

Special Article



COVID-19 Vaccination Recommendations for 2025-2026 in Korea

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ABSTRACT

The Korean Society of Infectious Diseases has regularly updated its adult immunization guidelines, including the coronavirus disease 2019 (COVID-19) vaccination recommendations in 2023 and the 2024-2025 seasonal update. This article provides a comprehensive update as of September 2025, reflecting the latest evidence and international guidance. Focusing on the 2025-2026 season, it reviews vaccines currently authorized in Korea and their effectiveness against predominant JN.1 sublineage variants, including LP.8.1, NB.1.8.1, and XFG. The updated recommendations prioritize vaccination with LP.8.1-adapted vaccines for high-risk groups—adults aged 65 years and older, individuals aged 6 months and older at increased risk for severe disease, and residents of facilities vulnerable to infection—while vaccination remains available for all individuals aged 6 months and older. A single-dose strategy is generally recommended, although older adults and immunocompromised individuals may consider an additional dose at 6-month intervals in consultation with healthcare professionals. These updates aim to refine Korea's COVID-19 vaccination strategy and sustain protection in high-risk populations, with recommendations remaining subject to revision as new evidence and epidemiological conditions evolve.

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SUMMARY OF RECOMMENDATIONS

1. Who should get vaccinated

Coronavirus disease 2019 (COVID-19) vaccination for the 2025–2026 season is recommended for adults aged 65 years and older, for individuals aged 6 months and older who are at high risk of severe COVID-19, and for residents of facilities at high risk, such as long-term care facilities and other facilities vulnerable to infection.

2. Doses and methods of vaccination

- 1) For the 2025–2026 season, vaccination with LP.8.1-adapted mRNA vaccines (Pfizer-BioNTech, Moderna) is recommended.
- 2) For individuals aged 12 years and older who are eligible for COVID-19 vaccination, a single dose of the 2025–2026 COVID-19 vaccine should be administered regardless of prior vaccination history.
- 3) For infants, children and adolescents aged 6 months through 11 years who are eligible for COVID-19 vaccination, the 2025–2026 COVID-19 vaccine may be administered in an age-appropriate dose and schedule, based on prior vaccination history.
- 4) For adults aged 65 years and older, or for individuals aged 6 months and older who are moderately or severely immunocompromised, an additional dose of the 2025–2026 vaccine may be considered at 6-month intervals.

3. Contraindications and precautions

- 1) When a severe allergic reaction (e.g., anaphylaxis) is confirmed to be caused by a component of a specific COVID-19 vaccine, further vaccination with the same vaccine type is contraindicated.
- 2) When COVID-19 vaccine-associated myocarditis or pericarditis is confirmed, subsequent administration of COVID-19 vaccines should generally be avoided.

At its May 2025 meeting, the Technical Advisory Group on coronavirus disease 2019 (COVID-19) Vaccine Composition (TAG-CO-VAC) under the World Health Organization (WHO), reviewing data [1, 2] on the immune escape potential of the LP.8.1 variant, a sublineage of JN.1,

proposed target antigens for the 2025–2026 vaccine [3]. WHO TAG-CO-VAC concluded that either JN.1 or KP.2 antigens remained appropriate and also proposed a monovalent LP.8.1-adapted vaccine as an alternative. The United States (US) Food and Drug Administration, at its May 2025 meeting, likewise recommended a JN.1 lineage-based vaccine for the 2025–2026 season while expressing preference for LP.8.1 [4]. The European Medicines Agency Emergency Task Force also endorsed development of an LP.8.1-based vaccine for the same season [5].

In Korea, LP.8.1 was the predominant severe acute respiratory syndrome coronavirus 2 variant until April 2025; however, since May 2025, the NB.1.8.1 variant increased rapidly, becoming dominant by September 2025 [6]. NB.1.8.1 carries six additional spike protein mutations beyond LP.8.1; however, WHO's Technical Advisory Group on Virus Evolution (TAG-VE) determined in May 2025 that NB.1.8.1 conferred minimal additional immune escape compared with LP.8.1, classifying its overall risk as "low" [7]. Animal studies showed that neutralizing antibody titers in mice vaccinated with KP.2 or LP.8.1 antigen vaccines were similar to or slightly lower against NB.1.8.1 than against the corresponding vaccine antigen, suggesting current vaccines remain effective.

