

COVID-19 Weekly Epidemiological Update

Edition 93, published 25 May 2022

In this edition:

- [Global overview](#)
- [Special Focus: Update on SARS-CoV-2 variants of interest and variants of concern](#)
- [WHO regional overviews](#)

Global overview

Data as of 22 May 2022

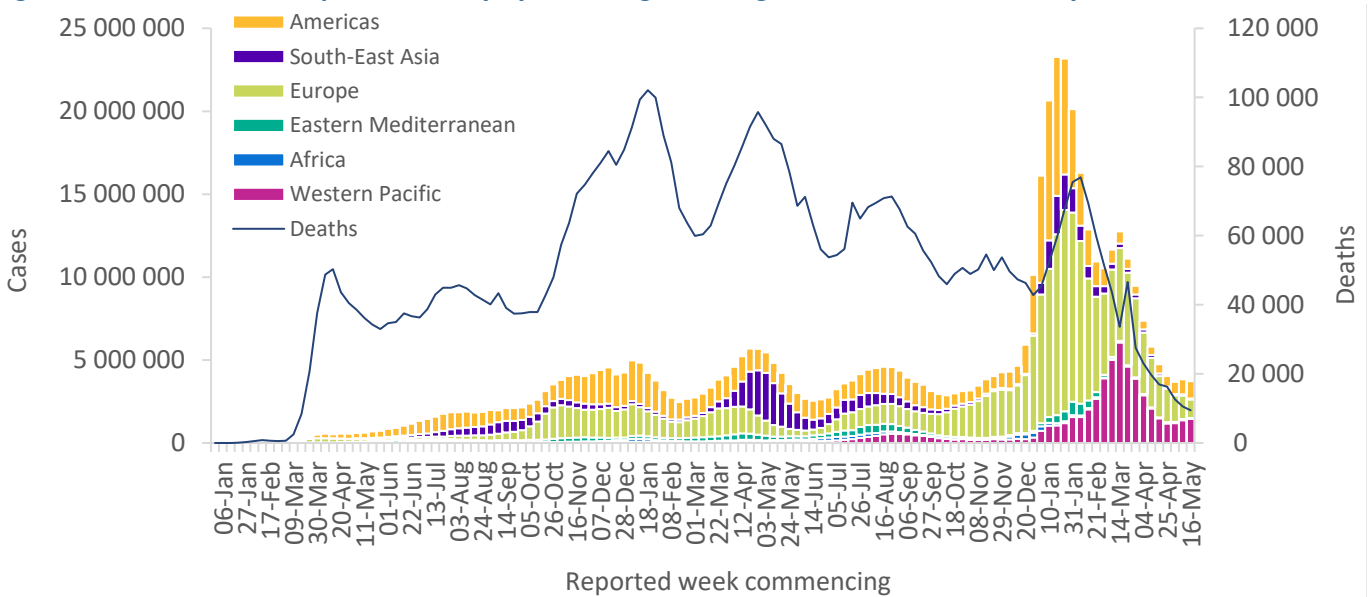
Globally, the number of new weekly cases has continued the declining trend observed since a peak in January 2022. During the week of 16 through 22 May 2022, over 3.7 million cases were reported, a 3% decrease as compared to the previous week (figure 1). The number of new weekly deaths also continues to decline, with over 9000 fatalities reported, representing an 11% decrease as compared to the previous week.

At the regional level, the number of new weekly cases increased in the Region of the Americas (+13%) and in the Western Pacific Region (+6%), while decreasing trends were observed in the remaining four regions. The number of new weekly deaths increased in the Eastern Mediterranean Region (+30%), remained stable in the Western Pacific and the Region of the Americas (both <1%), and decreased in the other three regions.

As of 22 May 2022, over 522 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 22 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 (713 882 new cases; +18%), China (543 290 new cases; +39%), Australia (360 323 new cases; +8%), Germany (268 396 new cases; -35%), and Japan (249 210 new cases; -11%).

The highest number of new weekly deaths were reported from the United States of America (1 957 new deaths; +2%), Italy (736 new deaths; -4%), Brazil (713 new deaths; +3%), the Russian Federation (680 new deaths; -6%), and Spain (564 new deaths; +118%).

Table 1. Newly reported and cumulative COVID-19 confirmed cases and deaths, by WHO Region, as of 22 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 (%)
Western Pacific	1 443 519 (39%)	6%	58 656 813 (11%)	1 271 (13%)	<1%	228 974 (4%)
Europe	1 119 084 (30%)	-20%	219 662 866 (42%)	3 574 (38%)	-23%	2 007 375 (32%)
Americas	1 036 740 (28%)	13%	155 877 294 (30%)	3 675 (39%)	<1%	2 737 863 (44%)
South-East Asia	54 768 (1%)	-23%	58 071 838 (11%)	539 (6%)	-12%	788 157 (13%)
Africa	49 633 (1%)	-24%	8 949 290 (2%)	208 (2%)	-22%	172 308 (3%)
Eastern Mediterranean	17 335 (<1%)	-12%	21 751 611 (4%)	173 (2%)	30%	342 717 (5%)
Global	3 721 079 (100%)	-3%	522 970 476 (100%)	9 440 (100%)	-11%	6 277 407 (100%)

