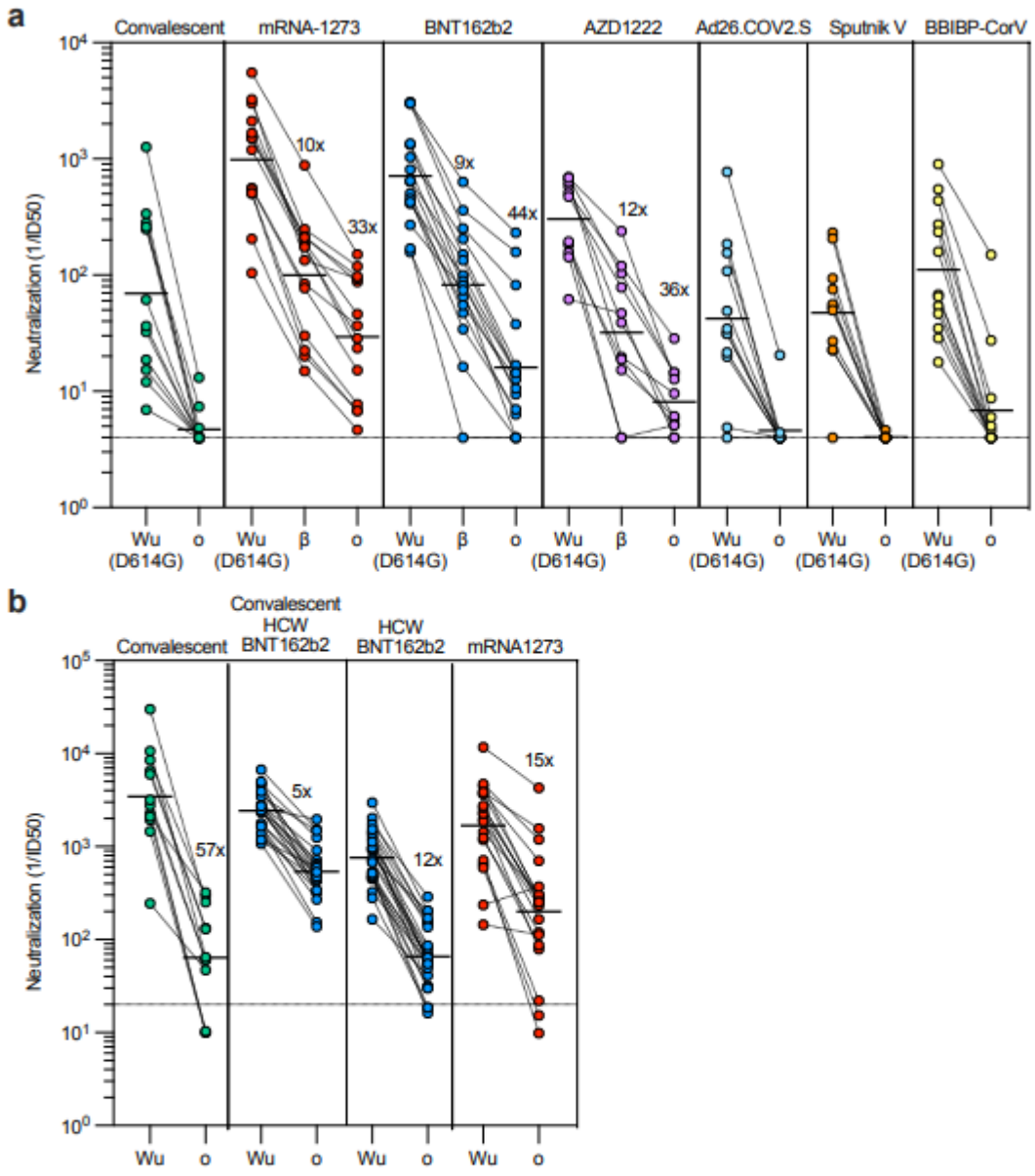
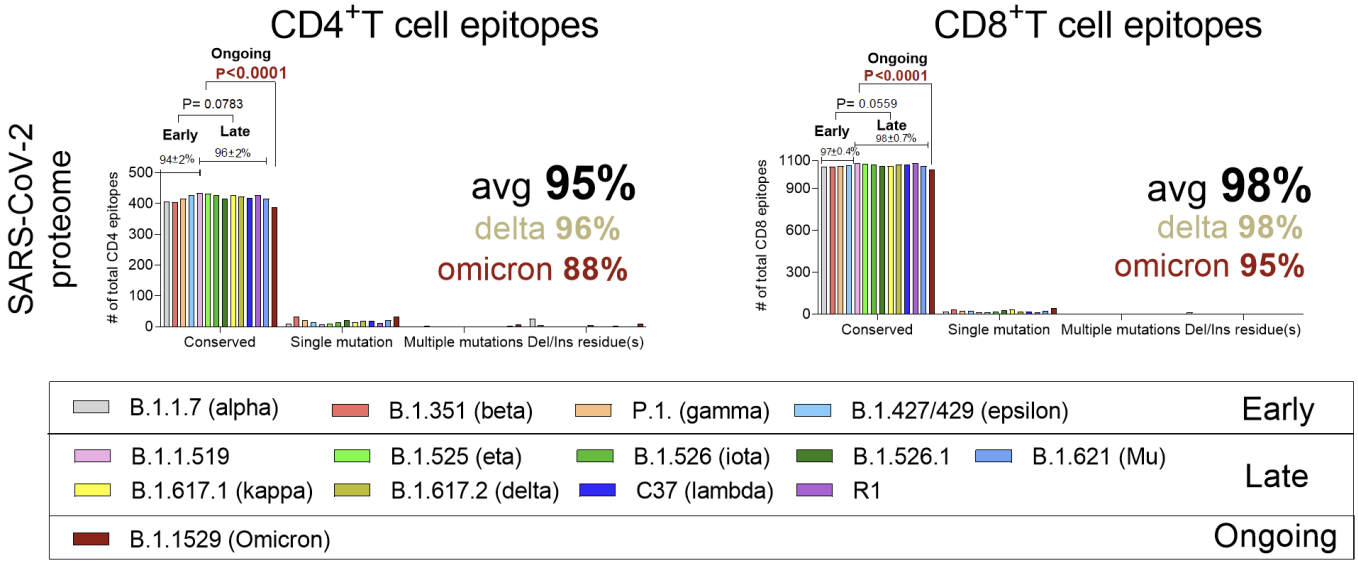


Fig. 2. Neutralization of Omicron SARS-CoV-2 VSV pseudovirus by plasma from COVID-19 convalescent and vaccinated individuals. Plasma neutralizing activity in COVID-19 convalescent or vaccinated individuals (mRNA-1273, BNT162b2, AZD1222, Ad26.COV2.S (single dose), Sputnik V and BBIBP-CorV). **a,** Pairwise neutralizing antibody titers (ID50) against Wuhan-Hu-1 (D614G), Beta and Omicron VOC. Vero E6-TMPRSS2 used as target cells. Shown one representative experiment out of 2. **b**, Pairwise neutralizing antibody titers of plasma (ID50) against Wuhan-Hu-1 and Omicron VOC. 11 out of 12 convalescent donors were hospitalized for COVID-19. Vero E6 used as target cells. Data are average of n = 2 replicates. Line, geometric mean of 1/ID50 titers. HCW, healthcare workers; Wu, Wuhan-Hu-1; o, Omicron VOC, β, Beta VOC. Enrolled donors' demographics provided in **Extended Data Table 2**.

Source: Corti et al (2021) https://www.biorxiv.org/content/10.1101/2021.12.12.472269v1.full.pdf

Chart 7: High conversation of CD4 and CD8 epitopes. T cell response likely less impacted by omicron than neutralisation antibody responses



Source: Alessandro Sette https://twitter.com/SetteLab/status/1469007632493002753

Chart 8: Early data suggest that the booster effect against symptomatic disease for omicron declines after three months (see red arrow)

