

# Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP)—United States, 2018-19

## Summary of Recommendations

For additional information: *MMWR Recomm Rep* 2018;67(No. RR-3) (<https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/flu.html>)  
Note: The contents of this document are available in HTML format at <https://www.cdc.gov/flu/professionals/acip/2018-19summary.htm>.

### GROUPS RECOMMENDED FOR VACCINATION

- Routine annual influenza vaccination is recommended for all persons aged  $\geq 6$  months who do not have contraindications.
- A licensed, age-appropriate influenza vaccine (IIV, RIV4, or LAIV4) should be used. Consult package information for age indications.
- Emphasis should be placed on vaccination of high-risk groups and their contacts/caregivers. When vaccine supply is limited, vaccination efforts should focus on delivering vaccination to (no hierarchy implied by order listed):
  - Children aged 6–59 months;
  - Adults aged  $\geq 50$  years;
  - Persons with chronic pulmonary (including asthma), cardiovascular (excluding isolated hypertension), renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus);
  - Persons who are immunocompromised due to any cause, (including medications or HIV infection);
  - Women who are or will be pregnant during the influenza season;
  - Children and adolescents (aged 6 months through 18 years) receiving aspirin- or salicylate-containing medications and who might be at risk for Reye syndrome;
  - Residents of nursing homes and other long-term care facilities;
  - American Indians/Alaska Natives;
  - Persons who are extremely obese (BMI  $\geq 40$ ); and
  - Caregivers and contacts of those at risk:
    - Health care personnel in inpatient and outpatient care settings, medical emergency-response workers, employees of nursing home and long-term care facilities who have contact with patients or residents, and students in these professions who will have contact with patients;
    - Household contacts and caregivers of children aged  $\leq 59$  months (i.e.,  $< 5$  years), particularly contacts of children aged  $< 6$  months, and adults aged  $\geq 50$  years; and
    - Household contacts and caregivers of persons with medical conditions that put them at high risk of severe complications from influenza.

### TIMING OF VACCINATION

- Vaccination should be offered by end of October; however, vaccination should continue to be offered as long as influenza viruses are circulating and unexpired vaccine is available.
- Children aged 6 months through 8 years who require 2 doses (see Figure) should receive their first dose as soon as possible after vaccine becomes available, and the second dose  $\geq 4$  weeks later.

### ADULTS AGED $\geq 65$ YEARS

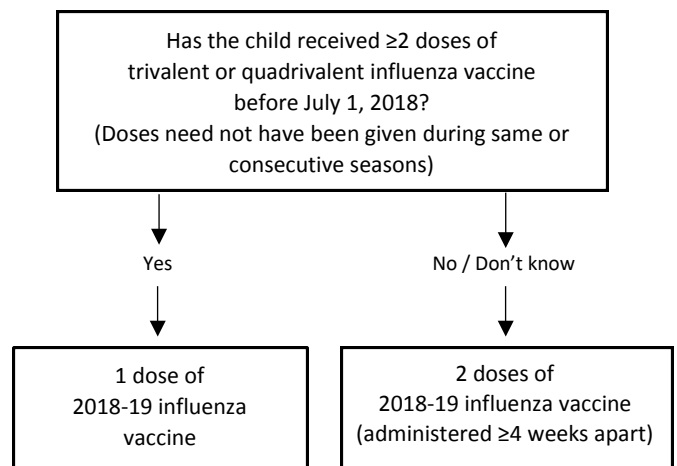
- Persons aged  $\geq 65$  years may receive any age-appropriate IIV (standard- or high-dose, trivalent or quadrivalent, adjuvanted or unadjuvanted) or RIV4.
- High-dose IIV3 exhibited superior efficacy over comparator standard-dose IIV3 in a large randomized trial, and may provide better protection than standard dose IIV3 for this age group.
- However, vaccination should not be delayed to find a particular product if an appropriate one is available.

### VOLUME PER DOSE FOR CHILDREN AND ADULTS

- Children aged 6 through 35 months may receive:
  - 0.5mL Fluarix Quadrivalent (IIV4) intramuscularly, or
  - 0.5mL FluLaval Quadrivalent (IIV4) intramuscularly, or
  - 0.25mL Fluzone Quadrivalent (IIV4) intramuscularly.
  - Note that dose volume differs for these different brands. Care should be taken to administer the correct dose.
- Children aged 3 through 17 years may receive 0.5mL of an age-appropriate intramuscular IIV formulation.
- Adults aged 18 years and older may receive 0.5mL intramuscularly of an age-appropriate IIV or RIV4.
- If a smaller intramuscular dose (e.g., 0.25mL) is administered to a person  $\geq 36$  months of age:
  - If the error is discovered immediately, an additional 0.25mL dose should be administered to provide a full 0.5mL dose.
  - If the error is discovered later (after the recipient has left the vaccination setting), a full 0.5mL dose should be administered as soon as the recipient can return.
- Healthy non-pregnant persons (see **LAIV4 Contraindications and Precautions** on page 4) aged 2 through 49 years may alternatively receive 0.2mL of LAIV4 intranasally (0.1mL per nostril using supplied sprayer).

