Influenza & Vaccination

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CDC:

"As long as flu viruses are circulating, vaccination should continue, even in January or later."

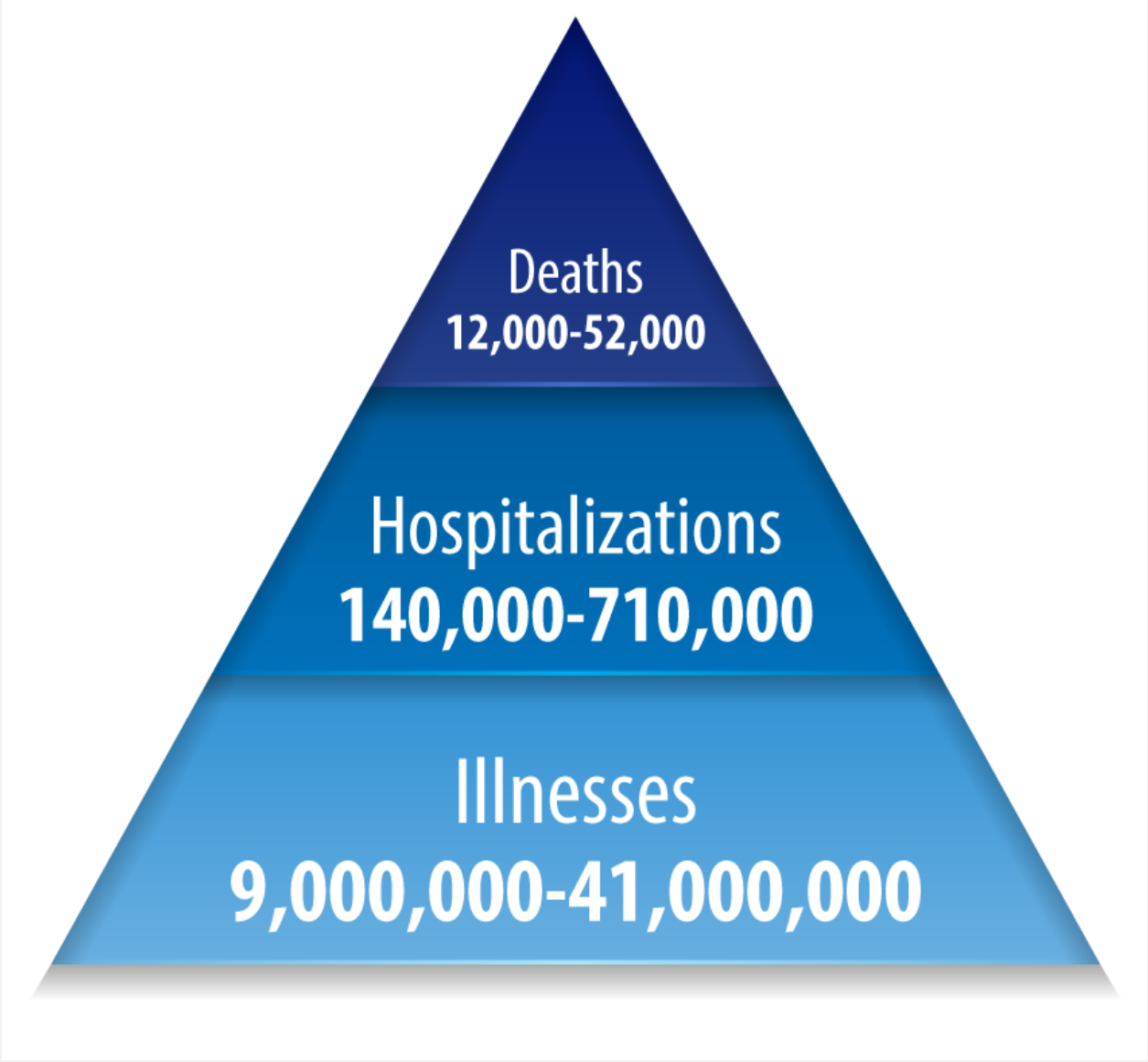
Influenza

- Influenza (flu) is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs. Some people, such as older people, young children, and people with certain health conditions, are at higher risk of serious flu complications. There are two main types of influenza (flu) viruses: **Types A and B**.

- The influenza A and B viruses that routinely spread in people (human influenza viruses) are responsible for seasonal flu epidemics each year.

