



2017-2018 Influenza Key Points

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Overarching Framework of CDC Influenza Messaging

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Take 3 Messages

CDC recommends a three-step approach to fighting the flu: vaccination, everyday preventive actions, and use of antiviral drugs if your doctor prescribes them.

1. Take time to get a flu vaccine.
 - a) CDC recommends a yearly flu vaccine as the first and most important step in protecting against flu.
 - b) For the 2017-2018 season, CDC recommends use of injectable flu vaccines, including the flu shot (inactivated influenza vaccine or IIV) or the recombinant influenza vaccine (RIV).
 - c) The nasal spray flu vaccine (live attenuated influenza vaccine or LAIV) should again not be used during 2017-2018. (See section "Recommendation against LAIV" for more information.)
 - d) Flu vaccination can reduce flu illnesses, doctor visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations.
 - In 2017, a study in the journal *Pediatrics* was the first of its kind to show that flu vaccination also significantly reduced a child's risk of dying from influenza. See "Influenza Vaccine Effectiveness Against Pediatric Deaths: 2010-2014" by Brendan Flannery et al. in *Pediatrics* at <http://pediatrics.aappublications.org/content/early/2017/03/30/peds.2016-4244>.
2. While there are many different flu viruses, the flu vaccine protects against the viruses that research suggests will circulate the most this season (3 or 4 viruses, depending on the vaccine).
 - a) Everyone 6 months of age and older should get a 2017-2018 flu vaccine, by the end of October, if possible. However, as long as flu viruses are circulating, vaccination should continue throughout the flu season, even in January or later.
 - b) Vaccination of people at high risk of developing serious influenza complications is especially important to decrease their risk of severe illness from flu.
 - People at high risk of serious flu complications include children younger than 5 years, pregnant women, people with certain chronic health conditions like asthma, diabetes, or heart or lung disease, and people 65 years and older.
 - The full list of high-risk conditions is available on the CDC website at http://www.cdc.gov/flu/about/disease/high_risk.htm.
 - c) Vaccination also is especially important for health care personnel, and others who live with or care for people at high risk of serious flu-related complications.
 - d) Children younger than 6 months are at high risk of serious flu illness, but are too young to get a flu vaccine. If you live with or care for an infant younger than 6 months of age, you should get a flu vaccine to protect the infant, yourself, and others.
 - e) Find a place near you to get flu and other recommended vaccines at <http://vaccine.healthmap.org/>.

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- f) Take the CDC quiz to find out which vaccines might be right for you:
<http://www2.cdc.gov/nip/adultimmsched>.
- g) (See the [Vaccine section](#) for more key messages related to flu vaccination.)
- 3. Take everyday preventive actions to help slow the spread of germs that can cause respiratory illnesses like the flu. While these actions may be helpful, remember that vaccination is the most important step in preventing flu.
 - a) Try to avoid close contact with sick people.
 - b) If you get sick, limit contact with others as much as possible to keep from infecting them.
 - c) If you are sick, CDC recommends that you stay home for at least 24 hours after your fever is gone, except to get medical care or for other necessities. (Your fever should go away without the use of a fever-reducing medicine.)
 - d) Cover your nose and mouth with a tissue when you cough or sneeze. After using a tissue, throw it in the trash and wash your hands.
 - e) Wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand rub.
 - f) Avoid touching your eyes, nose, or mouth because germs spread this way.
 - g) For more information, see <http://www.cdc.gov/flu/protect/habits/>.
- 4. Take flu antiviral drugs if your doctor prescribes them.
 - a) If you get sick with flu, antiviral drugs can be used to treat your illness.
 - b) Antiviral drugs are prescription medicines (pills, liquid or an inhaled powder) and are not available over the counter.
 - c) Antiviral drugs are different from antibiotics. Antiviral drugs fight viruses (like flu viruses) in your body; antibiotics fight infections in your body that are caused by bacteria.
 - d) Antiviral drugs are not a substitute for getting a flu vaccine. The flu vaccine is the best way modern medicine currently has to protect against this potentially serious disease.
 - e) It's very important that antiviral drugs are used early to treat hospitalized patients, people with severe flu illness, and people who are at high risk of serious flu complications based on their age or health.
 - f) CDC recommends that people who are very sick or people who are sick who are at high risk of serious flu complications be treated early with flu antiviral drugs.
 - g) Most people who are otherwise healthy and get the flu do not need to be treated with antiviral drugs, but some people may be treated with antiviral drugs by their doctor.
 - h) Antiviral drugs can make flu illness milder and shorten the time you are sick.
 - i) There also are data showing that antiviral drugs may prevent serious flu complications.
 - o In 2015, [a CDC study found](#) that early treatment of flu-hospitalized people 65 and older with flu antiviral medications cut the duration of their hospital stay and reduced their risk of needing extended care after discharge.

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- This study entitled “Impact of Prompt Influenza Antiviral Treatment on Extended Care Needs After Influenza Hospitalization Among Community-Dwelling Older Adults” by Sandra Chaves et al. is available from the Clinical Infectious Diseases journal website at <http://cid.oxfordjournals.org/content/early/2015/09/01/cid.civ733>.
- j) For people who have flu and are at high risk of serious flu complications, treatment with an antiviral drug can mean the difference between having a milder illness instead of a very serious illness that could result in a hospital stay.
- k) If you get the flu, the earlier you begin taking antivirals, the better. Antiviral drugs work best when started within two days of symptoms first appearing, but there are data to suggest they can still be beneficial in very ill patients even up to five days after getting sick. This would be especially important for a person who is at high risk of serious flu complications and who is very sick.
- l) Three FDA-approved influenza antiviral drugs are recommended for use in the United States during the 2017-2018 influenza season: oseltamivir, zanamivir (Relenza®), and peramivir (Rapivab®).
- m) Generic formulations of oseltamivir are available commercially.
- n) More information about antiviral drugs and antiviral drug resistance can be found at <http://www.cdc.gov/flu/antivirals/index.htm> and <http://www.cdc.gov/flu/about/qa/antiviralresistance.htm>.
- o) For more information about the flu or the flu vaccine, call 1-800-CDC-INFO or visit www.cdc.gov/flu.

What’s New this Flu Season

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1. There are relatively minor changes to the ACIP/CDC recommendations for the 2017-2018 influenza season.
2. For the 2017-2018 season, the Advisory Committee on Immunization Practices (ACIP) and the Centers for Disease Control and Prevention (CDC) continue to recommend annual influenza vaccination for everyone 6 months and older with injectable influenza vaccine. [The recommendation not to use live attenuated influenza vaccine (LAIV) was extended for the 2017-18 season.]
3. The 2017-2018 recommendations also note that the H1N1 component recommended for use in production of 2017-2018 influenza vaccines was updated.
4. The 2017-2018 trivalent vaccines are recommended to contain:
 - a) an A/Michigan/45/2015 (H1N1)pdm09-like virus (updated from last season)
 - b) an A/Hong Kong/4801/2014 (H3N2)-like virus
 - c) a B/Brisbane/60/2008-like (B/Victoria lineage) virus
5. The 2017-2018 quadrivalent vaccines will contain the above three viruses as well as a B/Phuket/3073/2013-like virus (B/Yamagata lineage).
 - a) The 2017-2018 recommendations document notes products licensed since publication of the 2016-2017 recommendations, including two new quadrivalent flu vaccines – one an inactivated influenza vaccine (“Afluria Quadrivalent” IIV) and the other a recombinant influenza vaccine (“Flublok Quadrivalent” RIV).

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- A summary of the recommendations is available at <https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/downloads/ACIP-recs-2017-18-summary.pdf>.
6. The document also notes a change in age indication for “Flulaval Quadrivalent” from 3 years and older to 6 months and older. Other changes for the 2017-2018 season include the recommendation that pregnant women may receive any licensed, recommended, and age-appropriate injectable influenza vaccine (providers should remember that LAIV is not recommended for any population this season, but also that LAIV should not be used in pregnancy because it is a live virus vaccine).
 7. In addition, the trivalent formulation of Afluria is recommended for people 5 years and older (changed from 9 years and older) in order to match the Food and Drug Administration package insert.
 8. The 2017-2018 influenza vaccine recommendations were published in a CDC Morbidity and Mortality Weekly Report (MMWR) dated August 25, 2017 that is available at <https://www.cdc.gov/mmwr/volumes/66/rr/rr6602a1.htm>.
 9. For the 2017-2018 season, the influenza A (H1N1) and both influenza B components will be egg-derived; the influenza A (H3N2) component will be cell-derived for the first time.
 10. A Background section to the ACIP recommendations will be available online at <https://www.cdc.gov/flu/professionals/acip/2017-18background.htm>.

Statements for General Audiences

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Disease

1. Influenza (the flu) can be a serious disease that can lead to hospitalization and sometimes even death. Anyone can get sick from the flu.
2. While the flu can make anyone sick, certain people are at high risk of serious flu complications. These people include:
 - a) Children younger than 5 years old, but especially children younger than 2 years old
 - b) People 65 years and older
 - c) Pregnant women and women up to 2 weeks after the end of pregnancy
 - d) Residents of nursing homes and other long-term care facilities
 - e) American Indians and Alaskan Natives
 - f) People who have medical conditions, including:
 - a) Asthma
 - b) Neurological and neurodevelopmental conditions (including disorders of the brain, spinal cord, peripheral nerves, and muscle such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury)]
 - c) Chronic lung disease (such as chronic obstructive pulmonary disease [COPD] and cystic fibrosis)
 - d) Chronic heart disease (such as congenital heart disease, congestive heart failure and coronary artery disease)
 - e) Blood disorders (such as sickle cell disease)
 - f) Endocrine disorders (such as diabetes mellitus)

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- g) Kidney disorders
 - h) Liver disorders
 - i) Metabolic disorders (such as inherited metabolic disorders and mitochondrial disorders)
 - j) Weakened immune system due to disease or medication (such as people with HIV or AIDS, or cancer, or those on chronic steroids)
 - k) People younger than 19 years of age who are receiving long-term aspirin therapy
 - l) People with severe obesity (Body Mass Index, [BMI] of 40 or greater)
3. For more information about people at high risk of serious flu-related complications visit: http://www.cdc.gov/flu/about/disease/high_risk.htm.
 4. Much of the U.S. population is at high risk of serious flu complications, either because of their age or because they have a medical condition like asthma, diabetes (type 1 and 2), or heart conditions; or because they are pregnant.
 - a) For example, more than 30 percent of people 50 through 64 years of age have one or more chronic medical conditions that put them at high risk of serious complications from flu.
 5. Symptoms of the flu can include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, and fatigue. Some people may also have vomiting and diarrhea.
 6. People may also be infected with the flu and have no symptoms at all, or have only respiratory symptoms without a fever.
 7. Most people who get influenza will recover in several days to less than two weeks, but some people will develop complications as a result of the flu.
 8. A wide range of complications can be caused by flu.
 9. Sinus and ear infections are examples of moderate complications from flu, while pneumonia is a serious flu complication that can result from either influenza virus infection alone or from co-infection of flu virus and bacteria.
 10. Other possible serious complications triggered by flu can include inflammation of the heart (myocarditis), brain (encephalitis) or muscle tissues (myositis, rhabdomyolysis), and multi-organ failure.
 11. Flu virus infection of the respiratory tract can trigger an extreme inflammatory response in the body and can lead to [sepsis](#), the body's life-threatening response to infection.
 12. Flu also can make chronic medical problems worse. For example, people with [asthma](#) may experience asthma attacks while they have the flu, and people with [chronic heart disease](#) may experience a worsening of this condition triggered by flu.
 13. Even healthy children and adults can get very sick from the flu.
 14. Flu seasons are unpredictable.
 15. Flu viruses are constantly changing.
 16. Each flu season, different flu viruses can spread, and they can affect people differently based on differences in their immune systems.
 17. It is not possible to predict how mild or severe the 2017-2018 flu season will be, or which influenza viruses will predominate.
 18. The severity of flu seasons can differ substantially from year to year.

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19. While the numbers vary, in the United States, millions of people are sickened, hundreds of thousands are hospitalized, and thousands to tens of thousands of people die from flu every year.
20. CDC estimates that influenza has resulted in between 9.2 million and 35.6 million illnesses, between 140,000 and 710,000 hospitalizations, and between 12,000 and 56,000 deaths annually since 2010.
21. See section "[Flu Burden and Burden-Averted Vaccination Estimates](#)" for more specific information.

Vaccination

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1. The first and most important step in protecting against the flu is to get a flu vaccine each season.
 - a) Everyone 6 months of age and older is recommended to get an annual flu vaccine, [with rare exceptions](#).
2. While how well the flu vaccine works can vary from year to year, there are many reasons to get a flu vaccine each year.
3. Flu vaccination can reduce flu illnesses, doctors' visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations.
 - a) Flu vaccination can keep you from getting sick from flu.
 - b) Flu vaccination can help protect people around you who are at high risk of getting seriously ill from flu, like older adults, people with chronic medical conditions, pregnant women, and young children (especially infants younger than 6 months old who are too young to get vaccinated).
 - c) Flu vaccination also may make your illness milder if you do get sick. (A study conducted during the 2013-2014 flu season found that flu vaccination was associated with a reduction in the odds of in-hospital death among patients aged 18-49 years old, 50-64 years old, and 65 years of age and older. Flu vaccination also reduced intensive care unit (ICU) admission among patients aged 18-49 years old and 65 years of age and older. Flu vaccination also shortened both length of stay in the hospital and ICU length of stay for patients 50-64 years of age as well as patients 65 years of age and older.)
 - o See "Influenza vaccination modifies disease severity among community-dwelling adults hospitalized with influenza" by Carmen Arriola et al. in *Clinical Infectious Diseases* at <https://www.ncbi.nlm.nih.gov/pubmed/28525597>.
 - d) Flu vaccination can reduce the risk of more serious flu outcomes, like hospitalizations.
 - e) In addition, a 2017 study in the journal *Pediatrics* was the first of its kind to show that flu vaccination also significantly reduced a child's risk of dying from influenza.
 - o See "Influenza Vaccine Effectiveness Against Pediatric Deaths: 2010-2014" by Brendan Flannery et al. in *Pediatrics* at <http://pediatrics.aappublications.org/content/early/2017/03/30/peds.2016-4244>.
4. CDC estimates the number of flu cases, medical visits, and hospitalizations prevented by vaccination each season. (Visit <http://www.cdc.gov/flu/about/disease/burden.htm> for more information)

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5. For example, for the [2015-2016 influenza season](#), CDC estimates that influenza vaccination prevented approximately 5.1 million influenza illnesses, 2.5 million influenza-associated medical visits, and 71,000 influenza-associated hospitalizations with vaccine effectiveness of 47%
6. CDC recommends an annual flu vaccine as the first and best way to protect against flu. There are two reasons to get a flu vaccine every year:
 - a) The first reason is that since flu viruses are constantly changing, flu vaccines may be updated from one season to the next to protect against the viruses that research indicates will be most common during the upcoming flu season.
 - b) The second reason that annual vaccination is recommended is that a person's immune protection from the vaccine declines over time. Annual vaccination is needed for the best protection.
7. The H1N1 component recommended for use in the production of 2017-2018 U.S. flu vaccines has been updated for this season.
8. Protect your family from the flu by getting yourself and your family members vaccinated.
9. Flu vaccines cannot cause flu infection or flu illness.
 - a) The most common side effects from a flu shot are a sore arm and maybe a low-grade fever or achiness. For most people who experience these side effects, they are mild and short-lived.
10. The flu vaccine is used to **prevent** flu illness, not to treat it. Influenza antiviral drugs may be prescribed to **treat** or prevent flu. See [Antiviral Drug messages](#) for more information.
11. A flu vaccine protects against influenza viruses. It will not protect against other respiratory illnesses.
12. Most seasonal flu vaccines expire by the end of June, but some expire sooner. Health care providers should check expiration dates before administering the vaccine.
13. For more information about the seriousness of the flu and the benefits of flu vaccination, talk to your doctor or other health care personnel, visit www.cdc.gov/flu, or call CDC at 1-800-CDC-INFO.

