# Summary of the 2016-2017 Influenza Season

## Season Summary Reports

- Seasonal Influenza Vaccine Effectiveness, 2016-2017
- Vaccine Benefits from the 2016 – 2017 Flu Season
- Vaccine Coverage for in U.S. 2016-2017 Flu Season

## Information for 2016-2017

Getting an annual flu vaccine is the first and best way to protect yourself and your family from the flu. Flu vaccination can reduce flu illnesses, doctors' visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations. Increasing the number of people who get vaccinated each year helps to protect more people, including older people, very young children, pregnant women and people with certain health conditions who are more vulnerable to serious flu complications. This page summarizes information for the 2016-2017 flu season.

## What's new this flu season?

A few things are new this season:

- Only injectable flu shots are recommended this season.
- Flu vaccines have been updated to better match circulating viruses.
- There are some new flu vaccines on the market this season.
- The flu vaccine recommendations for people with egg allergies have changed.
- Generic versions of the flu antiviral drug oseltamivir have become available.

## What flu vaccines are recommended this season?

This season, only injectable flu vaccines (flu shots) should be used. Some flu shots protect against three flu viruses and some protect against four flu viruses.

Options this season include:

- Standard dose flu shots. Most are given into the muscle (usually with a needle, but one can be given to some people with a jet injector). One is given into the skin.
- A high-dose shot for older people.
- A shot made with adjuvant for older people.
- A shot made with virus grown in cell culture.
- A shot made using a vaccine production technology (recombinant vaccine) that does not require the use of flu virus.

Live attenuated influenza vaccine (LAIV) – or the nasal spray vaccine – is **not** recommended for use during the 2016-2017 season because of concerns about its effectiveness.

There is a table showing all the influenza vaccines that are FDA-approved for use in the United States during the 2016-2017 season.

## What viruses do 2016-2017 flu vaccines protect against?

There are many flu viruses and they are constantly changing. The composition of U.S. flu vaccines is reviewed annually and updated to match circulating flu viruses. Flu vaccines protect against the three or four viruses (depending on the type of flu vaccine) that research suggests will be most common. For 2016-2017, three-component vaccines are recommended to contain:

- A/California/7/2009 (H1N1)pdm09-like virus,
- A/Hong Kong/4801/2014 (H3N2)-like virus and a
- B/Brisbane/60/2008-like virus (B/Victoria lineage).

Four component vaccines are recommended to include the same three viruses above, plus an additional B virus called B/Phuket/3073/2013-like virus (B/Yamagata lineage).

## When and how often should I get vaccinated?

September and October are generally good times to be vaccinated against flu. Ideally, everyone should be vaccinated by the end of October. Additional considerations concerning the timing of vaccination for certain groups include:

- Adults, especially those 65 years and older, should generally not get vaccinated early (in July or August) because protection may decrease over time, but early vaccination can be considered for any person who is unable to return at a later time to be vaccinated.
- Children can get vaccinated as soon as vaccine becomes available, even if this is in July or August. Some children need two doses of flu vaccine. For those children it is recommended to get the first dose as soon as vaccine is available, because the second dose needs to given at least 4 weeks after the first.
- Early vaccination can also be considered for people who are in the third trimester of pregnancy, because this can help protect their infants during the first months of life (when they are too young to be vaccinated).

## Can I get a flu vaccine if I am allergic to eggs?

The recommendations for people with egg allergies have been updated for this season.

- People who have experienced only hives after exposure to eggs can get any licensed and recommended flu vaccine that is otherwise appropriate for their age and health.
- People who have symptoms other than hives after exposure to eggs, such as angioedema, respiratory distress, lightheadedness, or recurrent emesis; or who have needed epinephrine or another emergency medical intervention, also can get any licensed and recommended flu vaccine that is otherwise appropriate for their age and health, but the vaccine should be given in a medical setting and be supervised by a health care provider who is able to recognize and manage severe allergic conditions. (Settings include hospitals, clinics, health departments, and physician offices). People with egg allergies no longer have to wait 30 minutes after receiving their vaccine.

