CDC Influenza Division Key Points
February 21, 2014

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Summary Key Messages

- The current FluView report indicates that flu activity is decreasing, but remains elevated.
- It's possible that flu season will continue for a number weeks, especially in the parts of the country that experienced increases in activity later in the season.
- The predominant virus so far this season is H1N1.
- This is the H1N1 virus that emerged in 2009 to cause a pandemic. This virus has continued to circulate since the pandemic as a seasonal flu virus, but this is the first flu season since the pandemic that this virus has circulated so widely.
- Seasonal flu is responsible for severe illness and death every year, but who is most affected each season can vary depending on the predominant circulating virus.
- During the pandemic, when H1N1 viruses were predominant, younger adults and children, and particularly people with chronic medical conditions, were harder hit by flu compared with adults aged 65 and older. Other groups of people, like pregnant women, people who are morbidly obese, and American Indians/Alaska Natives, were also hard hit by H1N1 during the pandemic.
- While it is not possible to predict which influenza viruses will predominate for the entire 2013-2014 influenza season, if H1N1 virus continues to circulate widely, we may continue to see illness that affects young and middle-aged adults more than in other seasons.
- Throughout the season, CDC has received several reports of severe flu illness among young and middle-aged adults, many of whom were infected with the 2009 H1N1 virus. Some hospitalizations and deaths have been reported.
- At this time, more than 60% of the reported hospitalizations this season have been in people 18 to 64 years old.
- More commonly, most flu hospitalizations occur in people 65 and older. Usually 50-60% of flu hospitalizations occur in people aged 65 years and older.

- Unfortunately, younger adults – especially those who are otherwise healthy – are less likely to get vaccinated.
- Estimates as of early-November 2013 indicate that among people 18-64 years of age, only 34% had been vaccinated. This vaccine coverage estimate is substantially lower than vaccine coverage estimates for people aged 6 months-17 years of age (41%) and people 65 and older (62%) in the U.S. during that same time period.
- These severe flu outcomes are a reminder that flu can be a very serious disease for anyone, including young, previously healthy adults.
- CDC urges people who still have not been vaccinated to get vaccinated now.
- All flu vaccines this season are designed to protect against H1N1.
- Influenza vaccination is especially important for people in the most vulnerable groups.
- 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.
- Also, as always, people who are at high risk for influenza complications should see their health care provider promptly if they get flu symptoms, even if they have been vaccinated this season.
- A health care provider can determine if the patient needs influenza antiviral drugs. Antiviral drugs can treat flu illness and prevent serious flu complications. These drugs work best when started soon after influenza symptoms begin (within 2 days), but persons with high-risk conditions can benefit even when antiviral treatment is started after the first two days of illness.
- Flu symptoms include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, chills and fatigue.
- While how well the flu vaccine works can vary, CDC recommends a yearly flu vaccination as the first and most important step in protecting against flu and its potentially serious complications.
- Flu vaccination can reduce flu illnesses, doctors' visits, missed work due to flu, as well as prevent flu-related hospitalizations and deaths.
- More than 134 million doses of flu vaccine had been delivered in the United States as of early February, with manufacturers projecting total production of 138-145 million doses this season.

- Flu vaccines are offered in many locations, including doctor's offices, clinics, health departments, retail stores, pharmacies, health centers, and by many employers and schools.
- At this point in the season, people may have to check with more than one vaccine provider in order to locate vaccine, but supplies of vaccine should still be available.

FluView Activity Update

- According to this week's FluView report while influenza activity is decreasing, it remains elevated nationally. Flu activity is likely to continue for a number of weeks.
- Below is a summary of the key indicators for the week of February 9-15, 2014:
    - For the week of February 9-15, the national proportion of people seeing their health care provider for influenza-like illness decreased for the seventh week, but remains above the national baseline. Nine of 10 regions continue to report ILI activity at or above their region-specific baseline level. Additional information regarding regional activity is available through FluView Interactive.
    - No states experienced high ILI activity; a decrease from the 6 states with high ILI activity last week. Seven states experienced moderate ILI activity. Sixteen states and New York City experienced low ILI activity. Twenty-seven 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.
    - Seventeen states reported widespread geographic influenza activity. This is a decrease from the 24 states that reported widespread activity in the previous week. Twenty-two states reported regional activity. The District of Columbia, Guam and nine states reported local activity. Puerto Rico and two states (Hawaii and Colorado) reported sporadic influenza activity. The U.S. Virgin Islands reported no influenza activity. Geographic spread data show how many areas within a state or territory are seeing flu activity.
    - 7,073 laboratory-confirmed influenza-associated hospitalizations have been reported since October 1, 2013. This translates to a cumulative overall rate of 26.1 hospitalizations per 100,000 people in the United States. Data for hospitalization rates are available through FluView Interactive.
        - The highest hospitalization rates are among people 65 and older (54.7 per 100,000), followed by people 50-64 years (41.2 per 100,000) and children younger than 5 years (37.8 per 100,000). During most seasons, children younger than 5 years and adults 65 years and older have the highest hospitalization rates.