Vaccination Timing

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1. You should get a flu vaccine by the end of October, if possible. However, as long as flu viruses are circulating, vaccination should continue throughout the flu season, even in January or later.
2. It is not possible to know exactly when the flu season will start each year. It is best to get vaccinated before influenza viruses start to spread in your community since it takes about two weeks after vaccination for antibodies to develop in the body and provide protection against the flu.
3. The timing of flu outbreaks is unpredictable. While seasonal flu outbreaks can happen as early as October, in most seasons flu activity is highest between December and February, although activity can last as late as May. Sometimes more than one flu virus type or subtype will cause outbreaks in a community in a single season. As long as flu activity is ongoing, it's not too late to get vaccinated, even in January or later.

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4. When you get your flu vaccine, your body starts to make antibodies that help protect you from influenza virus infection. It takes about two weeks after vaccination for the immune system to fully respond and for these antibodies to provide protection.

Vaccination: Who Should Do It, Who Should Not and Who Should Take Precautions

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CDC recommends use of flu shots (inactivated influenza vaccine or "IIV" and recombinant influenza vaccines "RIV"). The nasal spray flu vaccine (live attenuated influenza vaccine or LAIV) should not be used during 2017-2018.

The Flu Shot
<p>People who can get the flu shot:</p> <ul style="list-style-type: none">• Different flu shots are approved for people of different ages (see Note), but there are flu shots that are approved for use in people as young as 6 months of age and older. Flu shots are approved for use in pregnant women and people with chronic health conditions. <p>People who can't get the flu shot:</p> <ul style="list-style-type: none">• Children younger than 6 months are too young to get a flu shot• People with severe, life-threatening allergies to flu vaccine or any ingredient in the vaccine. See Special Considerations Regarding Egg Allergy for more information about egg allergies and flu vaccine. <p>Note: There are certain flu shots that have different age indications. For example, people younger than 65 years of age should not get the high-dose flu shot and people who are younger than 18 years old or older than 64 years old should not get the intradermal flu shot.</p> <p>People who should talk to their doctor before getting the flu shot:</p> <ul style="list-style-type: none">• If you have an allergy to eggs or any of the ingredients in the vaccine. Talk to your doctor about your allergy.• If you ever had Guillain-Barré Syndrome (a severe paralyzing illness, also called GBS). Some people with a history of GBS should not get this vaccine. Talk to your doctor about your GBS history.• If you are not feeling well. Talk to your doctor about your symptoms.

2017-2018 Influenza Vaccine Options, Indications and Availability

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There are several flu vaccine options available for the 2017-2018 flu season.

1. Flu vaccines made to protect against three different flu viruses (called "trivalent" vaccines) will be available this season. In addition, flu vaccines made to protect against

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four different flu viruses (called “quadrivalent” vaccines) also will be available. The flu vaccines recommended for use during the 2017-2018 season are all injectable vaccines (flu shots).

- a) **Trivalent** flu vaccines protect against two influenza A viruses (an H1N1 and an H3N2) and an influenza B virus. The following trivalent flu vaccines are available:
 - A [standard-dose trivalent shot](#) that is manufactured using virus grown in eggs. Different flu shots are approved for people of different ages, but there are flu shots that are approved for use in people as young as 6 months of age and older. Most flu shots are given with a needle. One flu vaccine also can be given with a needle-free [jet injector](#), for persons aged 18 through 64 years.
 - A [high-dose trivalent shot](#), approved for people 65 years and older.
 - A [recombinant trivalent shot that is egg-free \(RIV3\)](#), approved for people 18 years and older.
 - New last season, a trivalent flu shot ([FLUAD™](#)) made using adjuvant (an ingredient of a vaccine that helps create a stronger immune response in the patient’s body), approved for people 65 years and older.
- b) The **quadrivalent** flu vaccine protects against two influenza A viruses and two influenza B viruses. The following quadrivalent flu vaccines are available:
 - A [quadrivalent flu shot](#) approved for different ages, including one that can be given to children as young as 6 months of age.
 - An [intradermal quadrivalent flu shot](#), which is injected into the skin instead of the muscle and uses a much smaller needle than the regular flu shot. It is approved for people 18 through 64 years of age. All intradermal vaccines will be quadrivalent this season.
 - A [recombinant quadrivalent shot \(RIV4\) that is egg-free](#), approved for people 18 years and older.
 - A quadrivalent flu shot ([FLUCELVAX®](#)) containing virus grown in cell culture is approved for people 4 years and older. Cell-based flu vaccine was first approved in 2012 as a trivalent vaccine. This vaccine was changed to a quadrivalent formulation beginning with the 2016-2017 season.
 - A quadrivalent nasal spray flu vaccine approved for people 2 to 49 years of age. Note: While the quadrivalent nasal spray vaccine is FDA approved for the U.S. market, ACIP and CDC recommend that nasal spray vaccine should not be used during the 2017-2018 season because of concerns about how well it works.
2. CDC recommends use of flu shots during 2017-2018. ACIP and CDC recommend against nasal spray vaccine during 2017-2018.
3. Among injectable vaccines (flu shots), CDC does not have a preference for one vaccine over another. The important thing is to get vaccinated every year.
 - a) Flu shots include inactivated vaccines that are made with killed flu virus, and a recombinant vaccine which is made without flu viruses.
 - The age indications for the different flu shots vary. Flu shot options are available for people with chronic medical conditions who are older than 6 months of age.
4. Flu vaccine is available in doctor’s offices, pharmacies, public health clinics, and other locations.

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5. Flu vaccine is produced by private manufacturers, so supply depends on manufacturers.
6. For the 2017-2018 season, manufacturers have projected they will provide as many as 151-166 million doses of injectable influenza vaccine, which is similar to projected supply for last season.
7. Projections may change as the season progresses.
 - a) Of the total number of injectable influenza vaccine doses projected to be available for the 2017-2018 season, approximately 119 million (range: 114 million to 124 million) are estimated to be quadrivalent influenza vaccines (up from projected 96 million doses last season).
 - b) Of the total number of injectable influenza vaccine doses projected to be available for the 2017-2018 season, approximately 130 million doses (range: 126 million to 133 million) are estimated to be thimerosal-free (up from 120 million projected for last season).
8. Based on manufacturer projections, health officials expect that supply of injectable influenza vaccine (flu shots) for the 2017-2018 season should be sufficient to meet demand.
9. For the latest information on flu vaccine supply, including projections and doses distributed, visit <http://www.cdc.gov/flu/professionals/vaccination/vaccinesupply.htm>. Information about past numbers of doses distributed is also available at that link.
10. Although flu vaccines are available for purchase from manufacturers and distributors, different health care personnel may receive their vaccine shipments at different times because of production and delivery schedules for different products.
11. While some flu vaccine may become available in late July and August, the vaccine supply is usually most abundant in September and October and thereafter. (For information about the recommended timing of flu vaccination, see [Timing of Vaccination](#) section.)
12. Don't delay getting a flu shot if you want one particular kind and it is not available. The important thing is to get a flu shot.
13. Every flu vaccine is formulated to offer important protection from influenza viruses.
14. For the complete list of flu vaccines approved for use during the 2017-2018 season, visit <https://www.cdc.gov/flu/about/qa/vaxsupply.htm>.

Flu Vaccine and Egg Allergy

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1. CDC and its Advisory Committee on Immunization Practices last season updated their guidelines on egg allergy and receipt of influenza (flu) vaccines.
2. Based on the 2016-2017 recommendations, people with egg allergies no longer need to be observed for an allergic reaction for 30 minutes after receiving a flu vaccine.
3. People with a history of egg allergy who have experienced only hives after exposure to egg can receive any licensed and recommended flu vaccine (i.e., any form of IIV, or RIV) that is otherwise appropriate for their age and health status.
4. If you are able to eat lightly cooked egg (e.g., scrambled egg) without reaction, you are unlikely to be allergic and can get any licensed and recommended flu vaccine.
5. People who report having had reactions to egg involving symptoms other than hives, such as angioedema, respiratory distress, lightheadedness, or recurrent emesis; or who

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required epinephrine or another emergency medical intervention, may similarly receive any licensed and recommended flu vaccine (i.e., any form of IIV, or RIV) that is otherwise appropriate for their age and health status. For these people, the vaccine should be given in an inpatient or outpatient medical setting (including but not necessarily limited to hospitals, clinics, health departments, and physician offices), under the supervision of any health care provider who is able to recognize and manage severe allergic conditions.

6. A person who has previously experienced a severe allergic reaction to flu vaccine, regardless of the component suspected of being responsible for the reaction, should not get a flu vaccine again.
7. In 2016, the Advisory Committee on Immunization Practices (ACIP) decided to remove the algorithm for ACIP recommendations regarding flu vaccination of persons who report allergy to eggs from the 2016-2017 guidance.
8. CDC has created an updated version of the algorithm to reflect the new recommendations for this season that is available at <https://www.cdc.gov/flu/protect/vaccine/egg-allergies.htm>.

Background:

1. Egg allergy affects about 1.3% of all children and 0.2% of all adults.
2. Egg allergy can be confirmed by a consistent medical history of adverse reactions to eggs and egg-containing foods, plus skin and/or blood testing for immunoglobulin E antibodies to egg proteins.
3. Persons who are able to eat lightly cooked egg (e.g., scrambled egg) without reaction are unlikely to be allergic.
4. Egg-allergic persons might tolerate egg in baked products (e.g., bread or cake).
5. Tolerance to egg-containing foods does not exclude the possibility of egg allergy. Egg allergies can range in severity.
6. Most flu vaccines today are produced using an egg-based manufacturing process and thus contain a small amount of egg protein. There are a number of different egg proteins, but the egg protein content in a vaccine is usually expressed in terms of one of the proteins, ovalbumin.
7. While not all manufacturers disclose the amount of ovalbumin in their vaccines, those that did from 2011–12 through 2014–15 reported maximum amounts of $\leq 1 \mu\text{g}/0.5 \text{ mL}$ dose for flu shots and $0.24 \mu\text{g}/0.2 \text{ mL}$ dose for the nasal spray vaccine, a much smaller amount than would be present in a whole egg.
8. Cell-based flu vaccine (FLUCELVAX®) likely has a much smaller amount of egg protein since the original vaccine virus is grown in eggs, but mass production of that vaccine does not occur in eggs.
9. Recombinant vaccine (Flublok®) is the only vaccine currently available that is completely egg free.

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10. Studies that have examined the use of both the nasal spray vaccine and flu shots in egg-allergic and non-egg-allergic patients indicate that severe allergic reactions in people with egg allergies are unlikely.
11. A recent CDC study found the rate of anaphylaxis after all vaccines is 1.31 per one million vaccine doses given.

2017-2018 Influenza Vaccine Composition

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1. Each year, experts must select which flu viruses the flu vaccine should protect against many months in advance of the flu season in order for vaccine to be produced and delivered on time.
2. Because influenza (flu) viruses are constantly changing and the composition of the flu vaccine must be determined so far in advance, selecting the right influenza viruses for the flu vaccine to protect against is a challenging task.
3. In 2012, the Food and Drug Administration (FDA) approved flu vaccines that protect against four viruses (called "quadrivalent" flu vaccines) for use in the United States.
4. Trivalent and quadrivalent flu vaccines are available during the 2017-2018 season.
 - a) Trivalent flu vaccines protect against three flu viruses: an influenza A (H1N1) virus, an influenza A (H3N2) virus, and an influenza B virus (from Victoria lineage).
 - b) Quadrivalent flu vaccines protect against four flu viruses: an influenza A (H1N1) virus, an influenza A (H3N2) virus, and two influenza B viruses (from Victoria and Yamagata lineages).
5. Quadrivalent vaccines are intended to provide broader protection by adding another B virus to the vaccine.
6. The specific viruses for the 2017-2018 flu season vaccines were [recommended](#) by the FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) on March 9, 2017.
 - a) All of the 2017-2018 influenza vaccine is made to protect against the following three viruses:
 - an A/Michigan/45/2015 (H1N1)pdm09-like virus (updated from last season).
 - an A/Hong Kong/4801/2014 (H3N2)-like virus; and
 - a B/Brisbane/60/2008-like virus (this is a B/Victoria lineage virus).
 - b) The quadrivalent vaccine also protects against an additional B virus B/Phuket/3073/2013-like virus. This is a B/Yamagata lineage virus.
 - c) There is one difference between what was recommended for the 2016-2017 Northern Hemisphere vaccines and the 2017-2018 Northern Hemisphere vaccines.
 - The H1N1 vaccine virus component was updated. This is still a 2009 H1N1-like virus, but it is a more recently circulating virus.
 - d) Vaccine virus recommendations are based on several factors, including global influenza virologic and epidemiologic surveillance, genetic characterization, antigenic characterization, antiviral resistance, and the candidate vaccine viruses that are available for production.

2017-2018 Influenza Key Points continued

7. International surveillance suggested that these viruses would be the ones most likely to cause illness in the United States during the 2017-2018 season.
8. For more information about the composition of this year's flu vaccine and how viruses for the seasonal flu vaccine are selected, visit <http://www.cdc.gov/flu/about/season/vaccine-selection.htm>.