# Flu Activity

## What sort of flu season are we experiencing?

As of a flu activity update published in the Morbidity and Mortality Weekly Report on February 17, 2017, flu activity during the 2016-2017 season had been moderate, with influenza A (H3N2) viruses predominating and severity indicators within the range of what has been seen during previous seasons that were H3N2-predominant. H3N2-predominant seasons have been associated with more severe illness and mortality, especially in older people and young children, relative to seasons during which H1N1 or B viruses predominated.

## Have new flu viruses circulated this season?

Flu viruses are constantly changing so it's not unusual for new flu viruses to appear each year. However, as of the February 2017 MMWR, most of the influenza viruses analyzed this season have remained like the vaccine viruses recommended for production of Northern Hemisphere vaccines. For more information about how flu viruses change, visit How the Flu Virus Can Change.

## Is the United States having a flu epidemic?

The United States experiences epidemics of seasonal flu each year. This time of year is called “flu season.” In the United States, flu viruses are most common during the fall and winter months. Influenza activity often begins to increase in October and November. Most of the time flu activity peaks between December and March and can last as late as May. CDC monitors certain key flu indicators (for example, outpatient visits of influenza-like illness (ILI), the results of laboratory testing and flu hospitalization and deaths). When these indicators rise and remain elevated for a number of consecutive weeks, flu season is said to have begun. Usually ILI increases first, followed by an increase in flu-associated hospitalizations, which is then followed by increases in flu-associated deaths. During 2016-2017, influenza-like-illness (ILI) went above baseline the week ending December 17, 2016.

For the most current influenza surveillance information, please see FluView at Weekly U.S. Influenza Surveillance Report.

## When did flu activity begin and when will it peak?

The timing of flu is very unpredictable and can vary in different parts of the country and from season to season. Seasonal flu viruses can be detected year-round; however, seasonal flu activity can begin as early as October and continue to occur as late as May. Flu activity most commonly peaks in the United States between December and March.

For the 2016-2017 season, influenza-like-illness (ILI) in the United States went above baseline the week ending December 17, 2016 and remained elevated as of mid-March. The season has likely peaked.

## How many people die from flu each year?

CDC does not count how many people die from flu each year. Unlike flu deaths in children, flu deaths in adults are not nationally reportable. However, CDC uses mortality data collected by the National Center for Health Statistics to monitor relative levels of flu-associated deaths. This system tracks the proportion of death certificates processed that list pneumonia or influenza as the underlying or contributing cause of death of the total deaths reported. This system provides an overall indication of whether flu-associated deaths are elevated, but does not provide an exact number of how many people died from flu. For more information, see Overview of Influenza Surveillance in the United States, “Mortality Surveillance.”

CDC also uses modeling studies to estimate numbers of flu-related deaths, but these studies apply only to past seasons and are not done each year. For more information, see Estimating Seasonal Influenza-Associated Deaths in the United States.

## Why is it difficult to know how many people die from flu?

There are several factors that make it difficult to determine accurate numbers of deaths caused by flu regardless of reporting. Some of the challenges in counting influenza-associated deaths include the following: the sheer volume of deaths to be counted; the lack of testing (not everyone that dies with an influenza-like illness is tested for influenza); and the different coding of deaths (influenza-associated deaths are often a result of complications secondary to underlying medical problems, and this may be difficult to sort out). For more information, see Estimating Seasonal Influenza-Associated Deaths in the United States: CDC Study Confirms Variability of Flu.

# Protective Actions

## What should I do to protect myself from flu this season?

CDC recommends a yearly flu vaccine for everyone 6 months of age and older as the first and most important step in protecting against this serious disease.

In addition to getting a seasonal flu vaccine, you can take everyday preventive actions like staying away from sick people and washing your hands to reduce the spread of germs. If you are sick with flu, stay home from work or school to prevent spreading flu to others. In addition, there are prescription medications called antiviral drugs that can be used to treat influenza illness. Visit What you Should Know About Flu Antiviral Drugs for more information.

## What should I do to protect my loved ones from flu this season?

Encourage your loved ones to get vaccinated. Vaccination is especially important for people at high risk for developing flu-related complications, and their close contacts. Also, if you have a loved one who is at high risk of flu complications and they develop flu symptoms, encourage them to get a medical evaluation for possible treatment with flu antiviral drugs. CDC recommends that people who are at high risk for serious flu complications who get flu symptoms during flu season be treated with flu antiviral drugs as quickly as possible. People who are not at high risk for serious flu complications may also be treated with antiviral drugs, especially if treatment can begin within 48 hours.

