CDC Influenza Division Key Points
December 5, 2014

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Summary Key Messages

- This week's FluView report indicates that flu activity is beginning to increase in parts of the United States.
- **The flu season is beginning.**
- CDC is getting reports of flu illnesses, flu hospitalizations and flu deaths. Five pediatric deaths have been reported so far this season.
- Influenza A (H3N2) viruses are most common so far.
- H3N2 predominant seasons are associated with more severe illness and mortality, especially in older people and young children, than during H1N1- or B-predominant seasons.
- If H3N2 viruses continue to predominant, this season could be severe.
  - More than half of the influenza A (H3N2) viruses analyzed since October 1 are antigenically or genetically different from the H3N2 vaccine virus component this season. (See the FluView Activity Update below.)
- The vaccine may not work as well against these different viruses.
- **CDC is urging influenza vaccination for any unvaccinated persons because vaccine still offers benefit, and reminding health care professionals about the importance of antiviral medications for the treatment of influenza illness, as an adjunct to vaccination.**
- CDC always recommends 3 steps to fighting flu:
  1. Take time to get a flu vaccine.
  2. Take everyday preventive actions like covering coughs and sneezes, staying away from sick people and washing your hands often to help stop the spread of respiratory viruses like flu, respiratory syncytial virus (RSV), rhinovirus and enterovirus D68.

3. Take antivirals drugs for flu treatment if your doctor prescribes them.

Vaccination

Annual flu vaccination is the first and most important step in protecting against flu and its potentially serious complications.

- A flu vaccine is the best way to protect against influenza.
- The flu vaccine protects against three or four different influenza viruses, depending on which vaccine you got.
- Flu vaccination can reduce flu illnesses, doctors' visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations and deaths.
- Vaccination is particularly important for people at high risk for serious flu-related complications and their close contacts. (People at high risk include infants, pregnant women, kids and adults with chronic medical conditions like asthma, diabetes, or heart disease, and adults aged 65 and older.)
- Even when some circulating viruses are different from the vaccine viruses, CDC continues to recommend flu vaccination.
- We cannot know which viruses will circulate over the season.
- Flu vaccination can still reduce flu illnesses, doctors' visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations and deaths.
- The influenza vaccine protects against three or four different influenza viruses, depending on which vaccine you got (trivalent or quadrivalent).
- Antibodies created through vaccination with one influenza virus can sometimes offer protection against drifted influenza viruses (this is called cross-protection).
- While the vaccine may work less well against drifted viruses, it can still protect many people and prevent flu-related complications.
- If we have a severe season (with H3N2 viruses predominating) getting a vaccine that provides even partial protection may be more important than ever.
- It is not too late to get vaccinated.
- Health care professionals should continue to vaccinate patients who have not yet received influenza vaccine this season.
- The HealthMap Vaccine Finder can be used to locate flu vaccine.

Vaccine Match

- Influenza viruses are constantly changing – they can change from one season to the next or they can even change within the course of the same season. This kind of gradual change is called “antigenic drift.”

- In order for any vaccine to be delivered in the fall, the viruses in the vaccine must be chosen in February.
- When the vaccine viruses for 2014-2015 were selected, A/Texas/50/2012 was the most common circulating influenza H3N2 virus.
- Drifted H3N2 viruses were first detected during routine surveillance testing during late March 2014, after WHO recommendations for the vaccine composition for the Northern Hemisphere for the 2014-2015 season had been made in mid-February.
- At that time, just a very small number of these viruses had been found among the thousands of specimens that had been collected and tested.
- Influenza viruses are constantly changing and detecting small numbers of antigenic variants is common.
- Many antigenic variants emerge and spread in a limited way and then die out.
- Early on, there is no way to predict in advance if a given antigenic variant will circulate widely.
- Over the summer, these viruses were detected in greater proportions and by the fall had become common among H3N2 viruses in the United States and abroad.
- By September 20, about half of H3N2 viruses isolated worldwide since May were drifted from the H3N2 vaccine virus component.
- As of the week ending November 29, 58% of H3N2 viruses isolated in the United States since October 1, 2014 were drifted from the H3N2 vaccine virus component.

Vaccine Effectiveness

- More than half of H3N2 viruses are different from the vaccine virus.
- It's possible that vaccine effectiveness against these viruses may be reduced.
- However, seasonal influenza vaccination can sometimes induce antibodies and/or T cells capable of cross-reacting with antigenically distinct viruses.
- Influenza vaccination still offers the best protection we have against seasonal flu.
- In the context of reduced vaccine effectiveness, the use of influenza antiviral drugs as a second line of defense against the flu becomes even more important, especially for high risk people and people who are very sick (hospitalized).

