

COVID-19 Weekly Epidemiological Update

Edition 86, published 5 April 2022

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Global overview

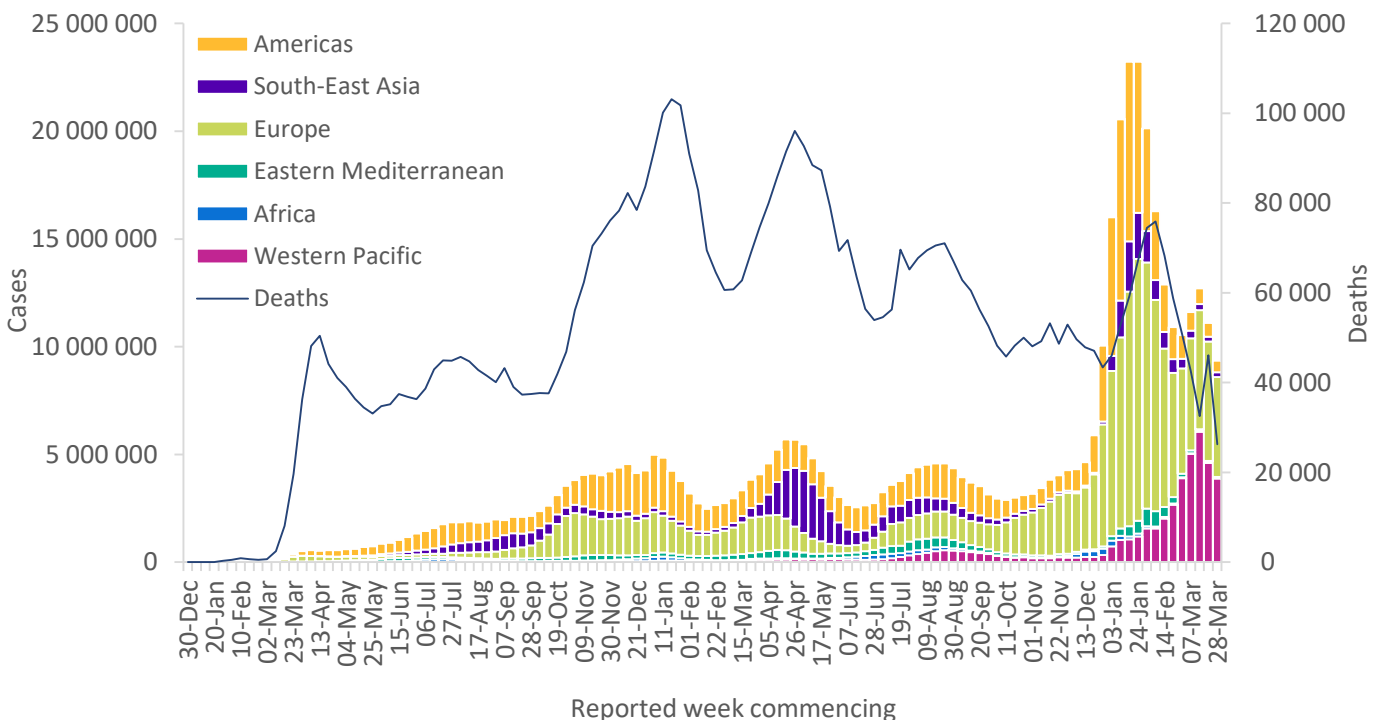
Data as of 3 April 2022

After the increase observed during the first half of March 2022, the number of new COVID-19 cases has decreased for a second consecutive week, with a 16% decline during the week of 28 March through 3 April 2022 as compared to the previous week (Figure 1). The number of new weekly deaths also decreased sharply (-43%) as compared to the previous week, when an artificial spike in deaths was observed ([see WEU 85](#)).

Across the six WHO regions, over nine million new cases and over 26 000 new deaths were reported. All regions reported decreasing trends both in the number of new weekly cases and new weekly deaths (Table 1). As of 3 April 2022, just over 489 million cases and over 6 million deaths have been reported globally.

These trends should be interpreted with caution as several countries are progressively changing their COVID-19 testing strategies, resulting in lower overall numbers of tests performed and consequently lower numbers of cases detected.

Figure 1. COVID-19 cases reported weekly by WHO Region, and global deaths, as of 3 April 2022**



**See [Annex 1: Data, table, and figure notes](#)

At the country level, the highest number of new weekly cases were reported from the Republic of Korea (2 058 375 new cases; -16%), Germany (1 371 270 new cases; -13%), France (959 084 new cases; +13%), Viet Nam (796 725 new cases; -29%), and Italy (486 695 new cases; -3%).

The highest number of new weekly deaths were reported from the United States of America (4 435 new deaths; -10%), the Russian Federation (2 357 new deaths; -18%), the Republic of Korea (2 336 new deaths; -5%), Germany (1 592 new deaths; +5%), and Brazil (1 436 new deaths; -19%).

Table 1. Newly reported and cumulative COVID-19 confirmed cases and deaths, by WHO Region, as of 3 April 2022**

WHO Region	New cases in last 7 days (%)	Change in new cases in last 7 days *	Cumulative cases (%)	New deaths in last 7 days (%)	Change in new deaths in last 7 days *	Cumulative deaths (%)
Europe	4 633 407 (50%)	-16%	203 782 791 (42%)	10 448 (40%)	-15%	1 943 512 (32%)
Western Pacific	3 888 889 (42%)	-16%	47 019 130 (10%)	5 592 (21%)	-16%	212 955 (3%)
Americas	538 114 (6%)	-15%	150 891 428 (31%)	7 822 (30%)	-61%	2 702 528 (44%)
South-East Asia	221 895 (2%)	-5%	57 195 752 (12%)	1 607 (6%)	-73%	779 475 (13%)
Eastern Mediterranean	45 545 (<1%)	-9%	21 586 380 (4%)	687 (3%)	-16%	340 735 (6%)
Africa	23 968 (<1%)	-19%	8 584 490 (2%)	129 (<1%)	-21%	171 115 (3%)
Global	9 351 818 (100%)	-16%	489 060 735 (100%)	26 285 (100%)	-43%	6 150 333 (100%)

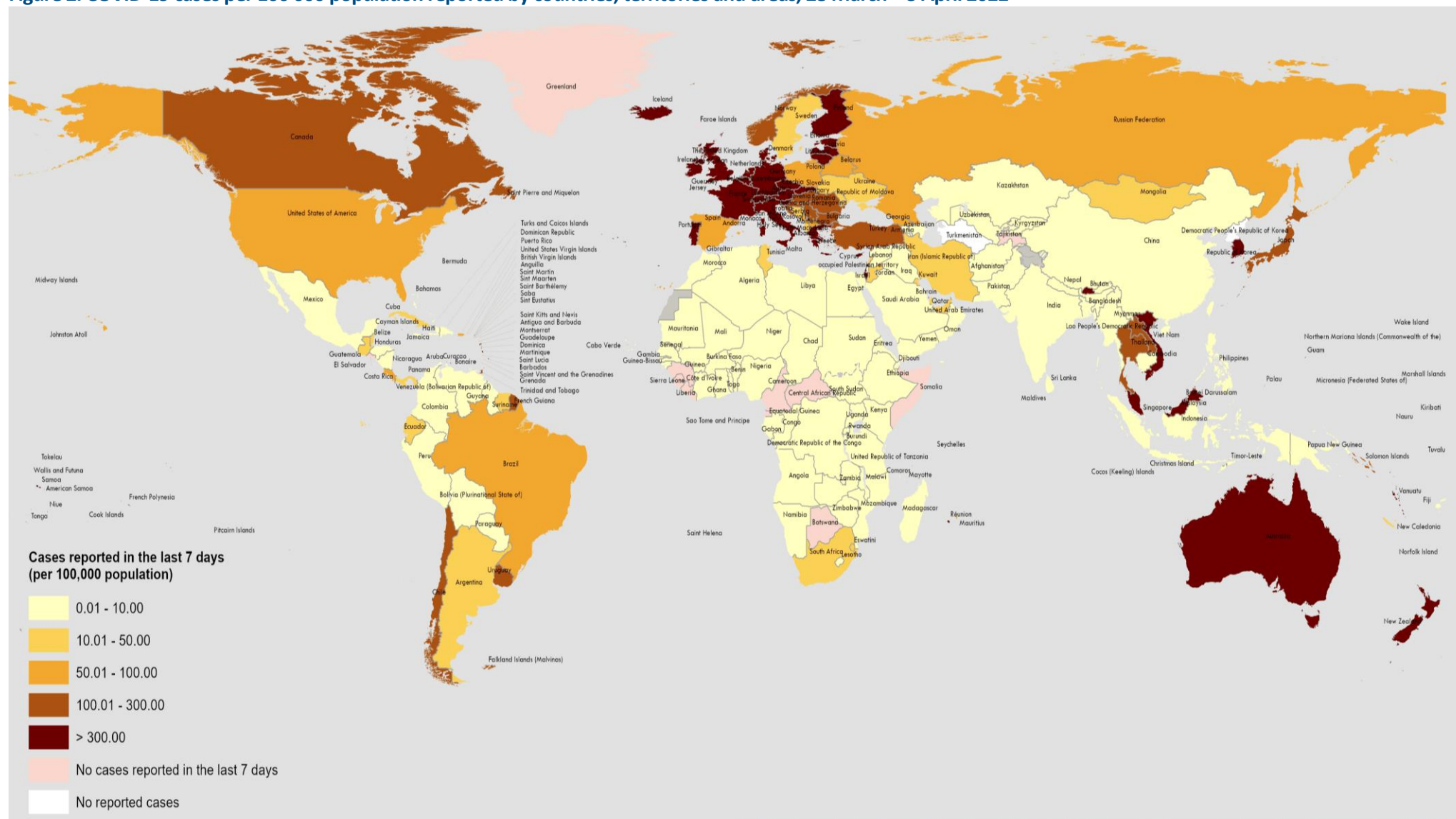
*Percent change in the number of newly confirmed cases/deaths in the past seven days, compared to seven days prior

