Epidemiology of Omicron variant of SARS-CoV-2

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Key Messages on the global epidemiologic situation

1. Globally, the number of cases of COVID-19 has been increasing, largely driven by Omicron

2. Omicron is now present in almost every country

3. Omicron has a significant growth advantage over Delta

4. The relative risk of severe disease due to Omicron appears to be lower than against Delta, but it is not “mild”

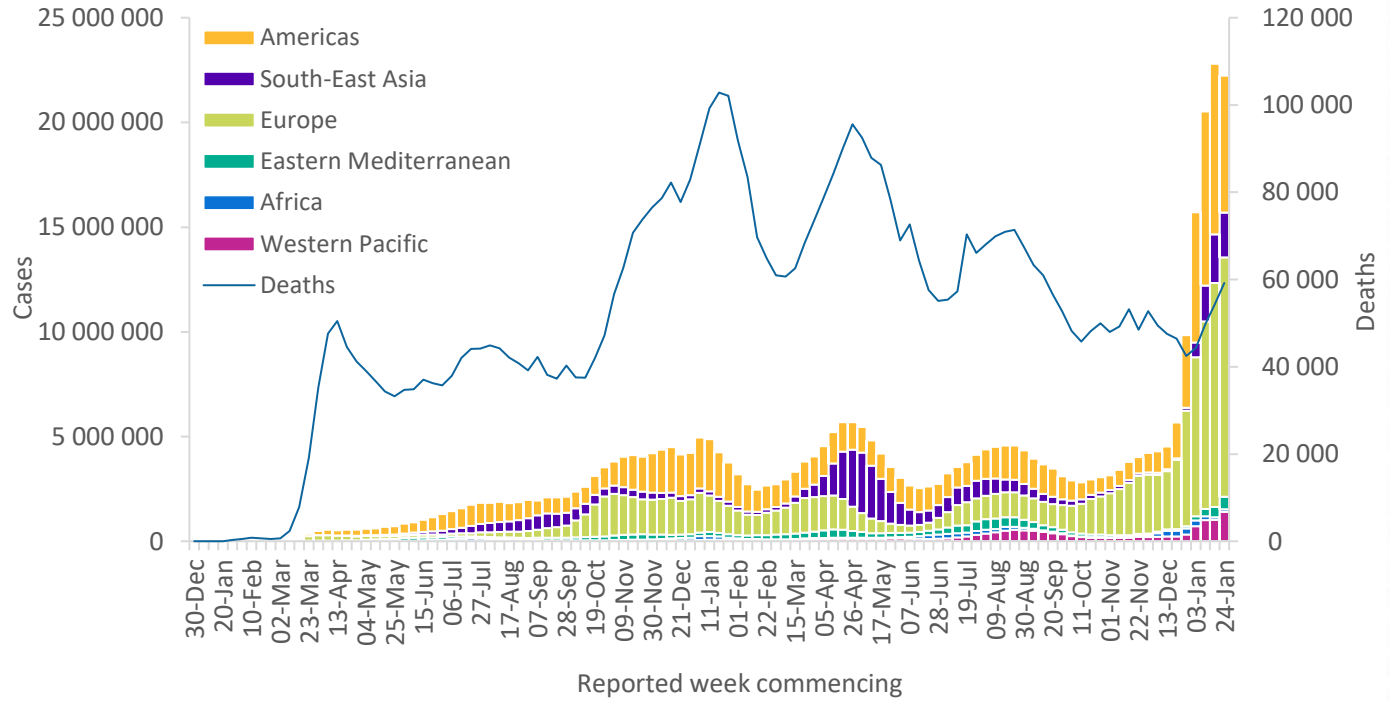
5. Large Omicron outbreaks are showing the potential to overwhelm health services

Current global situation

As of 30 Jan 2022

In the past week:
> 22 million new confirmed cases
> 59,000 new deaths

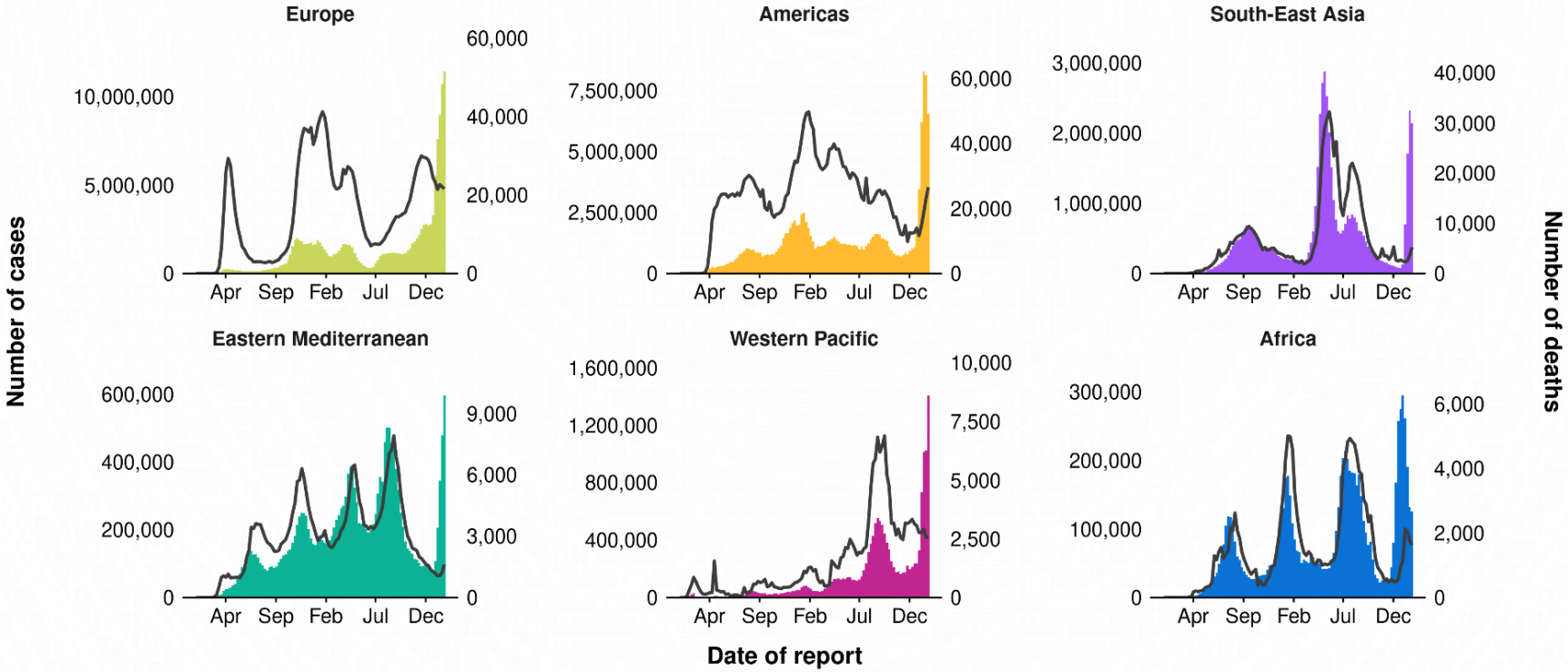
Cumulative as of 30 January 2022:
>370 million confirmed cases
>5.6 million deaths