Estimated Range of Annual Burden of Flu

- The burden of flu disease can vary widely and is determined by a number of factors including the
- characteristics of circulating viruses,
- the timing of the season,
- how well the vaccine is working to protect against illness,
- and how many people got vaccinated.
- CDC estimates that flu has resulted in 9 million – 41 million illnesses, 140,000 – 710,000 hospitalizations and 12,000 – 52,000 deaths annually between 2010 and 2020.


Deaths
12,000-52,000
Hospitalizations
140,000-710,000
Illnesses
9,000,000-41,000,000

How does CDC define “severity”?

- CDC began using a new approach published in 2017 to define flu season severity. CDC first calculates intensity thresholds [ITs] for three key flu indicators using data from past flu seasons. CDC then classifies the severity of individual flu seasons by determining whether the indicator values during the peak of each flu season crossed their respective ITs.

What did researchers do to classify the severity of flu seasons in this study?

- Flu severity is assessed using the following data:
- the percentage of visits to outpatient clinics for ILI,
- the rates of influenza-associated hospitalizations,
- the percentage of deaths resulting from pneumonia or influenza that occurred during each season.

Flu Vaccines Work

- CDC conducts studies each year to determine how well influenza (flu) vaccines protect against flu. While vaccine effectiveness (VE) can vary, recent studies show that flu vaccination reduces the risk of flu illness by between 40% and 60% among the overall population during seasons when most circulating flu viruses are well-matched to those used to make flu vaccines. In general, current flu vaccines tend to work better against influenza B and influenza A(H1N1) viruses and offer lower protection against influenza A(H3N2) viruses.

What are factors that influence how well flu vaccines work?

- How well flu vaccines work (or their ability to protect against a certain outcome) can vary from season to season. Protection can vary depending on who is being vaccinated. At least two factors play an important role in determining the likelihood that vaccination will protect a person from flu illness:
- 1) characteristics of the person being vaccinated (such as their age and health),
- 2) how well the vaccines “match” the flu viruses spreading in the community. When flu vaccines are not well matched to one or more circulating influenza viruses, it is possible that vaccination may provide little or no protection from illness caused by those viruses, but still provide protection against other flu viruses that circulate during the season. When there is a good match between flu vaccines and circulating viruses, vaccination provides substantial benefits by preventing flu illness and complications.

Flu vaccination can keep from getting sick with flu

- Flu vaccination prevents millions of illnesses and flu-related doctor's visits each year. For example, during 2019-2020 flu vaccination prevented an estimated 7.5 million influenza illnesses, 3.7 million influenza-associated medical visits, 105,000 influenza-associated hospitalizations, and 6,300 influenza-associated deaths.
- During seasons when flu vaccine viruses are similar to circulating flu viruses, flu vaccine has been shown to reduce the risk of having to go to the doctor with flu by 40 percent to 60 percent.

Flu Vaccination

- **Flu vaccination has been shown in several studies to reduce severity of illness in people who get vaccinated but still get sick.**A 2021 studyexternal icon showed that among adults, flu vaccination was associated with a 26% lower risk of ICU admission and a 31% lower risk of death from flu compared to those who were unvaccinated.
- A 2018 studyexternal icon showed that among adults hospitalized with flu, vaccinated patients were 59 percent less likely to be admitted to the ICU than those who had not been vaccinated. Among adults in the ICU with flu, vaccinated patients on average spent 4 fewer days in the hospital than those who were not vaccinated.

Flu vaccination can reduce the risk of flu-associated hospitalization.

- A 2014 studyexternal icon showed that flu vaccination reduced children's risk of flu-related pediatric intensive care unit (PICU) admission by 74 percent during flu seasons from 2010-2012. A 2017 study found that during 2009-2016, flu vaccines reduced the risk of flu-associated hospitalization among older adults by about 40 percent on average.

- A 2018 study showed that from 2012 to 2015, flu vaccination among adults reduced the risk of being admitted to an intensive care unit (ICU) with flu by 82 percent.

Flu vaccination is an important preventive tool for people with certain chronic health conditions.

- Flu vaccination has been associated with lower rates of some cardiac events among people with heart disease, especially among those who have had a cardiac event in the past year.

- Flu vaccination can reduce the risk of a flu-related worsening of chronic lung disease (for example, chronic obstructive pulmonary disease requiring hospitalization.

- Among people with diabetes and chronic lung disease, flu vaccination also has been shown in separate studies to be associated with reduced hospitalizations from a worsening of their chronic condition.