Statements for Parents

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1. Flu can be a serious disease for children of all ages and can lead to hospitalization or, in rare cases, even death.
 - a) [Alternative] Flu can be a serious disease for children of all ages, causing them to miss school, activities, or even be hospitalized.
2. Vaccination is especially important for certain people who are at high risk of serious complications from flu or who are in close contact with people at high risk, including the following groups:
 - a) Children younger than 5 years of age, and especially those younger than 2 years of age.
 - b) Children of any age with a long-term health condition like asthma, diabetes, or disorders of the brain or nervous system. These children are at higher risk of serious flu complications (like pneumonia). For the complete list of those at high risk, visit http://www.cdc.gov/flu/about/disease/high_risk.htm.
 - c) Adults who meet any of the following criteria:
 - Are close contacts of, or live with, children younger than 5 years old.
 - Are out-of-home caregivers (e.g., nannies, daycare providers, etc.) of children younger than 5 years old.
 - Live with or have other close contact with children of any age with a chronic health condition (e.g., asthma, diabetes, etc.).
 - Are health care personnel.
3. Every year in the United States, otherwise healthy children are hospitalized for or die from flu complications.
4. CDC estimates that since 2010, flu-related hospitalizations among children younger than 5 years ranged from 6,000 to 26,000 in the United States. For more information, see <https://www.cdc.gov/flu/protect/children.htm>.
5. Children younger than 5 years old and especially those younger than 2 years old, are at higher risk of serious flu complications, including hospitalization and death, compared to older children.
6. The risk of serious flu complications requiring hospitalization is highest among children younger than 6 months of age, but they are too young to be vaccinated. The best way to protect these children is for their mother to get a flu shot during pregnancy and for people around them to get vaccinated, as well.
7. Since 2004-2005, flu-related deaths in children reported to CDC during regular flu seasons have ranged from 37 deaths (during 2011-2012) to 171 deaths (during 2012-2013). During the 2009 H1N1 flu pandemic (April 15, 2009 to October 2, 2010), 358 pediatric deaths were reported to CDC.

2017-2018 Influenza Key Points continued

8. The majority of flu-related deaths occur in children who are not fully vaccinated.
9. Since 2011-2012, between 70% and 85% of reported pediatric deaths have occurred in children who were not fully vaccinated.
10. Information about pediatric deaths since the 2004-2005 flu season is available in the [interactive pediatric death web application](#).
11. Vaccination is the first and most important step in protecting your family against the flu.
12. Flu vaccination can prevent illness, hospitalization, and deaths in children.
13. Children 6 months and older are recommended to get a yearly flu vaccine.
14. A seasonal influenza vaccination (flu shot) every year is especially important for children with asthma, diabetes (type 1 and 2), neurologic conditions (conditions affecting the brain and nerves), or certain other long-term medical conditions, because they are at high risk for complications from flu if they get sick. A full list of people at high risk for flu-related complications is at https://www.cdc.gov/flu/about/disease/high_risk.htm
 - a) The flu can make some medical conditions worse. For example, children with asthma (even if it's mild or controlled by medication) who catch the flu are more likely to have worsening of their condition, for example, more asthma attacks.
 - b) Children with asthma (even if the asthma is mild or controlled by medication) are more likely than children who don't have asthma to develop serious complications from the flu (like pneumonia) and to need to be hospitalized for flu-related complications.
 - c) Children with neurologic disorders and neurodevelopmental conditions, such as cerebral palsy, intellectual disability (decreased ability to think, learn, and reason), muscular dystrophy or spinal cord injury, are at high risk of developing flu-related complications, hospitalization, and even death. Children with these conditions sometimes:
 - o Have trouble with muscle function, lung function, or difficulty coughing, swallowing or clearing fluids from their airways.
 - o Have limited mobility and cannot avoid coming into contact with others who may be infected, like caretakers and family members.
 - o Have trouble understanding or practicing measures to prevent infections like the flu, such as hand washing or avoiding contact with people who are sick.
 - o Cannot communicate if they are sick.
15. If you live with or care for a child who is at high risk of serious complications from flu, it is particularly important for you and your children 6 months of age and older to get vaccinated.
 - a) If your child is at high risk of serious flu complications and gets sick with the flu, your doctor may recommend treatment with flu antiviral drugs. (See [Antiviral Drugs messages](#).)
 - b) For the full list of age factors and medical conditions that put someone at high risk, see http://www.cdc.gov/flu/about/disease/high_risk.htm.
16. Be sure to let the doctor know if your child has any medical conditions like asthma, heart or lung conditions, neurologic conditions, or other medical problems.
17. Be sure to let the doctor know if your child has ever experienced a reaction to the flu vaccine. (See [Egg Allergy messages](#).)

2017-2018 Influenza Key Points continued

18. Children also should be current on other vaccines, including those that can help prevent pneumonia, like pneumococcal and Hib vaccines.
19. Talk to your child's doctor or other health care personnel about getting a flu vaccine.
20. CDC also recommends that parents and children take everyday preventive actions to stop the spread of germs. (See [Everyday Preventive Actions messages](#).)
21. The Flu Guide for Parents (<http://www.cdc.gov/flu/freeresources/print-family.htm>) provides detailed information for parents on the seriousness of flu illness in children, how to protect them, and how to care for children with flu illness.
22. It is also important for [pregnant women to get vaccinated](#) to protect themselves and their babies.
23. More information about influenza and influenza vaccination in pregnant women is available at <https://www.cdc.gov/flu/protect/vaccine/pregnant.htm>.

Vaccine Doses for Children Aged 6 Months through 8 Years

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1. 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 also may need two doses. Your child's doctor or other health care personnel can tell you if your child needs two doses.
 - a) The current recommendation is that children 6 months through 8 years of age need only one dose of 2017-2018 seasonal influenza vaccine if the child has previously received two or more total doses of any trivalent or quadrivalent influenza vaccine (including LAIV) before July 1, 2016. The two previous doses do not need to have been given during the same season or consecutive seasons.
 - b) [Children](#) 6 months through 8 years who have previously received only 1 dose or no doses of influenza vaccine need two doses of vaccine to be fully protected for the 2017-2018 season. If the vaccination status is unknown any child in this age group, that child should be given two doses of seasonal flu vaccine.
2. Everyone 9 years of age and older needs only one dose of 2017-2018 flu vaccine to be protected.
3. To view a chart (algorithm) that shows influenza vaccine dosing recommendations for children aged 6 months through 8 years, visit https://www.cdc.gov/mmwr/volumes/65/rr/rr6505a1.htm?s_cid=rr6505a1_w.

Statements for Pregnant Women

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1. Influenza can be dangerous for pregnant women and may be harmful for their developing baby.
 - a) Pregnant women who get flu are more likely to develop serious illness, including illness resulting in hospitalization, than women who are not pregnant.

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- b) Changes in the immune system, heart, and lungs during pregnancy make pregnant women (and women up to two weeks postpartum) more prone to severe illness from flu, including illness resulting in hospitalization.
 - c) Flu also may be harmful for a pregnant woman's developing baby.
 - o A common flu symptom is fever, which may be associated with neural tube defects and other adverse outcomes for a developing baby.
2. Millions of flu vaccines have been given for decades, including to pregnant women, with a good safety record.
 - a) There is a lot of evidence that flu vaccines can be given safely during pregnancy; though these data are limited for the first trimester.
 3. Getting a flu shot can protect pregnant women and their babies from the flu.
 - a) There are a number of studies that show flu vaccines protect pregnant women from flu the same way that they protect people who are not pregnant (i.e., pregnant women develop antibodies against flu after vaccination).
 - b) Many vaccine effectiveness studies show that getting a flu shot reduces risk of illness by 40% to 60% during seasons when the vaccine is well-matched to circulating viruses.
 - c) Other studies have shown that similar protection is provided against flu-associated hospitalization.
 - d) Vaccinating a pregnant woman can also protect a baby after birth from flu (i.e., a mother passes antibodies to the developing baby during her pregnancy).
 - e) There are studies that show that a baby whose mother was vaccinated during her pregnancy is protected from flu infection and hospitalization with flu infection for several months after they are born.
 - f) Babies younger than 6 months of age are too young to get a flu vaccine. The best way to protect them is for their mother to get a flu shot during pregnancy and for people around them to get vaccinated, as well. Though not specifically examined among pregnant women, there are some studies that suggest that flu vaccination may make illness milder among people who do still get sick.
 4. If you have additional questions, talk to your doctor about flu vaccination during pregnancy. Pregnant women are at high risk of serious flu complications and should be treated with flu antiviral medications if they become ill with flu.
 5. If you are pregnant and get sick with flu symptoms, call your doctor right away. Your doctor may recommend treatment with influenza antiviral drugs (see [Antiviral Drugs messages](#)).
 6. Influenza vaccination is fully compatible with breastfeeding.
 - a) If you have your baby before getting the flu shot, you should still be vaccinated. Preventing the flu in mothers can reduce the chances that their babies will get the flu.
 7. An additional way to protect babies is for all caregivers and close contacts (including parents, brothers and sisters, grandparents, and babysitters) to get a flu vaccine.

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8. In 2017, a study in the journal Pediatrics was the first of its kind to show that flu vaccination also significantly reduced a child's risk of dying from influenza.
 - a) See "Influenza Vaccine Effectiveness Against Pediatric Deaths: 2010-2014: by Brendan Flannery et al. in Pediatrics at <http://pediatrics.aappublications.org/content/early/2017/03/30/peds.2016-4244>.
9. [Learn](#) about the vaccines you will need before and during your pregnancy to help protect yourself and your newest family member from serious diseases.
 - a) Vaccines are an important part of planning and having a healthy pregnancy. If you are planning to get pregnant, check with your doctor to make sure you are up-to-date on your vaccines.
 - b) If you are pregnant now, CDC, the American Academy of Pediatrics, the American College of Nurse midwives, and many other professional medical groups recommend you get two vaccines during your pregnancy:
 - o Tdap to help protect against whooping cough (pertussis)
 - o A flu shot to help protect against influenza (flu). (Note, flu vaccination is recommended during any trimester of pregnancy.)

Statements for Adults (18 through 64 years of age)

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1. Persons of all ages are at risk from influenza illness.
2. Influenza seasons vary from year to year in terms of their timing, severity, and impact on different age groups.
3. All people 6 months of age and older, including all adults 18 years of age and older, are recommended to receive the seasonal flu vaccine annually.
4. Getting sick with the flu can result in missed school, work, and extracurricular activities and may result in severe illness with complications, hospitalizations, and sometimes even death.
5. Flu does not affect just those at high risk of flu complications like young children and seniors; it can affect people in any age group, including people who are otherwise healthy.
6. It is not possible to predict which influenza viruses will predominate this season, but it is important for all adults to be vaccinated this season.
7. Vaccination is especially important for adults with certain long-term medical conditions because they are at increased risk of serious illness if they get the flu. This includes, for example, people with asthma (even if mild or controlled), heart disease, or diabetes (types 1 and 2).
8. By getting a flu vaccine, adults also can help prevent spreading flu to friends and family who are at increased risk for flu complications including pregnant women, grandparents, young children, and people with certain long-term medical conditions like asthma or diabetes or people with a weakened immune system.
9. CDC recommends all adults and children also take everyday preventive actions to reduce the spread of germs. (See [Everyday Preventive Actions messages](#).)
10. For the full list of age factors and medical conditions that put someone at increased risk of flu-related complications, see http://www.cdc.gov/flu/about/disease/high_risk.htm.

2017-2018 Influenza Key Points continued

11. If you are at increased risk of serious flu complications and get sick with the flu, CDC recommends you be treated with antiviral drugs. ([See Antiviral Drugs messages.](#))
12. In addition to the flu vaccine, other vaccines that prevent serious diseases such as shingles, pneumococcal disease, meningococcal disease, hepatitis, and whooping cough are recommended for some adults. See [Vaccine Information for Adults](#) for more information.
13. Unfortunately, many adults are not up-to-date on vaccines recommended for them, leaving themselves and their loved ones unnecessarily vulnerable to serious diseases.
14. Adults should talk with their doctors or other health care personnel to learn which vaccines are recommended for them and take steps to stay up-to-date to ensure that they have the best protection.
15. Flu and other vaccines for adults are offered in many locations, including doctor's offices, health departments, pharmacies, health centers, travel clinics, as well as by many employers and schools.

Statements for Adults 65 Years and Older

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1. People's immune systems can become weaker with age which can place people 65 years and older at greater risk of flu complications.
2. While annual flu vaccination is recommended for all people 6 months and older, vaccination is especially important for people 65 years and older because people in this age group are at increased risk of getting seriously ill from the flu.
3. During most seasons, people 65 years and older bear the greatest burden of severe flu disease.
4. During recent seasons, for example, it's estimated that between about 70 percent and 90 percent of seasonal flu-related deaths in the United States have occurred among people 65 years and older.
5. It's estimated that between about 50 percent and 70 percent of seasonal flu-related hospitalizations in the United States have occurred among people 65 and older.
6. This pattern can change depending on which flu viruses are circulating. Vaccination is the best protection against the flu and flu-related complications.
7. Protection provided by flu vaccination can vary depending on a number of factors including the age and health of the person being vaccinated.
8. In general, the flu vaccine works best among healthy adults and older children.
9. Some older people and people with certain chronic illnesses might develop less immunity than healthy children and adults after vaccination. However, even for these people, the flu vaccine is still the best protection against flu.
(<http://www.cdc.gov/flu/about/qa/vaccineeffect.htm>.)
 - a) Some studies have indicated that immunity may last for shorter periods of time in some people (for example, in people with weaker immune systems, which may include people 65 years and older); other studies have indicated that antibody levels (which are an indicator of immune protection) last through one flu season.
 - b) Consistent with CDC's and Advisory Committee on Immunization Practices' (ACIP) general recommendation, people with weakened immune systems and people 65 years and older should be vaccinated, if possible, by the end of October. Given the

2017-2018 Influenza Key Points continued

- variability of existing study results and the uncertainty and unpredictability of when flu activity will begin in a given community, CDC and ACIP do not recommend delaying vaccination.
- c) As long as flu viruses are circulating, vaccination should continue throughout the flu season, even during January or later.
8. Several flu vaccine options are available for people 65 years and older, including standard dose inactivated influenza vaccine, a high dose influenza vaccine, and a standard dose vaccine with adjuvant.
- a) One vaccine option is a "high dose" flu vaccine (Fluzone® High-Dose) which contains four times the antigen (the part of the vaccine that helps your body build up protection against flu viruses) of standard flu shots.
- Data from studies comparing trivalent Fluzone® vaccines, high dose and standard dose, among people 65 years and older found a stronger immune response (i.e., higher antibody levels) after vaccination with Fluzone® High-Dose.
 - Results from a clinical trial of more than 30,000 participants showed that adults 65 years of age and older who received the high dose vaccine had 24% fewer influenza infections as compared to those who received the standard dose flu vaccine.
- b) Another vaccine option is an "adjuvanted" flu vaccine (FLUAD™). FLUAD™ is a trivalent vaccine containing MF59 adjuvant for people 65 years and older. FLUAD™ is the first adjuvanted flu vaccine marketed in the United States.
- In a Canadian observational study of 282 people 65 years and older conducted during the 2011-12 season, FLUAD™ was 63% more effective than regular-dose unadjuvanted flu shots.
 - There are no randomized studies comparing FLUAD™ with Fluzone® High-Dose.
 - Note: At this time, CDC and ACIP have not expressed a preference for the high dose vaccine or adjuvanted vaccine over the standard-dose flu shot for people 65 years of age and older.
9. The "high dose" and adjuvanted flu vaccines may result in more of the mild side effects that can occur with standard-dose seasonal flu shots. Mild side effects can include pain, redness or swelling at the injection site, headache, muscle ache and malaise. In clinical trials, most people had minimal or no adverse events after receiving the Fluzone® High-Dose vaccine.
10. Talk to your doctor or other health care personnel about the best vaccine option for you.
11. People 65 years of age and older should not get the nasal spray flu vaccine, the intradermal flu shot, or flu vaccine given using a jet injector.
12. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu.
- a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See [Antiviral Drugs messages.](#))
13. Pneumococcal disease can be a complication of influenza infection and includes pneumonia, meningitis and blood infections.