Globally, the number of cases of COVID-19 has been increasing largely driven by Omicron

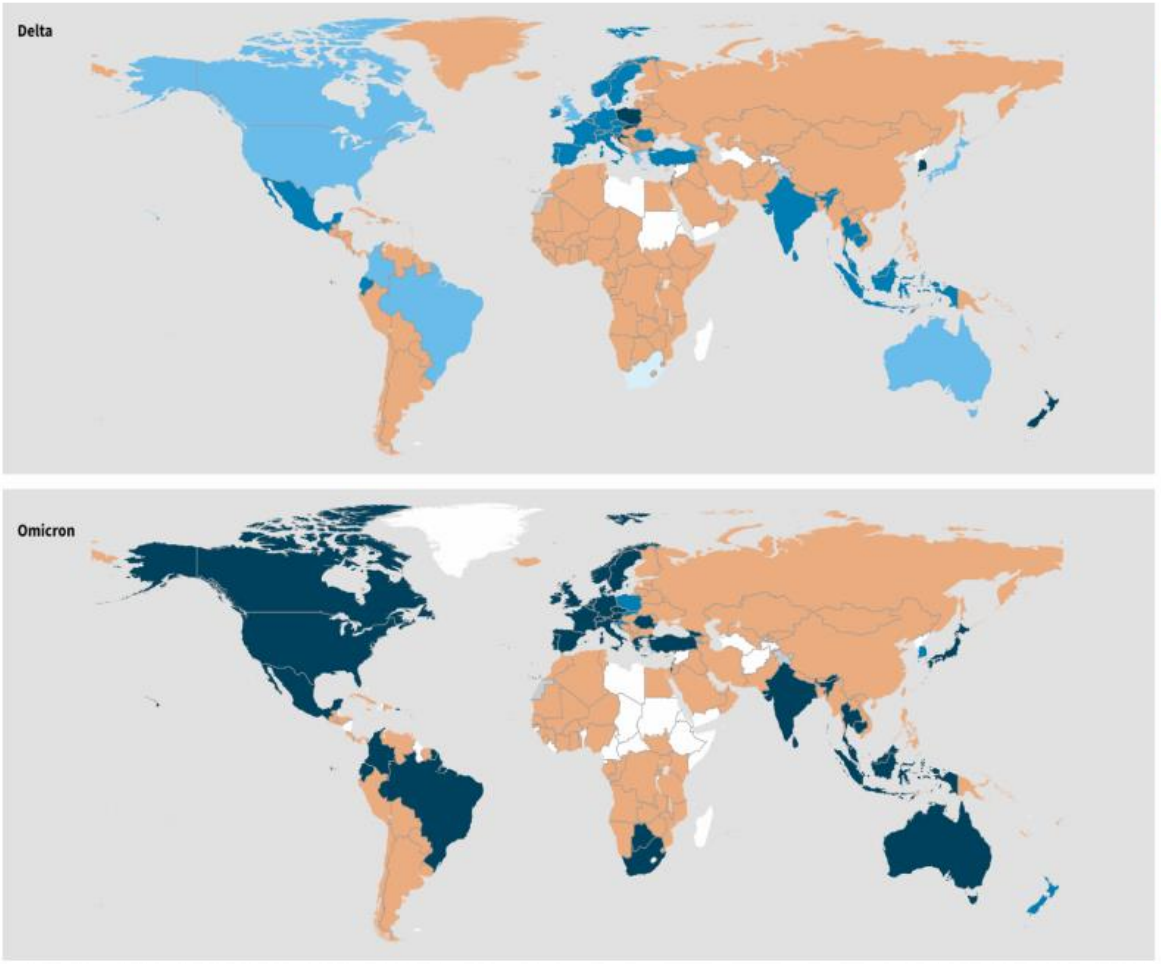
Weekly situation by WHO region

As of 30 Jan 2022

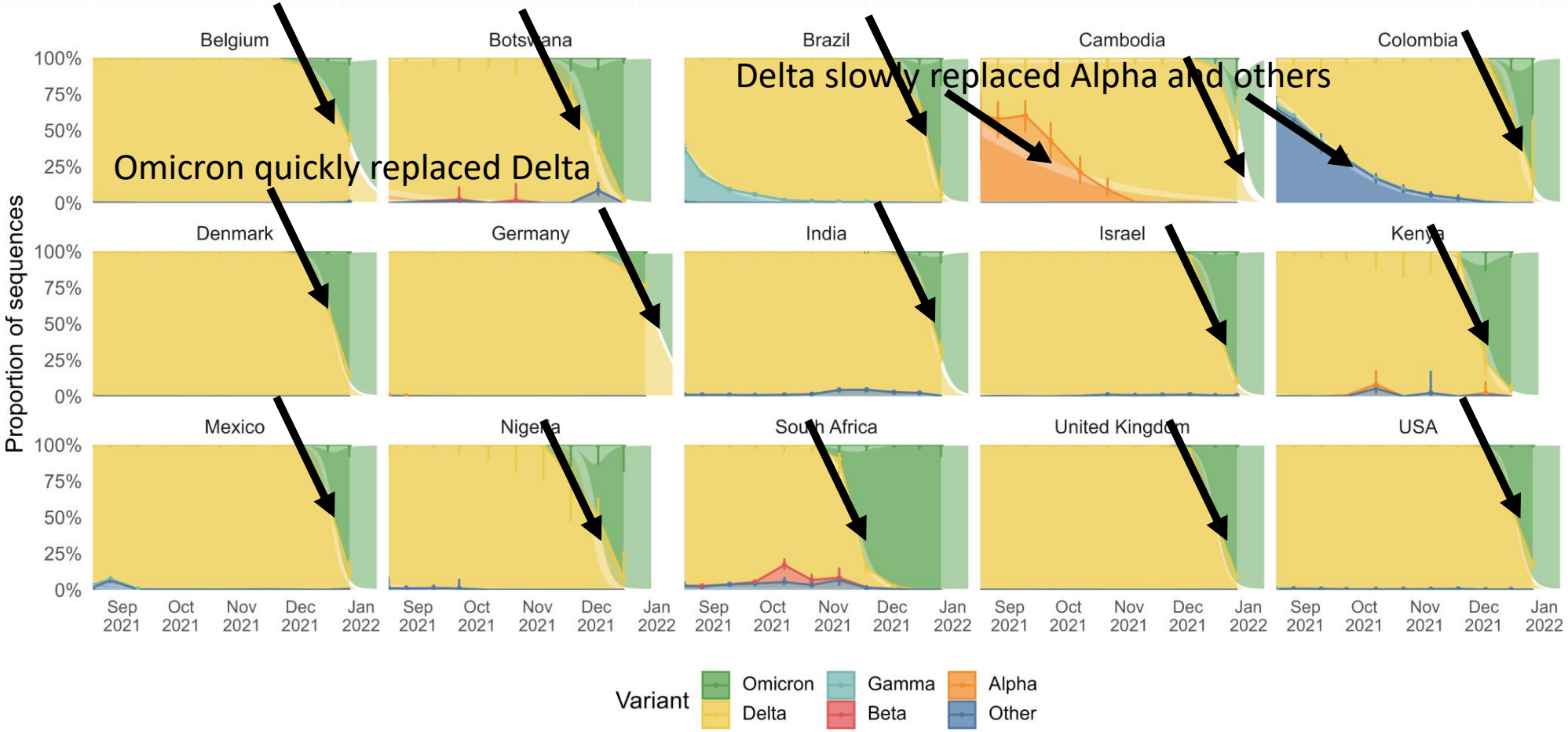


** Data are incomplete for the current week. Cases depicted by bars; deaths depicted by line. Note different scales for y-axes.*