Flu vaccination is an important preventive tool for people with certain chronic health conditions.

- **Flu vaccination helps protect pregnant people during and after pregnancy.**
  - Vaccination reduces the risk of flu-associated acute respiratory infection in pregnant people by about one-half.
  - A 2018 studyexternal icon showed that getting a flu shot reduced a pregnant person's risk of being hospitalized with flu by an average of 40 percent from 2010-2016.
  - A number of studies have shown that in addition to helping to protect pregnant people from flu, a flu vaccine given during pregnancy helps protect the bab from flu for several months after birth, when he or she is too young to be vaccinated.

Flu vaccination is an important preventive tool for people with certain chronic health conditions.

- Despite the many benefits offered by flu vaccination, only about half of Americans get an annual flu vaccine and flu continues to cause millions of illnesses, hundreds of thousands of hospitalizations and tens of thousands of deaths. Many more people could be protected from flu if more people got vaccinated.

Are flu vaccines effective against all types of flu and cold viruses?

- Seasonal flu vaccines are designed to protect against infection and illness caused by the four flu viruses that research indicates will be most common during the upcoming flu season. Flu vaccines do not protect against infection and illness caused by other viruses that also can cause flu-like symptoms. There are many other viruses besides flu viruses that can result in flu-like illness* (also known as influenza-like illness or “ILI”) that spread during the flu season. These non-flu viruses include rhinovirus (one cause of the “common cold”) and respiratory syncytial virus (RSV), which is the most common cause of severe respiratory illness in young children, and a major cause of severe respiratory illness in adults 65 years and older.

Does flu vaccine effectiveness vary by type or subtype?

- The amount of protection provided by a flu vaccine may vary by flu virus type or subtype or by vaccine, even when viruses used to make flu vaccines are similar (or 'well matched') to the influenza viruses that are causing illness that season. Since 2009, VE studies looking at how well flu vaccines protect against medically attended illness have suggested better protection against influenza B or influenza A(H1N1) viruses than against influenza A(H3N2) viruses.

Why is flu vaccine typically less effective against influenza A(H3N2) viruses?

- There are a number of reasons why flu vaccine effectiveness against influenza A(H3N2) viruses may be lower.
- While all flu viruses undergo frequent genetic changes, the changes that have occurred in influenza A(H3N2) viruses have more frequently resulted in differences between the virus components of the flu vaccine and circulating influenza viruses (i.e., antigenic change) compared with influenza A(H1N1) and influenza B viruses. That means that between the time when flu viruses are selected to begin producing vaccines and when flu vaccines are delivered,

- 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, changes in influenza A(H3N2) viruses tend to be more likely to result in antigenic changes compared with changes in other influenza viruses. These so-called "egg-adapted changes" are present in vaccine viruses recommended for use in vaccine production and may reduce their potential effectiveness against circulating influenza viruses. Other vaccine production technologies, e.g., cell-based vaccine productionor recombinant flu vaccines, do not use eggs in vaccine production to avoid egg-adapted changes to the viruses used to make vaccines. CDC also is using advanced molecular techniques to improve flu vaccines.

How effective are flu vaccines in older adults?

- For older adults, some studies have shown that some newer vaccines (the high-dose inactivated vaccine, the adjuvanted inactivated vaccine, and the recombinant influenza vaccine) might be more effective than standard-dose inactivated vaccines without an adjuvant. Because flu viruses and effectiveness of flu vaccines can vary from one season to another, it isn't known whether any one of these vaccines will always be more effective in every flu season. For this reason, there currently is no preference for one vaccine over another for this age group. Public health experts are still gathering information about these newer vaccines and their effectiveness. Older adults can get any flu vaccine approved for use in their age group with no preference for any one vaccine over another.

If older people have weaker immune responses to flu vaccination, should they still get vaccinated?

- Despite the fact that some older adults (people 65 years and older) have weaker immune responses to the influenza A(H3N2) component of flu vaccines, there are many reasons why people in this age group should be vaccinated each year.
- First, people 65 years and older are at increased risk of serious illness, hospitalization and death from flu.
- Second, while the effectiveness of flu vaccines can be lower among some older people (particularly against influenza A(H3N2) viruses), there are seasons when significant benefit can be observed (this is particularly true against influenza A(H1N1) and influenza B viruses).
- Third, flu vaccination has been shown in several studies to reduce severity of illness in people who get vaccinated but still get sick.
- Flu vaccines can protect against more serious outcomes like hospitalization and deathFourth, in adults 65 years and older, hospitalizations can mark the beginning of a significant decline in overall health and mobility, potentially resulting in loss of the ability to live independently or to complete basic activities of daily living. While the protection older adults obtain from flu vaccination can vary significantly, a yearly flu vaccination is still the best protection currently available against flu.

