COVID-19 Weekly Epidemiological Update

Edition 52, published 10 August 2021

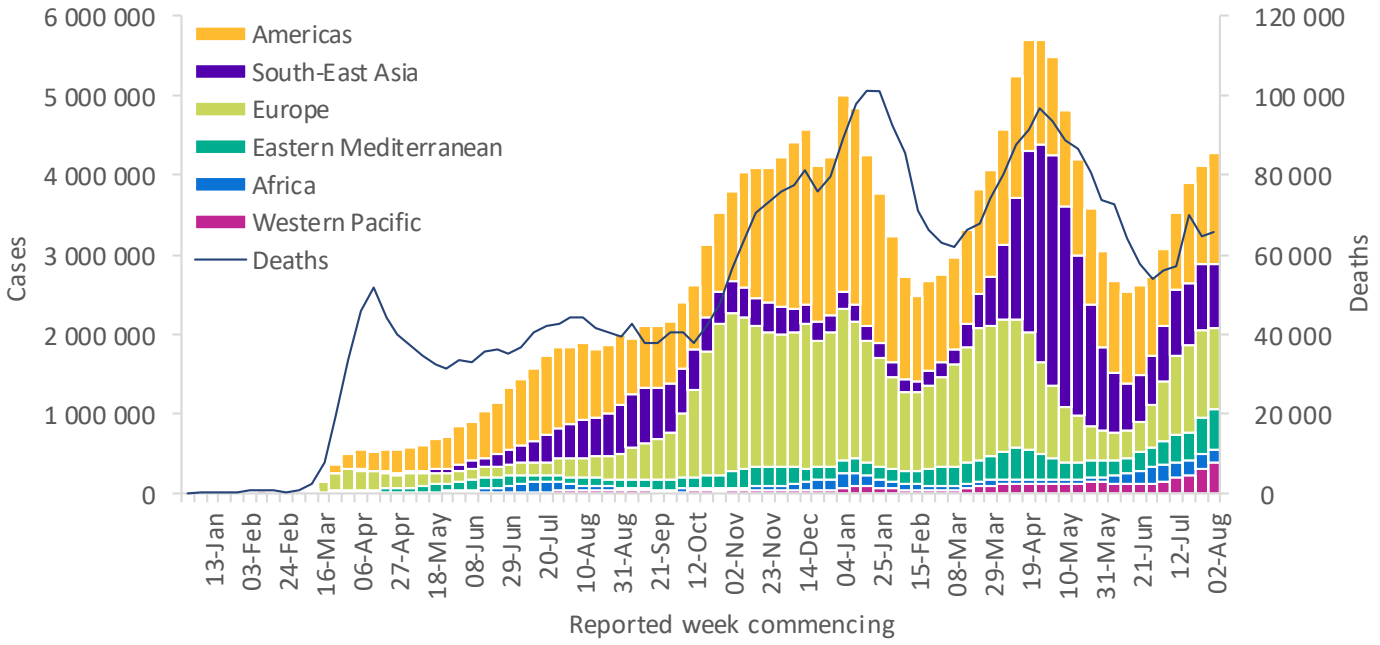
In this edition:

Global overview

Data as of 8 August 2021

On 5 August, the cumulative number of COVID-19 cases globally surpassed 200 million, just six months after reaching 100 million cases. This week alone, over 4.2 million new cases and over 65 000 new deaths were reported, a slight increase as compared to the previous week. The largest proportionate increases in new cases were reported by the Region of the Americas (14%) and Western Pacific Region (19%), with 1.3 million and over 375 000 new cases reported, respectively. Additionally, a substantial increase (46%) in the number of new deaths was reported this week in the Western Pacific Region (Table 1). Of the 228 Member States and territories, 38 (17%) reported more than a 50% increase in new cases as compared to the previous week and 34 (15%) reported a more than a 50% increase in new deaths.

Figure 1. COVID-19 cases reported weekly by WHO Region, and global deaths, as of 8 August 2021**



**See *Annex 2: Data, table and figure notes*

The Regions reporting the highest weekly case and deaths incidence rates per 100 000 population remain the same as last week: the Regions of the Americas (136.5 new cases per 100 000 population; 14% increase) and Europe (108.6 new cases per 100 000 population; 7% decrease) reported the highest weekly incidence in cases; while the Regions of the Americas (1.9 per 100 000 population; 4% decrease), Europe (1.0 per 100 000

population; 16% increase) and South-East Asia (1.0 per 100 000 population; 6% decrease) reported the highest weekly incidence in deaths.

At the country level, the highest numbers of new cases were reported from the United States of America (734 354 new cases; 35% increase), India (278 631 new cases; 2% decrease), the Islamic Republic of Iran (248 102 new cases; 20% increase), Brazil (228 473 new cases; 8% decrease), and Indonesia (225 635 new cases; 18% decrease).

Globally, cases of the Alpha variant have been reported in 185 countries, territories or areas (hereafter countries), with three new countries reporting this Variant of Concern (VOC) since last week, while 136 countries (four new countries) have reported cases of the Beta variant; 81 countries (no new country) have reported cases of the Gamma variant; and 142 countries (seven new countries) have reported cases of the Delta variant.

Table 1. Newly reported and cumulative COVID-19 cases and deaths, by WHO Region, as of 8 August 2021**

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 (%)
Americas	1 396 284 (33%)	14%	78 619 744 (39%)	19 832 (30%)	-4%	2 030 101 (47%)
Europe	1 012 890 (24%)	-7%	61 214 530 (30%)	9 562 (15%)	16%	1 230 343 (29%)
South-East Asia	799 225 (19%)	-5%	39 177 502 (19%)	20 702 (32%)	-6%	590 988 (14%)
Eastern Mediterranean	499 655 (12%)	8%	13 095 783 (6%)	6 000 (9%)	8%	242 229 (6%)
Africa	181 019 (4%)	-1%	5 137 088 (3%)	4 743 (7%)	-2%	122 025 (3%)
Western Pacific	375 568 (9%)	19%	4 901 518 (2%)	4 633 (7%)	46%	69 722 (2%)
Global	**4 264 641 (100%)**	**4%**	**202 146 929 (100%)**	**65 472 (100%)**	**2%**	**4 285 421 (100%)**

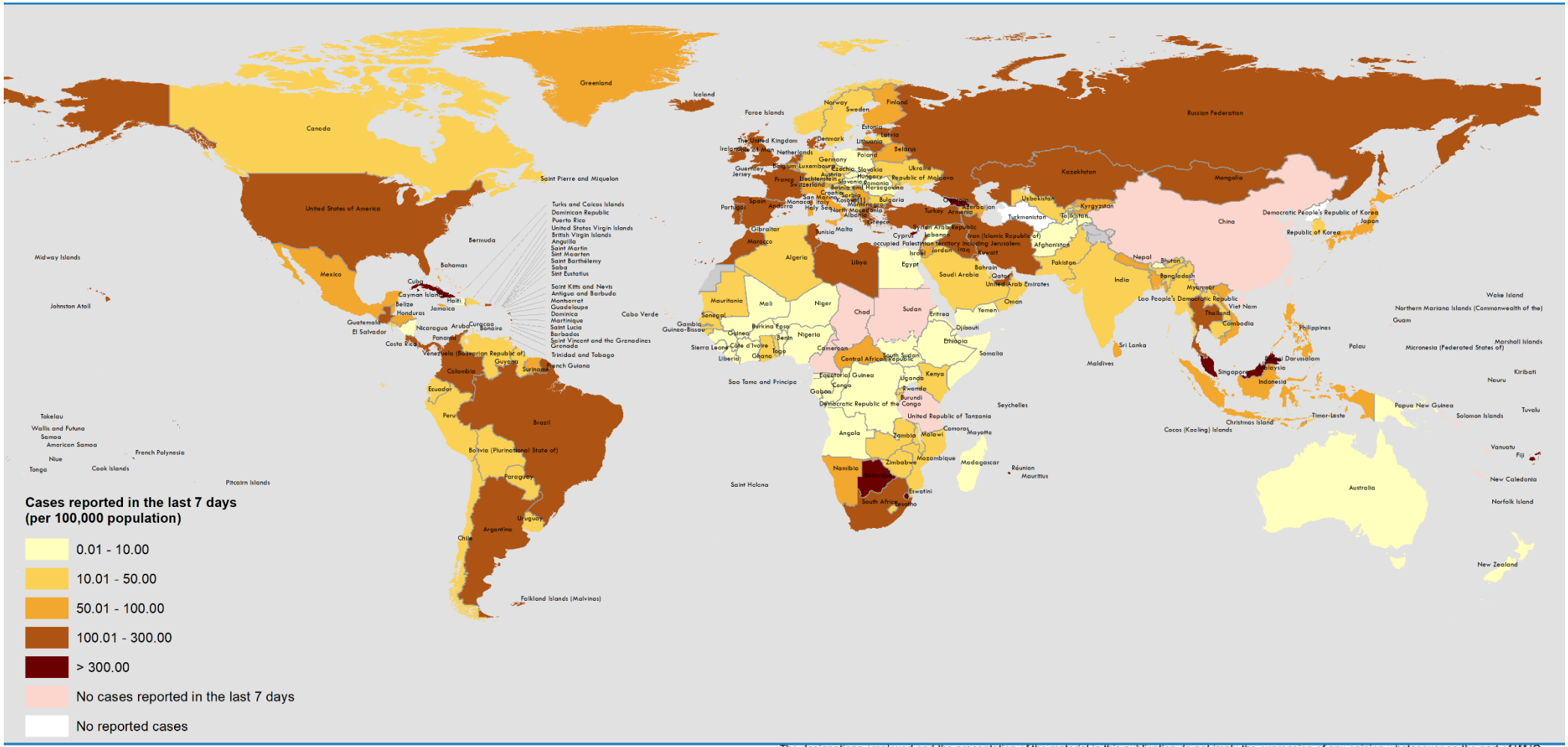
Percent change in the number of newly confirmed cases/deaths in past seven days, compared to seven days prior

