

In brief

Omicron (B.1.1.529)

24 December 2021

Summary

- Omicron (B.1.1.529) was designated a variant of concern by the World Health Organization on 26 November 2021. It was first reported to WHO from South Africa on 24 November 2021. It has 50 mutations, including 26-32 mutations on its spike protein.^{1,2}
- The World Health Organization notes that based on current evidence, Omicron has a substantial growth advantage over Delta. In countries with documented community transmission of the Omicron variant, the doubling time is 1.5-3 days.²
- Epidemiological data in the Gauteng Province, South Africa, showed SARS-CoV-2 infection rates increased more rapidly than in previous waves but have now plateaued.³
- Preliminary evidence suggests an increased risk of reinfection with Omicron, where people with prior infection are vulnerable to Omicron.^{4,5}
- Preliminary data from South Africa, England, Scotland and Denmark show that people infected with the Omicron variant are less likely to require hospitalisation compared with Delta. This ranges from 40-45%, up to 80% less likely.⁶⁻⁹
- Therapeutic interventions for the management of severe or critical COVID-19 that target host responses (such as corticosteroids, interleukin 6 receptor blockers and prophylaxis with anticoagulation) are expected to remain effective.² Evidence for other interventions include:
 - Antiviral medications will still likely be effective for managing COVID-19, including Paxlovid (nirmatrelvir plus ritonavir), molnupiravir and remdesivir.¹⁰⁻¹²
 - Treatments that target the spike protein of the virus, such as monoclonal antibodies may be less effective, but this will require assessment.¹²⁻¹⁴ Early findings suggest Omicron will likely compromise the binding of many monoclonal antibodies.^{15,16}
 - Preprint results for monoclonal antibody sotrovimab show it retains neutralising activity against all tested individual Omicron substitutions in laboratory tests¹⁷, while early tests show Regen-Cov (casirivimab and imdevimab) is not as effective against Omicron.^{11,18}
- Studies are underway to understand the effectiveness of vaccines. Early estimates of vaccine effectiveness against symptomatic infection indicate significantly lower effectiveness against Omicron compared with Delta. However, this is increased in the early period after a booster dose.¹⁹ Early results have found:
 - the T-cell immune response in previously infected, and most likely vaccinated individuals, should still be effective against Omicron.²⁰
 - neutralising activity of sera from individuals who are vaccinated plus infected, or infected plus vaccinated (also called hybrid immunity), holds well against Omicron.^{21,22}
 - studies on specific vaccines include:
 - Comirnaty
 - a 20- to 40-fold reduction in neutralising activity by two doses of Comirnaty compared with other strains.¹⁹
 - a booster dose of Comirnaty resulted in an increase in neutralising activity irrespective of primary vaccination type (approximately 71% for

those who received Vaxzevria as the primary course and approximately 76% for those who received Comirnaty).¹⁹

- two doses of Comirnaty offers 70% protection against hospitalisation.²³
 - Spikevax
 - a booster dose of Spikevax at 50 microgram (ug) level increases Omicron neutralising antibody levels approximately 37-fold compared to pre-boost level. A booster dose at 100ug increased the Omicron neutralising antibody levels approximately 83-fold.²⁴
 - Vaxzevria
 - Preliminary studies suggest a significant reduction in vaccine effectiveness at 15 weeks after the second dose of Vaxzevria.²⁵
- The diagnostic accuracy of routinely used PCR and antigen-based rapid diagnostic test (Ag-RDT) assays does not appear to be influenced by Omicron.²
- Most Omicron variant sequences reported include a deletion in the S gene, causing some S gene targeting PCR assays to appear negative, and so S gene target failure can be used as a useful proxy marker of Omicron for surveillance.²

To inform this brief, PubMed and Google searches were conducted using terms related to Omicron on 9 December 2021 and updated on 23 December 2021. The Critical Intelligence Unit maintains a living evidence table on [SARS-CoV-2 variants](#).

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