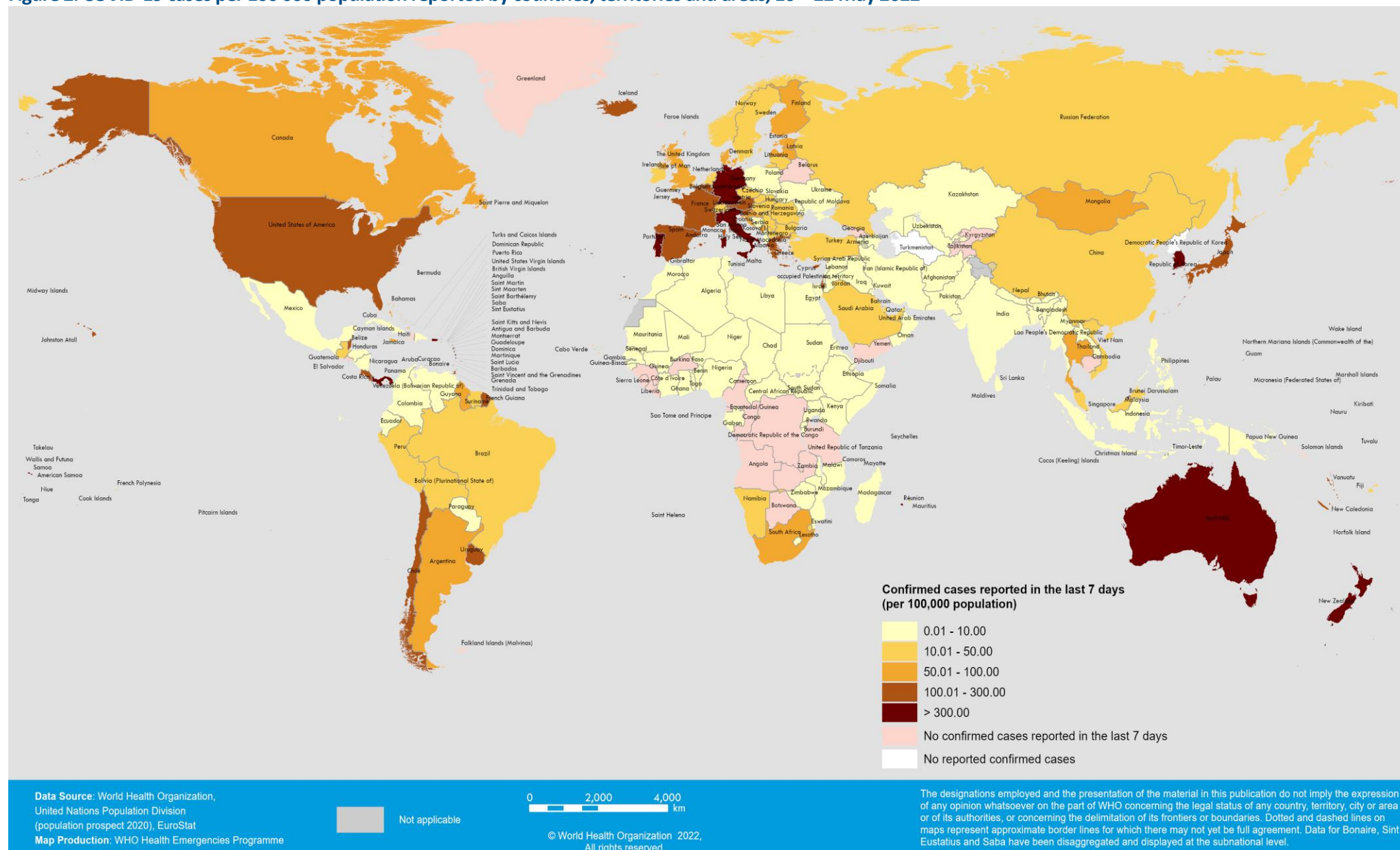
*Percent change in the number of newly confirmed cases/deaths in the past seven days, compared to seven days prior

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

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

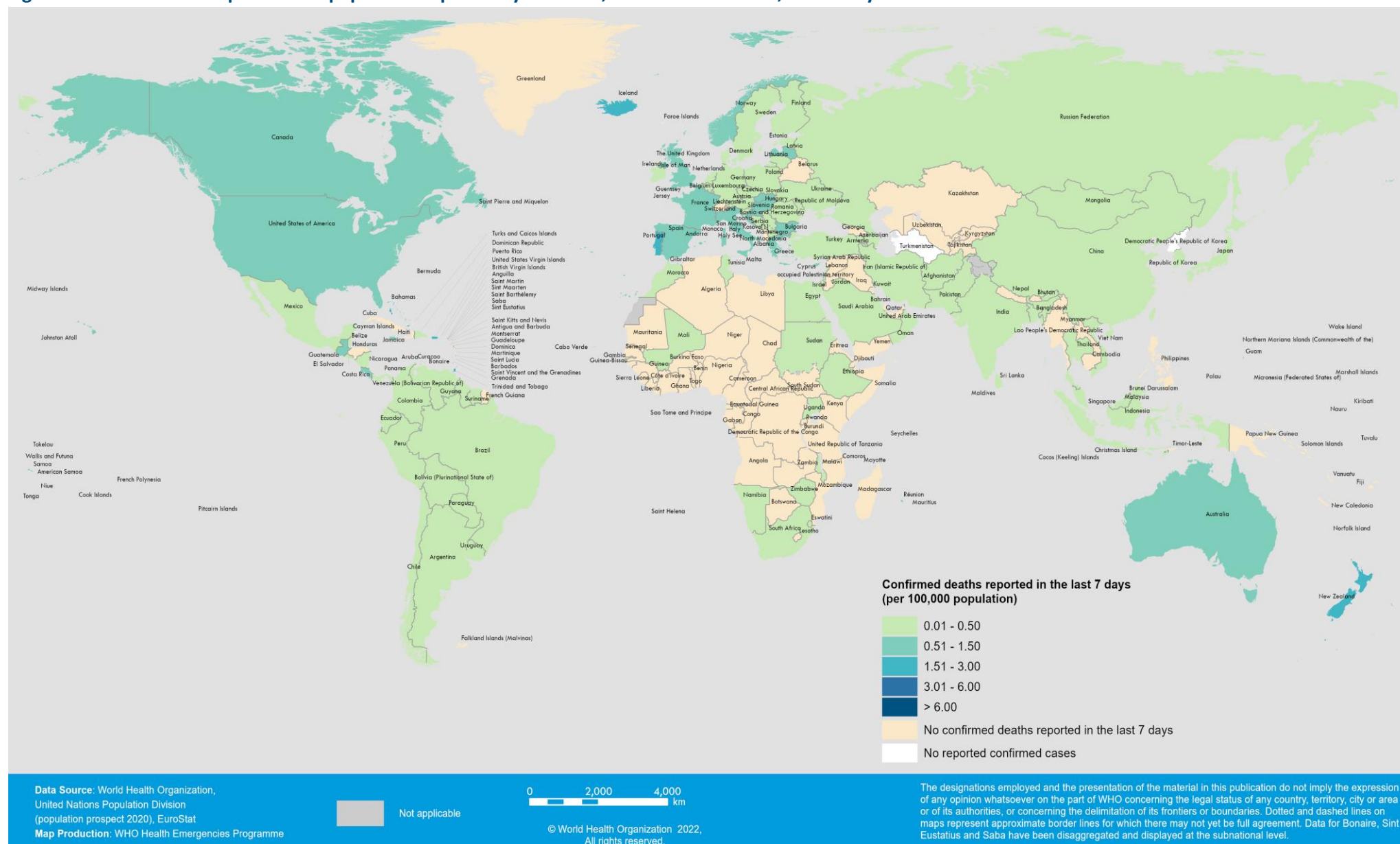
- [WHO COVID-19 Dashboard](#)
- [WHO COVID-19 Weekly Operational Update and previous editions of the Weekly Epidemiological Update](#)

