Influenza:
Questions and Answers

Q&A

INFORMATION ABOUT THE DISEASE AND VACCINES

What causes influenza?

Viruses cause influenza. There are two basic types, A and B, which can cause clinical illness in humans. Their genetic material differentiates them. Influenza A can cause moderate to severe illness in all age groups and infects humans and other animals. Influenza B causes milder disease and affects only humans, primarily children.

Subtypes of the type A influenza virus are identified by two antigens (proteins involved in the immune reaction) on the surface of the virus. These antigens can change, or mutate, over time. An antigen "shift" (major change) creates a new influenza virus and an epidemic is likely among the unprotected population. This happened when the novel H1N1 influenza virus appeared in March 2009 and led to a major pandemic, lasting until the summer of 2010.

How does influenza spread?

Influenza is transmitted through the air from the respiratory tract of an infected person. It can also be transmitted by direct contact with respiratory droplets.

How long does it take to develop symptoms of influenza after being exposed?

The incubation period of influenza is usually two days but can range from one to four days.

What are the symptoms of influenza?

Typical influenza disease is characterized by abrupt onset of fever, aching muscles, sore throat, and nonproductive cough. Additional symptoms may include runny nose, headache, a burning sensation in the chest, and eye pain and sensitivity to light. Typical influenza disease does not occur in every infected person. Someone who has been previously exposed to similar virus strains (through natural infection or vaccination) is less likely to develop serious clinical illness.

How serious is influenza?

Although many people think of influenza as just a common cold, it is really a specific and serious respiratory infection that can result in hospitalization and death.

In the United States, the number of influenza-associated deaths has increased since 1990. This increase is due in part to the substantial increase in the number of people age 65 years or older who are at increased risk for death from influenza complications. The Centers for Disease Control and Prevention (CDC) estimates that from the 1976–77 influenza season to the 2006–07 season, influenza-associated deaths ranged from a low of about 3,000 to a high of about 49,000 each year. It is estimated that approximately 43–89 million people became ill with 2009 pandemic H1N1 in the U.S. from April 2009 to April 2010.

Influenza disease can occur among people of all ages; however, the risks for complications, hospitalizations, and deaths are higher among people age 65 years or older, young children, and people of any age who have certain medical conditions. Pregnancy also increases the risk for serious medical complications from influenza.

During an outbreak in a long-term care facility, up to 60% of residents may become infected, with up to a 30% fatality rate in the infected people. Risk for influenza-associated death is highest among the oldest of the elderly: people age 85 years and older are 16 times more likely to die from an influenza-associated illness than people age 65–69 years.

Hospitalization from influenza-related complications is also high among children age 24 months and younger – comparable to rates for people age 65 and older. There were 146 laboratory-confirmed influenza-related pediatric deaths reported during the 2014–15 influenza season. During the H1N1 pandemic (April 2009 through September 2010), 348 influenza-related deaths in children were reported.

What are possible complications from influenza?

The most frequent complication of influenza is bacterial pneumonia. Viral pneumonia is a less common complication but has a high fatality rate. Other complications include inflammation of the heart and worsening of pulmonary diseases (e.g., bronchitis).

Reye's syndrome is a complication that occurs almost exclusively in children – patients suffer from severe vomiting and confusion, which may progress to coma

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because of swelling of the brain. To decrease the chance of developing Reye's syndrome, infants, children, and teenagers should not be given aspirin for fever reduction or pain relief.

What is the best way to prevent influenza?

The best way to prevent influenza is with annual vaccination.

Is there an alternative to vaccination in preventing influenza?

Vaccination is the principal means of preventing influenza and its complications. Here are some additional steps that may help prevent the spread of respiratory illnesses like influenza:

1. Cover your nose and mouth with your sleeve or a tissue when you cough or sneeze – throw the tissue away after you use it.
2. Wash your hands often with soap and water, especially after you cough or sneeze. If you are not near water, use an alcohol-based hand cleaner.
3. Stay away as much as you can from people who are sick.
4. If you get influenza, stay home from work or school for at least 24 hours after the fever has ended. If you are sick, don't go near other people to avoid infecting them.
5. Try not to touch your eyes, nose, or mouth. Germs often spread this way.