**See [Annex 1: Data, table, and figure notes](#)

For the latest data and other updates on COVID-19, please see:

- [WHO COVID-19 Dashboard](#)
- [WHO COVID-19 Weekly Operational Update and previous editions of the Weekly Epidemiological Update](#)

Figure 2. COVID-19 cases per 100 000 population reported by countries, territories and areas, 28 March – 3 April 2022*



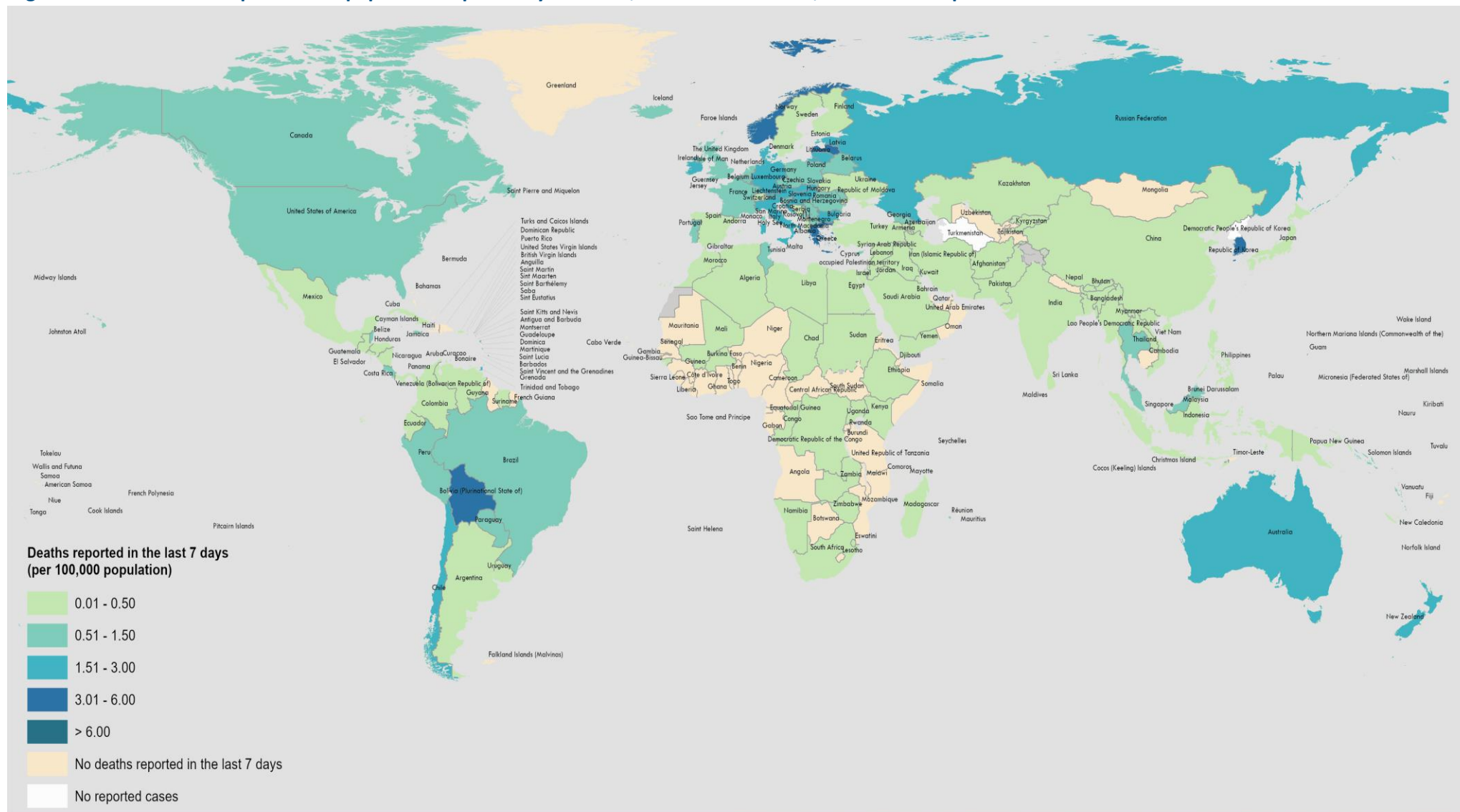
Data Source: World Health Organization
 United Nations Population Division (Population prospect 2020)
Map Production: WHO Health Emergencies Programme

Not applicable 0 2,500 5,000 km
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The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes. Data for Bonaire, Sint Eustatius and Saba have been disaggregated and displayed at the subnational level.

**See [Annex 1: Data, table, and figure notes](#)

Figure 3. COVID-19 deaths per 100 000 population reported by countries, territories and areas, 28 March – 3 April 2022*



Data Source: World Health Organization
 United Nations Population Division (Population prospect 2020)
 Map Production: WHO Health Emergencies Programme

Not applicable 0 2,500 5,000 km

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Special Focus: Update on SARS-CoV-2 variants of interest and variants of concern

WHO, in collaboration with national authorities, institutions and researchers, routinely assesses if variants of SARS-CoV-2 alter transmission or disease characteristics, or impact effectiveness of vaccines, therapeutics, diagnostics or public health and social measures (PHSM) applied to control disease spread. Potential variants of concern (VOCs), variants of interest (VOIs) or variants under monitoring (VUMs) are regularly assessed based on the risk posed to global public health.

The classifications of variants will be revised to reflect the continuous evolution of circulating variants and their changing epidemiology. Criteria for variant classification, and the current lists of VOCs, VOIs and VUMs, are available on the [WHO Tracking SARS-CoV-2 variants website](#). National authorities may choose to designate other variants and are encouraged to investigate and report on the impacts of these variants. When referring to the genomic sequence of SARS-CoV-2 identified from the first cases (December 2019), the term 'index virus' should be used.

Geographic spread and prevalence of VOCs

The Omicron variant remains the dominant variant circulating globally, accounting for nearly all sequences recently reported to GISAID. Among the 417 147 sequences uploaded to GISAID with specimens collected in the last 30 daysⁱ, 416 175 (99.8%) were Omicron, 141 (<0.1%) were Delta, and 562 sequences were not assigned to a Pango lineage (<0.2%). The total number of submitted Omicron sequences continues to decline, a trend observed for each of the Omicron descendent variants. Among the Omicron descendent lineages, the relative proportion of BA.2 has increased to 93.6%, while BA.1.1 accounts for 4.8% and BA.1 and BA.3 account for <0.1% (figure 4, panels A and B) of all Omicron lineages. BA.2 has become dominant in all six WHO regions (figure 4, panel C) and in 68 countries for which sequence data are available. However, there have been subregional differences in the rise of BA.2; notably in South America: BA.2 began to rise later and at a slower rate as compared to other subregions, accounting for 28% of Omicron lineages in week 11 (14 to 20 March 2022). These trends should be interpreted with due consideration of the limitations of surveillance systems, including differences in sequencing capacity and sampling strategies between countries, as well as laboratory turn-around times for sequencing and delays in reporting.