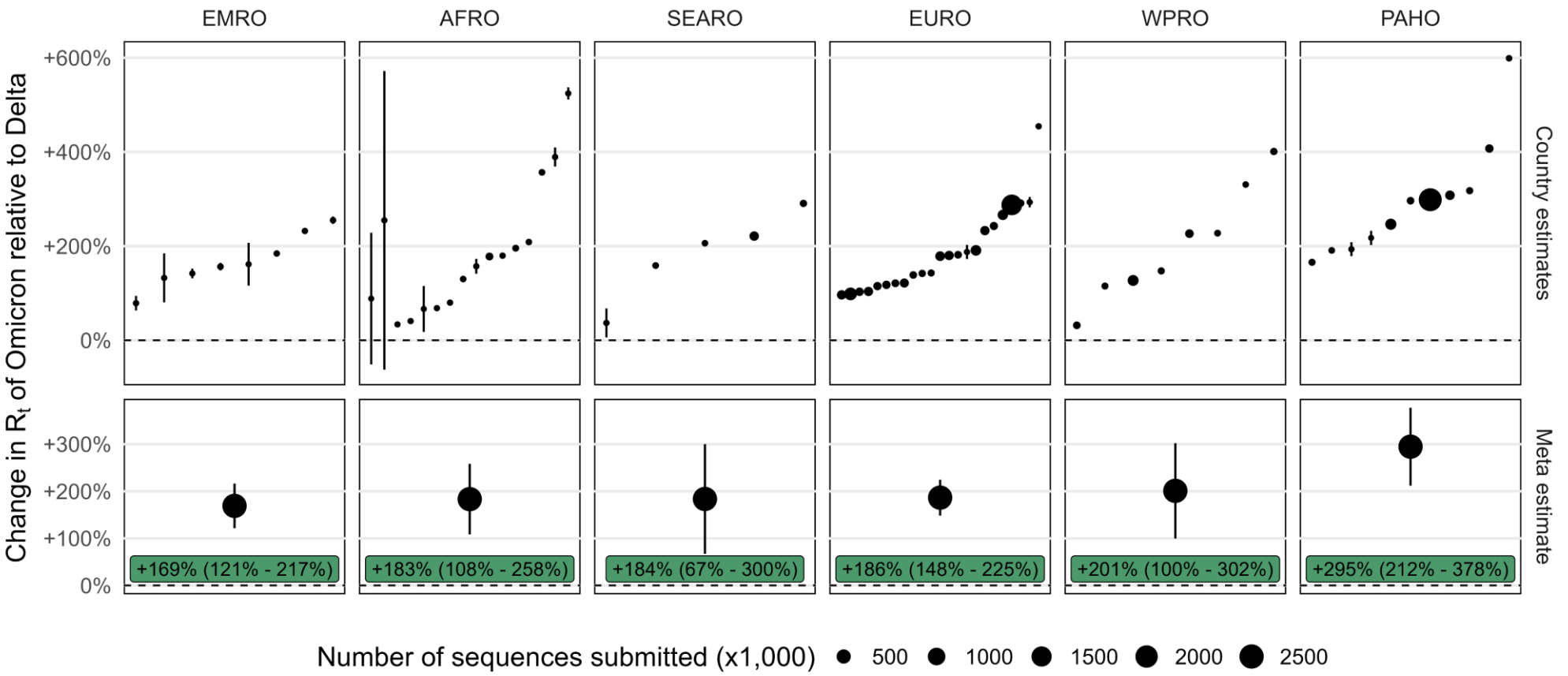
Proportion of Delta and Omicron in the last 30 days as of 25 January



Variant proportions globally : GISAID and other sources

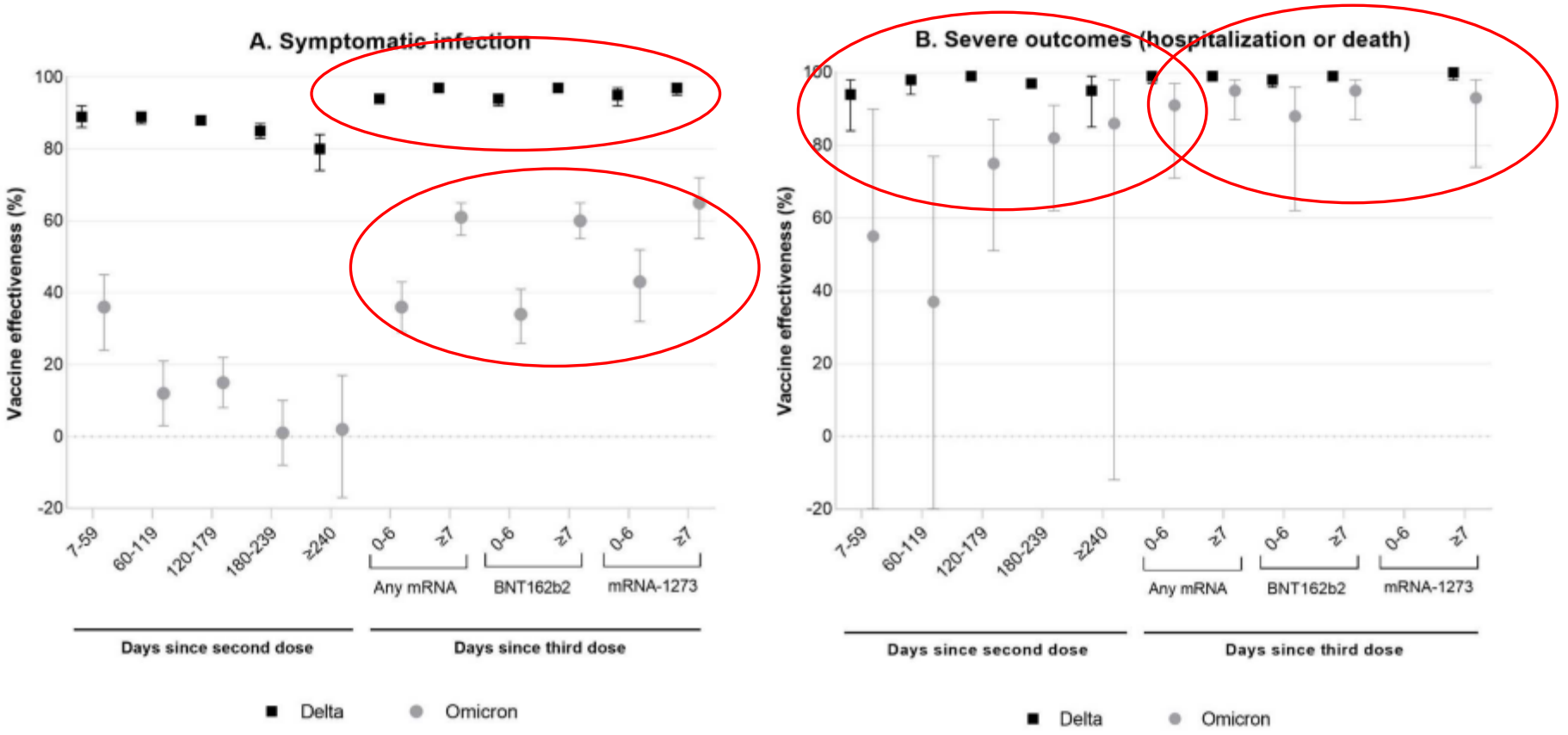


Transmission: Relative Rt (based on GISAID)



