COVID-19 Weekly Epidemiological Update

Edition 91, published 11 May 2022

In this edition:

Global overview

Data as of 8 May 2022

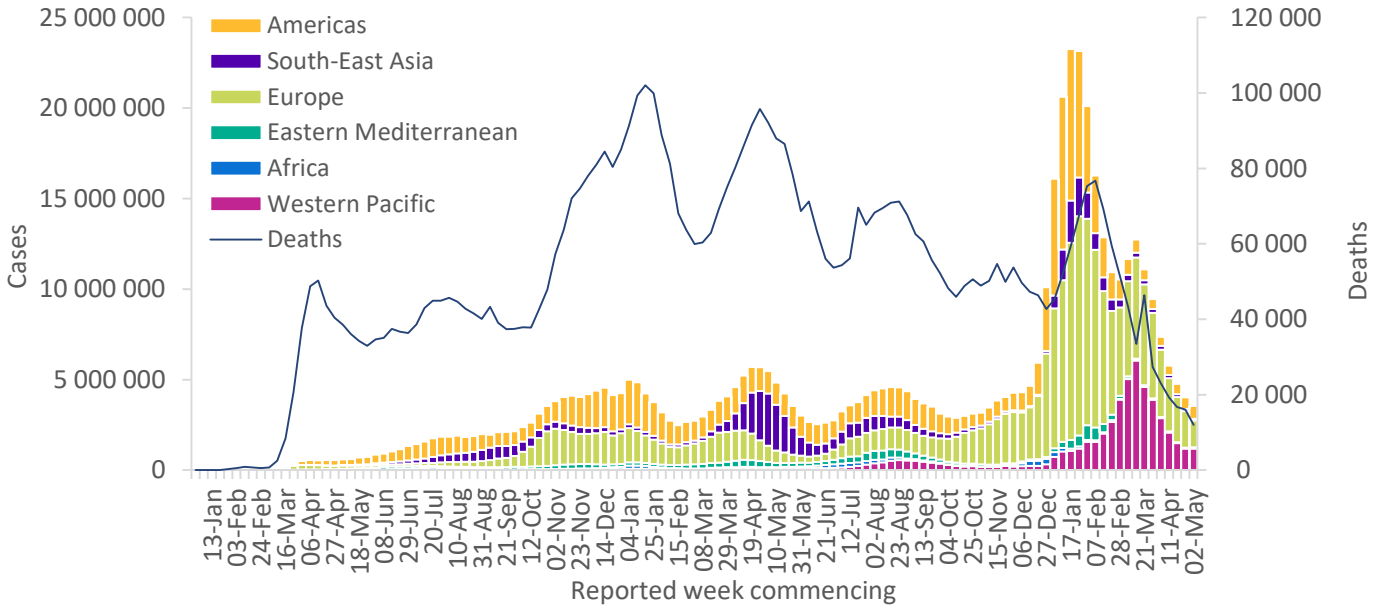
Globally, the number of new COVID-19 cases and deaths has continued to decline since the end of March 2022. During the week of 2 through 8 May 2022, over 3.5 million cases and over 12 000 deaths were reported, decreases of 12% and 25% respectively, as compared to the previous week (Figure 1).

At the regional level, the number of new weekly cases increased in the Region of the Americas (+14%) and in the African Region (+12%), remained stable in the Western Pacific Region (+1%), and decreased in the remaining three regions. The number of new weekly deaths increased in the African Region (+84%), remained stable in the Region of the Americas (+3%), while decreasing trends were reported in the other four regions.

As of 8 May 2022, over 514 million confirmed cases and over six million deaths have been reported globally.

These trends should be interpreted with caution as several countries have been progressively changing 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 8 May 2022**



**See *Annex 1: Data, table, and figure notes*

At the country level, the highest number of new weekly cases were reported from the United States of America (451 414 new cases; +19%), Australia (431 410 new cases; +59%), Germany (427 044 new cases; -29%), Italy (304 573 new cases; -21%), and the Republic of Korea (268 749 new cases; -29%).

The highest number of new weekly deaths were reported from the United States of America (2 652 new deaths; +19%), the Russian Federation (915 new deaths; -19%), Italy (910 new deaths; +1%), France (732 new deaths; -19%), and Brazil (681 new deaths; -20%).

Table 1. Newly reported and cumulative COVID-19 confirmed cases and deaths, by WHO Region, as of 8 May 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	1 482 775 (42%)	-26%	216 726 575 (42%)	5 137 (43%)	-24%	1 996 028 (32%)
Western Pacific	1 197 250 (34%)	1%	55 846 326 (11%)	1 407 (12%)	-32%	226 437 (4%)
Americas	709 439 (20%)	14%	153 884 155 (30%)	4 344 (36%)	3%	2 729 790 (44%)
South-East Asia	87 674 (2%)	-29%	57 945 672 (11%)	805 (7%)	-70%	787 004 (13%)
Africa	56 983 (2%)	12%	8 830 808 (2%)	166 (1%)	84%	171 824 (3%)
Eastern Mediterranean	11 948 (<1%)	-28%	21 714 448 (4%)	166 (1%)	-26%	342 411 (5%)
Global	**3 546 069 (100%)**	**-12%**	**514 948 748 (100%)**	**12 025 (100%)**	**-25%**	**6 253 507 (100%)**