Figure 4. Global distribution and relative proportion of Omicron lineages for sequences submitted to GISAID presented by week of specimen collection

Panel A. Relative proportions of Omicron lineages over the last four weeks by week of specimen collection

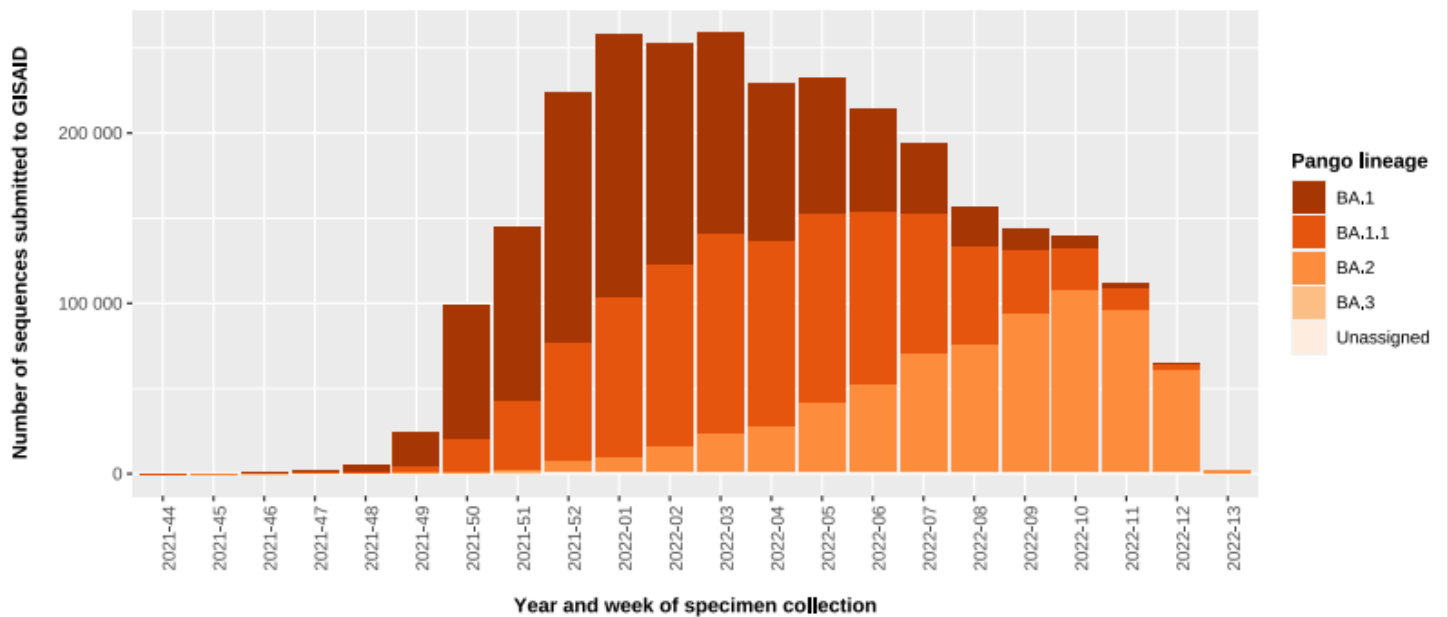
Lineage	Countries	Sequences ^a	SGTF ^b	Overall (%)		Last 4 weeks by collection date (%)			
				Total	2022-10	2022-11	2022-12	2022-13	
BA.1	174	1 124 247	95.93	39.56	5.51	3.18	1.57	0.94	
BA.1.1	155	1 017 287	95.35	35.79	17.47	10.99	4.54	4.81	
BA.2	114	693 654	0.24	24.41	76.56	85.38	93.44	93.63	
BA.3	23	690	97.25	0.02	0.02	0.01	0.01	0.06	
Unassigned	68	6 193	29.68	0.22	0.44	0.44	0.45	0.56	

^a Data source: sequences and metadata from [GISAID](#)

^b Percentage of sequences with Spike H 69-70 deletion associated with S gene failure

ⁱ Includes sequences submitted to [GISAID](#) with sample collected dates from 02 to 31 March 2022 (last reported sample at the time of data extraction), excluding low coverage sequences. Proportions are estimated for countries submitting more than 100 total sequences. In the past 30 days, 45 countries submitted a total of 100 sequences and above on GISAID.

Panel B. Incidence of Omicron lineages by week of specimen collection.



Global distribution of Omicron lineages from sequences and metadata submitted to [GISAID](#)
 Data was extracted from [GISAID](#) on 22 March 2022 at 14:00 CET; figures are correct at the time of printing

Panel C. Proportion of Omicron descendent lineage BA.2 since January 2021 by WHO region

WHO region	Omicron sequences			Proportion BA.2 by specimen collection week (%)												
	Total ^a	Weekly ^b	TAT ^c	2022-01	2022-02	2022-03	2022-04	2022-05	2022-06	2022-07	2022-08	2022-09	2022-10	2022-11	2022-12	2022-13
Africa	8 742	574	28 days	12.03	17.40	38.74	37.66	45.07	59.90	76.59	86.25	83.33	79.09	91.18	88.24	
Eastern Mediterranean	1 297	147	38 days	30.31	33.14	32.77	12.93	16.67	45.58	44.32	40.82	50.00	100.00			
Europe	1 425 279	124 128	10 days	3.20	8.04	12.80	17.52	22.81	32.59	46.11	60.06	74.32	82.90	90.02	94.17	94.33
Americas	685 187	51 459	19 days	0.17	0.36	0.75	1.26	1.75	2.92	5.35	9.67	17.48	32.10	48.67	65.88	65.79
South-East Asia	47 348	4 132	27 days	52.48	57.87	47.99	58.62	78.47	82.90	82.48	79.28	86.14	85.16	94.16	93.10	
Western Pacific	89 145	5 302	29 days	5.20	4.40	6.55	10.65	14.72	21.07	30.22	40.97	49.87	70.58	81.66	92.14	93.10

^a Total number of Omicron sequences in GISAID with specimen dates from 3 January 2022

^b Median number of sequences per specimen week (excludes weeks with no Omicron sequences)

^c Median number of days from specimen collection to sequence deposition in GISAID

Reduced number of SARS-CoV-2 sequences in publicly available database

Since the first epidemiological week of 2022, when the highest number of weekly sequences was reported in GISAID (284 061 sequences), the number of weekly sequences has declined progressively. During week 12 (21 to 27 March 2022), only 65 381 sequences were collected and submitted to GISAID. There has been an average of 12% reduction in the weekly collection and submission of sequences. While the decrease in sequences is consistent with the overall trend in new cases observed globally, it may also reflect changes in epidemiological surveillance policies in some countries, including changes in sampling and sequencing strategies, resulting in lower overall numbers of tests performed and consequently lower numbers of cases detected.

Recombinants update

The SARS-CoV-2 virus continues to evolve. Given the current high level of transmission worldwide, it is likely that further variants, including recombinants, will continue to emerge. Recombination is common among coronaviruses and is regarded as an expected mutational event.

WHO is tracking recombinant variants, both recombinants of Delta (AY.4) and Omicron (BA.1) (e.g., XD Pango lineage), as well as recombinants of BA.1 and BA.2 (e.g., XE Pango lineage). The XD recombinant is being tracked as a VUM by WHO, although its spread appears to have remained limited at present (26 sequences in GISAID). Currently available evidence does not suggest that it is more transmissible than other circulating variants. The XE recombinant is being tracked as part of the Omicron variant. This recombinant was first detected in the United Kingdom on 19 January and approximately 600 sequences have been reported and confirmed as of 29 March 2022. Early estimates suggest that XE has a community growth rate advantage of 1.1 (which represents a 10% transmission advantage) as compared to BA.2; however, this finding requires further confirmation.

The evolution rate and the risk of the emergence of new variants, including recombinants, is still very high. The implementation of continuous, comprehensive and representative community sampling and sequencing strategies, alongside timely sharing of data by Member States, remain critical for tracking and understanding the behaviour of SARS-CoV-2 (see [WEU 85](#)). WHO continues to closely monitor and assess the public health risk associated with recombinant variants, alongside other SARS-CoV-2 variants, and will provide updates as further evidence becomes available.

Characteristics of Omicron

Available evidence on the phenotypic impacts of VOCs is reported in [previous editions](#) of the COVID-19 Weekly Epidemiological Update. Since the [last update on 22 March 2022](#), there have been several new publications on the phenotypic characteristics of VOCs, including literature on Omicron (Table 2). Some of these studies have not been peer-reviewed and the findings must therefore be interpreted with due consideration of this limitation.

Table 2: Summary of current evidence on Omicron

Domain	Indicator	Main results
Epidemiology	Impact on disease prevalence/incidence	Following an increase in the first half of March 2022, the number of new COVID-19 cases has decreased for a second consecutive week, with a 16% decline during the week of 28 March through 3 April 2022 as compared to the previous week. It is important to note that recent changes in testing policies may influence the number of reported cases. The Omicron variant is the dominant circulating variant globally, representing 99.8% of samples collected between 2 and 31 March 2022 (GISAID), while the Delta variant represents <0.1%. Among the Omicron Pango lineages, BA.2 is the most prevalent (93.6%), followed by BA.1.1 (4.8%), BA.1 and BA.3 account for <0.1%.
	Impact on transmission	In an updated analysis of GISAID data ¹ , Omicron continues to show a growth advantage over Delta in 67 countries with sufficient sequence data available up to 4 April 2022, translating to a pooled mean transmission advantage (i.e., relative difference in effective reproduction numbers) of 110% (95% CI: 90%-131%) across epidemiological contexts, under the assumption of an unchanged generation time (i.e., duration between the moment a person gets infected to the moment they infect another person). However, evidence for a reduced generation time of Omicron suggests the transmission advantage may be lower; for a 20% shorter generation time, the estimated pooled mean transmission advantage of Omicron over Delta is 91% (95% CI: 71%-112%). The same analysis yielded identical results to the previous iteration regarding the growth rate advantage of the Omicron Pango lineage BA.2 over the Pango lineage BA.1, with a pooled mean transmission advantage of 72% (95% CI: 55%-82%), under the assumption of an unchanged generation time. These estimates are stabilising as the cumulative number of Omicron sequences is increasing and data become available from more countries. An updated analysis published on 25 March 2022 by the United Kingdom Health Security Agency ² , which used data on samples collected between 15 December 2021 and 15 March 2022, supports BA.2 as having a higher growth rate compared to BA.1 (median: 75.3% per week).
	Impact on disease severity	Omicron has consistently been associated with lower severity when compared to Delta across different settings. ³⁻⁶ Although reported hospitalisation rates among children 0-4 years in the United States of America were about five times higher during periods of Omicron predominance compared to Delta predominance (14.5 vs. 2.9 per 100,000), length of hospital stay was shorter (2 vs 1.5 days, p = 0.002) and the proportion of children requiring ICU admissions was lower (27% vs 21%, p = 0.02) during Omicron predominance. ⁷ An updated analysis found no difference in the risk of hospitalisation between individuals infected with BA.1 compared to BA.2 (HR=0.94; 95% CI: 0.88-1.0) in the United Kingdom. ²
Immune response	Impact on reinfection	Higher rates of reinfection have been reported for Omicron as compared to other SARS-CoV-2 variants. Reinfection with BA.2 following BA.1 has been associated with mild disease in Denmark ⁸ while in Qatar, previous infection with one of the Omicron Pango lineages was found to potentially confer protection against infection with other Omicron Pango lineages: 94.9% (95% CI: 88.4-97.8%) protection against BA.2 following infection with BA.1, and 85.6% (95% CI: 77.4-90.9%) protection against BA.1 following infection with BA.2. ⁹

