

# Enhancing Readiness for Omicron (B.1.1.529): Technical Brief and Priority Actions for Member States

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## Summary

### Background

- On 26 November 2021, [WHO designated the variant B.1.1.529 a variant of concern \(VOC\)](#), on the basis of advice from WHO's Technical Advisory Group on Virus Evolution. The variant has been given the name Omicron.
- Omicron is a highly divergent variant with a high number of mutations, including 26-32 in the spike, some of which are concerning and may be associated with immune escape potential and higher transmissibility. However, there are still considerable uncertainties.
- The main uncertainties are (1) how transmissible the variant is and whether any increases are related to immune escape, intrinsic increased transmissibility, or both; (2) how well vaccines protect against infection, transmission, clinical disease of different degrees of severity and death; and (3) does the variant present with a different severity profile. Public health advice is based on current information and will be tailored as more evidence emerges around those key questions.

### Risk Assessment

- Given mutations that may confer immune escape potential and possibly transmissibility advantage, the likelihood of potential further spread of Omicron at the global level is high. Depending on these characteristics, there could be future surges of COVID-19, which could have severe consequences, depending on a number of factors including where surges may take place. The overall global risk related to the new VOC Omicron is assessed as very high.

### Priority actions for Member States:

- Enhance surveillance and sequencing efforts to better understand circulating SARS-CoV-2 variants, including Omicron. Where capacity exists, perform [field investigations](#) and laboratory assessments to improve understanding of the characteristics of Omicron. This should include community testing to detect if Omicron is circulating in the community.
- As S gene target failure (SGTF) from a widely used PCR test (ThermoFisher TaqPath) is indicated for Omicron, the SGTF can be used as the marker for this variant, which may lead to efficient detection of Omicron.
- Report initial cases/clusters associated with Omicron infection to WHO through the IHR mechanism
  - Thereafter, report (publicly or through IHR) the relative prevalence of Omicron as the number of sequences of Omicron (numerator) divided by the total number of sequences generated through routine surveillance (denominator) and/or, where

available, number of SGTF out of number tested, in the same unit of time, according to sampling date

- Accelerate COVID-19 vaccination coverage as rapidly as possible, especially among [populations designated as high priority](#) who remain unvaccinated or are not yet fully vaccinated.
  - Use a risk-based approach to adjust international travel measures in a timely manner. See forthcoming *WHO advice for international traffic in relation to the SARS-CoV-2 Omicron variant* for additional information.
- The use of masks, physical distancing, ventilation of indoor space, crowd avoidance, and hand hygiene remain key to reducing transmission of SARS CoV-2 even with the emergence of the Omicron variant. Contact tracing of COVID-19 cases to interrupt chains of transmission of SARS-CoV-2 is strongly advised.
- Ensure early warning systems are in place to inform efficient adjustment of public health and social measures.
- In anticipation of increased COVID-19 caseloads and associated pressure on the health system, ensure mitigation plans are in place to maintain essential health services and necessary health care resources are in place to respond to potential surges.
- Authorities should regularly communicate evidence-based information on the Omicron and other circulating variants and potential implication for the public in a timely and transparent manner, including what is known, what is unknown and what is being done by responsible authorities.

## 1. Background

- On 26 November 2021, on the basis of advice from WHO's Technical Advisory Group on Virus Evolution, WHO designated the SARS-CoV-2 variant B.1.1.529 a variant of concern (VOC). This variant has been given the name Omicron.
- The variant Omicron was first reported to WHO from South Africa on 24 November 2021. In recent weeks, infections have increased steeply in South Africa, coinciding with the detection of Omicron. The first known confirmed Omicron infection was from a specimen collected on 9 November 2021, and the first publicly available sequence from a specimen collected on 11 November 2021. The number of cases of this variant appears to be increasing in multiple provinces in South Africa.
- The variant Omicron was also detected in Botswana in samples collected on 11 November 2021. As of 28 November 2021, cases have been detected in several additional countries in four WHO regions. While most of the current cases in these countries are travel-related, we expect this to change as more information becomes available.
- Omicron has an unprecedented number of spike mutations, some of which are concerning for their potential impact on the trajectory of the pandemic. Preliminary evidence suggests there may be an increased risk of reinfection with this variant, as compared to other variants of concern (VOCs).
- Current SARS-CoV-2 PCR diagnostics are able to detect the Omicron variant. Several labs have indicated that for one widely used PCR test (ThermoFisher TaqPath), one of the three target genes is not detected (called S gene dropout or S gene target failure, SGTF) and this test can therefore be used as marker for this variant, pending sequencing confirmation.
- Studies are underway to evaluate the transmissibility, severity and reinfection risk of Omicron. Additional studies are needed to understand effectiveness of vaccination, by product, and by infection and disease outcomes. WHO will communicate new findings with Member States and to the public as this information becomes available.