**See *Annex 2: 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 August 2021**

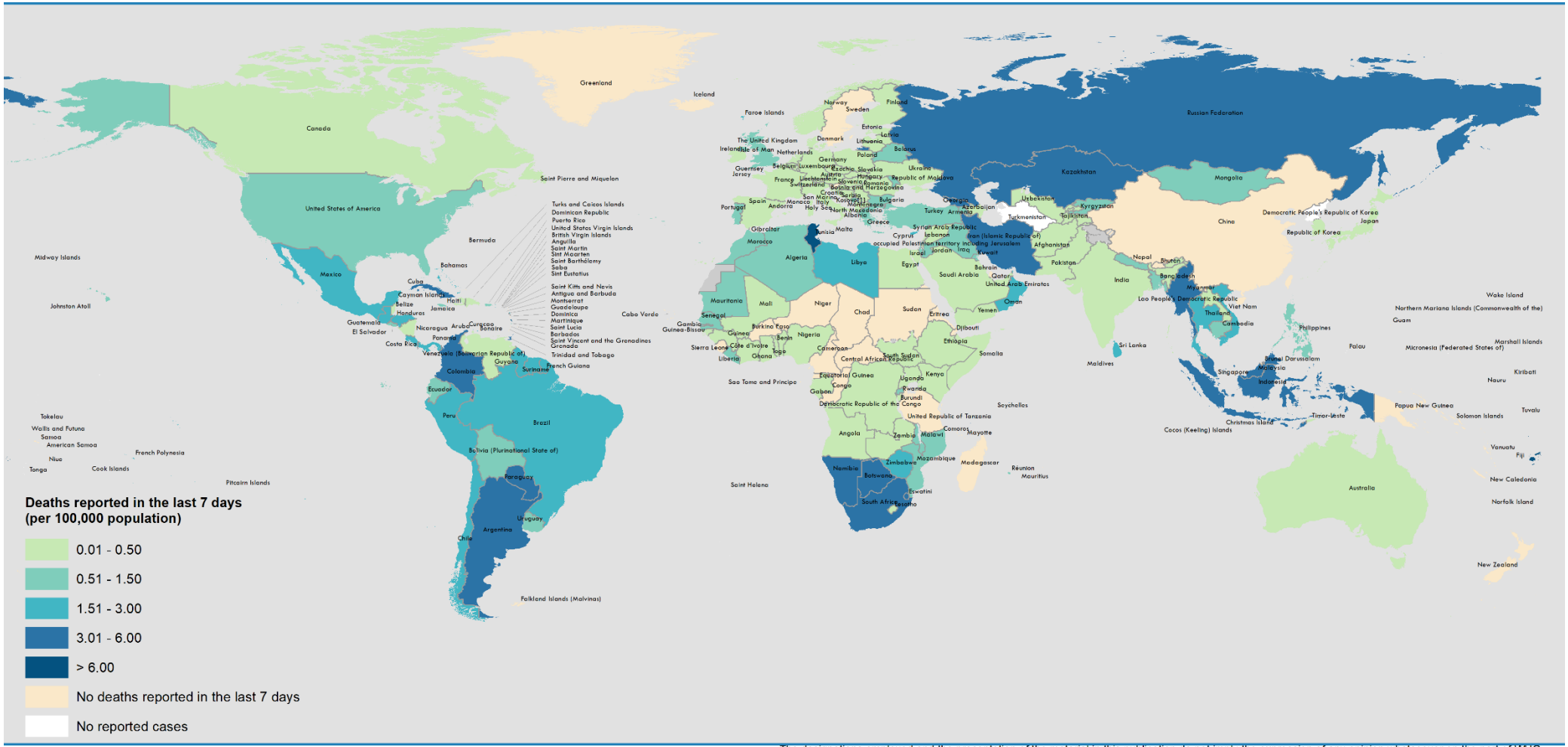


***Data Source**: World Health Organization*
United Nations Population Division (Population prospect 2020)
***Map Production**: WHO Health Emergencies Programme*

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 2: Data, table and figure notes*

Figure 3. COVID-19 deaths per 100 000 population reported by countries, territories and areas, 2 – 8 August 2021**



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

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 2: 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 vaccine, therapeutics, diagnostics or effectiveness of public health and social measures (PHSM) applied by national authorities to control disease spread. "Signals" of potential Variants of Concern (VOCs) or Variants of Interest (VOIs) are detected and assessed based on the risk posed to global public health. National authorities may choose to designate other variants of local interest/concern and are encouraged to investigate and report on impacts of these variants.

For updates on VOCs and VOIs, and a list of Alerts for Further Monitoring, are available on the WHO Tracking SARS-CoV-2 Variants website.

Geographic distribution

As surveillance activities to detect SARS-CoV-2 variants are strengthened at national and subnational levels, including through the expansion of genomic sequencing capacities, the number of countries/areas/territories (hereafter countries) reporting VOCs continues to increase (Figure 4, Annex 1). This distribution should nonetheless be interpreted with due consideration of surveillance limitations, including differences in sequencing capacities and sampling strategies between countries.

Phenotypic characteristics

Available evidence on phenotypic impacts of VOCs is summarized in Table 2, as well as in previous editions of these COVID-19 Weekly Epidemiological Updates. Since the last detailed update on 20 July, new evidence has been published on the phenotypic characteristics of VOCs.

A case-control study conducted in Qatar[1] using a national database comparing outcomes of cases(defined as individuals with severe or critical COVID-19 or who progressed to death) and controls (individuals with asymptomatic or mild disease) found the odds of progressing to severe disease requiring acute-care hospitalization was 1.24 (95% CI 1.11-1.39) for cases infected with Beta compared to Alpha. The odds of cases progressing to critical disease requiring ICU admission was 1.49 (95%CI 1.13-1.97) for Beta compared to Alpha, and the odds of death were 1.57 (95% CI 1.03-2.43) for Beta compared to Alpha[1(p)].

An analysis of symptomatic[2], PCR positive cases aged 15 years or older in the United Kingdom (n=83 197) identified between 12 April and 27 June 2021 found that 1.2% (980/83 197) were possible reinfections. The adjusted odds ratio of reinfection with the Delta variant was 1.46 (95% CI 1.03-2.05) compared to the Alpha variant[3].

A report on the first local transmission of the Delta SARS-CoV-2 variant in China[4] described viral infection and transmission dynamics of 167 cases that were traced back to the index case. Daily sequential PCR testing of the quarantined subjects indicated that among those who became infected, the viral load of the first positive test of Delta infections was approximately 1000 times

higher than that of the original non-VOC strain, suggesting the potential for faster viral replication and increased infectiousness of the Delta variant during early stages of infection[5].

Another report by Public Health England[6] showed similar findings of high viral loads among breakthrough cases infected with Delta. However, the authors highlighted that the results may be influenced by test-seeking behaviour or by changes, such as age distribution of cases, which can also influence cycle threshold (Ct) values.

Table 2: Summary of phenotypic impacts* of Variants of Concern

WHO label	Alpha	Beta	Gamma	Delta
Transmissibility	Increased transmissibility and secondary attack rate[7]	Increased transmissibility[8]	Increased transmissibility[9]	Increased transmissibility and secondary attack rate[10] Similar transmissibility between vaccinated and unvaccinated individuals[11–13]
Disease severity	Increased risk of hospitalization[14], possible increased risk of severity and mortality[15]	Not confirmed, possible increased risk of in-hospital mortality[16]	Not confirmed, possible increased risk of hospitalization[17]	Increased risk of hospitalization[18]
Risk of reinfection	Neutralizing activity retained [19], risk of reinfection remains similar[20]	Reduction in neutralizing activity reported; T cell response elicited by D614G virus remains effective[21]	Moderate reduction in neutralizing activity reported[22]	Reduction in neutralizing activity reported[23–25]
Impacts on diagnostics	Limited impact – S gene target failure (SGTF); no impact on overall result from multiple target RT-PCR, No impact on Ag RDTs observed[26]	No impact on RT-PCR or Ag RDTs observed[25]	None reported to date	None reported to date