Domain	Indicator	Main results
	Impact on vaccination	Results of vaccine effectiveness (VE) studies should be interpreted with caution because estimates vary with the type of vaccine administered and the number of doses and scheduling (sequential administration of different vaccines). For further information, see the section Interpretation of the results of the VE for the Omicron variant.
	Impact on antibody responses	There are no new data on antibody responses to Omicron since the epidemiological update published on 22 March 2022 . An analysis of neutralization data from 23 laboratories found a 20-fold reduction in neutralization associated with the Omicron variant. ¹⁰ These findings are consistent with results of recent studies that reported lower neutralising antibody titers to BA.1 and BA.2 compared to wild-type SARS-CoV-2 and similar responses for BA.1 and BA.2. ^{11,12} Another recent study found similar non-neutralising antibody responses to BA.1 and BA.2 in vaccinated individuals. ¹³ Overall, these results indicate similar humoral responses among BA.1 and BA.2.
Diagnostic tools	Impact on PCR assays	Most BA.2 sequences lack the 69-70 deletion responsible for S-gene target failure, with only a limited number of sequences (0.24% out of 693 654) having the 69-70 deletion (GISAID). Assessment of PCR tests for SARS-CoV-2 that include multiple gene targets predicted limited impact of the Omicron variant on the accuracy of these assays. ^{14,15}
	Impact on Rapid Diagnostic tests	Based on evidence from a recent study conducted in the United States of America, the sensitivity of Ag-RDT tests to detect Omicron compared to Delta and wild-type SARS-CoV-2 is similar. ¹⁶
Impact on treatment	Impact on antivirals	Consistent with preliminary data showing no difference in the effectiveness of antiviral agents against the Omicron variant, a recent review reported similar efficacy of antiviral agents against Omicron and previous SARS-CoV-2 variants. ¹⁷
	Impact on biologicals	Initially, studies on the effectiveness of monoclonal antibodies for treating patients with Omicron reported conserved neutralizing activity for three broadly neutralizing monoclonal antibodies (sotrovimab, S2X259 and S2H97) and a reduction in effectiveness of other monoclonal antibodies. ¹⁸⁻²¹ However, additional preclinical evidence shows reduced neutralizing activity of sotrovimab against the BA.2 Pango lineage and lack of efficacy of casirivimab-imdevimab against the BA.1 Omicron Pango lineage. ²²
	Other treatment options	There is no evidence available on the effectiveness of Interleukin-6 receptor blockers and corticosteroids for the management of severe patients with Omicron.

Additional resources

- [Tracking SARS-CoV-2 Variants](#)
- [COVID-19 new variants: Knowledge gaps and research](#)
- [Genomic sequencing of SARS-CoV-2: a guide to implementation for maximum impact on public health](#)
- [Considerations for implementing and adjusting public health and social measures in the context of COVID-19](#)
- [VIEW-hub: repository for the most relevant and recent vaccine data](#)
- [WHO Statement on Omicron sublineage BA.2](#)

Figure 5. Vaccine effectiveness (VE) of primary series and booster vaccination against the Delta variant of concern

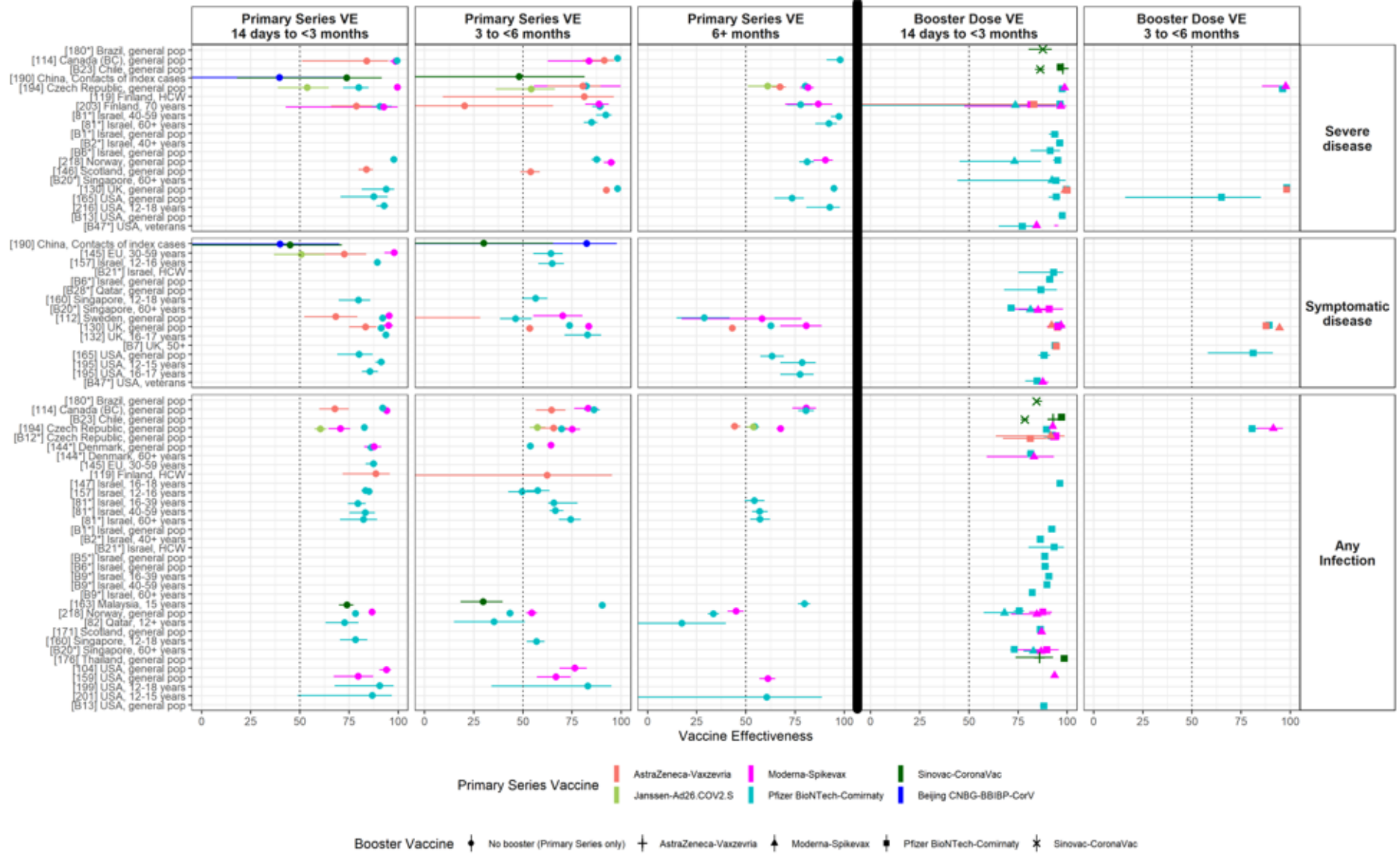
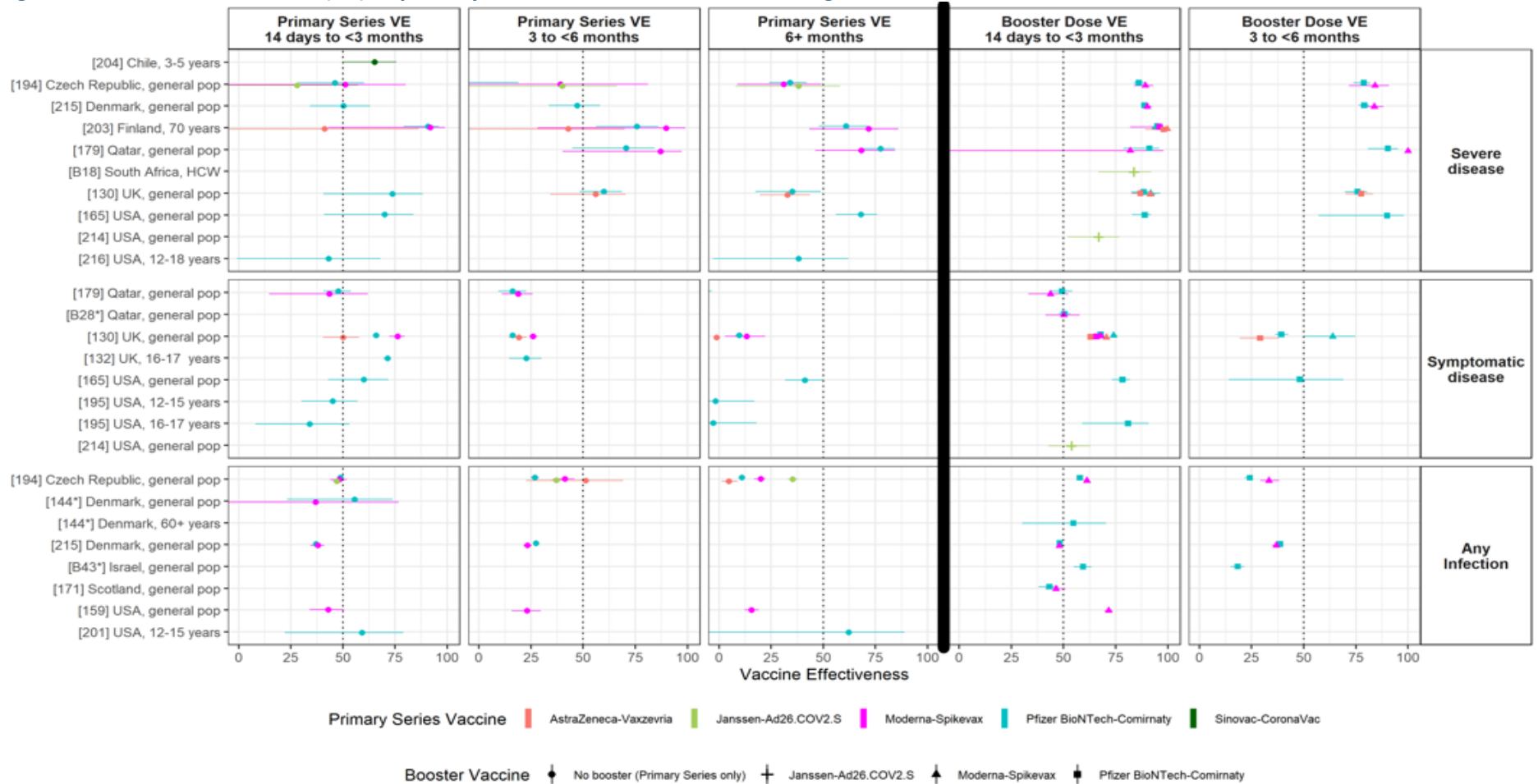


