

# Influenza Vaccine (2022 – 2023)

**Table 1: Influenza Vaccines — United States, 2022-23 Influenza Season\***

| Trade name<br>(manufacturer)   | Presentations                     | Age indication  | Volume per dose<br>by<br>Age                  | Route           | Mercury<br>(from thimerosal, if<br>present)<br>µg/0.5 mL<br><br>Pregnant women<br>&<br>children under 3 yrs<br>should receive<br>preservative-free<br>inactivated influenza<br>vaccine* |
|--|-----------------------------------|---|---|-----------------|---|
| <b>Quadrivalent Inactivated Influenza Vaccine (IIV4s)—Standard-dose—Egg-based<br/>(15 µg HA per virus component in 0.5 mL; 7.5 µg HA per virus component in 0.25 mL)</b> |                                   |   |   |                 |   |
| Afluria Quadrivalent<br>(Seqirus)  | 0.5 mL prefilled syringe<br>(PFS) | ≥3 years (yrs) <sup>†</sup>   | ≥3 yrs<br>0.5 mL <sup>†</sup>                 | IM <sup>¶</sup> | —**   |
|  | 5.0 mL multidose vial<br>(MDV)    | ≥6 months (mos)<br>(needle/syringe) <sup>†</sup><br>18 - 64 yrs<br>(jet injector) | 6 to 35 mos<br>0.25 mL <sup>†</sup>           | IM <sup>¶</sup> | 24.5  |
| Fluarix Quadrivalent<br>(GlaxoSmithKline)  | 0.5 mL PFS                        | ≥6 mos  | ≥6 mos<br>0.5 mL                              | IM <sup>¶</sup> | —   |
| FluLaval Quadrivalent<br>(GlaxoSmithKline)   | 0.5 mL PFS                        | ≥6 mos  | ≥6 mos<br>0.5 mL                              | IM <sup>¶</sup> | —   |
| Fluzone Quadrivalent<br>(Sanofi Pasteur)   | 0.5-mL PFS                        | ≥6 mos <sup>§</sup>   | ≥3 yrs<br>0.5 mL <sup>§</sup>                 | IM <sup>¶</sup> | —   |
|  | 0.5-mL single-dose vial           | ≥6 mos <sup>§</sup>   |   | IM <sup>¶</sup> | —   |
|  | 5.0-mL MDV                        | ≥6 mos <sup>§</sup>   | 6 to 35 mos<br>0.25 mL or 0.5 mL <sup>§</sup> | IM <sup>¶</sup> | 25  |
| <b>Quadrivalent IIV Standard-dose—Cell culture-based (ccIIV4)— (15 µg HA per virus component in 0.5 mL)</b>  |                                   |   |   |                 |   |
| Flucelvax Quadrivalent<br>(Seqirus)  | 0.5-mL PFS                        | ≥6 mos  | ≥6 mos<br>0.5 mL                              | IM <sup>¶</sup> | —   |
|  | 5.0-mL MDV                        | ≥6 mos  |   | IM <sup>¶</sup> | 25  |
| <b>Quadrivalent IIV High-dose (HD-IIV4)—Egg-based (60 µg HA per virus component in 0.7 mL)</b>   |                                   |   |   |                 |   |
| Fluzone High-Dose<br>Quadrivalent<br>(Sanofi Pasteur)  | 0.7-mL PFS                        | ≥65 yrs   | ≥65 yrs<br>0.7 mL                             | IM <sup>¶</sup> | —   |
| <b>Adjuvanted quadrivalent (aIIV4)—Standard-dose with MF59 adjuvant—Egg-based (15 µg HA per virus component in 0.5 mL)</b>   |                                   |   |   |                 |   |
| Fluad Quadrivalent<br>(Seqirus)  | 0.5-mL PFS                        | ≥65 yrs   | ≥65 yrs<br>0.5 mL                             | IM <sup>¶</sup> | —   |
| <b>Quadrivalent Recombinant Influenza Vaccine (RIV4)- HA (45 µg HA per virus component in 0.5 mL)</b>  |                                   |   |   |                 |   |