Figure 2. COVID-19 cases per 100 000 population reported by countries, territories and areas, 16 – 22 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, 16-22 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.

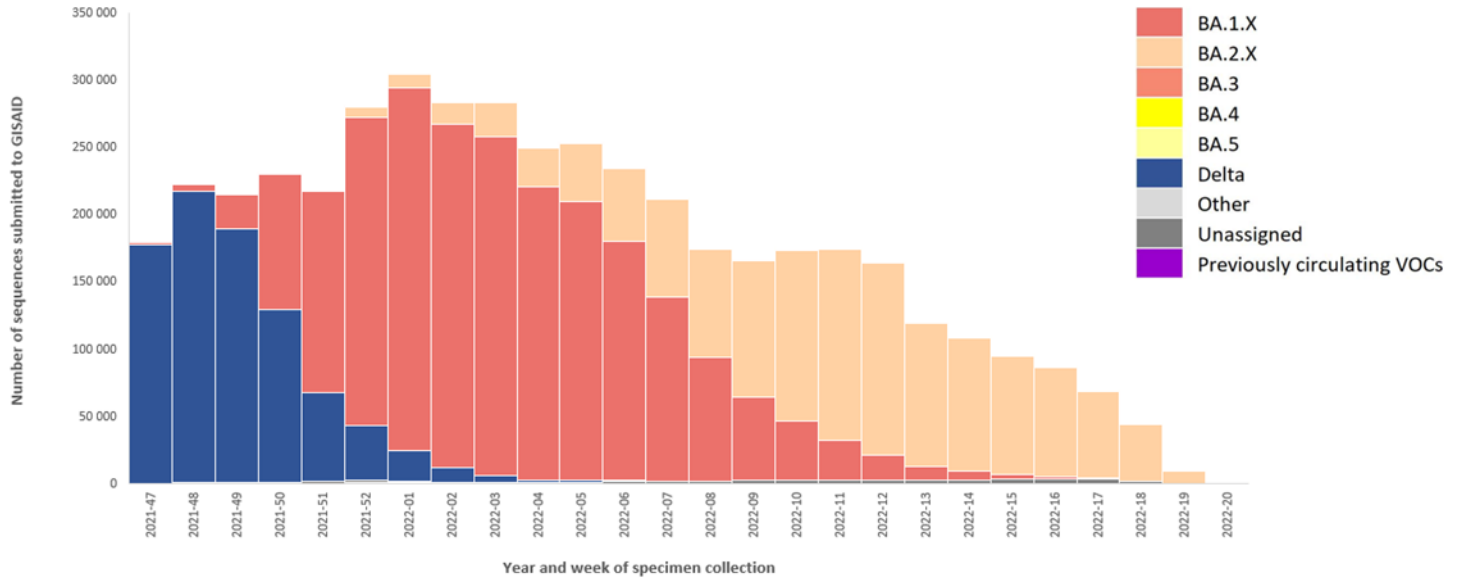
Geographic spread and prevalence of VOCs

The total number of SARS-CoV-2 sequences submitted to GISAID continues to show a declining trend (Figure 4). The Omicron VOC is the dominant variant circulating globally, accounting for nearly all sequences reported to GISAID within the last 30 days. Among Omicron lineages, BA.2 and its descendent lineages (pooled lineages named BA.2.X) are the dominant variants. As of the epidemiological week 18 in 2022 (1-7 May), the relative proportions of BA.2.X, BA.4, and BA.5 were 94%, 0.8%, and 1%, respectively. Among BA.2 descendent lineages, BA.2.12.1 accounted for 17% (Figure 5). Delta and other VOCs (Alpha, Beta and Gamma) have declined significantly over time but may still be circulating below detection levels.

Studies are ongoing to further elucidate the characteristics of Omicron lineages that appear to show a growth advantage as compared to BA.1 and BA.2. Further, additional evidence is anticipated regarding the severity or clinical manifestations for Omicron lineages which have a mutation at the spike locus S:L452. With currently available data, BA.4, BA.5 and BA.2.12.1 appear to be spreading faster in countries with substantial prior waves of cases due to BA.1; while countries that experienced more substantial BA.2 waves appear to have fewer cases due to BA.4, BA.5 and BA.2.12.1 at this stage. The extent of vaccination in each country, also likely influences the impact of these emerging Omicron descendent lineages.