Figure 6. Vaccine effectiveness (VE) of primary series and booster vaccination against the Omicron variant of concern



*Indicates booster dose vaccine effectiveness evaluated using persons completing primary series as reference group, rather than unvaccinated persons. Abbreviations: pop=population; HCW=healthcare workers; EU=European Union. Dots represent point estimates of vaccine effectiveness; horizontal lines represent the 95% confidence intervals. Labels along left side of plot indicate reference numbers [], country, and study population. Reference numbers identify the study and link to the [summary table](#) of VE effectiveness studies on [view-hub.org](#) (Table 1 in summary table); references starting with a 'B' are studies found in the booster VE table only (Table 2 in summary table). Primary series refers to the completion of two doses of vaccines for AstraZeneca-Vaxzevria; Moderna-Spikevax, Pfizer BioNTech-Comirnaty and Sinovac-CoronaVac and one dose of Janssen-Ad26.COVID.2.S. Severe disease includes severe disease, hospitalization, and pneumonia; symptomatic disease includes disease of any severity level; any infection can include symptomatic and asymptomatic infection. Additional details on the methods for inclusion of the estimates in the plots provided in Annex 3. Note, three negative point estimates for the primary series are not shown in the Omicron plot: Moderna-Spikevax VE against symptomatic disease at 6+ months (reference 179) as well as Moderna-Spikevax and Pfizer BioNTech-Comirnaty VE against infection at 3-6 months (reference 144); one negative point estimate for primary series is not shown in the Delta plot: AstraZeneca-Vaxzevria VE against Delta symptomatic disease (reference 112) with 95% CIs crossing 0 is not fully visible in the plot.

Figures 5 and 6 summarize the impact of Delta and Omicron variants, respectively, on product-specific vaccine effectiveness (VE) over time for both primary series vaccines and booster vaccines. Since the last [update](#), four new studies, one of which assessed VE against Delta, two of which assessed VE against Omicron, and one which also assessed VE against both Delta and Omicron, have been added to the figures.^{23–26} Of the studies on Omicron, one peer-reviewed study provided new VE data on Janssen-Ad26.COVID.S²³, one (not yet peer-reviewed) on Moderna-Spikevax²⁴, and two (one not yet peer-reviewed) on Pfizer BioNTech-Comirnaty.^{24,26} Additional information on vaccine performance against VOCs can also be found in Annex 4.

Interpretation of the results of the VE for the Omicron variant

To date, twelve studies reporting VE estimates against the Omicron variant show reduced protection of the primary series COVID-19 vaccines for all outcomes (*severe disease*, *symptomatic disease*, and *infection*) than has been observed for other VOCs. Importantly, VE estimates against the Omicron variant remain highest for *severe disease*. Booster vaccination substantially improves VE for all outcomes for all vaccine products. However, due to the short follow-up time, more data are needed to characterize the duration of VE following a booster dose for all outcomes.

For protection against *severe disease*, within the first three months of primary series vaccination, four of eight (50%) VE estimates for the mRNA vaccines (Moderna-Spikevax and Pfizer BioNTech-Comirnaty) were $\geq 70\%$; while only two VE were available for vector vaccines (AstraZeneca-Vaxzevria and Janssen-Ad26.COVID.S), both of which reported a VE of $< 50\%$. Beyond three months after the primary series vaccination, six of 17 (35%) VE estimates for the mRNA vaccines and none of the five available VE estimates for the vector vaccines were $\geq 70\%$. A booster dose improved VE against *severe disease* in all 12 studies, with only one estimate for Janssen-Ad26.COVID.S being $< 70\%$ between 14 days and three months of receipt of a booster dose (17 VE estimates evaluated an mRNA booster dose and two estimates evaluated a booster dose of Janssen-Ad26.COVID.S). At three to six months post mRNA booster dose, all nine available estimates showed VE $\geq 70\%$, including six studies in which an mRNA vaccine was given as the primary series and three studies in which AstraZeneca-Vaxzevria was given as the primary series.

Initial VE estimates against *symptomatic disease* and *infection* tended to be lower than against *severe disease*, and VE decreased more substantially over time. For *symptomatic disease* within the first three months of primary series vaccination, two of eight (25%) VE estimates for the mRNA vaccines were $\geq 70\%$, and the single VE estimate for the AstraZeneca-Vaxzevria was $< 70\%$. Beyond three months after vaccination, none of the 14 VE estimates were $\geq 50\%$ (12 estimates evaluated mRNA vaccines and two evaluated AstraZeneca-Vaxzevria). An mRNA booster dose after completion of a primary series of an mRNA vaccine or a vector vaccine improved VE against *symptomatic disease*, with four of 13 (31%) VE estimates of $\geq 70\%$, and 11 of 13 (85%) VE estimates of $\geq 50\%$ between 14 days and three months post booster. However, booster dose protection appeared to decline over time since vaccination, with one of four (25%) available estimates indicating a VE of $\geq 50\%$ at three to six months following receipt of an mRNA booster dose. VE against *infection* showed a similar pattern as that against *symptomatic disease*.

Interpretation of the results of the VE for the Delta variant

To date, 41 studies contribute evidence of the effectiveness of COVID-19 vaccines against disease and infection due to the Delta variant. VE estimates against Delta are substantially higher as compared to those against Omicron and decline more gradually over time for symptomatic disease and infection. There are only slight declines over time for VE estimates against severe disease caused by Delta.

For *severe disease* outcomes with the Delta variant within the first three months of vaccination with the primary series, all 10 available VE estimates for the mRNA vaccines (Moderna-Spikevax and Pfizer BioNTech-Comirnaty) and four of five

(80%) VE estimates for the vector vaccines (AstraZeneca-Vaxzevria and Janssen-Ad26.COVS.2.S) were $\geq 70\%$. In addition, one of the two available VE estimates for the inactivated vaccines (Beijing CNBG-BBIBP-CorV and Sinovac-CoronaVac), from a study among a high risk population of close contacts of Delta index cases, was $\geq 70\%$.²⁷ Beyond three months after vaccination, all of the 23 available VE estimates for the mRNA vaccines, and five of the 10 (50%) VE estimates for the vector vaccines, were $\geq 70\%$. A booster dose improved VE against *severe disease*, with all 25 VE estimates being $\geq 70\%$ between 14 days and three months of receipt of a booster dose (22 estimates evaluated an mRNA booster, one evaluated a booster dose of AstraZeneca-Vaxzevria, and one evaluated a booster dose of Sinovac-CoronaVac). Between three and six months post mRNA booster, four of five (80%) estimates showed a VE of $\geq 70\%$.