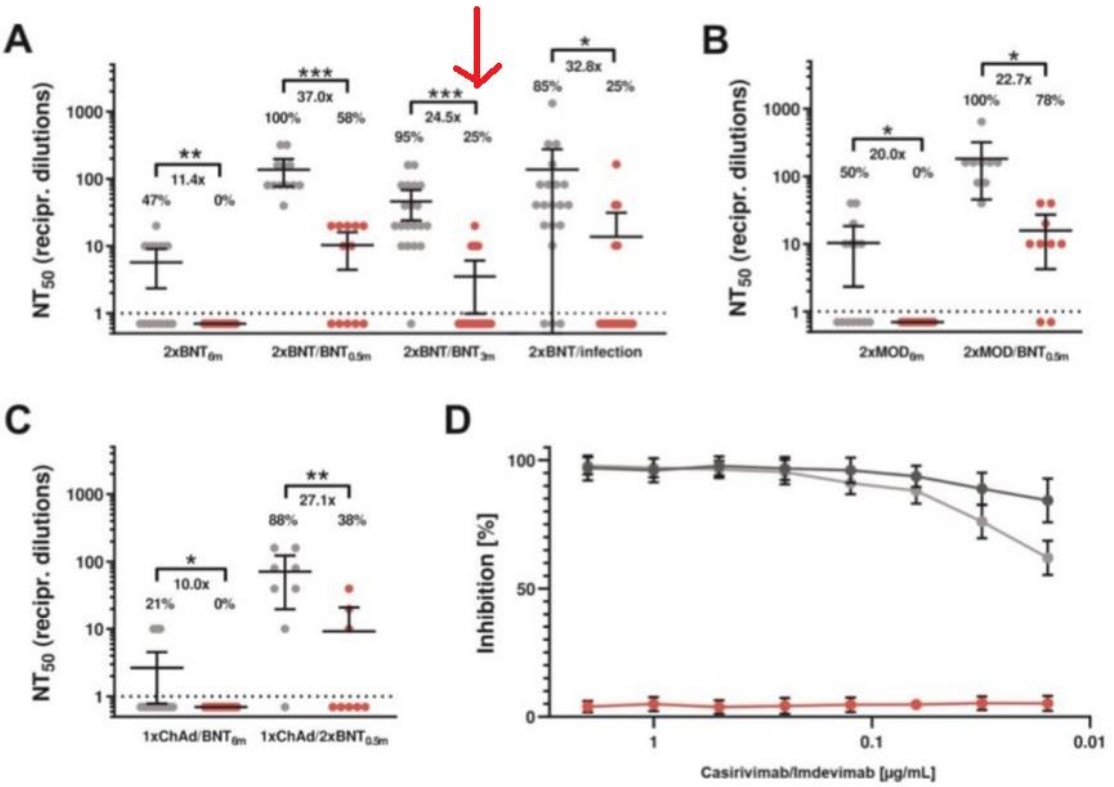
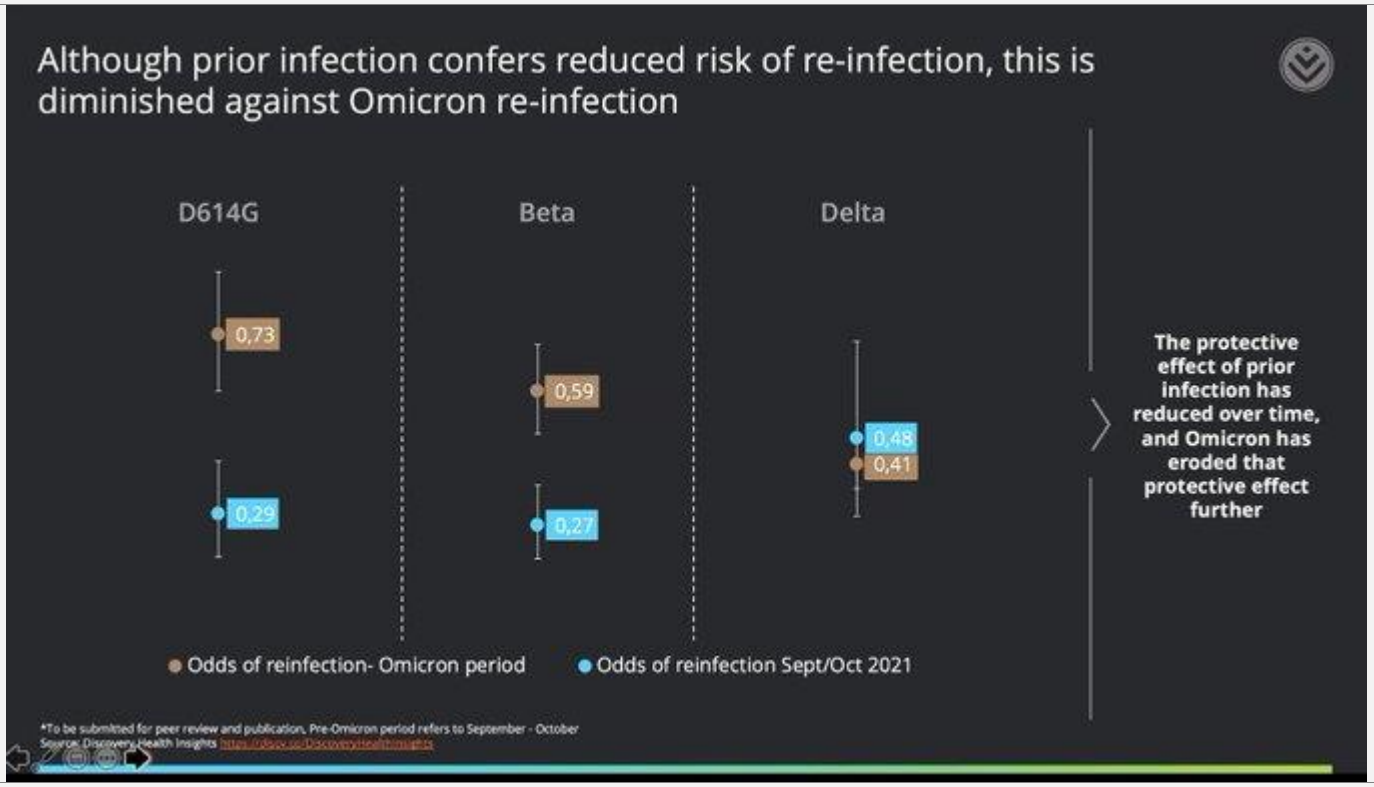


Figure 1 - Antibody-mediated neutralization efficacy against authentic SARS-CoV-2 variants Delta and Omicron. Values represent reciprocal dilutions of SARS-CoV-2 variants Delta (grey) and Omicron (red) micro-neutralization titers resulting in 50% virus neutralization (NT_{50}). **A)** Neutralization assays were performed using serum samples obtained from individuals double BNT162b2 vaccinated (2xBNT). Sera from additionally BNT162b2 boosted individuals were sampled 0.5 month (2xBNT/$BNT_{0.5m}$) or 3 month (2xBNT/BNT_{3m}) as well as sera from double BNT162b2 vaccinated and SARS-CoV-2 infected individuals (2xBNT/infection). **B)** Neutralization assays with sera from double mRNA-1273 vaccinated (2xMOD) and additionally BNT162b2 boosted (2xMOD/$MOD_{0.5m}$). **C)** Neutralization titers for sera from heterologous ChAdOx1 and BNT162b2 vaccinated (1xChAd/1x$BNT_{0.5m}$) and BNT162b2 boosted (1xChAd/2x$BNT_{0.5m}$) individuals. The x-fold reduction was determined using the difference between NT_{50} values for Delta and Omicron. Only Delta neutralizing samples were considered for the calculation. Negative titers were handled as 1. The percentages indicate the relative number of sera that achieved a measurable titer. Information regarding the sera donors (sex, age, antibody titers test and sampling dates) are summarized in in the Supplementary Appendix. **D)** Neutralization efficacy of monoclonal antibodies imdevimab and casirivimab against SARS-CoV-2 Omicron (red), B (dark grey), and Delta (grey). The indicated concentrations of mAbs casirivimab and imdevimab were applied in a 1:1 ratio. Mean values of two technical replicates per sample are depicted with 95% confidence intervals and SD. All experiments were verified using a second SARS-CoV-2 strain (Supplementary Table 4). Statistical significance compared to Delta was calculated by two-tailed, paired student's t-tests. Asterisks indicate p-values as * ($p < 0.05$), ** ($p < 0.01$), and *** ($p < 0.001$).

Source: Ciesek et al (2021) https://www.medrxiv.org/content/10.1101/2021.12.07.21267432v4.full.pdf

Chart 9: Odds of reinfection based on South African data

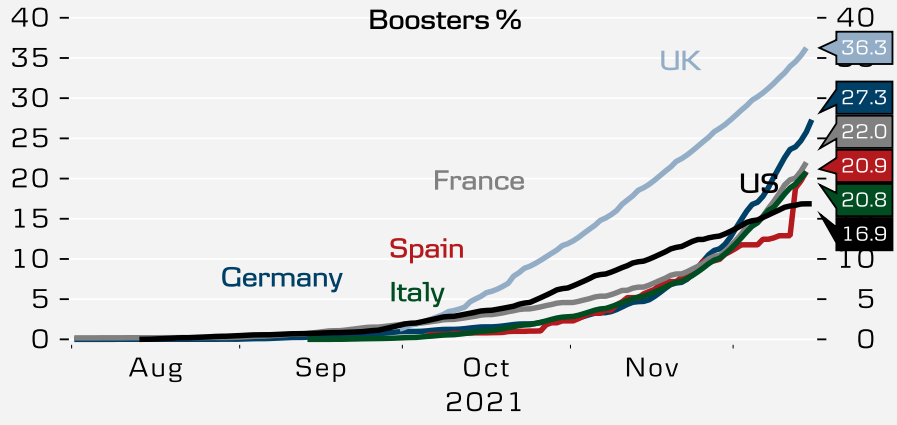


Source: https://twitter.com/miamalan/status/1470712665072971778

COVID-19 charts

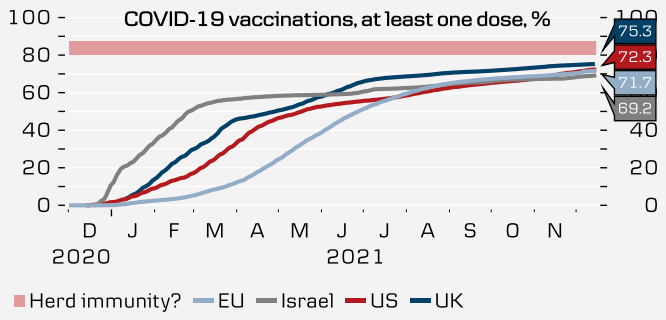
Global

EU lagging behind the UK and the US on administration of booster shots



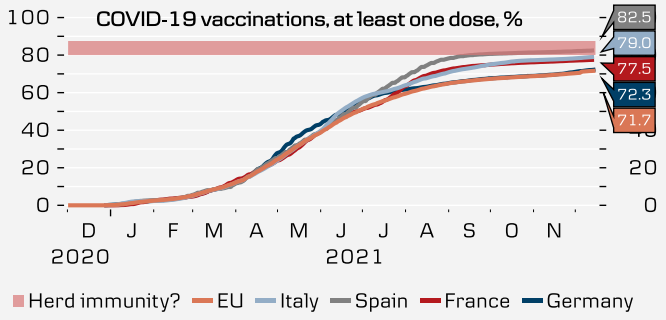
Sources: Our World In Data, Macrobond Financail