How are benefits of vaccination measured?

- Public health researchers measure how well flu vaccines work through different kinds of studies. In "randomized studies," flu vaccination is randomly assigned, and the number of people who get flu in the vaccinated group is compared to the number who get flu in the unvaccinated or placebo group. Randomized studies are the "gold standard" (best method) for determining how well a vaccine works. The effects of vaccination measured in these studies is called "vaccine efficacy."
- Randomized, placebo-controlled studies are expensive and are not conducted after a recommendation for vaccination has been issued, as withholding vaccine from people recommended for vaccination would place them at risk for infection, illness and possibly serious complications. For that reason, most U.S. studies of vaccine benefits conducted after a vaccine is licensed and recommended are "observational studies." Observational studies look at a group of people in a real world setting and compare the occurrence of flu illness in vaccinated people to unvaccinated people. This means that vaccination of study subjects is not randomized. The measurement of vaccine effects in an observational study is referred to as "vaccine effectiveness."

Is it true that getting vaccinated repeatedly can reduce vaccine effectiveness?

- The effectiveness of a flu vaccine may be influenced by vaccination the prior season or during many prior seasons . In some seasons, protection against influenza A(H3N2) virus illness may have been lower for people vaccinated in the current season and the prior season compared with those who had only been vaccinated in the current season. This fits with findings on immune response to vaccination that suggest repeated influenza vaccination can weaken the immune response to vaccination and especially to the H3N2 vaccine component. However, repeated annual vaccination also can be beneficial during some seasons, since sometimes people retain and carry over immune protection from one season to the next. During some seasons, people who missed getting vaccinated still had residual protection against influenza illness.

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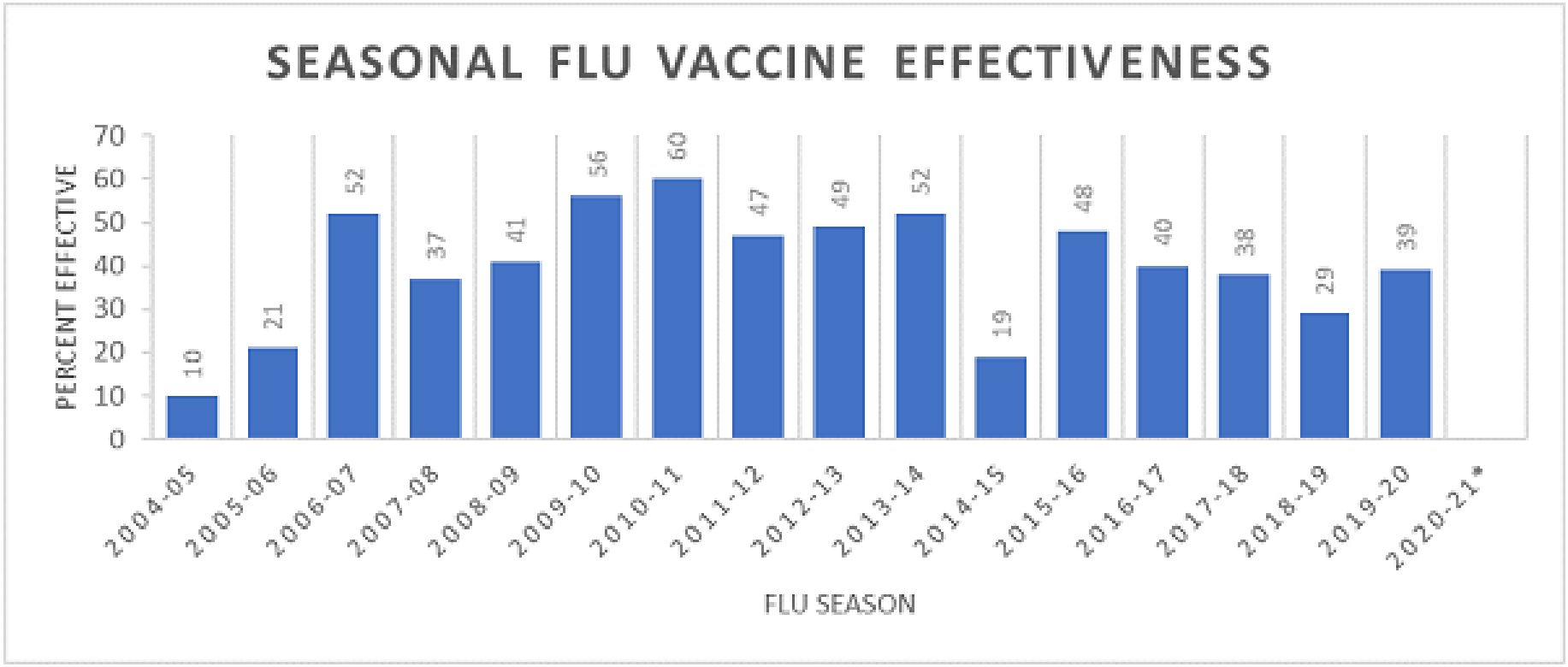
Do recent vaccine effectiveness study results support flu vaccination?