For *symptomatic disease* and *infection*, initial VE estimates tended to be lower than against severe disease, and VE estimates decreased more significantly over time. Nonetheless, for *symptomatic disease* outcomes within the first three months of vaccination with the primary series, all 11 available VE estimates for the mRNA vaccines were $\geq 70\%$; two of four (50%) VE estimates for the vector vaccines were $\geq 70\%$. Both VE estimates for the inactivated vaccines among the high-risk group of close contacts of Delta index cases were $< 50\%$. Beyond three months after vaccination, seven of 15 (47%) VE estimates for the mRNA vaccines and none of the three VE estimates for AstraZeneca-Vaxzevria were $\geq 70\%$. An mRNA booster dose after completion of a primary series of an mRNA vaccine or AstraZeneca-Vaxzevria restored VE against *symptomatic disease* to $\geq 70\%$ in all studies (18 VE estimates) within three months of a booster dose. This persisted across six months post booster dose, with all the four VE estimates $\geq 70\%$. Limited data were available for VE of inactivated vaccines against symptomatic disease, though a similar pattern was seen with VE estimates of inactivated vaccines against *infection* over time: the single VE estimate within the first three months of completion for Sinovac-CoronaVac was $\geq 70\%$, which declined to $< 50\%$ between three to six months; however, a booster dose with various platforms following Sinovac-CoronaVac primary series restored VE to $\geq 70\%$ in all studies (six VE estimates) within the first three months of receipt of any booster dose.

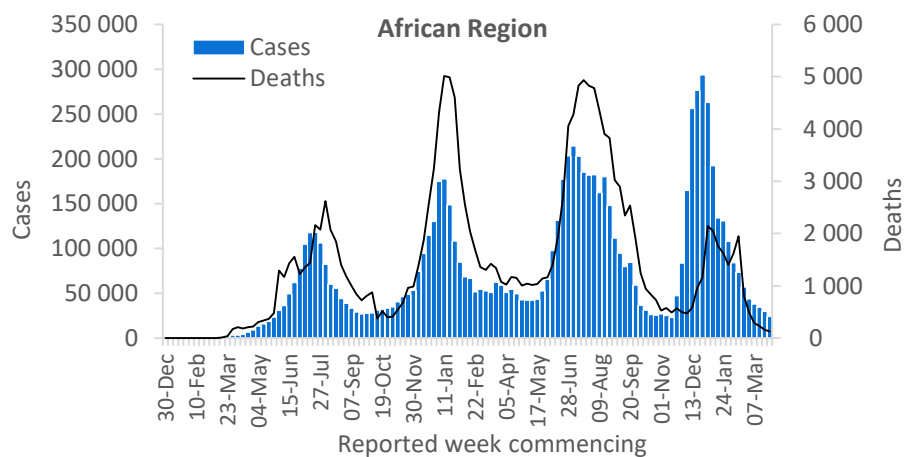
WHO regional overviews:

Epidemiological week 28 March – 3 April 2022**

African Region

The African Region has continued to report a decreasing trend in weekly cases since January 2022, with just under 24 000 new weekly cases reported, representing a 19% decrease as compared to the previous week. However, nine (18%) countries in the Region reported an increase of over 20% in cases, with some of the greatest proportional increases observed in Mauritania (39 vs 4 new cases; +875%), Seychelles (442 vs 206 new cases; +115%) and Namibia (97 vs 63 new cases; +54%). The highest numbers of new cases were reported from South Africa (9802 new cases; 16.5 new cases per 100 000 population; +10%), Réunion (9756 new cases; 1089.7 new cases per 100 000; +15%), and Mauritius (794 new cases; 62.4 new cases per 100 000; -90%).

The number of new weekly deaths in the Region decreased by 21% as compared to the previous week, with over 100 new deaths reported. The highest numbers of new deaths were reported from South Africa (81 new deaths; <1 new death per 100 000 population; -6%), Ethiopia (12 new deaths; <1 new death per 100 000; +300%), and Zimbabwe (9 new deaths; <1 new death per 100 000; -18%).

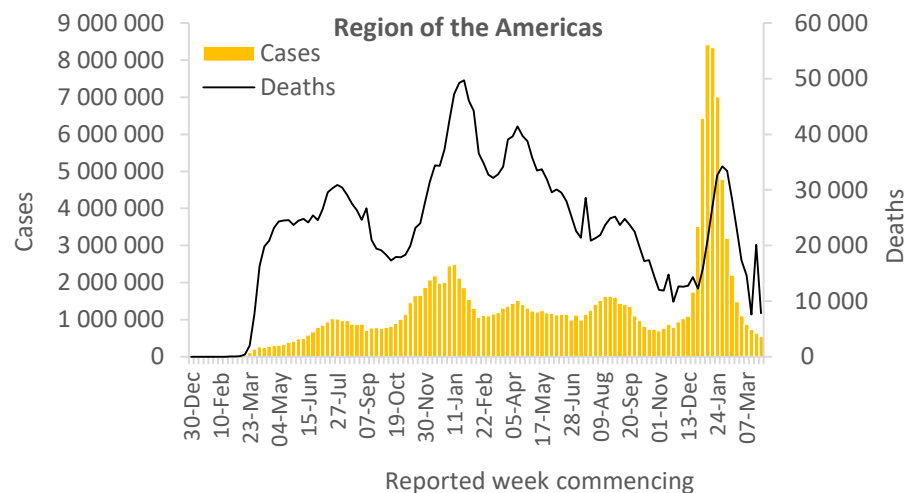


Updates from the [African Region](#)

Region of the Americas

The Region of the Americas has also been reporting a decreasing trend in weekly cases since mid-January 2022, with over 538 000 new weekly cases reported, corresponding to a 15% decrease as compared to the previous week. However, thirteen (23%) countries in the Region reported increases in new cases of 20% or greater, with the largest increases observed in Saba (55 vs 3 new cases; +1733), Aruba (123 vs 26 new cases; +373) and Saint Barthélemy (186 vs 78 new cases; +139%). The highest numbers of new cases were reported from the United States of America (205 433 new cases; 62.1 new cases per 100 000; +2%), Brazil (172 908 new cases; 81.3 new cases per 100 000; -25%) and Canada (48 853 new cases; 129.4 new cases per 100 000; +16%).

The number of new weekly deaths decreased by 61% as compared to the previous week, when an artificial spike was observed due to changes in the definition of COVID-19 deaths in Chile and in the United States of America. The highest numbers of new deaths were reported from the United States of America (4435 new deaths; 1.3 new deaths per 100 000; -10%), Brazil (1436 new deaths; <1 new death per 100 000; -19%), and Bolivia (Plurinational State of) that shows a sharp increase in deaths due to backlog reporting (408 new deaths; 3.5 new deaths per 100 000; +806%).

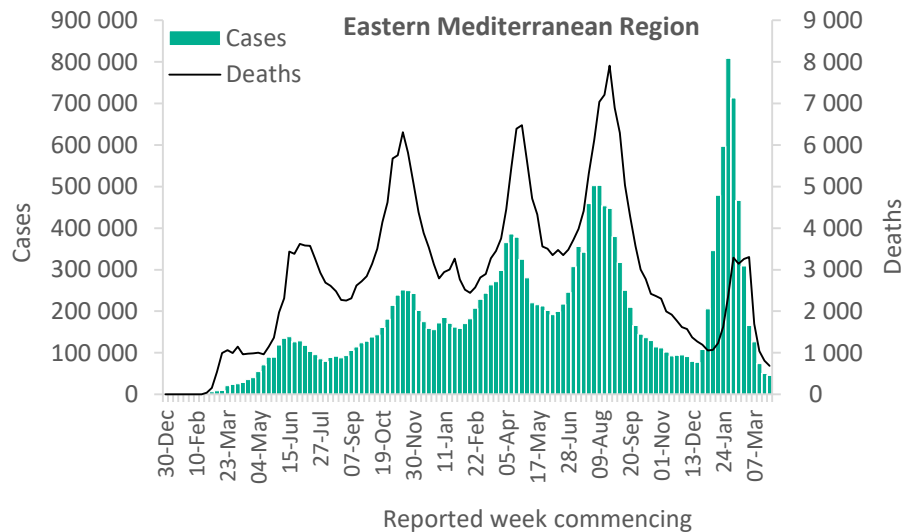


Updates from the [Region of the Americas](#)

Eastern Mediterranean Region

In the Eastern Mediterranean Region, new weekly cases have continued to decline after reaching a peak in early February 2022. Just over 45 000 new weekly cases were reported last week, a 9% decrease as compared to the previous week. However, two (9%) countries in the Region have reported increases in new cases of 20% or greater: Islamic Republic of Iran (17 582 vs 9572 new cases; +84%) and Iraq (2379 vs 1956 new cases; +22%). The highest numbers of new cases were reported from the Islamic Republic of Iran (20.9 new cases per 100 000), Bahrain (5198 new cases; 305.5 new cases per 100 000; -20%) and Egypt (4375 new cases; 4.3 new cases per 100 000; -21%).

