Force Health Protection Branch
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# Update 124
# FHP-Update
# 19 October 2022

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## GLOBAL
↘
627 043 641
confirmed cases
613 100 000
recovered
6 575 206 deaths

## TWN
7-days incidence
1,312
→

## SGP
7-days incidence
1,018
↗

## BRN
7-days incidence
628
↗

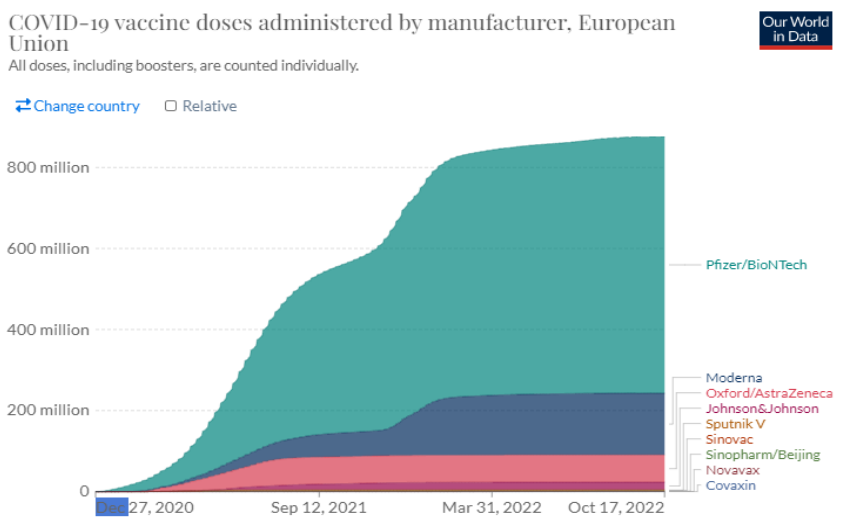
News:

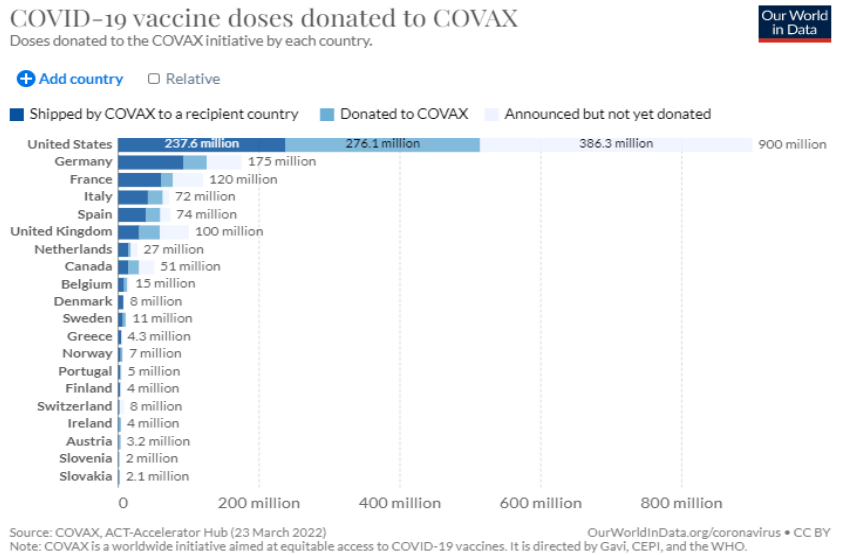
- **CDC:** CDC Expands Updated COVID-19 Vaccines to Include Children Ages 5 Through 11- CDC has approved the expanded use of the updated (bivalent) COVID-19 vaccines to children ages 5 through 11 years. This follows the Food and Drug Administration's (FDA) authorization of updated COVID-19 vaccines from Pfizer-BioNTech for children ages 5 through 11 years, and from Moderna for children and adolescents ages 6 through 17 years. Updated COVID-19 vaccines help to restore protection that has waned since previous vaccination and help to fight off a wider range of variants.
- **ECDC:** Ebola outbreak in Uganda under ECDC monitoring please find the focus report from BlueDot at Slide 6 and 7.
- **ECDC:** working together towards COVID-19 and seasonal influenza vaccination for this winter
- **WHO:** The European Union teams up with WHO to boost COVID-19 vaccination coverage in Africa
- **WHO: G**lobal leaders confirmed US$ 2.6 billion in funding toward the Global Polio Eradication Initiative's (GPEI) 2022-2026 Strategy to end polio at a pledging moment co-hosted by Germany's Federal Ministry for Economic Cooperation and Development (BMZ) at the World Health Summit in Berlin.
  The funding will support global efforts to overcome the final hurdles to polio eradication, vaccinate 370 million children annually over the next five years and continue disease surveillance across 50 countries.

Topics:








## EUROPE
↘
251 174 000
confirmed cases
244 800 000
recovered
2 054 834 deaths

## AUT
7-days incidence
916
↘

## SMR
7-days incidence
675
↘

## DEU
7-days incidence
671
↘

# COVID-19 Situation by WHO Region, as of 12 October

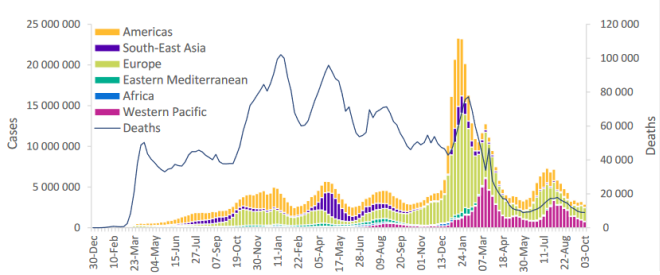
**Global epidemiological situation overview; WHO as of 12 October2022**

Globally, the number of new weekly cases decreased by 10% during the week of 3 to 9 October 2022 as compared to the previous week, with over 2.8 million new cases reported (Figure 1). The number of new weekly deaths remained stable (-1%) as compared to the previous week, with about 9000 fatalities reported. As of 9 October 2022, over 618 million confirmed cases and over 6.5 million deaths have been reported globally.

At the regional level, the number of newly reported weekly cases decreased or remained stable across the six WHO regions: the African Region (-41%), the South-East Asia Region (-25%), the Western Pacific Region (-21%), the Eastern Mediterranean Region (-14%), the Region of the Americas (-10%) and the European Region (-3%). The number of new weekly deaths decreased or remained stable across five regions: the African Region (-53%), the South-East Asia Region (-23%), the European Region (-12%), the Eastern Mediterranean Region (similar to the previous week) and the Western Pacific Region (+1%); while the number of deaths increased in the Region of the Americas (+11%).

At the country level, the highest numbers of new weekly cases were reported from Germany (508 749 new cases; +12%), China (333 830 new cases; +10%), France (323 787 new cases; +4%), the United States of America (283 220 new cases; -9%) and Italy (280 947 new cases; +30%). The highest numbers of new weekly deaths were reported from the United States of America (2817 new deaths; +3%), Brazil (767 new deaths; +168%), the Russian Federation (731 new deaths; +3%), Japan (567 new deaths; +1%) and China (412 new deaths; +12%).

Figure 1. COVID-19 cases reported weekly by WHO Region, and global deaths, as of 9 October 2022**



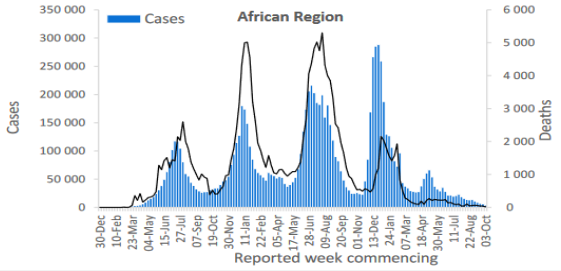

## WHO regional overviews:

**Epidemiological week 3 - 9 October 2022****

### African Region

The African Region reported over 3700 new weekly cases, a 41% decrease as compared to the previous week. Nine (18%) countries reported increases in the number of new cases of 20% or greater, with some of the greatest proportional increases seen in Mauritania (46 vs 32 new cases; +44%), Mali (56 vs 40 new cases; +40%) and Eswatini (26 vs 20 new cases; +30%). The highest numbers of new cases were reported from South Africa (2020 new cases; 3.4 new cases per 100 000 population; +26%), Nigeria (385 new cases; <1 new case per 100 000; +57%) and Réunion (356 new cases; 39.8 new cases per 100 000; -43%).

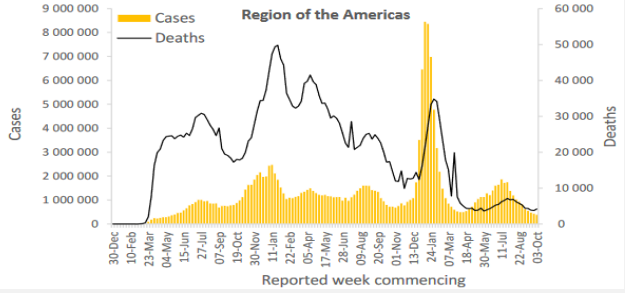
The number of new weekly deaths in the Region decreased by 53% as compared to the previous week, with 18 deaths reported. The highest numbers of new deaths were reported from South Africa (nine new deaths; <1 new death per 100 000 population; -44%), Algeria (two new deaths; <1 new death per 100 000; no deaths reported in the previous week) and Zimbabwe (two new deaths; <1 new death per 100 000; -33%).