Share of people that have received at least one dose (%)



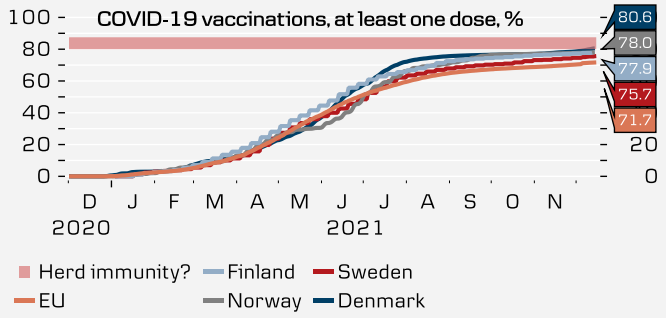
Sources: Our World In Data, Macrobond Financial

Share of people that have received at least one dose (%) - EU



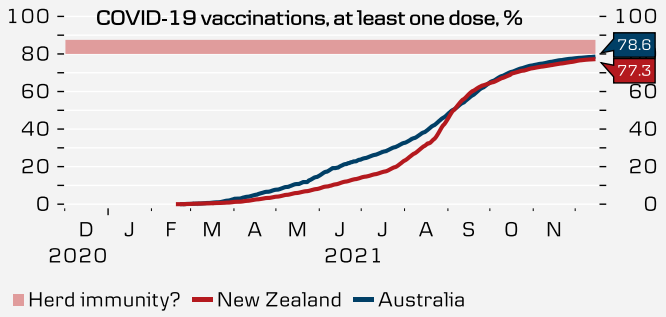
Sources: Our World In Data, Macrobond Financial

Share of people that have received at least one dose (%) - Nordic



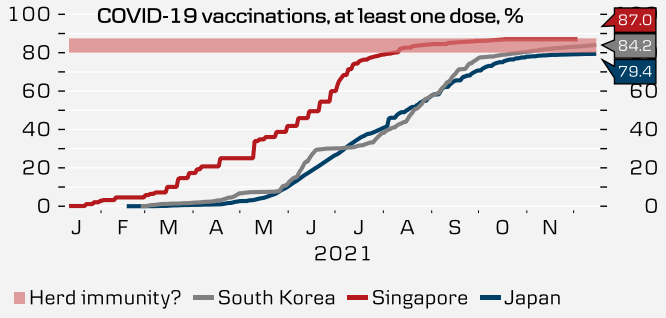
Sources: Our World In Data, Macrobond Financial

Share of people that have received at least one dose (%) - Oceania



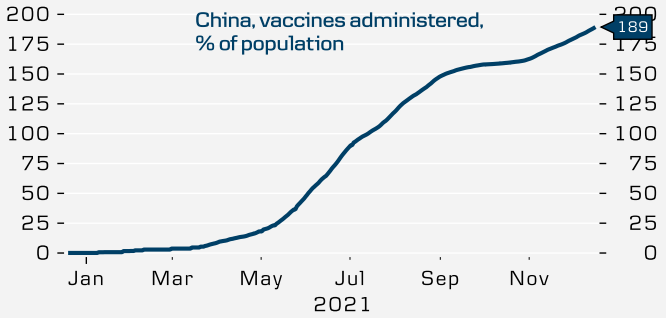
Sources: Our World In Data, Macrobond Financial

Share of people that have received at least one dose (%) - Asia



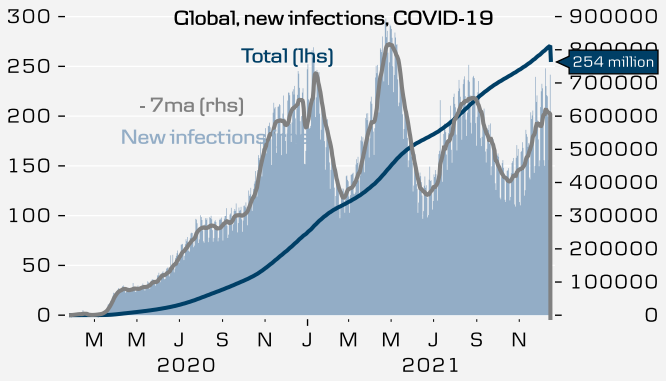
Sources: Our World In Data, Macrobond Financial

Vaccines administered (%) - China



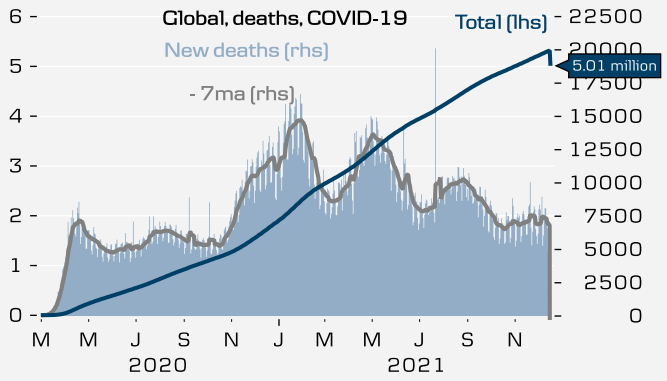
Sources: Our World In Data, Macrobond Financial

Global new cases (daily)



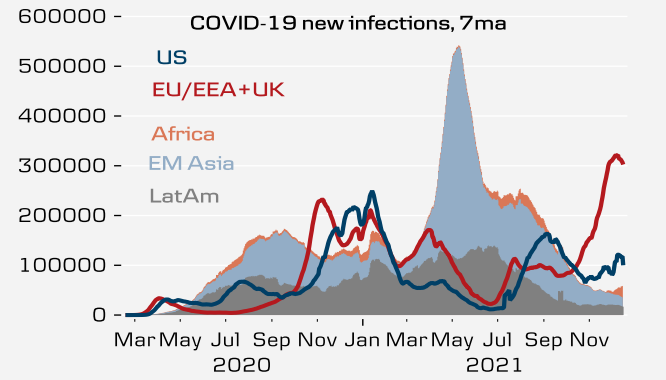
Source: WHO, Macrobond Financial, Danske Bank

Global deaths (daily)



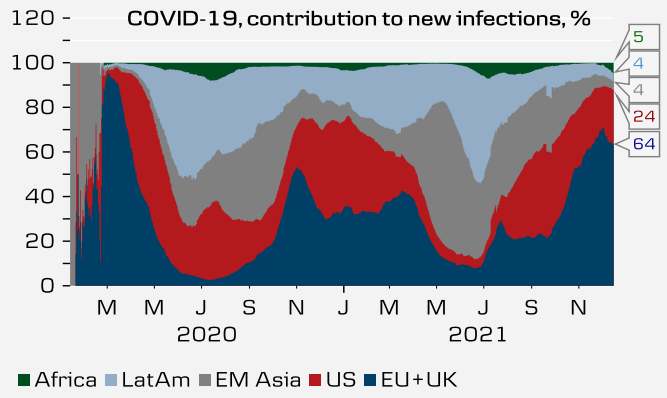
Source: WHO, Macrobond Financial, Danske Bank

New cases by region



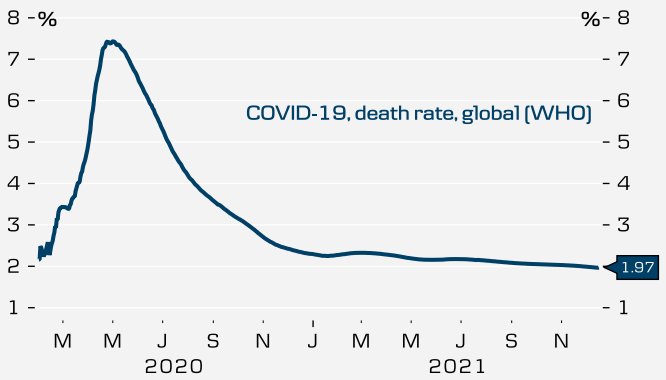
Source: WHO, Macrobond Financial, COVID-19 tracking project, Danske Bank

Share of new cases by region



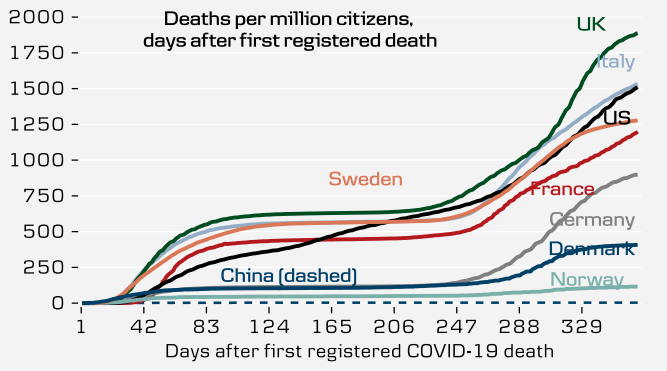
Source: WHO, Macrobond Financial, Danske Bank

Global death rate (Case Fatality Rate)