The number of new weekly deaths in the Region decreased by 16% when compared to the previous week, with just over 600 new deaths reported. The highest numbers of new deaths were reported from the Islamic Republic of Iran (306 new deaths; <1 new death per 100 000; -27%), Tunisia (158 new deaths; 1.3 new deaths per 100 000; +58%), and Egypt (56 new deaths; <1 new death per 100 000; -33%).

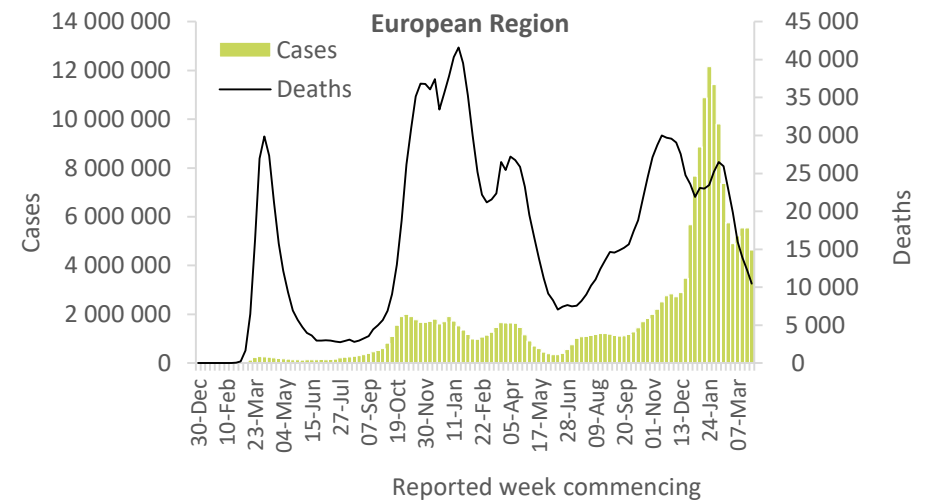


Updates from the [Eastern Mediterranean Region](#)

European Region

After the increase in cases observed in the European Region during the first half of March 2022, new weekly cases have decreased for the second consecutive week (-16% as compared to the previous week), with over 4.6 million new cases reported. Four (7%) countries in the Region reported increases in new cases of 20% or greater, with the largest observed in Malta (4243 vs 2434 new cases; +74%), Uzbekistan (212 vs 165 new cases; +28%) and Kyrgyzstan (89 vs 70 new cases; +27%). The highest numbers of new cases were reported from Germany (1 371 270 new cases; 1648.8 new cases per 100 000; -13%), France (959 084 new cases; 1474.6 new cases per 100 000; +13%) and Italy (486 695 new cases; 816.0 new cases per 100 000; -3%).

The number of new deaths has continued to decrease in the Region, with over 10 000 new deaths reported this week, a 15% decrease as compared to the previous week. The highest numbers of new deaths were reported from the Russian Federation (2357 new deaths; 1.6 new deaths per 100 000; -18%), Germany (1592 new deaths; 1.9 new deaths per 100 000; +5%), and Italy (966 new deaths; 1.6 new deaths per 100 000; -4%).

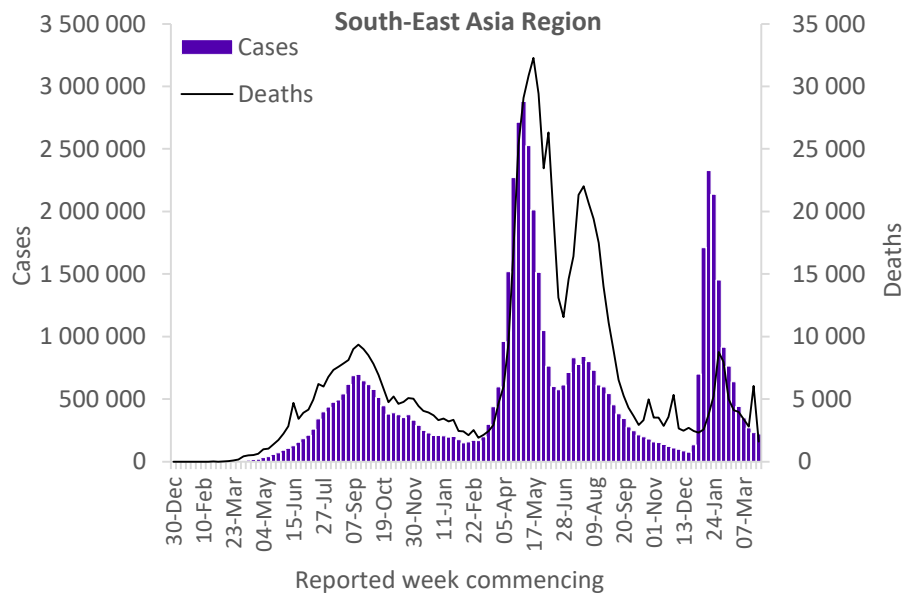


Updates from the [European Region](#)

South-East Asia Region

The South-East Asia Region reported over 221 000 new weekly cases, a 5% decline as compared to the previous week, continuing the decreasing trend observed since mid-January 2022. However, Bhutan reported an increase in new weekly cases of 107% (6357 vs 3076 new cases). The highest numbers of new cases were reported from Thailand (182 510 new cases; 261.5 new cases per 100 000; +4%), Indonesia (21 028 new cases; 7.7 new cases per 100 000; -42%), and India (8678 new cases; <1 new case per 100 000; -25%).

The Region reported just over 1600 new weekly deaths, representing a 73% decrease as compared to the previous week, when an artificial spike was observed due to retrospective adjustments reported from India. The highest numbers of new deaths were reported from Indonesia (618 new deaths; <1 new death per 100 000; -34%), Thailand (616 new deaths; <1 new death per 100 000; +11%), and India (341 new deaths; <1 new death per 100 000; -92%).

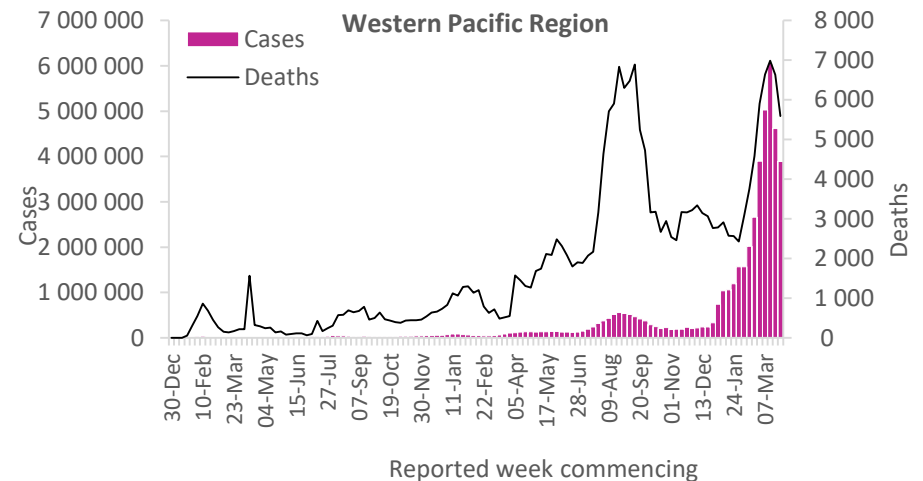


Updates from the [South-East Asia Region](#)

Western Pacific Region

After the increasing trend in new cases observed in the Western Pacific Region since the end of December 2021, new weekly cases declined for a second consecutive week (-16% as compared to the previous week), with over 3.8 million new cases reported. However, seven (23%) countries in the Region reported an increase of 20% or greater, with some of the largest increases observed in Mongolia (1628 vs 622 new cases reported; +162%), Solomon Islands (1044 vs 668 new cases; +56%) and Cook Islands (828 vs 554 new cases; +49%). The highest numbers of new cases were reported from the Republic of Korea (2 058 375 new cases; 4014.8 new cases per 100 000; -16%), Viet Nam (796 725 new cases; 818.5 new cases per 100 000; -29%), and Australia (399 479 new cases; 1566.6 new cases per 100 000; +9%).

The number of new weekly deaths shows a decrease of 16% as compared to the previous week, with just under 5600 new deaths reported. The highest numbers of new deaths were reported from the Republic of Korea (2336 new deaths; 4.6 new deaths per 100 000; -5%), China (960 new deaths; <1 new death per 100 000; -34%), and Japan (549 new deaths; <1 new death per 100 000; -16%).



Updates from the [Western Pacific Region](#)

Annex 1. Data, table, and figure notes

Data presented are based on official laboratory-confirmed COVID-19 cases and deaths reported to WHO by country/territories/areas, largely based upon WHO [case definitions](#) and [surveillance guidance](#). While steps are taken to ensure accuracy and reliability, all data are subject to continuous verification and change, and caution must be taken when interpreting these data as several factors influence the counts presented, with variable underestimation of true case and death incidences, and variable delays to reflecting these data at the global level. Case detection, inclusion criteria, testing strategies, reporting practices, and data cut-off and lag times differ between countries/territories/areas. A small number of countries/territories/areas report combined probable and laboratory-confirmed cases. Differences are to be expected between information products published by WHO, national public health authorities, and other sources.