### Region of the Americas

The Region of the Americas reported just under 397 000 new cases, a 10% decrease as compared to the previous week. Six (11%) of the 56 countries for which data are available reported an increase in the number of new cases of 20% or greater, with the greatest proportional increases seen in Honduras (273 vs 55 new cases; +396%), Bermuda (66 vs 32 new cases; +106%) and Curaçao (22 vs 11 new cases; +100%). The highest numbers of new cases were reported from the United States of America (283 220 new cases; 85.6 new cases per 100 000; -9%), Brazil (42 613 new cases; 20.0 new cases per 100 000; -11%) and Chile (21 425 new cases; 112.1 new cases per 100 000; -12%).

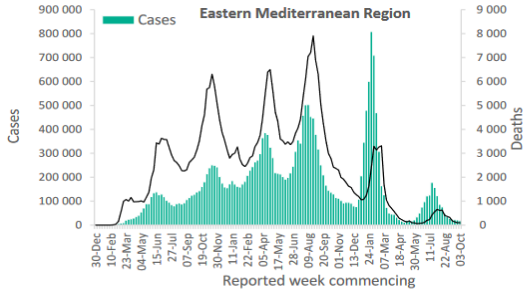
The number of new weekly deaths increased by 11% in the Region as compared to the previous week, with over 4100 new deaths reported. The highest numbers of new deaths were reported from the United States of America (2817 new deaths; <1 new death per 100 000; +3%), Brazil (767 new deaths; <1 new death per 100 000; +168%) and Canada (176 new deaths; <1 new death per 100 000; -9%).




### Eastern Mediterranean Region

The Eastern Mediterranean Region reported over 17 900 new cases, a 14% decrease as compared to the previous week. Three (22%) countries reported an increase in new cases of 20% or greater, with the highest proportional increases observed in Morocco (125 vs 89 new cases; +40%) and Kuwait (744 vs 579 new cases; +29%). The highest numbers of new cases were reported from Qatar (5144 new cases; 178.5 new cases per 100 000; -5%), the Islamic Republic of Iran (3389 new cases; 4.0 new cases per 100 000; +30%) and the United Arab Emirates (2545 new cases; 25.7 new cases per 100 000; -6%).

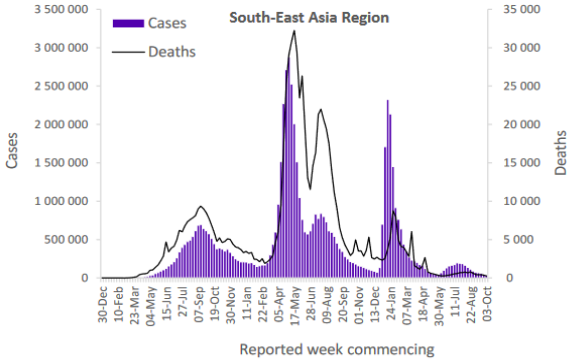
The number of new weekly deaths in the Region was similar to the previous week, with 100 new deaths reported. The highest numbers of new deaths were reported from the Islamic Republic of Iran (62 new deaths; <1 new death per 100 000; +7%), Saudi Arabia (12 new deaths; <1 new death per 100 000; similar to the previous week), Lebanon (seven new deaths; 1 new death per 100 000; similar to the previous week) and Pakistan (seven new deaths; <1 new death per 100 000; +75%).




### South-East Asia Region

The South-East Asia Region reported over 37 000 new cases, a 25% decrease as compared to the previous week. One country (10%) in the Region for which data are available showed an increase in the number of new cases of 20% or greater: Timor-Leste (14 cases vs four new cases; +250%). The highest numbers of new cases were reported from India (17 526 new cases; 1.3 new cases per 100 000; -34%), Indonesia (10 363 new cases; 3.8 new cases per 100 000; -14%) and Bangladesh (3511 new cases; 2.1 new cases per 100 000; -22%).

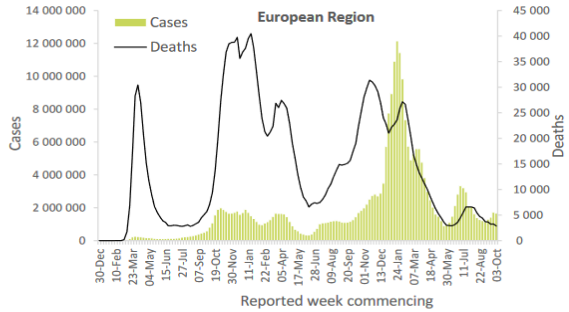
The Region reported over 200 deaths, a 23% decrease as compared to the previous week. The highest numbers of new deaths were reported from India (126 new deaths; <1 new death per 100 000; -23%), Indonesia (73 new deaths; <1 new death per 100 000; -38%) and Thailand (58 new deaths; <1 new death per 100 000; +9%).




### European Region

In the European Region, the number of new weekly cases remained similar (-3%) to the number of cases reported during the previous week, with over 1.6 million new cases reported. Five (8%) countries reported increases in new cases of 20% or greater, with some of the highest proportional increases observed in San Marino (221 vs 157 new cases; +41%), Austria (96 973 vs 77 688 new cases; +25%) and Greece (54 649 vs 45 001 new cases; +21%). The highest numbers of new cases were reported from Germany (508 749 new cases; 611.7 new cases per 100 000; +12%), France (323 787 new cases; 497.8 new cases per 100 000; +4%) and Italy (280 947 new cases; 471.1 new cases per 100 000; +30%).

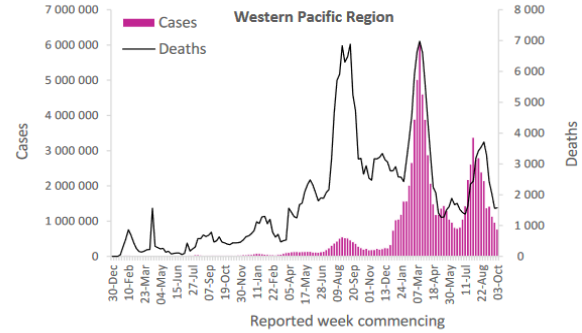
Over 2800 new weekly deaths were reported in the Region, a 12% decrease as compared to the previous week. The highest numbers of new deaths were reported from the Russian Federation (731 new deaths; <1 new death per 100 000; +3%), Italy (348 new deaths; <1 new death per 100 000; +32%) and Spain (289 new deaths; <1 new death per 100 000; +70%).




### Western Pacific Region

The Western Pacific Region reported over 770 000 new cases, a 21% decrease as compared to the previous week. Four (12%) countries reported increases in new cases of 20% or greater, with the largest proportional increases observed in Mongolia (606 vs 304 new cases; +99%), Papua New Guinea (99 vs 53 new cases; +87%) and Singapore (36 985 vs 21 873new cases; +69%). The highest numbers of new cases were reported from China (333 830 new cases; 22.7 new cases per 100 000; +10%), Japan (208 547 new cases; 164.9 new cases per 100 000; -32%) and the Republic of Korea (151 178 new cases; 294.9 new cases per 100 000; -24%).

The Region reported a 1% increase in new weekly deaths as compared to the previous week, with over 1500 deaths reported. The highest numbers of new deaths were reported from Japan (567 new deaths; <1 new death per 100 000; +1%), China (412 new deaths; <1 new death per 100 000; +12%) and the Philippines (348 new deaths; <1 new death per 100 000; +57%).




Source: https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---12-october-2022

# COVID-19 situation update

## Uncertainty of the Pandemic Trajectory with the Evolution of Omicron

The current landscape for SARS-CoV2 waves appears to be deviating from what was observed earlier in the pandemic. Prior to the emergence of Omicron, the pandemic was defined by distinct epidemic waves driven by a particular dominant variant. These variants were found to be arising as a result of relatively large genomic changes through an evolutionary process called 'antigenic shift'. Each epidemic wave that was driven by a new variant was observed to subside due to immunity building up in the population, before the next wave began.

The increased speed of evolutionary changes in Omicron, likely as a result of its higher transmission rates globally and increasing pressure from population-level immunity, is resulting in new subvariants emerging at increasing frequency through smaller genomic changes called 'antigenic drift'. This is now observed to be leading to overlapping epidemic curves (waves), [1] extending the duration of higher case activity with multiple sublineages circulating in a given location. **It is expected, with uninterrupted transmission, that sublineages will continue to emerge with high frequency, driving future waves through a combination of immune evasion and waning population immunity.**

While a new lineage (significantly divergent) has yet to emerge since Omicron became dominant globally, the ongoing evolution is leading to **increasing diversity within the Omicron lineage**. According to the WHO [2] the majority of circulating strains derive from an Omicron variant (80.8% BA.5 descendent, 7.8% BA.4 descendent, 3.1% BA.2 descendent). We are now observing a process called **convergent evolution**, meaning several different emerging sublineages are gaining similar changes (mutation hotspots) that **likely provide an advantage with immune evading properties**. [3]

However, it is **difficult to predict the outcome of this process, and whether one particular variant may outcompete all emerging strains** or a combination of similar variants will drive new epidemic waves in different locations. This emphasizes the **importance of preventative measures in preparation for ongoing epidemic waves** and to reduce the frequency by which new variants arise. Ongoing concerns from the WHO and other experts regarding the global decline in genomic surveillance also raise the risks of slow detection of a markedly different variant from Omicron or one that substantially evades vaccine-protection and infection-derived immunity, should one arise.