        - Of the 7,073 influenza-associated hospitalizations that have been reported this season, more than 60% have been in people 18 to 64 years old. This pattern of more hospitalizations among younger people was also seen during the 2009 H1N1 pandemic.
        - Hospitalization data are collected from 13 states and represent approximately 8.5% 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 decreased again this week, but remains above the epidemic threshold. When the proportion of the deaths due to P&I is above the epidemic threshold it means that the number of P&I deaths occurring are in excess of the number that is expected.
    - Two influenza-associated pediatric deaths were reported to CDC during the week of February 9-15. One death was associated with a 2009 H1N1 virus and occurred during week 6 (week ending Feb 8), and the other death was associated with an influenza A virus for which subtyping was not performed and occurred during week 5 (week ending Feb 1). A total of 52 influenza-associated pediatric deaths have been reported for the 2013-2014 season at this time. Additional information about the pediatric deaths from this season and previous seasons is available through FluView Interactive.
    - Nationally, the percentage of respiratory specimens testing positive for influenza viruses in the United States during the week of February 9-15 decreased to 13.9%. Averaged over the last three weeks, the regional percentage of respiratory specimens testing positive for influenza viruses ranged from 11.4% to 27.7%.
    - Influenza A (H3N2), 2009 H1N1, and influenza B viruses have all been identified in the U.S. this season. During the week of February 9-15, 865 of the 958 influenza-positive tests reported to CDC were influenza A viruses and 93 were influenza B viruses. Of the 439 influenza A viruses that were subtyped, 5% were H3 viruses and 95% were 2009 H1N1 viruses.
        - To date, influenza A (H1N1) viruses have predominated. This is the H1N1 virus that emerged in 2009 to cause a pandemic. 2009 H1N1 viruses have continued to circulate among people since that time, but this is the first season that the virus has circulated at such high levels since the pandemic.
    - CDC has antigenically characterized 1,056 influenza viruses, including 920 viruses identified as 2009 H1N1 viruses, 86 influenza A (H3N2) viruses, and 50 influenza B viruses, collected since October 1, 2013.

- 919 (99.9%) of the 920 2009 H1N1 viruses tested were characterized as A/California/7/2009-like. This is the influenza A (H1N1) component of the Northern Hemisphere quadrivalent and trivalent vaccines for the 2013-2014 season.
- All 86 of the influenza A (H3N2) viruses tested were characterized as Texas/50/2012-like. This is the influenza A (H3N2) component of the Northern Hemisphere quadrivalent and trivalent vaccines for the 2013-2014 season.
- 31 (62%) of the 50 influenza B viruses tested belonged to the B/Yamagata lineage of viruses, and were characterized as B/Massachusetts/02/2012-like. This is an influenza B component for the 2013-2014 Northern Hemisphere quadrivalent and trivalent influenza vaccines.
- The 19 (38%) 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 2013-2014 Northern Hemisphere quadrivalent influenza vaccine.

- Since October 1, 2013, CDC has tested 3,471 2009 H1N1, 186 influenza A (H3N2), and 73 influenza B virus samples for resistance to the neuraminidase inhibitor influenza antiviral drugs. While the vast majority of the 2009 H1N1 viruses that have been tested are sensitive to oseltamivir and zanamivir, one additional 2009 H1N1 virus showed resistance to oseltamivir during the week of February 9-15. So far this season 26 (0.7%) 2009 H1N1 viruses have shown resistance to oseltamivir. No influenza A (H3N2) or influenza B viruses have shown resistance to oseltamivir. No viruses have shown resistance to zanamivir.
  - The neuraminidase inhibitors oseltamivir and zanamivir are currently the only recommended influenza antiviral drugs.
  - As in recent past seasons, high levels of resistance to the adamantanes (amantadine and rimantadine) continue to persist among 2009 H1N1 and influenza A (H3N2) viruses. Adamantanes are not effective against influenza B viruses. Adamantanes are not recommended for use against influenza this season.

FluView is available – and past issues are archived – on the CDC website.

Note: Delays in reporting may mean that data changes over time. The most up to date data for all weeks during the 2013-2014 season can be found on the current FluView.

Influenza-Associated Pediatric Deaths

- Two influenza-associated pediatric deaths were reported to CDC during the week of February 9-15, 2014 (Week 7).
- This brings the total of influenza-related pediatric deaths that have been reported for the 2013-2014 flu season to 52.
- Additional information regarding pediatric deaths is available through FluView Interactive.
- A pediatric death is a death in a person who is a U.S. resident and younger than 18 years old from an illness associated with infection with an influenza virus.
- During the 2012-2013 influenza season, a total of 171 influenza-associated pediatric deaths were reported to CDC.
- A review of the available pediatric death reports from the 2012-2013 season indicates that:
    - Of the 164 deaths in which the child's medical history was known, 55% occurred in children who had underlying medical conditions that placed them at high risk of developing serious flu-associated complications. However, 45% had no recognized underlying health problems.
    - The proportions of pediatric deaths that occurred in unvaccinated children and among children with underlying medical conditions that placed them at high risk from flu complications are largely consistent with what has been seen in the past.
- Since 2004, when flu-associated pediatric deaths became a nationally notifiable condition, the number of deaths reported to CDC each season has ranged from 35 (2011-2012 season) to 171 (2012-2013 season).
- During the 2009 H1N1 pandemic — April 15, 2009 to October 2, 2010 — 348 pediatric deaths were reported to CDC.
- These deaths are a somber reminder of the danger flu poses to children.
- The single best way to protect children against seasonal flu and its potential severe consequences is to have them receive a seasonal flu vaccine each year.
- Among children, vaccination is especially important for those younger than 5 years of age and those of any age with an underlying medical condition like asthma; a neurological, neuromuscular or neurodevelopmental disorder; or immune suppression. These children are at higher risk of serious complications if they get the flu.
- Yearly vaccination also is especially important for people who come in contact with high risk children in order to protect the child (or children) from the flu.