## 2. Global risk assessment

- There is substantial uncertainty regarding Omicron's transmissibility, immune escape potential (from either infection- or vaccine-induced immunity), clinical presentation, severity of disease, and response to other available countermeasures (e.g. diagnostics, therapeutics). A number of researchers in South Africa and other countries are carrying out studies to assess these characteristics of Omicron. Depending on these characteristics, if another major surge of COVID-19 takes place driven by Omicron, consequences may be severe. Increasing cases, regardless of a change in severity, may pose overwhelming demands on health care systems and may lead to increased morbidity and mortality. The impact on vulnerable populations would be substantial, particularly in countries with low vaccination coverage. To date, no deaths linked to Omicron variant have been reported.
- At present, local transmission has been reported in South Africa and there is evidence of spread to several countries in four WHO regions (African, Eastern Mediterranean, European, and Western Pacific regions). While most of the cases identified in these countries are travel-related, we expect this to change as more information becomes available.
- The overall risk related to the new variant of concern Omicron is considered very high for a number of reasons. First, the global risk of COVID-19 remains very high overall, and second, there is concerning preliminary evidence on Omicron suggesting, in contrast to previous VOCs, both potential immune escape and higher transmissibility that could lead to further surges with severe consequences. The evidence for this assessment contains considerable uncertainty and will be updated as more information becomes available.<sup>1</sup>

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<sup>1</sup> This paragraph has been revised for clarity.

### 3. Priority Actions for Member States

Based on the risk assessment, the following priority actions are recommended to enhance readiness for the new variant of concern Omicron.

#### 3.1 Enhanced Surveillance

- Ensure early warning systems are in place, composed of multiple indicators such as rapid growth (e.g. growth rate, effective reproduction number), case incidence, and test positivity proportion. It is also crucial to monitor indicators related to disease severity and pressure on health care systems (e.g. bed occupancy of general ward and intensive care unit)
- Enhance event-based surveillance for unusual epidemiological signals:
  - Reports of rapidly spreading outbreaks in healthcare facilities or communities might raise the concern that these events are due to a variant that spreads more easily from person to person.
  - Similar reports from populations expected to have a high level of immunity (due to prior infections or high vaccination coverage) may indicate the presence of a variant able to evade the immune response.
  - Outbreaks causing unexpectedly high levels of morbidity and mortality may be due to a variant causing more severe disease.
- **Report initial cases/clusters associated with Omicron infection to WHO through the IHR mechanism**
  - **Thereafter, report (publicly or through IHR) the relative prevalence of Omicron as the number of sequences of Omicron (numerator) divided by the total number of sequences generated through routine surveillance (denominator) and/or, where available, number of SGTF out of number tested, in the same unit of time, according to sampling date**
- Where capacity exists and in coordination with the international community, perform field investigations and laboratory assessments (see below) to improve understanding of transmission parameters, vaccine effectiveness, severity, effectiveness of public health and social measures against Omicron, diagnostic methods, immune responses, antibody neutralization, or other relevant characteristics. Specimens collected during such investigations may warrant prioritization for sequencing.
  - When recording case data, particular attention should be paid to cases' vaccination status and date of vaccination; history of previous SARS-CoV-2 infection; symptoms/clinical presentation; and clinical severity/outcome.
  - The epidemiological studies and sequencing of specimens can be targeted to those with particular individual-level characteristics (e.g. suspected reinfections, clinical characteristics; immunocompromised patients and selective sequencing of vaccine breakthrough), as well as usual clusters and super-spreader events.
- For further details on surveillance in the context of emerging variants, including sampling strategy, please refer to [WHO guidance for surveillance of SARS-CoV-2 variants Interim guidance 9 August 2021](#); additional guidance is available from [ECDC Guidance for representative and targeted genomic SARS-CoV-2 monitoring](#).

#### 3.2 Laboratory

- The variant of concern Omicron belongs to Pango lineage B.1.1.529, Nextstrain clade 21K, GISAID clade GR/484A, is characterized by 45-52 amino acid changes, including 26-32 the spike protein compared to the reference strain.
- Most diagnostic tests continue to work and can detect the variant of concern Omicron.
- S gene dropout or S gene target failure (SGTF) due to deletion at Spike position 69-70, similar to the detection of the Alpha variant, has been reported. The ThermoFisher TaqPath assay can therefore be used as proxy test for this variant, pending sequencing confirmation. Use of the SGTF approach may lead to faster detection rates.
- Studies are ongoing to assess if some SARS-CoV-2 antigen-based rapid diagnostic tests (AgRDT) may be impacted

by this variant.