Source: WHO HQ COVID-19 Analytics team | Estimates reported as of 11 Jan 2022

Vaccine effectiveness against Omicron



Vaccine effectiveness (VE) for mRNA-1273 0-6 days after the third dose was estimated as 100% based on zero vaccinated test-positive hospitalized cases and was therefore not presented in panel B. The lower 95% confidence limit for Omicron VE against severe outcomes 7-59 days after a second dose was -106 and 60-119 days after a second dose was -71.

Source: Buchan SA et al. https://www.medrxiv.org/content/10.1101/2021.12.30.21268565v2.full.pdf

Denmark: Secondary infection in the household (Dec 2021)

Odds Ratio	Unvaccinated	Completed primary series	Booster vaccinated
Omicron households	1.17 (0.99 -1.38)	2.61 (2.34 – 2.90)	3.66 (2.65 – 5.05)
Delta households	Ref	Ref	Ref

Number of observations: N=27,874

Source: https://www.medrxiv.org/content/10.1101/2021.12.27.21268278v1.full.pdf

Estimating Omicron Reinfection

Risk for reinfection in England (study period 23/11/2021 – 11/12/2021)

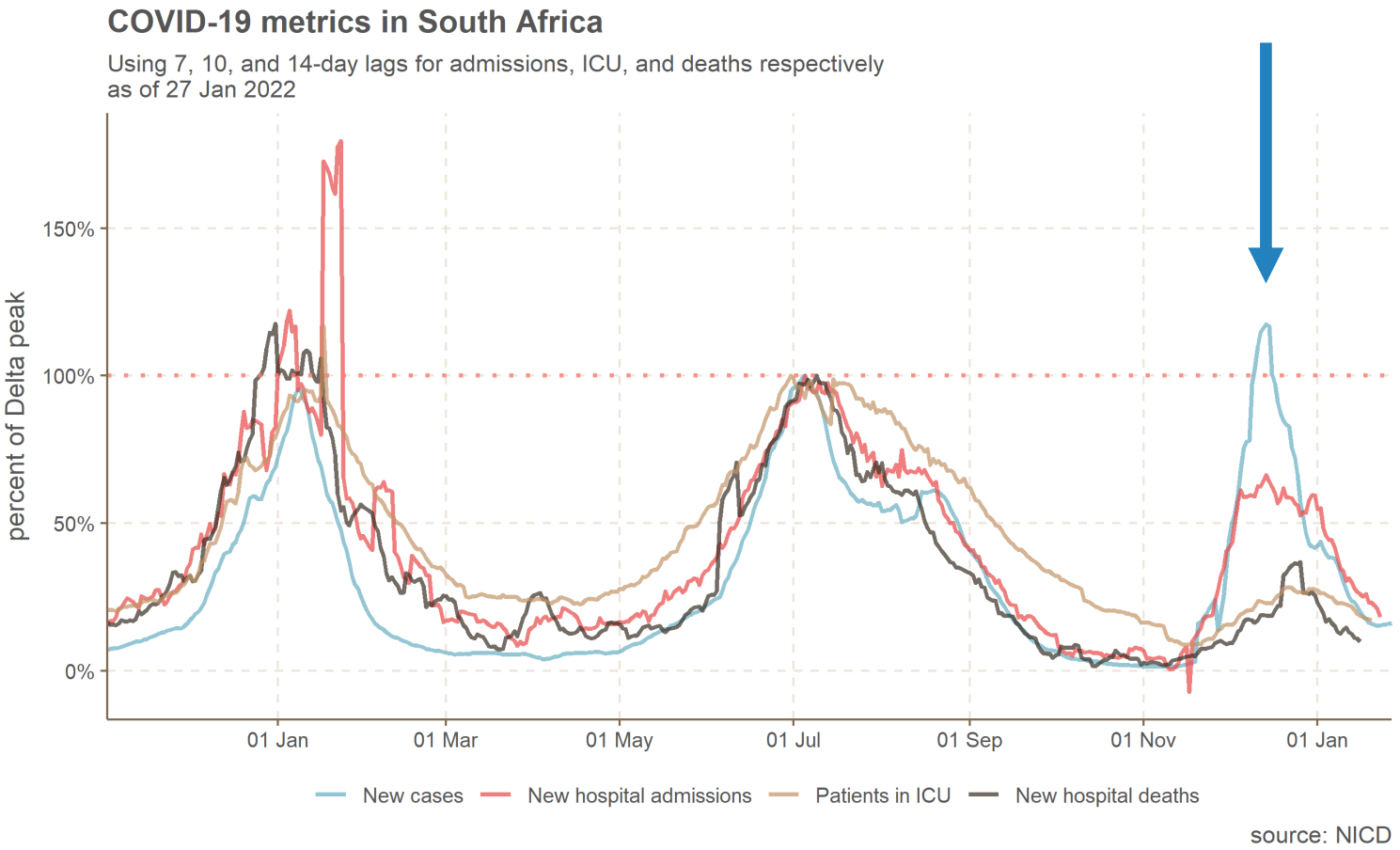
- Omicron: reinfection risk 5.4 (95% CI: 4.87-6.00) fold higher than for Delta.

  accounting for vaccine status, 10-year age-band, sex, ethnicity, asymptomatic status, region and specimen date