By September 2025, the XFG variant was predominant in the US and Europe, with an increasing trend observed in Korea since June 2025 [6]. As of August 2025, XFG was most frequently detected in wastewater samples from aircraft and passenger ships [8]. At its June 2025 meeting, WHO TAG-VE assessed XFG as conferring minimal immune escape compared with LP.8.1 and overall low risk, concluding that currently approved vaccines should provide protection [9]. Accordingly, in Korea, consistent with international guidance, vaccination with an LP.8.1-adapted mRNA vaccine was recommended for the 2025–2026 season.

As of the second week of September 2025, two vaccines for the 2025–2026 season had been approved domestically: Pfizer-BioNTech and Moderna (Table 1). In the US, Pfizer's vaccine has been authorized in both prefilled syringe and single-dose vial formulations; in Korea, only the prefilled syringe formulation has been approved by the Ministry of Food and Drug Safety for individuals aged 12 years and older, at 30 µg/0.3 mL. It must be stored at 2–8 °C, must not be frozen, and is stable for 12 months from

the date of manufacture. Each full dose is administered intramuscularly to a single recipient without dilution or splitting. Moderna's vaccine has been authorized in the United States (US) in two prefilled syringe formulations (50 µg/0.5 mL for those aged 12 years and older, and 25 µg/0.25 mL for those aged 6 months to 11 years). In Korea, however, the approved product is the 50 µg/0.5 mL single-dose vial formulation. It must be stored frozen at -50 to -15 °C, and once thawed, can be stored at 2–8 °C for up to 80 days but must not be refrozen. Each full dose is administered intramuscularly without dilution or splitting. In the US, Novavax's JN.1-adapted recombinant protein vaccine has been authorized in a prefilled syringe formulation for the 2025–2026 season but had not been approved in Korea as of the second week of September 2025.

In its 2024–2025 COVID-19 vaccination guidelines, the Korean Society of Infectious Diseases (KSID) recommended a single dose for adults aged 65 years and older and for individuals aged 6 months and older at high risk of severe disease or living in high-risk facilities such as long-term care facilities, taking into account international guidelines and the domestic COVID-19 epidemiological situation. KSID also recommended that adults aged 65 years and older and moderately or severely immunocompromised individuals consider a two-dose schedule at 6-month intervals, in consultation with healthcare professionals [10].

Internationally, the US, noting waning vaccine effectiveness, recommends that adults aged 65 years and older and individuals aged 6 months and older with moderate or severe immunocompromise receive an additional dose 6 months after their last dose (with a minimum interval of 2 months) [11]. The United Kingdom (UK) recommends vaccination for adults aged 75 years and older, residents in a care home for older adults, and immunosuppressed individuals aged 6 months and

older, at 6-month intervals [12]. Canada recommends vaccination for adults aged 65 years and older and for individuals aged 6 months and older at high risk of severe disease, whereas adults aged 80 years and older, adult residents of long-term care homes and other congregate living settings for seniors, as well as individuals aged 6 months and older who are moderately or severely immunocompromised, are advised to receive two doses annually [13]. Australia recommends vaccination for adults aged 65 years and older and for immunocompromised adults aged 18 years and older, with additional 6-month interval vaccination for adults aged 75 years and older [14].

