2017-18 Influenza Vaccine Recommendations Update

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Current Issues in Immunization NetConference

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Some Abbreviations

- **IIV =** Inactivated influenza vaccine
- **LAIV =** Live attenuated influenza vaccine
- **RIV =** Recombinant influenza vaccine
- **Prefixes:** **SD =** standard dose
  HD = high dose
  a = adjuvanted
  cc = cell culture-based
- **Numeric suffixes** (e.g., RIV3, IIV4) indicate trivalent or quadrivalent, respectively

2017-18 ACIP Influenza Statement--Overview

- **Published in MMWR August 25, 2017***
- **New Format**
  - MMWR document focuses on recommendations and selected references; contains figure and tables
  - Background Document with additional references and a Summary of recommendations available on ACIP web pages
  - Core recommendation remains the same: annual influenza vaccination is recommended for all persons aged ≥6 months who do not have contraindications

*MMWR 2017;66(No. RR-2):1–20.

2017-18 ACIP Influenza Statement--Overview

- **Principal changes and updates for 2017-18**
  - Influenza vaccine composition for 2017-18
  - Several new licensures and approvals
  - Updates recommendations for pregnant women
  - Change in age recommendations for Afluria (IIV3)
  - Extension of the recommendation that LAIV not be used

Key Updates for 2017-18

1) Composition of U.S. influenza Vaccines for 2017-18

2017-18 Influenza Vaccine Composition

- **Trivalent vaccines:**
  - an A/Michigan/45/2015 (H1N1)pdm09-like virus (updated);
  - an A/Hong Kong/4801/2014 (H3N2)-like virus; and
  - a B/Brisbane/60/2008-like virus.

- **Quadrivalent vaccines:**
  - The above three viruses, and
  - a B/Phuket/3073/2013-like virus.

Key Updates for 2017-18

2) New Licensures/Approvals

Afluria Quadrivalent

- **Standard-dose IIV4 (Seqirus)**
- **Licensed in August 2016,**
  - Initially for persons aged ≥18 years
  - Now for persons aged ≥5 years
- **Intramuscular**
  - Like Afluria, can be administered via jet injector (the Pharmajet Stratis), but only for those aged 18 through 64 years
- **Trivalent formulation of Afluria also available this season**
  - Both Afluria and Afluria Quadrivalent are licensed for ≥5 years

Flublok Quadrivalent

- RIV4 (Protein Sciences)
- Licensed in October 2016 for persons aged ≥18 years, though not available until the 2017-18 season
- Hemagglutinin produced in insect cell line using a viral vector
- Egg-free
- Previous trivalent formulation of Flublok (RIV3) also expected to be available

FluLaval Quadrivalent

- **Standard-dose IIV4 (GSK)**
- **Previously licensed for ages ≥3 years; since November 2016 licensed for ≥6 months**
  - One of only two influenza vaccines approved for children 6 through 35 months of age
- **Dose volume is same as that for all ages (0.5mL)**
  - Previously 6 through 35 month-olds recommended to receive smaller doses of influenza vaccines than older persons
  - Recommendation based on increased reactogenicity of older, whole-virus vaccines
  - Split virus vaccines less reactogenic in this age group
  - FluLaval Quadrivalent 0.5mL safety comparable to 0.25mL Fluzone Quadrivalent

FluLaval Quadrivalent

- **Potential for confusion**
  - The one other product licensed for 6-through 35 month olds is 0.25mL Fluzone—dose volumes are different for this age group.
  - ***Dose volume*** is distinct from ***number of doses*** needed:
    - A child aged 6 months through 8 years who needs 2 doses—
    - (for example, if a first-time vaccinee)—
    - and who gets 0.5mL FluLaval Quadrivalent for a first dose—
    - *Still* needs a second dose of influenza vaccine, ≥4 weeks later

Key Updates for 2017-18

3) Updated Recommendations for Influenza Vaccination of Pregnant Women

Influenza Vaccination of Pregnant Women

- **Influenza vaccination recommended by ACIP for women who will be pregnant during influenza season since 2004**
  - Increased risk for severe influenza illness in pregnant women, particularly during second and third trimesters;
- **Previous language stated pregnant women should receive inactivated influenza vaccine (IIV)**
- **For 2017-18, pregnant women may receive any licensed, recommended, age-appropriate influenza vaccine**
  - IIV or RIV
  - LAIV not recommended in any population for 2017-18, and should not be used in pregnancy in any case

Key Updates for 2017-18

4) Change in the ACIP Age Recommendations for Afluria

Age Recommendation for Afluria (IIV3)