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|--|----------------------------------|----------------|---------------------------------------|---------------------|---|
| Flublok Quadrivalent<br>(Sanofi Pasteur)   | 0.5-mL PFS                       | ≥18 yrs        | ≥18 yrs<br>0.5 mL                     | IM <sup>¶</sup>     | —   |
| <b>Quadrivalent Live Attenuated Influenza Vaccine (LAIV4)—Egg-based (contains 10 6.5-7.5 fluorescent focus units/0.2 mL)</b> |                                  |                |                                       |                     |   |
| FluMist Quadrivalent<br>(AstraZeneca)  | 0.2-mL PFS<br>intranasal sprayer | 2 to 49 yrs    | 0.1 mL each nostril<br>(0.2 mL total) | <a href="#">NAS</a> | —   |

HA= Hemagglutinin

\* California Law, Assembly Bill 2943, Section 124172

† The approved dose volume for Afluria Quadrivalent is 0.25 mL for children aged 6 through 35 months and 0.5 mL for persons aged ≥3 years. However, 0.25-mL prefilled syringes are not expected to be available for the 2022–23 season. For children aged 6 through 35 months, a 0.25-mL dose must be obtained from a multidose vial.

¶ Intramuscular (IM)-administered influenza vaccines should be given by needle and syringe only, with the exception of the MDV presentation of Afluria Quadrivalent, which may alternatively be given by the PharmaJet Stratis jet injector for persons aged 18 through 64 years only. For adults and older children, the recommended site for intramuscular influenza vaccination is the deltoid muscle. The preferred site for infants and young children is the anterolateral aspect of the thigh. Additional specific guidance regarding site selection and needle length for intramuscular administration is available in the ACIP General Best Practice Guidelines for Immunization, available at <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html>.

\*\*Not applicable.

§ Per the package insert, Fluzone Quadrivalent is currently approved for children aged 6 through 35 months at either 0.25 mL or 0.5 mL per dose; however, 0.25-mL prefilled syringes are no longer available. If a prefilled syringe of Fluzone Quadrivalent is used for a child in this age group, the dose volume will be 0.5 mL per dose.

## **Advisory Committee on Immunization Practices Recommendations<sup>1</sup>**

### **Groups Recommended for Vaccination**

Routine annual influenza vaccination is recommended for all persons aged ≥6 months who do not have contraindications.

- If supply is limited, see priority groups in the [ACIP statement](#).

# Influenza Vaccine (2022 – 2023)

## Timing of Vaccination

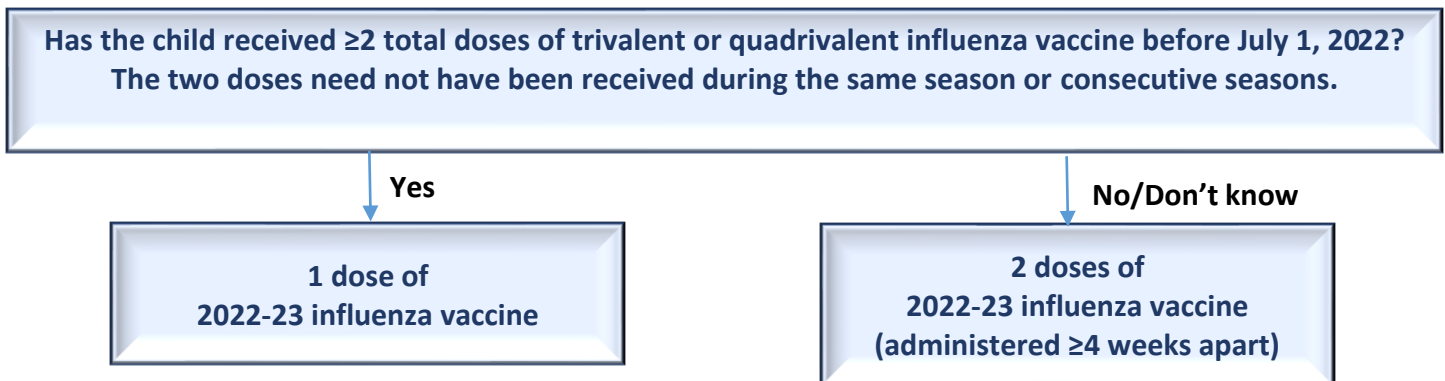
- For most persons who need only one dose of influenza vaccine for the season, vaccination should ideally be offered during September or October. However, vaccination should continue throughout the season as long as influenza viruses are circulating.
- Vaccination during July and August is not recommended for most groups. Considerations include:
  - For most adults (particularly those aged  $\geq 65$  years) and pregnant persons in the first or second trimester, vaccination during July and August should be avoided unless there is concern that later vaccination might not be possible.
  - Children 6 months through 8 years who require 2 doses (Figure) should receive the first dose as soon as vaccine is available.
  - Vaccination during July and August can be considered for children of any age who require only 1