**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.*

Table 3. Summary of vaccine performance against Variants of Concern

	Anhui ZL-Recombinant	AstraZeneca-Vaxzevria	Beijing CNBG-BBIBP-CorV	Bharat-Covaxin	Gamaleya-Sputnik V	Janssen-Ad26.COV 2.5	Moderna-mRNA-1273	Moderna-mRNA-1273/ Pfizer BioNTech-Comirnaty	Novavax-Covavax	Pfizer BioNTech-Comirnaty	SII - Covishield	Sinovac-CoronaVac
Alpha[27,28]												
Summary of VE*	Protection retained against all outcomes											
- Severe disease	-	↓$_1$	-	-	-	-	↔$_1$	↔$_1$	-	↔$_3$	-	-
- Symptomatic disease	-	↔ to ↓$_3$	-	-	-	-	↔$_1$	↔$_1$	↓$_1$	↔$_3$	-	-
- Infection	-	↔ to ↓$_2$	-	-	-		↔$_1$	-	-	↔$_2$	-	-
Neutralization	↔$_2$	↓$_3$	↔$_1$	↔$_1$	↔$_1$	↔$_2$	↔$_{10}$	↓$_1$	↔$_1$	↔ to ↓$_{28}$	-	↔ to ↓$_5$
Beta[29–32]												
Summary of VE*	Protection retained against severe disease; reduced protection against symptomatic disease; limited evidence											
- Severe disease	-	-	-	-	-	↔$_1$	-	-	-	↔	-	-
- Symptomatic disease	-	↓↓↓$_1$	-	-	-	↔$_1$	-	-	↓↓↓$_1$	-	-	-
- Infection	-	-	-	-	-	-	↔$_1$	-	-	↔ to ↓$_2$	-	-
Neutralization	↔ to ↓$_3$	↓↓$_5$	↔ to ↓$_2$	↓$_1$	↓↓$_1$	↓ to ↓↓$_5$	↓ to ↓↓$_{12}$	↓↓↓$_1$	↓↓↓$_1$	↓ to ↓↓$_{28}$	-	↓ to ↓↓$_4$
Gamma												
Summary of VE*	Unclear impact; very limited evidence											
- Severe disease	-	-	-	-	-	-	-	-	-	-	-	-
- Symptomatic disease	-	-	-	-	-	-	-	-	-	-	-	-
- Infection	-	-	-	-	-	-	-	-	-	-	-	↔$_1$
Neutralization	↔$_1$	↓$_1$	-	-	-	↓$_2$	↓$_4$	-	-	↔ to ↓$_{13}$	-	↔ to ↓$_3$
Delta[33]												
Summary of VE*	Protection retained against severe disease; possible reduced protection against symptomatic disease and infection; limited evidence											
- Severe disease	-	↔$_1$	-	-	-	-	-	-	-	↔	-	-
- Symptomatic disease	-	↓↓$_2$	-	↓$_1$	-	-	-	-	-	↔ to ↓$_3$	-	-
- Infection	-	↓$_1$	-	-	-	-	-	-	-	↓$_1$	-	-
Neutralization	↔ to ↓$_2$	↓to↓↓$_3$	-	↔ to ↓$_2$	-	↓$_3$	↓$_3$	↓↓$_1$	-	↓$_7$	↓$_1$	↓to↓↓↓$_2$

VE refers to vaccine effectiveness and vaccine efficacy Summary 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% reduction in VE, or VE >90% with no comparator, or that there was a <2-fold reduction in neutralization; "↓" 10 to <20% reduction in VE, or 2 to <5-fold reduction in neutralization; "↓↓" 20 to <30% reduction in VE, or 5 to <10-fold reduction in neutralization; "↓↓↓" ≥30% 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 page (https://view-hub.org/resources). For vaccine effectiveness studies, see references noted with '#' in the 'COVID-19 Vaccine Effectiveness Results Summary Table'. For a list of all neutralization studies, see 'COVID-19 Vaccine Neutralization Studies Table'.
References indicated by superscripts are vaccine efficacy studies informing this table and are included in the reference section below.

Additional notes on VOC impacts on vaccines

- All comparisons of results with and without VOC are within a given vaccine product.
- Studies presenting VOC-specific vaccine efficacy or effectiveness (VE) estimates for full vaccination (≥ 7 days post final dose) are assessed against a comparator VE estimate for that product to determine level of reduction in VE. For symptomatic disease, VOC VE is compared against phase 3 randomised RCT results from non-VOC settings. For severe disease and infection, 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 severe disease (phase 3 RCT efficacy estimates against severe disease are used as comparator since a within study comparator is unavailable) and for infection (when 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.

Table 3 presents the impact of variants on product specific vaccine efficacy/effectiveness (VE) and quantifies the reduction in VE in the setting of VOCs compared to VE in non-VOC settings. Of note, 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%. In addition, vaccines have shown higher VE against severe disease; thus, small reductions in VE against severe disease due to VOCs may still mean substantial protection, as is the case for AstraZeneca-Vaxzevria.

Since the 20 July update, results from an ongoing randomized clinical trial evaluating the 6-month efficacy of Pfizer BioNTech-Comirnaty against SARS-CoV-2 infection (symptomatic + asymptomatic) in persons ≥ 12 years old reports an overall vaccine efficacy against infection and against severe disease ≥7 days post second dose of 91% (95% CI: 89.0-93.2%) and 96.7% (95% CI: 80.3-99.9%), respectively, across 152 participating sites in 6 countries. The authors also estimated VE against the Beta variant in South Africa and found 2 doses of Pfizer BioNTech-Comirnaty prevented 100% (95% CI: 53.5-100.0%) of SARS-CoV-2 infections ≥7 days post second dose, though confidence intervals are wide.[32] These results have not yet been peer-reviewed.

A second study (not yet peer-reviewed) estimated the effectiveness of Pfizer BioNTech-Comirnaty against infection with the Beta variant among residents of long-term care facilities (LCTFs) in France. The authors describe two outbreaks associated with the Beta variant among LTCFs in which more than 70% of residents had received both doses of the vaccine. VE in this population against any SARS-CoV-2 infection ≥ 7 days after receipt of the second dose was 49% (95% CI: 14-69%). VE against severe disease remained high at 86% (95% CI: 67-94%).[34]

Another study (not yet peer-reviewed) evaluated the real-world effectiveness of mRNA (Moderna-mRNA-1273 and Pfizer BioNTech-Comirnaty) vaccines among health care workers in Canada, where the interval between doses was 16 weeks. Most participants (88%) included in the analysis received Pfizer BioNTech-Comirnaty vaccine. Using a test-negative design, the study found that a single dose of mRNA vaccine had lower effectiveness against symptomatic COVID-19 due to the Alpha variant compared to non-VOC strains: 60% (95%CI: 53.6-65.5%) vs. 77.0% (95%CI: 72.6-80.7%), but no substantive difference in two-dose recipients: 92.6%% (95%CI: 87.1%-95.8%) vs. 86.5%% (95%CI: 56.8-95.8%).[35]

A fourth study (not yet peer-reviewed), also using a test-negative case-control design, evaluated the effectiveness of AstraZeneca-Vaxzevria in adults ≥ 60 years in Brazil in a setting of high prevalence of the Gamma variant. Single dose VE estimates against SARS-CoV-2 infection, hospitalization, and death ≥ 28 days after immunization were 33.4% (95% CI: 26.4 to 39.7%), 55.1% (95% CI: 46.6 to 62.2%), and 61.8% (95% CI: 48.9 to 71.4%), respectively. Beginning at 14 days after receipt of the second dose, respective VE estimates increased to 77.9% (95% CI: 69.2 to 84.2%), 87.6% (95% CI: 78.2 to 92.9%), and 93.6% (95% CI: 81.9 to 97.7%).[36]

Eight recent studies have assessed the impact of the Delta variant on COVID-19 vaccine performance. Three evaluated vaccine effectiveness. A study from India (not yet peer-reviewed) assessed the effectiveness of AstraZeneca-Vaxzevria vaccine at preventing SARS-CoV-2 infection and severe COVID-19 disease in a setting with high prevalence of the Delta variant. Two doses of the vaccine were 63.1% (95%CI: 51.5-72.1%) and 81.5% (95%CI: 9.9- 99.0) effective at preventing infection and moderate-severe disease, respectively. Single dose VE against infection (46.2%, 95%CI: 31.6, 57.7) was lower than 2 dose VE, while single dose VE against moderate-severe disease (79.2%, 95%CI: 46.1-94.0%) was similar to that of 2 doses. While this study was conducted during a time of high transmission of the Delta variant, it is noteworthy that viral sequencing and lineage determination were available from only a small subset of positive cases (4.4%); of these samples 90% were the Delta variant.[37]

A second study, from the United States, evaluated cases occurring between April and June 2021 in Mesa County, Colorado, where cases of the Delta variant had increased rapidly. The fraction of cases who were fully vaccinated with any vaccine was evaluated in Mesa county and compared to the rest of the state which experienced a slower increase in the proportion of the Delta variant cases among new infections. Among COVID-19 cases aged ≥65 years in Mesa county, 27.5% were fully vaccinated compared to 17.4% in other Colorado counties. The authors report a crude VE of 78% (95% CI: 71%–84%) against symptomatic infection for a 2-week period ending June 5 in Mesa County and 89% (95% CI = 88%–91%) for the rest of the state; during this time Delta made up close to 100% of sequenced samples in Mesa compared to ~50% for all other counties.[38] A third study (not yet peer reviewed), from the UK, estimated VE of any COVID-19 vaccine against infection and symptomatic disease to be 49% (95%: 22-67%) and 59% (95% CI: 23-78%), respectively, among adults 18 to 64 years during the period from 24 June to 12 July 2021 when the Delta variant was highly prevalent. These estimates were reduced compared to the period from 20 May to 7 June 2021 characterized by lower Delta prevalence and VE estimates against infection and symptomatic disease of 64% (95% CI: 11%-85%) and 83% (95% CI: 19-97%), respectively. VE against severe disease was not evaluated in this study.[39]