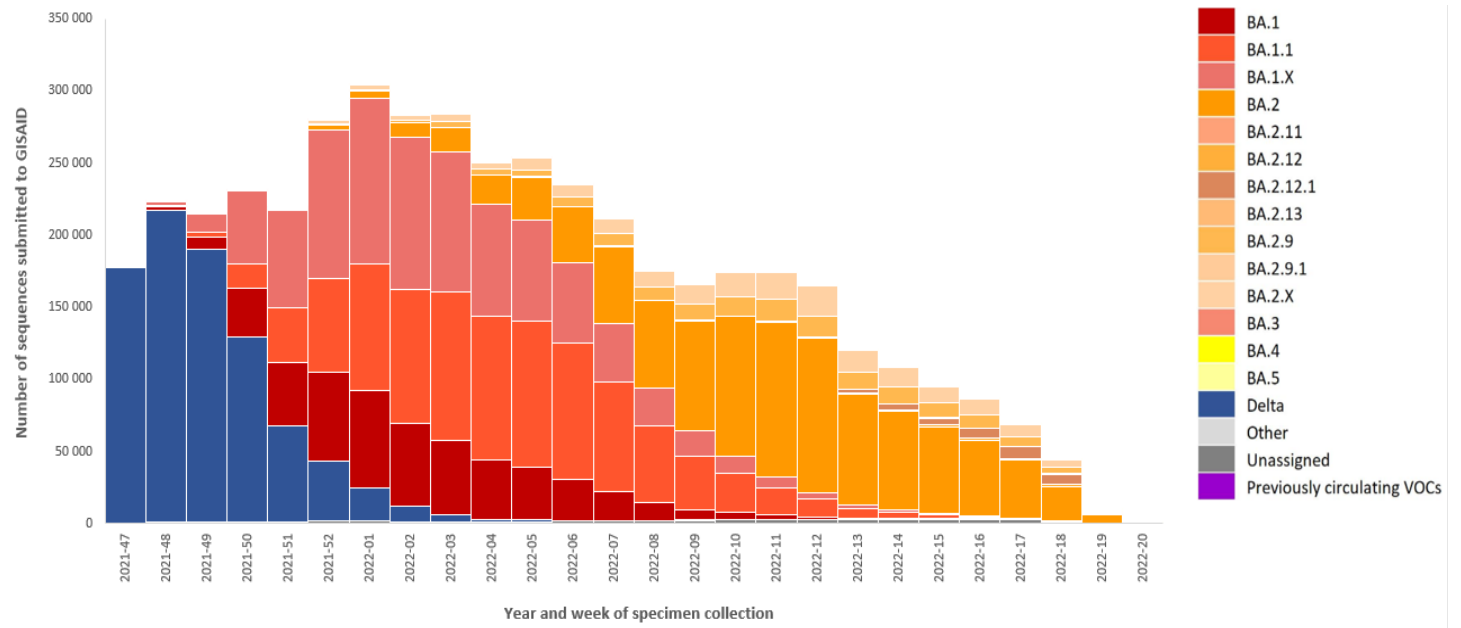
All Omicron descendant lineages continue to be tracked under the umbrella of Omicron VOC, given the lack of evidence on changes that would indicate difference in phenotype, such as associated severity.

Figure 4. The number of Omicron sequences by sister-lineage*, as of 23 May 2022



*Omicron sister-lineages include Omicron lineages BA.1 and pooled descendent lineages named BA.1.X, BA.2 and all pooled descendent lineages named BA.2.X, BA.3, BA.4 and BA.5. Source: SARS-CoV-2 sequence data and metadata from GISAID, extracted from GISAID on 23 May 2022 at 10 CET.

Figure 5. The number of Omicron sequences by Omicron sister-lineages* and BA.2 descendent lineages, as of 23 May 2022



*Omicron descendent lineages with past and present signs of growth advantage are shown in this figure. BA.1.X and BA.2.X show pooled descendent lineages of BA.1 and BA.2 excluding those that have been reported here. Source: SARS-CoV-2 sequence data and metadata from GISAID, extracted from GISAID on 23 May 2022 at 10 CET.

Characteristics of Omicron

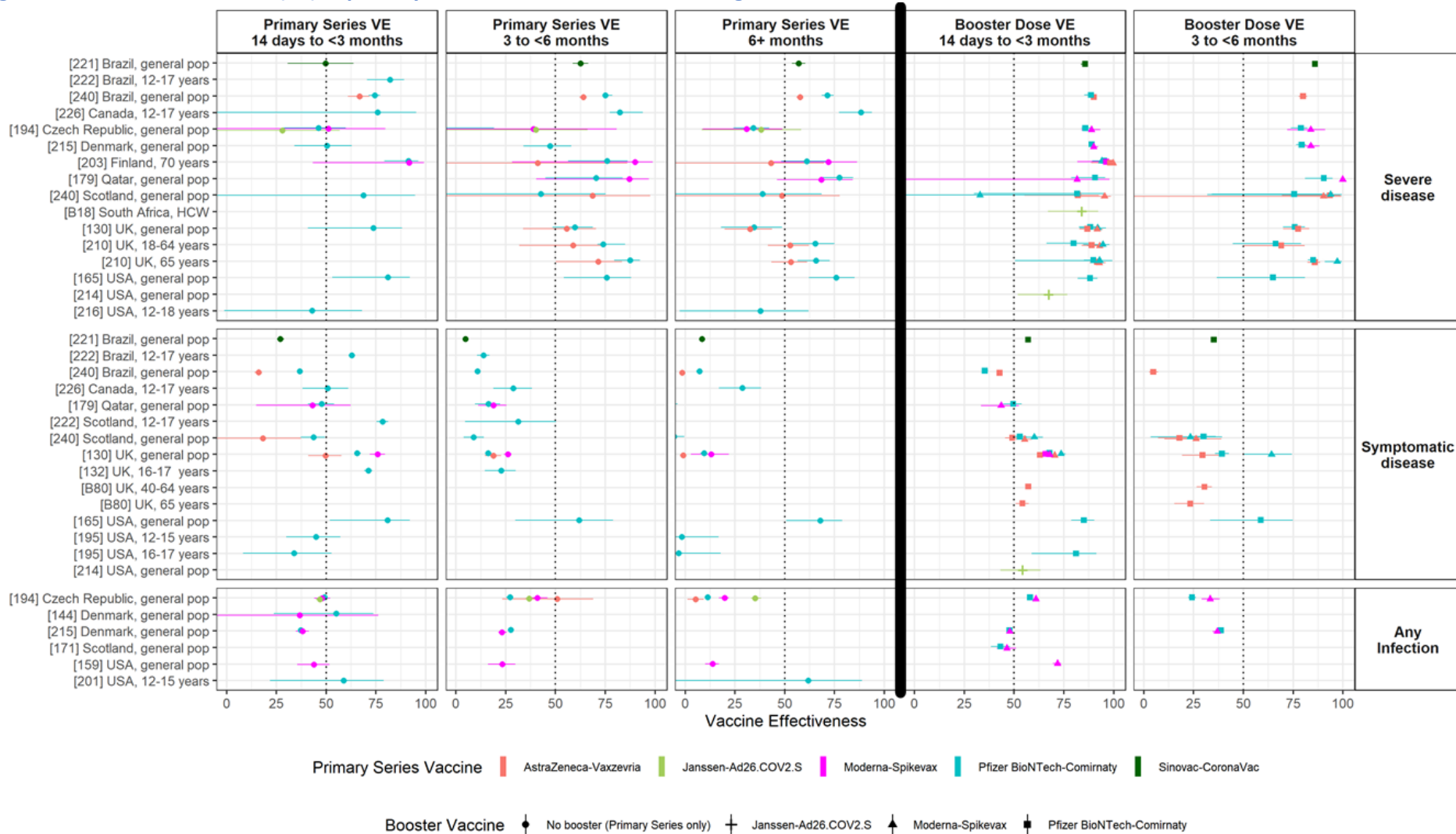
Available evidence on the phenotypic impacts of VOCs is reported in [previous editions](#) of the COVID-19 Weekly Epidemiological Update. Table 2 summarizes the phenotypic characteristics of the Omicron VOC and its sublineages for which evidence is available since the [last update on 11 May 2022](#). 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 phenotypic characteristics* of the Omicron VOC