### NUMBER OF DOSES NEEDED FOR CHILDREN AGED 6 MONTHS THROUGH 8 YEARS

- Determine the number of doses needed for this age group as follows:



### PREGNANT WOMEN

- All women who are pregnant or who might be pregnant during the influenza season should receive influenza vaccine.
  - An age-appropriate IIV or RIV4 may be used.
  - LAIV4 should not be used during pregnancy.
- Influenza vaccine can be administered at any time during pregnancy.

## IMMUNOCOMPROMISED PERSONS

- Immunocompromised persons should receive an age-appropriate IIV or RIV4.
- LAIV4 should not be used for immunocompromised persons.
- Immune response to vaccines might be blunted in immunocompromised persons.
- Timing of vaccination might be a consideration (e.g., in some period before or after an immunocompromising intervention).

## CAREGIVERS AND CONTACTS OF HIGH-RISK PERSONS

- Caregivers and contacts (including those of immunosuppressed persons) may receive any age-appropriate IIV 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 providing care for severely immunosuppressed persons (those requiring a protected environment) for 7 days after vaccination.

## PERSONS WITH EGG ALLERGY

- Persons who are able to eat lightly cooked egg (e.g., scrambled egg) without reaction are unlikely to be egg-allergic.
- Persons who have experienced only hives after exposure to egg should receive any licensed, recommended, age-appropriate influenza vaccine (i.e., IIV, 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 and recommended influenza vaccine that is otherwise appropriate.
  - Additionally, for these persons, vaccine should be administered in an inpatient or outpatient medical setting and supervised by a health care provider who is able to recognize and manage severe allergic reactions.
- A previous severe allergic reaction to influenza vaccine, regardless of the component suspected of causing the reaction, is a contraindication to future receipt of the vaccine.

## VACCINATION ISSUES FOR TRAVELERS

- Travelers who wish to reduce the risk for influenza infection should consider influenza vaccination, preferably ≥2 weeks before departure.
- Persons at high risk for complications of influenza who were not vaccinated during the preceding fall or winter should consider receiving influenza vaccine before departure, if they plan to travel to the tropics, with organized tourist groups or on cruise ships, or to the Southern Hemisphere during April–September.
- Influenza vaccine formulated for the Southern Hemisphere might differ in viral composition from Northern Hemisphere vaccine.
- Vaccination with Southern Hemisphere influenza vaccine prior to travel to the Southern Hemisphere may be reasonable; however, only one Southern Hemisphere formulation is licensed by FDA (Fluzone Quadrivalent, Sanofi Pasteur), and it is generally not commercially available in the U.S.

## VACCINATION AND INFLUENZA ANTIVIRAL MEDICATIONS

- IIV and RIV4 may be administered to persons receiving influenza antiviral medications for treatment or chemoprophylaxis.
- Influenza antivirals may reduce the effectiveness of LAIV4, if administered from 48 hours before until 2 weeks after vaccination.

## ADMINISTRATION OF INFLUENZA VACCINE WITH OTHER VACCINES

- IIVs and RIV4 may be administered concurrently or sequentially with other inactivated or live vaccines.
- Vaccines administered simultaneously should be given at separate anatomic sites.
- LAIV4 may be administered simultaneously with other live vaccines, however if not given simultaneously ≥4 weeks should pass between administration of LAIV4 and another live vaccine.
- Immunogenicity and safety of simultaneous or sequential administration of two vaccines containing novel (non-aluminum) adjuvants has not yet been evaluated.

## VACCINE ADVERSE EVENT REPORTING SYSTEM (VAERS)

- VAERS is the national vaccine safety monitoring system that is co-managed by CDC and FDA.
- VAERS serves as an early warning system to detect possible safety problems with U.S. vaccines.
- Health care providers are required to report any adverse event listed by the vaccine manufacturer as a contraindication to further doses of the vaccine, and adverse events listed in the table at: [https://vaers.hhs.gov/docs/VAERS\\_Table\\_of\\_Reportable\\_Events\\_Following\\_Vaccination.pdf](https://vaers.hhs.gov/docs/VAERS_Table_of_Reportable_Events_Following_Vaccination.pdf)
- For information on how to report to VAERS, go the VAERS website at <https://vaers.hhs.gov/index.html>.