### Emerging Variants and Converging Mutations

Among global samples submitted with genomic sequence data, experts are tracking a diverse pool of emerging Omicron sublineages (including BA.2.3.20, BA.2.75.2, BR.1, BN.1, BJ.1 and BQ.1.1) demonstrating greater growth advantage over Omicron BA.5. [4] Many of these have a combination of mutations within the receptor binding domain (R346, K444, V445, G446, N450, L452, N460, F486, F490, and R493) suggesting increased antibody evading traits. **Preliminary investigation indicates that BA.2.75.2 and BQ.1.1 are the most immune evading strains identified to date.** [4, 5] For information on BA.2.75.2 and BA.4.6 see our previous COVID-19 Brief on September 23, 2022.

*BQ.1.1* (BA.5 descendant) [4, 5, 6]

- **Experts believe that BQ.1.1 is a top contender to drive an upcoming wave in Europe and North America.**
- The strain has been detected in small proportions but is growing, with an eight-fold increase in England, UK between August 23, 2022, to August 29, 2022. Sequencing lags and insufficient testing provide challenges in tracking emerging variants.
- Initial modeling suggests a **growth advantage of at least 10%** per day over BA.5. This is comparable to the growth advantage over the predecessors among recent variants of concern (Delta over Alpha, Omicron BA.2 over BA.1, Omicron BA.4/5 over BA.2).
- Some level of protection is expected with BA.2/BA.5 immunity due to antibody recognition outside of the receptor binding domain. However, **available therapeutic antibodies are ineffective** including Evusheld and Bebtelovimab. This is a concern for high-risk individuals including the immunocompromised given reduced avenues for preventing severe outcomes.

*XBB*

- The recombinant variant has been detected in **low abundance in several locations**. It is predicted to be the **most immune-evading variant** due to additional mutations that escapes the majority of neutralizing antibodies derived from breakthrough infections. This suggests that XBB possesses the ability to surpass growth of BA.2.75.2 and BQ.1.1.
- Due to similar mutations as BQ.1.1, it is expected that **available therapeutic antibodies will not be effective**.

### Current Global Situation

BA.5 remains the dominant global variant, while weekly reported cases appear to be gradually declining since mid-August. Notably, **the European region is observing an increase in new weekly reported cases** as of October 2, 2022 (+8% increase compared to September 26). [2] The remaining regions are observing decreasing trends ranging from 8% to 32% in weekly reported cases. Since the **novel convergent variants currently only make up a small proportion of the total share of sequenced cases in Europe, increasing trends can be attributed to additional factors including waning immunity and behavioral changes during colder seasons.** [1] For example, Germany has been observing increasing trends since early-September with almost a 50% increase in the seven-day rolling average number of daily cases on October 1, 2022 compared to two weeks prior. However, for the month of September over 95% of sequenced cases were attributed to Omicron BA.5. [1]. **North America is expected to mirror trends currently observed in Europe.** The extent to which newer emerging variants will drive the next waves globally and the degree to which new bivalent vaccines will have a mitigating impact is challenging to predict. However, the rise in cases already observed in Europe is concerning and suggests the next dominant variant(s) will push transmission further in November/December from already high levels. **Some countries in Europe are beginning to re-introduce mitigation measures** such as high grade masks in public settings (Germany) [7] and improved monitoring of ventilation in schools (Netherlands) [8] in anticipation of increasing challenges to already struggling healthcare systems.

**BlueDot will be monitoring the European region closely in the coming weeks to assess the epidemic growth and changing rates of hospitalization.**

# COVID-19 situation update

## Global Estimate: 6,2% of Individuals with Symptomatic COVID-19 had Long COVID Symptoms

In a new study published in *JAMA* by the Global Burden of Disease Long COVID Collaborators group this week, **researchers estimated that of 1.2 million individuals who had symptomatic SARS-CoV-2 infection in 2022 and 2021, 6.2% reported one of three Long COVID symptom clusters**. [1]
The observational analysis pooled data from two United States medical record databases and 54 studies (44 published studies and 10 collaborating cohort studies), which in total included 1.2 million individuals spanning 22 countries. Researchers based their analyses on the WHO case definition for post-COVID-19 condition, [2] in that symptoms were new onset and had persisted for three months after symptomatic SARS-CoV-2 infection. However, to manage the diverse array of study methods and correct for overestimation of symptoms, the researchers defined three different Long COVID symptom clusters (persistent fatigue with bodily pain or mood swings; cognitive problems; or ongoing respiratory problems), relying on cohort studies which asked patients to recall their pre-COVID health status and symptoms.
The researchers conducted a Bayesian meta-regression of the data to determine the proportion of individuals who experienced at least one of the three Long COVID symptom clusters three- and 12-months post-SARS-CoV-2 infection symptom onset. They also analyzed the duration and relative severity of the Long COVID symptom clusters.

**Key Findings**

Long COVID symptom clusters

- An estimated 6.2% of all individuals experienced at least one of three Long COVID symptom clusters three months after symptom onset. This estimated proportion was higher for women ≥20 years old than for men ≥20 years old (10.6% vs 5.4%, respectively).
- For those hospitalized, the estimated proportion of individuals with at least one of three Long COVID symptom clusters three months after symptom onset was greater in those admitted to an Intensive Care Unit or a general hospital ward when compared to those who were not hospitalized (43.1%, 27.5%, and 5.7%, respectively). Within all three categories, there were higher proportions of women than men.

Long COVID symptom duration

- Hospitalized individuals experienced a longer estimated Long COVID symptom duration when compared to those not hospitalized (9.0 months vs. 4.0 months, respectively).
- Of the individuals who experienced symptoms three months post-SARS-CoV-2 infection, an estimated 15.1% continued to have symptoms at 12 months.

The relative severity of Long COVID symptom clusters

- 3.7% had ongoing respiratory problems.
- 3.2% had persistent fatigue with bodily pain or mood swings.
- 2.2% had cognitive problems.

**Why is this important?**

Overall, this study showed that many individuals, and especially women, with symptomatic SARS-CoV-2 infection experience ongoing symptoms, and that the duration of symptoms is estimated to be longer for those who require hospitalization. The researchers note that although estimated proportions of Long COVID were higher in women, this is different from severe acute SARS-CoV-2 infection, which typically affects more males. [1] This study suggests that different underlying mechanisms may exist for the development of severe acute SARS-CoV-2 infection and Long COVID, and so optimal methods of patient care and treatment may change as the duration of symptoms progress.
Of note, this analysis does not describe vaccination status; however, BlueDot has previously described new data showing the protective effect of vaccination against Long COVID [see BlueDot's September 16, 2022 messaging]. As hospitalization data in this study was primarily based on high-income and upper-middle-income countries, there is limited data to understand how low- and middle-income countries may be experiencing Long COVID in terms of duration and severity. Additionally, this study only analyzed a few common Long COVID symptoms and did not cover the full spectrum of COVID-19 symptoms. Symptoms with greater severity such as deafness resulting from COVID-19 are not addressed and individuals with Long COVID of lesser severity are not widely reported, leading to probable underestimation in the ratios described within the analysis. [3]

This study also excludes infections due to the Omicron variant, as it only included symptomatic SARS-CoV-2 infections in 2020 and 2021. This past week the European Centre for Disease Prevention and Control (ECDC) released information that a new wave of COVID-19 infections may have begun in Europe, as multiple European countries show increasing indicators due to new Omicron sub-lineages. [4, 5] With increasing cases, increases in lagging indicators such as increased hospitalizations and severe cases will likely follow. It is expected that the number of individuals experiencing symptoms of Long COVID will also increase with the new wave, which will inevitably have repercussions for workforce capacity and health systems globally. The ECDC announcement came in tandem with the WHO Director General's call for urgent action against Long COVID, including five key elements to further Long COVID research and prevention. The WHO highlighted the need for sustained investment into Long COVID research, increased data collection from low- and middle-income countries, for governments to assess long-term support for those experiencing long COVID, and continued efforts to prevent COVID-19 infections. [6]

For more general information on Long COVID, BlueDot's previous report can be found here.