2017-2018 Influenza Key Points continued

14. Learn more about when pneumococcal vaccines are needed for adults: <http://www.cdc.gov/features/adult-pneumococcal>.
 - a) CDC recommends all adults 65 years or older receive 2 types of pneumococcal vaccines.
 - a) One dose of PCV13 first, followed at least 1 year later by one dose of PPSV23.
15. It is safe to get either of the pneumococcal vaccines at the same time as the influenza (flu) vaccine, but you need to get the two pneumococcal vaccines at different times.
16. While you don't need a pneumococcal vaccine every year, it is important to get a flu vaccine each flu season. Flu can be serious, even for otherwise healthy people. Having the flu increases your chances of getting pneumococcal disease.
17. For more information about flu and people 65 years or older, visit: <http://www.cdc.gov/flu/about/disease/65over.htm>.

Statements for Adults with Certain Medical Conditions

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General Messages

1. Most people who get the flu will have mild illness, will not need medical care or antiviral drugs, and will recover in less than two weeks. Some people, however, are more likely to have serious flu-related complications that may result in being hospitalized and occasionally result in death.
2. Diabetes, asthma, and chronic heart disease (even if well managed) are among the most common long-term medical conditions that place people at higher risk for serious flu complications.
 - a) The flu also can make long-term health problems worse, even if they are well managed.
 - b) It is particularly important that all adults with chronic medical conditions like asthma, diabetes (types 1 and 2), and chronic heart disease, receive a flu vaccine every year.
 - c) Stay in control of your health by getting your flu vaccine.
3. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See [Antiviral Drugs messages.](#))
4. For the full list of medical conditions that put you at a higher risk for serious flu complications, visit http://www.cdc.gov/flu/about/disease/high_risk.htm.

Diabetes

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1. While CDC recommends everyone 6 months and older get vaccinated against the flu, it is especially important to get a flu shot if you have diabetes (type 1, type 2, gestational diabetes).

2017-2018 Influenza Key Points continued

2. Even if your diabetes is well managed, you can get the flu and have [serious complications](#), for example, pneumonia. It's important that you know the signs and symptoms of flu and make a plan with your doctor about what to do in case you get sick.
3. For example, flu illness can make it harder to control your blood sugar. Sometimes, when you are sick, your blood sugar goes up.
4. It is also possible for blood sugar levels to go too low, for example, if you can't eat or have nausea or vomiting from flu illness.
5. People with diabetes sometimes have a harder time fighting infections.
6. A study showed that people with diabetes were more than two times more likely to be hospitalized with a flu-related illness than people without diabetes. Everyone with diabetes, either type 1 or type 2 diabetes, should get an annual flu shot to protect themselves from flu.
7. People with diabetes should ask their family and friends to get a flu shot as well to help reduce their chances of getting sick from flu illness.
8. Flu shots are approved for use in people with diabetes.
9. If you have flu symptoms, call a doctor, nurse, or clinic right away – even if you have had a flu shot. A doctor or clinic can prescribe medicine to treat the flu and reduce your chance of serious illness. It's important to start taking this medicine as soon as possible.
 - a) [Symptoms may include](#): Fever or feeling feverish/chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches, fatigue (tiredness), and sometimes vomiting and diarrhea, though this is more common in children than adults.
10. CDC recommends that people at high risk of serious flu complications – such as people with diabetes – be treated with flu antiviral drugs if they get sick with flu.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See [Antiviral Drugs messages](#).)
11. Take everyday steps to protect your health, like staying home when you are sick and washing your hands often. Visit: <http://www.cdc.gov/flu/protect/habits/index.htm>.
12. For more information about flu and diabetes, visit <http://www.cdc.gov/flu/diabetes/>.

Asthma

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1. Although people with asthma are not more likely to get flu, flu is more serious for people with asthma, even when asthma is mild or the symptoms are well managed.
2. People with asthma are more likely to have breathing problems if they get the flu.
3. The flu can also trigger asthma attacks or cause pneumonia and other acute respiratory diseases. Adults and children with asthma are more likely to develop pneumonia after getting sick with the flu.
4. Asthma is the most common chronic medical condition among children hospitalized with the flu.
5. Flu shots are approved for use in people with asthma.

2017-2018 Influenza Key Points continued

6. Family and friends of someone with asthma should get vaccinated to protect themselves and to reduce the chance of getting and spreading the flu to their loved one with asthma.
7. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See Antiviral Drugs messages.)
8. For more information about flu and asthma, visit <http://www.cdc.gov/flu/asthma/index.htm>.

Heart Disease

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1. People with heart disease or who have had a stroke are at increased risk for developing serious complications from the flu and should get a flu shot every year.
2. People with heart disease may experience a worsening of this condition triggered by flu.
3. Flu vaccination has been associated with lower rates of some cardiac events, such as a heart attack, among people with heart disease, especially among those who had had a cardiac event in the 12 months prior to flu vaccination.
4. Flu shots are approved and highly recommended for use in people with heart disease or who have had a stroke.
5. Despite the known increased risk of severe flu-related complications in patients with heart disease and recommendations for vaccination, many patients are still not getting vaccinated.
6. Complications from the flu, like pneumonia, can put more stress on a person's heart.
7. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See [Antiviral Drugs messages](#).)
8. For more information about influenza and heart disease, visit <http://www.cdc.gov/flu/heartdisease/>.

Severe Obesity

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1. Adults who have severe obesity (adults with a body mass index [BMI] of 40 or greater), are included in the Advisory Committee on Immunization Practices (ACIP) list of people for whom flu vaccination is especially important due to their high-risk status.
2. During the 2009 H1N1 pandemic, having a body mass index of 40 or greater was shown to be an independent risk factor for serious complications related to influenza infection.
3. People with obesity were disproportionately affected during the 2009 H1N1 pandemic. This was demonstrated in studies worldwide (U.S., Canada, Australia and New Zealand, China, France, and Spain).
4. Various studies showed that adults with a BMI of 40 or greater were more likely to experience hospitalization, longer ICU stays, and death during the 2009 H1N1 pandemic.

2017-2018 Influenza Key Points continued

5. Among adults hospitalized with flu during the 2015-2016 flu season, obesity was the most common chronic condition; 41.8% of adults hospitalized with flu were obese.
6. People with severe obesity (a body mass index [BMI] of 40 or greater) often suffer from other medical conditions that put them at high risk of flu complications, such as pneumonia and death.
 - a) It is possible that some adults with severe obesity could have unrecognized chronic medical conditions.
7. Getting a flu vaccine is the most important action a person can take to prevent the flu and its complications. Because people who have a BMI of 40 or greater are at higher risk of flu complications, it is especially important that they get vaccinated every year to protect against the flu.
8. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after your symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information. (See [Antiviral Drugs messages.](#))
9. For more information about those at high risk of flu-related complications and to learn more about body mass index, visit http://www.cdc.gov/flu/about/disease/high_risk.htm and <http://www.cdc.gov/healthyweight/assessing/bmi/>.

People with Disabilities* and Caregivers:

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* The term "disability" refers to a reduced capacity to move parts of the body (mobility limitation) or to think, understand, remember, or reason (cognitive limitation). Disability includes people with conditions that affect how their brains and nerves function (neurological and neuro-developmental conditions). This includes disorders of the brain, spinal cord, nerves, and muscles, such as cerebral palsy, spinal cord injury, muscular dystrophy, and intellectual disability (the decreased ability to think, learn, and reason). These long-term conditions can make it difficult for a person to do certain activities or to interact in the world around them. Disability also includes people with other long-term health conditions, such as heart disease, asthma, and diabetes, which can interfere with and limit participation in daily activities.

1. People with certain types of disability are at high risk for developing flu-related complications that could require hospitalization. A full list of people at high risk for flu-related complications is at https://www.cdc.gov/flu/about/disease/high_risk.htm.
2. Flu is particularly dangerous for people who may have trouble with muscle function, lung function or difficulty coughing, swallowing or clearing fluids from their airways. Serious flu complications can include pneumonia, secondary bacterial infections that can lead to blood infections (sepsis), and sudden difficulties breathing (acute respiratory distress syndrome).
3. People with disabilities may be at risk of getting flu and/or having unrecognized flu symptoms because they
 - a) Have limited mobility and cannot avoid coming into contact with others who may be infected, like caretakers and family members;
 - b) Have trouble understanding or practicing measures to prevent infections like the flu, such as hand washing, or avoiding contact with people who are sick;

2017-2018 Influenza Key Points continued

- c) May not be able to communicate if they are sick;
 - d) May not be monitored closely for symptoms of illness.
4. Getting a flu vaccine (flu shot) is the most important action a person with disabilities can take to prevent the flu and its complications. Caregivers and family members of people with disabilities can also help to protect them by getting the flu vaccine themselves.
 5. CDC recommends that people at high risk of serious flu complications be treated with flu antiviral drugs if they get sick with flu. Antiviral drugs can make the flu illness milder and shorten the time being sick. They may also prevent serious flu complications.
 - a) Flu antiviral drugs work best if taken within the first 48 hours after symptoms start. Visit <http://www.cdc.gov/flu/antivirals/index.htm> for more information.
 - b) Ask your healthcare provider or pharmacist about possible drug interactions and side effects of your regular prescriptions with flu-related medications. (See [Antiviral Drugs messages](#).)
 6. Take everyday steps to protect your health. Visit <http://www.cdc.gov/flu/protect/habits/index.htm>.

Statements for American Indians and Alaska Natives

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1. During the 2009 H1N1 pandemic, indigenous populations from Australia, Canada, New Zealand, and the United States, including American Indians and Alaska Natives, experienced a rate of hospitalization and death associated with infection with the 2009 H1N1 flu virus that was three to eight times higher than what was seen in other populations.
 - a) A study of 12 states, including Alaska, showed that the death rate from 2009 H1N1 flu in American Indian and Alaska Natives was four times higher compared to the death rate from 2009 H1N1 flu in all other racial/ethnic populations combined. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5848a1.htm>
 - b) The increased influenza mortality in American Indian and Alaska Native individuals was due to factors other than racial status. Prevention of influenza deaths should focus on modifiable factors (smoking, early antiviral use, access to care) and identifying high-risk persons for immunization and prompt medical attention.
 - c) A study of racial-ethnic disparities in 2009 H1N1 pandemic illness severity found that self-reported influenza-like-illness (ILI) was higher among American Indians and Alaska Natives (16.2%) compared to non-Hispanic whites (8.5%). Also, rates of hospitalization were higher among American Indians and Alaska Natives than for non-Hispanic whites.
 - See "Racial and Ethnic Disparities in Hospitalization and Deaths Associated with 2009 Pandemic Influenza A (H1N1) Virus Infections in the United States" by Deborah Lee et al. *Annals of Epidemiology*, 21:8 (2011) pp 623-630 at <https://doi.org/10.1016/j.annepidem.2011.03.002>.
2. Studies by doctors in Alaska suggest that several factors may increase infection risk and serious complications associated with bacterial and viral pathogens (including the flu) in these groups. These factors include household crowding; a lack of sanitation services, such as running water in remote villages; and limited access to timely medical care for persons living in remote areas.

2017-2018 Influenza Key Points continued

3. Flu is a leading cause of pneumonia. American Indian and Alaska Native people are more likely to die from pneumonia and influenza than other races.
4. American Indians and Alaska Natives are included in the list of people at high risk for complications from the flu and for whom vaccination is especially important.
5. American Indians and Alaska Natives can protect themselves by getting flu and pneumococcal vaccines. These vaccines are available at your local health care facility (even if you don't have a regular doctor or other health care personnel); mobile and community-based immunization clinics that are held in many locations; and at pharmacies and grocery stores where available.
6. The flu vaccine can help protect American Indians and Alaska Natives, including children, adults, and elders against the flu.
7. The flu can cause severe illness that may require hospital care, even in healthy adults and children. A flu vaccine reduces your risk of illness, hospitalization, and can prevent you from spreading the virus to your loved ones. By reducing the risk of severe illness, a flu vaccine can offer life-saving protection, especially in communities that do not have a hospital with an emergency department or Intensive Care Unit (ICU).
8. CDC has prepared general messages for how all people, including American Indians and Alaska Natives, can protect themselves and their loved ones from the flu. (Please see the sections titled [Take 3](#), [Vaccination](#) and [Everyday Preventive Actions](#) for these messages).

Statements on the Importance of Health Care Personnel Recommendation and Vaccination

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1. As a health care personnel, you are a trusted and valuable source of health information. Patients may view you as their primary or preferred source of care. This provides you the opportunity to assess your patients' vaccination status and possibly even to administer the appropriate vaccines.
2. Recommend flu vaccination for all of your patients 6 months of age and older. Make plans to vaccinate your patients, staff, and yourself.
3. Visit <http://www.cdc.gov/flu/professionals/acip/> to view the 2017-18 Advisory Committee on Immunization Practices (ACIP) Influenza Vaccine Recommendations.
4. This season ACIP and CDC have again recommended against use of the live attenuated influenza vaccine (LAIV) because of concerns about effectiveness.
5. During 2017-2018, vaccination is recommended with injectable influenza vaccine (flu shots); either inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIV).
 - a) As a trusted health care personnel, research shows that your recommendation to patients for yearly flu vaccination and taking action to get yourself vaccinated is vital.
 - b) Ideally, all health care personnel, including specialists and primary care professionals, should recommend *and* offer flu vaccines to their patients.
 - c) Even if you do not stock flu vaccines in your office, assessing your patients' vaccination needs and making a strong recommendation for them to get vaccinated is critical. Health care personnel who don't administer flu vaccines can refer patients to their primary care professional or to a pharmacist or local health department to receive the needed vaccines. You and your patient can visit the HealthMap Vaccine

2017-2018 Influenza Key Points continued

Finder (<http://vaccine.healthmap.org/>) to find locations in your area that offer the recommended vaccines.