- In countries with sequencing capacity, WHO advises that a representative subset of SARS-CoV-2 confirmed cases be sequenced. In addition to randomly selected samples to achieve representativeness, sampling selection criteria should include cases from any unusual transmission events (e.g., increased transmission despite interventions in place), unexpected disease presentation/severity, vaccine breakthrough, reinfections, severely ill patients, and patients with known epidemiologic links to settings of Omicron transmission.
- WHO advises the timely reporting of genomic data to the public domain and the timely collection of metadata including clinical and epidemiologic data for careful interpretation of results.
- It is critical that all SARS-CoV-2 testing be linked to public health actions to ensure appropriate clinical care and support and to carry out contact tracing to break chains of transmission.

### ***S gene target failure (SGTF)***

- For countries with access to diagnostic tests in which at least one gene target contains the S gene target:
  - Prioritize specimens with SGTF (no detection for S gene and detection for other gene targets) for sequencing confirmation of the Omicron.
  - While a sudden increase in SGTF may be indicative of circulation of the Omicron since the prevalence of Alpha variant (which also causes SGTF) is very low in the vast majority of countries, confirmation of Omicron by sequencing is recommended.
- For countries without access to diagnostic tests with S gene target, enhanced surveillance and sequencing are recommended to characterize the circulating SARS-CoV-2 variants.

### ***Retrospective sampling***

- Conduct a retrospective review of available genomic sequences and S gene dropout data if available at country level, with sample collection dates dating from October 2021 through present.
- If not already done, sequence specimens with S Gene target failure in the recent past, preferably from October 2021 through present.
- Ensure timely reporting of genomic sequences to public domain (e.g., GISAID) to facilitate automated retrospective analysis;
- For countries with such capacity, wastewater sampling may be an additional tool for the retrospective and prospective investigation of Omicron in the community.

### ***Prospective sampling***

- Due to the risk of importation by incoming travelers from locations experiencing Omicron transmission, countries may increase sampling from inbound travelers. Positive rRT-PCR samples should be sequenced to confirm presence of the Omicron.
- [National testing strategies](#) should be updated to include available diagnostic tools for rapid testing and reporting and effective decentralization of testing.
- WHO recommends that national testing capacity and genomic sequencing capabilities and appropriate planning be undertaken for possible surges in testing demand.

## **3.3 Vaccination**

- The presence of multiple mutations of the spike protein in the receptor-binding domain suggests that Omicron may have a high likelihood of immune escape from antibody-mediated protection. However, immune escape potential from cell-mediated immunity is more difficult to predict. Overall, there are considerable uncertainties in the magnitude of immune escape potential of Omicron. Further research is needed to better understand the escape potential against vaccine- and infection-induced immunity. Research efforts are ongoing, and the data are expected to be available in the coming weeks.

- Despite uncertainties, it is reasonable to assume that currently available vaccines offer some protection against severe disease and death.
- Efforts should be intensified by public health authorities to accelerate COVID-19 vaccination coverage in all eligible populations, but with [priority for populations at high risk](#) for serious disease who remain unvaccinated or not yet fully vaccinated. These include older adults, health care workers and those with underlying conditions putting them at risk of severe disease and death.

### 3.4 Risk-based approach in adjusting international travel measures

- Use a risk-based approach to adjust international travel measures in a timely manner. See forthcoming *WHO advice for international traffic in relation to the SARS-CoV-2 Omicron variant* for additional information.

### 3.5 Public health and social measures (PHSMs)

- The use of masks, physical distancing, ventilation of indoor space, crowd avoidance, and hand hygiene remain key to reducing transmission of SARS CoV-2, even in the context of emerging variants. However, PHSMs may need to be enhanced, to further limit interpersonal contact, to control transmission with a more transmissible variant.
- The use of established PHSMs in response to individual cases or clusters of cases, including contact tracing, quarantine and isolation, must continue to be adapted to the epidemiological and social context and enforced.
- Guided by risk assessment, taking into account the epidemiological situation, response capacities, vaccination coverage and public perception, as well as uncertainties related to the rapidly evolving situation of Omicron, countries should be ready to escalate PHSMs in a timely manner to avoid overwhelming demands on health care services.
- For further guidance on risk-based calibration of PHSMs, please see WHO guidance on [Considerations for implementing a risk-based approach to international travel in the context of COVID-19](#).