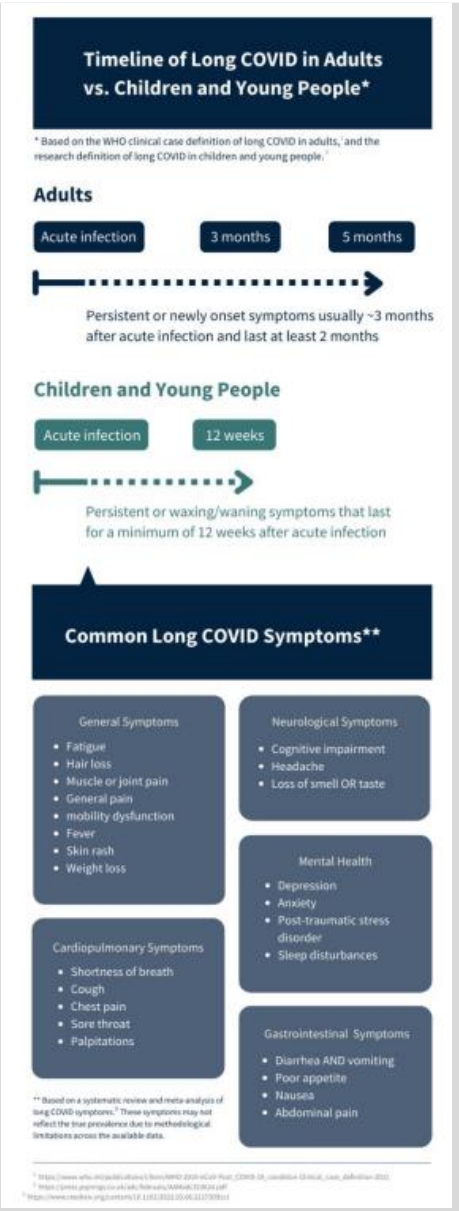



Figure 1. Timeline of the standardized definition of long COVID in adults and research definition of long COVID in children and young people, and commonly observed long COVID symptoms.

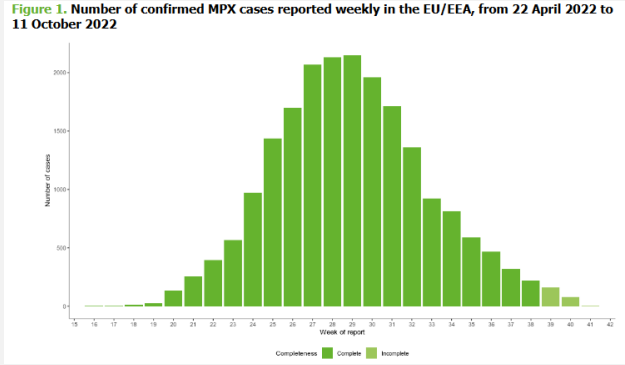
# Monkeypox

## Multi-country outbreak – ECDC Rapid Risk Assessment

### Key messages

Since early May, and as of 11 October 2022, 20 455 confirmed cases of monkeypox (MPX) have been reported from 29 European Union/European Economic Area (EU/EEA) countries, including four deaths. As of 30 September, MPX confirmed cases reported from EU/EEA countries represented almost one third (29.7%) of the cases reported to the World Health Organization (WHO) globally (68 267 cases). The weekly number of MPX cases reported in the EU/EEA peaked in July 2022 and a steady declining trend has been observed since, with only a few cases being reported at the time of this update. Multiple factors have probably contributed to the decline of this outbreak, including efforts in risk communication and community engagement, increasing immunity in the most affected population due to natural immunity and vaccination, and a decrease after the summer in large cultural and social events frequented by the main risk groups for this outbreak. The majority of cases continue to be detected in males between 18 and 50 years (87%), and primarily among men who have sex with men (MSM). Summer mass gatherings and specific sexual practices have facilitated the transmission of MPX among MSM groups until now. Sporadic cases in women and children have also been reported. Cases in the current outbreak continue to present with a spectrum of symptoms and signs that differs from what has been described in past outbreaks of MPX in endemic countries. In general, cases have presented in this outbreak with relatively mild symptoms although some patients describe significant discomfort, pain and complications. From the total number of cases reported in the EU/EEA, 1.1% have required hospitalisation for clinical care and five cases were admitted to intensive care.

**Figure 1. Number of confirmed MPX cases reported weekly in the EU/EEA, from 22 April 2022 to 11 October 2022**




Based on evidence in the current outbreak and the declining number of new infections, the overall risk of MPX infection is assessed as moderate for MSM and low for the broader population. Early diagnosis, isolation, and effective contact tracing, supported by appropriate vaccination strategies remain key for the effective control of this outbreak. Mass vaccination against MPX is currently not required nor recommended. Considering limitations in vaccine supplies, primary preventive vaccination (PPV) and post- exposure preventive vaccination (PEPV) strategies may be combined focusing on individuals at substantially higher risk of exposure and close contacts of cases, respectively. PPV strategies should prioritise gay, bisexual, or other men or transgender people who have sex with men who are at higher risk of exposure based on epidemiological or behavioural criteria. Individuals at risk for occupational exposure should be considered based on risk assessment. Vaccination strategies will need to be kept under review as evidence on effectiveness is accumulated and adapted to the situation in each country according to the trajectory of the outbreak. While some encouraging preliminary evidence is emerging on the performance of the MVA-BN vaccine, more robust data on vaccine efficacy and effectiveness is needed. Targeted national vaccination programmes should be implemented within a framework of collaborative research and clinical trial protocols with standardised data collection tools for clinical and outcome data. Health promotion interventions and community engagement are also critical to ensure effective outreach and high vaccine acceptance and uptake among those most at risk of exposure. Despite the improving epidemiological situation, it is important to continue active risk communication and community engagement efforts with the affected population to prevent a resurgence. Activities to increase awareness of health professionals across specialties should also continue in order to ensure prompt diagnosis and the appropriate management of cases and contacts. Testing services for orthopoxvirus should be available, while support to sexual health services is important to the continuation of case detection, contact tracing, and management of cases.

Future considerations for the evolution of the MPX outbreak and for preventing similar outbreaks are outlined, including the scenario that the outbreak resurges, it causes a continued low number of new cases almost exclusively among MSM, which is considered more likely currently, MPX wanes and finally it is eliminated in EU/EEA countries through concerted efforts in the European region.

### ECDC risk assessment for the EU/EEA

This assessment is based on evidence available to ECDC at the time of publication. It follows the ECDC rapid risk assessment methodology, where the overall risk is determined by a combination of the probability of infection and the impact of the disease on the affected population. ECDC will continue monitoring the event and will reassess the risk depending on its evolution and the implemented response measures.

**Table 1. Overview of the risk assessment for MPX infection in the ongoing multi-country outbreak, 2022**

| Population/route | Probability | Impact | Risk |
|---|---|---|---|
| Risk in the most affected subpopulation of MSM | Moderate | Low | Moderate |
| Broader population | Very low | Low | Low |
| Health professionals without proper PPE performing general patient care | Low | Low | Low |
| Health professionals without proper PPE performing an aerosol generating procedure | Moderate | Low | Moderate |
| Health professionals with proper PPE in all types of care and procedures | Very low | Low | Low |
| Laboratory staff with proper PPE and using proper laboratory protocols | Very Low | Low | Low |
| Laboratory staff without proper PPE and/or not following laboratory protocols | Moderate | Moderate | Moderate |
| Risk of transmission through SoHO | Low | Low | Low |
| (Reverse-)zoonotic transmission and establishment of an enzootic cycle among wild animals in Europe | Very low | Low | Low |

# Monkeypox

## Multi-country outbreak – ECDC Rapid Risk Assessment

**Options for response**

Early diagnosis, isolation, effective contact tracing, and vaccination strategies remain key for the effective control of this outbreak. This entails continued investment in:

- Awareness activities for health professionals around the ongoing outbreak and support of sexual health services, together with appropriate management of cases and contacts;
- The availability of testing for orthopoxvirus;
- The development, implementation, and review of vaccination strategies;
- Risk communication and community engagement activities with the affected population and the general public.

**Awareness of health professionals**

Although MPX remains quite rare in the EU/EEA, it is important to continue awareness-raising activities targeting health professionals. In addition, support for sexual health services, which have carried the weight of this outbreak, is urgently needed. Information provided to medical practitioners should include the range of clinical presentation of currently diagnosed cases, testing recommendations and testing procedure, advice on infection prevention and control in primary care, an outline of the public health measures in place in the country, as well as risk communication tips and advice for health professionals for outreach to their communities. Although the number of reported infections following occupational exposure of health professionals to MPX in the current outbreak is very small, guidance and training should be enforced as regards sampling (e.g. avoid de-roofing MPX lesions, reinforce hand hygiene in all contacts and regular needle safety practices).

Awareness activities targeting clinicians should be a priority in all countries but particularly in those which that have diagnosed a low number of cases to address misdiagnosis and under-reporting. WHO has developed interim rapid guidance for clinical management and infection prevention and control of MPX cases and the ECDC has produced guidance on infection prevention and control for primary care and acute care settings.