Public health domain of impact	Omicron (BA.1.1.529)	Omicron sublineages	
		BA.1	BA.2
Transmissibility	<ul style="list-style-type: none"> Growth advantage and increased transmissibility compared to Delta (Campbell 2021)¹ 	Lower transmissibility compared to BA.2 ²	Increased transmissibility compared to BA.1 ²
Disease severity	<ul style="list-style-type: none"> Overall evidence suggests lower severity despite contrasting evidence. Earlier studies reported lower severity compared to Delta³⁻⁷. However, more recent studies reported similar^{8,9} or increased severity compared to Delta.^{3-5,7,10,11} 	No difference in disease severity compared to BA.2 ⁷	No difference in disease severity compared to BA.1 ⁷
Risk of reinfection	<ul style="list-style-type: none"> Reduced risk of Omicron reinfection if previously infected with a different SARS-CoV-2 variant^{12,13} 	Reduced risk of reinfection with BA.1 following infection with BA.2 ¹⁴	Reduced risk of reinfection with BA.2 following infection with BA.1 ¹⁴
Impact on antibody responses	Reduction in neutralizing activity reported as compared to other VOCs ¹⁵⁻¹⁷	<ul style="list-style-type: none"> Lower neutralising antibody titers compared to the Index virus^{16,17} Possible reduced vaccine-induced and infection-induced neutralisation and non-neutralisation activity compared to BA.2^{15,17,18} 	<ul style="list-style-type: none"> Lower neutralising antibody titers compared to the Index virus^{16,17} Possible increased vaccine-induced and infection-induced neutralization and non-neutralisation activity compared to BA.1 (Yu 2022, Bartsch 2022)^{15,17,18}
Impacts on diagnostics	PCR assays that include multiple gene targets maintain their accuracy to detect Omicron; S gene target failure/positivity (SGTF) may be a proxy for screening. Limited to no impact on sensitivity of Ag-RDTs observed ¹⁷⁻²¹	No specific data available. No S gene target failure. ¹⁹⁻²²	No specific data available. The majority will be S gene target positive (SGTF). ¹⁹⁻²²
Impact on treatment	<ul style="list-style-type: none"> No difference in the effectiveness of antiviral agents (polymerase and protease inhibitors) against the Omicron variant²⁴ Conserved neutralizing activity for three broadly neutralizing monoclonal antibodies (sotrovimab, S2X259 and S2H97) and a reduced effectiveness of other monoclonal antibodies²⁵⁻²⁸ 	Reduced efficacy of casirivimab-imdevimab against BA.1 ²⁹	Reduced neutralizing activity of sotrovimab against BA.2 ²⁹
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		

*Generalized findings as compared to previously/co-circulating variants. Based on emerging evidence, including non-peer-reviewed preprint articles and reports, all subject to ongoing investigation and revision

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



* 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.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, nine point estimates for the primary series with confidence intervals below 0 are not shown in the Omicron plot: two estimates from reference #144 against infection at 3 to <6 months (Pfizer BioNTech-Comirnaty and Moderna-Spikevax), two estimates from reference #179 against symptomatic disease at 6+ months (Pfizer BioNTech-Comirnaty 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).

Figure 6 summarizes the impact of Omicron variant on product-specific vaccine effectiveness (VE) over time for both primary series vaccines and booster vaccines. Additional information on vaccine performance against VOCs can also be found in Annex 4. Since the last [update](#), no new studies assessing absolute vaccine effectiveness have been added to the figures. Two studies that assessed relative vaccine effectiveness of a booster dose only (comparing persons receiving three doses to persons receiving two doses) were removed from the figure. As the interpretation of relative vaccine effectiveness is not comparable to absolute vaccine effectiveness (using unvaccinated persons as the comparison group), only estimates of absolute vaccine effectiveness are included in the figure.

Interpretation of the results of the VE for the Omicron variant

To date, 21 studies from nine countries (Brazil, Canada, Czech Republic, Denmark, Finland, 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, four assessed VE of booster 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, VE estimates against the Omicron variant remain higher for *severe disease* in the majority of studies. Booster vaccination substantially improves VE for all outcomes and for all combinations of schedules with estimates available for both primary series and booster vaccination. VE declines more with time after booster vaccination for symptomatic disease and infection than it does for severe disease; 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 $\geq 70\%$. Of the two studies available for vectored 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 $\geq 70\%$, while 18 (77%) were $\geq 50\%$, one of the 12 (8%) VE estimates for AstraZeneca-Vaxzevria was $\geq 70\%$ while eight (67%) were $\geq 50\%$, and the two (100%) available VE estimates for Sinovac-CoronaVac were $\geq 50\%$; both estimates for Janssen-Ad26.COV2.S beyond three months of vaccination were $< 50\%$.