- **Afluria is licensed by FDA for persons aged ≥5 years.**
- **From 2010-11 through 2016-17 ACIP recommended only for ≥9 years**
  - Febrile seizures/reactions in Australia during 2010 season
- **February 2017: ACIP reviewed manufacturer data concerning investigation and resulting manufacturing changes**
  - Putative root cause: lipid and RNA complexes following splitting of A(H1N1)pdm09 and B viruses
  - A(H1N1)pdm09 and B viruses split with lower concentration of detergent (taurodeoxycholate, or TDOC) than A(H3N2)--(0.9% and 0.5% vs. 1.5%)
  - Reactogenicity diminished Increasing TDOC concentration to 1.5% for all three viruses
- **For 2017-18, ACIP recommends Afluria for ≥5 years**

Key Updates for 2017-18

5) LAIV not Recommended for Use During the 2017-18 Season

LAIV Recommendations for 2017-18

- **LAIV4 no recommended for use during the 2017-18 season**
  - Recommendation extended from 2016-17 season
  - Due to concerns regarding low effectiveness against influenza A(H1N1)pdm09 viruses during 2013-14 and 2015-16
  - ACIP will consider new data concerning LAIV as it becomes available

Some Things That are the Same for 2017-18

1) Groups Recommended for Vaccination

Groups Recommended for Vaccination

- **Routine annual influenza vaccination is recommended for all persons ≥6 months of age who do not have contraindications**
- **While vaccination is recommended for everyone in this age group, there are some for whom it is particularly important—**
  - People aged ≥6 months who are at high risk of complications and severe illness
  - Contacts and caregivers of these people, and of infants under age 6 months (because there is no vaccine approved for children this age)

Groups at Increased Risk for Influenza Complications and Severe Illness

- Children aged 6 through 59 months and adults aged ≥50 years (children under 6 months of age are also at high risk, but cannot be vaccinated);
- Persons with chronic pulmonary (including asthma) or cardiovascular (except isolated hypertension), renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus);
- Immunosuppressed persons;
- Women who are or will be pregnant during the influenza season;
- Children and adolescents (aged 6 months–18 years) who are receiving aspirin therapy and who might be at risk for experiencing Reye syndrome after influenza virus infection;
- Residents of nursing homes and other long-term care facilities;
- American Indians/Alaska Natives; and
- Persons who are extremely obese (BMI ≥40).

Some Things That are the Same for 2017-18

2) There are many influenza vaccines available

TABLE 1. Influenza vaccines — United States, 2017–18 influenza season*

Trade name	Manufacturer	Presentation	Age indication	Mercury (from thimerosal, µg/0.5 mL)	Latex	Route
Inactivated influenza vaccines, quadrivalent (IIV4s), standard-dose†						
Afluria Quadrivalent	Seqirus	0.5 mL prefilled syringe	≥18 years	NR	No	IM§
		5.0 mL multidose vial	≥18 years (by needle/syringe) 18 through 64 years (by jet injector)	24.5	No	IM
Fluarix Quadrivalent	GlaxoSmithKline	0.5 mL prefilled syringe	≥3 years	NR	No	IM
FluLaval Quadrivalent	ID Biomedical Corp. of Quebec (distributed by GlaxoSmithKline)	0.5 mL prefilled syringe	≥6 months	NR	No	IM
		5.0 mL multidose vial	≥6 months	<25	No	IM
Fluzone Quadrivalent	Sanofi Pasteur	0.25 mL prefilled syringe	6 through 35 months	NR	No	IM
		0.5 mL prefilled syringe	≥3 years	NR	No	IM
		0.5 mL single-dose vial	≥3 years	NR	No	IM
		5.0 mL multidose vial	≥6 months	25	No	IM
Inactivated influenza vaccine, quadrivalent (ccIIV4), standard-dose,† cell culture-based						
Flucelvax Quadrivalent	Seqirus	0.5 mL prefilled syringe	≥4 years	NR	No	IM
		5.0 mL multidose vial	≥4 years	25	No	IM
Inactivated influenza vaccine, quadrivalent (IIV4), standard-dose, intradermal¶						
Fluzone Intradermal Quadrivalent	Sanofi Pasteur	0.1 mL single-dose prefilled microinjection system	18 through 64 years	NR	No	ID**
Inactivated influenza Vaccines, trivalent (IIV3s), standard-dose†						
Afluria	Seqirus	0.5 mL prefilled syringe	≥5 years	NR	No	IM
		5.0 mL multidose vial	≥5 years (by needle/syringe) 18 through 64 years (by jet injector)	24.5	No	IM
Fluvirin	Seqirus	0.5 mL prefilled syringe	≥4 years	≤1	Yes††	IM
		5.0 mL multidose vial	≥4 years	25	No	IM
Adjuvanted inactivated influenza vaccine, trivalent (aIIV3),† standard-dose						
Fluad	Seqirus	0.5 mL prefilled syringe	≥65 years	NR	Yes††	IM
Inactivated influenza Vaccine, trivalent (IIV3), high-dose§§						
Fluzone High-Dose	Sanofi Pasteur	0.5 mL prefilled syringe	≥65 years	NR	No	IM
Recombinant influenza Vaccine, quadrivalent (RIV4)¶¶						
Flublok Quadrivalent	Protein Sciences	0.5 mL prefilled syringe	≥18 years	NR	No	IM
Recombinant influenza Vaccine, trivalent (RIV3)¶¶						
Flublok	Protein Sciences	0.5 mL single-dose vial	≥18 years	NR	No	IM
Live Attenuated influenza Vaccine, quadrivalent (LAIV4)* (not recommended for use during the 2017–18 season)**						
FluMist Quadrivalent	MedImmune	0.2 mL single-dose prefilled intranasal sprayer	2 through 49 years	NR	No	NAS