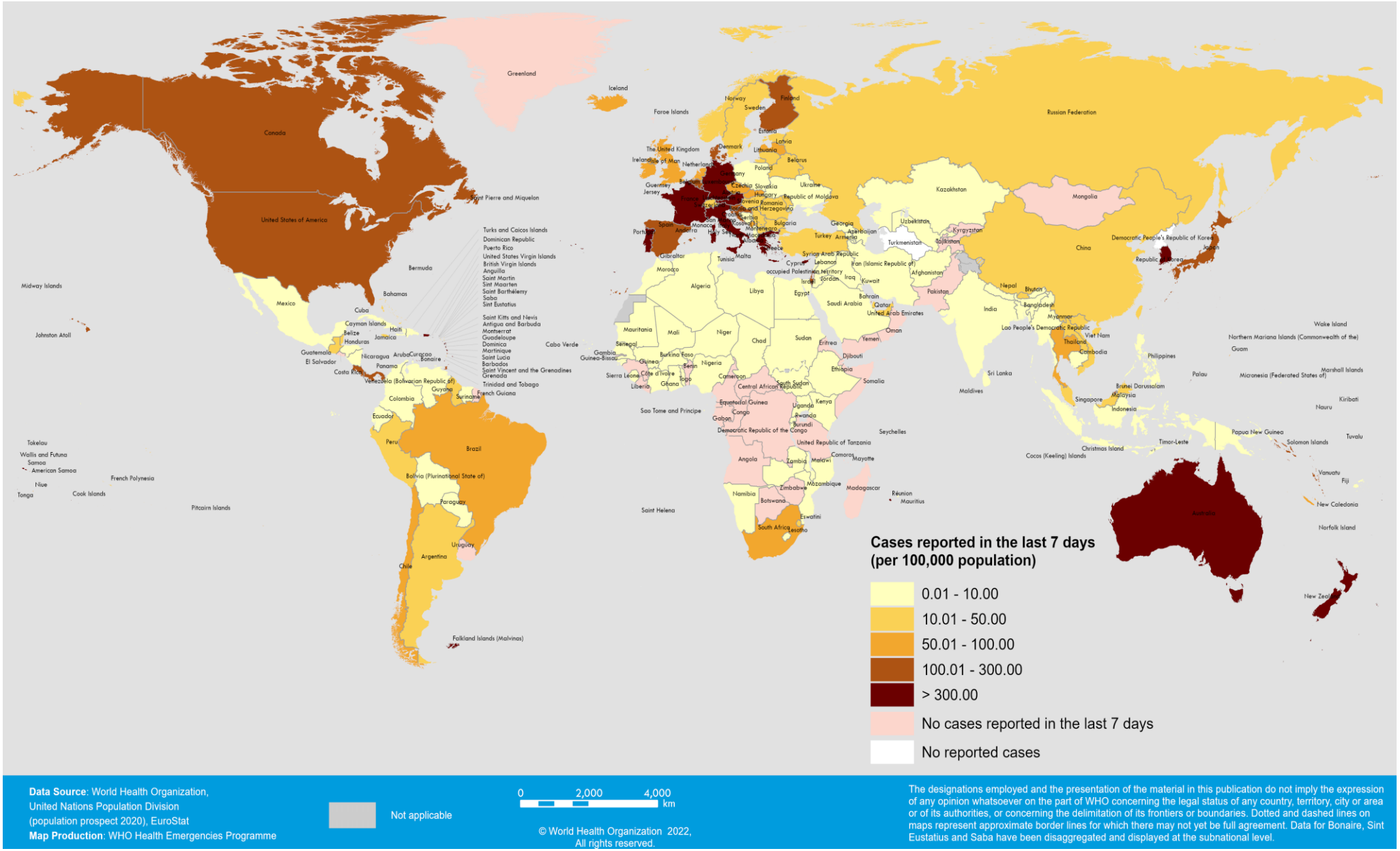
**Percent change in the number of newly confirmed cases/deaths in the past seven days, compared to seven days prior*

**See *Annex 1: Data, table, and figure notes*

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

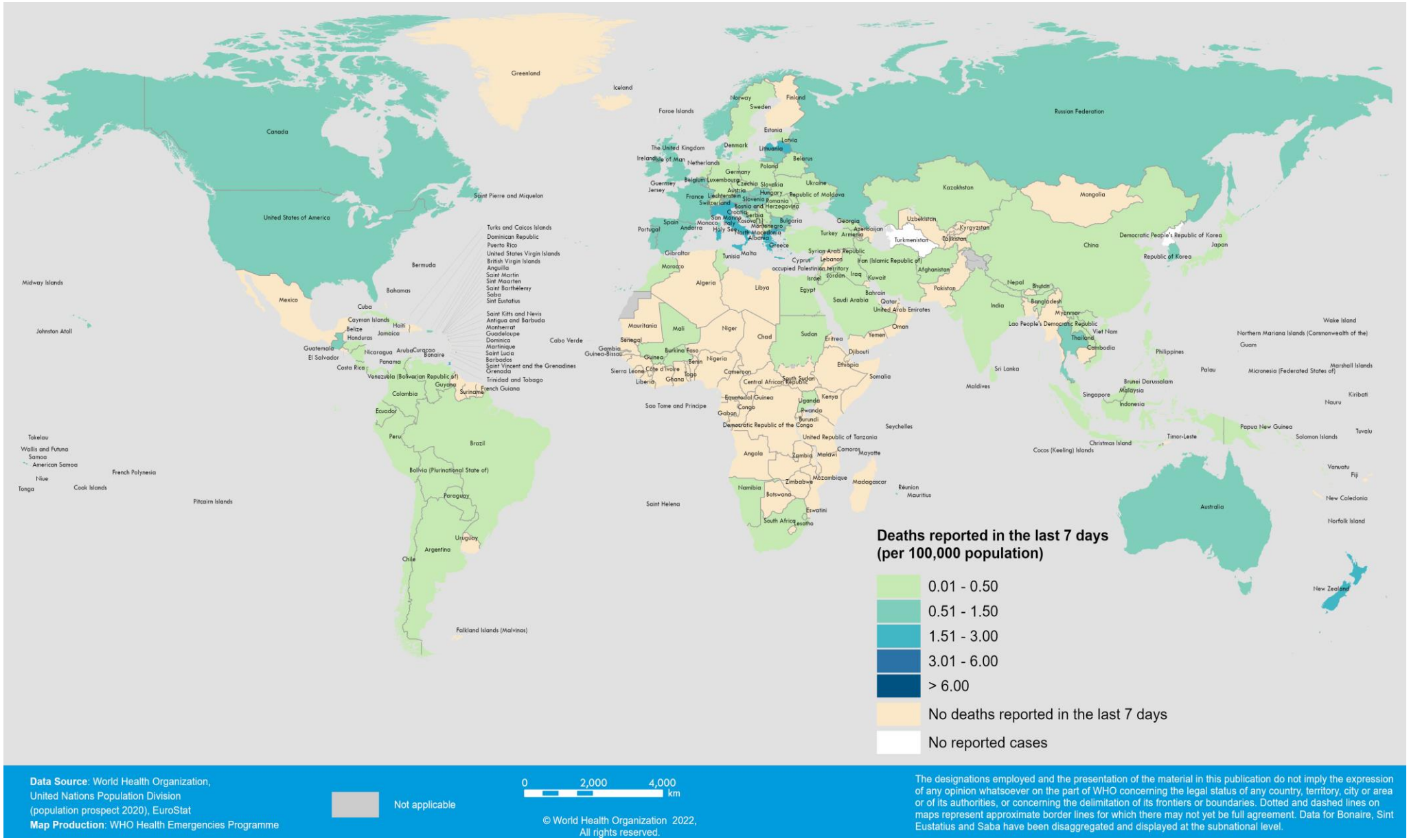
- WHO COVID-19 Dashboard
- WHO COVID-19 Weekly Operational Update and previous editions of the Weekly Epidemiological Update