1. Management of cases
2. Management of contacts
3. Wastemanagement
4. Cleaning and disinfection

Please find detailed information about point 1 to 4 **here**

**Laboratory diagnostics and sequencing**

Countries should review their molecular diagnostic testing capacities and capabilities for MPXV. Increasing overall testing capacity will facilitate the prompt diagnosis of MPX cases. If there is limited experience in MPXV diagnostic testing, laboratories are encouraged to refer specimens for confirmatory testing. Countries not having national reference laboratory capacity for MPXV can refer specimens for confirmatory testing to an experienced laboratory in another country. The European laboratory network for emerging viral diseases (EVD-LabNet) facilitates the sharing of protocols and confirmatory testing support through their network members. The European Virus Archives (EVAg) can provide positive control materials for diagnostic testing. Several countries have developed and validated PCR assays for the detection of MPXV and commercial PCR kits are available. False-negative PCR test results have been reported for a few cases in the US and preliminary data indicate this to be caused by a deletion affecting the target regions of two published MPXV-specific PCR assays. Laboratories diagnosing MPX should consider reanalysing PCR-negative samples from patients with MPX symptoms and exposure using PCR assays targeting another region of the MPXV genome. To prevent false positive test results, laboratories should consider performing repeated testing to verify positive PCR test results for specimens with high Cycle Threshold (Ct) values from people without known epidemiologic link. Sequencing of MPXV assists in general understanding of the outbreak as well as providing potential data to better understand transmission chains and patterns of spread. We recommend that whole genome or partial genome raw reads and assemblies are deposited into available databases designed for sequence data-sharing.

**Vaccination and vaccination strategies**

*Authorised vaccine against M P X V and considerations for use*

Since 22 July 2022, the third-generation non-replicating smallpox vaccine ImvanexTM (Modified Vaccine Ankara – Bavarian Nordic or MVA-BN) has been authorised by the European Medicines Agency (EMA) for protection against MPX in adults. MVA-BN is administered as a subcutaneous injection (0.5 ml), preferably in the upper arm, with a two- dose regimen, with the second dose given at least 28 days after the first. Data from human and animal studies suggest that a single dose of MVA may offer fast protection against MPX, and that the second dose mainly serves to extend the durability of protection. A single booster vaccination dose (0.5 ml) may be considered for individuals previously vaccinated against smallpox, MPX, or vaccinia viruses, although there are inadequate data to determine the appropriate timing of the booster doses. The safety profile of MVA-BN is favourable, with mild to moderate side effects. Older generation smallpox vaccines have significant side effects and are not authorised by EMA.

MVA-BN is currently authorised for use against infection and disease caused by both smallpox and MPXV in the US (JynneosTM) and Canada (ImvamuneTM) as well as other related orthopoxviruses (Canada only). There are minor differences in terms of manufacturing process and quality specifications between the various marketing authorisations in the different countries, which are due to differences in the datasets submitted for marketing authorisation, but which do not affect the final quality of the vaccine. Considering the limited availability of ImvanexTM , the EMA Emergency Task Force (ETF), together with the Committee for Medicinal Products for Human Use (CHMP) Biologics Working Party (BWP) and the European Directorate for the Quality of Medicines and HealthCare (EDQM), evaluated the specificities of the FDA-approved Jynneos TM and released a statement including safety, efficacy, and manufacturing considerations in case Jynneos TM is used as a replacement of Imvanex in the EU to provide protection against MPX disease.

In addition, in August 2022, EMA's ETF reviewed data on MVA-BN used as an intradermal injection at a lower dose of 0.1 ml (i.e. fractional dose) showing similar immunogenicity to the subcutaneous administration [63] and advised national authorities to consider using MVA-BN as an intradermal injection at a lower dose to protect at-risk individuals during the current MPX outbreak as a temporary urgent measure while supply of the vaccine remains limited [64]. Nevertheless, the ETF also cautioned about a higher risk of local reactions (e.g. longer-lasting redness, and thickening or discoloration of the skin) after intradermal injections, recommended the use of low- dead volume syringes to optimise the number of doses that can be extracted from each vial, and emphasised that the administration should only be carried out by healthcare professionals experienced with intradermal injection administration.

Additional considerations regarding the use of MVA-BN in special populations (children and adolescents, pregnant women, and immunocompromised individuals) have been previously discussed and may be found in the EMA's Summary of product characteristics.

In the context of the current multi-country outbreak, mass vaccination against MPX is not required nor recommended. MPX vaccines can be used as post-exposure vaccination (PEPV) or as primary preventive vaccination (PPV).

Please find more detailed information and the full ECDC Rapid Risk Assessment here

# Notable Public Health Events

## Sudan Ebolavirus Outbreak in Uganda

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### SITUATION OVERVIEW

On September 20, 2022, an outbreak of EVD was declared in Uganda by the country's Ministry of Health, following confirmation of a fatal case. The fatal case was a 24-year-old male from the Ngabano village in Mubende District, Central Uganda.**1** He became ill on September 11 with high fever, vomiting, diarrhea, and other signs consistent with EVD. On September 19, laboratory testing confirmed that it was EVD, caused by the Sudan species of the virus.

The confirmation of this case followed an investigation of several suspicious cases and deaths that occurred in the district a month prior.**1** Several challenges contributed to the delay in the diagnosis, including differential diagnosis in areas that have a high disease burden of malaria along with delayed access to healthcare.2

The number of initial suspected cases and deaths were distributed across Mubende (>100,000 population) in several villages. It is believed that there was undetected transmission in the region for several weeks before the official declaration of the outbreak. Asymptomatic individuals travelling throughout the region, including men working in local gold mines, could have played a significant role in the disease's initial spread.**3**

Within the first 14 days of the outbreak being declared in the Mubende District, additional cases were confirmed in four more districts: one in the Central Region (Kassanda) and three in the Western Region (Kagadi, Kyegegwa, Bunyangabu). Kassanda District is the closest to Kampala, situated roughly 110 kilometers west of the country's capital. Bunyangabu District (specifically the town of Rwimi which reported a case) is the closest to the Democratic Republic of the Congo, situated roughly 100 kilometers away (two-hour drive).**4**

As of October 6 2022, over 60 cases have been reported (including the suspected cases initially investigated), of which 44 laboratory confirmations have been documented. Ten deaths have been reported among the confirmed cases, of which four have been healthcare workers (10 confirmed cases are healthcare workers). While information regarding the official distribution of cases among the five districts is limited, the vast majority has been documented in Mubende with cases in the other districts having reported some degree of connection to Mubende.5

### REASONS FOR CONCERN

Ebola is a disease of severe consequence with a high case fatality rate, long-term sequelae and persistance of virus in survivors.**12** Prospective research of survivors from the 2014 Ebola outbreak are being followed to understand viral persistence and risk of viral recrudescence among Ebola survivors.

Official case counts are believed to be underestimating the true extent of the outbreak that was declared less than three weeks ago. There has been decreasing frequency of official reports and limited details, leading to an incomplete understanding of the event on a community level. This is the largest outbreak of EVD Sudan species in Uganda in the last 20 years and the 12th largest overall.**13**

There has been geographic expansion of the outbreak across Uganda, as highlighted by case confirmation in different regions. There is growing concern around cases reported in districts in closer proximity to the border of the Democratic Republic of Congo (approximately 150km)/ neighboring the Rwenzori Mountains National Park and Kampala, the populated capital city and a hub for international travel. Further individuals may have been exposed when the most recent case travelled between the Mubende district and Bunyangabu district (approximately 170 km).**14**

No evidence that the widely-available test, existing vaccines, and treatment approved for the Ebolavirus Zaire offers cross protection or is effective against the Sudan Ebolavirus. Due to the genomic differences between the Zaire and Sudan species, vaccine manufacturers have stated that there is limited to non-cross protection provided by the single-dose recombinant vesicular stomatitis virus-based vaccine (ERVEBO®).**15** While two vaccine candidates have made some significant advances, there are still some benchmarks that need to be met with regards to safety, regulatory and ethical approval, manufacturing and scale up to serve clinical trials. After the approval of the vaccine and manufacturing issues are solved, a protocol needs to be approved which can further delay the distribution of the vaccine.**1**

#### Risk among healthcare workers

It is possible that the healthcare professionals from the Mubende hospital were infected prior to the outbreak declaration on September 20, 2022, considering the incubation period for EVD (two to 21 days). From the first confirmed case, at least eight days had passed since the death of the initial confirmed case (September 19) and the case (September 27) in a medical student who developed symptoms.

So far, over 20% (n=10) of the confirmed cases have been identified in healthcare workers, of which four have unfortunately died within the first two weeks of the outbreak being declared.**1** This figure highlights not only that it is plausible that a substantial proportion of close contacts in the community have not yet been identified and that high-risk exposures between healthcare workers and patients may have occurred in the absence of appropriate infection prevention and control procedures. However, no explicit case of hospital-acquired infections in patients have been reported as of October 6, 2022.

#### Challenges in outbreak management due to:

1. Limited healthcare resources - There is a heavy reliance on Fort Portal Regional Referral Hospital and in the Mubende Regional Referral Hospital due to the absence of ambulance services to transport cases from more distant communities. Local health facilities near Bunyangabu District do not have access to isolation centers and the responsibility for adhering to quarantine measures is placed on the population. However, new Ebola Isolation facilities, such as one in Madudu in Mubende, are being built with the help of MSF and other organizations**16**. The Ugandan government is seeking monetary support given the large number of affected healthcare workers and increasing burden on local hospitals.17
2. Health officials have highlighted some of the challenges of contact tracing in the region, which has made it difficult to determine the true extent of the outbreak. Stigmatization of survivors and close contacts and fear within the community has led to difficulties in contact tracing.**1** However, while 200 close contacts were identified by the end of the first week, as of October 6, over 1000 close contacts have been identified.