Booster vaccination improved VE against *severe disease* in all studies in which it was assessed. There were 33 estimates of an mRNA booster, two estimates a booster dose of Janssen-Ad26.COV2.S, and one estimates a booster dose of Sinovac-CoronaVac. Across the datasets, only one estimate for Pfizer BioNTech-Comirnaty as a booster dose and one for Janssen-Ad26.COV2.S as a booster dose below 70% between 14 days and three months of receipt of a booster dose. At three to six months post mRNA booster, 18 of 20 (90%) estimates showed VE $\geq 70\%$ (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 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 $\geq 70\%$ and seven (54%) were $\geq 50\%$; all 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 $\geq 50\%$ (20 estimates evaluated mRNA vaccines, six evaluated AstraZeneca-Vaxzevria, and two evaluated Sinovac-CoronaVac). A booster with mRNA vaccine after completion of a primary series of an mRNA vaccine, AstraZeneca-Vaxzevria, or Sinovac-CoronaVac, improved VE against *symptomatic disease* with four of 19 (21%) VE estimates $\geq 70\%$ and 14 (74%) estimates $\geq 50\%$ between 14 days and three months post booster. However, booster dose protection declined with time since vaccination, with only two of twelve (17%) available estimates indicating a VE of $\geq 50\%$ 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 against *infection* showed a similar pattern as that against *symptomatic disease*.

Additional resources for VOCs

- [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](#)

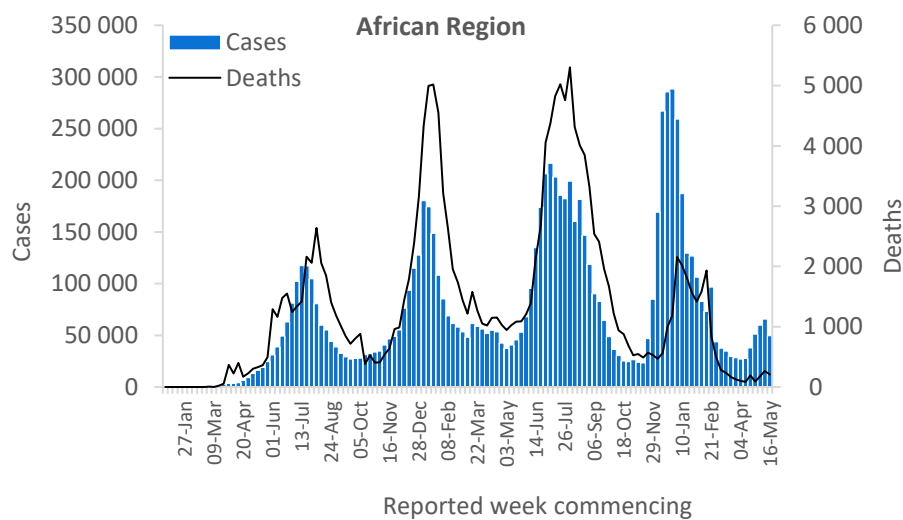
WHO regional overviews:

Epidemiological week 16-22 May 2022**

African Region

After a month of increasing trends, the African Region reported a decline both in the number of new weekly cases (over 49 000; -24%) and new weekly deaths (n=208; -22%) as compared to the previous week. However, 13 (27%) countries in the Region reported an increase in cases of over 20%, with some of the greatest proportional increases observed in Côte d'Ivoire (65 vs 22 new cases; +195%), Ethiopia (406 vs 207 new cases; +96%) and Burundi (509 vs 268 new cases; +90%). The highest numbers of new cases were reported from South Africa (39 203 new cases; 66.1 new cases per 100 000 population; -24%), Réunion (5383 new cases; 601.2 new cases per 100 000; -32%), and Zimbabwe (1436 new cases; 9.7 new cases per 100 000; +53%).

The highest numbers of new deaths in the Region were reported from South Africa (178 new deaths; <1 new death per 100 000 population; -25%), Zimbabwe (12 new deaths; <1 new death per 100 000; +33%), and Réunion (eight new deaths; <1 new deaths per 100 000; +33%).

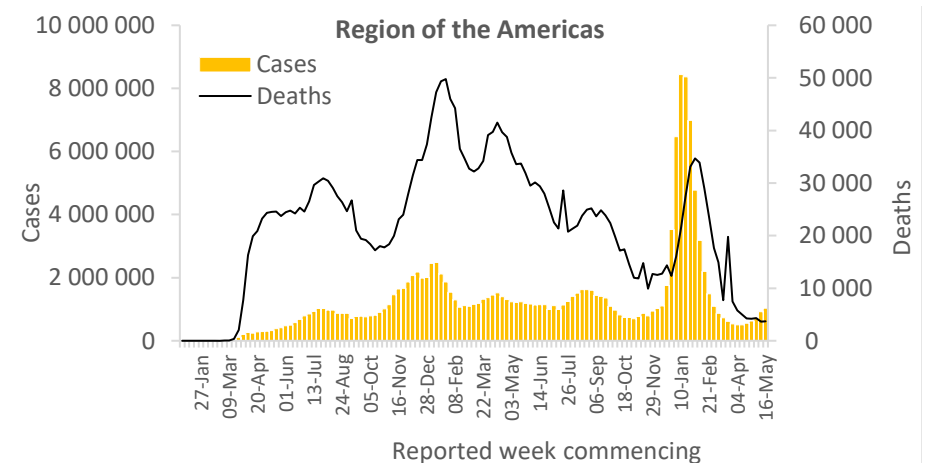


Updates from the [African Region](#)

Region of the Americas

The Region of the Americas has continued to report an increasing trend since mid-April 2022, with over one million new weekly cases reported, a 13% increase as compared to the previous week. Twenty-four (43%) countries in the Region reported increases in new cases of 20% or greater, with the greatest proportional increases observed in Antigua and Barbuda (221 vs 58 new cases; +281%), Bolivia (Plurinational State of) (1193 vs 465 new cases; +157%) and Colombia (3795 vs 1671 new cases; +127%). The highest numbers of new cases were reported from the United States of America (713 882 new cases; 215.7 new cases per 100 000; +18%), Brazil (97 674 new cases; 46.0 new cases per 100 000; -19%), and Argentina (43 487 new cases; 96.2 new cases per 100 000; +28%).