Are any drugs available to prevent or treat influenza?

There are five antiviral agents approved for preventing or treating influenza in selected patients. Only three, oral oseltamivir (Tamiflu), inhaled zanamivir (Relenza), and intravenous peramivir (Rapivab) will provide protection against both A and B viruses; the other two, amantadine and rimantadine, protect only against the A viruses. Their use is generally limited to situations where an outbreak is underway and immediate protection of vulnerable, unvaccinated people is critical (e.g., nursing home residents) or in people who are expected to have an inadequate antibody response to the vaccine (e.g., people with cancer or being treated for cancer) or who could not otherwise be vaccinated (e.g., people with severe allergies to a vaccine component). Antiviral agents are not a substitute for vaccination. Recent evidence indicates that a high proportion of currently circulating influenza A viruses in the United States have developed resistance to amantadine and rimantadine. Researchers are watching for additional antiviral resistance to any of these five agents that might develop in the future.

If I contract influenza, what should I do?

Call your healthcare provider to discuss your particular situation. You will need to get plenty of rest and drink a lot of liquids. You can take medications to relieve the symptoms of influenza (but never give aspirin to children or teenagers who have influenza-like symptoms, particularly fever). If you are at high risk of developing complications from influenza, you should consult your healthcare provider immediately if you develop influenza-like symptoms. For purposes of treatment and prevention, antiviral medicines are prioritized for people at high risk for influenza-related complications, such as people 65 years or older, people with chronic medical conditions, pregnant women, and young children.

When is a person with influenza contagious?

A person is most likely to pass on the virus during the period beginning one to two days before the onset of symptoms and ending four to five days after the onset.

Can you get influenza more than once?

Yes. Influenza viruses change frequently and infection with one strain does not provide protection against all strains.

When did influenza vaccine first become available?

The first influenza vaccine in the United States became available in 1945.

What kind of vaccine is it?

The most common influenza vaccine is made from inactivated (killed) viruses. A vaccine containing live viruses that have been weakened (attenuated) is also available, although it is not recommended to be used during the 2016–17 influenza season. Influenza vaccine in the United States contains either 3 or 4 strains of influenza virus.

Why is the live influenza vaccine (LAIV, FluMist) not recommended for the 2016–17 influenza season?

The Centers for Disease Control and Prevention (CDC) monitors the effectiveness of influenza vaccines during each influenza season. During the 2010–11 through 2012–13 seasons, the estimated effectiveness of LAIV

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and inactivated influenza vaccine (IIV) was about the same (45% to 71%, depending on the season). During the 2013–14 and 2015–16 seasons, CDC studies indicated that LAIV was not effective against the H1N1 component among children ages 2 through 17 years (during the 2014–15 season, neither vaccine was effective because of a mismatch between the vaccine and circulating influenza strains). It was because of these 3 consecutive years of low or no effectiveness that the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Pediatrics (AAP) made the recommendation not to use LAIV during the 2016–17 season.

How are the vaccines made?

Every year, researchers and manufacturers develop a vaccine that contains virus strains they believe will be circulating in the upcoming influenza season. Influenza vaccine typically contains both type A and type B viruses.

For the inactivated (injectable) vaccine, the viruses are inactivated (killed), purified, and packaged in vials or syringes. Live virus vaccine is packaged in a special nasal sprayer. About six months are required to produce influenza vaccine each year.

How is the vaccine given?

The inactivated vaccine is generally given as an intramuscular injection; one inactivated vaccine can be given as an intradermal injection with a micro needle into the skin of the arm for persons ages 18 through 64 years. The live attenuated vaccine is sprayed into the nose.

Is the vaccine that contains 4 viruses preferred over the vaccine that contains 3 viruses?

Vaccines that contain four strains of influenza virus may eventually replace 3-virus vaccines. CDC and other groups do not have a preference for use of the 4-virus vaccine over the 3-virus vaccine.

Who should get influenza vaccine?

Annual influenza vaccination is recommended for all people ages 6 months and older who do not have a contraindication to the vaccine.

What are the unique features of giving influenza vaccine to children compared with adults?

