Statement on the antigen composition of COVID-19 vaccines

16 May 2026
Statement

Reading time: 7 min (1943 words)

Key points:

- The WHO Technical Advisory Group on COVID-19 Vaccine Composition (TAG-CO-VAC) held its twice-yearly decision-making meeting in May 2026 to review the evolution of SARS-CoV-2, the effectiveness of currently approved COVID-19 vaccines and the implications for COVID-19 vaccine antigen composition.
- The objective of any update to COVID-19 vaccine antigen composition is to enhance vaccine-induced immune responses to circulating SARS-CoV-2 variants, when needed.
- Following this meeting, the TAG-CO-VAC advises vaccine manufacturers that **monovalent LP.8.1** is the recommended vaccine antigen.
- Other antigens (e.g. XFG, NB.1.8.1) or other approaches that demonstrate broad and robust neutralizing antibody responses or efficacy against currently circulating SARS-CoV-2 variants could also be used.

- Vaccination remains an important public health countermeasure against COVID-19 and vaccination should not be delayed in anticipation of access to vaccines with an updated antigen composition. As per the March 2026 WHO Strategic Advisory Group of Experts on Immunization (SAGE) recommendations, Member States should consider routine COVID-19 vaccination of groups at highest risk of severe COVID-19 disease.

The WHO Technical Advisory Group on COVID-19 Vaccine Composition (TAG-CO-VAC) continues to closely monitor the genetic and antigenic evolution of SARS-CoV-2 variants, immune responses to SARS-CoV-2 infection and COVID-19 vaccination, and the effectiveness of COVID-19 vaccines against circulating variants. Based on these evaluations, WHO advises vaccine manufacturers and regulatory authorities on the implications for future updates to COVID-19 vaccine antigen composition. In December 2025, the TAG-CO-VAC advised vaccine manufacturers that monovalent LP.8.1 is the recommended vaccine antigen. Multiple manufacturers (using mRNA or recombinant protein-based vaccines) have updated COVID-19 vaccine antigen composition to monovalent LP.8.1 formulation. Several of these vaccines have been approved for use by regulatory authorities and have been introduced into vaccination programmes. Previous statements from the TAG-CO-VAC can be found on the WHO website.

The TAG-CO-VAC reconvened on 7-8 May 2026 to review the genetic and antigenic evolution of SARS-CoV-2; immune responses to SARS-CoV-2 infection and/or COVID-19 vaccination; the effectiveness of currently approved vaccines against circulating SARS-CoV-2 variants; and the implications for COVID-19 vaccine antigen composition.

Evidence reviewed

The published and unpublished evidence reviewed by the TAG-CO-VAC included: (1) SARS-CoV-2 genetic evolution, with additional support from the WHO Technical Advisory Group on Virus Evolution (TAG-VE); (2) Antigenic characterization of previous and emerging SARS-CoV-2 variants

using virus neutralization tests with animal antisera and further analysis of antigenic relationships using antigenic cartography; (3) Immunogenicity data on the breadth of neutralizing antibody responses elicited by currently approved vaccine antigens against circulating SARS-CoV-2 variants using animal and human sera, with additional support from WHO Coronavirus Network (CoViNet); (4) Preliminary clinical immunogenicity data on immune responses following infection with circulating SARS-CoV-2 variants; (5) Available COVID-19 vaccine effectiveness (VE) estimates of currently approved vaccines; and (6) Preliminary non-clinical and clinical immunogenicity data on the performance of candidate vaccines with updated antigens shared by vaccine manufacturers with TAG-CO-VAC. Further details on the data reviewed by the TAG-CO-VAC can be found in the accompanying data annex. Confidential data reviewed by the TAG-CO-VAC are not shown.

Summary of available evidence

- There are persistent and increasing gaps and delays in the surveillance and reporting of cases, hospitalizations and deaths from WHO Member States, limiting the interpretation and comparability of epidemiological trends over time. In 2026, SARS-CoV-2 continues to circulate globally, causing severe disease, post COVID-19 condition, and death. However, the impact on health systems has reduced substantially compared to 2020-2021 due to multiple factors, including increased population immunity from infection and/or vaccination and improved clinical management. In 2026, all WHO regions are reporting lower SARS-CoV-2 test positivity rates than during the corresponding period in previous years.
- Globally, the current predominant variant among SARS-CoV-2 sequences remains Variant Under Monitoring (VUM) XFG, however the weekly proportion is now declining. In contrast, in countries in the WHO Western Pacific Region where sequencing continues, VUM NB.1.8.1 is the predominant variant. Globally, the proportion of VUM BA.3.2 is increasing, with heterogeneous dynamics across countries where genomic surveillance continues. BA.3.2 appears to have lower fitness than JN.1-descendant variants, which may explain why BA.3.2