### 3.6 Health care system readiness

As part of preparedness activities while studies are ongoing to better understand the phenotypic characteristics of the new VOC, and in the anticipation of possible increase in COVID-19 case-load and associated pressure on the health system, countries are advised to ensure mitigation plans are in place to [maintain essential health services](#), and necessary resources are in place to respond to potential surges. Tools such as the [COVID-19 Essential Supplies Forecasting Tool](#) are available for use.

### 3.7 Risk communication and community engagement

- Authorities should communicate information related to Omicron and potential implication for the public in a timely and transparent manner to further foster trust and increase acceptance of response measures.
- One of the most important and effective interventions in a public health response to any event is to proactively communicate with the population what is known, what is unknown and what is being done by responsible authorities to get more information and to reduce risk.
- COVID-19 information overload and misinformation should be managed at all stages of the response by providing the right information at the right time to the right people through trusted channels (e.g. community and faith leaders, family doctors and other influential members of society). There should be an information monitoring system in place to capture emerging trends to enable delivery of a targeted communication package.
- When PHSMs are adjusted, communities should be fully and regularly informed, engaged and enabled before changes are made, to allow them to take ownership of the selected PHSMs. It is critical to build and foster trust, especially in contexts where there is little or no involvement of the local population in decision-making. Clear, concise and transparent risk communication, including an evidence-based rationale for adjusting measures, should be developed with communities targeted for PHSMs.

- Communities will be critical to implementing population-wide PHSMs and contributing to the mitigation of the social and economic impact of certain measures (e.g. disrupting availability of food and other needed supplies).

## References

- WHO Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern.  
[https://www.who.int/news/item/26-11-2021-classification-of-omicron-\(b.1.1.529\)-sars-cov-2-variant-of-concern](https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern)
- European Centre for Disease Prevention and Control. Threat Assessment Brief: Implications of the emergence and spread of the SARS-CoV-2 B.1.1.529 variant of concern (Omicron) for the EU/EEA.  
<https://www.ecdc.europa.eu/en/publications-data/threat-assessment-brief-emergence-sars-cov-2-variant-b.1.1.529>
- [Guidance for surveillance of SARS-CoV-2 variants: Interim guidance, 9 August 2021](https://www.who.int/publications/i/item/WHO_2019-nCoV_surveillance_variants)  
[https://www.who.int/publications/i/item/WHO\\_2019-nCoV\\_surveillance\\_variants](https://www.who.int/publications/i/item/WHO_2019-nCoV_surveillance_variants)
- Other references are embedded as hyper link at each section.

## Acknowledgement

- This document was based on the [SEARO technical brief and priority action on Omicron V2.1](#) developed with contribution of various staff members of WHO Regional Office for the South-East Asia Region and WHO India Country Office.

## ***Annex: Working definitions***

**Suspected reinfection case:** Confirmed or probable COVID-19 case (following WHO case definition), with a history of a primary confirmed, or probable COVID-19 infection, with at least 90 days between the episodes.

**Probable reinfection case:** Positive RT-qPCR testing results for both episodes or equivalent positive antigen tests fitting the WHO Case Definition with episodes occurring at least 90 days apart, based on the sampling date. OR - Genomic evidence for the second episode is available and includes lineage that was not submitted to SARS-Cov-2 genomic databases at the time of first infection.

**Reinfection confirmed by sequencing:** Samples available for both primary and secondary episodes allowing for full genomic sequencing, whereby samples must be shown to be phylogenetically distinct from one another. Evidence should be generated at clade/lineage, as defined by genomic classification of SARS-CoV-2 between the first and second infection. If evidence of different clades is demonstrated in episodes less than 90 days apart, this also constitutes evidence of confirmed reinfection. If there are more than two nucleotide differences for every month separating the samples between the sequences for first and second infections, i.e., exceeding the expected Single Nucleotide Variation, these would be considered as different linages/clades.

The 90-day cut off should ideally be determined between onset dates (for probable cases), or sampling dates (for confirmed cases) of primary and secondary episodes.

### **Vaccine breakthrough**

Vaccines should be authorized by a Stringent Regulatory Authority or listed under WHO Emergency Use Listing.

Cases and infections are expected in vaccinated persons, albeit in a small and predictable proportion, in relation to vaccine efficacy values. The following definitions should be used to characterize infections and cases in vaccinated persons:

- Asymptomatic breakthrough infection: detection of SARS-CoV-2 RNA or antigen in a respiratory specimen collected from a person without COVID-like symptoms  $\geq 14$  days after they have completed all recommended doses of the vaccine series.
- Symptomatic breakthrough case: detection of SARS-CoV-2 RNA or antigen in a respiratory specimen collected from a person with COVID-like symptoms  $\geq 14$  days after they have completed all recommended doses of the vaccine series.

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