Children ages 6 months through 8 years should receive two doses of influenza vaccine, separated by at least 4 weeks, the first time they receive this vaccine. Children who received 2 or more total doses of influenza vaccine before July 1, 2016 need only one dose for the 2016–17 season. Your doctor or other healthcare professional should be able to tell you if your child needs a second dose.

Children age 6 through 35 months should receive only Fluzone inactivated vaccine.

Who recommends the influenza vaccine?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), and the American College of Obstetricians and Gynecologists (ACOG) all recommend this vaccine.

How often should this vaccine be given?

Influenza vaccine is given each year because immunity decreases after a year and because each year's vaccine is formulated to prevent only that year's anticipated influenza viruses. An annual vaccination is recommended even if the strains included in the vaccine are not changed from one year to the next.

When should people be vaccinated?

Health experts recommend that patients should be vaccinated as soon as vaccine is available in their clinic, which can be as early as August or September. Vaccination should continue into the winter and spring, even until April or May. Travelers should be aware that the influenza season typically occurs from April to September in the Southern Hemisphere and throughout the year in the tropics. If they missed vaccination in the previous season, they should still be vaccinated before they travel, even if it's in the following spring or summer.

Are there recommendations for the prevention of influenza outbreaks in institutions?

The most important factor in preventing outbreaks is annual vaccination of all occupants of the facility and all people working or volunteering in the facility who share the same air as the high-risk occupants. Groups that should be targeted include physicians, nurses, and all other personnel in hospitals, long-term care facilities, other care facilities, and outpatient settings who have contact with high-risk patients in all age groups.

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Should siblings of a person with a chronic illness receive influenza vaccine even though the chronically ill person has been vaccinated?

Yes. Vaccination is recommended for all people ages 6 months and older. This includes all household contacts of people with high-risk conditions.

Should siblings of a healthy child who is younger than age 6 months be vaccinated?

Yes, it is especially important that all household contacts of children too young to be vaccinated against influenza (i.e., younger than age 6 months) receive annual influenza vaccination to protect the infant from serious infection. This is very important because these infants are too young to be vaccinated and are most vulnerable to complications from influenza.

Why are different influenza vaccines (Fluzone High-Dose; Fluad) available for adults 65 and older?

Aging decreases the body's ability to develop a good immune response after getting influenza vaccine, which places older people at greater risk of severe illness from influenza. Vaccine manufacturers have taken two different approaches to improve the immune response in older people.

For Fluzone High-Dose, a larger amount of antigen in the vaccine gives older people a better immune response and provides better protection against influenza. Data from clinical trials comparing regular Fluzone to Fluzone High-Dose among people age 65 and older indicate that higher antibody levels occur after vaccination with Fluzone High-Dose. Compared to standard Fluzone, the high-dose formulation reduced laboratory-confirmed influenza by about 24% and reduced the risk of pneumonia and hospitalization.

For Fluad (new in the U.S. for the 2016-2017 season), the manufacturer includes an adjuvant to improve the response to the vaccine. The adjuvant is called MF59 and is an oil-in-water emulsion containing squalene, an oil that occurs naturally in many plants and animals. Fluad is the first influenza vaccine licensed in the U.S. that contains an adjuvant.

Both Fluzone High-Dose and Fluad are trivalent formulations (containing H3N2, H1N1 and B viruses) and both are approved for use only in people 65 years of age and older. Neither vaccine should be given to people younger than 65 years.

CDC has stated no preference for using high-dose or adjuvanted vaccine or standard-dose influenza vaccine for people age 65 and older. But it is reasonable for a person age 65 years or older to receive either Fluzone High-Dose or Fluad if it is readily available. However, influenza vaccination should not be deferred if the high-dose or adjuvanted formulation is not immediately available. Standard dose vaccine should be given.

If a patient is undergoing treatment for cancer, is it safe to vaccinate her or him against influenza?

People with cancer need to be protected from influenza. Cancer patients and survivors are at higher risk for complications from influenza, including hospitalization and death. They can and should receive injectable (inactivated) influenza vaccine (not the nasal spray vaccine) even if they are being treated for cancer. Here is a helpful CDC web page on cancer and influenza for patients: www.cdc.gov/cancer/flu.