In Korea, although the severity and fatality of COVID-19 have gradually declined, more than 90% of related domestic deaths continue to occur among individuals aged 60 years and older [15, 16]. Therefore, for the 2025–2026 season, vaccination is recommended for adults aged 65 years and older, for individuals aged 6 months and older at high risk of severe disease (Table 2) [17], and for residents of facilities at high risk, such as long-term care facilities and other facilities vulnerable to infection. Among those eligible for COVID-19 vaccination, individuals aged 12 years and older should receive a single dose of the 2025–2026 COVID-19 vaccine regardless of prior vaccination history, with a recommended minimum interval of 3 months (90 days) from their most recent COVID-19 vaccination. For infants, children and adolescents aged 6 months through 11 years who are eligible for COVID-19 vaccination, the 2025–2026 COVID-19 vaccine may be administered in an age-appropriate dose and schedule, based on prior vaccination history. In the US, age-specific prefilled syringe formulations—10 µg/0.3 mL (Pfizer-BioNTech) for ages 5–11 years and 25 µg/0.25 mL (Moderna) for ages 6 months–11 years—are authorized. In Korea, although pediatric prefilled syringe products are not available,

Table 1. COVID-19 vaccines approved in Korea for the 2025–2026 season (as of September 2025)

Product	Manufacturer	Vaccine platform	Age of vaccination	Dose and administration	Storage
Comirnaty LP.8.1 prefilled syringe	Pfizer/BioNTech	mRNA vaccine	≥12 years ^a	30 µg/0.3 mL, prefilled syringe, intramuscular injection	2–8°C refrigerated (stable up to 12 months)
Spikevax LP.8.1 Injection	Moderna	mRNA vaccine	≥12 years ^b	50 µg/0.5 mL, single-dose vial, intramuscular injection	Frozen at -50 to -15°C; after thawing, refrigerated at 2–8°C (up to 80 days)

^aIn the US, a 10 µg/0.3 mL prefilled syringe formulation is approved for those aged 5–11.

^bIn the US, a 50 µg/0.5 mL prefilled syringe formulation is approved for those aged 12 years and older; a 25 µg/0.25 mL prefilled syringe formulation is approved for those aged 6 months–11 years. COVID-19, coronavirus disease 2019.

Table 2. Risk factors for severe COVID-19^a

High risk	Asthma, cancer, cerebrovascular disease, chronic kidney disease, chronic lung diseases (bronchiectasis, chronic obstructive pulmonary disease, interstitial lung diseases, pulmonary embolism, pulmonary hypertension), chronic liver diseases (cirrhosis, non-alcoholic fatty liver disease, alcoholic liver disease, autoimmune hepatitis), cystic fibrosis, type 1 and type 2 diabetes, disabilities ^b (down syndrome, etc.), heart conditions (heart failure, coronary artery disease, cardiomyopathy), Human immunodeficiency virus infection, mental health conditions (mood disorders, schizophrenia spectrum disorders), dementia, Parkinson's disease, obesity (body mass index [BMI] ≥ 30 or ≥ 95 th percentile for children), physical inactivity, pregnancy and recent pregnancy, primary immunodeficiencies, current and former smoking, solid organ or blood stem cell transplantation, tuberculosis, use of corticosteroids or other immunosuppressive medications
Suggestive high risk	Children with certain underlying conditions ^b , epilepsy, hemophilia, overweight ($25 \leq \text{BMI} < 30$), sickle cell disease, substance use disorders
Inconclusive	Alpha-1 antitrypsin deficiency, bronchopulmonary dysplasia, hepatitis B, hepatitis C, hypertension, thalassemia

^aSource: United States Centers for Disease Control and Prevention [17].

^bFor the complete list of disabilities classified as high-risk and the underlying conditions in children presumed to be high-risk, see reference [17]. COVID-19, coronavirus disease 2019.

the Moderna single-use vial formulation may be used to draw and administer the recommended pediatric half-dose (25 µg/0.25 mL) for individuals aged 6 months–11 years without dilution. Because primary series vaccination schedules for infants and children vary by age and prior vaccination history, detailed recommendations on primary series dose number and intervals for this age group are beyond the scope of this adult immunization guideline. In addition, among the special populations, pregnancy is one of the high-risk conditions for severe COVID-19. Given that the safety and effectiveness of COVID-19 vaccines have been demonstrated in pregnant women [18], the 2025–2026 COVID-19 vaccine can be safely administered during pregnancy.