# Notable Public Health Events

## Sudan Ebolavirus Outbreak in Uganda

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**OUTLOOK**

The risk of regional and international spread through ground travel is highly plausible due to population movement domestically and across the porous land borders between Uganda and its neighbouring countries.

Suspected cases in Kenya and South Sudan thus far have been confirmed negative.[18,19] The wife of the confirmed case in Bunyagubu, who works in a refugee camp in the neighbouring district of Kamwenge, has also tested negative.[20] Although these suspected cases and known contact were negative, this dynamic of population movement exemplifies the plausible risk of spread to the general and high-risk populations in Uganda as well as populations in neighbouring countries. According to UNICEF, 16 additional districts across the Western and Central regions of Uganda are at high risk of experience cases, whereas the rest of the districts in Uganda are categorized as moderate risk.[21]

While the risk of international spread via air travel is far less likely, it should not be discounted. As a proactive measure to identify locations potentially at highest risk of international spread via air travel, BlueDot examined our most historical air travel volume originating from Uganda for June 2022 (most recent data from the International Air Transport Association available). The top 25 destinations at the country-level (Table 1) and city-level (Table 2) are shown on the following two pages. Country-level results - The top 2 countries accounted for over 25% of the total outbound international air passenger volume (Table 1): the United Arab Emirates (15.4%) and Kenya (12.2%). This was followed by India and the United States at 7.8% and 7.3% of total outbound passenger volume, respectively. The remaining top 10 countries accounted for >3% to 3% of total outbound international air passenger volume: Juba, South Sudan (4.2%); Addis Adaba, Ethiopia (3.3%); London, U.K. (3.1%); Johannesburg, South Africa (3.1%); and Kigali, Rwanda (3.1%). While India was the 3rd most popular destination country, its cities that received the most passengers included: Ahmedabad (11 at 2.0% of total volume), Mumbai (13 at 1.6%), Delhi (20 at 1.0%), and Hyderabad (23 at 0.8%).

| Ranking | Destination Country | Passenger Volume | % of Total Passenger Volume (June 2022) |
|---|---|---|---|
| 1 | United Arab Emirates | 10,962 | 15.4% |
| 2 | Kenya | 8,657 | 12.2% |
| 3 | India | 5,533 | 7.8% |
| 4 | United States | 5,161 | 7.3% |
| 5 | Tanzania | 3,092 | 4.3% |
| 6 | South Sudan | 2,988 | 4.2% |
| 7 | United Kingdom | 2,616 | 3.7% |
| 8 | South Africa | 2,592 | 3.6% |
| 9 | Ethiopia | 2,348 | 3.3% |
| 10 | Rwanda | 2,181 | 3.1% |
| 11 | Saudi Arabia | 2,043 | 2.9% |
| 12 | Qatar | 1,877 | 2.6% |
| 13 | Congo (Kinshasa) | 1,410 | 2.0% |
| 14 | Burundi | 1,314 | 1.8% |
| 15 | Germany | 1,110 | 1.6% |
| 16 | Netherlands | 988 | 1.4% |
| 17 | Somalia | 944 | 1.3% |
| 18 | Canada | 792 | 1.1% |
| 19 | Nigeria | 777 | 1.1% |
| 20 | Belgium | 770 | 1.1% |
| 21 | France | 702 | 1.0% |
| 22 | Pakistan | 688 | 1.0% |
| 23 | Turkey | 599 | 0.8% |
| 24 | Egypt | 570 | 0.8% |
| 25 | Sweden | 527 | 0.7% |

Table 1: Top 25 destination countries for international air travel from Uganda based on historical air passenger volumes in June 2022 (most recent data from the International Air Transport Association available to BlueDot).

Table 2: Top 25 destination cities for international air travel from Uganda based on historical air passenger volumes in June 2022 (most recent data from the International Air Transport Association available to BlueDot).

| Ranking | Destination City | Destination Country | Passenger Volume | % of Total Passenger Volume (June 2022) |
|---|---|---|---|---|
| 1 | Dubai | United Arab Emirates | 10,788 | 15.2% |
| 2 | Nairobi | Kenya | 7,410 | 10.4% |
| 3 | Juba | South Sudan | 2,987 | 4.2% |
| 4 | Addis Ababa | Ethiopia | 2,318 | 3.3% |
| 5 | London | United Kingdom | 2,237 | 3.1% |
| 6 | Johannesburg | South Africa | 2,232 | 3.1% |
| 7 | Kigali | Rwanda | 2,175 | 3.1% |
| 8 | Doha | Qatar | 1,877 | 2.6% |
| 9 | Dar Es Salaam | Tanzania | 1,579 | 2.2% |
| 10 | Riyadh | Saudi Arabia | 1,530 | 2.1% |
| 11 | Ahmedabad | India | 1,419 | 2.0% |
| 12 | Bujumbura | Burundi | 1,314 | 1.8% |
| 13 | Mumbai | India | 1,174 | 1.6% |
| 14 | Kinshasa | Congo (Kinshasa) | 1,165 | 1.6% |
| 15 | Amsterdam | Netherlands | 988 | 1.4% |
| 16 | Kilimanjaro | Tanzania | 960 | 1.3% |
| 17 | Mombasa | Kenya | 904 | 1.3% |
| 18 | Mogadishu | Somalia | 846 | 1.2% |
| 19 | Brussels | Belgium | 770 | 1.1% |
| 20 | Delhi | India | 723 | 1.0% |
| 21 | Washington | United States | 720 | 1.0% |
| 22 | Cairo | Egypt | 560 | 0.8% |
| 23 | Hyderabad | India | 546 | 0.8% |
| 24 | Istanbul | Turkey | 539 | 0.8% |
| 25 | Paris | France | 532 | 0.7% |

# Other Infectious Disease Outbreaks/ Conflicts

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**Unknown Febrile illness in Nepal**

SUBLOCATIONS AFFECTED: Province 3 (Kathmandu)

Media reports are raising concerns over an undiagnosed febrile illness outbreak in the city of Kathmandu, the capital and the most populous locality in Nepal. There is limited information on the precise number or any epidemiological indicators in all affected individuals. However, these reports state that these cases have emerged concurrently with upward trends of an unprecedented dengue outbreak in Nepal since early 2022. In addition, media reports have indicated that although the affected individuals present with a dengue-like clinical picture, laboratory tests returned negative for dengue virus.

CONCERN LEVEL: **MEDIUM**.

The BlueDot intelligence team considers this event of medium concern at the local and regional level given:

The underlying cause of the disease has not been identified.

There might be limited testing capacity and there is no clarification on whether other vector-borne diseases that are also transmitted by Aedes mosquito species, such as chikungunya or Zika virus, have been tested and/or ruled out. These outbreaks may also co-exist, but there are reports that Nepal discontinued routine testing for these diseases in the past couple of years. Hence, its presence or impact in Nepal is now unknown.

Another possible explanation for the emerging dengue-like illness might be due to mutations not yet identified in the dengue virus.

Dengue-like illness is not a brand new phenomenon. Previously, it was not only reported in Nepal (i.e. for the first time in 2017 among patients admitted for fever, which drew the attention of physicians working at Sukraraj Tropical and Infectious Disease Hospital) but also more recently in Pakistan at the end of 2021 among cases that resulted negative for all dengue laboratory investigations. Likewise, India has also frequently reported dengue-like illness in the past.

Cases of unknown febrile illness are increasingly seen in South Asia. Testing capacity is crucial to investigating these unknown fevers as laboratory testing and genomic analyses will help confirm the cause of the illness and guide public health response. BlueDot is closely monitoring this event and will provide further information as it becomes available.

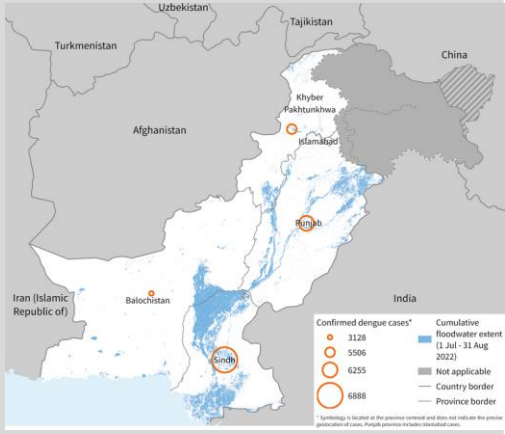
**Source:** Bluedot - **The Kathmandupost**

**Violence, poverty, climate change drive global cholera surge**

From **Haiti** to **Lebanon** to **Syria**, the World Health Organization has warned of a global spike in cholera cases, with war, violence, poverty, and – in a newer twist – climate change driving the surge. The **WHO** noted that 27 countries have reported outbreaks since the start of the year. Syria, where **concern of spread into the war-battered Idlib region is growing**, has reported more than 10,000 cases in the past six weeks. **Lebanon**, where a downward economic spiral has plunged three quarters of the population into poverty, recorded its first case of cholera since 1993. **In Haiti**, meanwhile, cholera recently returned after a three-year absence, and the timing couldn't be worse. Rampant **gang violence** has led to an increase in cases, and has combined with fuel shortages to **heavily restrict hospital services**. After the devastating **2010 earthquake**, the Caribbean country was hit with a cholera outbreak – traced back to **UN peacekeepers** – that infected some 820,000 people and killed an estimated 10,000. Cholera spreads through contaminated water or food and can kill within hours if untreated. It can be prevented with vaccines and treated with rehydration methods, but many patients don't have access to these means. More cholera outbreaks **have been reported** in Afghanistan, Bangladesh, the Democratic Republic of Congo, Ethiopia, and Nigeria.