- d) Take every opportunity to help educate your patients about the importance of flu vaccination this and every year.
6. Flu can spread rapidly in health care settings. Vaccination is the first and most important step physicians and health care personnel can take to protect themselves and their patients against the flu.
7. Even if you are healthy, you can get sick and spread the flu. Get vaccinated to help protect yourself from the flu and to keep from spreading it to your family, co-workers, and patients. Studies conducted in health care settings show that when a large number of health care personnel get vaccinated, vulnerable patients are protected.
8. Health care personnel should routinely offer seasonal flu vaccination to everyone aged 6 months and older, by the end of October, if possible, and continuing throughout the flu season, which can last as late as May.
9. Optimally, vaccination should occur before onset of influenza activity in the community. In any given season, however, the optimal time to vaccinate cannot be predicted precisely because influenza seasons vary in timing and duration. Moreover, more than one flu outbreak might occur in a given community in a single year.
10. In the United States, in 74% of influenza seasons from 1982–1983 through 2015–2016, peak influenza activity (which often is close to the midpoint of influenza activity for the season) has not occurred until January or later, and in 59% of seasons, the peak was in February or later (<https://www.cdc.gov/flu/about/season/flu-season.htm>).
11. ACIP and CDC recommend vaccination by the end of October, if possible; however, providers should try to avoid missed opportunities for vaccination of patients who they might see before October and continue to vaccinate patients throughout the influenza season.
12. CDC encourages medical practices, health departments, pharmacists, and other health care personnel to use flu vaccination as an opportunity to remind adult patients about other recommended vaccines. <http://www.cdc.gov/vaccines/schedules/hcp/adult.html>
13. Visit [CDC's free influenza resources](#) for references and resources to communicate about flu vaccination with patients, partners, and the community.
14. For the latest information on flu vaccine supply, including projections and doses distributed, visit <https://www.cdc.gov/flu/about/qa/index.htm>.
15. Key information for public health and health care personnel regarding vaccination, infection control, prevention, treatment, and diagnosis of seasonal flu is available at <http://www.cdc.gov/flu/professionals>.
16. Order free print resources from <http://www.cdc.gov/pubs/CDCInfoOnDemand.aspx> (search in drop-down box by "Immunization & Vaccines (Influenza/Flu)") or download from <http://www.cdc.gov/flu/freeresources/print.htm>.
17. Health care personnel should take everyday preventive actions to prevent the spread of germs and suggest the same to their patients. (See [Everyday Preventive Actions messages](#)).
18. As part of the Affordable Care Act, many insurance plans, including all plans in the Health Insurance Marketplace, will provide many free preventive services, including flu vaccinations. For information about the Health Insurance Marketplace, visit www.HealthCare.gov.

Statements for Health Care Personnel in Long-term Care Facilities

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1. All health care personnel (HCP) in the long-term care (LTC) workforce are recommended to receive annual influenza vaccination.
 - a) Health care personnel includes physicians, physician's assistants, nurses, aides, attendants, therapists, emergency medical service personnel, pharmacists, and other categories of workers who do not interact directly with patients or residents. A list of who is considered health care personnel is available on the CDC website at <http://www.cdc.gov/flu/toolkit/long-term-care/snapshot.htm>.
2. Influenza is a serious health threat, especially to vulnerable populations like people 65 and older and those living with certain chronic medical conditions.
 - a) You can get the flu from patients and coworkers who are sick with the flu.
 - b) If you get the flu, you can spread it to others even if you don't feel sick.
 - c) By getting vaccinated, you help protect yourself, your family at home, and your patients.
 - d) People 65 years of age and older are at high risk for hospitalization and complications from the flu and account for the majority of flu hospitalizations and deaths in the United States each year.
3. It's important for people living with and caring for high risk persons, including those who work in long-term care, to get vaccinated against influenza each year.
4. Health care personnel should get their flu vaccine by the end of October, if possible. Ideally they should be protected before flu activity increases in their community.
5. CDC recommends flu vaccine to health care personnel working in LTC settings in order to prevent influenza among health care personnel and to help reduce the spread of flu in resident populations.
 - a) Health care personnel in long-term care facilities who are not vaccinated against the flu may become infected through contact with infected residents, other infected health care personnel, or infected people in the community, including friends and family members.
 - b) Unvaccinated health care personnel may spread influenza to residents, other health care personnel, and friends and family.
6. CDC makes specific recommendations for flu vaccination of health care personnel and recommendations for persons who live with or care for persons at high risk for influenza-related complications.
7. During flu season, health care personnel should not report to work if experiencing flu symptoms.
8. Studies have found an association between high flu vaccination coverage rates among health care personnel and increased protection against flu among people in long-term care facilities and hospitals.
 - a) For example, see "Effect of Influenza Vaccination of Healthcare Personnel on Morbidity and Mortality Among Patients: Systematic Review and Grading of Evidence" by Faruque Ahmed et al. in *Clinical Infectious Diseases* at <https://academic.oup.com/cid/article/58/1/50/372080/Effect-of-Influenza-Vaccination-of-Healthcare>.

2017-2018 Influenza Key Points continued

9. People 65 years and older are at high risk of serious complications from the flu compared with young, healthy adults, in part because human immune defenses become weaker with age.
 - a) During most flu seasons, people 65 years and older bear the greatest burden of severe flu disease.
 - b) It's [estimated](#) that between 71 percent and 85 percent of seasonal flu-related deaths have occurred in people 65 years and older.
 - c) It's estimated that between 54 percent and 70 percent of seasonal flu-related hospitalizations have occurred among people 65 years and older.
10. There are several reasons that health care personnel report that they get vaccinated against influenza. During the 2015-2016 influenza season, health care personnel, in general, reported the most common reason was to protect themselves from getting the flu.
 - a) Other commonly reported reasons included an employer requirement for flu vaccination and protecting their friends or family from flu.
11. The Healthy People 2020 target goal for seasonal influenza vaccination among health care personnel is 90 percent (see Healthy People 2020 objective IID-12.9).

Background:

1. As reported in the October 29, 2017 Morbidity and Mortality Weekly Report (MMWR), overall, 78.6% of health care personnel reported having received an influenza vaccination for the 2016-2017 season.
 - a) Vaccination coverage was highest among HCP working in hospitals (92.3%) and lower among health care personnel working in ambulatory (76.1%) and long-term care settings (68.0%).
2. Studies show that during a confirmed influenza outbreak in a long-term care facility, up to one in three residents and one in four staff develop an influenza-like illness.
 - a) Preventing influenza among health care personnel can help reduce the spread of influenza in resident populations.
3. Studies have documented that health care personnel might report to work on days when they have a fever or a respiratory disease because they feel they are needed at work or they do not receive paid sick leave.
 - a) Sometimes health care personnel have mild flu symptoms but do not realize they have influenza and might report to work. During this time, those personnel may still spread the virus to others.
 - b) To avoid this, people should stay away from sick people and stay home if sick.
 - c) During the influenza season, health care personnel should be encouraged to report influenza symptoms to their supervisors and to stay home if they are ill.
4. Health care personnel such as nursing assistants or nursing aides, home health aides, and personal care aides provide hands-on and personal assistance to vulnerable populations, including LTC residents. Among health care personnel, vaccination rates are lower in these occupations.
5. A [recent large, randomized clinical trial](#) tested whether a flu vaccine with four times the antigen of a standard flu vaccine (high-dose) could reduce the risk of hospitalization among vulnerable adults aged 65 years or older.

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- a) [Study shows](#), when compared with standard-dose vaccine, high-dose influenza vaccine can reduce risk of respiratory-related hospital admissions from nursing home residents aged 65 years and older.
- b) More immunogenic, high-dose vaccines can reduce the number of hospital admissions for people aged 65 years or older, among those living in nursing homes.
- c) [Study shows](#) that high-dose influenza vaccine has greater effectiveness against respiratory and all-cause hospital admissions in a long-term care population than does a standard-dose influenza vaccine.

Flu Vaccine Safety

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General

1. Flu vaccines are among the safest medical products in use. Hundreds of millions of Americans have safely received flu vaccines during the past 50 years, and there has been extensive research supporting the safety of seasonal flu vaccines.
2. CDC recommends that everyone 6 months of age and older receive a flu vaccine every year. A flu vaccine is the best way to reduce your chances of getting the flu and spreading it to others.
3. The flu vaccine cannot cause flu.
4. Flu vaccine side effects are generally mild and go away on their own within a few days.
5. Common side effects from the flu shot include soreness, redness, and/or swelling from the shot, headache, fever, muscle aches, and nausea.
6. Severe allergic reactions are rare. They would most likely happen within a few minutes to a few hours after the vaccine is given.
7. CDC and the Food and Drug Administration (FDA) closely monitor the safety of vaccines approved for use in the United States. CDC uses two primary systems to monitor the safety of flu vaccines:
 - a) [Vaccine Adverse Event Reporting System \(VAERS\)](#): an early warning system that helps CDC and FDA detect possible safety issues with U.S. vaccines. Anyone can report possible vaccine side effects to VAERS. Generally, VAERS reports cannot determine if an adverse event was caused by a vaccine, but these reports can help determine if further investigations are needed.
 - b) [Vaccine Safety Datalink \(VSD\)](#): A collaboration between CDC and eight integrated health care organizations conducts near real-time vaccine safety monitoring and epidemiologic studies.

Thimerosal

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1. Thimerosal is an ethyl mercury-based preservative used in vials that contain more than one dose of a vaccine (multi-dose vials) to prevent germs, bacteria, and/or fungi from contaminating the vaccine.

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2. Thimerosal use in medical products has a record of being very safe. Data from many studies show no evidence of harm caused by the low doses of thimerosal in vaccines.
3. Flu vaccines in multi-dose vials contain thimerosal to prevent contamination of the vial after the first dose has been removed. Most single-dose vials and pre-filled syringes of flu shot and the nasal spray flu vaccine do not contain a preservative because they are intended to be used once.
4. Of the total number of injectable influenza vaccine doses projected to be available for the 2017-2018 season (151 million to 166 million), approximately 130 million doses are estimated to be thimerosal-free (up from 120 million projected for last season)

Guillain-Barré Syndrome

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1. Guillain-Barré syndrome (GBS) is a rare disorder in which a person's own immune system damages their nerve cells, causing muscle weakness and sometimes paralysis.
2. About two-thirds of people who develop GBS symptoms do so several days or weeks after they have been sick with diarrhea or a lung or sinus illness.
3. People also can develop GBS after having the flu or other infections (such as cytomegalovirus and Epstein Barr virus).
4. On very rare occasions, people may develop GBS in the days or weeks after getting a vaccination.
5. In 1976 there was a small increased risk of GBS following vaccination with a flu vaccine made to protect against a swine flu virus. The increased risk was approximately 1 additional case of GBS per 100,000 people who got the swine flu vaccine.
 - a) The Institute of Medicine (IOM) conducted a thorough scientific review of this issue in 2003 and concluded that people who received the 1976 swine influenza vaccine had an increased risk for developing GBS.
 - b) Scientists have multiple theories on why this increased risk may have occurred, but the exact reason for this association remains unknown.
6. The link between GBS and flu vaccination in other years is unclear, and if there is any risk for GBS after seasonal flu vaccines it is very small, about 1-2 in a million. Studies suggest that it is more likely that a person will get GBS after getting flu than after a flu vaccination.
7. It is important to keep in mind that severe illness and death are associated with flu, and vaccination is the best way to prevent flu infection and its complications.

Febrile Seizures

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1. A "febrile seizure" refers to a seizure/convulsion in a child associated with a fever.
2. Febrile seizures usually last around one or two minutes and can occur with any illness that causes fever, such as colds, flu, ear infection, or roseola.

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3. They are most common with fevers of 102°F (38.9°C) or higher, but they can also happen at lower body temperatures or when a fever is going down. A person experiencing a febrile seizure may lose consciousness.
4. Most febrile seizures happen in children between the ages of 6 months and 5 years. Up to 5% of young children will have at least one febrile seizure. The most common age range for children to have febrile seizures is 14–18 months.
5. Febrile seizures can be frightening, but nearly all children who have a febrile seizure recover quickly, are healthy afterwards, and do not have any permanent neurological damage. Febrile seizures do not make children more likely to develop epilepsy or any other seizure disorder.
6. Several studies of children in the United States have been conducted to see if there is an increased risk for febrile seizures following seasonal flu vaccination.
7. Flu vaccine was not found to be associated with febrile seizures in one [study](#) that looked at 45,000 children aged 6 months through 23 months of age who received a flu vaccine from 1991 through 2003.
8. Seasonal flu vaccine and the 2009 H1N1 flu vaccine was not found to be associated with febrile seizures in children during the 2009-10 flu season.
9. Studies have detected a small increased risk of febrile seizures in young children following inactivated influenza vaccine in some influenza seasons. The risk of febrile seizures is increased for children 12 through 23 months of age and is more common when the flu shot is given at the same time as pneumococcal conjugate vaccine (PCV13) and/or the combination diphtheria, tetanus, and pertussis vaccine (DTaP). The CDC carefully reviewed the data on febrile seizures and considered the benefits of vaccinating children against these illnesses, and decided that no changes in the childhood immunization recommendations should be made.

Allergy and Flu Vaccine

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1. People who have had a severe (life-threatening) allergic reaction to a previous flu vaccine should not be vaccinated.
2. For information on the flu vaccine and egg allergy, please see the [Flu Vaccine and Egg Allergy section](#) of this document.

Flu Vaccine and Pregnancy

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Influenza vaccines have a good safety record.