Antiviral drugs

Treat flu illness and prevent serious flu complications

- There are prescription drugs, called "influenza antiviral drugs" that can be used to treat the flu or to prevent infection with flu viruses.
- Treatment with antivirals works best when begun within 48 hours of getting sick, but can still be beneficial when given later in the course of illness.
- Treatment with flu antiviral drugs can make your illness milder and shorter. Treatment with antivirals can also lessen the risk of being hospitalized or dying from flu.
- Antiviral drugs become even more important when circulating flu viruses are very different from the vaccine viruses; which can mean that the vaccine's effectiveness is reduced against those viruses.
- Antiviral drugs are effective across all age and risk groups.
- Prescription antiviral drugs are under-prescribed for high risk people who get flu.
- Treating high risk people or people who are very sick with flu with antiviral drugs is very important. It can mean the mean the difference between having a milder illness instead of very serious illness that could result in a hospital stay.
- Two FDA-approved influenza antiviral agents are recommended for use in the United States during the 2014-2015 influenza season: oseltamivir and zanamivir.
- Visit http://www.cdc.gov/flu/professionals/antivirals/index.htm for information about how antiviral medications can be used to prevent or treat influenza when influenza activity is present in your community.
- People at high risk for serious flu complications include: people with underlying chronic medical conditions such as asthma, diabetes, heart disease, or neurological conditions; pregnant women; those younger than 5 years or older than 65 years of age; or anyone with a weakened immune system. A full list of high risk factors is available at http://www.cdc.gov/flu/about/disease/high_risk.htm.
- As always, people who are at high risk for influenza complications should see a health care professional promptly if they get flu symptoms, even if they have been vaccinated this season.
- More information about everyday preventive actions that help fight flu is available at http://www.cdc.gov/flu/protect/habits.htm.

FluView Activity Update

- According to this week's FluView report, flu activity increased in the United States.

- Reports of influenza-like-illness (ILI) are at or above baseline for the second time this season and widespread and high ILI activity is being reported by six states in the continental U.S. Flu activity is expected to increase further in the coming weeks.

- Below is a summary of the key flu indicators for the week ending November 29, 2014:
    - For the week ending November 29, the proportion of people seeing their health care provider for influenza-like illness (ILI) is above the national baseline. Eight of 10 U.S. regions reported ILI activity at or above region-specific baseline levels.
    - Puerto Rico and six states (Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas) experienced high ILI activity. One state (Illinois) experienced moderate ILI activity. Five states (Kansas, Missouri, Nevada, Utah and Virginia) experienced low ILI activity. New York City and 38 states experienced minimal ILI activity. The District of Columbia did not have sufficient data to calculate an activity level. ILI activity data indicate the amount of flu-like illness that is occurring in each state.
    - Widespread influenza activity was reported by Puerto Rico and six states (Alaska, Florida, Illinois, Louisiana, Maryland, and North Carolina). Fourteen states reported regional geographic influenza activity. The U.S. Virgin Islands and 19 states reported local activity. The District of Columbia and 11 states reported sporadic influenza activity. Guam did not report. Geographic spread data show how many areas within a state or territory are seeing flu activity.
    - Data regarding influenza-associated hospitalizations for the 2014-2015 influenza season is now available. 500 laboratory-confirmed influenza-associated hospitalizations have been reported since October 1, 2014. This translates to a cumulative overall rate of 1.8 hospitalizations per 100,000 people in the United States.
        - The highest hospitalization rates are among people 65 years and older (5.9 per 100,000 populations).
        - Hospitalization data are collected from 13 states and represent approximately 9% of the total U.S. population. The number of hospitalizations reported does not reflect the actual total number of influenza-associated hospitalizations in the United States.

- The proportion of deaths attributed to pneumonia and influenza (P&I) based on the 122 Cities Mortality Reporting System is below the epidemic threshold.
- No influenza-associated pediatric deaths were reported to CDC during the week ending November 29. A total of 5 influenza-associated pediatric deaths have been reported for the 2014-2015 season at this time.
- Nationally, the percentage of respiratory specimens testing positive for influenza viruses in the United States during the week ending November 29 increased once again to 17.0%. For the most recent three weeks, the regional percentage of respiratory specimens testing positive for influenza viruses ranged from 1.7% to 22.7%.
- Influenza A (H3N2) viruses have been identified most commonly in the United States this season. Fewer influenza B viruses have been detected and very few influenza A (H1N1) pdm09 viruses have been detected. During the week ending November 29, 2,129 (93.6%) of the 2,274 influenza-positive tests reported to CDC were influenza A viruses and 145 (6.4%) were influenza B viruses. Of the 661 influenza A viruses that were subtyped, 99.2% were influenza A (H3) viruses and 0.8% were influenza A (H1N1) pdm09 viruses.
- CDC has antigenically or genetically characterized 132 influenza viruses, including one A(H1N1) pdm09, 114 A(H3N2) viruses and 17 influenza B viruses, collected in the United States since October 1, 2014.
    - The one 2009 H1N1 virus tested was characterized as A/California/7/2009-like. This is the influenza A (H1N1) component of the 2014-2015 Northern Hemisphere quadrivalent and trivalent influenza vaccine.
    - Forty-eight (42%) of the 114 influenza A (H3N2) viruses tested have been characterized as A/Texas/50/2012-like. This is the influenza A (H3N2) component of the 2014-2015 Northern Hemisphere quadrivalent and trivalent influenza vaccine.
    - The remaining 66 (58%) influenza A (H3N2) viruses tested showed either reduced titers with antiserum produced against A/Texas/50/2012 or belonged to a genetic group that typically shows reduced titers to A/Texas/50/2012. The majority of these 66 influenza A (H3N2) viruses were antigenically similar to A/Switzerland/9715293/2013, the influenza A (H3N2) component of the 2015 Southern Hemisphere influenza vaccine.
    - Ten (58.8%) of the 17 influenza B viruses tested belonged to the B/Yamagata/16/88 lineage and were characterized as

B/Massachusetts/2/2012-like. This is an influenza B component of the 2014-2015 Northern Hemisphere trivalent and quadrivalent influenza vaccine.