Figure 2. COVID-19 cases per 100 000 population reported by countries, territories and areas, 2 – 8 May 2022*



**See *Annex 1: Data, table, and figure notes*

Figure 3. COVID-19 deaths per 100 000 population reported by countries, territories and areas, 2-8 May 2022*



**See *Annex 1: Data, table, and figure notes*

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 the 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.

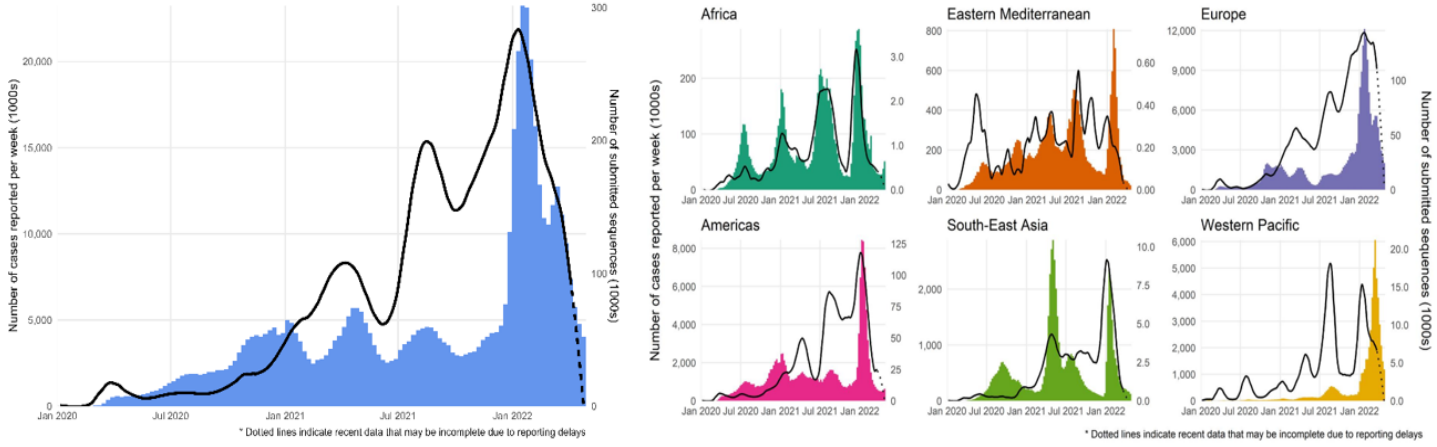
The classifications of variants will be revised as needed to reflect the continuous evolution of circulating variants and their changing epidemiology. Criteria for variant classification, and the lists of currently circulating and previously circulating VOCs, VOIs and VUMs, are available on the WHO Tracking SARS-CoV-2 variants website. National authorities may choose to designate other variants and are strongly encouraged to investigate and report newly emerging variants and their impact.

Geographic spread and prevalence of VOCs

Sequence availability

Figure 4 shows the number of cases reported and the number of SARS-CoV-2 sequences submitted to GISAID between 1 January 2020 and 5 May 2022, globally and by WHO region. Globally, the number of shared sequences has increased over time as countries strengthened sequencing capacity and intensified genomic surveillance in response to the ongoing pandemic and following the emergence of new VOCs. However, after reaching a peak in January 2022, the number of shared sequences fell to levels similar to those observed in June 2021, just after Delta started to spread and was designated a VOC. The recent declining trend is similar across WHO regions. It is unclear whether this decline is primarily driven by the reduction in the true number of cases, or changes in testing strategies in several countries, or a combination of both. A change in the proportion of cases sequenced per country may have also resulted in a decrease of available data.

Figure 4. The number of cases reported and the number of sequences submitted to GISAID, from 1 January 2020 to 10 May 2022, globally and by WHO region



Note: the dotted line represents the number of sequences submitted in the last four weeks. Due to delays in the submission of sequences, data in this period should be interpreted with caution.

Variant circulation

WHO continues to monitor circulating SARS-CoV-2 variants, including Omicron sublineages, thanks to the continued and transparent sharing of information from Member States, Regional Offices, partners and technical experts, such as the members of the Technical Advisory Group on SARS-CoV-2 Virus Evolution (TAG-VE).

The Omicron VOC remains the dominant variant circulating globally, accounting for nearly all sequences reported to GISAID in the last 30 days. Of note is the very low proportions of 'previously circulating VOCs' and of the Delta VOC. With variant diversification, Omicron sublineages have continued to be identified; however, only a few of these sublineages appear to have a growth advantage. These findings need to be interpreted with caution, as differences in sequence capacity across regions and countries may confound such interpretations and global distributions.