The number of new weekly deaths in the Region remained stable as compared to the previous week (<1% increase), with over 3600 new deaths reported. The highest numbers of new deaths were reported from the United States of America (1957 new deaths; <1 new death per 100 000; +2%), Brazil (713 new deaths; <1 new death per 100 000; +3%), and Canada (411 new deaths; 1.1 new deaths per 100 000; -18%).

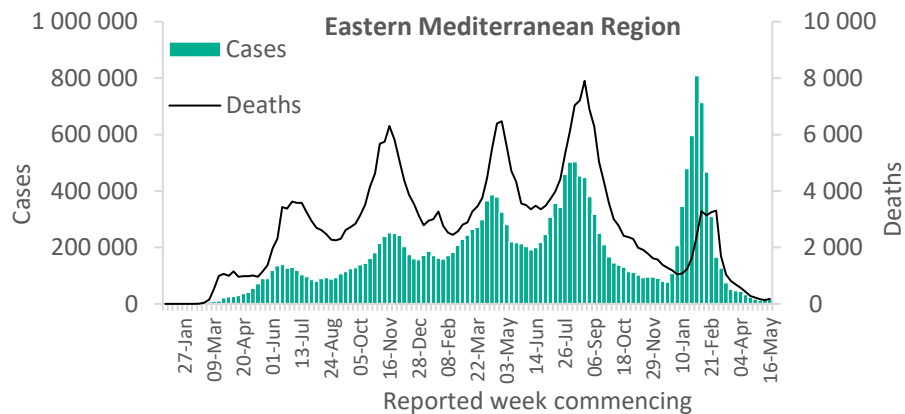


Updates from the [Region of the Americas](#)

Eastern Mediterranean Region

After the increasing trend observed during the past week (following a declining trend observed since mid-February 2022), the Eastern Mediterranean Region reported over 17 000 new weekly cases, representing a 12% decrease as compared to the previous week. Four (19%) countries in the Region reported increases in new cases of 20% or greater, with the greatest proportional increases observed in Jordan (305 vs 84 new cases; +263%), Morocco (824 vs 500 new cases; +65%) and Afghanistan (431 vs 320 new cases; +35%). The highest numbers of new cases were reported from Bahrain (3800 new cases; 223.3 new cases per 100 000; -23%), Saudi Arabia (3780 new cases; 10.9 new cases per 100 000; +2%), and the United Arab Emirates (2305 new cases; 23.3 new cases per 100 000; +8%).

The number of new weekly deaths in the Region increased by 30% when compared to the previous week, with over 150 new deaths reported. The highest numbers of new deaths were reported from the Islamic Republic of Iran (55 new deaths; <1 new death per 100 000; +8%), Tunisia (53 new deaths; <1 new deaths per 100 000; +489%), and Egypt (21 new deaths; <1 new death per 100 000; -25%). All 53 deaths reported from Tunisia last week were batch reported on 18 May 2022.

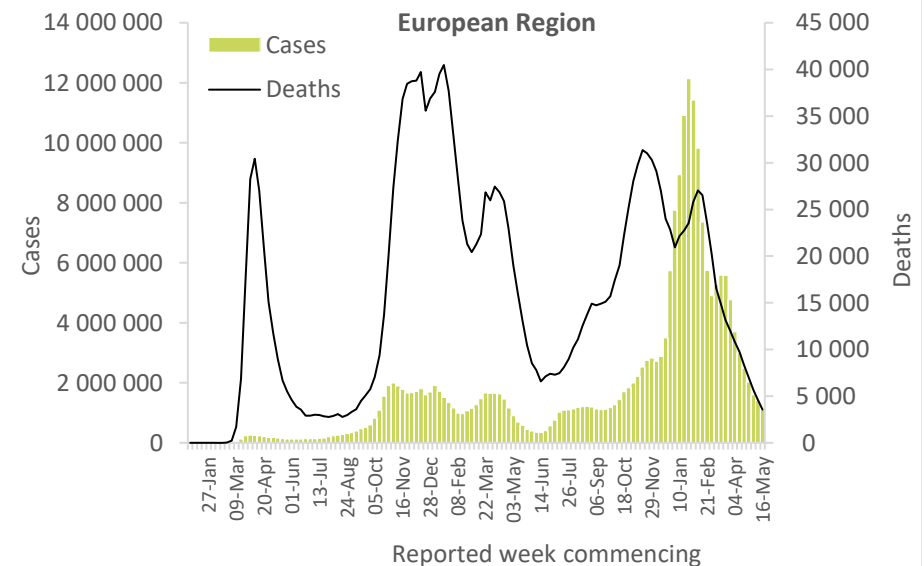


Updates from the [Eastern Mediterranean Region](#)

European Region

In the European region, cases have continued to decline since mid--March 2022, with over 1.1 million new weekly cases, a 20% decrease as compared to the previous week. Three (5%) countries in the Region reported increases in new cases of 20% or greater: Spain (110 951 vs 51 716 new cases; +115%), Uzbekistan (127 vs 87 new cases; +46%) and Monaco (105 vs 15 new cases; +33%). The highest numbers of new cases were reported from Germany (268 396 new cases; 322.7 new cases per 100 000; -35%), Italy (199 116 new cases; 333.9 new cases per 100 000; -24%), and Portugal (164 225 new cases; 1595.1 new cases per 100 000; +7%).