Abbreviations: ACIP = Advisory Committee on Immunization Practices; ID = intradermal; IM = intramuscular; NAS = intranasal; NR = not relevant (does not contain thimerosal).

* Immunization providers should check Food and Drug Administration–approved prescribing information for 2017–18 influenza vaccines for the most complete and updated information, including (but not limited to) indications, contraindications, warnings, and precautions. Package inserts for U.S.-licensed vaccines are available at https://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm093833.htm. Availability of specific products and presentations might change and differ from what is described in this table and in the text of this report.

† Standard dose intramuscular IIVs contain 15 µg of each vaccine HA antigen (45 µg total for trivalents and 60 µg total for quadrivalents) per 0.5 mL dose.

§ 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. Specific guidance regarding site 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.

¶ Quadrivalent inactivated influenza vaccine, intradermal: a 0.1-mL dose contains 9 µg of each vaccine HA antigen (36 µg total).

** The preferred injection site is over the deltoid muscle. Fluzone Intradermal Quadrivalent is administered per manufacturer's instructions using the delivery system included with the vaccine.

†† Syringe tip cap might contain natural rubber latex.

§§ High-dose IIV3 contains 60 µg of each vaccine antigen (180 µg total) per 0.5 mL dose.

¶¶ RIV contains 45 µg of each vaccine HA antigen (135 µg total for trivalent 180 µg total for quadrivalent) per 0.5 mL dose.

*** ACIP recommends that FluMist Quadrivalent (LAIV4) not be used during the 2017–18 season.

There are Still Many Different Vaccines

- **ACIP Statement, Table 1**
- **13 distinct products**
- **More than one might be appropriate for any given recipient**
  - ACIP/CDC express no preferences for any one type of influenza vaccine over another, where more than one is appropriate and available
  - Vaccination should not be delayed in order to obtain a specific product.

Inactivated (IIV) vs. Recombinant (RIV) vs. Live Attenuated (LAIV)

- **IIV:**
  - Contain inactivated virus, split or subunit
    - High Dose or Standard Dose,
    - Trivalent or quadrivalent,
    - Unadjuvanted or adjuvanted
    - Egg- or cell culture-based
  - Many brands, some approved for those as young as 6 months of age
  - Most are intramuscular; one intradermal (for 18 through 64 years)
- **RIV**
  - Contain recombinant HA
  - Egg-free
  - Trivalent or (starting in 2017-18) quadrivalent
- **LAIV**
  - Live attenuated virus
  - Not recommended for use in 2017-18

High-Dose vs. Standard-Dose (IIVs Only)

- **SD-IIV3 and 4:**
  - Contain 15µg of HA total per virus (45µg total for trivalents and 60µg total for quadrivalents)

- **HD-IIV3:**
  - Contain 60µg of HA total per virus (180µg total).
  - Observed to provide stronger immune response and have greater efficacy in persons aged ≥65 years

Quadrivalent vs. Trivalent

- **IIV3, RIV3:**
  - Contain an A(H1N1) virus, an A(H3N2) virus, and a B virus (from one lineage)

- **IIV4, RIV4, LAIV4:**
  - Contain an A(H1N1) virus, an A(H3N2) virus, and 2 B viruses (one from each lineage)
  - Designed to provide broader protection by representing both B lineages

Unadjuvanted or adjuvanted (IIVs Only)

- **Currently licensed U.S. influenza vaccines are unadjuvanted, with one exception**