Characteristics of Omicron

Available evidence on the phenotypic impacts of VOCs has been reported in previous editions of the COVID-19 Weekly Epidemiological Update. Since the last update on 5 April 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 transmission**	Previous analyses of GISAID data[1] consistently showed Omicron having a steadily increasing growth rate advantage over Delta in all countries with sufficient sequence data (last update included data available up to 4 April 2022). Applying this approach yielded results in favour of a growth rate advantage of the Omicron sublineage BA.2 over the sublineage BA.1. However, the recent identification of several sublineages of the Omicron variant does not yet allow for updated estimates to be obtained. A recent modelling study in India[2] that included samples submitted to GISAID found a higher basic reproductive number for BA.2 (2.45, 95% highest posterior density [HPD] intervals: 1.53-3.76) compared to BA.1 (1.70, 95% HPD: 1.43-2.46).
	Impact on disease severity	Omicron had been associated with lower severity when compared to Delta across several settings.[3–7] A recent study conducted in England, United Kingdom[8] reported a lower risk of emergency unit attendance following infection with Omicron compared to infection with Delta (HR: 0.39 (95% CI: 0.30 – 0.51; P<.0001). On the contrary, a study in Indonesia [9] and the United States[10] found no difference in hospitalisation and mortality following infection with Omicron compared to infection with Delta. This suggests that the severity of Omicron infection could vary in different settings, although vaccination coverage, population immunity, age distribution and other factors could influence disease severity.
Immune response	**Impact on reinfection**	Higher rates of reinfection were initially reported for Omicron as compared to other SARS-CoV-2 VOCs. However, a protective effect of previous infection was reported in a recent study conducted in the United States of America[11], which found increased antibody titres and neutralisation activity (79.5%) against Omicron among vaccinated solid organ transplant recipients who were previously infected with SARS-CoV-2, compared to those who had no previous infection (34%). Similarly, another study conducted in Canada[12] reported that infection with a different SARS-CoV-2 variant resulted in a reduction in the risk of infection (44%; 95% CI: 38-48) and hospitalisation (81%; 95%CI: 66-89) with Omicron. Previous infection with one of the Omicron sublineages has been suggested as potentially conferring protection against infection with other Omicron sublineages: 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.[13]
	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 have been no new studies on antibody responses to BA.2. Previous studies have reported lower neutralising antibody titers to BA.1 and BA.2 compared to the index virus, and similar responses for BA.1 and BA.2.[14,15] Similar non-neutralising antibody responses to BA.1 and BA.2 were also reported in vaccinated individuals.[16] However, another study reported reduced vaccine-induced and infection-induced neutralization of BA.1 and BA.2, with higher neutralisation activity against BA.2 compared to BA.1.[17] Therefore, these results indicate lower humoral responses to BA.1 and BA.2, but inconsistent findings regarding BA.1 versus BA.2.
Diagnostic tools	**Impact on PCR assays**	BA.1, BA.4 and BA.5 contain the 69-70 deletion, responsible for S-gene target failure. Most BA.2 sequences lack the 69-70 deletion and will be positive for the S-gene target. PCR assays that include multiple gene targets maintain their accuracy to detect Omicron. Specifically, early assessments of several PCR tests predicted limited impact of the Omicron variant (BA.1) on the accuracy of these assays. [18,19]

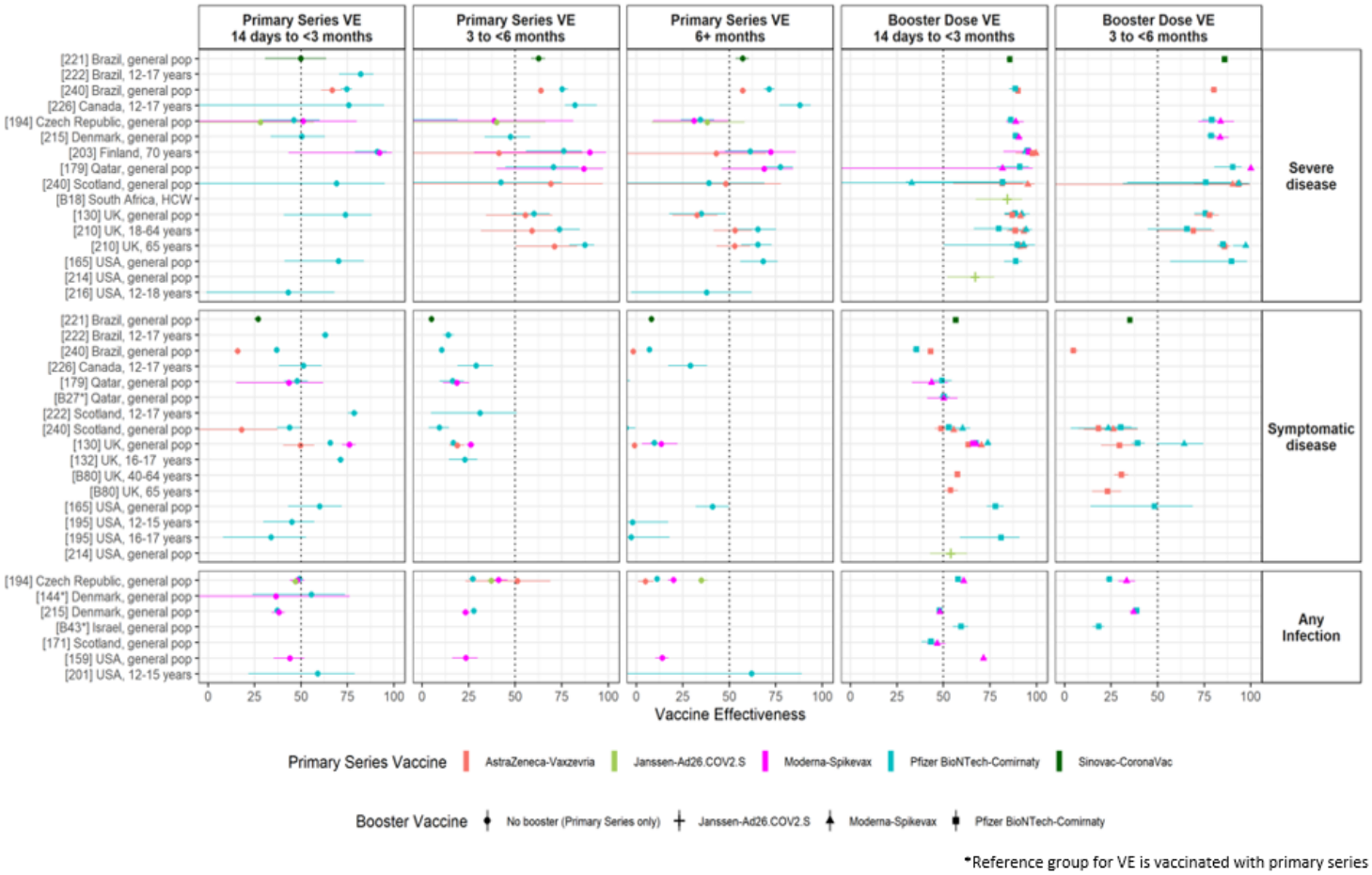
	Impact on Rapid Diagnostic tests	Though many studies have reported comparable sensitivity of Ag-RDTs to detect Omicron compared to other VOCs or the index virus[20–22], others have shown reduced sensitivity.[23,24] These contradictory findings will require further investigation.
Impact on treatment	**Impact on antivirals**	Consistent with preliminary data showing no difference in the effectiveness of antiviral agents (Remdesivir, Molnupiravir, and PF-07304814) against the Omicron variant, a recent review reported similar efficacy of antiviral agents against Omicron and previous SARS-CoV-2 variants.[25]
	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 reduced effectiveness of other monoclonal antibodies.[26–29] However, additional preclinical evidence shows reduced neutralizing activity of sotrovimab against the BA.2 sublineage and lack of efficacy of casirivimab-imdevimab against the BA.1 Omicron sublineage (see WHO Therapeutics living guideline). A recent phase 2 clinical trial[30] found a shorter time to hospital discharge among patients on high titre convalescent plasma compared to patients on standard titre (HR = 1.94 [95% CI 1.05, 3.58], p=0.02).
	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 summarizes the impact of Omicron variant on product-specific vaccine effectiveness (VE) over time for both primary series vaccines and booster vaccines. Since the last update, two new studies have been added to the figures.[31,32] Both studies (not yet peer reviewed) provided new VE data on both AstraZeneca-Vaxzevria and Pfizer BioNTech-Comirnaty. Additional information on vaccine performance against VOCs can also be found in Annex 4.