Source: WHO, Macrobond Financial, Danske Bank

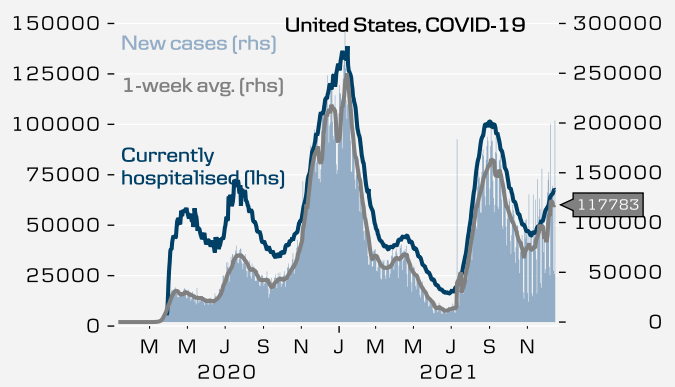
Deaths per capita across countries



Source: National offices, WHO, Macrobond Financial, Danske Bank

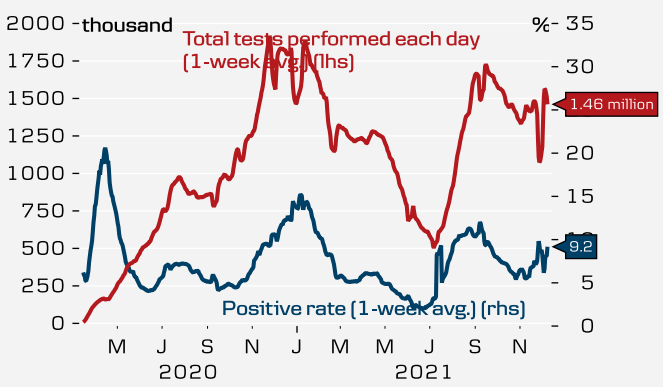
United States

US: New cases and hospitalisations (daily)



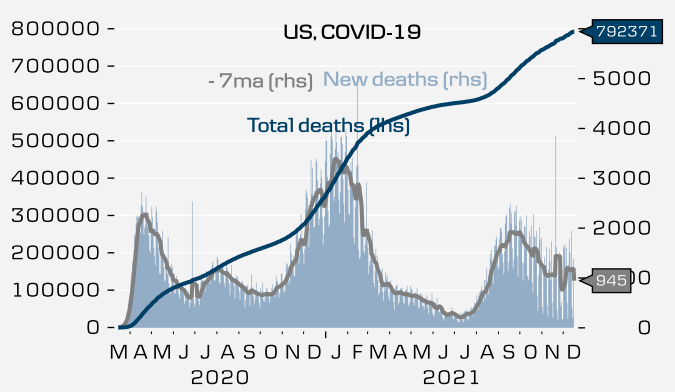
Source: WHO, Department of Health and Human Services, Macrobond Financial, Danske Bank

US: Positive rate



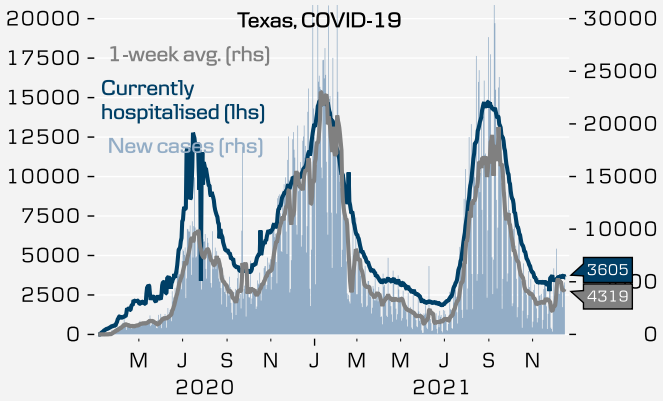
Source: COVID-19 tracking project, Macrobond Financial, Danske Bank

US: New deaths (daily)



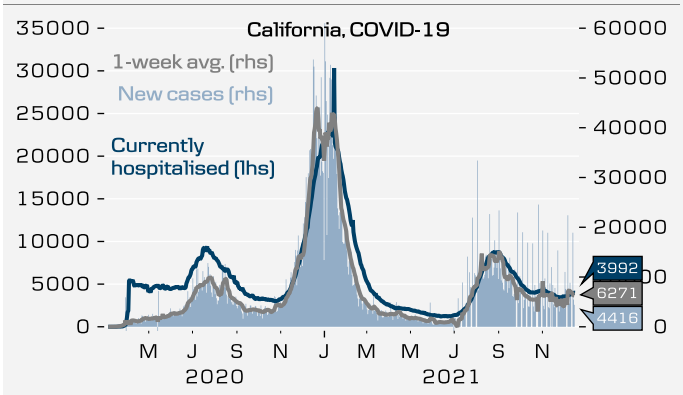
Source: WHO Macrobond Financial, Danske Bank

Texas: New cases and hospitalisations (daily)



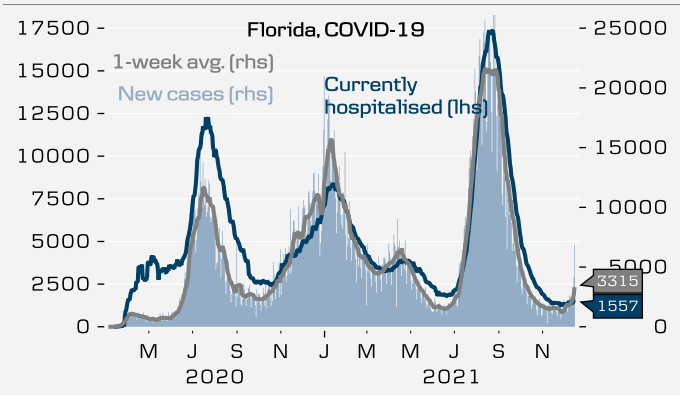
Source: CDC, US Department of Health & Human Services, Macrobond Financial, Danske Bank

California: New cases and hospitalisations (daily)



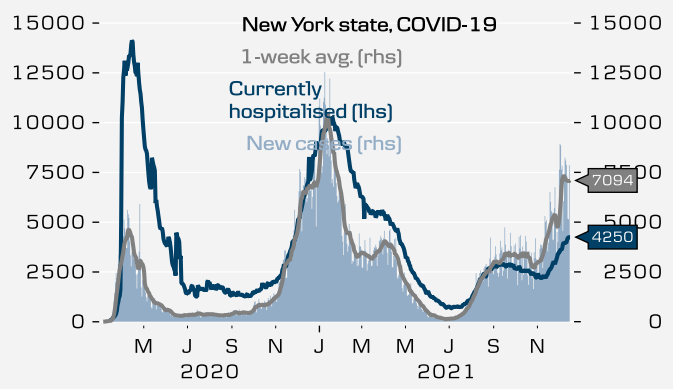
Source: CDC, US Department of Health & Human Services, Macrobond Financial, Danske Bank

Florida: New cases and hospitalisations (daily)



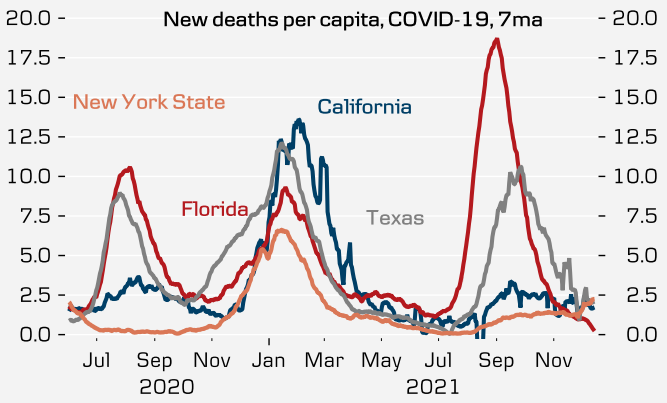
Source: CDC, US Department of Health & Human Services, Macrobond Financial, Danske Bank

New York: New cases and hospitalisations (daily)



Source: CDC, US Department of Health & Human Services, Macrobond Financial, Danske Bank

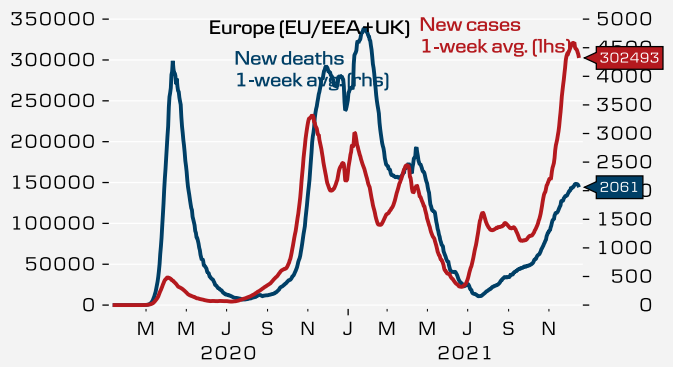
US: Number of new deaths across the big states



Source: CDC, Macrobond Financial, Danske Bank

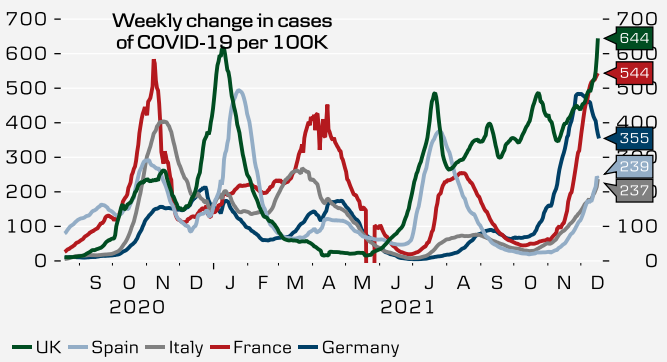
EU and UK

Europe: New cases, 1-week average (daily)