Domestic studies in Korea also confirm waning immunity over time [19]. For adults aged 65 years and older, and

for children and adults aged 6 months and older with moderate or severe immunocompromise, a twice-yearly vaccination schedule at 6-month intervals may be warranted. Although a consensus definition of moderate or severe immunocompromise for which semiannual vaccination should be recommended has not yet been established, guidance from the US Centers for Disease Control and Prevention (CDC) (Table 3) may be used as a reference [20]. The CDC specifies that its list is illustrative and not exhaustive. Although detailed criteria differ, the UK [12] and Australia [21] similarly include hematologic malignancy, hematopoietic stem cell or solid organ transplantation, immunosuppressive therapy for autoimmune or inflammatory conditions, HIV infection, and primary immunodeficiency as representative conditions. Consequently, the need for semiannual vaccination in immunocompromised patients should be

Table 3. Moderate and severe immunocompromising conditions related to COVID-19 vaccination^a

Active treatment for solid tumor and hematologic malignancies
Hematologic malignancies associated with poor responses to COVID-19 vaccines regardless of current treatment status (e.g., chronic lymphocytic leukemia, non-Hodgkin lymphoma, multiple myeloma, acute leukemia)
Receipt of solid-organ transplant or an islet cell transplant and taking immunosuppressive therapy
Receipt of chimeric antigen receptor-T-cell therapy or hematopoietic cell transplantation (within 2 years of transplantation or taking immunosuppressive therapy)
Moderate or severe primary immunodeficiency (e.g., common variable immunodeficiency disease, severe combined immunodeficiency, DiGeorge syndrome, Wiskott-Aldrich syndrome)
Advanced HIV infection (people with HIV and CD4 cell count $< 200/\text{mm}^3$, history of an AIDS-defining illness without immune reconstitution, or clinical manifestation of symptomatic HIV infection) or untreated HIV infection
Active treatment with <ul style="list-style-type: none"> · High-dose corticosteroids (e.g., ≥ 20 mg prednisone-equivalent daily for ≥ 2 weeks) · Alkylating agents · Antimetabolites · Transplant-related immunosuppressive drugs · Cancer chemotherapeutic agents classified as severely immunosuppressive · Tumor necrosis factor blockers · Other biologic agents that are immunosuppressive or immunomodulatory biologic agents (e.g., B-cell-depleting agents)

^aUnited States Centers for Disease Control and Prevention [20]. Moderate and severe immunocompromising conditions are not limited to those listed in the table, and immune status should be assessed by considering disease severity, duration of illness, clinical stability, complications, comorbidities, and treatments.

determined in consultation with specialists on a case-by-case basis. As the epidemiology of COVID-19 continues to evolve, vaccination policy should remain flexible, with risk-benefit assessment individualized according to domestic epidemic conditions in the first half of 2026 and host-specific factors.

Severe allergic reactions, such as anaphylaxis, caused by a COVID-19 vaccine or its components are considered a contraindication to further administration of the same vaccine [22]. When myocarditis or pericarditis caused by a COVID-19 vaccine is confirmed in a vaccinated individual, following COVID-19 vaccination should generally be avoided. The US CDC recommends that individuals diagnosed with myocarditis or pericarditis within 3 weeks after COVID-19 vaccination should generally not receive a subsequent dose of any COVID-19 vaccine [23]. However, the CDC notes that vaccination may be considered following individualized risk assessment in individuals who have recovered without sequelae and whose myocarditis or pericarditis is unrelated to COVID-19 vaccination, or in those at high risk for severe COVID-19.

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Conflict of Interest

WBP is editor-in-chief of *Infect Chemother*. JYS and JYC are editorial board of *Infect Chemother*; however, they did not involve in the peer reviewer selection, evaluation, and decision process of this article. Otherwise, no potential conflicts of interest relevant to this article was reported.

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Conceptualization: WBP, WSC. Data curation: WBP, YHH. Writing - original draft: WBP, YHH. Writing - review & editing: WBP, YHH, KTK, JYN, SHP, JYS, EJC, MJC, JYC, JYH, WSC.