Some children 6 months through 8 years of age will require two doses of flu vaccine for adequate protection from flu. Children in this age group who are getting vaccinated for the first time will need two doses of flu vaccine, spaced at least 28 days apart. Some children who have received flu vaccine previously and children who have only received one dose in their lifetime also may need two doses. Your child's doctor or other health care professional can tell you if your child needs two doses. Visit Children, the Flu, and the Flu Vaccine for more information.

Children younger than 6 months are at higher risk of serious flu complications, but are too young to get a flu vaccine. Because of this, safeguarding them from flu is especially important. If you live with or care for an infant younger than 6 months of age, you should get a flu vaccine to help protect them from flu. See Advice for Caregivers of Young Children for more information. Also, studies have shown that getting the flu vaccine during pregnancy can protect the baby after birth for several months.

In addition to getting vaccinated, you and your loved ones can take everyday preventive actions like staying away from sick people and washing your hands to reduce the spread of germs. If you are sick with flu, stay home from work or school to prevent spreading flu to others.

# Vaccine and Vaccination

## How much flu vaccine is available this season?

Flu vaccine is produced by private manufacturers, so supply depends on manufacturers. For the 2016-2017 season, manufacturers projected they would provide between 157 million and 168 million doses of injectable vaccine for the U.S. market. (Projections may change as the season progresses.) The quantity of vaccine that has been distributed is updated regularly during flu season and is available at Seasonal Influenza Vaccine & Total Doses Distributed.

## Is live attenuated intranasal influenza vaccine (LAIV) available this season even though it is not recommended for use?

FluMist Quadrivalent is still an FDA-licensed product. As such, there may be some supply of FluMist Quadrivalent on the U.S. market during the 2016-2017 season. It is important for clinicians and the public to be aware that because of concerns about this vaccine's effectiveness, CDC recommends that this vaccine **not** be used during the 2016-2017 influenza season.

## When did flu vaccine become available?

Flu vaccine is produced by private manufacturers, so the timing of vaccine availability depends on when production is completed. For the 2016-2017 influenza season, by late September, more than 90 million doses of 2016-2017 flu vaccine had already been distributed in the United States.

## Where can I get a flu vaccine?

Flu vaccines are offered by many doctor's offices, clinics, health departments, pharmacies and college health centers, as well as by many employers, and even by some schools.

Even if you don't have a regular doctor or nurse, you can get a flu vaccine somewhere else, like a health department, pharmacy, urgent care clinic, and often your school, college health center, or work.

Visit the HealthMap Vaccine Finder to locate where you can get a flu vaccine.

## Are there new recommendations for the 2016-2017 influenza season?

On June 22, 2016, CDC's Advisory Committee on Immunization Practices (ACIP) voted that the live attenuated influenza vaccine (LAIV) should not be used during the 2016-2017 flu season. ACIP continues to recommend annual flu vaccination for everyone 6 months and older. The ACIP recommendation must be reviewed and approved by CDC's director before it becomes CDC policy. The final annual recommendations on the prevention and control of influenza with vaccines will be published in a CDC Morbidity and Mortality Weekly Report (MMWR) in late summer or early fall.

## What is flu vaccination using a jet injector?

On August 14, 2014, the U.S. Food and Drug Administration (FDA) approved use of one jet injector device (the PharmaJet Stratis 0.5ml Needle-free Jet Injector) for delivery of one particular flu vaccine (AFLURIA® by bioCSL Inc.) in people 18 through 64 years of age. A jet injector is a medical device used for vaccination that uses a high-pressure, narrow stream of fluid to penetrate the skin instead of a hypodermic needle. For more information, see Flu Vaccination by Jet Injector.

## What is adjuvanted flu vaccine?

The U.S. Food and Drug Administration (FDA) licensed a new seasonal influenza (flu) vaccine containing adjuvant for adults 65 years of age and older. An adjuvant is an ingredient added to a vaccine to create a stronger immune response to vaccination. FLUAD™ was licensed in November 2015 and will be available during the 2016-2017 flu season. It contains the MF59 adjuvant, an oil-in-water emulsion of squalene oil. FLUAD™ is the first adjuvanted seasonal flu vaccine marketed in the United States. For more information visit: FLUAD™ Flu Vaccine With Adjuvant.