Figure 5. 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. 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.COV2.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, nine negative point estimates for the primary series are not shown in the Omicron plot: two estimates from reference #144 against infection at 3 to <6 months (Pfizer BioNTech-Comrinaty and Moderna-Spikevax), two estimates from reference #179 against symptomatic disease at 6+ months (Pfizer BioNTech-Comrinaty and Moderna-Spikevax), and five estimates from reference #240 (one AstraZeneca-Vaxzevria estimate at 3 to <6 months; three AstraZeneca-Vaxzevria estimates and one Pfizer BioNTech estimate at 6+ months).

Interpretation of the results of the VE for the Omicron variant

To date, 23 studies from ten countries (Brazil, Canada, Czech Republic, Denmark, Finland, Israel, Qatar, South Africa, the United Kingdom and the United States of America) have assessed the duration of protection of five vaccines against the Omicron variant (six studies assessed VE of primary series vaccination only, six assessed VE of a booster dose vaccination only, and 11 assessed both). Findings from these studies show reduced VE of COVID-19 primary series vaccines against the Omicron variant for all outcomes (*severe disease*, *symptomatic disease*, and *infection*) than has been observed for other four VOCs. Importantly though, in the majority of studies VE estimates against the Omicron variant remain higher for *severe disease.* Booster vaccination substantially improves VE for all outcomes and for all combinations of schedules with estimates available, for both primary series and booster vaccination. However, studies that assess VE of booster vaccination beyond six months are needed to evaluate the longer duration of protection.

For *severe disease*, within the first three months of primary series vaccination, seven of 12 (58%) VE estimates for the mRNA vaccines (Moderna-Spikevax and Pfizer BioNTech-Comirnaty) were ≥70%. Of the two studies available for vector vaccines, one reported a VE of <70% for AstraZeneca-Vaxzevria, and the other reported a VE of <50% for Janssen-Ad26.COV2.S. One study available for inactivated vaccines (Sinovac-CoronaVac) reported a VE of 50%. Beyond three months after vaccination, 12 of 27 (44%) VE estimates for the mRNA vaccines were ≥70% while 18 (77%) were ≥50%, one of the 12 (8%) VE estimates for AstraZeneca-Vaxzevria was ≥70% while eight (67%) were ≥50%, and the two available VE estimates for Sinovac-CoronaVac were ≥50%; both estimates for Janssen-Ad26.COV2.S beyond three months of vaccination were <50%.

A booster dose improved VE estimates against *severe disease* in all studies, with only one estimate for Pfizer BioNTech-Comrinaty and one for Janssen-Ad26.COV2.S as the booster dose below 70%, between 14 days and three months of receipt of the booster dose (33 estimates evaluated an mRNA booster, two estimates a booster dose of Janssen-Ad26.COV2.S, and one estimate a booster dose of Sinovac-CoronaVac). At three to six months post mRNA booster, 18 of 20 (90%) estimates showed VE ≥70% (an mRNA vaccine was given as the primary series in 13 of the 20 estimates while AstraZeneca-Vaxzevria and Sinovac-CoronaVac were given as the primary series for six and one of the twenty estimates, respectively).