1. There is a lot of evidence that flu vaccines are safe during pregnancy, but data for the first trimester of pregnancy are limited.
2. Several examples of recent flu vaccine safety studies conducted in pregnant women are provided below:

2017-2018 Influenza Key Points continued

- a) A review of reports to the Vaccine Adverse Reporting System ([VAERS](#)) ([Moro et al, 2011](#)) found no link between pregnancy complications or adverse fetal outcomes among pregnant women and flu shots or nasal spray flu vaccine.
 - b) A study using Vaccine Safety Datalink ([VSD](#)) data ([Irving et al, 2013](#)) found no increased risk of miscarriage among pregnant women who received flu vaccines in the 2005-06 or 2006-07 flu seasons.
 - c) A large study using [VSD](#) data ([Kharbanda et al, 2013](#)) found no increased risk for adverse obstetric events (like chorioamnionitis, pre-eclampsia, or gestational hypertension) for pregnant women who received the flu vaccine from 2002 to 2009 when compared to pregnant women who were not vaccinated.
 - d) A [VSD](#) study ([Nordin et al, 2014](#)) compared pregnant women who received the flu shot with an equal number of pregnant women who did not receive the flu shot during the 2004-05 and 2008-09 flu seasons, and found no differences between the two groups in the rates of premature delivery or small for gestational age infants.
 - e) A study published on September 13, 2017, in the journal *Vaccine* used data from 2010-2012 and found that women in early pregnancy who received two consecutive annual flu vaccines had an increased risk of miscarriage in the 28 days after receiving the second vaccine. The median gestational age at the time of miscarriage was 7 weeks. A larger follow up investigation to study this issue further is ongoing. More information on this topic is available at <https://www.cdc.gov/flu/professionals/vaccination/vaccination-possible-safety-signal.html>
3. There is a large body of scientific studies that supports the safety of flu vaccine in pregnant women and their babies. The CDC continues to gather data on this topic.
 4. The most common side effects of flu vaccination experienced by pregnant women are the same as those experienced by other people. They are generally mild and include soreness, redness, and/or swelling from the shot, fainting, headache, fever, muscles aches, nausea, and fatigue.

Shoulder Injury and Safe Vaccination

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1. Preliminary data from both the Vaccine Adverse Event Reporting System (VAERS) and the National Vaccine Injury Compensation Program (VICP) indicate reports of shoulder injury related to vaccine administration (SIRVA) have increased in the last several years.
2. These reports occur more commonly among adults than children.
3. Shoulder injuries like bursitis and tendinitis resulting from improper injection technique are errors that can easily be avoided.
4. To promote safe vaccination, CDC is launching a campaign to educate and remind providers about proper influenza (flu) vaccine administration technique to help avoid
5. The materials include links to comprehensive [vaccine administration information](#) and a [short video](#) on the correct technique for intramuscular injection, as well as a link to a new [vaccine administration e-Learn](#).

Flu Vaccine Effectiveness

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1. Flu vaccines protect against infection and illness caused by flu viruses.
2. Flu vaccines will **NOT** protect against infection and illness caused by **other viruses** that can also cause flu symptoms.
 - a) There are many other viruses besides flu that can result in influenza-like illness (ILI) that spread during the flu season.
3. Researchers conduct studies each year to measure how well flu vaccines work in order to continually assess and confirm their value as a public health measure. Part of the need for this continued assessment is that the flu viruses that circulate each year tend to change and evolve, and so the components of the flu vaccine are changed relatively frequently to protect against these new circulating viruses.
4. CDC typically conducts studies throughout the influenza season to help determine how well flu vaccines are working. These studies are called "vaccine effectiveness" studies or "VE" studies, for short.
5. VE studies and their findings can vary due to study design, outcome(s) measured, population studied, and the season in which the vaccine was studied. These differences can make it difficult to compare one study's results with another.
6. Two general types of VE studies are used to determine how well influenza vaccines work: randomized controlled trials and observational studies. For more information, see the section entitled "VE Study Methods."
7. It's not possible to predict how well the flu vaccine will work this season.
 - a) Laboratory data, such as the antigenic and genetic characterization data provided in the weekly FluView report, can give a general indication of how well the vaccine might work.
 - b) CDC carefully looks at the results of laboratory studies of currently circulating viruses to look for any evidence of changes in these viruses.
 - c) Vaccine effectiveness studies are needed to tell how well the vaccine is actually protecting against illness.
 - d) CDC conducts yearly vaccine effectiveness studies based on data collected through the U.S. Flu VE Network and HAIVEN. For more information, see the section entitled "[VE Studies.](#)"
 - e) CDC will provide new information about circulating viruses and flu vaccine effectiveness as it becomes available this season.
8. While determining how well a flu vaccine works is challenging, in general, recent studies have supported the conclusion that flu vaccination benefits public health, especially when the vaccine and circulating viruses are well matched.
9. During years when the flu vaccine and circulating flu viruses are very well matched, it is possible to measure substantial benefits from flu vaccination in terms of preventing flu illness.

2017-2018 Influenza Key Points continued

10. Recent studies by CDC researchers and other experts indicate that flu vaccination reduces the risk of influenza illness by 40% to 60% among the overall population when the vaccine viruses are like the ones spreading in the community.
11. Effectiveness against influenza A(H3N2) viruses tends to be lower than against influenza A(H1N1) and influenza B viruses.
 - a) Even when recommended vaccine viruses and circulating influenza viruses are alike (i.e., well matched), the amount of protection provided by flu vaccines may vary by influenza virus type or subtype.
 - b) Since 2009, VE studies looking at how well flu vaccines protect against medically attended illness have suggested that when vaccine viruses and circulating flu viruses are well-matched, flu vaccines provide better protection against influenza B or influenza A(H1N1) viruses than against influenza A(H3N2) viruses.
 - c) There are a number of reasons why flu vaccine effectiveness against influenza A(H3N2) viruses may be lower.
 - While all influenza viruses undergo frequent genetic changes, the changes that have occurred in A(H3N2) viruses have more frequently resulted in differences (i.e., antigenic changes) between the H3N2 component of the flu vaccine and circulating H3N2 viruses compared with H1N1 and influenza B viruses.
 - That means that between the time when the composition of the flu vaccine is recommended and when the vaccine is delivered, H3N2 viruses are more likely than H1N1 or influenza B viruses to have changed in ways that could impact how well the vaccine works. Explained a different way, flu experts have a difficult time finding and choosing a H3N2 virus component for the seasonal flu vaccine that will be well-matched to all of the circulating H3N2 viruses.
 - Growth in eggs is part of the production process for most seasonal flu vaccines. While all influenza viruses undergo changes when they are grown in eggs, the egg-adapted changes that occur in influenza A(H3N2) viruses tend to be more likely to result in antigenic changes compared to other influenza viruses.
 - These so-called "egg-adapted changes" are present in the vaccine virus that is recommended for use in vaccine production and may reduce its effectiveness against circulating influenza viruses.
 - Egg-adapted changes can result in significant antigenic differences between vaccine viruses and circulating viruses. When this occurs, the resulting vaccine may not provide immune protection against the corresponding viruses in circulation. For more information on egg-adapted changes, see <https://www.cdc.gov/flu/protect/vaccine/how-fluvaccine-made.htm#egg-based>.
12. Some studies have shown that flu vaccination can reduce the risk of more serious flu outcomes, including hospitalizations.
13. Those studies have often shown that flu vaccines provide similar protection against flu-associated hospitalization and outpatient flu-associated illness during the same season.
14. In 2017, a study in the journal *Pediatrics* was the first of its kind to show that flu vaccination also significantly reduced a child's risk of dying from influenza.
 - a) This study, which looked at data from four flu seasons between 2010 and 2014, found that flu vaccination reduced the risk of flu-associated death by half (51 percent) among children with underlying high-risk medical conditions, and it reduced

2017-2018 Influenza Key Points continued

- the risk of flu-associated death by nearly two-thirds (65 percent) among healthy children.
- b) Researchers estimated how effective the vaccine was at preventing flu-related deaths by comparing the vaccination status of the children who died from flu to comparison groups of children. The comparison groups were obtained from two national surveys and a database of commercial insurance claims.
 - c) During the study period, 358 laboratory-confirmed, flu-associated child deaths were reported to CDC. Of the reported pediatric deaths with known vaccination status (291), only one in four children (26 percent) had been vaccinated.
 - d) The study findings underscore the importance of the recommendation by CDC and the American Academy of Pediatrics (AAP) that all children 6 months and older get an annual flu vaccine.
 - e) The study is available at <http://pediatrics.aappublications.org/content/early/2017/03/30/peds.2016-4244>.
15. Studies also have shown that flu vaccination is an important preventive tool for people with chronic health conditions.
16. Vaccination helps protect women against influenza during pregnancy and their babies for several months after they are born.
- a) For example, a review of four randomized controlled trials conducted in South Africa, Mali, Nepal and Bangladesh assessed the efficacy of flu vaccination during pregnancy against laboratory confirmed flu infection in mothers and their infants. In these trials, vaccination of pregnant women resulted in vaccine efficacy in infants that ranged from 30% in Nepal to 63% in Bangladesh.
 - ["Maternal Immunization" by Saad Omer et al. N Engl J Med; 376:1256-1267.](#)
17. Two factors play an important role in determining the likelihood that flu vaccines will protect a person from flu illness: 1) characteristics of the person being vaccinated (such as their age and health), and 2) the similarity or "match" between the flu viruses in the vaccine and those spreading in the community.
- a) Note: additional factors, such as egg-adapted changes that can occur as part of the process to create flu vaccines (see bullet 10.c for more information), can affect the match between the vaccine and circulating flu viruses.
18. In general, the flu vaccine works best among young healthy adults and older children. Reduced effectiveness of flu vaccine has been reported in studies of young children (e.g., those younger than 2 years of age) and older adults.
19. People 65 years and older, who may have weaker immune systems, often have a lower protective immune response following flu vaccination compared to the immune response of younger, healthier persons following flu vaccination. This can result in lower levels of vaccine effectiveness in these people.
20. During years when the viruses in the flu vaccine and circulating flu viruses are not well matched, it is possible that no or minimal benefit from flu vaccination may be observed.
- a) When flu vaccines and circulating flu viruses are not well matched, the use of influenza antiviral medications may be more important than usual.
21. The substantial burden of flu-associated illness and death in the United States combined with the overall evidence from a variety of studies that show flu vaccines offer protection against flu illness support the current U.S. flu vaccination recommendations.

2017-2018 Influenza Key Points continued

22. It is important to note; however, that how well flu vaccines work to protect against flu illness will continue to vary each year.
23. Flu vaccination does not guarantee protection against the flu. Some people who get vaccinated might still get sick. However, people who get vaccinated are less likely to get sick with flu than someone who does not get vaccinated.

VE Studies

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1. CDC has been working with researchers at universities and hospitals since the 2003-2004 flu season to estimate how well flu vaccines work each season.
2. CDC has established two VE networks that collect data each year against two different outcomes:
 - a) the "U.S. Flu Vaccine Effectiveness Network" collects VE data on outpatient illness (i.e., doctor's visits) with laboratory-confirmed flu; and
 - b) the recently established "Hospitalized Adult Influenza Vaccine Effectiveness Network" (HAIVEN), which collects VE data on hospitalizations associated with laboratory-confirmed flu among adults 18 years of age and older.
3. CDC partners with universities and hospitals to conduct observational studies each year using data collected through these two VE networks.
4. These studies currently use a very accurate and sensitive laboratory test known as RT-PCR (reverse transcription polymerase chain reaction) to confirm medically-attended flu virus infections as a specific outcome.
5. For more information on each of these VE networks, see the sections entitled "[U.S. Flu VE Network](#)" and "[Hospitalized Adult Influenza Vaccine Effectiveness Network \(HAIVEN\)](#)" below.
6. In the future, a 3rd network, the New Vaccine Surveillance Network, may contribute VE data on hospitalizations associated with laboratory-confirmed flu among children.

U.S. Flu VE Network

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7. The U.S. Flu Vaccine Effectiveness (VE) network is designed to provide estimates of clinical effectiveness of licensed vaccines by age group and by influenza type and subtype.
8. Enrollees are patients evaluated in outpatient settings for acute respiratory symptoms with cough.
9. The network consists of five study sites spread across the United States, including sites in the following states:
 - Wisconsin;
 - Michigan;
 - Washington;
 - Pennsylvania; and
 - Texas.
10. Enrollment begins after laboratory-confirmed influenza cases are reported in local surveillance for two consecutive weeks and continues for the rest of flu season.

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11. Patients are eligible if they are older than 6 months of age (thus being eligible to receive influenza vaccination), they have reported acute respiratory illness with cough within seven days, and they have not been treated with influenza antiviral medications.
12. Eligible patients complete an enrollment interview and answer basic questions regarding their influenza vaccination status, age, underlying health conditions, and other characteristics. Influenza vaccination status is later confirmed by reviewing records. Following enrollment, a respiratory specimen is collected and tested for influenza by the CDC real-time reverse transcription polymerase chain reaction (RT-PCR) assay. Influenza-positive samples are then typed and subtyped.

Hospitalized Adult Influenza Vaccine Effectiveness Network (HAIVEN)

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13. At the ACIP meeting on June 21, 2017, CDC presented preliminary VE estimates of flu vaccine effectiveness against flu-associated hospitalizations in adults using data from the U.S. Hospitalized Adult Influenza Vaccine Effectiveness Network (HAIVEN).
14. HAIVEN was created to estimate how well the flu vaccine works at preventing lab-confirmed flu-related hospitalizations, especially among older adults.
 - a) VE in older adults is important because this age group has the highest hospitalization rates compared to other age groups. Also, adults who are hospitalized may have more underlying conditions and be more frail than older adults enrolled in the outpatient network.
15. HAIVEN is funded by the Centers for Disease Control and Prevention (CDC). Participating sites are located in four states:
 - a) Michigan,
 - b) Texas,
 - c) Pennsylvania, and
 - d) Tennessee.
16. In 2016-2017, 10 enrolling hospitals participated.
17. HAIVEN was piloted during the 2015-2016 season, during which seven hospitals participated. In 2016-2017, 10 enrolling hospitals participated.
18. HAIVEN uses an observational study design and collects data at the participating hospitals.
19. The study uses a test-negative case-control study design to calculate the odds of having lab-confirmed influenza among unvaccinated hospitalized patients with odds of having lab-confirmed influenza among vaccinated hospitalized patients.
20. HAIVEN calculates VE by comparing the frequency of influenza among hospitalized adults who were either vaccinated or not vaccinated against influenza.
 - a) Adults who were admitted to participating hospitals were invited to enroll in the study if their symptoms could be caused by influenza infection.
 - b) If they chose to enroll, patients were asked if they got their flu vaccine for that season.

2017-2018 Influenza Key Points continued

- c) Patients also were tested for influenza using highly accurate lab tests (RT-PCR) to verify the outcome.
- d) Patient medical charts were reviewed.
- e) In addition, information was provided by patients' self-reports, and data also was collected from vaccination providers and immunization registries to confirm receipt of vaccination.

21. In addition to information about VE, the HAIVEN data provided insight into severe influenza outcomes, such as length of hospital stay and need for intensive care.