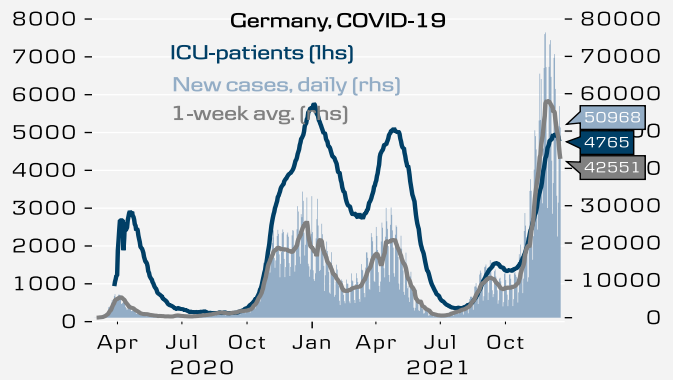
Source: WHO, Macrobond Financial, Danske Bank

Europe: Weekly changes in cases per 100K



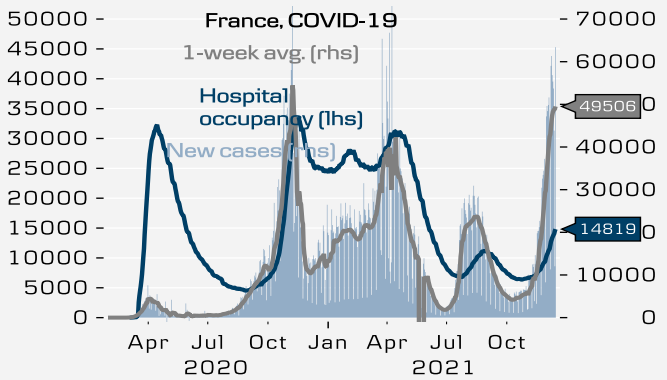
Source: National offices, Macrobond Financial

Germany: New cases and ICU-patients (daily)



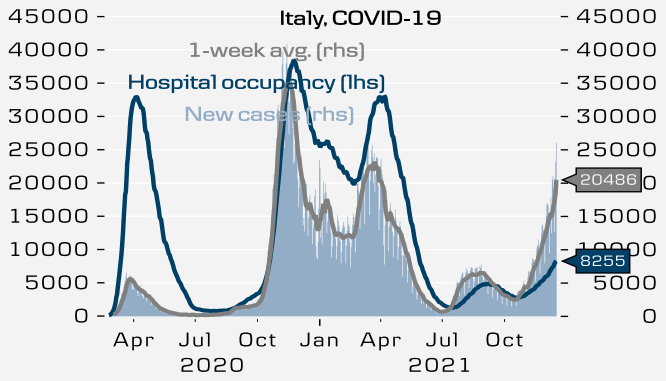
Source: Robert Koch Institute, Macrobond Financial, Danske Bank

France: New cases and hospitalisations (daily)



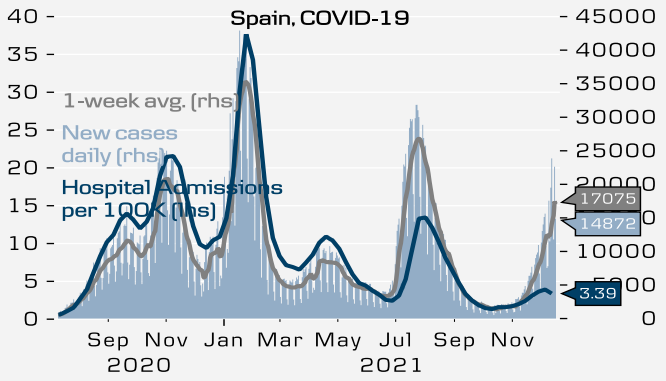
Source: National Public Health Agency, Macrobond Financial, Danske Bank

Italy: New cases and hospitalisations (daily)



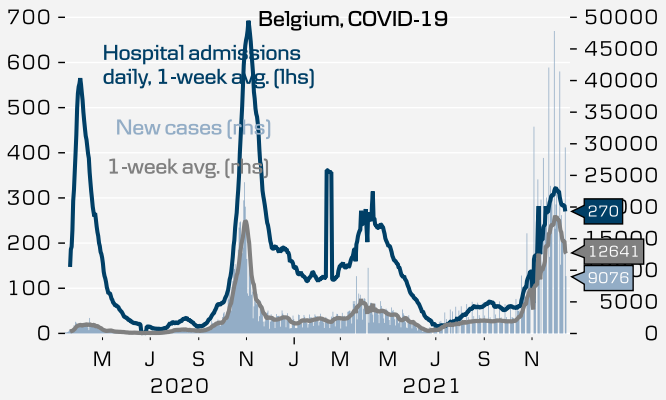
Source: Italian Department of Civil Protection, Macrobond Financial, Danske Bank

Spain: New cases and hospitalisations per 100K (daily)



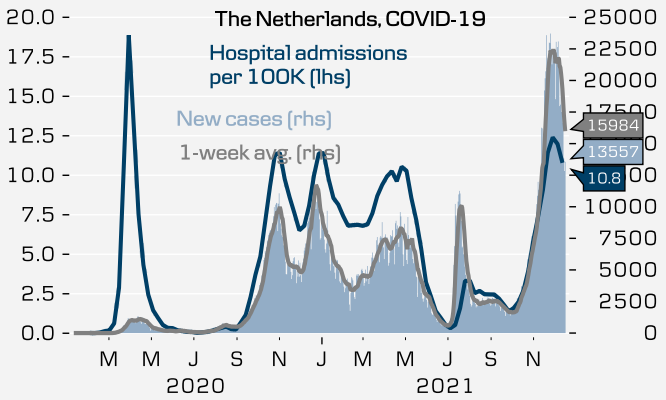
Source National Public Health Agency, Macrobond Financial, Danske Bank

Belgium: New cases and hospitalisations (daily)



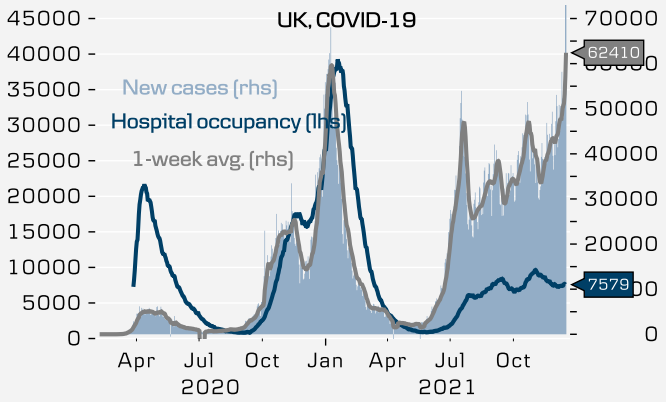
Source: Sciensano Research Institute, Macrobond Financial, Danske Bank

The Netherlands: New cases and hospitalisations per 100K (daily)



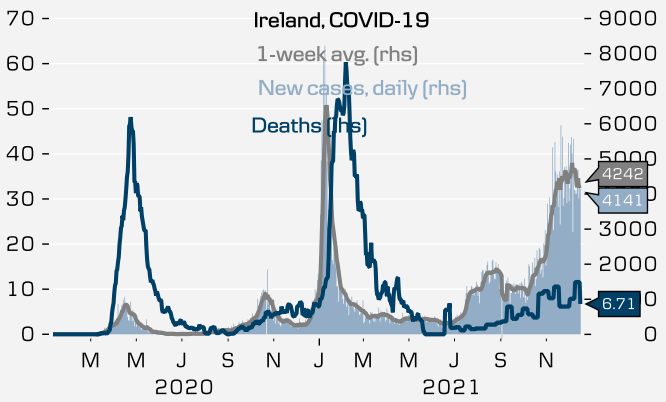
Source: ECDC, WHO, Macrobond Financial, Danske Bank

UK: New cases and hospitalisations (daily)



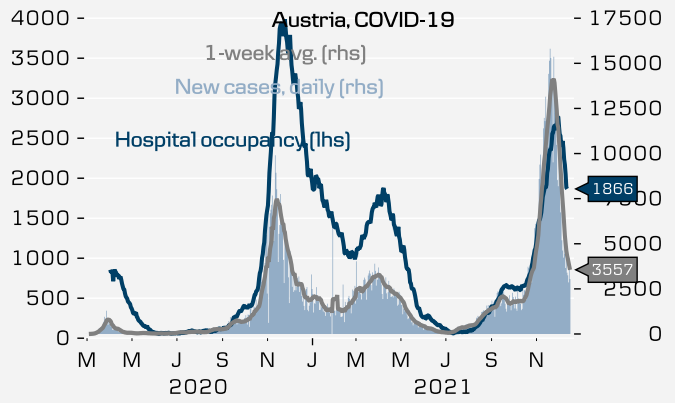
Source: Public Health England Agency, Macrobond Financial, Danske Bank

Ireland: New cases and deaths (daily)



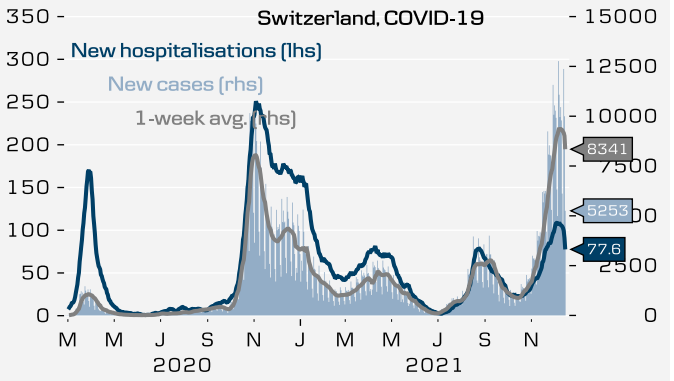
Source: Irish Health Protection Surveillance Centre (HPSC), Macrobond Financial, Danske Bank

Austria: New cases and hospitalisations (daily)