Is it safe for pregnant women to get influenza vaccine?

Yes. In fact, vaccination with the inactivated vaccine is recommended for women who will be pregnant during the influenza season. Pregnant women are at increased risk for serious medical complications from influenza. One recent study found that the risk of influenza-related hospitalization was four times higher in healthy pregnant women in the fourteenth week of pregnancy or later than in nonpregnant women. An increased risk of severe influenza infections was also observed in postpartum women (those who delivered within the previous 2 weeks) during the 2009–10 H1N1 pandemic. In addition, vaccination of the mother will provide protection for her newborn infant. The live intranasal vaccine is not licensed for use in pregnant women. However, pregnant women do not need to avoid contact with people recently vaccinated with this vaccine.

Vaccination is especially important for all people who are contacts of infants or children from birth through age 59 months because infants and young children are at higher risk for influenza complications and are more likely to require medical care or hospitalization if infected. Women who are breastfeeding may be vaccinated.

How safe is this vaccine?

Influenza vaccine is very safe. The most common side effects of the injectable (inactivated) influenza vaccine include soreness, redness, or swelling at the site of

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the injection. These reactions are temporary and occur in 15%–20% of recipients. Less than 1% of vaccine recipients develop symptoms such as fever, chills, and muscle aches for 1 to 2 days following the vaccination. Experiencing these non-specific side effects does not mean that you are getting influenza.

Healthy children ages 2 through 4 years who received the live attenuated virus (nasal spray) vaccine during clinical trials appeared to have an increased chance of wheezing. In previous years, children with a history of recurrent wheezing or have had a wheezing episode within the past 12 months were not recommended to receive the live nasal spray vaccine. Healthy adults receiving the live influenza vaccine reported symptoms such as cough, runny nose, sore throat, chills, and tiredness at a rate 3%–18% higher than for placebo recipients. ACIP recommends that LAIV not be used in any age group for the 2016–17 season.

Serious adverse reactions to either vaccine are very rare. Such reactions are most likely the result of an allergy to a vaccine component. In 1976, the swine influenza vaccine was associated with a severe illness called Guillain-Barré syndrome (GBS), a nerve condition that can result in temporary paralysis. Injectable influenza vaccines since then have not been clearly linked with GBS, because the disease is so rare it is difficult to obtain a precise estimate of any increase in risk. However, as a precaution, any person without a high risk medical condition who previously experienced GBS within 6 weeks of an influenza vaccination should generally not be vaccinated. Instead, their physician may consider using antiviral drugs during the time of potential exposure to influenza.

What can you tell me about the preservative thimerosal that is in some injectable influenza vaccines and the claim that it might be associated with the development of autism?

Thimerosal is a very effective preservative that has been used to prevent bacterial contamination in vaccines for more than 50 years. It contains a type of mercury known as ethylmercury. Ethylmercury is different from methylmercury, which is the form that is in some fish and other seafood. At very high levels, methylmercury can be toxic to people, especially to the neurological development of infants.

In recent years, several large scientific studies have determined that thimerosal in vaccines does not lead to serious neurologic problems, including autism. However, because we generally try to reduce people's exposure to mercury if at all possible, vaccine manufacturers have voluntarily changed their production methods to produce vaccines that are now free of thimerosal or have only trace amounts. They have done this because it is possible to do, not because there was any evidence that the thimerosal was harmful.

How effective is influenza vaccine?

Protection from influenza vaccine varies by the similarity of the vaccine strain(s) to the circulating strains, and the age and health of the recipient. Healthy people younger than age 65 years are more likely to have protection from their influenza vaccination than are older, frail individuals. It is important to understand that although the vaccine is not as effective in preventing influenza disease among the elderly, it is effective in preventing complications and death.

When the "match" between vaccine and circulating strains is close, the injectable (inactivated) vaccine prevents influenza in about 50%–70% of healthy people younger than age 65 years. Among elderly nursing home residents, the shot is most effective in preventing severe illness, secondary complications, and deaths related to influenza.

Can the vaccine cause influenza?

