

LETTER TO THE EDITOR

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# Emergence and spread of JN.1 COVID-19 variant

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## Dear editor,

The COVID-19 pandemic continues to significantly impact global health, economics, and public well-being. Millions suffer from long-term consequences or "long COVID," highlighting the enduring effects of the infection (Looi 2023). While existing public health measures and case monitoring remain vital (Looi 2023), the virus' constant evolution poses ongoing challenges.

The recently identified JN.1 variant, classified as a "Variant of Interest" by the WHO due to its rapid spread (Gavi. 2023), represents a growing public health concern. As of December 16th, 2023, JN.1 has been detected in 41 countries, comprising 27.1% of global sequences submitted to GISAID (World Health Organization (WHO) 2023). First identified in the US in September 2023, this variant has already become dominant in some nations, including the UK, Iceland, and Portugal (World Health Organization (WHO) 2023). This rapid spread, especially in developed nations with robust healthcare systems, raises significant concerns for developing countries with less resilient healthcare infrastructure. Novel strategies and rapid responses are crucial for effectively countering JN.1's threat.

JN.1 appears to be more transmissible than other variants (Table 1), including its parent, BA.2.86 (World Health Organization (WHO) 2023; Adebowale and Adesola 2022). Its rapid circulation has made it the

dominant strain in the US, and the UK Health Security Agency attributes this spread to a specific spike protein mutation (American Medical Association 2023). While JN.1's transmissibility is concerning; data suggests its disease severity is not significantly different from other variants (Yale Medicine 2023). It carries an additional L455S mutation in the spike protein, which confers extra immune evasion capabilities. This mutation contributes to JN.1's rapid spread and dominance in the US, where it accounts for over 60% of COVID-19 cases (Hopkins 2024). Despite its heightened resistance to antibodies, JN.1 appears to be less contagious compared to previous strains, suggesting a potential trade-off between immune evasion and transmissibility. Furthermore, the symptoms associated with JN.1 remain largely consistent with those of other variants, including common COVID-19 symptoms such as fever, cough, and loss of taste and smell (Adesola et al. 2021, 2022). However, JN.1 may also present with additional symptoms like a runny nose and digestive issues, further distinguishing it from other strains.

Fortunately, early evidence indicates that current COVID-19 vaccines remain effective in preventing severe disease, hospitalization, and death from JN.1 (Centres for Disease Control and Prevention (CDC) 2023). Although the WHO recommends continuing with XBB.1.5 vaccines for this cross-protection (Centres for Disease Control and Prevention (CDC) 2023), ongoing surveillance and research are crucial to monitor vaccine efficacy against this evolving variant. Continuous adaptation of vaccination strategies, based on updated research, will be essential in effectively combating future variants.

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**Table 1** Characteristics of key covid-19 variants

Variant	First identified	Characteristics
Alpha	December 2020, UK	More transmissible than the original strain. Spike protein mutations affecting vaccine effectiveness (Duong 2021; Adesola and Idris 2022)
Beta	December 2020, South Africa	
Delta	December 2020, India	More transmissible than the Alpha variant. May cause more severe illness. Spike protein mutations affecting vaccine effectiveness (Zhan et al. 2022)
Gamma (P.1)	Tokyo, Japan	Increased transmissibility. Potential to evade immunity. Associated with a higher rate of reinfection. Comprises two sub-variants (28-AM-1 and 28-AM-2) carrying K417T, E484K, and N501Y mutations. Caused widespread infection in Manaus, Brazil in early 2021 despite high prior immunity. May present with different symptoms compared to non-variant of concern infections (Luna-Muschi et al. 2022)
Omicron	November 2021, South Africa	A large number of spike protein mutations affect vaccine effectiveness. Highly transmissible (He et al. 2021)
JN.1	September 2023, United States	Highly mutated sub-variant of Omicron. Additional L455S mutation in spike protein for extra immune evasion. Highly transmissible. Dominant strain in the US, accounting for over 90% of cases. Rapid evolution and prevalence increase. More resistant to antibodies but less contagious. Symptoms include runny nose, fatigue, fever, headaches, cough, sore throat, shortness of breath, digestive issues, and loss of taste and smell (Kaku et al. 2024)

### Public health response and recommendations

Global surveillance plays a crucial role in tracking the spread of COVID-19 variant strains, such as the JN.1 variant. The World Health Organization (WHO) and other health organizations continuously monitor the emergence and spread of new variants to inform public health strategies and vaccine updates.

Regular monitoring of COVID-19 cases and sequences helps identify new variants and their potential impact on transmissibility and disease severity. Early detection allows for prompt public health responses to mitigate the spread of new variants. As new variants emerge, global surveillance data helps assess the effectiveness of current vaccines and informs updates to vaccination strategies. The findings from global surveillance inform public health policies and decisions, such as travel restrictions, social distancing measures, and vaccine prioritization. The need for a rapid and coordinated response to mitigate risks is crucial in addressing the challenges posed by the COVID-19 pandemic, including the spread of new variants like the JN.1 variant.

Early detection and swift action can help prevent the spread of new variants, limiting their impact on public health and reducing the risk of further mutations, also, as new variants emerge, it is crucial to update COVID-19 vaccines to maintain their effectiveness against these strains. This requires a coordinated effort among researchers, health officials, and scientists to understand the impact of variants on vaccine effectiveness. Therefore, rapid and coordinated responses allow governments and health authorities to implement targeted interventions, such as vaccination campaigns, testing, and tracing, to mitigate the risks posed by new variants this also helps minimize the economic consequences of

the pandemic, as seen in the significant negative impact on global economies due to the COVID-19 pandemic. Moreover, it helps address health inequalities, as the pandemic has disproportionately affected vulnerable populations and exacerbated existing health disparities.

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