Due to public health authorities conducting data reconciliation exercises that remove large numbers of cases or deaths from their total counts, negative numbers may be displayed in the new cases/deaths columns as appropriate. When additional details become available that allow the subtractions to be suitably apportioned to previous days, graphics will be updated accordingly. A record of historic data adjustment made is available upon request by emailing epi-data-support@who.int. Please specify the countries of interest, time period, and purpose of the request/intended usage. Prior situation reports will not be edited; see covid19.who.int for the most up-to-date data. COVID-19 confirmed cases and deaths reported in the last seven days by countries, territories, and areas, and WHO Region (reported in previous issues) are now available at: <https://covid19.who.int/table>.

'Countries' may refer to countries, territories, areas or other jurisdictions of similar status. The designations employed, and the presentation of these materials do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. Countries, territories, and areas are arranged under the administering WHO region. The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions except, the names of proprietary products are distinguished by initial capital letters.

^[1] All references to Kosovo should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). In the map, the number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes.

Annex 2. Additional notes on VOC impacts on vaccines

- Reductions in VE do not necessarily mean loss of protection, as indicated by the absolute VE estimate. For example, a 10-percentage point reduction in VE against symptomatic disease for mRNA vaccines would still mean high vaccine effectiveness of ~85%. Likewise, vaccines have shown higher VE against severe disease; thus, small reductions in VE against severe disease due to VOCs may still mean substantial protection.
- Annex 4 summarizes the impact of VOCs on COVID-19 vaccine performance in the absence of waning, and, therefore, does not include studies that only assess VE greater than 4 months post final dose.
- Studies reporting VOC-specific VE estimates for full vaccination (≥ 7 days post final dose) are assessed against a comparator VE estimate for that vaccine product to determine level of reduction in VE. For symptomatic disease, VOC VE is compared against phase 3 RCT results from non-VOC settings. For severe disease and infection, due to instability or lack of phase 3 RCT estimates, VOC VE is compared to non-VOC VE estimates from the same study when available (or to Alpha VE from same study when assessing Beta, Gamma, or Delta); with an exception for AstraZeneca-Vaxzevria for infection (when a phase 3 estimate of VE against infection due to non-VOC is available and used as comparator). In some instances, a study may be included for severe disease or infection outcome even without a comparator if a very high VE estimate is reported against a VOC (i.e., $>90\%$).

- It is also important to note that studies vary in population, outcome definitions, study design and other methodological considerations, which may in part explain differences when comparing VE estimates for a product between different studies. In addition, the reductions summarized in the table represent VE point estimates and do not represent the uncertainty intervals around these estimates which vary substantially across studies. The reductions in VE noted should be interpreted with these limitations in mind.
- Neutralization studies that use samples collected >7 days and < 6 months after complete vaccination and that use an ancestral strain as the reference are included in the Table

Annex 3. Methods for Figures 5 and 6

Figures include fourteen studies from the Czech Republic, Denmark, Finland, Israel, Qatar, South Africa, the United Kingdom, and the United States of America evaluating the VE against the Omicron variant, and 31 studies of the VE against the Delta variant from various countries from the European Region, Region of the Americas, and South-East Asia Region as well as Qatar and Thailand.

VE studies included in the plot were identified from an ongoing systematic review of COVID-19 vaccine effectiveness studies. All studies were cohort or test-negative studies. Methods for the systematic review and inclusion/exclusion criteria are available on view-hub.org. The studies were conducted during a period when either Delta or Omicron was the predominant circulating variant. Estimates were included if they were of laboratory-confirmed cases of the Omicron or Delta variant. In addition, for the primary series VE, only studies providing VE estimates for discrete time intervals since vaccination, which evaluate changes in VE over time, are included. For the primary series VE, estimates are only included in the plot for studies that report VE for more than one time period.

Annex 4. Summary of Primary Series Vaccine Performance against Variants of Concern (VE data as of 31 March 2022; Neutralization data as of 28 March 2022)

	WHO Emergency Use Listing (EUL) Qualified Vaccines ⁺								Vaccines without WHO EUL ⁺	
	AstraZeneca-Vaxzevria/SII - Covishield	Beijing CNBG-BBIBP-CorV	Bharat-Covaxin	Janssen-Ad26.COV 2.S	Moderna-mRNA-1273	Novavax-Nuvaxovid/SII - Covavax	Pfizer BioNTech-Comirnaty	Sinovac-CoronaVac	Anhui ZL-Recombinant	Gamaleya-Sputnik V
Alpha, Beta, Gamma										
Summary of VE*	<i>(see update from 11 January 2022 for details of vaccine performance against Alpha, Beta, and Gamma variants of concern)</i>									
Delta²⁸										
Summary of VE*	Protection retained against severe disease; possible reduced protection against symptomatic disease and infection									
- Severe disease	↔ ₃	-	-	↓ ₁	↔ ₄	-	↔ ₇	-	-	-
- Symptomatic disease	↔ _{to} ↓ ₆	-	↓ ₁	-	↔ ₂	-	↔ _{to} ↓ ₅	-	-	-
- Infection	↔ _{to} ↓ ₅	-	-	↓↓↓ ₁	↔ ₆	-	↔ _{to} ↓ ₇	-	-	-
Neutralization	↓ ₁₅	↔ _{to} ↓ ₃	↔ _{to} ↓ ₄	↔ _{to} ↓ ₁₁	↓ ₁₅	-	↔ _{to} ↓ ₄₁	↓ _{to} ↓ ₁₀	↔ _{to} ↓ ₂	↓ _{to} ↓ ₃
Omicron										
Summary of VE*	Reduced protection against infection and symptomatic disease; possible reduced protection against for severe disease but limited evidence									
- Severe disease	-	-	-	-	↓/↓ ₁	-	↓↓/↓↓↓ ₃	-	-	-
- Symptomatic disease	↓↓↓ ₁	-	-	-	↓↓/↓↓↓ ₂	-	↓↓↓ ₂	-	-	-
- Infection	↓↓↓ ₁	-	-	-	↓↓↓ ₃	-	↓↓↓ ₃	-	-	-
Neutralization	↓↓↓ ₇	↔ _{to} ↓ ₃	↓↓ ₁	↔ _{to} ↓ ₄	↓↓↓ ₁₈	-	↓↓↓ ₃₈	↓ _{to} ↓ ₅	-	↓↓ ₁

VE refers to vaccine effectiveness and vaccine efficacy. *Summary of VE: indicates the general conclusions but only for the vaccines evaluated against the specific variant. Arrows generalize the magnitude of reduction in VE or neutralization: “↔” <10 percentage point (pp) reduction in VE, or VE >90% with no comparator, or that there was a <2-fold reduction in neutralization; “↓” 10 to <20 pp reduction in VE, or 2 to <5-fold reduction in neutralization; “↓↓” 20 to <30 pp reduction in VE, or 5 to <10-fold reduction in neutralization; “↓↓↓” ≥30 pp reduction in VE, or ≥10-fold reduction in neutralization. When more than one neutralization study is available, the interquartile range (25th and 75th percentiles) of fold-reductions across all studies for specific vaccine/variant was used. “Moderna-mRNA-1273/Pfizer BioNTech-Comirnaty” indicates that both vaccines were evaluated together in study. The number of studies is shown as subscripts: vaccine effectiveness and neutralization studies informing this table can be found on the [VIEW-hub Resources Library](#). References indicated by superscripts next to VOC name in column 1 are vaccine efficacy results from randomized controlled trials informing this table.

Additional notes on VOC impacts on vaccines

- Reductions in VE do not necessarily mean loss of protection, as indicated by the absolute VE estimate. For example, a 10-percentage point reduction in VE against symptomatic disease for mRNA vaccines would still mean high vaccine effectiveness of ~85%. Likewise, vaccines have shown higher VE against severe disease; thus, small reductions in VE against severe disease due to VOCs may still mean substantial protection.
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- Neutralization studies that use samples collected more than seven days and less than six months after complete vaccination and that use an ancestral strain as the reference are included in Annex 4

Technical guidance and other resources

- [WHO technical guidance](#)
- [WHO COVID-19 Dashboard](#)
- [WHO Weekly Operational Updates on COVID-19](#)
- [WHO COVID-19 case definitions](#)
- [COVID-19 Supply Chain Inter-Agency Coordination Cell Weekly Situational Update](#)
- [Research and Development](#)
- [Open WHO courses on COVID-19](#) in official UN languages and in [additional national languages](#)
- [WHO Academy COVID-19 mobile learning app](#)
- [The Strategic Preparedness and Response Plan](#) (SPRP) outlining the support the international community can provide to all countries to prepare and respond to the virus
- [EPI-WIN: tailored information for individuals, organizations, and communities](#)
- Recommendations and advice for the public: [Protect yourself](#); [Questions and answers](#); [Travel advice](#)

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