

# Talking to Patients about the Influenza Vaccine

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## ABSTRACT

Influenza is a significant cause of hospitalization and death in late fall and early spring, especially in our most vulnerable populations. Despite high mortality and morbidity of influenza infection, patients are still hesitant about getting the flu vaccine each year. This article offers advice on educating our patients to address misconceptions and help them embrace this important seasonal vaccination.

**KEYWORDS:** influenza, vaccine hesitancy, flu, cardiovascular risk, COVID

## INTRODUCTION

Influenza is a common seasonal and often severe respiratory illness that affects humans and animals. It was first isolated in 1933 and has caused multiple pandemics since its discovery, with the most recent occurring in 2009 due to Influenza A/H1N1. Influenza is spread from person to person primarily through inhalation of infected droplets when a person coughs, sneezes, or speaks.<sup>1</sup> Individuals with influenza can shed the virus in the absence of symptoms. Once symptomatic, they are infectious up to 7 days after onset.<sup>2</sup> The most common symptoms on presentation include fever, cough, body aches and headache, yet most people recover without persistent sequelae.<sup>3</sup> However, through late fall and early spring it is a significant cause of hospitalization and even death, especially in our most vulnerable populations which include elderly, chronically ill individuals, pregnant women, and young children.<sup>4,5</sup> Annually, tens of millions worldwide are infected with influenza. According to the Centers for Disease Control and Prevention (CDC), in the 2018–2019 influenza season, ~35.5 million Americans were infected with influenza, which resulted in ~34,000 deaths.<sup>6</sup>

Despite high morbidity and mortality from influenza, patients are still hesitant about getting the influenza vaccine each year.<sup>7</sup> Most people recognize that vaccination is one of the most important public health interventions in the 21st century. Elimination of smallpox worldwide and elimination of polio in most of the world are two major accomplishments attributed to vaccinations.<sup>8</sup> However, when it comes to influenza vaccine, it is more challenging to convince patients to get their influenza vaccine. Notably, only

49% of the US population received the influenza vaccine in the 2018–2019 influenza season according to the CDC.<sup>6</sup> Here is a summary of key points to use when speaking to your patients about the influenza vaccine.

### 1: Offer the influenza vaccine

The first step to talking to patients about vaccination is to actively offer the influenza vaccine in a positive manner. Provider recommendation is a strong factor in convincing patients to be vaccinated.<sup>9,10</sup> In general, patients have trust in the person who is providing medical care for them. This is especially true if the provider has been caring for them for an extended length of time. As medical providers, we have a unique role in educating our patients about different diseases. When we take advantage of the opportunity to educate our patients about the rationale behind influenza vaccination and address misconceptions, they are less likely to internalize false information from family, friends, co-workers, and social media. Considering the COVID-19 pandemic there is heightened awareness on prevention of other respiratory infections. After offering the influenza vaccination, we should go into more detail on why it is so important.

### 2: Explain the importance of Influenza vaccination

Vaccination against influenza reduces the risk of significant illness that requires evaluation by a medical professional or hospitalization by 40–60%.<sup>11</sup> It decreases influenza-related hospitalization, hospital death, and ICU admission associated with influenza.<sup>3</sup> The Benowitz, et al 2010 study showed the vaccination of pregnant women was over 90% preventive of hospitalization of their infants due to influenza in the first 6 months of life. Unfortunately, the efficacy of the influenza vaccine is about 40%.<sup>4</sup> While it may be true that it will not prevent all vaccinated persons from infection, it may ameliorate the clinical presentation to a less severe illness. Lastly, studies show that illness due to the flu is associated with secondary increases in heart attacks and stroke, which provides patients, especially persons with heart disease, a reason for influenza vaccination.<sup>12</sup>

### 3: Know your audience

As medical professionals, we can appreciate the benefits of influenza vaccinations and have likely taken care of patients

who have had complications from influenza. However, many patients have either never had it, was infected and do not remember having influenza, or had a mild case and fully recovered. Consequently, focusing on death rates from influenza will likely not mean much to your patient. Therefore, when speaking with patients, focus on explaining that influenza vaccination is our primary prevention strategy to combat severe illness from this infection and to prevent them from spreading influenza to more vulnerable persons. Reiterate that if your patient were to be infected with an influenza strain that was not included in the vaccine, it may ameliorate the disease so that he or she will be less sick from this infection than someone who did not get vaccinated. Stress that it may keep your patient out of the hospital if he or she does catch the flu. It may even prevent having a heart attack or stroke. At this point, your patient may bring up some questions/concerns about the influenza vaccines.