- Flu vaccines help to protect against flu illness and its potentially serious complications. CDC recommends a yearly flu vaccine as the first and most important step in protecting against flu viruses. Everyone 6 months and older should get an annual flu vaccine, ideally by the end of October.

Besides vaccination, how can people protect themselves against the flu?

- Getting a flu vaccine each year is the best way to prevent the flu. In addition to getting the flu shot, people should take the same everyday preventive actions to prevent the spread of flu, including covering coughs, washing hands often, and avoiding people who are sick. Antiviral drugs are an important second line of defense to **treat** the flu. These drugs are not a substitute for vaccination and must be prescribed by a health care provider.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FLU SEASON

Which is most accurate regarding influenza and COVID-19?

- Influenza symptoms occur longer after infection (typically 5-7 days) than do COVID-19 symptoms (typically 1-3 days)
- Unlike COVID-19, influenza can be spread only after symptoms are present
- Influenza vaccine and COVID-19 vaccine can be given at the same time
- Influenza vaccine should be administered to patients with current suspected or confirmed COVID-19

- According to guidance from the Centers for Disease Control and Prevention (CDC), patients can receive a COVID-19 and influenza vaccine at the same time. If co-administered, COVID-19 vaccines and influenza vaccines that may be more likely to cause a local reaction should be administered in different limbs, if possible. Influenza vaccination should be deferred for patients with suspected or confirmed COVID-19, regardless of whether they are asymptomatic, until they have met the criteria to discontinue isolation.

- Patients with COVID-19 may take longer to develop symptoms than those with influenza. Although the time between infection and symptom development may be as little as 1 day for both conditions, patients with influenza typically become symptomatic within 1-4 days, whereas those with COVID-19 may take as long as 14 days to become symptomatic. Both COVID-19 and influenza can be spread at least 1 day prior to symptom development.

Which is best recognized as a risk factor for developing influenza or for developing a complication of influenza?

- Long-term aspirin therapy in younger individuals (age > 19 years)
- Exposure to cold weather without sufficient protection or with wet hair
- Body mass index (BMI) of ≥ 25 kg/m2
- Living in a humid climate vs a drier climate

- A common myth about influenza is that exposure to cold weather without a sufficient coat, or having wet hair or sitting in a drafty location, can increase risk for infection. Several studies have shown that higher humidity levels impair the ability of influenza virus to infect.

- Factors known to increase the risk of developing influenza or complications of influenza include:

- Older age (≥ 65 years)
- Younger age (< 2 years)
- Asthma
- Neurologic and neurodevelopment conditions
- Blood disorders (eg, anemia)

- Chronic lung disease (eg, chronic obstructive pulmonary disease, cystic fibrosis)
- Endocrine disorders (eg, diabetes mellitus)
- Heart disease
- Kidney disease
- Liver disease

- Metabolic disorders
- Obesity (BMI ≥ 40 kg/m2)
- Long-term aspirin therapy in patients younger than 19 years
- Weakened immune system

Beyond the respiratory symptoms and fever that are well known, which is also a common symptom of influenza in adults?

- ✓Vomiting
- ✓Frontal or retro-orbital headache
- ✓Diarrhea
- ✓ Anosmia

- Patients who receive vaccination typically have milder symptoms and fewer complications. The most common signs and symptoms in mild cases include fever, cough, sore throat, myalgia, and congestion. Frontal or retro-orbital headache is common and may occur with ocular symptoms (eg, photophobia, pain). Diarrhea and vomiting may occur in children but are rarely present in adults. Anosmia is a symptom that suggests COVID-19 as opposed to influenza.