The authors of this UK study also found reduced viral load (higher cycle threshold values) among vaccinated COVID-19 cases compared to unvaccinated cases during the period of high Delta prevalence. A study of Delta breakthrough infections in Singapore (not yet peer reviewed) found that those who were fully vaccinated with an mRNA vaccine had similar viral loads to those who were infected with Delta but unvaccinated; however, the viral loads were found to decrease faster among those who were vaccinated. The authors also reported that fully vaccinated individuals experienced less severe illness than unvaccinated individuals.[40] Two additional studies from the United States of America (one not yet peer reviewed) also found no difference in viral load among cases who had been vaccinated with any vaccine and unvaccinated cases during a time when there was a high prevalence of the Delta variant.[11,13]

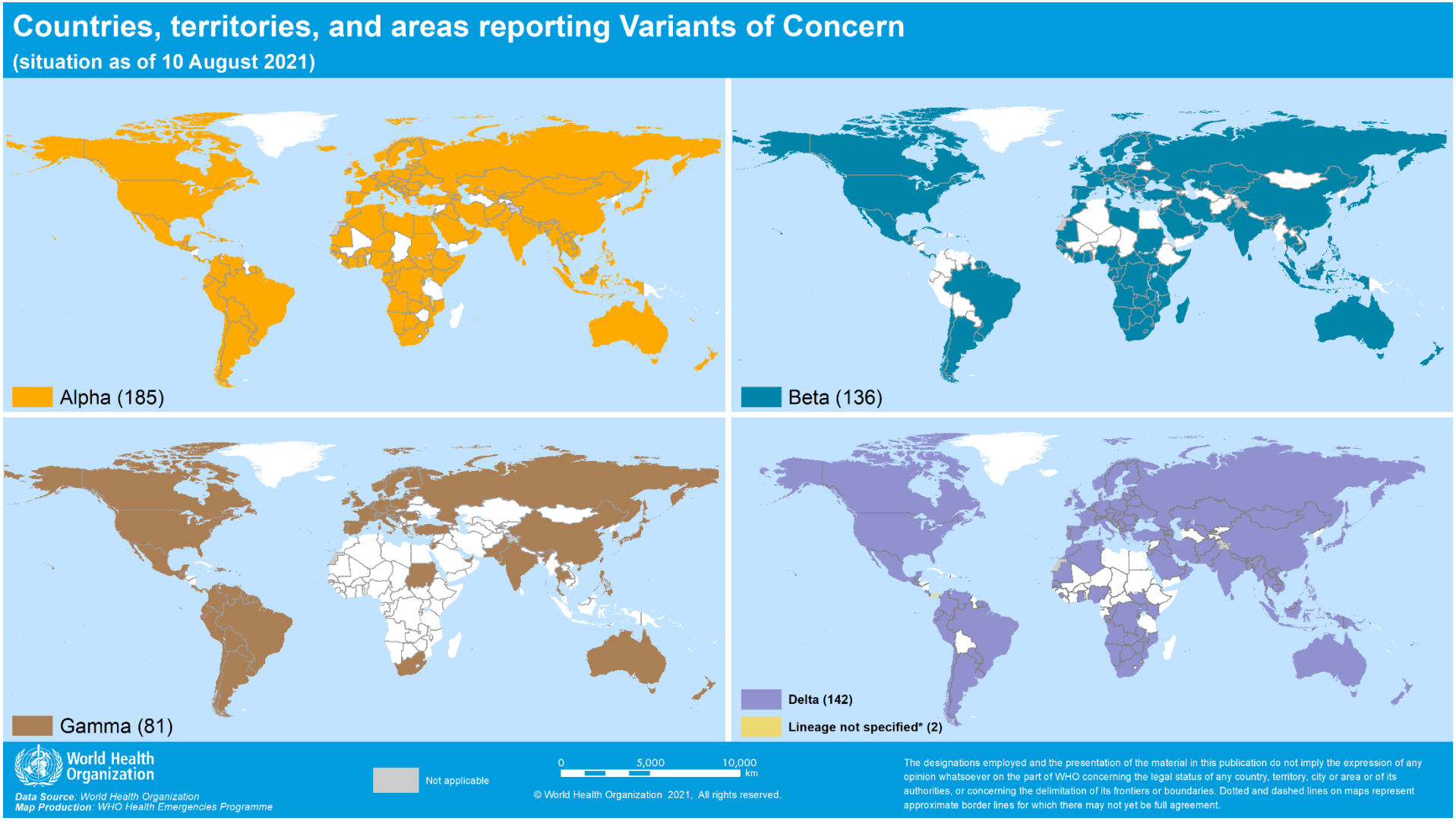
Two studies from Israel (both not yet peer-reviewed) assessed the duration of protection by the Pfizer BioNTech-Comirnaty vaccine. The first study compared the rate of breakthrough infection during June and July 2021, a period during which the Delta variant was dominant, between individuals who received 2 doses of the vaccine in winter 2021 to individuals who received two doses of the vaccine in the spring, adjusting for confounders. The authors report that persons vaccinated between January and February 2021 had a 53% (95% CI: 40-68%) increased risk of breakthrough infection in June and July compared to individuals vaccinated between March and April 2021.[41] The second study, conducted during a time of high Delta

transmission (Delta infections accounted for 93% of a small subset of cases which were sequenced) found an increased odds (odds ratio: 2.1, 95% CI: 1.7-2.5) of SARS-CoV-2 infection among persons vaccinated at least 146 days before their positive test results compared to individuals who were vaccinated less than 146 days prior to becoming infected.[42] These preliminary findings may suggest a decrease in long-term protection of the vaccine or decreased effectiveness of the vaccine against the Delta variant or a combination of these factors. No unvaccinated persons were included in these two studies; thus vaccine effectiveness was not evaluated.

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

Figure 4. Countries, territories and areas reporting variants Alpha, Beta, Gamma and Delta, as of 10 August 2021**



**Includes countries/territories/areas reporting the detection of B.1.617 without further specification of lineage at this time. These will be reallocated as further details become available.*

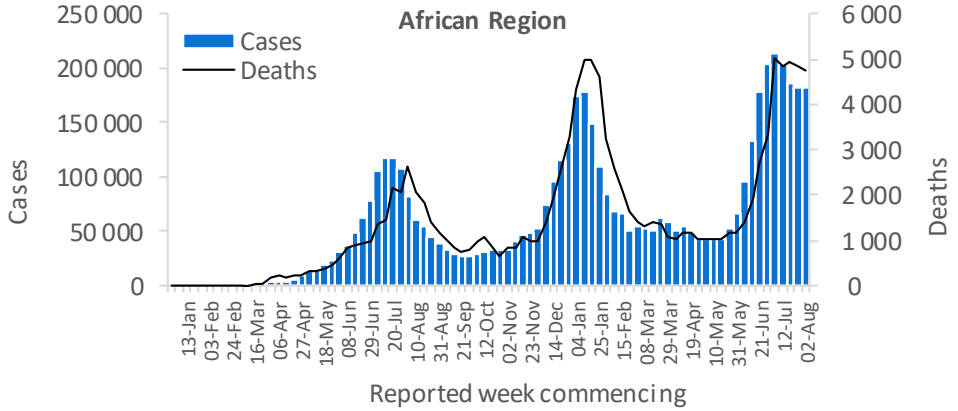
***Countries/territories/areas highlighted include both official and unofficial reports of VOC detections, and do not presently differentiate between detections among travellers (e.g., at Points of Entry) or local community cases. Please see Annex 2 for further details.*

WHO regional overviews – Epidemiological week 2 – 8 Aug 2021

African Region

The Region reported relatively similar numbers of weekly cases and deaths as the previous week, with just over 181 000 new cases (-1%) and over 4700 new deaths (-2%) reported this week. After cases peaked in June 2021, the Region has experienced a decrease in weekly reported cases since the middle of July, largely driven by declines observed in South Africa. However, over the past two weeks the rate of decline has slowed and nearly half of the countries in the Region (24; 49%) are now reporting increasing trends.

Most countries in the Region (31; 63%) showed decreasing trends in the number of new deaths reported. This decline has been driven by decreases in deaths reported from Namibia (-51%), Uganda (-42%), Zimbabwe (-39%) and Zambia (-39%). Overall, the highest numbers of new cases were reported from South Africa (76 034 new cases; 128.2 new cases per 100 000 population; 4% decrease), Botswana (15 884 new cases; 675.4 new cases per 100 000; 76% increase), and Mozambique (9771 new cases; 31.3 new cases per 100 000; 26% decrease). The highest numbers of new deaths were reported from South Africa (2610 new deaths; 4.4 new deaths per 100 000 population; 3% increase), Zimbabwe (294 new deaths; 2.0 new deaths per 100 000; 39% decrease), and Algeria (233 new deaths; 0.5 new deaths per 100 000; 10% increase).