## MOST COMMON QUESTIONS ABOUT INFLUENZA VACCINE

### Why do we have to get the flu shot every year?

Influenza is encapsulated by an envelope that contains host-derived lipid membrane and viral proteins including hemagglutinin (HA), neuraminidase (NA), matrix 1 (M1), and matrix 2 (M2). Infection of host cells occur when HA binds to the host cell, which triggers endocytosis of the virus. Once inside, M1 and M2 are activated resulting in the release of viral RNA into the cytoplasm and through a complex series of steps, transportation in to the host nucleus. Viral RNA-dependent RNA polymerase transcribes and replicates influenza.<sup>13</sup> However, this polymerase activity is known to be error-prone. Therefore, inaccuracies in replication results in production of slightly different influenza strains, which explains the propensity for influenza to have antigenic drift. Antigenic drift occurs when an accumulation of mutations in the viral genome results in small changes. However, over time, these errors produce antigenically different influenza strains.<sup>14</sup> Since the influenza vaccines target antigens on the envelope, the influenza vaccine needs to change each year with the hopes of including protection against the most predominant strains that year.

The significant changes needed in the influenza vaccines from year to year are evident by **Figure 1**, which shows

the viruses used for the egg-based quadrivalent influenza vaccine by year. Only 1 influenza strain (B/Phuket/3073/2013 (B/Yamagata lineage)-like virus used in the vaccine formulation remains the same between the 2019–2020 season and the 2020–2021 season.

The following analogy simplifies the above answer for patients. Think of the envelope of the influenza virus as a coat. The buttons on the coat represent antigens on the envelope. When the vaccine gets into the system, it is looking to target the buttons on the coat. However, the virus learns this and adapts by either changing the buttons on its coat or changing its coat completely. This is happening all of the time. Therefore, the initial vaccine given becomes ineffective because the virus has changed. This is why influenza vaccine changes yearly. It's trying to keep up with the fashion choices of the influenza virus.

### I have an egg allergy. Can I get the flu shot?

Inactivated influenza vaccine (IIV) and live attenuated influenza vaccines (LAIV) are the two types of vaccines available in the US against influenza. Formulations of other influenza vaccines are found in the table below (**Table 1**). All available vaccines are egg-based with the exception of recombinant Influenza vaccine (RIV4), which is a good option for patients with severe egg allergies.<sup>1</sup> Contraindications for influenza vaccine include history of severe allergic reaction to any component of the influenza vaccine.

FluMist is an example of the live attenuated vaccine that is administered via nasal spray. It can be given to people ages 2–49 years old. It is a safe alternative for individuals with aversion to needles. However, the following are contraindications to the live-attenuated influenza vaccine:

- Children and adolescents on aspirin or salicylate containing therapy
- Children aged 2-4 years old with asthma or wheezing within the last 12 months prior to vaccination
- Any immunocompromised persons
- Close contacts and caregivers of severely immunocompromised persons
- Pregnancy
- Administration of influenza antiviral medications in the last 48 hours<sup>1,15</sup>

**Figure 1.** Egg-Based quadrivalent influenza viruses used for vaccine by season

2019–2020 season	2020–2021 season
A/Brisbane/02/2018 (H1N1)pdm09-like virus	A/Guangdong-Maonan/SWL1536/2019 (H1N1)pdm09-like virus
A/Kansas/14/2017 (H3N2)-like virus	A/Hong Kong/2671/2019 (H3N2)-like virus;
B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage);	B/Washington/02/2019 (B/Victoria lineage)-like virus
B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage)	B/Phuket/3073/2013 (B/Yamagata lineage)-like virus