Which is most accurate regarding the workup of influenza?

Throat swab specimens are preferred over nasopharyngeal specimens for the detection of influenza viruses.

Testing of blood, plasma, and serum for influenza is routinely recommended in immunocompromised patients.

Rapid influenza diagnostic tests tend to be more sensitive in adults than in children and are better at detecting influenza B than influenza A.

Rapid molecular assays are recommended over rapid influenza diagnostic tests in outpatients.

Clinicians should use rapid molecular assays (ie, nucleic acid amplification tests) over rapid influenza diagnostic tests in outpatients to improve detection of influenza virus infection.

Clinicians should use reverse-transcription polymerase chain reaction or other molecular assays over other influenza tests in hospitalized patients to improve detection of influenza virus infection.

Nasopharyngeal specimens should be collected over other upper respiratory tract specimens to increase detection of influenza viruses. If nasopharyngeal specimens are not available, nasal and throat swab specimens should be collected and combined for testing over single specimens from either site. Mid-turbinate nasal swab specimens should be collected over throat swab specimens.

Clinicians should not collect or routinely test for influenza specimens from nonrespiratory sites such as blood, plasma, serum, cerebrospinal fluid, urine, and stool.

- Rapid influenza diagnostic tests can directly detect influenza A or B virus-associated antigens or enzyme in throat swabs, nasal swabs, or nasal washes. These tests can produce results within 30 minutes. A meta-analysis examining the accuracy of rapid influenza diagnostic tests found that these tests tended to be more sensitive in children (67%) than in adults 54%) and were better at detecting influenza A 65%) than influenza B (52%).
- The CDC states that clinicians should not wait for the results of influenza testing, SARS-CoV-2 testing, or multiplex molecular assays to initiate antiviral treatment for influenza in high-risk patients. These include hospitalized patients with respiratory illness; outpatients with severe, complicated, or progressive respiratory illness; and outpatients at higher risk for influenza complications who present with any acute respiratory illness symptoms, with or without fever.

- The CDC also suggests that antiviral treatment can be considered for any previously healthy, symptomatic outpatient not at high risk for influenza complications, who is diagnosed with confirmed or suspected influenza, based on clinical judgement, if treatment can be initiated within 48 hours of illness onset.

- For outpatients with acute uncomplicated influenza, the CDC recommends oral oseltamivir, inhaled zanamivir, intravenous peramivir, or oral baloxavir for treatment. The CDC does not recommend use of baloxavir for treatment of influenza in pregnant women, breastfeeding mothers, or severely immunosuppressed persons.

The CDC states that neuraminidase inhibitor antiviral medications are approximately 70%-90% effective in preventing against susceptible influenza viruses and are useful adjuncts to influenza vaccination.

Influenza activity is increasing nationally and flu season has started in parts of the country. There's still time to get a flu vaccine.

Everyone 6 months & older should receive a yearly flu vaccine.

The majority of influenza viruses detected are A(H3N2). Most influenza A(H3N2) infections have occurred among children and young adults ages 5-24 years; however, the proportion of infections occurring among adults age 25 years and older has been increasing.

Hospitalizations for influenza are starting to increase.

- The percentage of outpatient visits due to respiratory illness has trended upwards in recent weeks and is now above the national baseline. Influenza is contributing to levels of respiratory illness, but other respiratory viruses are also circulating. The relative contribution of influenza to respiratory illness varies by location.

- The flu season is just getting started. It’s not too late to get vaccinated. An annual flu vaccine is the best way to protect against flu and its potentially serious complications. There are early signs that flu vaccination uptake is down this season compared to last.

There are also flu antiviral drugs that can be used to treat flu illness

- An increasing number of influenza positive tests have been reported by clinical and public health laboratories during recent weeks. Influenza A(H3N2) viruses have been the most frequently detected. The majority of influenza A(H3N2) viruses were detected in persons aged 5-24 years old, but the proportion of influenza A(H3N2) virus detections occurring among adults aged 25 years and older has increased in recent weeks. Influenza A(H3N2) viruses were reported by public health laboratories in all 10 HHS regions this week. For regional and state level data about circulating influenza viruses, please visit FluView Interactive. Viruses known to be associated with recent live attenuated influenza vaccine (LAIV) receipt or found upon further testing to be a vaccine virus are not included as they are not circulating influenza viruses.