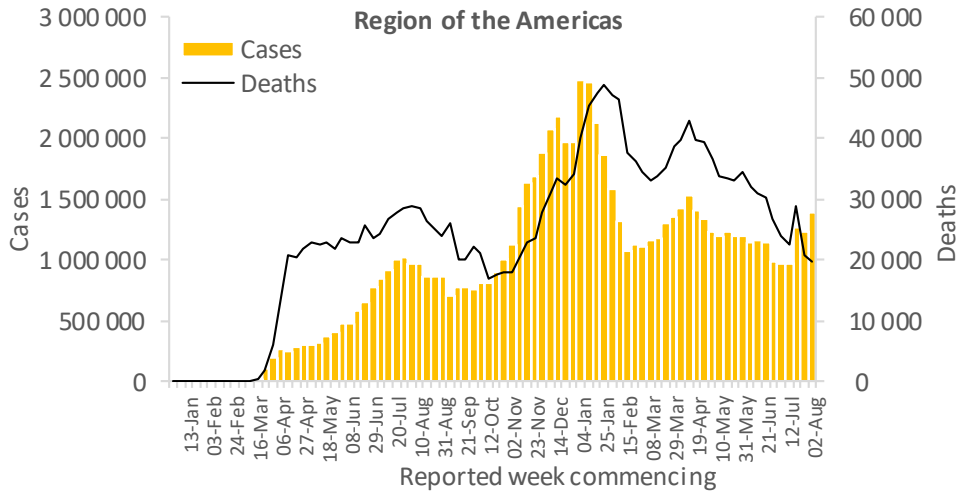


Updates from the African Region

Region of the Americas

This week, the Region of the Americas reported an increase of 14% in new cases as compared to the previous week, with just under 1.4 million new cases reported. The Region showed a slight decrease in the number of weekly deaths as compared to the previous week, with nearly 20 000 new deaths reported (4% decrease compared with the previous week).

The increase in weekly cases is mainly driven by Peru (a 64% increase), and the United States of America (35%). The declines in mortality reported by the Region in recent weeks have been mainly driven by Ecuador* (-81%), Argentina (-27%), Colombia (-26%) and Brazil (-12%). Overall, the highest numbers of new cases were reported from the United States of America (734 354 new cases; 221.9 new cases per 100 000; 35% increase), Brazil (228 473 new cases; 107.5 new cases per 100 000; 8% decrease), and Mexico (114 783 new cases; 89.0 new cases per 100 000; 11% increase). The highest numbers of new deaths were reported from Brazil (6302 new deaths; 3.0 new deaths per 100 000; 11% decrease), the United States of America (3391 new deaths; 1.0 new deaths per 100 000; 38% increase), and Mexico (3277 new deaths; 2.5 new deaths per 100 000; 31% increase).

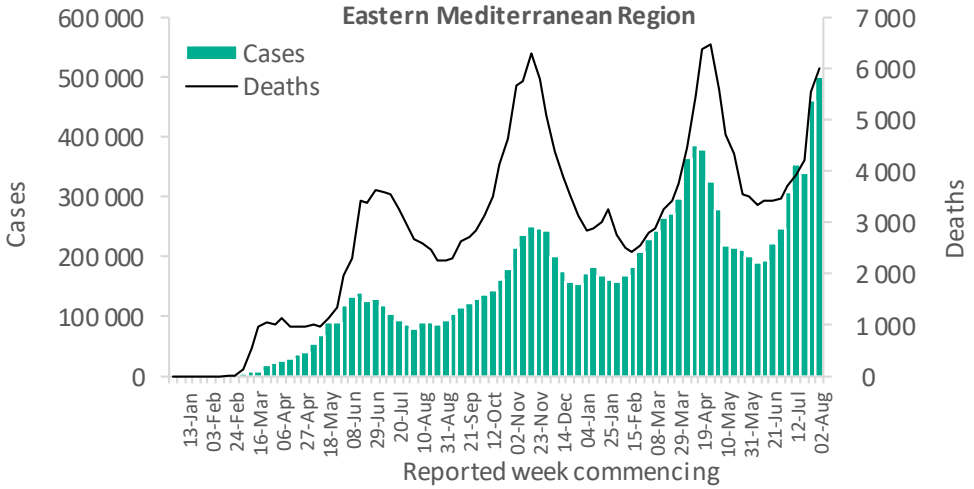


Updates from the Region of the Americas

Eastern Mediterranean Region

The Eastern Mediterranean Region reported just under half a million new cases and over 6000 new deaths, increases of 8% as compared to the previous week. The Region continued to report the highest weekly number of cases since the beginning of the pandemic for the second consecutive week. Almost half of the countries in the Region (10 of 22) have reported an increase in cases as compared to the previous week, mainly driven by the surge reported by the Islamic Republic of Iran (20%) and Morocco (31%). The highest numbers of new cases were reported from the Islamic Republic of Iran (248 102 new cases; 295.4 new cases per 100 000), Iraq (77 764 new cases; 193.3 new cases per 100 000; 6% decrease), and Morocco (63 764 new cases; 172.8 new cases per 100 000).

The highest numbers of new deaths were reported from the Islamic Republic of Iran (2843 new deaths; 3.4 new deaths per 100 000; 36% increase), Tunisia (951 new deaths; 8.0 new deaths per 100 000; 24% decrease), and Iraq (489 new deaths; 1.2 new deaths per 100 000; 15% increase).

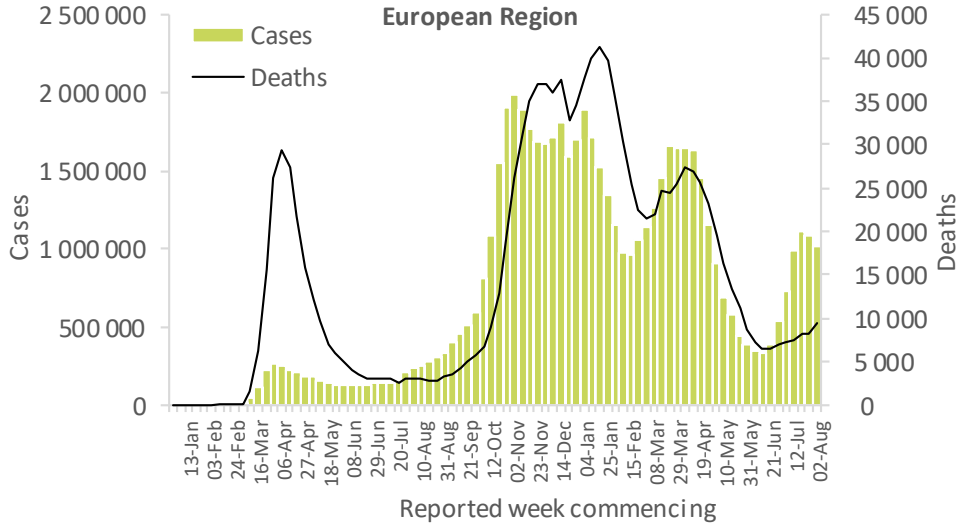


Updates from the Eastern Mediterranean Region

European Region

While the European Region reported a 7% decrease in the number of weekly cases as compared to the previous week, it still reported over one million new cases with an increasing trend in a number of countries in South-East Europe including North Macedonia, Kosovo and Albania. The number of weekly deaths increased by 16% as compared to the previous week, with over 9500 new deaths reported, and Estonia, Kosovo and Romania reporting sharp increases in new deaths. The highest numbers of new cases were reported from the United Kingdom (185 724 new cases; 273.6 new cases per 100 000; similar to the previous week), Russian Federation (159 073 new cases; 109.0 new cases per 100 000; similar to the previous week), and Turkey (144 839 new cases; 171.7 new cases per 100 000; a 4% increase).

The highest numbers of new deaths were reported from the Russian Federation (5529 new deaths; 3.8 new deaths per 100 000; similar to the previous week), Kazakhstan (832 new deaths; 4.4 new deaths per 100 000; 25% decrease) and Turkey (649 new deaths; <1 new deaths per 100 000; 43% increase).

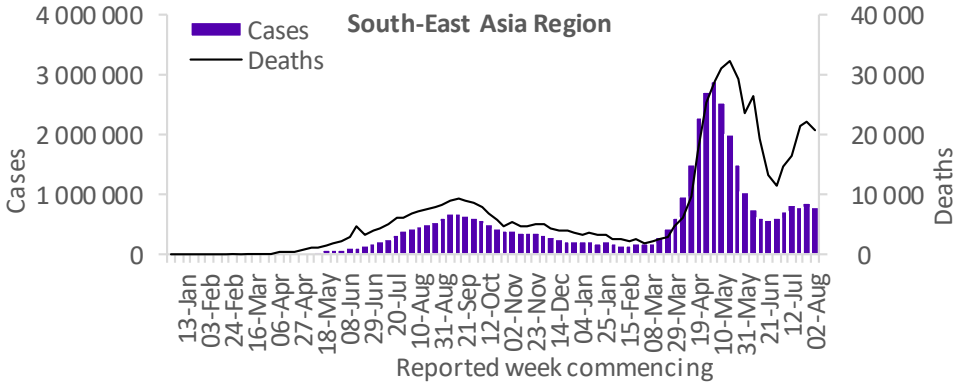


Updates from the European Region

South-East Asia Region

The South-East Asia Region reported over 799 000 new cases, a 5% decrease as compared to the previous week, however, several countries in the Region continue to report increasing trends, including Sri Lanka and Thailand (26% and 20% increases, respectively). Case incidence in the region peaked in early May and has since largely plateaued over the past month. This is largely due to cases in India remaining stable, and consistent decreases in Indonesia and Myanmar over the past month. Following a steep increase in the mortality rate in the Region, this is the first time in seven weeks that a decline in the number of new weekly deaths has been reported; a trend largely driven by declines in the Maldives and Myanmar this week. Large increases in weekly deaths were reported in several countries including Sri Lanka, Nepal and Thailand (47%, 35% and 30% increases, respectively). The highest numbers of new cases were reported from India (278 631 new cases; 20.2 new cases per 100 000; 2% decrease), Indonesia (225 635 new cases; 82.5 new cases per 100 000; 18% decrease), and Thailand (141 191 new cases; 202.3 new cases per 100 000; 20% increase).