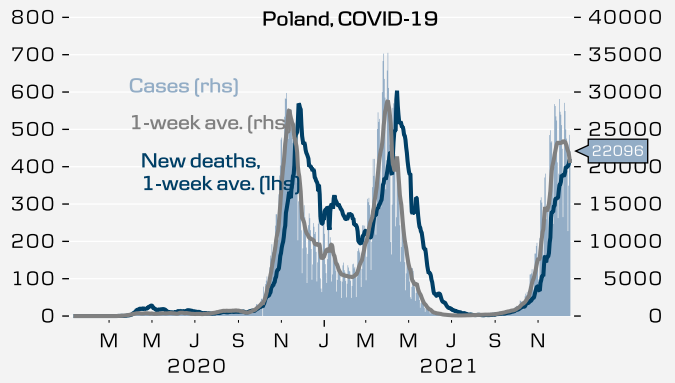
Source: Federal Ministry of Social Affairs, Health, Care & Consumer Protection , ECDC, Macrobond Financial, Danske Bank

Switzerland: New cases and hospitalisations (daily)



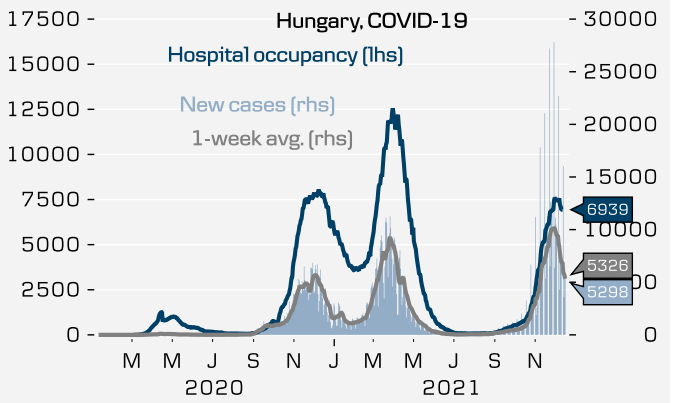
Source: Federal Office of Public Health, Macrobond Financial, Danske Bank

Poland: New cases and deaths (daily)



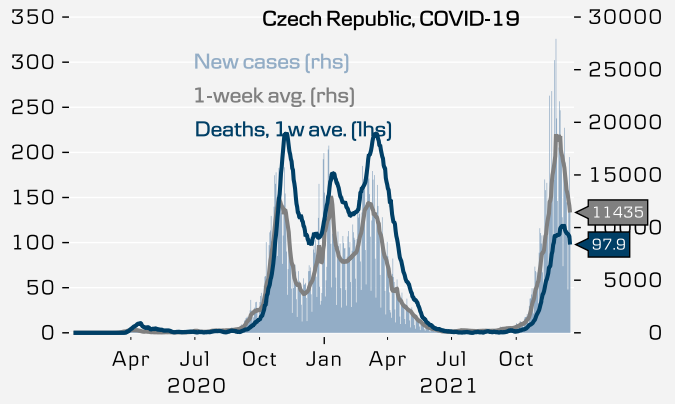
Source: ECDC, WHO, Macrobond Financial, Danske Bank

Hungary: New cases and hospitalisations (daily)



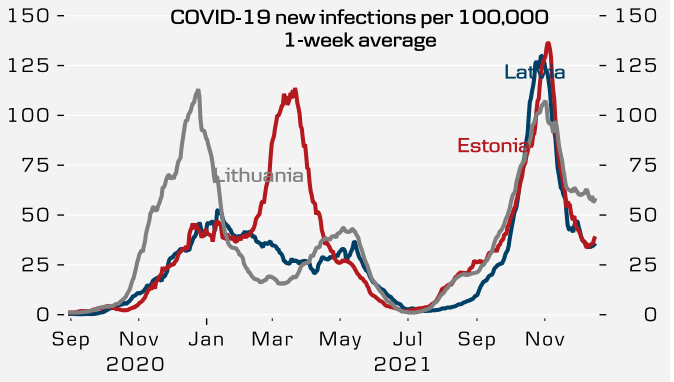
Source: ECDC, WHO, Macrobond Financial, Danske Bank

Czech Republic: New cases and deaths (daily)



Source: ECDC, WHO, Macrobond Financial, Danske Bank

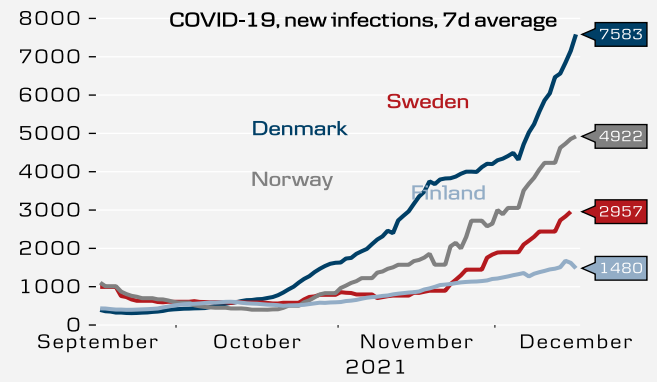
Baltics: New cases per 100K (daily)



Source: ECDC, WHO, Macrobond Financial, Danske Bank

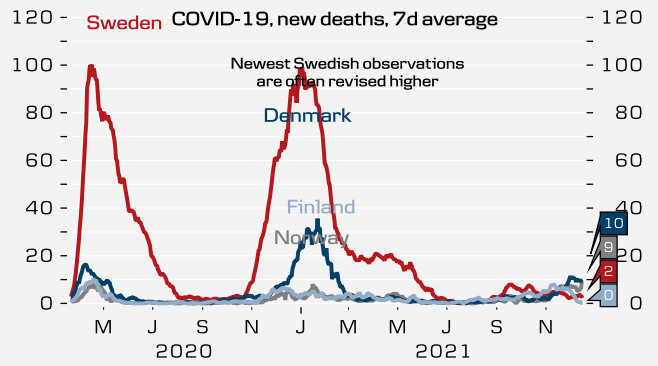
Nordic countries

Nordic region: New cases, 1-week average (daily), past 3 months



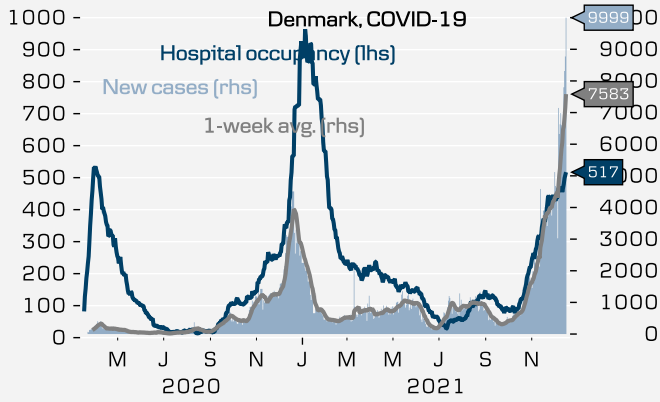
Source: National offices, WHO, Macrobond Financial, Danske Bank

Nordic region: Deaths, 1-week average (daily)



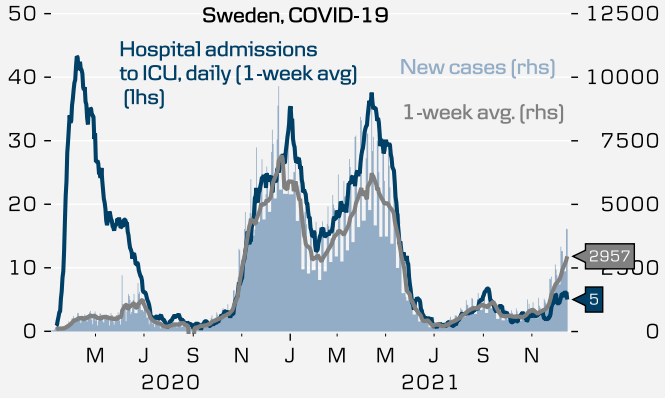
Source: National offices, WHO, Macrobond Financial, Danske Bank

Denmark: New cases and hospitalisations (daily)



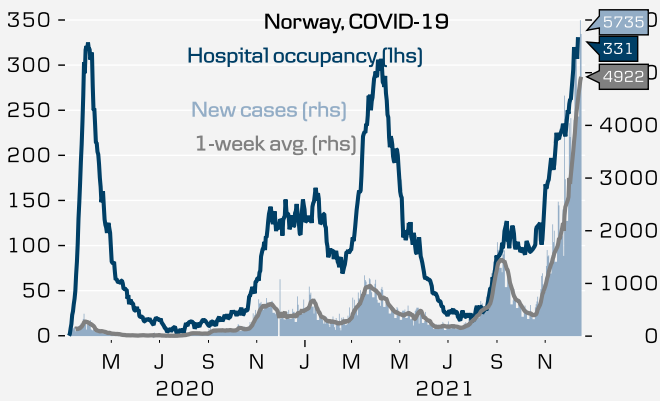
Source: Statens Serum Institut, Macrobond Financial, Danske Bank

Sweden: New cases and ICU hospitalisations (daily)



Source: Public Health Agency of Sweden,, Macrobond Financial, Danske Bank

Norway: New cases and hospitalisations (daily)



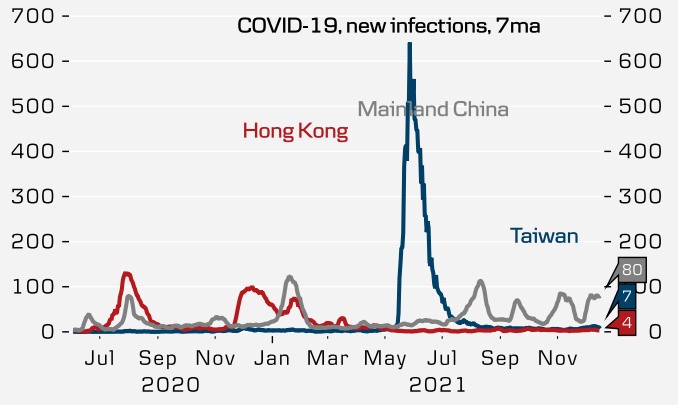
Source: ECDC, NIPH, Macrobond Financial, Danske Bank