**Source: The Humanitarian**

**Dengue in Pakistan**




Situation: Between 1 January and 27 September 2022, a total of 25 932 confirmed dengue cases and 62 deaths (CFR 0.25%) were reported in Pakistan, with 74% of these cases reported in the month of September alone. The current surge in cases follows unprecedented flooding that began in mid-June 2022. With the current flood crisis affecting the national health system capacity and the growing humanitarian situation, there is a high risk of serious health impacts from dengue fever and other concurrent disease outbreaks. High population movement between Pakistan and bordering countries (in particular, Afghanistan and the Islamic Republic of Iran) means that the international transmission of dengue fever cannot be ruled out.

Outbreak description: Dengue fever is endemic to Pakistan, which experiences year-round transmission with seasonal peaks. However, triggered by the worst flooding in the country's history that began in mid-June, the number of reported dengue cases is significantly higher in 2022 (between January and September) as compared to the same period during the four previous years. Between 1 January to 27 September 2022, according to the National Institute of Health-Islamabad, a cumulative total of 25 932 confirmed dengue cases and 62 deaths have been reported nationally. Three-quarters (74%) of these cases were reported during the month of September alone. As of 22 September, the distribution of cases by province was available for 83% (n=21 777) of the total cases, of which 32% (n=6888) were reported from Sindh, 29% (n=6255) from Punjab (including the Islamabad Capital Territory), 25% (n=5506) from Khyber Pakhtunkhwa, and 14% (n=3128) from Balochistan (Figure 1).

**WHO risk assessment**

Pakistan is experiencing an abnormal monsoon rainfall and unprecedented floods. One-third of the country and an estimated 33 million people have been impacted in 84 calamity declared districts. More than 2 million houses have been destroyed and an estimated 1460 health facilities have also reportedly been damaged. Some 7.9 million people are reportedly displaced, 12 900 people injured, and 1600 people have died. Heavy rains and floods have left millions of people without access to healthcare and medical treatment.

With the current flood crisis affecting the national health system capacity, there is a high risk of serious health impacts from dengue fever. Currently, there is a need for improved vector surveillance, enhanced laboratory capacity for better detection, sensitization of health care providers on case management (including warning signs of severe dengue) and improved surveillance of acute febrile illness to better define disease burden and seasonality patterns.

Vector-borne epidemics – including dengue – after flooding is a well-known phenomenon, as the stagnant water provides favorable habitats for mosquitoes to breed. The lag time is usually around 3-4 weeks before the occurrence of dengue cases. Ongoing disease outbreaks in Pakistan, including acute watery diarrhoea, dengue, malaria, measles, polio, and COVID-19 are being further aggravated, particularly in internally displaced persons and refugee camps and where water and sanitation facilities have been damaged.

Dengue fever is the most rapidly spreading mosquito-borne virus infection in the world. There is high population movement between Pakistan—in particular, Khyber Pakhtunkhwa province— and bordering countries, especially the Islamic Republic of Iran and Afghanistan. Khyber Pakhtunkhwa province is also home to 1 200 000 Afghani refugees, of which 800 000 live in districts officially notified as calamity hit by floods. The transmission of dengue fever from Pakistan to border countries cannot be ruled out. Source: WHO

# Other Infectious Disease Outbreaks/ Conflicts

## Geographic Expansion of Japanese Encephalitis Virus (JEV) in Australia – Addendum

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1. **Past outbreaks of Japanese Encephalitis Virus in Australia**

1 st outbreak - In 1995, JEV was first recognized in natural transmission cycles in northern Australia when a widespread outbreak occurred on the islands of the Torres Strait, the body of water that separates the Cape York Peninsula and the New Guinea landmass. Three human cases, two of which were fatal, occurred on the island of Badu. This event was unprecedented as prior to this, Murray Valley encephalitis virus (MVEV) and West Nile virus Kunjin subtype (WNVKUN) were considered the only encephalitogenic flaviviruses southeast of Wallacea (region that separates the Asian and Australasian zoogeographical regions). 1,2

Virus genotyping revealed that the 1995 Badu 1995 human and mosquito isolates cluster were JEV Genotype II.3 Culex annulirostris was the only mosquito that yielded JEV at a carriage rate of 2.97 per 1000 mosquitoes, indicating that this was the potential mosquito vector. Subsequent broader serosurveys of humans and pigs revealed that the outbreak was widespread across the Torres Strait. It is believed that migratory birds and/or wind-blown mosquitoes imported the virus into the Torres Strait from a focus of viral activity, possibly from Papua New Guinea. Precipitating factors for the outbreak included a combination of an immunologically naïve human population and a large immunologically naïve domestic pig population, with numerous pigpens located close to human residences.4.

When JEV first emerged in northern Australia, it was initially feared that the virus would proliferate in mosquito–pig–bird cycles and become established on the mainland, similar to events involving the establishment of West Nile Virus in bird-mosquito cycles in the United States. Despite these predictions, viral activity appears to have remained restricted to the Torres Strait, with the occasional incursion onto the Cape York Peninsula.

2 nd outbreak - The second JEV outbreak occurred in 1998. However, the Torres Strait has not reported JE cases since then.5 There is no evidence to suggest that the virus has not become established in mainland Australia, let alone reached endemic status. Several ecological reasons for this apparent lack of establishment have been proposed and include: o Competition between the endemic flaviviruses, Murray Valley Encephalitis Virus and West Nile Virus Ku MVEV and West Nile Virus/Kunjin, with JEV for susceptible vertebrate hosts; o Host feeding patterns of C. Annulirostris mosquito, whereby they feed on hosts (other than pigs) that cannot amplify JEV; o Different lineages of C. Annulirostris mosquito, which vary in their vector competence for the different genotypes of JEV. Alternatively, the lack of detection on the mainland could represent the limited geographical area covered by the current sugar-based mosquito surveillance program prior to the 2022 outbreak. 6

2. **JEV Genotypes**

There are five existing genotypes of the Japanese encephalitis virus. Genotypes 1-4 have been detected in vectors and patients within eastern, southern, and southeast Asia, as well as Australia.7

The current JE outbreak in Australia is attributed to Genotype 4.8 A retrospective review found a sentinel fatal human case of JE in February 2021 on Tiwi Islands in northern Australia. 9 This case was identified as Genotype 4 and is genetically related to the samples taken from humans, pigs, and other animals that tested positive for JE in the current 2022 outbreak. Previously, Genotype 4 of JE had been detected in Indonesia, a country endemic for JE.10

3. **Geographic distribution of mosquitoes carrying the virus**

JEV is primarily transmitted to hosts through infected bites from Culex mosquito species (i.e., Culex annulirostris, Culex quinquefasciatus, Culux tritgeniorhynchus, Culix gelidus). These mosquitoes lay eggs in freshwater sources such as dirty water, small rivers, ponds, marshes, and stagnant water in artificial containers (i.e., car tires, drums, pots), and natural containers (i.e., coconut shells).11 They develop into adults within 7-10 days (about 1 and a half weeks) of hatching from eggs and live for approximately three weeks. Adult female mosquitoes are the more prominent biters and tend to blood feed every 3-4 days. Generally, adult mosquitoes' flight range is within 2-5km from their location of hatching. Preferred hosts of the mosquito species include cows, pigs, humans, water buffalo, goats, deer, chickens, and wild birds.

Previously, mosquito surveillance for JEV in mainland Australia was due to JEV historically being limited to north Australia. With the expansion of JEV into the south, the geographic distribution of JE vectors in Australia (Table 1) can provide some information into potential areas of mosquitos that carry JEV.