The highest numbers of new deaths were reported from Indonesia (11 373 new deaths; 4.2 new deaths per 100 000; 9% decrease), India (3511 new deaths; 0.3 new deaths per 100 000; 8% decrease), and Myanmar (2045 new deaths; 3.8 new deaths per 100 000; 22% decrease).

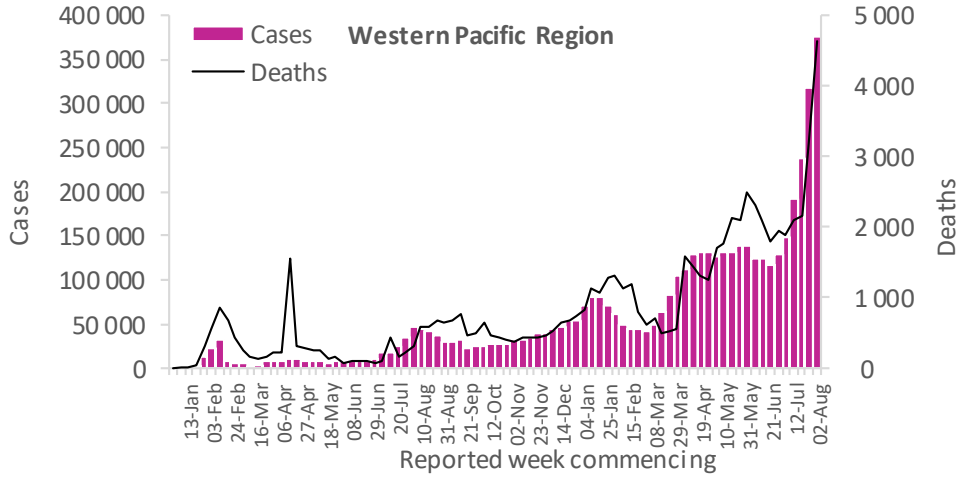


Updates from the South-East Asia Region

Western Pacific Region

The Western Pacific Region reported over 375 000 new cases and over 4600 new deaths, increases of19% and a 46%, respectively, as compared to the previous week. This increasing trend in both cases and deaths has been observed for nearly two months and is largely due to continued increases in case incidence in Japan, Philippines and Malaysia, although nearly half of the countries in the region are reporting rising case numbers (11 of 24; 46%). Similarly, the number of reported deaths has also been climbing over the past six weeks with a third (8 of 24: 33%) of the region's countries reporting an increase in deaths in the past week.

The highest numbers of new cases were reported from Malaysia (130 580 new cases; 403.4 new cases per 100 000; 12% increase), Japan (90 958 new cases; 71.9 new cases per 100 000; 51% increase), and the Philippines (60 373 new cases; 55.1 new cases per 100 000; 32% increase). The highest numbers of new deaths were reported from Viet Nam (1944 new deaths; 2.0 new deaths per 100 000; 108% increase), Malaysia (1365 new deaths; 4.2 new deaths per 100 000; 22% increase), and the Philippines (946 new deaths; 0.9 new deaths per 100 000; 25% increase).



Updates from the Western Pacific Region

Key weekly updates

WHO Director-General's key messages

- In his opening remarks at the media briefing on COVID-19 - 4 August 2021, the Director-General called for a moratorium on booster shots until at least the end of September to enable at least 10% of the population of every country to be vaccinated.
- In his remarks at the 1st International Forum on Vaccine Cooperation - 5 August 2021, the Director-General quantified the WHO's global targets for vaccines against COVID-19: vaccinate at least 10% of the population of every country by September, at least 40% by the end of the year, and 70% of the world's population by mid-next year. With more than 11 billion doses of vaccine needed to reach these critical milestones.
- In his opening remarks at the Member State Information Session on COVID-19 - 5 August 2021, the Director-General highlighted:
    - The WHO Strategic Preparedness and Response Plan for 2021 faces a funding shortfall of US$900 million, less than half of what is needed. Of the funds received, nearly all of them are earmarked and not flexible to sustain urgent priorities for vaccination, surveillance and response in countries experiencing surges in cases based on emerging needs.
    - In addition, the Access to COVID-19 Tools Accelerator is launching the Rapid ACT-Accelerator Delta Response, or RADAR, issuing an urgent call for US$7.7 billion for tests, treatments and vaccines.
    - In parallel, WHO will need $3.8 billion in additional financing this year for COVAX to exercise its options to purchase vaccines for 2022.

Updates and publications

- Training on handling, storing, and transporting Pfizer BioNTech COVID-19 Vaccine COMIRNATY® (Tozinameran), 4 August 2021
- ACT Accelerator: Quarterly Update Q2: 1 April - 30 June 2021, published on 4 August 2021
- Fraudulent "COVID-19 Compensation Lottery Prize" scam, falsely alleges association with WHO and others, 6 August 2021
- COVID-19 vaccines available for all healthcare workers in the Western Pacific Region, 6 August 2021

Annex

- 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.

Annex 1. List of countries/territories/areas reporting Variants of Concern as of 10 August 2021**

Country/Territory/Area	Alpha	Beta	Gamma	Delta	Unspecified B.1.617
Afghanistan	●	-	-	●	-
Albania	●	-	-	○	-
Algeria	●	-	-	●	-
Angola	●	●	-	●	-
Anguilla	●	-	-	●	-
Antigua and Barbuda	●	●	-	-	-
Argentina	●	●	●	●	-
Armenia	○	-	-	●	-
Aruba	●	●	●	●	-
Australia	●	●	●	●	-
Austria	●	●	●	●	-
Azerbaijan	●	-	-	○	-
Bahamas	●	-	-	-	-
Bahrain	●	●	-	●	-
Bangladesh	●	●	-	●	-
Barbados	●	-	●	●	-
Belarus	●	-	-	○	-
Belgium	●	●	●	●	-
Belize	●	-	-	-	-
Bermuda	●	●	-	-	-
Bhutan	●	●	-	●	-
Bolivia (Plurinational State of)	●	-	●	-	-
Bonaire	●	-	●	●	-
Bosnia and Herzegovina	○	○	○	○	-
Botswana	●*	●	-	●	-
Brazil	●	●	●	●	-
British Virgin Islands	●	-	●	-	-
Brunei Darussalam	●	●	-	-	-
Bulgaria	●	●	-	●	-
Burkina Faso	●	-	-	-	-
Burundi	●	●	-	●	-
Cabo Verde	●	-	-	●*	-
Cambodia	●	●	-	●	-
Cameroon	●	●	-	-	-
Canada	●	●	●	●	-
Cayman Islands	●	-	●	-	-
Central African Republic	●	●*	-	-	-
Chile	●	●	●	●	-
China	●	●	●	○	-
Colombia	●	-	●	●	-
Comoros	-	●	-	-	-
Congo	●	●	-	●	-
Costa Rica	●	●	●	●	-
Croatia	●	●	○	○	-
Cuba	●	●	-	-	-
Curaçao	●	-	●	●	●
Cyprus	●	●	-	○	-
Czechia	●	●	●	●	-
Côte d'Ivoire	●	●	-	-	-
Democratic Republic of the Congo	●	●	-	●	-
Denmark	●	●	●	●	-
Djibouti	●	●	-	-	-
Dominica	●	-	-	-	-
Dominican Republic	●	-	●	-	-
Ecuador	●	-	●	●	-
Egypt	●	-	-	-	-
El Salvador	●*	-	-	●*	-
Equatorial Guinea	●	●	-	-	-
Estonia	●	●	○	○	-
Eswatini	-	●	-	-	-
Ethiopia	●	-	-	-	-
Faroe Islands	●	-	●	-	-
Fiji	-	-	-	●	-
Finland	●	●	●	●	-
France	●	●	●	●	-
French Guiana	●	●	●	●	-
French Polynesia	●	●	●	●	-
Gabon	●	●	-	-	-
Gambia	●	-	-	●	-
Georgia	●	○	-	●	-
Germany	●	●	●	●	-
Ghana	●	●	-	●	-
Gibraltar	●	-	-	-	-