SUPPLEMENTARY MATERIAL

Supplementary Material

Korean version

REFERENCES

- Chen L, Kaku Y, Okumura K, Uriu K, Zhu Y, ; Genotype to Phenotype Japan (G2P-Japan) Consortium; Ito J, Sato K. Virological characteristics of the SARS-CoV-2 LP.8.1 variant. *Lancet Infect Dis* 2025;25:e193. [PUBMED](#) | [CROSSREF](#)
- World Health Organization (WHO). WHO TAG-VE risk evaluation for SARS-CoV-2 variant under monitoring: LP.8.1. Available at: https://cdn.who.int/media/docs/default-source/documents/epp/tracking-sars-cov-2/03022025_lp.8.1_ire.pdf?sfvrsn=b89f0899_4&download=true. Accessed 12 September 2025.
- World Health Organization (WHO). Statement on the antigen composition of COVID-19 vaccines, 2025 May 15. Available at: <https://www.who.int/news-room/15-05-2025-statement-on-the-antigen-composition-of-covid-19-vaccines>. Accessed 12 September 2025.
- Food and Drug Administration (FDA). COVID-19 vaccines (2025-2026 Formula) for use in the United States beginning in fall 2025. Available at: <https://www.fda.gov/vaccines-blood-biologics/industry-biologics/covid-19-vaccines-2025-2026-formula-use-united-states-beginning-fall-2025>. Accessed 12 September 2025.
- European Medical Agencies (EMA). EMA recommendation to update the antigenic composition of authorised COVID-19 vaccines for 2025-2026. Available at: https://www.ema.europa.eu/en/documents/other/ema-recommendation-update-antigenic-composition-authorised-covid-19-vaccines-2025-2026_en.pdf. Accessed 12 September 2025.
- Korea Disease Control and Prevention Agency (KDCA). Current status of COVID-19 genetic analysis. Available at: <https://www.kdca.go.kr/contents.es?mid=a20107030000>. Accessed 12 September 2025.
- World Health Organization (WHO). WHO TAG-VE risk evaluation for SARS-CoV-2 variant under monitoring: NB.1.8.1. Available at: https://cdn.who.int/media/docs/default-source/documents/epp/tracking-sars-cov-2/23052025_nb.1.8.1_ire.pdf?sfvrsn=7b14df58_5&download=true. Accessed 12 September 2025.
- Korea Disease Control and Prevention Agency (KDCA). Airport and port wastewater-based COVID-19 variant surveillance. Available at: <https://www.kdca.go.kr/contents.es?mid=a20107060000>. Accessed 12 September 2025.
- World Health Organization (WHO). WHO TAG-VE risk evaluation for SARS-CoV-2 variant under monitoring: XFG. Available at: https://cdn.who.int/media/docs/default-source/documents/epp/tracking-sars-cov-2/25062025_xfg_ire.pdf?sfvrsn=7b14df58_5&download=true. Accessed 12 September 2025.

pdf?sfvrsn=260a9981_4&download=true. Accessed 12 September 2025.