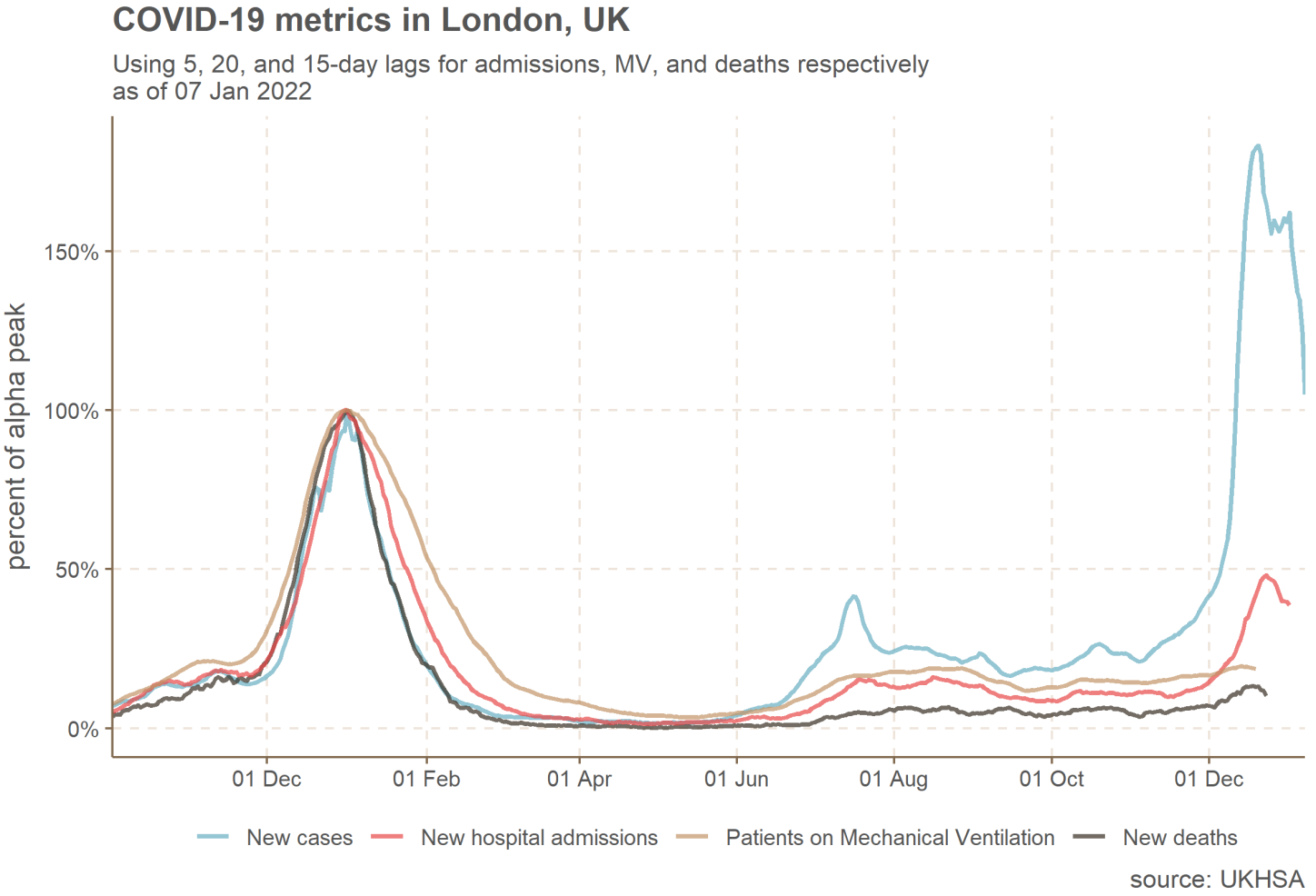
- The relative risk was 6.4 (95% CI: 5.2-7.7) for unvaccinated cases and 5.0 (95% CI: 4.5-5.7) for vaccinated cases.

Source: https://www.imperial.ac.uk/media/imperial-college/medicine/mrc-gida/2021-12-16-COVID19-Report-49.pdf)

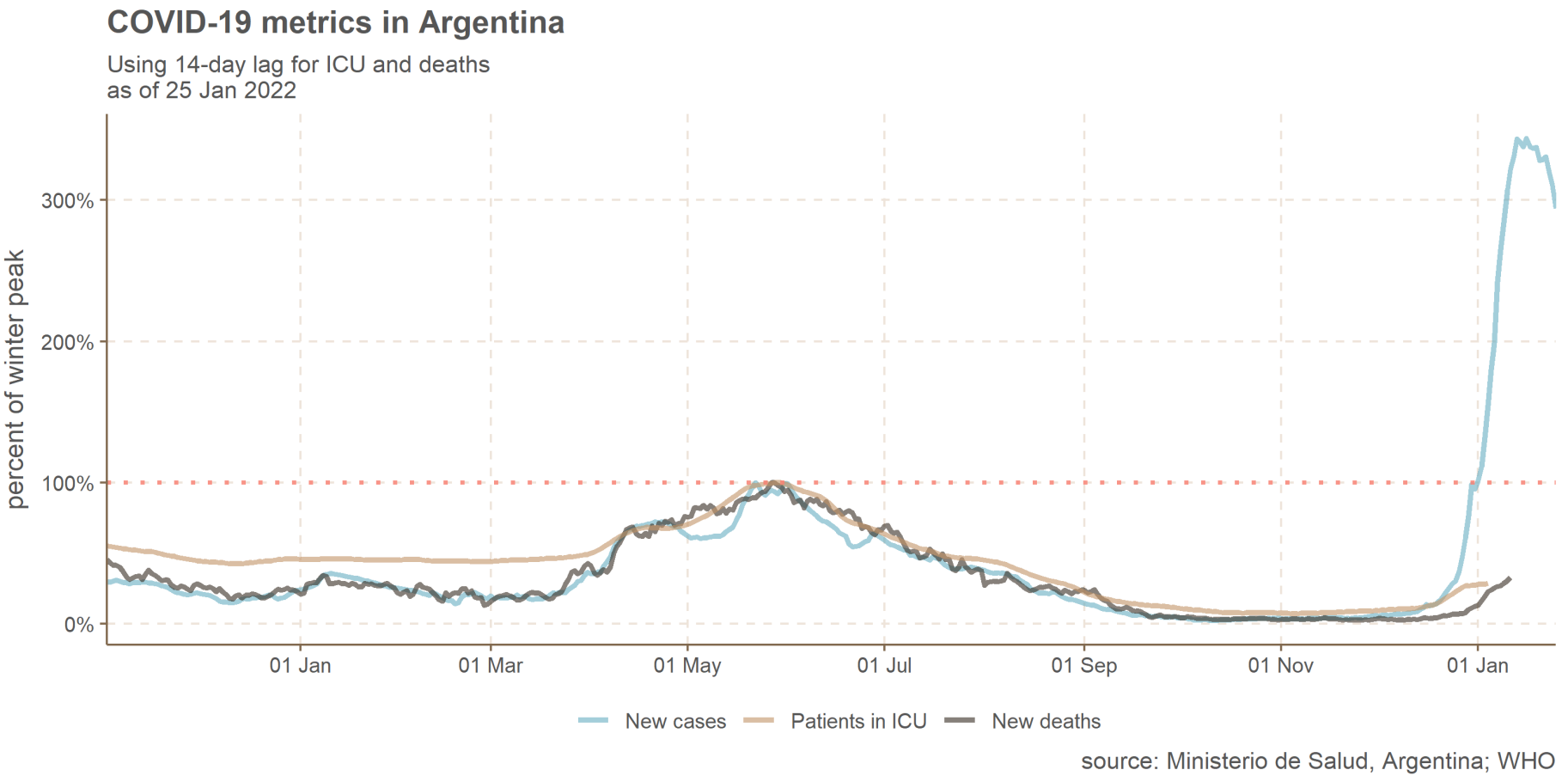
Impact on hospitalization and severe disease