## How well will flu vaccines work this season?

Influenza vaccine effectiveness (VE) can vary from year-to-year among different age and risk groups and even by vaccine type. How well the vaccine works can depend in part on the match between the vaccine virus used to produce the vaccine and the circulating viruses that season. It's not possible to predict what viruses will be most predominant during the upcoming season. CDC monitors circulating viruses throughout the year and provides new and updated information about the vaccine match as it becomes available. Information is published weekly in FluView and summarized at intervals in the Morbidity and Mortality Weekly Report (MMWR). Vaccine effectiveness estimates are also provided when they become available. For more information about vaccine effectiveness, visit How Well Does the Seasonal Flu Vaccine Work? .

Early vaccine effectiveness estimates for the 2016-2017 season indicated that flu vaccines this season was reducing a vaccinated person's risk of getting sick and needing medical care because of flu by about half. According to data from the U.S. Flu Vaccine Effectiveness Network, interim estimates show flu vaccine has been 48% effective in preventing medically-attended influenza A and B illness. Interim effectiveness estimates against the predominant influenza A (H3N2) viruses are 43% while the interim effectiveness estimate against influenza B viruses is 73%.

These interim estimates are consistent with vaccine effectiveness (VE) estimates from previous seasons during which vaccine viruses have been characterized as being "like" (well-matched to) circulating viruses based on standard characterization methods. During seasons with a less than optimal match, reduced VE has been observed.

## Will this season's flu vaccine be a good match for circulating viruses?

Historically, antigenic characterization data have been used most commonly to assess the similarity between vaccine viruses and circulating viruses to infer how well the flu vaccine might work until such time as vaccine effectiveness estimates are available. Nationally, based on influenza virus isolates that state health departments have sent to CDC that have been antigenically/genetically characterized, laboratory testing has not identified any evidence for a mismatch between circulating viruses and the vaccine. In other words, the vast majority of H1N1 (100%), H3N2 (95%) and B lineage viruses (90.6% for Victoria lineage, 100% for Yamagata lineage) are similar to the recommended vaccine virus components for this season. This information is published weekly in FluView.

There are, however, a small proportion of viruses that are different from the recommended vaccine viruses in circulation at this time, and the 2016-2017 seasonal flu vaccine likely won't work as well against these viruses. Additionally, even during seasons when circulating viruses and recommended vaccine viruses are similar, vaccine effectiveness can vary depending on virus type or subtype; with overall vaccine effectiveness falling somewhere between 50% and 60%. This figure is generally lower during seasons when H3N2 viruses are predominant, such as the current season. There is ongoing work across the federal government and the private sector to improve flu vaccine performance; however, current flu vaccines do offer important protection against influenza.

Antiviral treatment is an important adjunct to flu vaccination. CDC's antiviral guidance is available at Antiviral Drugs.

## Can the flu vaccine provide protection even if the vaccine is not a "good" match?

Yes, antibodies made in response to vaccination with one flu virus can sometimes provide protection against different but related viruses. A less than ideal match may result in reduced vaccine effectiveness against the virus that is different from what is in the flu vaccine, but it can still provide some protection against flu illness.

In addition, it's important to remember that the flu vaccine contains three or four flu viruses (depending on the type of vaccine you receive) so that even when there is a less than ideal match or lower effectiveness against one virus, the vaccine may protect against the other viruses.

For these reasons, even during seasons when there is a less than ideal match, CDC continues to recommend flu vaccination for everyone 6 months and older. Vaccination is particularly important for people at high risk for serious flu complications, and their close contacts.

## How long does a flu vaccine protect me from getting the flu?

Multiple studies conducted over different seasons and across flu vaccine types and flu virus subtypes have shown that the body's immunity to flu viruses (acquired either through natural infection or vaccination) declines over time. The decline in antibodies is influenced by several factors, including the antigen used in the vaccine, the age of the person being vaccinated, and the person's general health (for example, certain chronic health conditions may have an impact on immunity). When most healthy people with regular immune systems are vaccinated, their bodies produce antibodies and they are protected throughout the flu season, even as antibody levels decline over time. Older people and others with weakened immune systems may not generate the same amount of antibodies after vaccination; further, their antibody levels may drop more quickly when compared to young, healthy people.