Ways to Measure How Well Flu Vaccines Work (Study Methods)

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1. Two general types of studies are used to determine how well flu vaccines work: randomized controlled trials (RCTs) and observational studies. These study designs are described below.
 - a) In a RCT, volunteers are assigned randomly to receive a flu vaccine or a placebo (e.g., a shot of saline).
 - b) Vaccine efficacy is measured by comparing the frequency of influenza illness in the vaccinated and the unvaccinated (placebo) groups.
 - c) The RCT study design minimizes bias that could lead to invalid study results. Bias is an unintended systematic error in the way researchers select study participants, measure outcomes, or analyze data that can lead to inaccurate results
 - d) In a RCT, vaccine allocation is usually double-blinded, which means neither the study volunteers nor the researchers know if a given person has received vaccine or placebo.
 - e) RCTs are the "gold standard" (best method) for determining how well a vaccine works.
 - f) The measurement of vaccine effect from an RCT is referred to as "efficacy." Vaccine efficacy refers to vaccine protection measured in RCTs usually under optimal conditions where vaccine storage and delivery are monitored and participants are usually healthy.
 - g) Randomized studies are difficult to conduct after vaccines are recommended in a population, and particularly undesirable in high-risk groups, where withholding vaccine from people recommended for vaccination would place them at risk for infection, illness and possibly serious complications.
2. The second type of study design is an "observational study."
 - a) Observational studies assess how flu vaccines work by comparing the frequency of flu between people who have and have not been vaccinated.
 - b) This means that vaccination of study subjects is not randomized and factors linked with vaccination have to be carefully accounted for.
 - c) The measurement of vaccine effect from an observational study is referred to as "effectiveness." Vaccine effectiveness refers to vaccine protection measured under real-world conditions.
 - d) Most recent studies to measure how well flu vaccine works have been observational studies.

2017-2018 Influenza Key Points continued

- e) There are several types of observational studies, including cohort and case-control studies.
 - f) Many observational studies use a case-control design, in which people with lab-confirmed flu ("cases") are compared with a group of people who do not have the flu (i.e., the "control" group).
 - g) The choice of the "control group" is an important aspect of the design of observational studies that can influence their results.
 - Members of the control group who do not have the flu should come from the same population as the cases, and should be sampled in a way that is not related to exposure (i.e., vaccination). If this is not done, the results may show a falsely high or low result (i.e., bias).
 - h) In addition, it can be difficult to directly compare results between studies that used different comparison groups. Even if both studies were well-conducted, one might expect the results to be different because the choice of the comparison group in non-randomized studies can influence the VE estimate.
 - i) Other factors that can affect results are the numbers of cases (i.e., people who developed flu illness) in the study and the number of people eligible for, or enrolled in a study (again, smaller numbers can make results less reliable). Therefore, when assessing how well a vaccine works, it is important to consider the study design, population and year.
3. Studies also can assess how well a vaccine works at preventing different outcomes.
- a) For example, the outcomes can be broad syndromes associated with flu, like measuring influenza-like illness* (which includes illness caused by other viruses in addition to flu viruses),
 - b) or they can be more specific to flu, like measuring laboratory-confirmed influenza virus infection. Also, laboratory-confirmed influenza can be associated with mild illness that doesn't require medical care or more severe illness that requires hospitalization.
 - c) **Influenza-like illness (ILI) is defined as fever (temperature of 100°F [37.8°C] or greater) and a cough and/or a sore throat.*
4. The use of laboratory-confirmed flu cases is likely to yield more accurate estimates than studies that use non-specific case definitions (such as influenza-like illness).
5. Generally, flu vaccine can only prevent the portion of illnesses that is caused by flu. Studies that report flu vaccination prevents a large proportion of deaths due to "all causes" or "all respiratory illnesses" or "all respiratory-related hospitalizations" when only a small proportion are caused by flu may have unidentified errors or bias.

Vaccine Effectiveness Last Season (2016-2017)

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1. CDC vaccine effectiveness (VE) studies for the influenza A(H3N2)-predominant 2016-2017 flu season showed that flu vaccination reduced the risk of getting sick and having to go the doctor because of flu by 42% overall. These studies also showed that flu vaccination provided better protection against influenza B viruses (56%) than against the most common influenza A(H3N2) viruses (34%).
2. The preliminary VE estimate against flu-associated hospitalization was 30%.

2017-2018 Influenza Key Points continued

3. These results are consistent with what has been observed during previous seasons when vaccine viruses and circulating viruses have been well-matched. In recent years, VE against H3N2 viruses has been lower than against other viruses. The 2016-17 season's effectiveness estimates compare best with the 2012-13 season when VE was 52% and CDC estimated that vaccine prevented 5.6 million illnesses, 2.7 million doctor visits, and 60,000 hospitalizations.
4. While these VE results underscore the importance of developing better, more effective flu vaccines, they also show that current flu vaccines do offer substantial public health benefit and that increased coverage could provide additional benefit.

U.S. Flu VE Network: Outpatient Illness VE Estimates (2016-2017)

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5. On [June 21, 2017](#), CDC presented end-of-season estimates for the 2016-2017 flu vaccine's effectiveness (VE) at preventing laboratory confirmed, flu-associated medical visits for acute respiratory illness (ARI) collected through the U.S. Flu VE Network.
6. The overall vaccine effectiveness of the 2016-2017 flu vaccine against both influenza A and B viruses was estimated to be 42% (95% confidence interval (CI): 35%-48%).
 - a) In practical terms, this means that vaccinated persons had 42% less flu resulting in a doctor's visit than people who had not been vaccinated.
7. VE against outpatient illness caused specifically by influenza A (H3N2) viruses was estimated to be 34% (95% CI: 24%-42%).
8. VE against influenza B viruses was estimated to be 56% (95% CI: 47%-64%).
9. VE by age group for influenza A and B viruses combined ranged from 19% to 61%, with the highest VE (61%) found among young children (6 months to 8 years of age) and the lowest VE (19% and not statistically significant) found in adults 18-49 years of age. Lower VE (25% and not statistically significant) also was found in older adults 65 years old and older.
 - a) Note, when a VE estimate is "not statistically significant," it means the confidence interval crosses zero, and therefore, the true value could be zero and due to chance.
10. VE by age group for influenza A (H3N2) viruses ranged from 12% to 51%, with the highest VE (51%) found among young children (6 months to 8 years of age) and the lowest VE estimates (12% and not statistically significant) found in adults 18-49 years of age. Lower VE (25% and not statistically significant) also was found in older adults 65 years of age and older.
11. These updated VE estimates incorporate additional data collected since CDC published its interim VE estimates in the [February 17, 2017 edition](#) of the MMWR.
12. This VE report used data from 7,205 children and adults enrolled in the five participating sites in the U.S. Influenza Vaccine Effectiveness Network (U.S. Flu VE Network) during November 28, 2016 – April 14, 2017.
13. These preliminary end-of-season estimates may change slightly as additional data are collected through the summer. The final end-of-season VE estimates for 2016-2017 will be made available in fall 2017.

2017-2018 Influenza Key Points continued

HAIVEN: Hospitalization VE Estimates (2016-2017)

14. At the ACIP meeting on June 21, 2017, CDC presented preliminary VE estimates against flu-associated hospitalizations in adults using data collected through the U.S. Hospitalized Adult Influenza Vaccine Effectiveness Network (HAIVEN).
15. HAIVEN VE estimates for the 2016-2017 season are as follows:
 - a) Vaccine offered significant protection against flu hospitalizations.
 - b) Adjusted total VE against hospitalization was 30% (95% CI: 11%-46%) This means that the flu vaccine reduced a person's risk of hospitalization due to flu by 30%.
 - Adjusted VE in people 65 years of age and older: 37% (95% CI: 8%-57%)
 - Adjusted VE in people 50-64 years of age: 31% (95% CI: -6%-55%)
 - Adjusted VE in people 18-49 years of age: 23% (95% CI: -29%-54%)
16. The 2016-2017 flu season was an H3N2-predominant season. Adults 65 years and older typically fare worse than other age groups during H3N2-predominant seasons and are hospitalized at comparatively higher rates.

Improvements in Vaccine Technology

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1. Vaccine manufacturers and researchers are working on improved influenza vaccines.
2. High-dose vaccine that creates a stronger immune response is being produced for people 65 years and older. (Results from a clinical trial of more than 30,000 participants showed that adults older than 65 years of age who received the high dose vaccine had 24.2% fewer influenza infections as compared to those who received the standard dose flu vaccine.)
3. An adjuvanted vaccine designed to improve the immune response for people 65 years and older has been approved for use in the United States.
4. Quadrivalent vaccines that protect against four influenza viruses instead of three are now being produced.
5. An intradermal flu shot that requires less antigen to produce the same immune response is now being produced. This is useful because the same amount of available antigen can be used to make more doses of the vaccine.
6. Recombinant vaccines can be manufactured more quickly than either egg-based or cell-based flu vaccines and do not require an egg-grown virus or eggs to produce.
7. While continued improvements in vaccine technology are needed, influenza vaccination with currently available vaccines offers the best protection we have against seasonal flu at this time.

Flu Vaccine Coverage in the United States

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2017-2018 Influenza Key Points continued

1. CDC estimates that last season, almost half (46.8%) of the U.S. population 6 months and older got vaccinated against flu. This is a small increase of 1.2 percentage points since the previous season (45.6%).
2. Flu vaccination coverage in children held steady at 59% last season.
3. Flu vaccination coverage among adults increased by 1.6 percentage points compared to the 2015-16 season.
4. Flu vaccination coverage among people 50 and older increased. Last year we saw a concerning decrease in flu vaccination coverage among adults 50 years and older, but it appears the numbers have rebounded.
 - a) Vaccination coverage among adults 50-64 was 45.4% (an increase of 1.8 percentage points) and 65.3% among adults 65 and older (an increase of 1.9 percentage points).
 - b) Adults 65 and older, along with those that have certain medical conditions, are at risk for more severe complications due to flu.
5. Coverage among women who were pregnant during the 2016-17 season was 53.6%, which is consistent with the 2015-16 (49.9%) and the 2014-15 (50.3%) flu seasons.
6. Among health care providers, 95.8% of doctors got vaccinated last season, which is on par with last season's coverage.
7. Vaccination coverage is also high among pharmacists (93.7%) and nurses (92.6%).
8. As in prior seasons, coverage among healthcare personnel (HCP) working in Long Term Care (LTC) settings was lowest compared with all other settings.
 - a) Coverage among HCP working in LTC settings was 68% for the 2016-17 season.

General Population Final Coverage Data Online Release

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1. Among all people age 6 months and older, flu vaccination coverage during the 2016-17 flu season was 46.8%, which was 1.2 percentage points higher than the 2015-16 season (45.6%).
 - a) We saw a decline in coverage from the 2014-15 season to the 2015-16 season among people 65 years and older (66.7% to 63.4%) and people 50-64 years (47.0% to 43.6%). However, this decline did not persist and coverage rates rebounded in the 2016-17 season to levels similar to the 2014-15 season.
2. State-specific flu vaccination coverage among all people ≥ 6 months ranged from 36.1% (Nevada) to 55.4% (Rhode Island).

Coverage by Age

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1. Flu vaccine coverage varied by age, and is highest among the youngest children and oldest adults.
2. Flu vaccination coverage among children 6 months–17 years was 59.0%, unchanged from the previous two seasons.
 - a) 2015-16 was the first season when the nasal flu vaccine was not recommended for use. While there were some decreases in specific age groups (children 5-12

2017-2018 Influenza Key Points continued

years old had a 1.9 percentage point decrease in coverage), overall childhood vaccination rates remained stable.

- b) While this is encouraging news, more than 40% of children remain unvaccinated, which means 30 million kids are unprotected from flu.
3. Consistent with past years, Coverage for children decreased with increasing age:
 - a) 76.3% for children 6-23 months
 - b) 66.2% for children 2-4 years
 - c) 59.9% for children 5-12 years
 - d) 48.8% for children 13-17 years
4. Flu vaccination coverage among all adults was 43.3%, which was a 1.6 percentage points higher than the 2015-16 season (41.7%), but nearly the same as the 2014-15 season (43.6%).
5. Coverage for adults increased with increasing age:
 - a) 33.6% for adults 18-49 years
 - b) 45.4% for adults 50-64 years
 - c) 65.3% for adults 65 years and older

Coverage by Race/Ethnicity

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1. We continue to find differences in flu vaccination coverage between racial and ethnic groups, although the patterns differ for children and adults.
2. Among children, coverage was higher for Asian children (69.3%), compared to white children (54.3%), black children (59.3%), American Indian/Alaska Native children (61.6%), and children of other or multiple races (58.2%). Other racial/ethnic differences are noted in the online report.
3. Among adults, flu vaccination coverage for whites (45.9%) was higher than coverage for blacks (37.4%), Hispanics (36.9%), AI/ANs (37.5%) and adults of other or multiple races (41.7%); non-Hispanic whites had similar coverage to Asian (47.1%) adults. Other racial/ethnic differences are noted in the online report.

Methods and Background

4. CDC analyzed NIS-Flu and BRFSS data collected September (BRFSS) or October (NIS-Flu) 2016 through June 2017 from all 50 states and the District of Columbia to estimate national and state level flu vaccination coverage from July 2016 through May 2017 for the 2016-17 flu season. These findings were compared to 2015-16 flu season estimates. Estimates were also produced for Guam, Puerto Rico, the U.S. Virgin Islands, and select local areas in the United States; these estimates are included as links within the online report.
5. NIS-Flu data were used to estimate coverage for children 6 months through 17 years and BRFSS data were used to estimate coverage for adults ≥ 18 years.

Coverage among Pregnant Women

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1. Flu vaccination coverage for pregnant women remains similar to the previous seasons.