## Influenza Vaccination in Pregnancy

- Persons who are pregnant or who might be pregnant during the influenza season should receive influenza vaccine.
- Any age-appropriate IIV4 or RIV4 may be given in any trimester.
- LAIV4 should not be used during pregnancy but can be used postpartum.

## Number of Doses for Ages 6 months through 8 years

- Children aged 6 months through 8 years who have not previously received  $\geq 2$  total doses of trivalent or quadrivalent influenza vaccine  $\geq 4$  weeks apart before July 1, 2022, or whose influenza vaccination history is unknown need 2 doses of 2022-23 influenza vaccine, given  $\geq 4$  weeks apart (See Algorithm).
- For children aged 8 years who require 2 doses, both doses should be administered even if the child turns age 9 years between dose 1 and dose 2.
- Persons aged  $\geq 9$  years need only one dose.



## Adults Aged $\geq 65$ years

- ACIP recommends that adults aged  $\geq 65$  years preferentially receive any one of the following higher dose or adjuvanted influenza vaccines: quadrivalent high-dose inactivated influenza vaccine (HD-IIV4), quadrivalent recombinant influenza vaccine (RIV4), or quadrivalent adjuvanted inactivated influenza vaccine (aIIV4). If none of these three vaccines is available at an opportunity for vaccine administration, then any other age-appropriate influenza vaccine should be used.

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## Vaccination of Persons With COVID-19

- Persons in isolation for COVID-19 or in quarantine for known or suspected exposures should not be vaccinated if vaccination will pose an exposure risk to others in the vaccination setting.
- For persons who are moderately or severely ill, vaccination should be deferred until they have recovered.
- For persons who are mildly ill or asymptomatic, deferral might be considered to avoid confusing COVID-19 illness symptoms with postvaccination reactions.

## Persons With Chronic Medical Conditions

- LAIV4 is not recommended for persons with some chronic medical conditions (Table 2, page 7).

## Immunocompromised Persons

- Immunocompromised persons should receive an age-appropriate IIV4 or RIV4. LAIV4 should not be used.
- Immune response might be reduced or minimal in persons on certain medications, chemotherapy, or transplant regimens.
- Timing influenza vaccination relative to a specified period before or after interventions that compromise immunity may be appropriate. The Infectious Diseases Society of America (IDSA) has published guidance concerning the timing of vaccination in relation to such interventions (see Further Information, on page 9).

## Caregivers and Contacts of High-risk Persons

- Caregivers and contacts (including those of immunosuppressed persons) may receive any age-appropriate IIV4 or RIV4.
- LAIV4 may be given to caregivers and contacts of persons who are not severely immunocompromised (i.e., who do not require a protected environment).
- Health care personnel or hospital visitors who receive LAIV4 should avoid caring for/contact with severely immunosuppressed persons who require a protected environment for 7 days after vaccination.