VE estimates against *symptomatic disease* and *infection* within the first three months of primary series vaccination tended to be lower than those against *severe disease*, and VE decreased more substantially over time. For *symptomatic disease* within the first three months of primary series vaccination, only three of 13 (23%) VE estimates for the mRNA vaccines were ≥70%, and seven (54%) were ≥50%; all the three (100%) VE estimates for AstraZeneca-Vaxzevria and the single estimate for Sinovac (CoronaVac) were below 50%. Beyond three months after vaccination, none of the 28 VE estimates were ≥50% (20 estimates evaluated mRNA vaccines, six evaluated AstraZeneca-Vaxzevria, and two evaluated Sinovac-CoronaVac). An mRNA booster after completion of a primary series of an mRNA vaccine, AstraZeneca-Vaxzevria, or Sinovac-CoronaVac, improved VE estimates against *symptomatic disease,* with four of 21 (19%) VE estimates ≥70% and 16 (76%) estimates ≥50%, between 14 days and three months post booster. However, booster dose protection declined with time since vaccination, with only one of twelve (8%) available estimates indicating a VE of ≥50% at three to six months following receipt of an mRNA booster dose. Estimates for a booster dose of AstraZeneca-Vaxzevria (one estimate) and Sinovac-CoronaVac (one estimate) three to six months post vaccination indicated VE of <50%. VE estimates against *infection* showed a similar pattern as those against *symptomatic disease*.

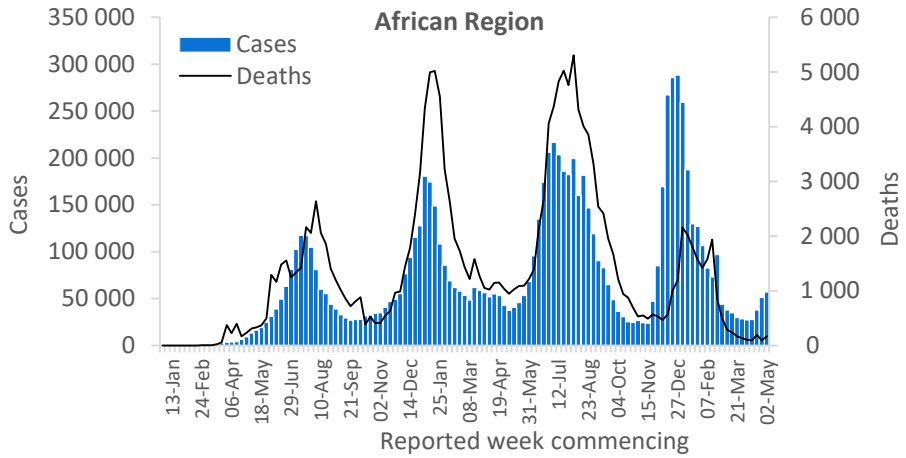
WHO regional overviews:

Epidemiological week 2-8 May 2022**

African Region

For the third consecutive week, the African Region has shown an increasing trend with just under 57 000 new weekly cases reported, a 12% increase as compared to the previous week. Six (12%) countries in the Region reported an increase of over 20% in cases, with some of the greatest proportional increases observed in Mauritania (48 vs 5 new cases; +860%), Niger (45 vs 27 new cases; +67%) and Nigeria (50 vs 31 new cases; +61%). The highest numbers of new cases were reported by South Africa (43 977 new cases; 74.1 new cases per 100 000; +36%), Réunion (10 931 new cases; 1220.9 new cases per 100 000; -15%), and Burundi (448 new cases; 3.8 new cases per 100 000; -64%).

The Region reported 166 new weekly deaths, an 84% increase as compared to the previous week. The highest numbers of new deaths were reported from South Africa (153 new deaths; <1 new death per 100 000 population; +135%), Réunion (seven new deaths; <1 new death per 100 000; similar to the previous week's figures), and Eswatini (two new deaths; <1 new death per 100 000; similar to the previous week's figures).

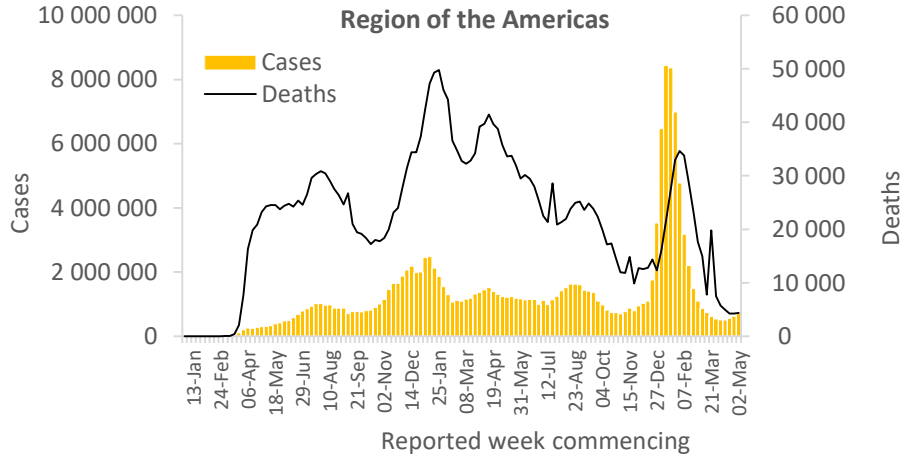


Updates from the African Region

Region of the Americas

The Region of the Americas has continued a gradual increasing trend observed since mid-April 2022, with over 709 000 new weekly cases reported, a 14% increase as compared to the previous week. Nineteen (34%) countries in the Region reported increases in new cases of 20% or greater, with some of the greatest proportional increases observed in Falkland Islands (Malvinas) (211 vs 29 new cases; +628%), Montserrat (236 vs 39 new cases; +505%) and the United States Virgin Islands (818 vs 258 new cases; +217%). The highest numbers of new cases were reported from the United States of America (451 414 new cases; 136.4 new cases per 100 000; +19%), Brazil (110 866 new cases; 52.2 new cases per 100 000; +18%), and Canada (41 069 new cases; 108.8 new cases per 100 000; -25%).

The number of new weekly deaths in the Region was similar to the previous week (+3%), with over 4300 new deaths reported. The highest numbers of new deaths were reported from the United States of America (2652 new deaths; <1 new death per 100 000; +19%), Brazil (681 new deaths; <1 new death per 100 000; -20%), and Canada (486 new deaths; 1.3 new deaths per 100 000; +2%).