For everyone, getting vaccinated each year provides the best protection against the flu throughout flu season. It's important to get a flu vaccine every season, even if you got vaccinated the season before and the viruses in the vaccine have not changed for the current season.

## Can I get vaccinated and still get the flu?

Yes. It's possible to get sick with the flu even if you have been vaccinated (although you won't know for sure unless you get a flu test). This is possible for the following reasons:

- You may be exposed to a flu virus shortly before getting vaccinated or during the period that it takes the body to gain protection after getting vaccinated. This exposure may result in you becoming ill with flu before the vaccine begins to protect you. (About 2 weeks after vaccination, antibodies that provide protection develop in the body.)
- You may be exposed to a flu virus that is not included in the seasonal flu vaccine. There are many different flu viruses that circulate every year. The flu vaccine is made to protect against the three or four flu viruses that research suggests will be most common.

Unfortunately, some people can become infected with a flu virus the flu vaccine is designed to protect against, despite getting vaccinated. Protection provided by flu vaccination can vary widely, based in part on health and age factors of the person getting vaccinated. In general, the flu vaccine works best among healthy younger adults and older children. Some older people and people with certain chronic illnesses may develop less immunity after vaccination. Flu vaccination is not a perfect tool, but it is the best way to protect against flu infection.

# If You Get Sick

## What should I do if I get sick with the flu?

Antiviral drugs are prescription drugs that can be used to treat flu illness. People at high risk of serious flu complications (such as children younger than 5 years, adults 65 years of age and older, pregnant women, people with certain medical conditions, and residents of nursing homes and other long-term care facilities) and people who are very sick with flu (such as those hospitalized because of flu) should get treatment with antiviral drugs as early as possible after illness begins. Some other people may be treated with antivirals at their health care professional's discretion. Treating high-risk people or people who

people may be treated with antivirals at their health care professional's discretion. Treating high risk people or people who are very sick with flu with antiviral drugs is very important. Studies show that prompt treatment, especially within 2 days of illness onset, with antiviral drugs can prevent serious flu complications. Prompt treatment can mean the difference between having a milder illness versus very serious illness that could result in a hospital stay.

Treatment with antivirals works best when begun within 48 hours of getting sick, but can still be beneficial when given later in the course of illness. Antiviral drugs are effective across all age and risk groups. Studies show that antiviral drugs are under-prescribed for people who are at high risk of complications who get flu. Three FDA-approved antiviral medications are recommended for use during the 2016-2017 flu season: oseltamivir (available as a generic version or under the trade name Tamiflu®), zanamivir (trade name Relenza®), and peramivir (trade name Rapivab®). More information about antiviral drugs can be found at Treatment – Antiviral Drugs.

See "The Flu: What To Do If You Get Sick" for more information.

## Are there new antiviral medications available for 2016-2017?

In August 2016 , the U.S. Food and Drug Administration approved the first generic version of Tamiflu® (oseltamivir phosphate). Generic oseltamivir is available as a pill. Tamiflu® is available as a pill or liquid.

# Surveillance

## How does CDC track flu activity?

The Epidemiology and Prevention Branch in the Influenza Division at CDC collects, compiles and analyzes information on flu activity year round in the United States and produces FluView, a weekly influenza surveillance report, and FluView Interactive, which allows for more in-depth exploration of flu surveillance data. The U.S. influenza surveillance system is a collaborative effort between CDC and its many partners in state, local, and territorial health departments, public health and clinical laboratories, vital statistics offices, health care providers, clinics, and emergency departments. Information in five categories is collected from eight different data sources that allow CDC to:

- Find out when and where flu activity is occurring
- Track flu-related illness
- Determine what flu viruses are circulating
- Detect changes in flu viruses
- Measure the impact flu is having on hospitalizations and deaths in the United States

For more information, visit "Overview of Influenza Surveillance in the United States".