## Previous Severe Allergic Reactions to Influenza Vaccines

| Vaccine (of any valency) associated with previous severe allergic reaction (e.g., anaphylaxis) | Available 2022–23 influenza vaccines |                   |                   |
|--|--------------------------------------|-------------------|-------------------|
|  | Egg-based IIV4s                      | cclIV4            | RIV4              |
| Any egg-based IIV or LAIV  | Contraindication*                    | Precaution†       | Precaution†       |
| Any cclIV  | Contraindication*                    | Contraindication* | Precaution†       |
| Any RIV  | Contraindication*                    | Precaution†       | Contraindication* |
| Unknown influenza vaccine  | Allergist consultation recommended   |                   |                   |

\*When a contraindication is present, a vaccine should not be administered. In addition to the contraindications based on history of severe allergic reaction to influenza vaccines noted in the Table, each individual influenza vaccine is contraindicated for persons who have had a severe allergic reaction (e.g., anaphylaxis) to any component of that vaccine. Vaccine components can be found in package inserts. Although a history of severe allergic reaction (e.g., anaphylaxis) to egg is a labeled contraindication to the use of egg-based IIV4s and LAIV4, ACIP makes an exception for allergy to egg (see Persons with Egg Allergy, page 4).

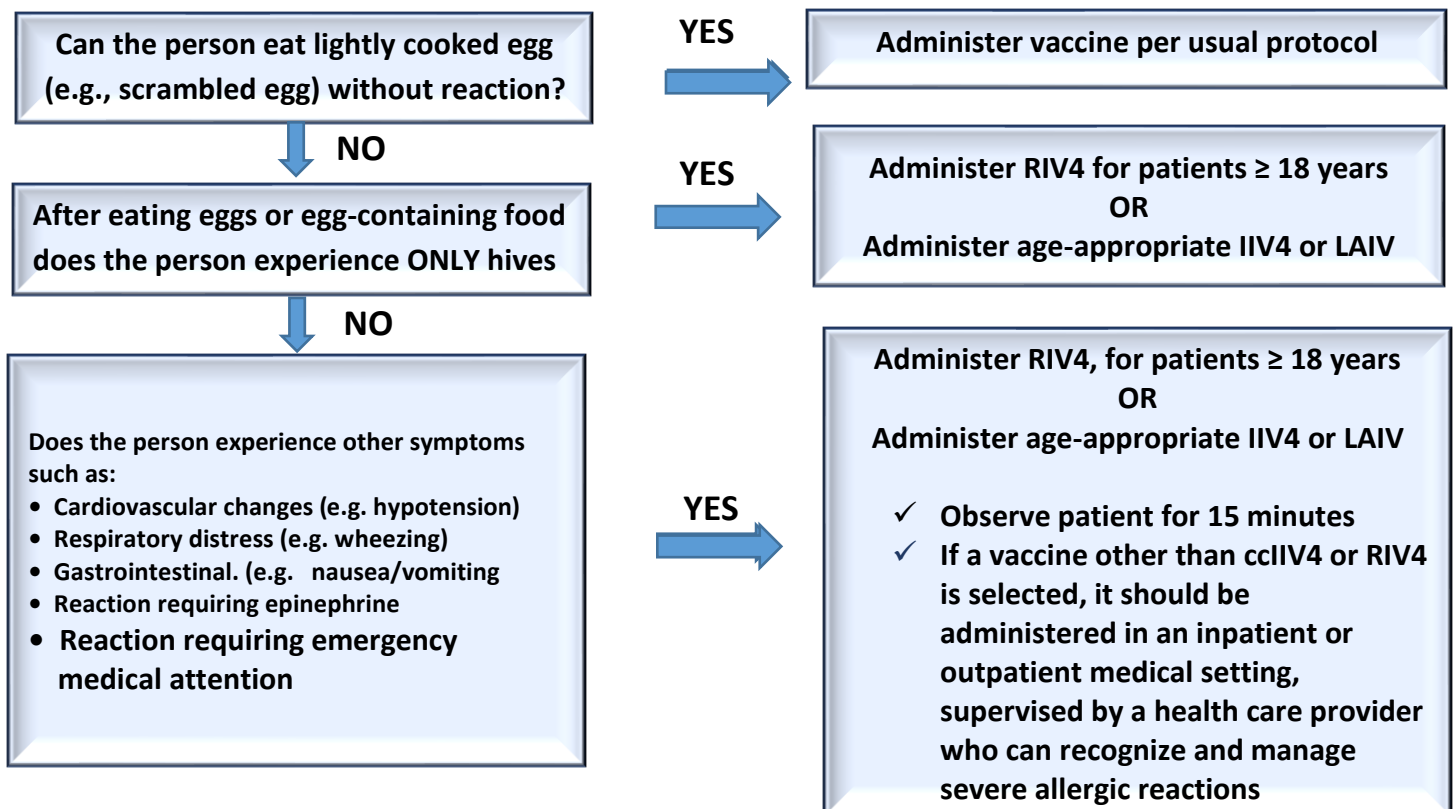
†When a precaution is present, vaccination should generally be deferred but might be indicated if the benefit of protection from the vaccine outweighs the risk for an adverse reaction. Providers can consider using the following vaccines in these instances; however, vaccination should occur in an inpatient or outpatient medical setting with supervision by a health care provider who is able to recognize and manage severe allergic reactions: 1) for persons with a history of severe allergic reaction (e.g., anaphylaxis) to any egg-based IIV or LAIV of any valency, the provider can consider administering cclIV4 or RIV4; 2) for persons with a history of severe allergic reaction (e.g., anaphylaxis) to any cclIV of any valency, the provider can consider administering RIV4; and 3) for persons with a