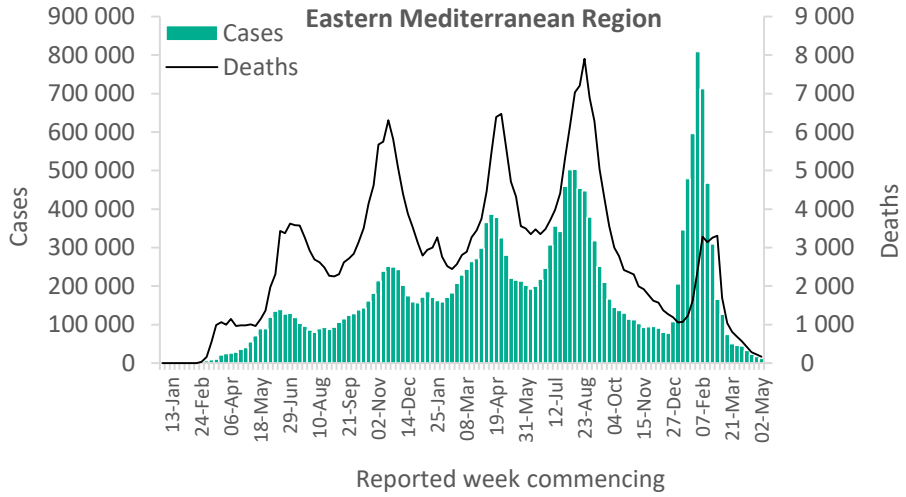


Updates from the Region of the Americas

Eastern Mediterranean Region

In the Eastern Mediterranean Region, new weekly cases have continued to decline after reaching a peak in early February 2022, with just under 12 000 new weekly cases reported last week, a 28% decrease as compared to the previous week. However, Saudi Arabia and the Syrian Arab Republic reported increases in new weekly cases of 57% (1065 vs 679 new cases) and 48% (31 vs 21 new cases), respectively. The highest numbers of new cases were reported from Bahrain (3376 new cases; 198.4 new cases per 100 000; +17%), the Islamic Republic of Iran (3048 new cases; 3.6 new cases per 100 000; -50%), and the United Arab Emirates (1455 new cases; 14.7 new cases per 100 000; -13%).

The number of new weekly deaths in the Region decreased by 26% when compared to the previous week, with 166 new deaths reported. The highest numbers of new deaths were reported from the Islamic Republic of Iran (82 new deaths; <1 new death per 100 000; -32%), Egypt (35 new deaths; <1 new death per 100 000; -17%), and Tunisia (16 new deaths; <1 new death per 100 000; -6%).

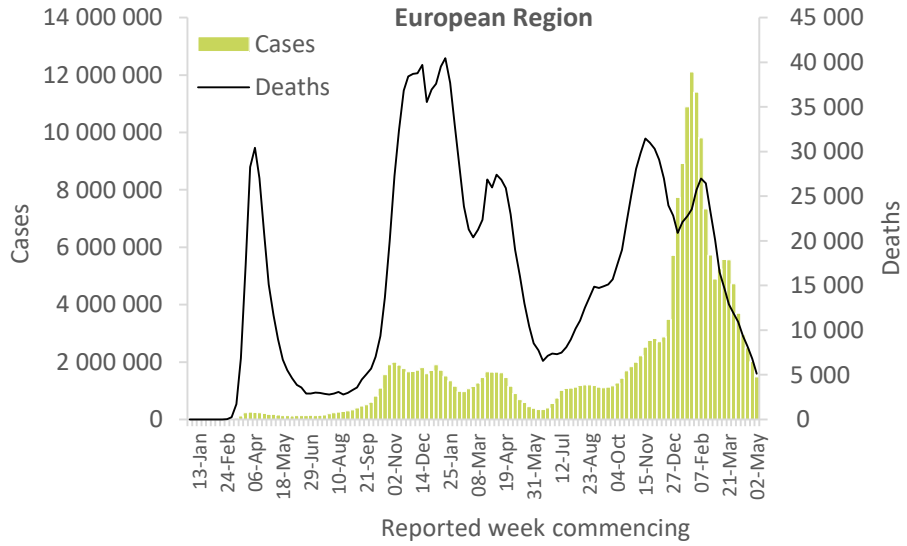


Updates from the Eastern Mediterranean Region

European Region

After the increase observed during the first half of March 2022, new weekly cases have continued to decrease in the European Region, with over 1.4 million new cases reported, a 26% decrease as compared to the previous week. However, the Republic of Moldova and Gibraltar reported increases in new weekly cases of 149% (547 vs 220 new cases) and 25% (161 vs 129 new cases), respectively. The highest numbers of new cases were reported from Germany (427 044 new cases; 513.5 new cases per 100 000; -29%), Italy (304 573 new cases; 510.7 new cases per 100 000; -21%), and France (267 172 new cases; 410.8 new cases per 100 000; -30%).

The number of new deaths has continued to decrease in the Region, with just over 5000 new deaths reported this week, a 24% decrease as compared to the previous week. The highest numbers of new deaths were reported from the Russian Federation (915 new deaths; <1 new death per 100 000; -19%), Italy (910 new deaths; 1.5 new deaths per 100 000; +1%), and France (732 new deaths; 1.1 new death per 100 000; -19%).