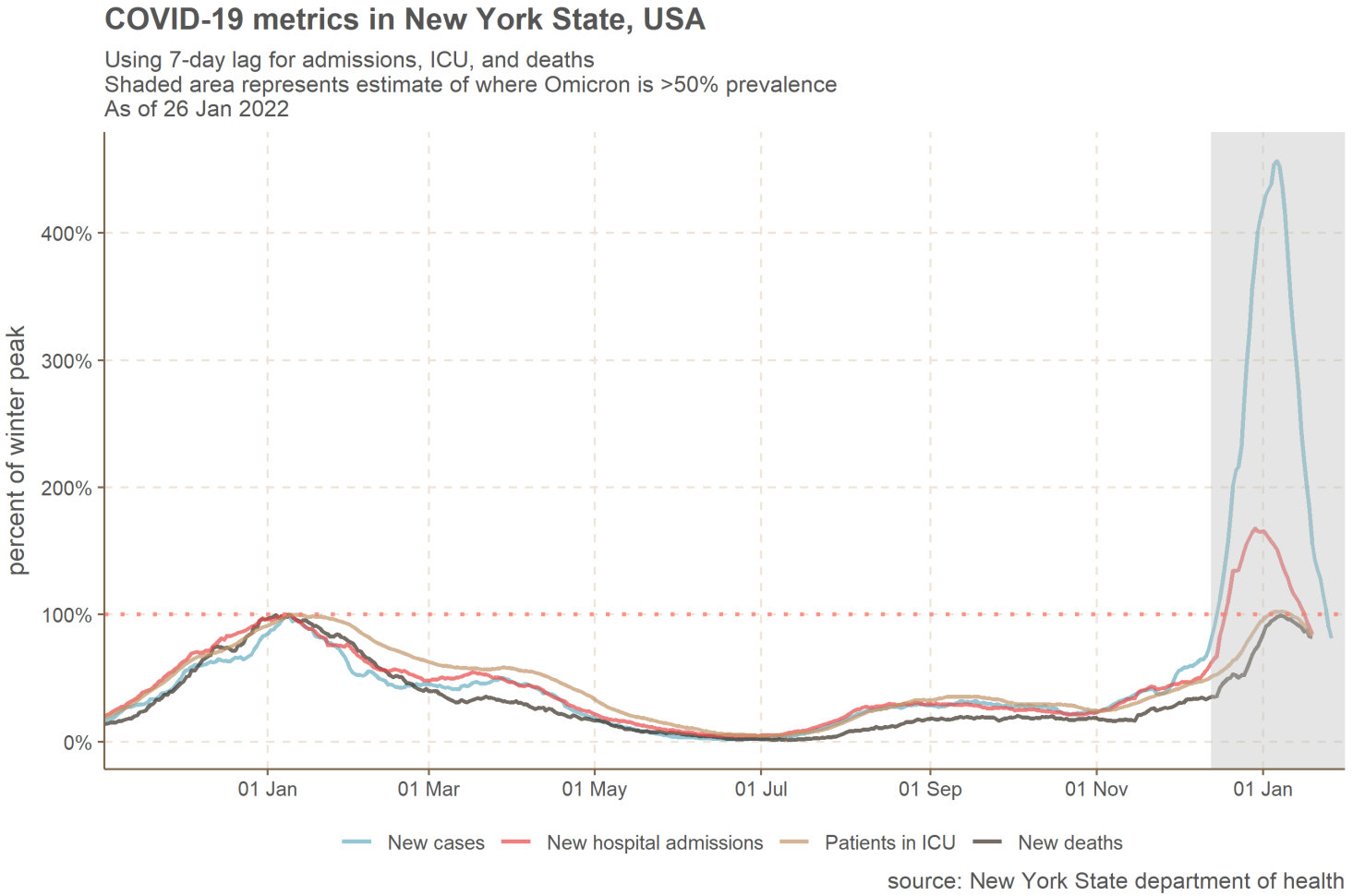
London, United Kingdom - cases and hospitalization trends



Argentina – cases, death and hospitalization trends



New York State, USA – cases and hospitalization trends



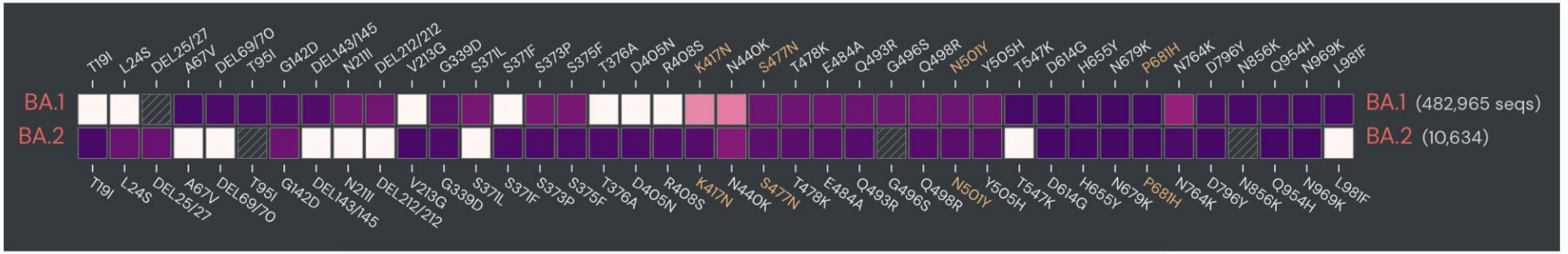
Impact of Omicron on healthcare services

- At the end of December 2021, 1 in 10 healthcare staff in the UK were absent due to sickness[1] with similar numbers in Canada[2]
- Number of COVID-19 absences in England doubled since mid-December[3]
- 24% of US hospitals reported critical staff shortages (highest since the start of the pandemic with elective surgery limited)[4]

[1] https://www.bmj.com/content/376/bmj.o18
[2] https://www.cbc.ca/news/canada/calgary/rapid-spread-omicron-staffing-shortages-alberta-1.6311258
[3] https://www.england.nhs.uk/statistics/statistical-work-areas/uec-sitrep/urgent-and-emergency-care-daily-situation-reports-2021-22/
[4] https://www.cidrap.umn.edu/news-perspective/2022/01/omicron-surge-sweeps-through-us-hospital-staff