The Region reported over 3500 new deaths, a 23% decrease as compared to the previous week. The highest numbers of new deaths were reported from Italy (736 new deaths; 1.2 new deaths per 100 000; -4%), the Russian Federation (680 new deaths; <1 new death per 100 000; -6%), and Spain (564 new deaths; 1.2 new deaths per 100 000; +118%).



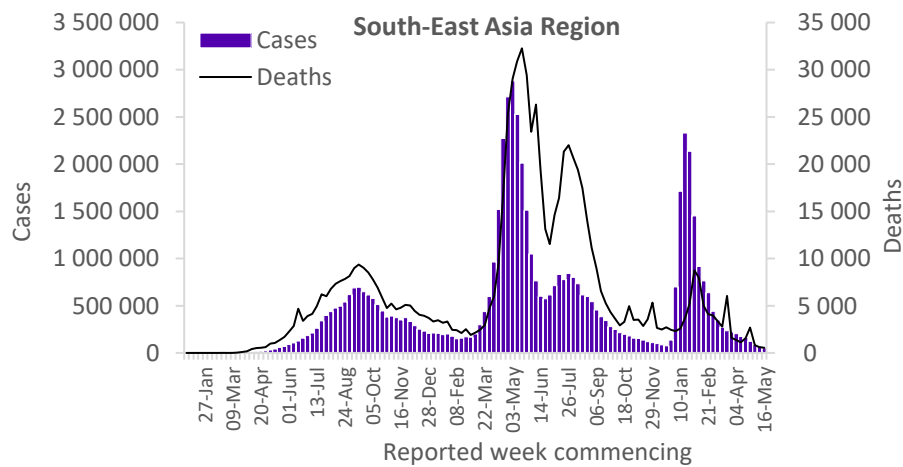
Updates from the [European Region](#)

South-East Asia Region

The South-East Asia Region has continued the decreasing trends observed since mid-January 2022, with over 54 000 new cases and over 500 new deaths reported, decreases of 23% and 12% respectively as compared to the previous week. Three (30%) countries in the Region showed increases in new cases of 20% or greater, with the largest proportional increases observed in the Maldives (93 vs 67 new cases; +39%) and Nepal (70 vs 56 new cases; +25%). The highest numbers of new cases were reported from Thailand (37 648 new cases; 53.9 new cases per 100 000; -23%), India (14 772 new cases; 1.1 new cases per 100 000; -24%), and Indonesia (1814 new cases; <1 new case per 100 000; -23%).

The highest numbers of new deaths in the Region were reported from Thailand (274 new deaths; <1 new death per 100 000; -29%), India (199 new deaths; <1 new deaths per 100 000; +33%), and Indonesia (64 new deaths; <1 new deaths per 100 000; -17%).

Reports of an outbreak of COVID-19 first reported in the Democratic People's Republic of Korea continue through official media on 12 May 2022; however, at present, no confirmed cases or deaths have been reported to WHO.

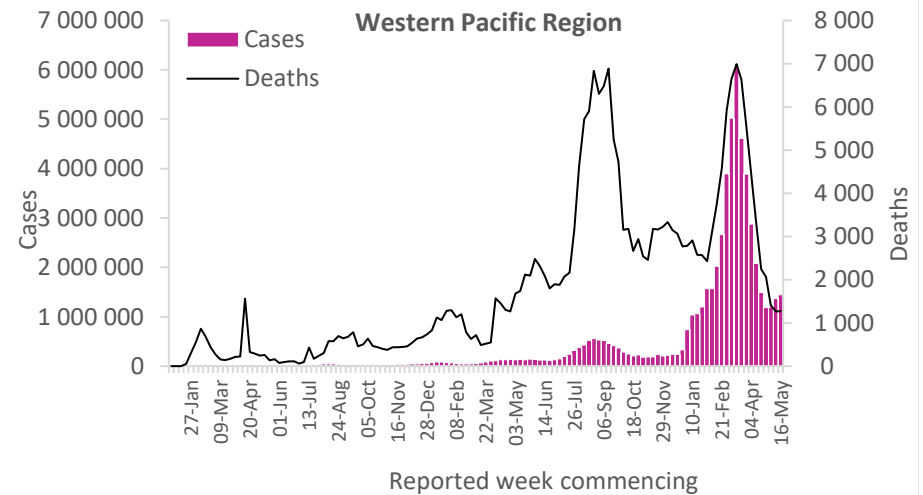


Updates from the [South-East Asia Region](#)

Western Pacific Region

The Western Pacific Region has shown an increasing trend in new weekly cases in the last three weeks, with over 1.4 million new cases, a 6% increase as compared to the previous week. Eight (25%) countries in the Region reported increases in new cases of 20% or greater, with the greatest proportional increases observed in Guam (238 vs 36 new cases; +562%), Fiji (116 vs 26 new cases; +346%) and Tonga (444 vs 246 new cases; +80%). The highest numbers of new cases were reported from China (543 290 new cases; 36.9 new cases per 100 000; +39%), Australia (360 323 new cases; 1413.0 new cases per 100 000; +8%), and Japan (249 210 new cases; 197.0 new cases per 100 000; -11%).

With over 1200 new deaths reported, the Region shows a stable trend (<1% increase) in new weekly deaths as compared to the previous week. The highest numbers of new deaths were reported from China (317 new deaths; <1 new death per 100 000; +64%), Australia (306 new deaths; 1.2 new deaths per 100 000; +15%), and the Republic of Korea (256 new deaths; <1 new death per 100 000; -27%).



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.
- Table 3 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 3.

Annex 3. Methods for Figure 6

- 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 absolute 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 19 May 2022; Neutralization data as of 16 May 2022)

	WHO Emergency Use Listing (EUL) Qualified Vaccines ⁺									Vaccines without WHO EUL ⁺	
	AstraZeneca-Vaxzevria/SII - Covishield	Beijing CNBG-BBIBP-CorV	Bharat-Covaxin	Cansino - Convidecia ³⁰	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↓↓ ₄	↓↓ 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 reduction³⁰n 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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