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history of severe allergic reaction (e.g., anaphylaxis) to any RIV of any valency, the provider can consider administering cIIIV4. Providers can also consider consulting with an allergist to help determine which vaccine component is responsible for the allergic reaction

## Persons With Egg Allergy

- Persons who have experienced only hives after exposure to egg may receive any licensed, recommended influenza vaccine appropriate for their age and health status (i.e., any IIV4, RIV4, or LAIV4).
- Persons reporting symptoms other than hives after exposure to egg (such as angioedema, respiratory distress, lightheadedness, or recurrent emesis; or who required epinephrine or another emergency medical intervention) may also receive any licensed, recommended influenza vaccine that is otherwise appropriate.
  - If a vaccine other than cIIIV4 or RIV4 is selected, it should be administered in an inpatient or outpatient medical setting, supervised by a health care provider who can recognize and manage severe allergic reactions.



## Administration of Influenza Vaccines with Other Vaccines

- IIV4s and RIV4 may be administered concurrently or sequentially with other live or inactivated vaccines.
- Providers should refer to current CDC/ACIP recommendations and guidance for the use of [COVID-19](#) vaccines for current information on administration of these vaccines with other vaccines.
- LAIV4 may be administered simultaneously with other inactivated or live vaccines. If not given simultaneously, then  $\geq 4$  weeks should pass between administration of LAIV4 and another live vaccine.

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## Vaccination and Influenza Antiviral Medications

- IIV4 and RIV4 may be administered to persons receiving influenza antiviral medications.
- Influenza antivirals might reduce effectiveness of LAIV4, if given before or after LAIV4. Persons who receive influenza antivirals during the following periods should be revaccinated with an age-appropriate IIV4 or RIV4 (intervals may be longer in conditions where medication clearance is delayed):

| Influenza Antiviral       | Estimated window for potential LAIV interference<br>(based upon half-life reported in package insert) |
|---------------------------|---|
| Oseltamivir and Zanamivir | 48 hours before to 2 weeks after LAIV4  |
| Peramivir                 | 5 days before to 2 weeks after LAIV4  |
| Baloxavir                 | 17 days before to 2 weeks after LAIV4   |