No. Neither the injectable (inactivated) vaccine nor the live attenuated (nasal spray) vaccine can cause influenza. The injectable influenza vaccine contains only killed virus fragments and cannot cause influenza disease. Fewer than 1% of people who are vaccinated develop influenza-like symptoms, such as mild fever and muscle aches, after vaccination. These side effects are not the same as having the actual disease. The nasal spray influenza vaccine contains live attenuated (weakened) viruses that can produce mild symptoms similar to a cold. While the viruses are able to grow in the nose and throat tissue and produce protective immunity, they are weakened and do not grow effectively in the lung. Consequently, they cannot produce influenza disease.

Protective immunity develops 1 to 2 weeks after vaccination. It is possible that a recently vaccinated person can be exposed to influenza disease before they develop immunity from the vaccine and consequently develop disease. This can result in someone erroneously believing they developed the disease from the vaccination.

Also, to many people "the flu" is any illness with fever and cold symptoms. If they get any viral illness, they

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may blame it on the influenza vaccination or think they got "the flu" despite being vaccinated. Influenza vaccine only protects against certain influenza viruses, not all viruses.

Who should NOT receive influenza vaccine?

In general, the inactivated (injectable) influenza vaccine can be given to everyone except children younger than age 6 months and people with a history of a severe allergic reaction to a previous dose of influenza vaccine (see next question).

Although not recommended for the 2016–17 season, LAIV is expected to be available and some providers may choose to administer it to their patients. In this situation the following people should not be vaccinated with the live, attenuated virus (nasal spray) influenza vaccine; however, most (except infants younger than 6 months) can be vaccinated with the injectable vaccine:

- People younger than age 2 years
- People age 50 years or older
- Immunosuppressed persons
- Children ages 2 through 4 years with a history of recurrent wheezing or who have had a wheezing episode in the last 12 months
- Children 2 through 17 years who are receiving aspirin or aspirin-containing products
- Pregnant women (adolescents or adults)
- People with a history of egg allergy
- People with severe allergic reaction following a previous dose of nasal spray vaccine
- People who have taken influenza antiviral medication within the previous 48 hours

Healthcare workers, household members, and others who have close contact with severely immunocompromised individuals during the periods in which the immunosuppressed person requires care in protective isolation should receive the injectable vaccine rather than the live (nasal spray) vaccine.

In addition, the following conditions are considered precautions to LAIV:

- Moderate or severe acute illness
- Chronic pulmonary conditions
- Asthma in someone 5 years old or older
- Cardiovascular (except isolated hypertension) conditions
- Renal conditions
- Hepatic conditions
- Neurologic conditions
- Hematologic conditions
- Metabolic conditions (including diabetes mellitus)

As a general rule people with a precaution should not receive LAIV, but there may be situations when the clinician may decide to administer it.

People with a history of Guillain-Barré syndrome should also consult with their physician before receiving this vaccine, so that the potential risks and benefits of influenza immunization can be weighed. People who are moderately or severely ill at the time of their influenza vaccination appointment should usually wait until their symptoms are improved before getting the vaccine.

Some people believe they are allergic to thimerosal, the preservative used in some brands of influenza vaccine supplied in multi-dose vials, because in the past they developed eye irritation after using eye drops containing thimerosal. Past eye irritation is not a valid reason to avoid getting influenza vaccine. Only serious, life-threatening allergies to thimerosal are reasons not to be vaccinated with an influenza vaccine containing thimerosal.

Some brands of influenza vaccine are packaged in vials or syringes that contain natural rubber or latex. People with a severe allergy to latex generally should not receive vaccine packaged in these vials or syringes.

Please summarize the influenza vaccine that does not contain egg protein.

In January 2013 the U.S. Food and Drug Administration (FDA) licensed Flublok, the first influenza vaccine available in the United States that is completely egg-free. Unlike current production methods for other influenza vaccines, production of Flublok does not use the whole influenza virus or chicken eggs in its manufacturing process. It is licensed for persons age 18 years and older.

Some providers may choose to administer FluBlok to their severely egg-allergic patients. ACIP recommends that any available influenza vaccine may be given to egg-allergic patients without a preference for FluBlok. However, vaccination of people with severe egg allergy with a vaccine other than FluBlok should be supervised by a healthcare provider who is able to recognize and manage a severe allergic reaction.