## FURTHER INFORMATION

### ***CDC Influenza Information***

- General influenza page: [www.cdc.gov/flu](http://www.cdc.gov/flu).
- CDC FluView: [www.cdc.gov/flu/weekly](http://www.cdc.gov/flu/weekly).
- Periodic influenza updates: [www.cdc.gov/mmwr](http://www.cdc.gov/mmwr).
- Influenza Antiviral Guidance: <https://www.cdc.gov/flu/professionals/antivirals/index.htm>.
- For more information, call CDC at (800) 232-4636.

### ***American Academy of Pediatrics (AAP) Guidance***

- <http://redbook.solutions.aap.org/ss/influenza-resources.aspx>.

### ***Infectious Diseases Society of America (ISDA) Guidance***

- <https://academic.oup.com/cid/article/58/3/e44/336537>

### ***Manufacturer package inserts***

- [www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm093833.htm](http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm093833.htm)

### **VACCINE ABBREVIATIONS**

- **IIV** = Inactivated Influenza Vaccine.
  - **IIV3** = Trivalent Inactivated Influenza Vaccine;
  - **IIV4** = Quadrivalent Inactivated Influenza Vaccine.
- **RIV4** = Quadrivalent Recombinant Influenza Vaccine.
- **LAIV4** = Quadrivalent Live Attenuated Influenza Vaccine
- **aIIV3** refers specifically to adjuvanted IIV3
- **ccIIV4** refers specifically to cell-culture based IIV4
- **HD-IIV3** refers specifically to high-dose IIV3
- **SD-IIV3** and **SD-IIV4** refer specifically to standard-dose IIVs

# U.S. INFLUENZA VACCINE PRODUCTS FOR THE 2018-19 SEASON

## INFLUENZA VACCINE COMPOSITION FOR 2018-19

- 2018-19 influenza vaccines will contain hemagglutinin (HA) derived from influenza viruses antigenically similar to those recommended by FDA.
- Trivalent vaccines will contain
  - an A/Michigan/45/2015 (H1N1)pdm09–like virus,
  - an A/Singapore/INFIMH-16-0019/2016 (H3N2)–like virus; and
  - a B/Colorado/06/2017–like virus (Victoria lineage).
- Quadrivalent vaccines will contain the same three HA antigens as trivalent vaccines, plus a B/Phuket/3073/2013–like virus (Yamagata lineage).

## INACTIVATED INFLUENZA VACCINES (IIVs) and RECOMBINANT INFLUENZA VACCINE (RIV4)

Trade name <i>Manufacturer</i>	Presentation	Age indication	HA, µg/dose (each virus)	Egg-grown virus, Cell culture-grown virus, or Recombinant HA	Adjuvanted Yes/No	Latex Yes/No	Thimerosal Yes/No If yes, Mercury, µg/0.5mL
<b>Quadrivalent IIVs (IIV4s)</b>							
Afluria Quadrivalent <i>Seqirus</i>	0.5 mL prefilled syringe 5.0 mL multi-dose vial	≥5 yrs ≥5 yrs (needle/syringe) 18 through 64 yrs (jet injector)	15	Egg	No	No	No Yes (24.5)
Fluarix Quadrivalent <i>GlaxoSmithKline</i>	0.5 mL prefilled syringe	≥6 mos	15	Egg	No	No	No
FluLaval Quadrivalent <i>ID Biomedical Corp. of Quebec</i>	0.5 mL prefilled syringe 5.0 mL multi-dose vial	≥6 mos	15	Egg	No	No	No Yes (<25)
Flucelvax Quadrivalent <i>Seqirus (ccIIV4)</i>	0.5 mL prefilled syringe 5.0 mL multi-dose vial	≥4 yrs ≥4 yrs	15	Cell	No	No	No Yes (25)
Fluzone Quadrivalent <i>Sanofi Pasteur</i>	0.25 mL prefilled syringe 0.5 mL prefilled syringe 0.5 mL single-dose vial 5.0 mL multi-dose vial	6 through 35 mos ≥3 yrs ≥3 yrs ≥6 mos	7.5/0.25 mL 15/0.5 mL	Egg	No	No	No No No Yes (25)
<b>Trivalent IIVs (IIV3s)</b>							
Afluria <i>Seqirus</i>	0.5 mL prefilled syringe 5.0 mL multi-dose vial	≥5 yrs ≥5 yrs (needle/syringe) 18 through 64 yrs (jet injector)	15	Egg	No	No	No Yes (24.5)
Fluad <i>Seqirus (aIIV3)</i>	0.5 mL prefilled syringe	≥65 yrs	15	Egg	Yes	No	No
Fluzone High-Dose <i>Sanofi Pasteur (HD-IIV3)</i>	0.5 mL prefilled syringe	≥65 yrs	60	Egg	No	No	No
<b>Quadrivalent RIV (RIV4)</b>							
Flublok Quadrivalent <i>Sanofi Pasteur</i>	0.5 mL prefilled syringe	≥18 yrs	45	Recombinant	No	No	No