Considering recent floods in Australia, some 'floodwater mosquitoes,' such as Aedes mosquito species, could also play a role in JEV transmission since they are able to persist through dry seasons and retain virus in some desiccation-resistant eggs.12

| Species | Geographic Distribution in Australia (based on observational data) | Additional Notes[13,14] |
|---|---|---|
| ***Culex annulirostris*** (main vector of JE in Australia) | Present widely across mainland Australia[15]; abundant between late summer and early fall | • Associated with primarily freshwater sources and is an opportunistic feeder which targets a range of animal hosts including birds, pigs and humans<br>• Some studies have found that *C. annulirostris* is extremely mobile and can fly to distances up to 10-12 kilometres |
| ***Culex quinquefasciatus*** (suspected vector of JE) | Present across Australia throughout most of the year[16] | • Generally found near built environments and is closely associated with polluted water sources |
| | | • Primarily bites birds, and its flight range is typically restricted to about 2km from its larval habitats<br>• While this species is not the most competent vector to spread JEV, it has previously been demonstrated to have a low-moderate capacity to transmit JEV under ideal conditions |
| ***Culex tritaeniorhynchus*** | Present in northern Australia but absent in the southern regions[17] | - |
| ***Culex gelidus*** | Present in northern Australia but absent in the southern regions[46] | - |

4. **Course of disease, medical conditions, treatment history of human cases in 2022**

There have been no changes in the number of confirmed/probable cases and confirmed deaths since BlueDot's September 14 Brief Intelligence Report. As of October 3, 2022, the Australian Government's Department of Health continued to report 40 cumulative - confirmed (30) and probable (10) - human cases of JEV infection, including six deaths Specific details on the medical conditions and treatment history of the human cases reported in mainland Australia have not been provided. However, of the information provided, the majority of confirmed cases in New South Wales, Victoria (3 hospitalized and at least 1 was discharged as of March 3, 2022)18 , several in South Australia 19 were treated in hospital at some point in their course of disease. Of the two confirmed cases in Queensland, one became the confirmed death and the other individual was hospitalized "in a critical but stable condition on life support" as of May 26, 2022.20 No information was provided for the confirmed cases in Queensland21. The one confirmed case in the Northern Territory "made good recovery".22

You can red more information about "Age distribution and vaccination history of JEV in Australia" here

# Ukraine
## Flash Update

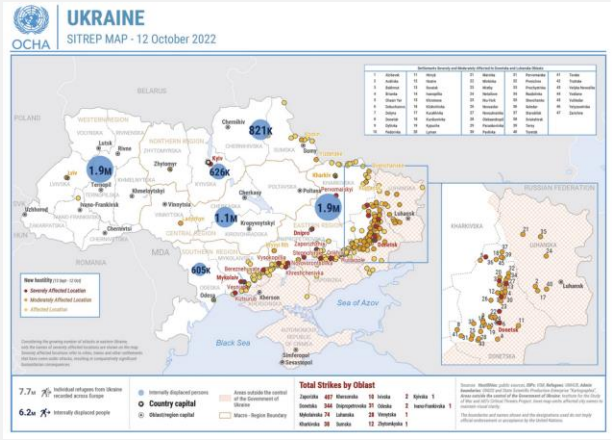
### Highlights

- Drone and air attacks have been reported in Kyiv and across Ukraine on 17 October – a week after the intensification of countrywide air and missile attacks.
- Some 680 civilian casualties have been recorded in Ukraine from 1 to 16 October by the UN Human Rights Office (OHCHR).
- Both residential and non-residential buildings have been struck – leading to deaths and injuries, while others have been rescued from the rubble, according to reports.
- There has also reportedly been more damage inflicted on Ukraine's energy infrastructure, with hundreds of towns and villages having lost power, including in the north-eastern Sumska oblast and the central Dnipropetrovska oblast.
- The Mayor of the southern city of Mykolaiv said that a drone strike there set a sunflower-oil terminal and pharmaceutical warehouse on fire.
- The UN and humanitarian partners, including the International Committee of the Red Cross and The Red Cross Society of Ukraine, are responding to immediate needs while continuing to access the newly retaken areas of the country and helping at least 2.4 million Ukrainians prepare for winter.

### HUMANITARIAN RESPONSE

The Acting Humanitarian Coordinator for Ukraine condemned the latest attacks 17 October, as the UN and humanitarian partners continued to step up their effort to reach and assist nearly 18 million Ukrainians in need. Immediate responses to the latest attacks have included helping to provide basics such as food and water, hygiene kits and medical supplies as well as shelter material to help repair damaged homes and buildings. Areas of particular concern have included the parts of the eastern Kharkivska and southern Khersonska oblasts newly retaken by the Ukrainian Government.

Another priority for humanitarians is helping at least 2.4 million Ukrainians prepare for and cope with the winter cold amid ongoing destruction and lack of necessities like electricity and, in some cases, water. This involves helping to repair damaged homes and buildings; and supporting partners and the authorities' preparations for a fresh influx of displaced people. There are already more than 6.2 million Ukrainians who are internally displaced from their homes, including people who have fled fighting and poor living conditions. Officials from the western Zakarpatska oblast told the UN Office of the Coordination of Humanitarian Affairs (OCHA) during a mission on 12-14 October that the oblast already hosts almost 400,000 displaced people and expects that many more could arrive before winter. Urgent needs include repairing bomb shelters; cash assistance; as well as support for centres for the internally displaced.




**KEY FIGURES**

**17.7M** People in need

**11.5M** People targeted

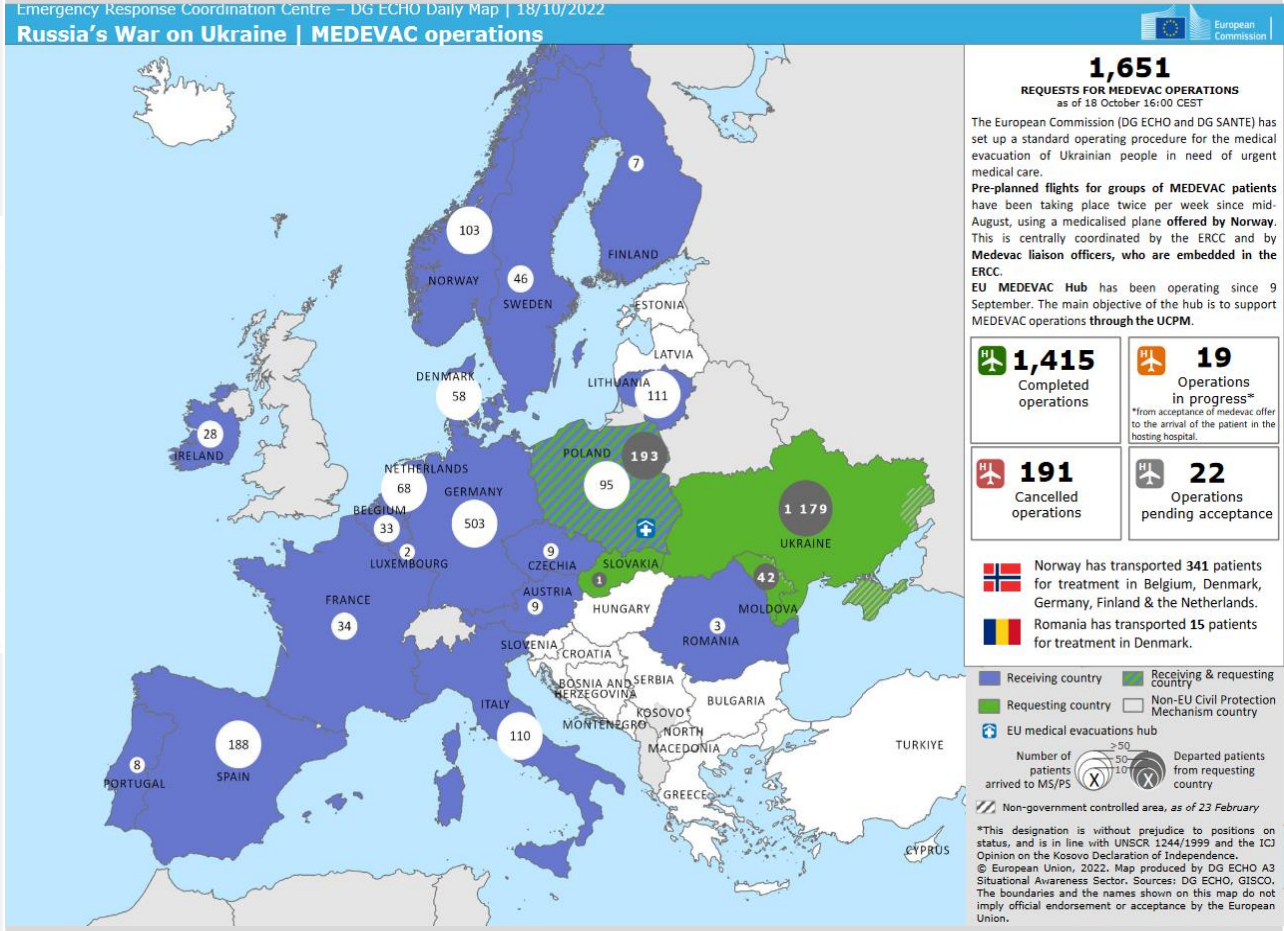
**13.4M** People reached as of 12 October 2022

**6.24M** Internally displaced people

**7.68M** Refugees in European countries

### MEDEVAC operations

The European Commission (DG ECHO and DG SANTE) has set up a standard operating procedure for the medical evacuation of Ukrainian people in need of urgent medical care. Pre-planned flights for groups of MEDEVAC patients have been taking place twice per week since midAugust, using a medicalised plane offered by Norway. This is centrally coordinated by the ERCC and by Medevac liaison officers, who are embedded in the ERCC. EU MEDEVAC Hub has been operating since 9 September. The main objective of the hub is to support MEDEVAC operations through the UCPM.




Source: reliefweb.int
reports.unocha.org