- The seven (41.2%) other influenza B viruses belonged to the B/Victoria lineage of viruses, and were characterized as B/Brisbane/60/2008-like. This is the recommended influenza B component of the 2014-2015 Northern Hemisphere quadrivalent influenza vaccine.

- Since October 1, 2014, CDC has tested five A (H1N1) pdm09, 71 A (H3N2), and 24 influenza B viruses for resistance to neuraminidase inhibitors (oseltamivir and zanamivir). All viruses showed susceptibility to both oseltamivir and zanamivir.
  - The neuraminidase inhibitors oseltamivir and zanamivir are currently the only recommended influenza antiviral drugs.

Vaccine Supply

- Seven influenza vaccine manufacturers have projected that as many as 151 million to 156 million doses of influenza vaccine will be available for use in the United States during the 2014-2015 influenza season.
- Of the overall flu vaccine supply projected for the 2014-2015 season, manufacturers estimate that 76 million doses will be available as quadrivalent flu vaccines.
  - Of the total quadrivalent flu vaccine supply, as many as 18 million doses of the nasal spray influenza vaccine (LAIV) have been projected by the manufacturer to be available.
- As of November 28, 2014, manufacturers reported having shipped 144.5 million doses of flu vaccine.
- For the latest information on flu vaccine supply, including projections and doses distributed, visit http://www.cdc.gov/flu/professionals/vaccination/vaccinesupply.htm.

LAIV Effectiveness Last Season and Vaccination of Children This Season

- Since 2008, ACIP and CDC have recommended that all children 6 months and older (with rare exceptions) receive influenza vaccine annually, using any licensed age-appropriate vaccine.

- During the summer of 2014, ACIP and CDC recommended that beginning during the 2014-2015 influenza season, live attenuated influenza vaccine (LAIV, or the "nasal spray vaccine") should be used for healthy children 2 through 8 years of age when immediately available and when there are no contraindications or precautions against getting that vaccine.
- This decision was based on previous data showing that LAIV offered superior protection against influenza virus infection compared to IIV in young children.
- However, recently available CDC analyses showed that there was no measurable effectiveness for LAIV against influenza A (H1N1) among children enrolled in a CDC-sponsored study last season.
- There were not enough cases of infection in the CDC study with H3N2 or B viruses to calculate vaccine effectiveness against those viruses in children last season.
- The reasons behind the lack of effectiveness against H1N1 infections for LAIV during the 2013-2014 season are not fully understood.
    - It is possible that results may be specific to the H1N1 component of LAIV. Influenza H1N1 viruses predominated during the 2013-2014 season for the first time since their emergence in 2009 when they caused a pandemic.
    - It also is possible – though less likely – that there is an unidentified issue with the study methods or analysis plan for measuring LAIV vaccine effectiveness.
- The 2013-2014 season LAIV VE estimates against H1N1 for children suggest that LAIV may not protect against H1N1 viruses during the 2014-2015 season because the same H1N1 vaccine virus from the 2013-2014 vaccine is included in the 2014-2015 vaccine.
- However, the nasal spray vaccine continues to be a recommended option for vaccination because:
    - All LAIV is designed to protect against four different influenza viruses: influenza A (H1N1), A (H3N2) and two influenza B viruses;
    - Surveillance shows that there is substantially more circulation of influenza A (H3N2) and B viruses and very little circulating H1N1 so far;
    - LAIV has been shown to offer good protection against influenza A (H3N2) and influenza B viruses in the past;
    - LAIV may offer better protection than IIV against antigenically drifted viruses that may circulate this season; and

  - Vaccine providers have received their vaccine for the 2014-2015 season and have likely administered a good proportion of it.

- People who have not been vaccinated yet this season should get vaccinated now.
- Parents should seek to get their children immunized with whatever vaccine is immediately available and indicated.
- Influenza vaccination should not be delayed to procure a specific vaccine preparation.
- The HealthMap Vaccine Finder can be used to locate vaccine.
- Children needing one dose of vaccine this season who got the nasal spray vaccine are considered fully vaccinated and do not need to be revaccinated.
- Children needing two doses of vaccine this season who have only gotten one dose can get either the nasal spray vaccine or the flu shot as their second dose, whatever is immediately available.
- See the CDC statement, "CDC Statement on LAIV Effectiveness and Vaccination of Children," at: http://www.cdc.gov/flu/news/nasal-spray-effectiveness.htm.