BA.1 versus BA.2

Spike



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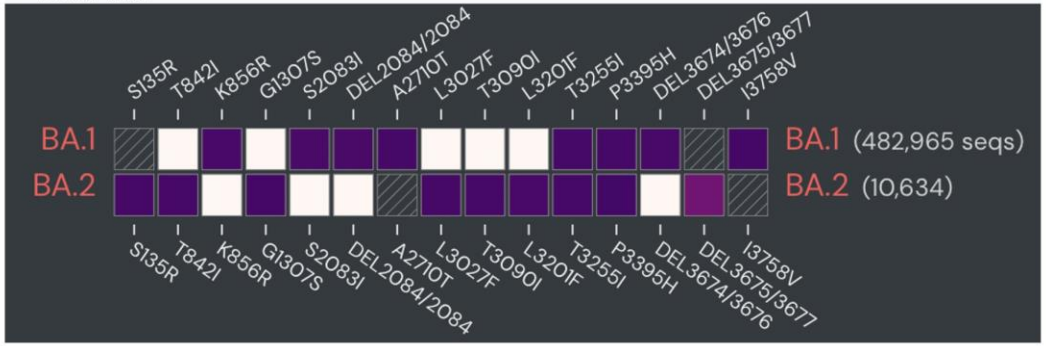
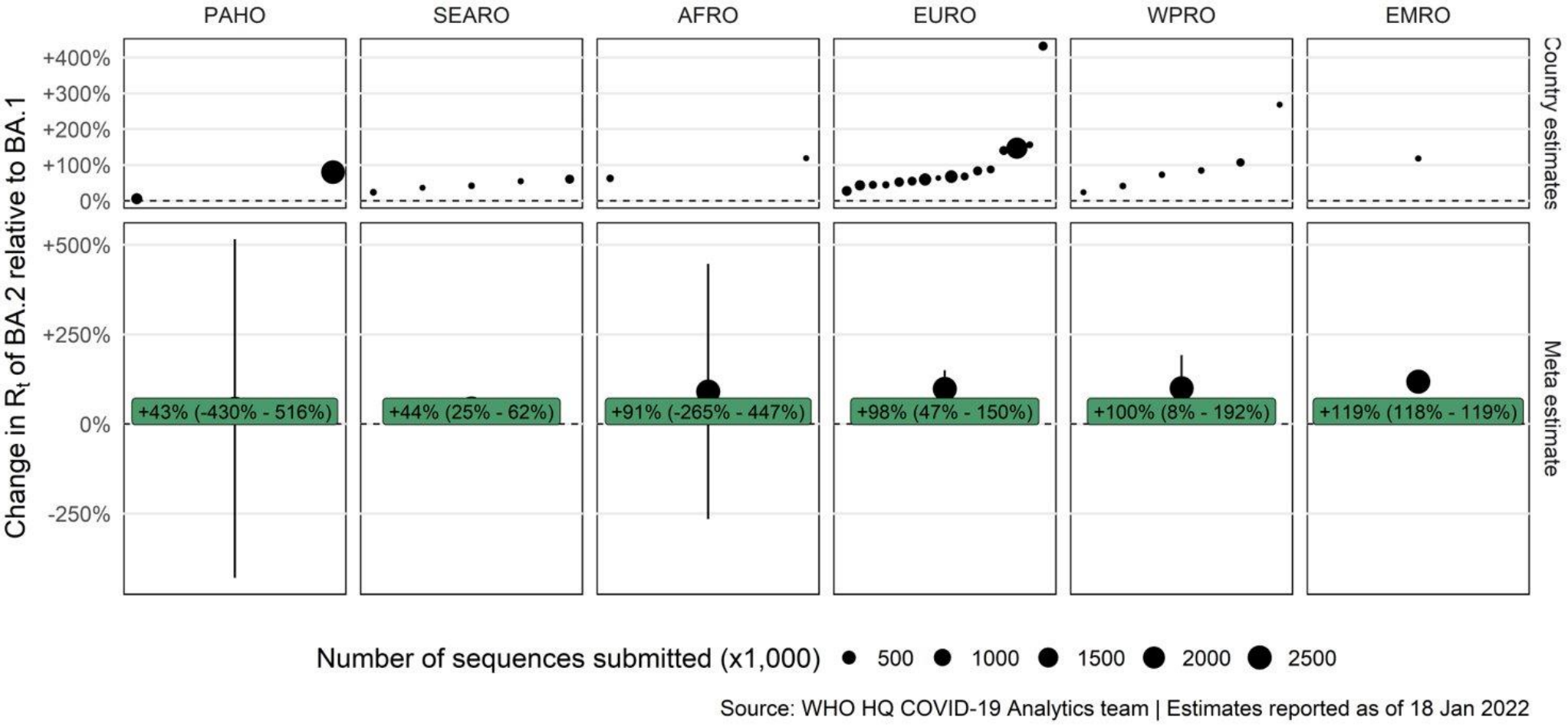


Source: outbreak.info

Transmission: Relative Rt BA.1 BA2 (based on GISAID)



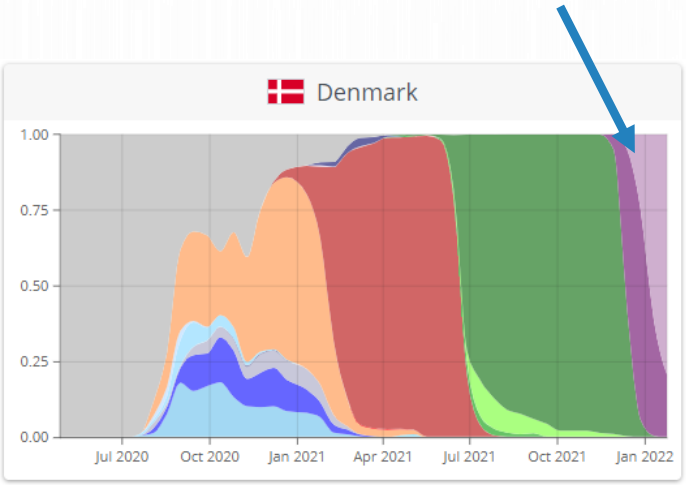
Source: WHO HQ COVID-19 Analytics team | Estimates reported as of 18 Jan 2022

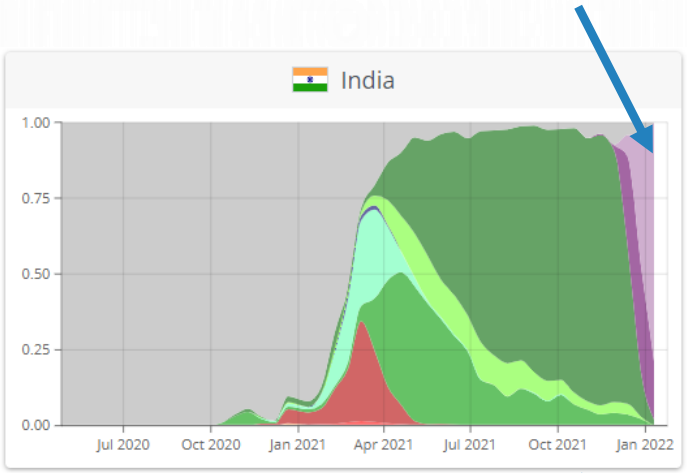
Other analysis of BA.2. transmission

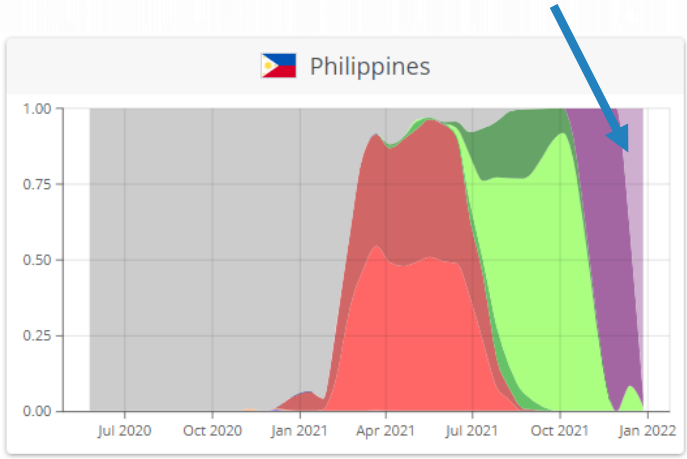
- Secondary attack rate (SAR):
  - BA.2 has been found to have higher SAR in household transmission studies
    - Denmark[1]: 39% vs 29%
    - UK[2]: 13.4% versus 10.3% (95% CI: 10.7%-16.8% versus 10.1%-10.4%)