Table 1. Influenza vaccines – United States, 2019–2020 influenza season\*

Trade name (Manufacturer)	Presentation	Age indication	HA (IIVs and RIV4) or virus count (LAIV4) for each vaccine virus (per dose)	Route	Mercury (from thimerosal) (µg/0.5mL)
<b>IIV4—Standard Dose—Egg based<sup>†</sup></b>					
Afluria Quadrivalent (Seqirus)	0.25-mL PFS <sup>§</sup>	6 through 35 mos	7.5 µg/0.25 mL <sup>§</sup>	IM <sup>¶</sup>	—
	0.5-mL PFS <sup>§</sup>	≥3 yrs	15 µg/0.5 mL <sup>§</sup>		—
	5.0-mL MDV <sup>§</sup>	≥6 mos (needle/syringe) 18 through 64 yrs (jet injector)			24.5
Fluarix Quadrivalent (GlaxoSmithKline)	0.5-mL PFS	≥6 mos	15 µg/0.5 mL	IM <sup>¶</sup>	—
FluLaval Quadrivalent (GlaxoSmithKline)	0.5-mL PFS	≥6 mos	15 µg/0.5 mL	IM <sup>¶</sup>	—
	5.0-mL MDV	≥6 mos			<25
Fluzone Quadrivalent (Sanofi Pasteur)	0.25-mL PFS**	6 through 35 mos	7.5 µg/0.25 mL**	IM <sup>¶</sup>	—
	0.5-mL PFS**	≥6 mos	15 µg/0.5 mL**		—
	0.5-mL SDV**	≥6 mos			—
	5.0-mL MDV**	≥6 mos			25
<b>IIV4—Standard Dose—Cell culture based (ccIIV4)</b>					
Flucelvax Quadrivalent (Seqirus)	0.5-mL PFS	≥4 yrs	15 µg/0.5 mL	IM <sup>¶</sup>	—
	5.0-mL MDV	≥4 yrs			
<b>IIV3—High Dose—Egg based<sup>†</sup> (HD-IIV3)</b>					
Fluzone High-Dose (Sanofi Pasteur)	0.5-mL PFS	≥65 yrs	60 µg/0.5 mL	IM <sup>¶</sup>	—
<b>IIV3—Standard Dose—Egg based<sup>†</sup> with MF59 adjuvant (aIIV3)</b>					
Fluad (Seqirus)	0.5-mL PFS	≥65 yrs	15 µg/0.5 mL	IM <sup>¶</sup>	—
<b>RIV4—Recombinant HA</b>					
Flublok Quadrivalent (Sanofi Pasteur)	0.5-mL PFS	≥18 yrs	45 µg/0.5 mL	IM <sup>¶</sup>	—
<b>LAIV4—Egg based<sup>†</sup></b>					
FluMist Quadrivalent (AstraZeneca)	0.2-mL prefilled single-use intranasal sprayer	2 through 49 yrs	10 <sup>6.5–7.5</sup> fluorescent focus units/0.2 mL	NAS	—

**Abbreviations:** ACIP = Advisory Committee on Immunization Practices; FDA = Food and Drug Administration; HA = hemagglutinin; IIV3 = inactivated influenza vaccine, trivalent; IIV4 = inactivated influenza vaccine, quadrivalent; IM = intramuscular; LAIV4 = live attenuated influenza vaccine, quadrivalent; MDV = multidose vial; NAS = intranasal; PFS = prefilled syringe; RIV4 = recombinant influenza vaccine, quadrivalent; SDV = single-dose vial.

\* Vaccination providers should consult FDA-approved prescribing information for 2019–20 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/vaccines-blood-biologics/approved-products/vaccines-licensed-use-united-states>. Availability of specific products and presentations might change and differ from what is described in this table and in the text of this report.

<sup>†</sup> Persons with a history of egg allergy may receive any licensed, recommended influenza vaccine that is otherwise appropriate for their age and health status. Those who report having had reactions to egg involving symptoms other than urticaria (e.g., angioedema or swelling, respiratory distress, lightheadedness, or recurrent emesis) or who required epinephrine or another emergency medical intervention should be vaccinated 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 reactions.