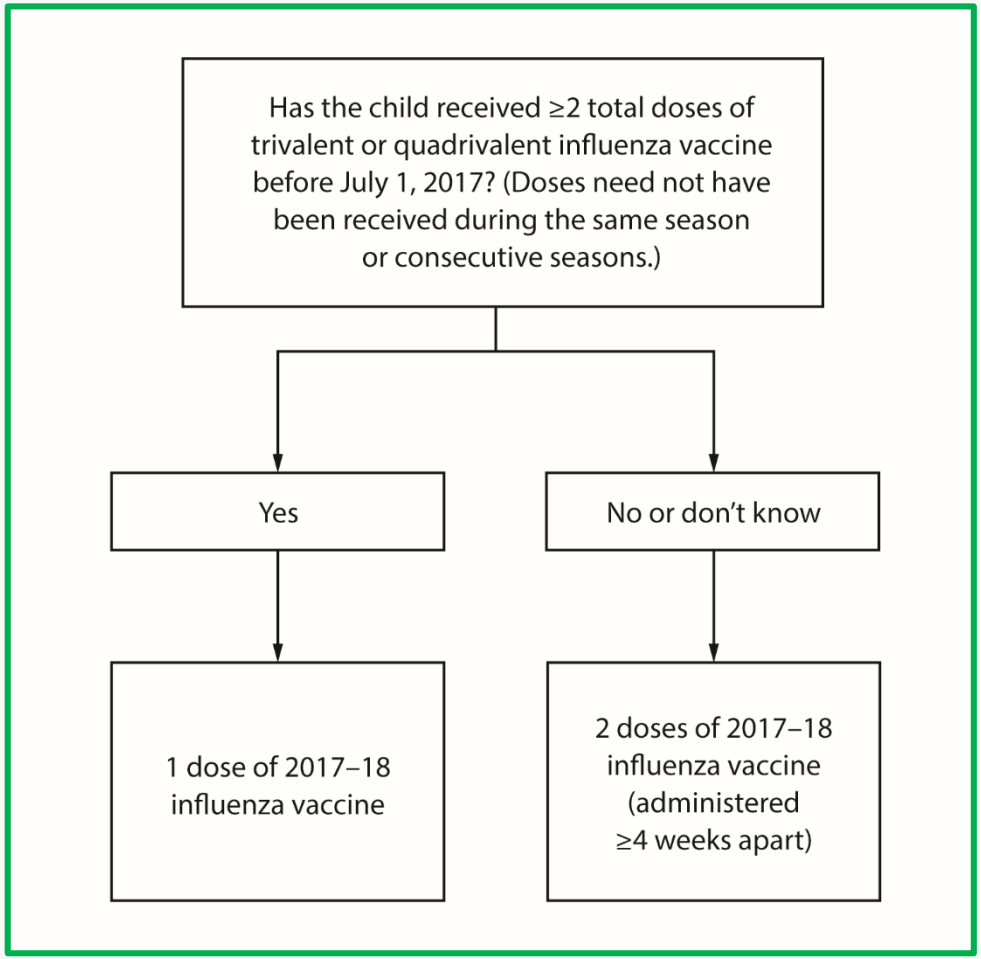
- **aIIV3 (first available in U.S. for 2016-17)**
  - Contains MF59, an oil-in-water adjuvant
  - Intended to provide better immune response
  - Non-inferior response compared with IIV3 in pre-licensure studies

Egg-Based vs. non Egg-Based

- **For most influenza vaccines, viruses are propagated in eggs. Two exceptions:**
  - **ccIIV4:**
    - Viruses are propagated in canine kidney cells rather than eggs
    - However, some of the initial viruses supplied to the manufacturer are egg-derived (for 2017-18, only the H3N2 is cell-derived), so not considered egg-free
  - **RIV4:**
    - HA is produced without viruses, by introduction of HA genetic sequence into an insect cell line (*Spodoptera frugiperda*) using a *Baculovirus* vector
    - Considered egg-free

Some Things That are the Same for 2017-18

3) Recommendations for Vaccination of Children aged 6 months through 8 years



Dosing Algorithim for Children aged 6 months through 8 years, 2017-18

- Similar to past two seasons
- If two cumulative doses received prior to July 1, 2017, only one dose needed for 2017-18