**Table 2: Influenza Vaccine Contraindications and Precautions**

| Vaccine                | Contraindications:  | Precautions:   |
|------------------------|---|--|
| <b>Egg-based IIV4s</b> | History of severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine (other than egg), or to a previous dose of any influenza vaccine (any egg-based IIV, cclIV, RIV, or LAIV of any valency). | <ul style="list-style-type: none"> <li>• Moderate or severe acute illness with or without fever.</li> <li>• History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine.</li> </ul>  |
| <b>cclIV4</b>          | History of severe allergic reaction (e.g., anaphylaxis) to cclIV of any valency, or to any component of cclIV4  | <ul style="list-style-type: none"> <li>• Moderate or severe acute illness with or without fever.</li> <li>• History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine.</li> <li>• History of severe allergic reaction to a previous dose of any other influenza vaccine (any egg-based IIV, RIV, or LAIV of any valency).</li> </ul> |
| <b>RIV4</b>            | History of severe allergic reaction (e.g., anaphylaxis) to RIV of any valency, or to any component of RIV4  | <ul style="list-style-type: none"> <li>• Moderate or severe acute illness with or without fever</li> <li>• History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine</li> <li>• History of severe allergic reaction to a previous dose of any other influenza vaccine (any egg-based IIV, cclIV, or LAIV of any valency).</li> </ul> |
|                        |   |  |

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| Vaccine | Contraindications:  | Precautions:   |
|---------|---|--|
| LAIV    | <ul style="list-style-type: none"> <li>• History of severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine (other than egg) or to a previous dose of any influenza vaccine (i.e., any egg-based IIV, cIIIV, RIV, or LAIV of any valency).</li> <li>• Concomitant aspirin or salicylate-containing therapy in children and adolescents</li> <li>• Children aged 2 through 4 years who have received a diagnosis of asthma or whose parents or caregivers report that a health care provider has told them during the preceding 12 months that their child had wheezing or asthma or whose medical record indicates a wheezing episode has occurred during the preceding 12 months</li> <li>• Children and adults who are immunocompromised due to any cause, including but not limited to medications, congenital or acquired immunodeficiency states, HIV infection, anatomic asplenia, or functional asplenia (e.g., due to sickle-cell anemia)</li> <li>• Close contacts and caregivers of severely immunosuppressed persons who require a protected environment</li> <li>• Pregnancy</li> <li>• Persons with active communication between the CSF and the oropharynx, nasopharynx, nose, or ear or any other cranial CSF leak</li> <li>• Persons with cochlear implants (due to potential for CSF leak, which might exist for some period of time after implantation. Providers might consider consultation with a specialist concerning risk of persistent CSF leak if an age-appropriate inactivated or recombinant vaccine cannot be used).</li> <li>• Receipt of influenza antiviral medication within the previous 48 hours for oseltamivir and zanamivir, 5 days for peramivir, and 17 days for baloxavir (see Vaccination and influenza antiviral medications, page 6, for additional guidance).</li> </ul> | <ul style="list-style-type: none"> <li>• Moderate or severe acute illness with or without fever.</li> <li>• History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine.</li> <li>• Asthma in persons aged <math>\geq 5</math> years.</li> <li>• Other underlying medical conditions that might predispose to complications from influenza (e.g., chronic pulmonary, cardiovascular [except isolated hypertension], renal, hepatic, neurologic, hematologic, or metabolic disorders [including diabetes mellitus]).</li> </ul> |

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## Further Information

CDC Influenza Information (for more, call 800-232-4636)

- General influenza page: [www.cdc.gov/flu](http://www.cdc.gov/flu)
- FluView (weekly U.S. surveillance): [www.cdc.gov/flu/weekly](http://www.cdc.gov/flu/weekly)
- Influenza Antiviral Guidance: <https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm>
- COVID-19 vaccination recommendations: <https://www.cdc.gov/vaccines/hcp/acip-recs/vaccspecific/covid-19.html>
- Vaccine Storage and Handling Toolkit: <https://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/>
- American Academy of Pediatrics (AAP) Guidance: <https://publications.aap.org/>
- IDSA Guidance for vaccination of immunocompromised hosts: <https://academic.oup.com/cid/article/58/3/e44/336537>
- Manufacturer package inserts for U.S.-licensed vaccines: <https://www.fda.gov/vaccines-blood-biologics/vaccines/vaccineslicensed-use-united-states-2-8-25-2022>

## Reference:

Grohskopf LA, Blanton LH, Ferdinands JM, et al. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2022–23 Influenza Season. *MMWR Recomm Rep* 2022;71(No. RR-1):1–28. DOI: <http://dx.doi.org/10.15585/mmwr.rr7101a1>.