<sup>§</sup> The 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.

<sup>¶</sup> Intramuscularly-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 IM influenza vaccination is the deltoid muscle. The preferred site for infants and young children is the anterolateral aspect of the thigh. Additional guidance regarding site selection and needle length for intramuscular administration is available in the ACIP General Best Practice Guidelines for Immunization (<https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf>).

\*\* Fluzone Quadrivalent may be given to children aged 6 through 35 months as either 0.25 mL per dose or 0.5 mL per dose. No preference is expressed for one or the other dose volume for this age group. Persons aged ≥3 years should receive the 0.5-mL dose volume.

### Who should get the flu shot?

Generally, all persons 6 months old and older should receive the influenza vaccine by the end of October. Vaccines for the 2020–2021 are available for pre-order by clinics and health-care facilities but they will not be available to the public until October 2020. Children between ages 6 months to 8 years old who are receiving the influenza vaccination for the first time require 2 doses separated by 4 weeks. The first dose should be given in children who require 2 doses as soon as possible so that the 2nd vaccination can be given by the end of October.<sup>15</sup>

The following people have the highest risk of medical complications from severe influenza infection according to the ACIP at CDC:

- All children aged 6 through 59 months;
- All persons aged ≥50 years;
- Adults and children who have 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 but not limited to immunosuppression caused by medications or HIV infection);
- Women who are or will be pregnant during the influenza season;

- Children and adolescents (aged 6 months through 18 years) who are receiving aspirin or salicylate-containing medications and who might be at risk for experiencing Reye's 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 (body mass index  $\geq 40$  for adults)

### I am healthy and I never get the flu.

#### Why should I be vaccinated?

In healthy individuals, influenza may present as a severe cold and that person fully recovers. In fact, that person may never present to the healthcare system for testing.<sup>2</sup> However, if they live with a vulnerable person such as pregnant women or children < 6 months old, they can unknowingly pass the virus to that vulnerable person or surrounding community which can result in severe disease in the compromised person and infection in persons within their community.<sup>14</sup> Explaining this to patients is important to get them to understand the risk they can place on other household members.

#### The flu shot gives you the flu

It is important to remind patients that they are not being injected with the influenza virus when they receive the influenza vaccine. Therefore, it is not possible for them to actually contract influenza from the influenza vaccine. Typically, symptoms include redness and soreness at the injection site. However, some people do feel ill after vaccinations and this can be attributed to the following reasons:

Exposure to another respiratory virus. There are many viruses that cause influenza-like symptoms, which include rhinovirus, adenovirus, coronavirus. The influenza vaccine does not provide protection against these so if someone was exposed to them, then they will fall ill.

Low-grade fever, headache, and muscle aches are less common adverse effects of the influenza vaccine but it does occur. These symptoms represent a healthy immune response to the vaccine. Usually, these symptoms resolve in 1–2 days post-vaccination. However, they are uncomfortable and can be mistaken for a case of the mild flu.

It takes about 2 weeks for the body to mount an immune response that is protective against influenza. However, if a patient is exposed to the virus a few days before vaccination or in the 2-week period after vaccination, they can come down with influenza because their body did not have protection against it.

Lastly, vaccine manufacturers predict the 3–4 most predominant influenza strains and create a vaccine against them. However, patients can get influenza strains that are not covered by the influenza vaccination and subsequently become sick from influenza.

Taking the time to review above scenarios will help alleviate patient concerns about getting ill from the influenza vaccine.

### CONCLUSION

Influenza infection continues to cause high morbidity and mortality among Americans yearly, affecting the most vulnerable people such as young children.<sup>1,14</sup> In an environment where there is more distrust about vaccines than in the past, talking to patients about influenza vaccination is challenging to providers. However, studies have shown that patients listen to medical providers about vaccines.<sup>8</sup> Additionally, changing in-office practices regarding vaccination including sending patient reminders about upcoming flu shot, posting facts about influenza in the waiting/exam room, and creating standing orders or order sets in the electronic medical record can make having this important conversation with patients much easier.<sup>9</sup>

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