Some Things That are the Same for 2017-18

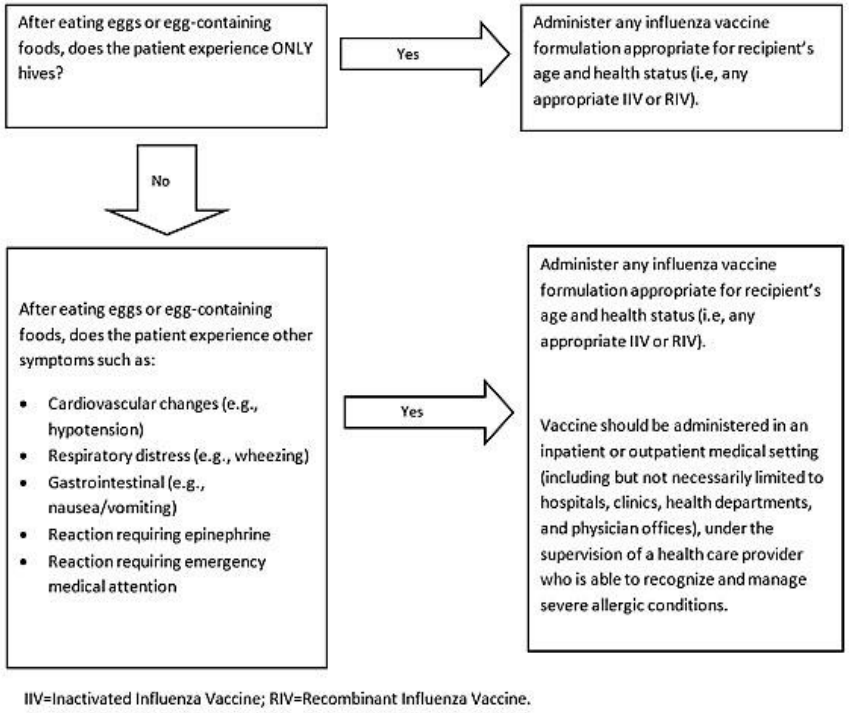
4) Recommendations for Vaccination of Persons with Egg Allergy

Influenza Vaccination of Persons with Egg Allergy

- **Unchanged from 2016-17**
- **Egg allergic persons can receive any licensed, recommended vaccine that is otherwise appropriate (IIV or RIV)**
  - However, RIV not licensed for persons under 18 years of age)
- **One additional measure remains for persons with a history of severe allergic reaction to egg (i.e., any symptom other than hives)**
  - "The selected vaccine should be administered in an inpatient or outpatient medical setting (including but not necessarily limited to hospitals, clinics, health departments, and physician offices). Vaccine administration should be supervised by a health care provider who is able to recognize and manage severe allergic conditions."
- **No specific post-vaccination observation period recommended**
  - However, per the ACIP General Best Practices guidelines, providers should consider observing all recipients of any vaccine for 15 minutes to avoid injury due to syncope

Recommendations regarding influenza vaccination of persons who report allergy to eggs: Advisory Committee on Immunization Practices, United States, 2016-17 Influenza season.

NOTE: Regardless of a recipient's allergy history, all vaccination providers should be familiar with the office emergency plan and be currently certified in cardiopulmonary resuscitation. Epinephrine and equipment for maintaining an airway should be available for immediate use. (CDC. General recommendations on immunization—recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep 2011;60(No. RR-2)



IIV=Inactivated Influenza Vaccine; RIV=Recombinant Influenza Vaccine.

Egg Allergy Algorithm

- **No longer printed in the MMWR**
- **Available on the CDC Web Pages at: http://www.cdc.gov/flu/protect/vaccine/egg-allergies.htm**

Shoulder Injury Related to Vaccine Administration

- Shoulder Injury Related to Vaccine Administration (SIRVA) was added to the Vaccine Injury Compensation Table in March 2017.
- It is an injury to the musculoskeletal structures of the shoulder, including the ligaments, bursae, and tendons.
    - SIRVA is thought to occur as a result of unintended injection of vaccine antigen and/or trauma from the needle going into and around the underlying bursa of the shoulder.
    - Symptoms include shoulder pain and limited range of motion after a vaccine injection.

https://www.hrsa.gov/vaccinecompensation/vaccineinjurytable.pdf

Shoulder Injury Related to Vaccine Administration

- When administering a vaccine by IM injection in the deltoid muscle:
  - Use proper landmarks and technique to identify the injection site.
  - Use the proper needle length based on the age and size of the patient and injection technique.
  - Health care providers who administer vaccines should demonstrate their ability to properly locate the recommended injection sites and receive additional training as needed.
- Providers are encouraged to report any clinically significant adverse event after vaccination, including SIRVA, to VAERS https://vaers.hhs.gov/index.html.

https://www.hrsa.gov/vaccinecompensation/vaccineinjurytable.pdf

Thank You!

Questions?

For more information, contact CDC
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