has not displaced JN.1-descendant variants in regions where it has been detected. To date, the increase in the proportion of BA.3.2 does not appear to be associated with a substantial increase in disease burden, unlike increases associated with previous Variants of Interest and JN.1-descendant variants. In several countries, BA.3.2 appears to account for a higher proportion of sequences from young children than adults, suggesting possible differences in susceptibility to BA.3.2 related to a lack of cross-reactive immunity generated by previous exposure to early SARS-CoV-2 variants. However, sequence numbers and the reported number of infected individuals, including those with severe disease, remain low; this observation should therefore be interpreted with caution.

- Neutralization data using antisera from naïve animals infected or vaccinated with JN.1, LP.8.1, NB.1.8.1 or XFG, indicated that recent JN.1-descendant variants are antigenically closely related. These variants differed by approximately 1 antigenic unit in cartographic analyses, corresponding to a two-fold-difference in neutralization, with XFG often the most antigenically distant from JN.1 within the JN.1 cluster. In contrast, these antisera showed limited neutralizing activity against BA.3.2. Antisera from naïve animals infected with BA.3.2 showed very limited cross-reactivity with recent JN.1-descendant variants. Together, these results indicate that BA.3.2 is antigenically distinct from JN.1-descendant variants.
- Sera from cohorts that are representative of recent population immunity and pre-LP.8.1 vaccination sera demonstrated cross-reactivity with recent JN.1-descendant variants and with BA.3.2.
- Pre- and post-vaccination sera from individuals immunized with LP.8.1 demonstrated significant increases in neutralizing activity against JN.1 and its descendant variants, including NB.1.8.1 and XFG. Post-vaccination neutralizing antibody titers and the fold change against BA.3.2 were lower than against the homologous LP.8.1 antigen and other JN.1- descendant variants.
- Pre- and post-vaccination sera from individuals immunized with JN.1 or KP.2 demonstrated significant increases in neutralizing activity against JN.1 and its descendant variants. However, post-vaccination neutralizing antibody titers against NB.1.8.1 and XFG were lower than

those against the homologous JN.1 or KP.2 antigens, with even larger reductions typically observed for BA.3.2.

- Contemporary vaccine effectiveness (VE) estimates are relative (rVE) and demonstrate the added or incremental protection of recent vaccination over and above pre-existing infection- and vaccine-derived immunity. Monovalent JN.1 and KP.2 mRNA vaccines demonstrated additional protection—relative to pre-existing immunity—against symptomatic and severe COVID-19. The limited number of rVE estimates using monovalent LP.8.1 vaccines also demonstrated additional protection against symptomatic and severe COVID-19.
- Data shared with the TAG-CO-VAC by vaccine manufacturers showed that:
    - Immunization of naïve mice with monovalent LP.8.1, XFG or NB.1.8.1 induced high neutralizing antibody titers against the homologous antigen, as well as other JN.1-descendant variants. Low or non-detectable neutralizing antibody titers were consistently observed against BA.3.2. In contrast, immunization of naïve mice with monovalent BA.3.2 induced immune responses largely restricted to the homologous antigen. Overall immunogenicity of BA.3.2 was lower than after LP.8.1, XFG or NB.1.8.1 immunization.
    - Immunization of mice previously immunized with SARS-CoV-2 variants and then immunized with LP.8.1, XFG or NB.1.8.1 induced high neutralizing antibody titers against JN.1-descendant variants. Lower neutralizing antibody titers against BA.3.2 were observed. Immunization with BA.3.2 induced neutralizing titers against the homologous antigen, and to a lesser extent against JN.1-descedant variants. However, overall immunogenicity of BA.3.2 was lower than after LP.8.1, XFG or NB.1.8.1 immunization.
    - In humans, vaccination with 8.1 induced strong increases in neutralizing antibody titers against JN.1, LP.8.1, NB.1.8.1 and XFG. As in mice, post- vaccination neutralizing antibody titers against BA.3.2 were lower than those against the homologous LP.8.1 antigen. A single clinical immunogenicity study using a BA.3.2 vaccine candidate showed increased

neutralizing antibody titers against the homologous antigen, and a back boost against JN.1-descendant variants, but overall lower immunogenicity than the LP.8.1 vaccine.