*Abbreviations: IIV=inactivated influenza vaccine; RIV=recombinant influenza vaccine; HA=hemagglutinin; mos=months; yrs=years.*

### Administration of IIVs and RIV4

- IIVs and RIV4 are administered intramuscularly (IM):
  - Adults and older children: the deltoid is the preferred site;
  - Infants and younger children (IIVs only): the anterolateral thigh is the preferred site.
  - Detailed guidance for administration sites and needle length is available in Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP) at <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html>
  - Afluria and Afluria Quadrivalent are licensed for intramuscular administration via jet injector (the Pharmajet Stratis), for persons aged 18-64 years only.
  - RIV4 is licensed for persons aged ≥18 years

### IIV and RIV4 Contraindications and Precautions

#### **Contraindications:**

- History of severe allergic reaction to the vaccine or any of its components
  - ACIP recommends that persons with egg allergy of any severity receive influenza vaccine (see Persons with a History of Egg Allergy, above)
  - Information about vaccine components is located in package inserts from each manufacturer.

#### **Precautions:**

- Moderate or severe acute illness with or without fever.
- Guillain–Barré syndrome within 6 weeks following a previous dose of influenza vaccine.

## LIVE ATTENUATED INFLUENZA VACCINE (LAIV4)

Trade Name Manufacturer	Presentation	Age Indication	Virus Dose per 0.2mL (each virus)	Egg-grown virus, Cell culture-grown virus, or Recombinant HA	Adjuvanted (Yes/No)	Latex (Yes/No)	Thimerosal Yes/No If yes, Mercury, µg/0.5mL
<b>Quadrivalent LAIV (LAIV4)</b>							
FluMist Quadrivalent AstraZeneca	0.2 prefilled intranasal sprayer	2 through 49 yrs	10 <sup>6.5-7.5</sup> fluorescent focus units	Egg	No	No	No

Abbreviations: LAIV=live attenuated influenza vaccine; mos=months; yrs=years.

### LAIV4 Administration

- LAIV is administered intranasally using the supplied prefilled, single-use sprayer containing 0.2 mL of vaccine.
  - Half of the total sprayer contents is sprayed into the first nostril while the recipient is in the upright position.
  - The attached divider clip is removed and the second half of the dose administered into the other nostril.
- If the vaccine recipient sneezes immediately after administration, the dose should not be repeated.
- If nasal congestion impedes delivery of the vaccine to the nasopharyngeal mucosa, deferral should be considered, or another age-appropriate vaccine should be administered.

### LAIV4 Contraindications and Precautions

#### **Contraindications:**

- History of severe allergic reaction to any vaccine component or after previous dose of any influenza vaccine;
  - ACIP recommends that persons with egg allergy of any severity receive influenza vaccine (see Persons with a History of Egg Allergy, above)
  - Information about vaccine components is located in package inserts from the manufacturer.
- Concomitant aspirin or salicylate-containing therapy in children and adolescents;
- 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;
- Children and adults who are immunocompromised due to any cause (including immunosuppression caused by medications or by HIV infection);
- Close contacts and caregivers of severely immunosuppressed persons who require a protected environment;
- Pregnancy;
- Receipt of influenza antiviral medication within previous 48 hours.

#### **Precautions:**

- Moderate or severe acute illness with or without fever;
- History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine;
- Asthma in persons aged ≥5 years;
- Other underlying medical conditions that might predispose to complications attributable to severe influenza (e.g., chronic pulmonary, cardiovascular [excluding isolated hypertension], renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus)).

## STORAGE AND HANDLING OF INFLUENZA VACCINES

- In all cases, manufacturer packaging information should be consulted for authoritative guidance regarding storage and handling of influenza vaccines.
- For guidance on specific situations not addressed in packaging materials, contact the manufacturer directly.
- In general:
  - Vaccines should be protected from light and stored at recommended temperatures.
  - Influenza vaccines are recommended to be stored refrigerated between 2° to 8°C (36° to 46°F).
  - Vaccine that has been frozen should be discarded.
  - Single-dose vials should not be accessed for more than one dose.
  - Multiple-dose vials should be returned to recommended storage conditions between uses, and once initially accessed should not be kept beyond the recommended period of time.
  - Vaccines should not be used after the expiration date on the label.