Country/Territory/Area	Alpha	Beta	Gamma	Delta	Unspecified B.1.617
Greece	●	●	●	●	-
Grenada	●	-	-	-	-
Guadeloupe	●	●	●	●	-
Guam	●	●	●	●	-
Guatemala	●	●	●	●*	-
Guinea	●	●	-	-	-
Guinea-Bissau	●	●	-	-	-
Guyana	-	-	●	-	-
Haiti	●	-	●	-	-
Honduras	●	-	-	-	-
Hungary	●	○	●	○	-
Iceland	●	-	-	-	-
India	●	●	●	●	-
Indonesia	●	●	-	●	-
Iran (Islamic Republic of)	●	●	-	●	-
Iraq	●	●	-	●	-
Ireland	●	●	●	●	-
Israel	●	●	●	●	-
Italy	●	●	●	●	-
Jamaica	●	-	-	-	-
Japan	●	●	●	●	-
Jordan	●	●	●	●	-
Kazakhstan	○	○	-	●	-
Kenya	●	●	-	●	-
Kosovo[1]	●	○	-	○	-
Kuwait	●	●	-	●	-
Kyrgyzstan	●	●	-	-	-
Lao People's Democratic Republic	●	-	-	●	-
Latvia	●	●	●	○	-
Lebanon	●	-	-	●	-
Lesotho	-	●	-	-	-
Liberia	●	-	-	-	-
Libya	●	●	-	-	-
Liechtenstein	●	-	-	-	-
Lithuania	●	●	●	○	-
Luxembourg	●	●	●	●	-
Madagascar	-	●	-	-	-
Malawi	●	●	-	●	-
Malaysia	●	●	-	●	-
Maldives	●	-	-	●	-
Malta	●	○	●	○	-
Martinique	●	●	●	●	-
Mauritania	●	●	-	●	-
Mauritius	●	●	-	●	-
Mayotte	●	●	-	-	-
Mexico	●	●	●	●	-
Monaco	●	○	-	○	-
Mongolia	●	-	-	●	-
Montenegro	●	-	-	-	-
Montserrat	●	-	-	-	-
Morocco	●	●	-	●	-
Mozambique	●	●	-	●	-
Myanmar	●	-	-	●	-
Namibia	●	●	-	●	-
Nepal	●	-	-	●	-
Netherlands	●	●	●	●	-
New Caledonia	●	-	-	-	-
New Zealand	●	●	○	○	-
Niger	●	-	-	-	-
Nigeria	●	●*	-	●	-
North Macedonia	●	●	-	○	-
Norway	●	●	●	●	-
Occupied Palestinian Territory	●	●	-	●	-
Oman	●	●	-	●	-
Pakistan	●	●	●	●	-
Panama	●	●	●	●*	●
Papua New Guinea	-	-	-	●	-
Paraguay	●	-	●	●	-
Peru	●	-	●	●	-
Philippines	●	●	●	●	-
Poland	●	○	●	●	-
Portugal	●	●	●	●	-
Puerto Rico	●	●	●	●	-
Qatar	●	●	-	●	-
Republic of Korea	●	●	●	●	-
Republic of Moldova	○	-	-	●	-
Romania	●	●	●	●	-
Russian Federation	●	●	○	●	-
Rwanda	●	●	-	●	-
Réunion	●	●	●	○	-
Saba	-	-	-	●	-
Saint Barthélemy	●	-	-	-	-
Saint Lucia	●	-	-	-	-
Saint Martin	●	●	-	-	-
Sao Tome and Principe	●	-	-	-	-
Saudi Arabia	●	●	-	●	-
Senegal	●	●	-	●	-
Serbia	●	-	-	●	-
Seychelles	-	●	-	-	-
Sierra Leone	-	-	-	○	-
Singapore	●	●	●	●	-
Sint Maarten	●	●	-	●	-

Country/Territory/Area	Alpha	Beta	Gamma	Delta	Unspecified B.1.617
Slovakia	●	●	-	●	-
Slovenia	●	●	●	●	-
Somalia	●	●	-	-	-
South Africa	●	●	○	●	-
South Sudan	●	●	-	●	-
Spain	●	●	●	●	-
Sri Lanka	●	●	-	●	-
Sudan	●	●	●	-	-
Suriname	●	●	●	●*	-
Sweden	●	●	●	●	-
Switzerland	●	●	○	●	-

Country/Territory/Area	Alpha	Beta	Gamma	Delta	Unspecified B.1.617
Thailand	●	●	●	●	-
Timor-Leste	●	-	-	●	-
Togo	●	●	-	-	-
Trinidad and Tobago	●	-	●	-	-
Tunisia	●	●	-	●	-
Turkey	●	●	●	●	-
Turks and Caicos Islands	●	-	●	-	-
Uganda	●	●	-	●	-
Ukraine	●	○	-	○	-
United Arab Emirates	●	●	●	●	-
United Kingdom	●	●	●	●	-

Country/Territory/Area	Alpha	Beta	Gamma	Delta	Unspecified B.1.617
United Republic of Tanzania	-	●	-	-	-
United States Virgin Islands	●*	●*	-	●	-
United States of America	●	●	●	●	-
Uruguay	●	●*	●	●*	-
Uzbekistan	●	●	-	○	-
Venezuela (Bolivarian Republic of)	●	-	●	●*	-
Viet Nam	●	●	-	●	-
Wallis and Futuna	●	-	-	-	-
Zambia	●	●	-	●	-
Zimbabwe	-	●	-	●	-

**Newly reported in this update.*
"Unspecified B.1.617" reflects countries/territories/areas reporting detection of B.1.617 without further specification of lineage at this time. These will be reallocated as further details become available.
"●" indicates that information for this variant was received by WHO from official sources.
"○" indicates that information for this variant was received by WHO from unofficial sources and will be reviewed as more information become available.
*** Gamma was excluded for Bangladesh this week based on further information.*
****Includes countries/territories/areas reporting the detection of VOCs among travelers (e.g., imported cases detected at points of entry), or local cases (detected in the community). Excludes countries, territories, and areas that have never reported the detection of a variant of concern*

See also Annex 2: Data, table and figure notes.

Annex 2. Data, table and figure notes

Data presented are based on official laboratory-confirmed COVID-19 case 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 incidence, and variable delays to reflecting these data at 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 which 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 country(ies) of interest, time period(s), 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.

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, number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes.

[2] On 20 July, Ecuador Ministry of Public Health (MSP) revised their process of reporting on deaths. The country has now started reporting probable deaths and deaths in other facilities, as well as confirmed deaths, as part of their cumulative death count. Due to this change in reporting, an artificial inflation in last week's deaths in the Region has been observed. Thus, the decline in deaths observed this week should be interpreted carefully.

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
- OpenWHO 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
- Recommendations and advice for the public:
  - Protect yourself
  - Questions and answers
  - Travel advice
- EPI-WIN: tailored information for individuals, organizations and communities