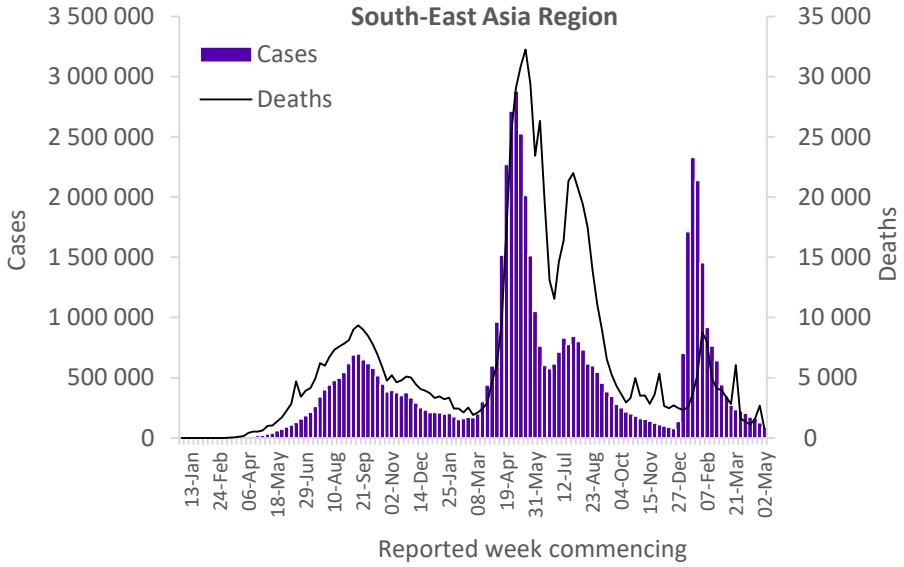


Updates from the European Region

South-East Asia Region

The South-East Asia Region reported over 87 000 new weekly cases, a 29% decline as compared to the previous week, continuing the decreasing trend observed since January 2022. However, Nepal and Timor-Leste reported increases in new weekly cases of 34% (114 vs 85 new cases) and 27% (14 vs 2 new cases), respectively. The highest numbers of new cases were reported from Thailand (62 366 new cases; 89.3 new cases per 100 000; -35%), India (23 006 new cases; 1.7 new cases per 100 000; +6%), and Indonesia (1391 new cases; <1 new case per 100 000; -52%).

With 805 new weekly death reported last week in the Region, weekly deaths decreased by 70% as compared to the previous week, during which India reported a delayed batch of deaths. The highest numbers of new deaths were reported from Thailand (471 new deaths; <1 new death per 100 000; -44%), India (221 new deaths; <1 new death per 100 000; -87%), and Indonesia (108 new deaths; <1 new death per 100 000; -38%).

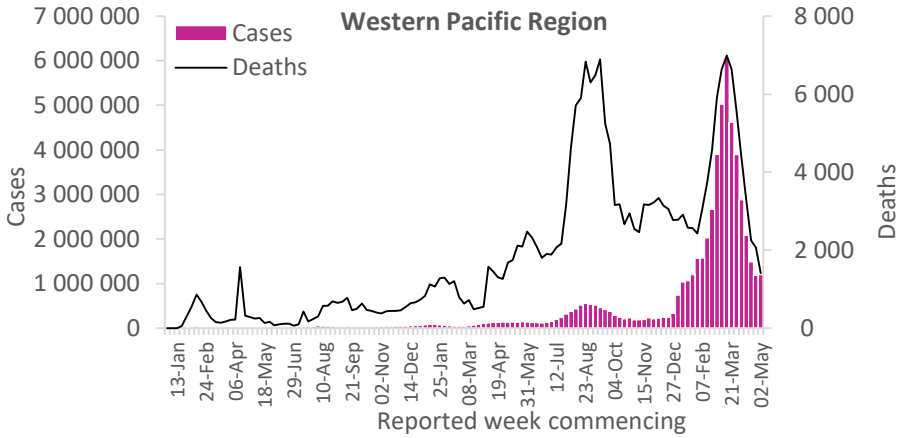


Updates from the South-East Asia Region

Western Pacific Region

The Western Pacific Region has shown decreasing trends in new weekly cases and deaths after peaks observed in mid-March 2022. However, the trend in new weekly cases has stabilized during the week ending on 8 May, with just under 1.2 million new weekly cases reported, which was similar to the previous week (+1%). Six (19%) countries in the Region reported an increase of 20% or greater, with some of the largest increases observed in China (200 968 vs 81 989 new cases; +145%), New Caledonia (232 vs 96 new cases; +142%) and Australia (431 410 vs 271 216 new cases; +59%). The sharp increase in Australia is due to the revision of the number of cases confirmed by rapid antigen detection tests. Australia also reported the highest numbers of new cases, followed by the Republic of Korea (268 749 new cases; 524.2 new cases per 100 000; -29%), and China.

The number of new weekly deaths shows a decrease of 32% as compared to the previous week, with over 1400 new deaths reported. The highest numbers of new deaths were reported from the Republic of Korea (485 new deaths; <1 new death per 100 000; -35%), Australia (231 new deaths; <1 new death per 100 000; -9%), and Japan (218 new deaths; <1 new death per 100 000; -23%).



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 Annex 4.

Annex 3. Methods for Figure 5

- 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 Omicron was the predominant circulating variant. Only studies providing VE estimates of individual vaccines are included in the plot (studies assessing combined VE of more than one vaccine are excluded). 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 for an individual vaccine. Thirteen studies of VE against Omicron provided only a single cumulative VE estimate for an individual vaccine, which due to varying lengths of time since vaccination are difficult to interpret due to the marked waning of VE over time with omicron.

Annex 4. Summary of Primary Series Vaccine Performance against Variants of Concern (VE data as of 5 May 2022; Neutralization data as of 2 May 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*	*see update from 11 January 2022 for details of vaccine performance against Alpha, Beta, and Gamma variants of concern*									
Delta										
Summary of VE*	*see update from 27 April 2022 for details of vaccine performance against Delta variant of concern*									
Omicron										
Summary of VE*	Reduced protection against infection and symptomatic disease; possible reduced protection against for severe disease but limited evidence									
- Severe disease	-	-	-	-	↓to↓↓/↓↓↓$_2$	-	↓↓ to ↓↓↓$_5$	-	-	-
- Symptomatic disease	↓↓↓$_1$	-	-	-	↓↓/↓↓↓$_2$	-	↓↓↓$_3$	-	-	-
- Infection	↓↓↓$_1$	-	-	-	↓↓↓$_3$	-	↓↓↓$_3$	-	-	-
Neutralization	↓↓↓$_7$	↔to↓↓↓$_3$	↓↓$_1$	↔to↓↓↓$_4$	↓↓↓$_{18}$	-	↓↓↓$_{45}$	↓↓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 reductio[32]n 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 the 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.

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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