10. Park WB, Hwang YH, Kwon KT, Noh JY, Park SH, Song JY, Choo EJ, Choi MJ, Choi JY, Heo JY, Choi WS; Committee on Adult Immunization of the Korean Society of Infectious Diseases. COVID-19 vaccination recommendations for 2024-2025 in Korea. *Infect Chemother* 2024;56:453-60. [PUBMED](#) | [CROSSREF](#)
11. Roper LE, Godfrey M, Link-Gelles R, Moulia DL, Taylor CA, Peacock G, Brewer N, Brooks O, Kuchel G, Talbot HK, Schechter R, Fleming-Dutra KE, Panagiotakopoulos L. Use of additional doses of 2024-2025 COVID-19 vaccine for adults aged ≥ 65 years and persons aged ≥ 6 months with moderate or severe immunocompromise: recommendations of the Advisory Committee on Immunization Practices – United States, 2024. *MMWR Morb Mortal Wkly Rep* 2024;73:1118-23. [CROSSREF](#)
12. UK Health Security Agency. COVID-19 - SARS-CoV-2. Available at: https://assets.publishing.service.gov.uk/media/68b5be03536d629f9c82a97d/Green-book-chapter-COVID-19_1_9_25.pdf. Accessed 12 September 2025.
13. Public Health Agency of Canada (PHAC). Summary of NACI statement of January 10, 2025: Guidance on the use of COVID-19 vaccines for 2025 to summer 2026. Available at: <https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/national-advisory-committee-immunization-summary-guidance-covid-19-vaccines-2025-summer-2026.html>. Accessed 12 September 2025.
14. Department of Health, Disability and Ageing. COVID-19 vaccine advice and recommendations. Available at: <https://www.health.gov.au/our-work/covid-19-vaccines/getting-your-vaccination>. Accessed 12 September 2025.
15. Choi SY, Ryu B, Jeong SJ, Jang M, An M, Park SY, Kim SS. Characteristics and trends of COVID-19 deaths in the Republic of Korea (January 20, 2020–August 30, 2023). *Public Health Weekly Report* 2024;17:802-22. [PUBMED](#)
16. Kim G, Ryu B, Jeong S, Baek S. Characteristics and trends of coronavirus disease 2019 outbreak in the Republic of Korea (January 20, 2020–August 30, 2023). *Public Health Weekly Report* 2025;18:157-79. [PUBMED](#)
17. Centers for Disease Control and Prevention (CDC). Underlying conditions and the higher risk for severe COVID-19. Available at: <https://www.cdc.gov/covid/hcp/clinical-care/underlying-conditions.html>. Accessed 12 September 2025.
18. Ciapponi A, Berrueta M, Argento FJ, Ballivian J, Bardach A, Brizuela ME, Castellana N, Comandé D, Gottlieb S, Kampmann B, Mazzoni A, Parker EPK, Sambade JM, Stegelmann K, Xiong X, Stergachis A, Buekens P. Safety and effectiveness of COVID-19 vaccines during pregnancy: a living systematic review and meta-analysis. *Drug Saf* 2024;47:991-1010. [PUBMED](#) | [CROSSREF](#)
19. Nham E, Ko JH, Song KH, Choi JY, Kim ES, Kim HJ, Kim B, Lim HY, Kim KC, Jang HC, Lee KH, Song YG, Baek YJ, Ahn JY, Choi JY, Kim YC, Park YS, Choi WS, Bae S, Kim SH, Kang ES, Jeong HW, Kim SW, Kwon KT, Kim SS, Peck KR. Kinetics of vaccine-induced neutralizing antibody titers and estimated protective immunity against wild-type SARS-CoV-2 and the Delta variant: A prospective nationwide cohort study comparing three COVID-19 vaccination protocols in South Korea. *Front Immunol* 2022;13:968105. [PUBMED](#) | [CROSSREF](#)
20. Centers for Disease Control and Prevention (CDC). COVID-19 vaccination guidance for people who are immunocompromised. Available at: <https://www.cdc.gov/covid/hcp/vaccine-considerations/immunocompromised.html>. Accessed 12 September 2025.
21. Department of Health, Disability and Ageing. Example conditions associated with increased risk of severe outcomes from COVID-19. Available at: <https://immunisationhandbook.health.gov.au/resources/tables/table-example-conditions-associated-with-increased-risk-of-severe-outcomes-from-covid-19>. Accessed 12 September 2025.
22. Centers for Disease Control and Prevention (CDC). Contraindications and precautions. Available at: <https://www.cdc.gov/covid/hcp/vaccine-considerations/contraindications-precautions.html>. Accessed 14 November 2025.
23. Centers for Disease Control and Prevention (CDC). Safety considerations for COVID-19 vaccines. Available at: <https://www.cdc.gov/covid/hcp/vaccine-considerations/safety-considerations.html>. Accessed 14 November 2025.