2017-2018 Influenza Key Points continued

- a) Coverage among women who were pregnant during the 2016-17 season was 53.6%, which is similar to the past five seasons – 2015–16 (49.9%), 2014–15 (50.3%), 2013–14 (52.2%), 2012–13 (50.5%), and 2011–12 (46.4%).
- b) While this rate has remained stable over the last several seasons, it still means nearly half of all pregnant women and their babies were not protected from flu.
2. Health care providers play a key role in increasing flu vaccination coverage among pregnant women.
 - a) A provider recommendation combined with an offer to administer the flu vaccine at the time of visit remains one of the best ways to increase flu vaccination among pregnant women.
 - b) Pregnant women who reported receiving a provider recommendation for and an offer of flu vaccination had higher vaccination coverage (70.5%) than pregnant women who reported receiving a recommendation but no offer (43.7%) or who reported receiving no recommendation (14.8%).
 - c) 67.3% of pregnant women reported receiving both a recommendation and offer and 20.7% received no provider recommendation or offer.
 - A provider offer of vaccination was associated with higher vaccination coverage even among pregnant women with negative perceptions regarding the safety and efficacy of vaccination and pregnant women who were not concerned about flu infection.
 - d) Systems supporting provider recommendation and offer, such as standing orders and provider reminder systems, can reduce missed opportunities for vaccination and improve vaccination coverage.
 - e) Healthcare providers who are not able to administer the flu vaccine at the time of the visit should still recommend flu vaccination and refer the pregnant patient to a place where vaccinations are provided.
 - f) Each provider's recommendation can be an important opportunity to improve vaccination coverage, especially where differences in coverage are seen among certain sub-groups based on education level and race/ethnicity.
3. Flu vaccination can protect pregnant women and their developing babies. Pregnant women and newborns are both at high risk for flu-related severe illness, hospitalization, and death.
 - a) Flu shots are a safe way to protect the mother and her developing baby from serious illness and complications of flu, regardless of trimester.
 - b) Some studies have even shown that vaccinating pregnant women can give their babies antibodies to protect against flu for several months after they are born, while they are too young to be vaccinated themselves.
 - c) A health care provider recommendation for and offer of flu vaccination was associated with increased coverage in all demographic groups, including women with a negative perception of flu vaccination.
4. Education messages from health care providers to their pregnant patients should emphasize that vaccination can protect not only the pregnant woman, but also her unborn baby and her newborn infant up to 6 months after birth.
 - a) Providers should offer information to pregnant patients on the safety and effectiveness of flu vaccination for both mother and baby.

2017-2018 Influenza Key Points continued

- b) Tailored education for pregnant women, designed to increase their knowledge about flu risks, vaccine safety, and vaccine effectiveness, combined with a strong recommendation may increase demand and vaccination coverage.

Methods and Background

- a) The results of this report were based on an Internet panel survey conducted in March and April 2017 among a total of 1,893 women who were pregnant at any time during October 2016 through January 2017.

Coverage among Health Care Personnel

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1. Health care personnel (HCP) should be vaccinated for flu every flu season to protect themselves, their patients, and their families from seasonal flu.
 - a) The coverage rate for HCP was 78.6% for the 2016-17 season, which is similar to last year's rate of 79.0%, as well as similar to coverage from the previous two seasons.
 - b) Coverage was highest among HCP working in settings with flu vaccination requirements (96.7%).
 - c) Among health care personnel, coverage was over 90% for physicians, physician assistants, nurses, nurse practitioners, and pharmacists.
2. There were differences in coverage by occupation and occupational setting.
 - a) Coverage estimates were highest among physicians (95.8%), pharmacists (93.7%), nurses (92.6%), and nurse practitioners and physician assistants (92.0%) during the 2016-17 flu season.
 - b) Coverage by occupation was lowest for assistants and aides (69.1%) and nonclinical personnel (73.7%).
 - Non-clinical personnel include administrative support staff or managers, and non-clinical support staff (food service workers, housekeeping staff, maintenance staff, janitors, laundry workers, etc.).
 - c) Coverage by occupational setting was highest for HCP working in hospitals (92.3%).
 - d) Vaccination coverage remained lowest among HCP in long-term care (LTC) settings.
 - Vaccination of HCP in LTC settings is extremely important because:
 - Many LTC residents are people 65 years and older who are at greater risk of serious complications from the flu.
 - Flu vaccine effectiveness is generally lowest in the elderly, making vaccination of close contacts even more critical.
 - Multiple studies have demonstrated health benefits to patients, including reduced flu-related complications and reduced risk of death, with vaccination of HCP in LTC settings.
3. Flu vaccination coverage was highest in settings with employer flu vaccination requirements and promotion of flu vaccination.
 - a) Overall, coverage among HCP reporting that their employer required them to receive flu vaccination was 96.7%.

2017-2018 Influenza Key Points continued

- b) Comprehensive, work-site intervention strategies that include education, promotion, and easy access to vaccination at no cost for multiple days can increase HCP vaccination coverage.
- c) Convenience of flu vaccine in the workplace affected vaccination coverage.
 - In the absence of an employer requirement for vaccination, coverage was higher (80.3%) among HCP who had access to free, on-site vaccinations over multiple days compared to HCP whose employers did not offer flu vaccination at no cost to employees but promoted it by other means (70.4%) or whose employers had no policies related to vaccination promotion (45.8%)

Methods and Background

- a) The results of this report were based on an Internet panel survey of a total of 2,438 HCP conducted during March and April 2017.

2016-2017 Influenza Season: A Summary

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1. On June 30, 2017, a report titled "Update: Influenza Activity in the United States During the 2016-17 Season and Composition of the 2017-18 Influenza Vaccine," was published in a [Morbidity and Mortality Weekly Report \(MMWR\)](#).
2. Flu activity remained low through November 2016, increased during December and peaked in February 2017 nationally, although there were regional differences in the timing of influenza activity.
3. The peak month is when, relative to other months in the season, laboratories report the highest portion of influenza-positive specimens. Individual regions often peak at different times.
4. Influenza A (H3N2) viruses predominated overall, but influenza B viruses became more frequently reported than influenza A viruses in late March through May. Influenza activity was moderate, similar to previous H3N2-predominant seasons.
5. The majority of all influenza viruses in specimens sent to CDC for further antigenic characterization were similar to the components of the 2016-17 Northern Hemisphere vaccine. A small subset of antigenically distinct influenza B/Victoria viruses that belonged to a new B/Victoria deletion variant subgroup was detected.
6. Nationally, the weekly percentage of visits to healthcare providers for flu-like illness was at or above the national baseline for 17 consecutive weeks during the 2016-2017 influenza season. Last season (2015-2016, which was an A (H1N1) pdm09-predominant season) the weekly percentage was at or above national baseline for 11 consecutive weeks.
7. During the 2016-2017 season, the peak percentage of visits to healthcare providers for flu-like illness was 5.1%, occurring in mid-February. This is similar to 2014-2015 and 2012-2013 flu seasons (also H3N2-predominant seasons) when the percentage of outpatient visits for influenza-like illness (ILI) peaked in December at 6.0% and 6.1% respectively.
8. The geographic distribution of influenza activity was most extensive during the week ending February 11, 2017 (week 6), when 47 jurisdictions reported widespread influenza activity.

2017-2018 Influenza Key Points continued

9. From October 1, 2016 through April 30, 2017, 18,184 laboratory-confirmed influenza-related hospitalizations were reported, with a cumulative incidence for all age groups of 65.0 per 100,000 population.
 - a) This is higher than the cumulative hospitalization rate for the 2012-2013 flu season (44.0 per 100,000), when influenza A (H3N2) viruses also predominated,
 - b) and is about the same as the cumulative hospitalization rate during 2014-2015 (64.1 per 100,000) which also was an H3N2 predominant season.
10. People 65 years and older accounted for approximately 60% of reported flu-associated hospitalizations this season.
 - a) The cumulative hospitalization rate (per 100,000 population) for people 65 years and older this season was 290.5.
 - b) During the previous four flu seasons, hospitalization rates for people 65 years and older have ranged from 84.7 to 308.8.
11. The percentage of deaths attributed to pneumonia and influenza (P&I) was at or above the epidemic threshold for 12 consecutive weeks this season.
12. Mortality attributed to P&I peaked twice, once at 8.2% of all deaths during the week ending January 21, 2017 (week 3) and once at 8.1% during the week ending February 25, 2017 (week 8).
 - a) During the 2011-12 through 2015-16 seasons, the peak weekly percentages of deaths attributable to P&I ranged from 8.7% during the 2011-12 season to 11.1% during the 2012-13 season.
13. During the 2016-2017 season, 104 laboratory-confirmed flu-associated deaths in children were reported.

Flu Burden and Burden-Averted Vaccination Estimates

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CDC estimates of influenza disease burden (illnesses, medical visits and hospitalizations) and disease-averted by influenza vaccination have been published annually, beginning in 2010.

1. On December 9, 2016, CDC released its estimates for the 2015-2016 season.
2. The report is available online at <https://www.cdc.gov/flu/about/disease/2015-16.htm>.
3. Estimates for the 2016-2017 season will be available in December.

2015-2016 Estimates

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CDC estimates that for the 2015-2016 influenza season, influenza vaccination prevented approximately 5.1 million influenza illnesses, 2.5 million influenza-associated medical visits, and 71,000 influenza-associated hospitalizations.

4. This represents a 19 percent reduction in the burden of influenza illness in the absence of vaccination; which is similar to what has been seen in estimates for other seasons.
5. The online report also provides the estimated number of illnesses, medical visits, and hospitalizations associated with influenza last season.
6. CDC estimates that last season there was a substantial amount of flu-associated illness: 25 million cases, 11 million medical visits and 310,000 flu-associated hospitalizations.

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7. The report underscores the benefits of the current vaccination program but it also highlights areas where improvements in vaccine uptake and vaccine effectiveness could deliver even greater benefits to the public's health.

Range of Flu-Related Hospitalizations

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A summary table of estimates generated using this model from 2010-2011 to 2015-2016 is included.

8. Based on these data:
 - a) "CDC estimates that from 2010-2011 to 2015-2016, flu-related hospitalizations in the United States ranged from 140,000 (2011-2012) to 710,000 (2014-2015)."
9. CDC has previously cited "[more than 200,000](#)" as an average for annual flu-related hospitalizations. That figure was based on data from 1979-2001.
10. CDC believes that providing a range of flu-related hospitalizations from more recent seasons is a more complete representation of the variability and severity of influenza than an average.
11. CDC also has estimated how many children younger than 5 years are hospitalized from flu complications every year. CDC estimates that since 2010, annual flu-related hospitalizations among children younger than 5 years ranged from 6,000 to 26,000 in the United States.

Range of Flu-Related Deaths and Deaths Prevented

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CDC also has added estimates of flu deaths and flu deaths prevented by vaccination to this report and will present those numbers annually going forward as well.

12. CDC calculates flu-related deaths in two ways:
 - 1) using reports of pneumonia & influenza (P&I) deaths, and
 - 2) using reports of respiratory & circulatory (R&C) deaths.
 - b) P&I deaths represent only a fraction of the total number of deaths from influenza, which can also result from respiratory and cardiovascular complications.
 - c) CDC believes that estimates of flu-related deaths using R&C reports gives a more complete estimate of the actual burden of influenza; however, P&I data is available in real-time whereas R&C data lags three years behind.
 - d) CDC will provide estimates of flu-related deaths based on P&I annually (before R&C estimates are available).
 - e) ***Important note: Past comparative data suggest that the total number of influenza-associated deaths may be 2 to 4 times greater than estimated using only reported P&I deaths.**
 - f) Calculations based on R&C will be provided with a three-year delay.
13. The online report finds that:
 - "CDC estimates that during the 2015-2016 influenza season, influenza vaccination prevented about 3,000 P&I deaths."
14. CDC also is updating the range used to characterize flu-related deaths using data from more recent seasons.

2017-2018 Influenza Key Points continued

15. Since 2010 CDC has used a range ("[3,000 to 49,000](#)") to describe annual flu-related deaths. These R&C-based influenza mortality estimates were derived from data from 1976 to 2007.
16. This range is being updated based on R&C deaths reported from 2010 to 2014.
17. The online report finds that:
 - "CDC estimates that from 2010-2011 to 2013-2014, influenza-associated deaths in the United States ranged from a low of 12,000 (during 2011-2012) to a high of 56,000 (during 2012-2013)."

Interim Recommendation Against Use of LAIV

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1. The Advisory Committee on Immunization Practices and CDC have recommended annual influenza vaccination for all persons 6 months and older since February 2010. The so-called "universal" recommendation remains in place.
2. On June 22, 2016, however, ACIP first voted to recommend a change in U.S. influenza vaccination policy for 2016-2017; this change was that live attenuated influenza vaccine (LAIV) should not be used.
3. That recommendation was renewed for the 2017-2018 influenza season.
4. The 2016-2017 influenza vaccine recommendations were published in a CDC Morbidity and Mortality Weekly Report (MMWR) dated August 25, 2016, that is available at <https://www.cdc.gov/mmwr/volumes/66/rr/rr6602a1.htm>.
5. As advised by the CDC Advisory Committee on Immunization Practices (ACIP), CDC recommends:
 - a) Injectable flu vaccines — inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIV) — should be used during 2017-2018.
 - b) The intranasal live attenuated influenza vaccine (LAIV) sold under the trade name "FluMist Quadrivalent," should not be used during the 2017-2018 flu season.
6. This is an interim recommendation that applies to the 2016-2017 and 2017-2018 seasons only.
7. The recommendation against the use of LAIV is based on concerns about effectiveness. (There were no safety concerns associated with LAIV.)
8. LAIV was initially licensed during 2003 by the Food and Drug Administration (FDA) as a trivalent (three-component) vaccine under the trade name "FluMist." It was approved for use among healthy, non-pregnant persons 5 years through 49 years of age, and was later licensed for persons 2 years through 49 years of age.
9. During 2012, "FluMist Quadrivalent" (four-component LAIV) was licensed.
10. Data on LAIV effectiveness has been inconsistent over time.
11. Vaccine effectiveness data for LAIV before and soon after the original licensure suggested LAIV was either comparable to, or better than, IIV.
12. Data from 2013-2014 and 2015-2016, however, showed poor or relatively lower effectiveness of LAIV against the predominant circulating H1N1 viruses.
13. FluMist Quadrivalent is still an FDA-licensed product.

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14. As such, there may be some available supply of FluMist Quadrivalent in the United States during the 2017-2018 season.
15. 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 2017-2018 influenza season.
16. FDA and CDC have important but different roles with regard to the use of vaccines in the U.S.
17. FDA evaluates drugs and vaccines for safety and efficacy and has the regulatory authority for approval of vaccines in the United States. FDA approves vaccines for use and determines the purpose and populations for which use is approved (also called "indications"). Flu vaccines are generally approved (indicated) for the prevention of influenza in specific age groups.
18. CDC and its Advisory Committee on Immunization Practices (ACIP) make public health recommendations for the use of approved vaccines. Consideration of effectiveness and safety data may sometimes lead to recommendations that are more specific or more limited than those outlined in the FDA-approved indications.
19. The change in the recommendation underscores the importance of ongoing efforts to measure and evaluate the effectiveness of public health interventions, including vaccine effectiveness studies, which can have significant implications for public health policy.
20. This is an example of using new data to hone public health practice to be most beneficial.
21. Based on manufacturer projections, health officials expect that supply of IIV for the 2017-2018 season should be sufficient to meet any increase in demand resulting from the ACIP recommendation, though providers may need to check more than one supplier or purchase a flu vaccine brand other than the one they normally select.