

Recombinant influenza vaccine and evidence



- Recombinant influenza vaccine is produced using an egg-free baculovirus expression system in insect cells⁵
- To date, RIV has been approved for individuals 9 years and above*



Use of recombinant technology maintains an exact match to WHO selected strains:

- Helps preserve antigen sequence
- Ensures known and exact content in each vaccine⁵



As the only approved influenza vaccine leveraging recombinant technology, this results in a less complex antigen structure, which can allow:

- Potential for cross protection through providing broader access to antigenic sites, allowing greater accessibility for an immune response⁵
- It eliminates egg-adaptation effects and delivers consistent, high-quality antigen⁵



- HA is the antigen presented to the body to help drive an immune response against influenza strains⁵
- RIV has 3X higher HA content (45 µg per strain) vs standard-dose (15 µg per strain) egg-based or cell-based vaccines¹

RIV : 45 µg of each HA antigen; IIV-SD (cell) : 15 µg of each HA antigen; IIV-SD (egg) : 15 µg of each HA antigen

*RIV is approved for use in the US and EU, including the UK for individuals aged ≥9 years.^{1,6,7} It is also approved in Hong Kong for individuals aged 18 years and older⁸

Abbreviations: CI, confidence interval; EU, European Union; HA, hemagglutinin; RCT, randomized controlled trial; RIV, recombinant influenza vaccine; UK, United Kingdom; US, United States of America; WHO, World Health Organization

References: 1. Flublok Prescribing Information, Sanofi Pasteur Inc. Swiftwater, PA. Package Insert - Flublok. Accessed 10 June 2026. 2. Dunkle LM, et al. *N Engl J Med*. 2017;376(25):2427-2436. doi: 10.1056/NEJMoa1608862. 3. Sullivan SG, et al. *Lancet Infect Dis*. April 02, 2026. doi:10.1016/S1473-3099(26)00062-9. 4. Bartelt-Hofer J, et al. Poster presented at: National Adult and Influenza Immunization Summit (NAIIS); May 19-21, 2026; Atlanta, GA. 5. Arunachalam AB, et al. *NPJ Vaccines*. 2021;6(1):144. doi: 10.1038/s41541-021-00403-7. 6. Supemtek Summary of Product Characteristics, Sanofi Winthrop Industrie. Gentilly, FR. supemtek-epar-product-information_en.pdf. Accessed 10 June 2026. 7. Supemtek Summary of Product Characteristics, Sanofi Pasteur Inc. Berkshire, UK. Supemtek TIVr solution for injection in pre-filled syringe - Summary of Product Characteristics (SmPC) - print friendly - (emc). Accessed 10 June 2026. 8. Centre for Health Protection. 2025. Centre for Health Protection - Frequently Asked Questions on Seasonal Influenza Vaccination for the 2025-26 Season in Hong Kong. Accessed 10 June 2026

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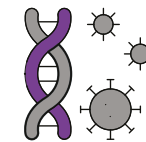
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MAT-US-2608028 V1.0 - P - expiry 07/10/2027

Recombinant Influenza Vaccine

Supporting annual influenza vaccination



Recombinant influenza vaccine (RIV) has 3X higher hemagglutinin (HA) compared to standard-dose vaccines and has been available for more than 10 seasons¹



Clinical evidence demonstrates its efficacy in adults aged 50 years and older¹



A pivotal phase 3/4 randomized controlled trial (RCT) in individuals aged ≥50, RIV showed²



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Reduced influenza infection by 30% (95% CI 10–47) for RIV vs egg-based standard-dose vaccine²



Similar safety profile compared to standard-dose influenza vaccine²

Key findings from new studies demonstrate



Higher immunogenicity against H3N2 compared to standard-dose egg and cell-based vaccines in younger adults, adjusted for prior vaccination history³



High tolerability and revaccination willingness in working-age adults⁴

Supporting the use of RIV in working-age adults who are recommended to receive annual influenza vaccination

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Immunogenicity Against A(H3N2) Adjusted for Prior Vaccination Status

Sullivan SG et al., The Lancet Infectious Diseases

Immunogenicity of recombinant influenza vaccine versus standard-dose egg-grown and cell-grown vaccines among frequently and infrequently vaccinated young adults in Singapore

Participants randomized to one of three vaccines, stratified by prior influenza vaccination status, Northern Hemisphere 2022/23

Infrequent vaccinees: 1 or 0 influenza vaccinations in 5 prior years

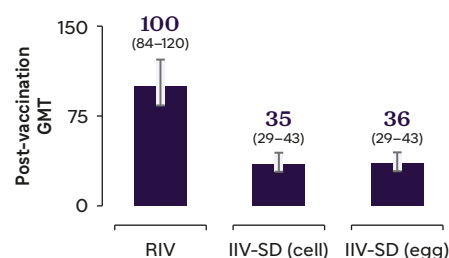
- Quadrivalent standard-dose egg-based vaccine [IIV-SD (egg)]
N = 62
- Quadrivalent standard-dose cell-based vaccine [IIV-SD (cell)]
N = 59
- Quadrivalent recombinant influenza vaccine [RIV]
N = 59