Overall, LP.8.1 as a vaccine antigen in populations with high levels of prior infection and / or vaccination continues to induce broadly cross-reactive immune responses to circulating SARS-CoV-2 variants.

The TAG-CO-VAC acknowledges several limitations of available data:

- There are persistent and increasing gaps and delays in the reporting of cases, hospitalizations and deaths, from WHO Member States, as well as in genetic/genomic surveillance of SARS-CoV-2 globally, including low numbers of samples sequenced and limited geographic diversity. The TAG-CO-VAC strongly supports the ongoing work of the WHO Coronavirus Network (CoViNet) and the Global Influenza Surveillance and Response System (GISRS) to address this information gap.
- The timing, specific mutations and antigenic characteristics of emerging and future variants are difficult to predict, and the potential public health impact of these variants remain unknown. Currently, two antigenically distinct lineages (JN.1-descendant and BA.3.2-descendant variants) are circulating and the comparative evolutionary potential of these lineages remains uncertain. Variants derived from these lineages will continue to be monitored and/or characterized, and the TAG-CO-VAC strongly supports the ongoing work of the TAG-VE.
- Although neutralizing antibody titers have been shown to be important correlates of protection from SARS-CoV-2 infection and of estimates of vaccine effectiveness, there are multiple components of immune protection elicited by infection and/or vaccination. Data on the immune responses following JN.1-descendant variant infection or monovalent LP.8.1 vaccination are largely restricted to neutralizing antibodies. Data and interpretation of other aspects of the immune response, including cellular immunity, are limited.
- Immunogenicity data against currently circulating SARS-CoV-2 variants are not available for all COVID-19 vaccines.

- Recent estimates of rVE are limited in terms of the number of studies, geographic diversity, vaccine platforms evaluated, populations assessed, duration of follow-up, and contemporary comparisons of vaccines with different antigen composition. There are currently only a limited number of available rVE estimates using monovalent LP.8.1 mRNA vaccines; there are no rVE estimates in populations in which BA.3.2 was the predominant variant.

Recommendations for COVID-19 vaccine antigen composition

Monovalent LP.8.1 (Nextstrain: 25A; GenBank: PV074550.1; GISAID: EPI_ISL_19467828) is the recommended COVID-19 vaccine antigen.

Other antigens (e.g. XFG, NB.1.8.1) or other approaches that demonstrate broad and robust neutralizing antibody responses or efficacy against currently circulating SARS-CoV-2 variants could also be used.

As per the March 2026 WHO Strategic Advisory Group of Experts on Immunization (SAGE) recommendations, Member States should consider routine COVID-19 vaccination of groups at highest risk of severe COVID-19 disease and vaccination should not be delayed in anticipation of access to vaccines with an updated antigen composition.

Further data requested

Given the limitations of the evidence upon which the recommendations above are derived and the anticipated continued evolution of the virus, the TAG-CO-VAC strongly encourages generation of the following data (in addition to the types of data outlined in March 2026)

- Immune responses and clinical endpoints (i.e. VE and/or comparator rates of infection and severe disease) in varied human populations who receive currently approved COVID-19 vaccines against emerging SARS-CoV-2 variants, across different vaccine platforms.

- Strengthened epidemiological and virological surveillance, as per the Standing Recommendations for COVID-19 in accordance with the International Health Regulations (2005), to determine if emerging variants are antigenically distinct and able to displace circulating variants.
- Strengthened epidemiological surveillance to characterize disease severity in immunologically naïve and/ or immature individuals (e.g. young pediatric cohorts), particularly for BA.3.2 infections.
- Non-clinical and clinical immunogenicity data against circulating SARS-CoV-2 variants for vaccine candidates with different SARS-CoV-2 antigens.

As previously stated, the TAG-CO-VAC continues to encourage the further development of vaccines that may improve protection against infection and reduce transmission of SARS-CoV-2.

The TAG-CO-VAC will continue to closely monitor the genetic and antigenic evolution of SARS-CoV-2 variants, immune responses to SARS-CoV-2 infection and COVID-19 vaccination, and the effectiveness of COVID-19 vaccines against circulating variants. The TAG-CO-VAC will also continue to reconvene every six months, or as needed, to evaluate the implications for COVID-19 vaccine antigen composition. At each meeting, recommendations to either maintain current vaccine composition or to consider updates will be issued. Prior to each meeting, the TAG-CO-VAC will publish an update to the statement on the types of data requested to inform COVID-19 vaccine antigen composition deliberations.