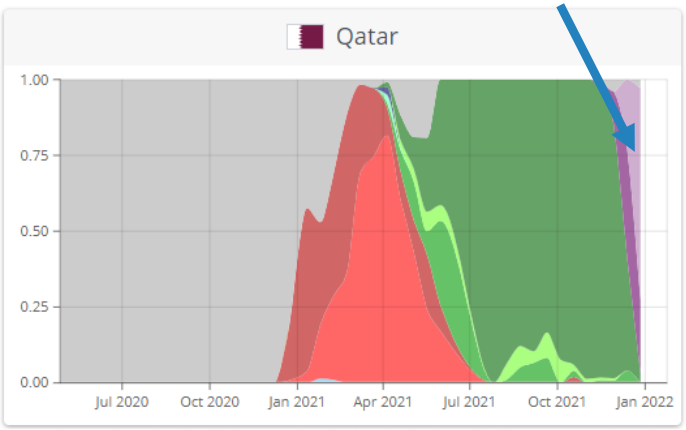
[1]https://www.medrxiv.org/content/10.1101/2022.01.28.22270044v1
[2]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1050999/Technical-Briefing-35-28January2022.pdf

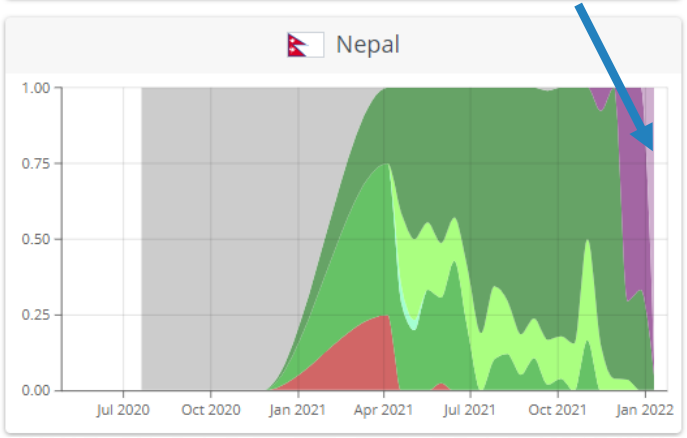
BA.2 overcoming BA.1 (BA.2 is light purple)











Source: covariants.org

BA.2 – severity

- Initial analyses of hospitalisation data in Denmark reveal no differences between BA.1 and BA.2[1].
- Other countries where BA.2 is rising are not seeing increase in hospitalization rate over BA.1

1https://en.ssi.dk/news/news/2022/omicron-variant-ba2-accounts-for-almost-half-of-all-danish-oomicron-cases

Vaccine effectiveness BA.1 vs BA.2 (United Kingdom)

- Preliminary data from the UK (test negative design)
- No apparent difference between BA.1 and BA.2 (preliminary data, all vaccines combined, endpoint of symptomatic disease)

Dose	Interval after dose	BA.1 (VE (95% CI))	BA.2 (VE (95% CI))
2	25+ weeks (primary series)	9% (7-10)	13% (-26-40)
3	2+ weeks (booster)	63% (63-64)	70% (58-79)

Source: SARS-CoV-2 variants of concern and variants under investigation(publishing.service.gov.uk)
Source: vaccine surveillance report - week 4 (publishing.service.gov.uk)

Take-home messages

- Omicron is still a very high risk globally, even though it is less severe
- Vaccination is profoundly protective against severe disease
- BA.2 is replacing BA.1, impact unlikely to be substantial but more data needed
- General principles to keep in mind:
  - Getting infected to create immunity is not a viable strategy
    - Many severe cases and deaths even with Omicron
  - Appropriate PHSM still needed while we get all the vulnerable vaccinated
  - Appropriate PHSM still needed to limit transmission to reduce risk of variants
    - Next variant will be more transmissible but may be more or less severe than Omicron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Paediatric analysis: South Africa

- Data linkage study using South African, individual-level data from four sources including case, laboratory, genomic and hospitalisation
- 161 328 cases reported from 1 October – 6 December
- Multivariable logistic regression:
  - <5 years more likely to be hospitalised with SGTF SARS-CoV-2 infection vs non-SGTF infection compared to those aged 19-24 years **(OR=9.3 (95%CI 5.2-16.8), p<0.001)**
  - No difference in those <5 years or 5-12 years in severity of disease* with SGTF infection vs non-SGTF infection compared to those aged 13-18 years **(OR=0.6 (0.1-4.0), p=0.58** and **OR=0.5 (0-6.7, p=0.63)**, respectively).

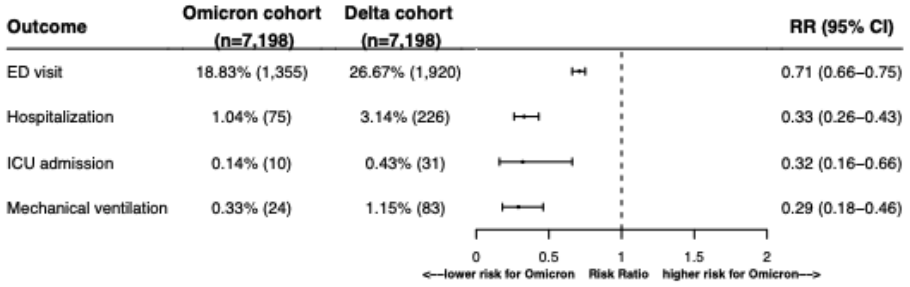
Severe disease = "hospitalised patient meeting at least one of the following criteria: admitted to ICU; received any level of oxygen treatment; was ventilated; received extracorporeal membrane oxygenation (ECMO); had acute respiratory distress syndrome (ARDS); or had died."

Wolter N, Jassat W, Walaza S, Welch R, Moultrie H, Groome M, et al. Early assessment of the clinical severity of the SARS-CoV-2 omicron variant in South Africa: a data linkage study. The Lancet. 2022 Jan;S0140673622000174.

Paediatric analysis: United States of America

Retrospective cohort of 79 592 children <5 years infected with SARS-CoV-2 for the first time across the US during Omicron and Delta waves

Comparison of 3–day acute outcomes in children under 5 with first time COVID infection (matched Omicron vs. Delta cohorts)



Risk of severe clinical outcomes was significantly lower for the Omicron cohort (26 Dec 2021 – 6 Jan 2022) compared to Delta cohort (9 January – 15 November 2021) for ED visits, hospitalization, ICU admission and mechanical ventilation

Wang L, Berger NA, Kaelber DC, Davis PB, Volkow ND, Xu R. COVID infection severity in children under 5 years old before and after Omicron emergence in the US [Internet]. Infectious Diseases (except HIV/AIDS); 2022 Jan [cited 2022 Jan 21]. Available from: http://medrxiv.org/lookup/doi/10.1101/2022.01.12.22269179