## Are there any new FluView interactive applications?

Yes. A new FluView interactive application was introduced over the summer of 2016 that shows the distribution by age group of flu-positive tests by flu virus type and subtype or lineage. This application allows users to view laboratory data from multiple seasons and different age groups. Users also can view the chart data by week or cumulatively for the season. The new FluView application shows the distribution by age group of flu-positive specimens from the 1997-1998 flu season through the current week of reporting. Influenza B lineage information is available starting from the 2015-16 season. It's important to note, however, that because testing practices and the number of participating public health laboratories can change from year to year; it is not always appropriate to determine the relative severity of flu seasons by comparing the number of positive specimens across seasons.

## What is CDC doing to monitor vaccine effectiveness for the 2016-2017 season?

CDC collaborates with other partners each season to assess how well the seasonal vaccines are working. During the 2016-2017 season, CDC is planning multiple studies on the effectiveness of flu shots. These studies measure vaccine effectiveness in preventing laboratory-confirmed influenza among persons 6 months of age and older. A summary of CDC's latest vaccine effectiveness estimates is available at Seasonal Influenza Vaccine Effectiveness, 2005-2016.

### What is CDC doing to monitor antiviral resistance in the United States during the 2016-2017 season?

CDC will continue to collect and monitor flu viruses for changes through an established network of domestic and global surveillance systems. CDC also is working with the state public health departments and the World Health Organization to collect additional information on antiviral resistance in the United States and worldwide. The information collected will assist in making informed recommendations regarding use of antiviral drugs to treat influenza.

## Flu and Parotitis

### What is acute parotitis?

Acute parotitis is recent swelling of one of the salivary glands. It can be caused by a number of things, including viruses and bacteria. Acute viral parotitis is not a common symptom of flu virus infection and is much more commonly seen following infection with the mumps virus.

### How common is acute parotitis with flu?

We don't know exactly how commonly parotitis occurs with flu. Prior to 2014, roughly a dozen cases were reported in the scientific literature. However, during the 2014–2015 flu season in the United States, several hundred cases were reported to CDC, representing the largest number of reported cases ever.

### Who is at risk of developing acute parotitis after flu?

Parotitis after flu appears to occur in people of all ages but mostly in school-aged children and more commonly in males. While still rare, flu-associated parotitis appears to occur more often after infection with influenza A (H3N2) viruses.

### What should I do if I have acute parotitis, or swollen salivary glands?

If you think you have swollen salivary glands, you should see your health care provider as this may be due to a blockage or may be a symptom of an infection, like mumps or flu, which could spread to others. Your health care provider may test you for an infection and tell you to stay home, or self-isolate, until the swelling has gone done or your symptoms have resolved. Depending on the cause of the swelling, treatment may be recommended.

More information about parotitis is available at Influenza & Parotitis: Question & Answers for Health Care Providers.

## Publications

### Morbidity and Mortality Weekly Reports (*MMWR*)

- Update: Influenza Activity in the United States During the 2016–17 Season and Composition of the 2017–18 Influenza Vaccine
- Update: Influenza Activity — United States, October 2, 2016–February 4, 2017
- *Announcement*: Final 2016–17 Influenza Vaccination Coverage Estimates Available Online
- Interim Estimates of 2016–17 Seasonal Influenza Vaccine Effectiveness — United States, February 2017
- Influenza Vaccination Coverage Among Health Care Personnel — United States, 2016–17 Influenza Season
- Influenza Vaccination Coverage Among Pregnant Women — United States, 2016–17 Influenza Season
- Update: Influenza Activity — United States and Worldwide, May 21–September 23, 2017

### CDC Flu Reports & Spotlights

- Avian Influenza H7N8 Update
- New CDC Observational Study: The Effect of Influenza Vaccination on Birth Outcomes
- CDC Collaborative Study: Improved Global Capacity for Influenza Surveillance
- New CDC Vaccine Effectiveness Study Uses Innovative Approach to Measure Vaccine Benefits

- New CDC Vaccine Effectiveness Study Uses Innovative Approach to Measure Vaccine Benefits
- CDC Collaborative Study: Influenza Seasonality in the Tropics and Sub-tropics
- CDC Collaborative Study: Influenza Important Cause of Respiratory Hospitalizations Worldwide
- Patients With Flu-Associated Pneumonia Less Likely to Have Received Flu Vaccine
- Study Looks at Flu Vaccine Dosing in Children

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