Finland: New cases and hospitalisations (daily)

Source: Finnish Institute for Health and Welfare, WHO, Macrobond Financial, Danske Bank

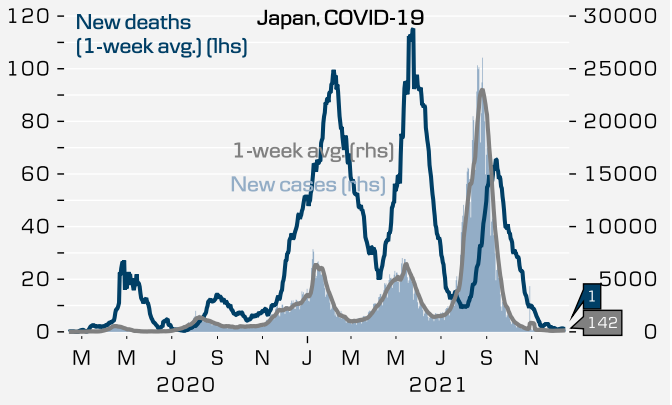
China, Japan, South Korea and Singapore

China, Taiwan and Hong Kong: New cases



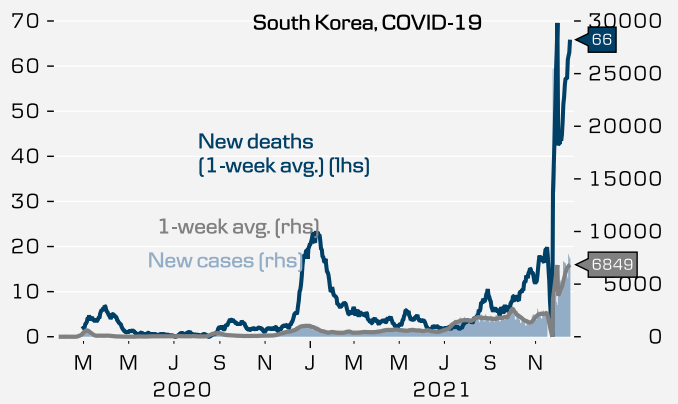
Source: Wikipedia, China National Health Commission, DXY, Macrobond Financial, Danske Bank

Japan: New cases and deaths (daily)



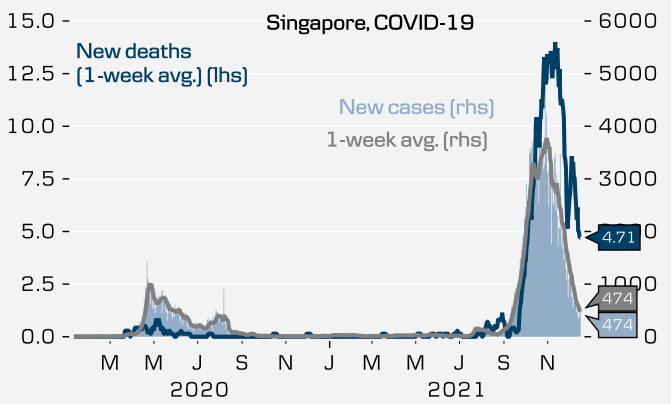
Source: Japan Ministry of Health, Labour and Welfare, Macrobond Financial, Danske Bank

South Korea: New cases and deaths (daily)



Source: Korea Ministry of Health and Welfare, Macrobond Financial, Danske Bank

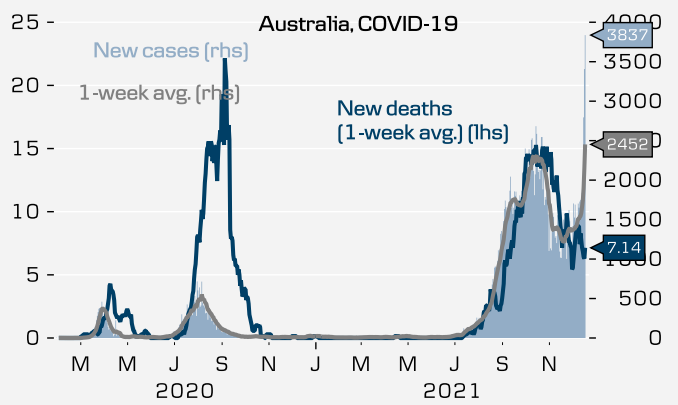
Singapore: New cases and deaths (daily)



Source: WHO, Macrobond Financial, Danske Bank

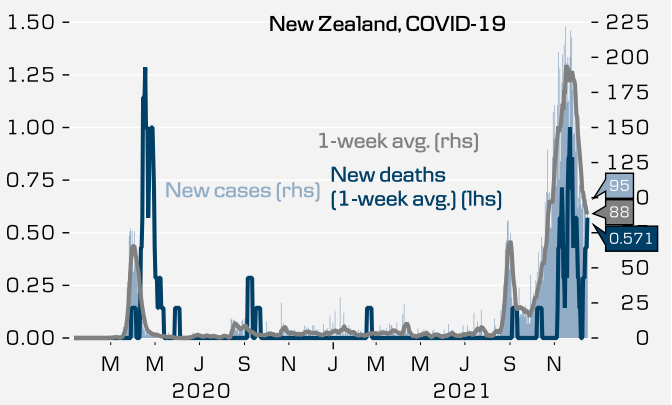
Australia and New Zealand

Australia: New cases and deaths (daily)



Source: Australian Department of Health, Macrobond Financial, Danske Bank

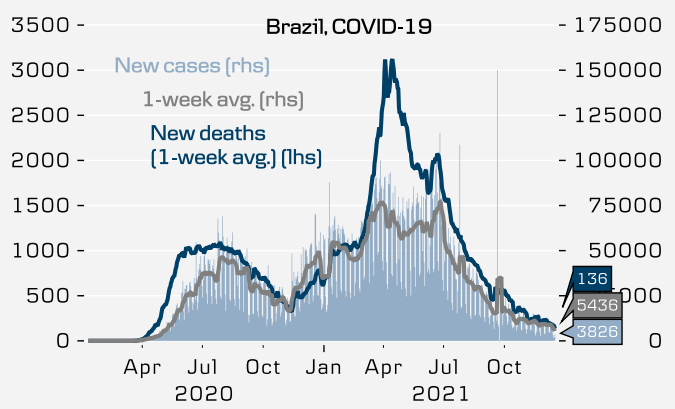
New Zealand: New cases and deaths (daily)



Source: WHO, Macrobond Financial, Danske Bank

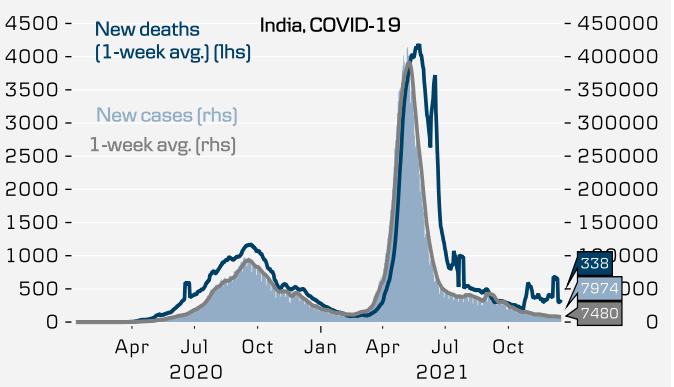
Other countries (emerging markets/developing countries)

Brazil: New cases and deaths (daily)



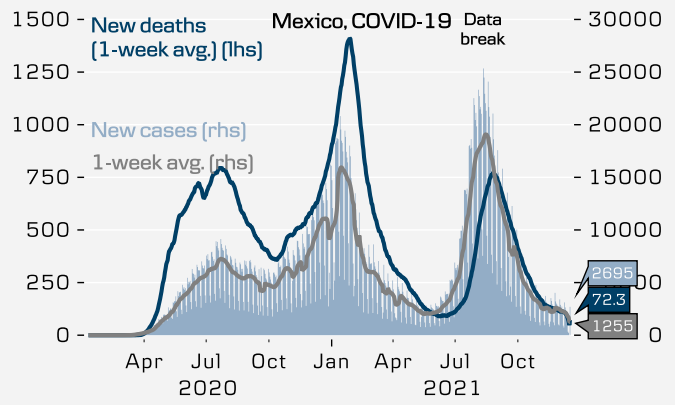
Source: WHO, Macrobond Financial, Danske Bank

India: New cases and deaths (daily)



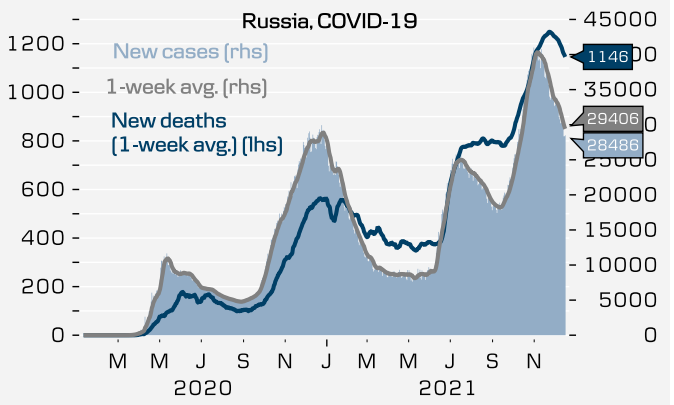
Source: WHO, Macrobond Financial, Danske Bank