References

1. Abu-Raddad LJ, Chemaitelly H, Ayoub HH, et al. Severity, criticality, and fatality of the SARS-CoV-2 Beta variant. *medRxiv*. Published online January 1, 2021:2021.08.02.21261465. doi:10.1101/2021.08.02.21261465
2. Public Health England. *SARS-CoV-2 Variants of Concern and Variants under Investigation in England Technical Briefing 16*.; 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994839/Variants_of_Concern_VOC_Technical_Briefing_16.pdf
3. Public Health England (PHE). *SARS-CoV-2 Variants of Concern and Variants under Investigation in England. Technical Briefing 19*. Public Health England; 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005517/Technical_Briefing_19.pdf
4. Li B, Deng A, Li K, et al. Viral infection and transmission in a large well-traced outbreak caused by the Delta SARS-CoV-2 variant. *medRxiv*. Published online January 1, 2021:2021.07.07.21260122. doi:10.1101/2021.07.07.21260122
5. Brown CM, Vostok J, Johnson H, Burns M, Garpure R. Outbreak of SARS-CoV-2 Infections, Including COVID-19 Vaccine Breakthrough Infections, Associated with Large Public Gatherings — Barnstable County, Massachusetts, July 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70. doi:10.15585/mmwr.mm7031e2
6. Public Health England. *SARS-CoV-2 Variants of Concern and Variants under Investigation in England, Technical Briefing 20*.; 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009243/Technical_Briefing_20.pdf
7. Buchan SA, Tibebu S, Daneman N, et al. Increased household secondary attacks rates with Variant of Concern SARS-CoV-2 index cases. *Clinical Infectious Diseases*. 2021;(ciab496). doi:10.1093/cid/ciab496
8. Tegally H, Wilkinson E, Giovanetti M, et al. Emergence of a SARS-CoV-2 variant of concern with mutations in spike glycoprotein. *Nature*. Published online 2021. https://doi.org/10.1038/s41586-021-03402-9
9. Curran J, Dol J, Boulos L, et al. Transmission characteristics of SARS-CoV-2 variants of concern Rapid Scoping Review. *medRxiv*. Published online January 1, 2021:2021.04.23.21255515. doi:10.1101/2021.04.23.21255515
10. Campbell F, Archer B, Laurenson-Schafer H, et al. Increased transmissibility and global spread of SARS-CoV-2 variants of concern as at June 2021. *Eurosurveillance*. 2021;26(24):2100509. https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2021.26.24.2100509
11. Riemersma KK, Grogan BE, Kita-Yarbro A, et al. Vaccinated and unvaccinated individuals have similar viral loads in communities with a high prevalence of the SARS-CoV-2 delta variant. *medRxiv*. Published online July 31, 2021:2021.07.31.21261387. doi:10.1101/2021.07.31.21261387
12. Li B, Deng A, Li K, et al. Viral infection and transmission in a large well-traced outbreak caused by the Delta SARS-CoV-2 variant. *medRxiv*. Published online July 12, 2021:2021.07.07.21260122. doi:10.1101/2021.07.07.21260122
13. Brown CM. Outbreak of SARS-CoV-2 Infections, Including COVID-19 Vaccine Breakthrough Infections, Associated with Large Public Gatherings — Barnstable County, Massachusetts, July 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70. doi:10.15585/mmwr.mm7031e2
14. Bager P, Wohlfahrt J, Fonager J, Albertsen. Increased Risk of Hospitalisation Associated with Infection with SARS-CoV-2 Lineage B.1.1.7 in Denmark. doi:Bager, Peter and Wohlfahrt, Jan and Fonager, Jannik and Albertsen, Mads and Yssing Michaelsen, Thomas and Holten Møller, Camilla and Ethelberg, Steen and Legarth, Rebecca and Fischer Button, Mia Sara and Gubbels, Sophie Madeleine and Voldstedlund, Marianne and Mølbak, Kåre and Skov, Robert Leo and Fomsgaard, Anders and Grove Krause, Tyra, Increased Risk of Hospitalisation Associated with Infection with SARS-CoV-2 Lineage B.1.1.7 in Denmark. Available at SSRN: https://ssrn.com/abstract=3792894 or http://dx.doi.org/10.2139/ssrn.3792894
15. NERVTAG paper on COVID-19 variant of concern B.1.1.7. *GOVUK*. Published online 2021. https://www.gov.uk/government/publications/nervtag-paper-on-covid-19-variant-of-concern-b117, http://files/64/nervtag-paper-on-covid-19-variant-of-concern-b117.html %[2021/02/08/18:37:19
16. Pearson CA, Eggo. Estimates of severity and transmissibility of novel South Africa SARS-CoV-2 variant 501Y.V2. https://cmmid.github.io/topics/covid19/reports/sa-novel-variant/2021_01_11_Transmissibility_and_severity_of_501Y_V2_in_SA.pdf
17. Funk T, Pharris A, Spiteri G, et al. Characteristics of SARS-CoV-2 variants of concern B.1.1.7, B.1.351 or P.1: data from seven EU/EEA countries, weeks 38/2020 to 10/2021. *Eurosurveillance*. 2021;26(16). doi:https://doi.org/10.2807/1560-7917.ES.2021.26.16.2100348
18. Fisman DN, Tuite AR. Progressive Increase in Virulence of Novel SARS-CoV-2 Variants in Ontario, Canada. *medRxiv*. Published online July 12, 2021:2021.07.05.21260050. doi:10.1101/2021.07.05.21260050
19. Muik A, Wallisch A-K, Sänger B, et al. Neutralization of SARS-CoV-2 lineage B.1.1.7 pseudovirus by BNT162b2 vaccine–elicited human sera. *Science*. Published online 2021:eabg6105. https://science.sciencemag.org/content/sci/early/2021/01/28/science.abg6105.full.pdf
20. Gallais F, Gantner P, Bruel T, et al. Anti-SARS-CoV-2 Antibodies Persist for up to 13 Months and Reduce Risk of Reinfection. *medRxiv*. Published online January 1, 2021:2021.05.07.21256823. doi:10.1101/2021.05.07.21256823
21. Wibmer CK, Ayres F, Hermanus T, et al. SARS-CoV-2 501Y.V2 escapes neutralization by South African COVID-19 donor plasma. *Nat Med*. Published online March 2021. https://www.ncbi.nlm.nih.gov/pubmed/33654292
22. Sabino EC, Buss LF, Carvalho MPS, et al. Resurgence of COVID-19 in Manaus, Brazil, despite high seroprevalence. *The Lancet*. 2021;397(10273):452-455. https://linkinghub.elsevier.com/retrieve/pii/S0140673621001835
23. Planas D, Veyer D, Baidaliuk A, et al. *Reduced Sensitivity of Infectious SARS-CoV-2 Variant B.1.617.2 to Monoclonal Antibodies and Sera from Convalescent and Vaccinated Individuals*. Microbiology; 2021. doi:10.1101/2021.05.26.445838
24. Public Health England (PHE). *SARS-CoV-2 Variants of Concern and Variants under Investigation in England. Technical Briefing 20*. Public Health England; 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009243/Technical_Briefing_20.pdf
25. Public Health England (PHE). *SARS-CoV-2 Variants of Concern and Variants under Investigation..Technical Briefing 18*.; 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001358/Variants_of_Concern_VOC_Technical_Briefing_18.pdf
26. Public Health England. SARS-CoV-2 lateral flow antigen tests: evaluation of VOC1 (Kent, UK) and VOC2 (South Africa). GOV.UK. Accessed June 21, 2021. https://www.gov.uk/government/publications/sars-cov-2-lateral-flow-antigen-tests-evaluation-of-voc1-and-voc2/sars-cov-2-lateral-flow-antigen-tests-evaluation-of-voc1-kent-uk-and-voc2-south-africa
27. Emary KRW, Golubchik T, Aley PK, et al. Efficacy of ChAdOx1 nCoV-19 (AZD1222) vaccine against SARS-CoV-2 variant of concern 202012/01 (B.1.1.7): an exploratory analysis of a randomised controlled trial. *The Lancet*. 2021;397(10282):1351-1362. doi:10.1016/S0140-6736(21)00628-0
28. Heath PT, Eva Galiza FP, David Neil Baxter M, et al. Efficacy of the NVX-CoV2373 Covid-19 Vaccine Against the B.1.1.7 Variant. *medRxiv*. Published online May 2021:2021.05.13.21256639-2021.05.13.21256639. doi:10.1101/2021.05.13.21256639
29. Madhi SA, Baillie V, Cutland CL, et al. Efficacy of the ChAdOx1 nCoV-19 Covid-19 Vaccine against the B.1.351 Variant. *New England Journal of Medicine*. Published online March 2021:NEJMoa2102214-NEJMoa2102214. doi:10.1056/NEJMoa2102214
30. Sadoff J, Gray G, Vandebosch A, et al. Safety and Efficacy of Single-Dose Ad26.COV2.S Vaccine against Covid-19. *New England Journal of Medicine*. Published online April 2021:NEJMoa2101544-NEJMoa2101544. doi:10.1056/NEJMoa2101544
31. Shinde V, Bhikha S, Hoosain MZ, et al. Preliminary Efficacy of the NVX-CoV2373 Covid-19 Vaccine Against the B.1.351 Variant [Authors, highest degree, and affiliation/institution]. *medRxiv*. Published online March 2021:2021.02.25.21252477-2021.02.25.21252477. doi:10.1101/2021.02.25.21252477
32. Thomas SJ, Moreira ED, Kitchin N, et al. Six Month Safety and Efficacy of the BNT162b2 mRNA COVID-19 Vaccine. *medRxiv*. Published online July 28, 2021:2021.07.28.21261159. doi:10.1101/2021.07.28.21261159
33. Ella R, Reddy S, Blackwelder W, et al. Efficacy, safety, and lot to lot immunogenicity of an inactivated SARS-CoV-2 vaccine (BBV152): a double-blind, randomised, controlled phase 3 trial. *medRxiv*. Published online July 2, 2021:2021.06.30.21259439. doi:10.1101/2021.06.30.21259439

34. Lefèvre B, Tondeur L, Madec Y, et al. Impact of B.1.351 (beta) SARS-CoV-2 variant on BNT162b2 mRNA vaccine effectiveness in long-term care facilities of eastern France: a retrospective cohort study. *medRxiv*. Published online July 31, 2021:2021.07.28.21261285. doi:10.1101/2021.07.28.21261285
35. Carazo S, Talbot D, Boulianne N, et al. Single-dose mRNA vaccine effectiveness against SARS-CoV-2 in healthcare workers extending 16 weeks post-vaccination: a test-negative design from Quebec, Canada. *medRxiv*. Published online July 22, 2021:2021.07.19.21260445. doi:10.1101/2021.07.19.21260445
36. Hitchings MDT, Ranzani OT, Dorion M, et al. Effectiveness of the ChAdOx1 vaccine in the elderly during SARS-CoV-2 Gamma variant transmission in Brazil. *medRxiv*. Published online July 22, 2021:2021.07.19.21260802. doi:10.1101/2021.07.19.21260802
37. Thiruvengadam R, Awasthi A, Medigeshi G, et al. *Cellular Immune Responses Are Preserved and May Contribute to Chadox1 ChAdOx1 NCoV-19 Vaccine Effectiveness Against Infection Due to SARS-CoV-2 B·1·617·2 Delta Variant Despite Reduced Virus Neutralisation*. Social Science Research Network; 2021. doi:10.2139/ssrn.3884946
38. Herlihy R. Rapid Increase in Circulation of the SARS-CoV-2 B.1.617.2 (Delta) Variant — Mesa County, Colorado, April–June 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70. doi:10.15585/mmwr.mm7032e2
39. Elliott P, Haw D, Wang H, et al. *REACT-1 Round 13 Final Report: Exponential Growth, High Prevalence of SARS-CoV-2 and Vaccine Effectiveness Associated with Delta Variant in England during May to July 2021*.; 2021. Accessed August 7, 2021. http://spiral.imperial.ac.uk/handle/10044/1/90800
40. Chia PY, Ong SWX, Chiew CJ, et al. Virological and serological kinetics of SARS-CoV-2 Delta variant vaccine-breakthrough infections: a multi-center cohort study. *medRxiv*. Published online July 31, 2021:2021.07.28.21261295. doi:10.1101/2021.07.28.21261295
41. Mizrahi B, Lotan R, Kalkstein N, et al. Correlation of SARS-CoV-2 Breakthrough Infections to Time-from-vaccine; Preliminary Study. *medRxiv*. Published online July 31, 2021:2021.07.29.21261317. doi:10.1101/2021.07.29.21261317
42. Israel A, Merzon E, Schäffer AA, et al. Elapsed time since BNT162b2 vaccine and risk of SARS-CoV-2 infection in a large cohort. *medRxiv*. Published online August 5, 2021:2021.08.03.21261496. doi:10.1101/2021.08.03.21261496