Frequent vaccinees: 3+ influenza vaccinations in 5 prior years

- Quadrivalent standard-dose egg-based vaccine [IIV-SD (egg)]
N = 58
- Quadrivalent standard-dose cell-based vaccine [IIV-SD (cell)]
N = 60
- Quadrivalent recombinant influenza vaccine [RIV]
N = 61

The prespecified primary outcome was the GMT for HI antibodies against A(H3N2) on day 14 after vaccination for each vaccine, adjusted for vaccination history and pre-vaccination titer

Post-vaccination GMTs against cell-grown A(H3N2)



Post-vaccination GMTs against cell-grown A(H3N2) were 2.9-fold higher following RIV (95% CI 2.2–3.8) compared with both IIV-SD (cell) ($p < 0.001$) or IIV-SD (egg) ($p < 0.001$)

Frequent vs infrequent vaccinees:

- RIV, but not IIV-SD (cell) or IIV-SD (egg), recovered antibody responses against egg- and cell-based A(H3N2), with comparable post-vaccination GMTs, GMRs, and seroconversion rates among frequent and infrequent vaccinees
- RIV did not recover antibody responses of frequent vaccinees against other vaccine antigens

Limitations:

- Single-season study with the new A(H3N2) antigen
- Not powered to assess relative vaccine effectiveness
- Potential bias from healthcare worker over-representation among frequent vaccinees

Abbreviations: GMR, geometric mean ratio; GMT, geometric mean titer; HA, hemagglutinin; IIV-SD (cell), quadrivalent standard-dose cell based vaccine; IIV-SD (egg), quadrivalent standard dose egg based vaccine; RIV, quadrivalent recombinant influenza vaccine

Study period: October 2022 – March 2023

Study location: Singapore



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Favorable Tolerability and Willingness for Revaccination

*Bartelt-Hofer J et al., NAIIS Summit 2026**

Favorable tolerability and willingness for repeat vaccination with recombinant influenza vaccine: patient-reported experience in working-age adults in US



439 working adults -
203 in
18–49 years 236
in 50–64 years



Period -
September to December 2025
influenza season
Location -
representation from
22 US states



Most participants were
female, White/Caucasian,
previously vaccinated against
influenza, and completed the
survey within 5 days of
vaccination



Self-reported local and systemic reactions, vaccine acceptability/ tolerability, and impact on daily activities were assessed using a previously validated instrument for assessing perception of vaccination (VAPI 2.0)

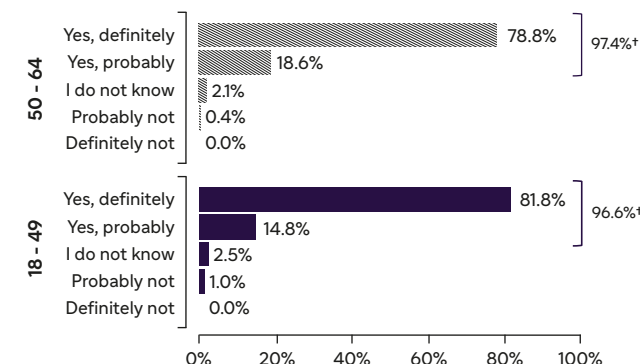


Participants found reactions experienced after receiving RIV vaccination to be acceptable:
91% of participants reported local reactions to be very or totally tolerable
92% of participants reported systemic reactions to be very or totally tolerable



Intent to receive the same vaccine brand next year was driven primarily by insurance coverage (18–49 years: 56%; 50–64 years: 52%) and a positive tolerability profile with fewer or no symptoms (18–49 years: 54%; 50–64 years: 60%)

Figure 1. Overall, how willing are you to receive the same vaccine again next year?



RIV was well tolerated among working-age adults, with minimal symptom burden and a consistently positive patient reported experience regardless of age groups. These findings support RIV use to reinforce annual influenza vaccination in 18–49 and 50–64 year old, working-age adults

Strengths:

Real-world study assessing patient-reported experience following routine RIV vaccination in working-age adults

Limitations:

No comparator was included. Tolerability was assessed descriptively and cannot be evaluated relative to alternative influenza vaccines

*No peer-review publication available at this time; *Calculated data based on poster

Abbreviation: VAPI, Vaccine Administration Patient Instrument

Study period: September – December 2025

Setting: US retail pharmacy settings across 22 US states



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