Mexico: New cases and deaths (daily)



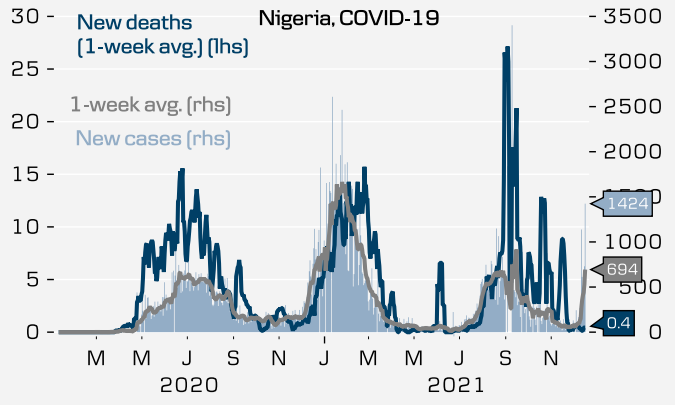
Source: WHO, Macrobond Financial, Danske Bank

Russia: New cases and deaths (daily)



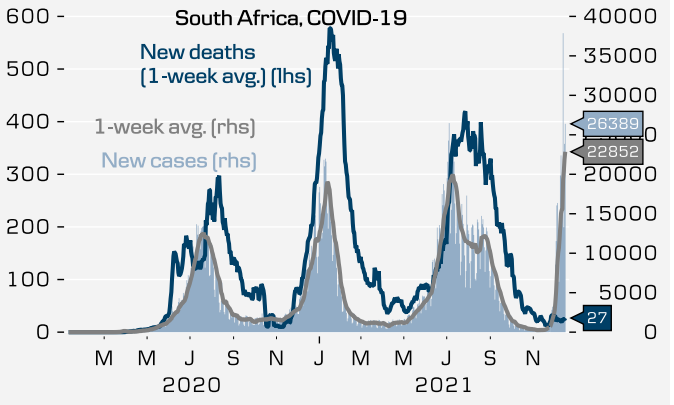
Source: WHO, Macrobond Financial, Danske Bank

Nigeria: New cases and deaths (daily)



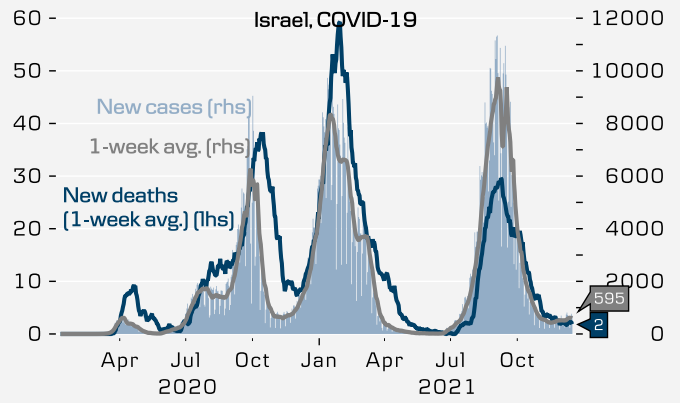
Source: WHO, Macrobond Financial, Danske Bank

South Africa: New cases and deaths (daily)



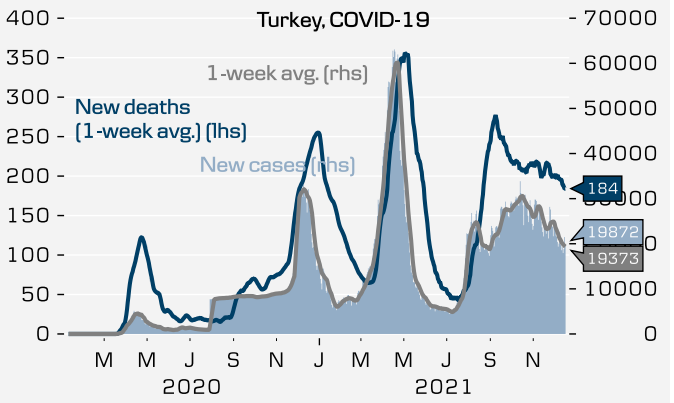
Source: WHO, Macrobond Financial, Danske Bank

Israel: New cases and deaths (daily)



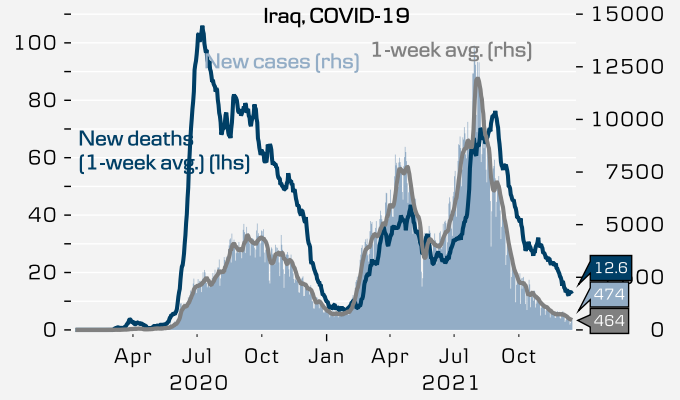
Source: WHO, Macrobond Financial, Danske Bank

Turkey: New cases and deaths (daily)



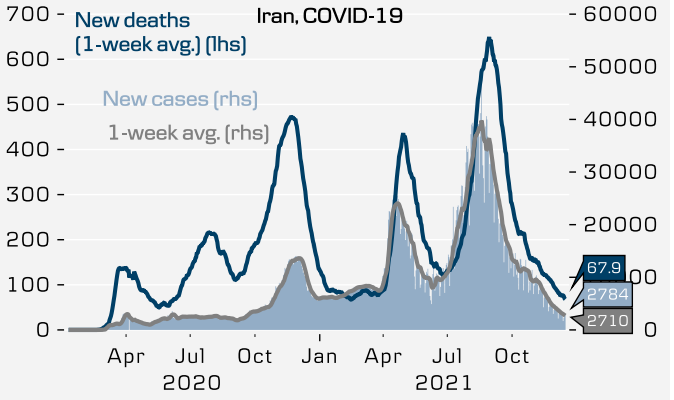
Source: WHO, Macrobond Financial, Danske Bank

Iraq: New cases and deaths (daily)



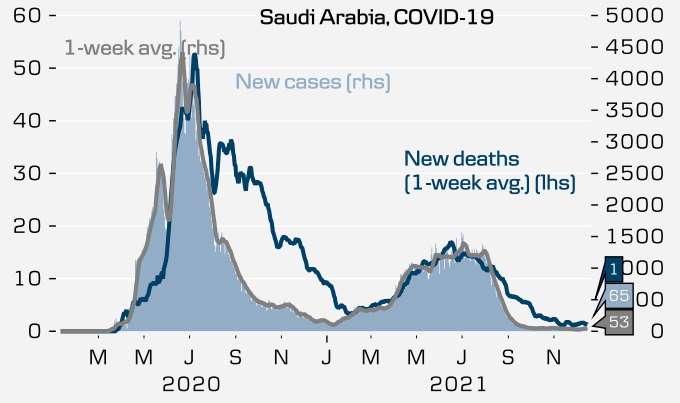
Source: WHO, Macrobond Financial, Danske Bank

Iran: New cases and deaths (daily)



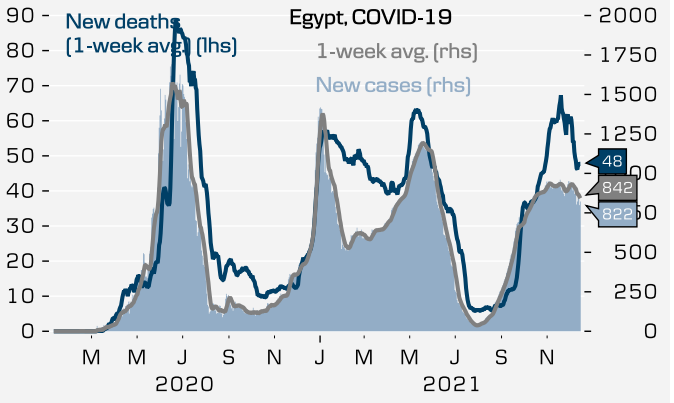
Source: WHO, Macrobond Financial, Danske Bank

Saudi Arabia: New cases and deaths (daily)



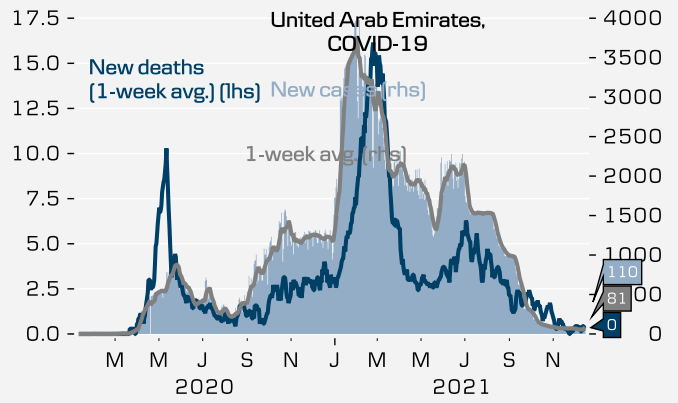
Source: WHO, Macrobond Financial, Danske Bank

Egypt: New cases and deaths (daily)



Source: WHO, Macrobond Financial, Danske Bank

United Arab Emirates: New cases and deaths (daily)



Source: WHO, Macrobond Financial, Danske Bank

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