- Even previously healthy children can become seriously ill if they get the flu. Data on laboratory-confirmed influenza hospitalizations during the 2012-2013 flu season indicated that 46% of children hospitalized with the flu had no identified underlying medical conditions.
- Flu-associated deaths in children younger than 18 years old should be reported through the Influenza-Associated Pediatric Mortality Surveillance System. The number of flu-associated deaths among children reported during the 2013-2014 flu season will be updated each week and can be found at http://www.cdc.gov/flu/weekly/.
- Additional information about the pediatric deaths, including basic demographics, underlying conditions and week and place of death, for the 2013-2014 season as well as past influenza seasons, is available through the Influenza Associated Pediatric Mortality application of FluView Interactive at http://gis.cdc.gov/GRASP/Fluview/PedFluDeath.html.

Oseltamivir-Resistant Influenza Viruses

- Influenza viruses can sometimes develop resistance to antiviral medications.
- Antiviral resistance means that a virus has changed in such a way that the antiviral drug is less effective in treating or preventing illnesses caused by the virus.
- Influenza viruses constantly change as the virus makes copies of itself. Some changes can result in the viruses being resistant to one or more of the antiviral drugs that are used to treat or prevent influenza.
- Resistance of influenza A viruses to antiviral drugs can occur spontaneously or emerge during the course of antiviral treatment.
- Antiviral resistance is detected through laboratory testing.
- CDC reports specimens collected and tested through national surveillance as well as additional specimens tested at public health laboratories who share testing results with CDC.
- For the week of February 9-15, 2014 (Week 7), one oseltamivir-resistant 2009 H1N1 virus was reported, bringing the total number of oseltamivir-resistant viruses to 26 for this season.
- Oseltamivir resistance among 2009 H1N1 viruses is rare.
- The majority of 2009 H1N1 viruses circulating in the United States remain susceptible to the neuraminidase inhibitor antiviral medications, oseltamivir and zanamivir.
- Oseltamivir-resistant viruses often have a single known substitution in the neuraminidase protein of the virus (H275Y) that seems to confer oseltamivir

resistance. All the oseltamivir-resistant H1N1 viruses reported this season have had this substitution.

- CDC and state and local partners will continue to watch influenza viruses closely for possible emerging patterns of antiviral resistance in addition to watching for antigenic changes.
- Two FDA-approved influenza antiviral medications are recommended for use in the United States during the 2013-2014 influenza season: oseltamivir (Tamiflu®) and zanamivir (Relenza®). More information about antiviral drug resistance can be found at http://www.cdc.gov/flu/about/qa/antiviralresistance.htm and http://www.cdc.gov/flu/antivirals/index.htm.
- Information on the monitoring of antiviral resistance of influenza viruses to oseltamivir and zanamivir is updated weekly in the CDC FluView surveillance report, which is available at: http://www.cdc.gov/flu/weekly/.

CDC Antiviral Treatment Recommendations

- Evidence from past influenza seasons and the 2009 H1N1 pandemic has shown that treatment with antiviral medications can have clinical and public health benefit in reducing severe outcomes of influenza when initiated soon after illness onset.
    - Clinical trials and observational data show that early antiviral treatment may shorten the duration of fever and illness symptoms, reduce the risk for complications and death, and shorten the duration of hospitalization.
- Clinical benefit is greatest when antiviral treatment is administered early. When indicated, antiviral treatment should be started as soon as possible after illness onset, ideally within 48 hours of symptom onset. However, antiviral treatment might still be beneficial in patients with severe, complicated or progressive illness and in hospitalized patients when started after 48 hours of illness onset, as indicated by observational studies.
- Antiviral treatment is recommended as early as possible for any patient with confirmed or suspected influenza who
    - is hospitalized;
    - has severe, complicated, or progressive illness; or
    - is at higher risk for influenza complications.
- Treatment of persons with suspected influenza should not wait for laboratory confirmation of influenza.

  - When there is clinical suspicion of influenza and antiviral treatment is indicated, antiviral treatment should be started as soon as possible, along with use of appropriate infection control measures.

- While influenza vaccination is the first and best way to prevent influenza, a history of influenza vaccination does not rule out the possibility of influenza virus infection in an ill patient with clinical signs and symptoms compatible with influenza.
- Antiviral treatment also can be considered for any previously healthy, symptomatic outpatient not at high risk with confirmed or suspected influenza on the basis of clinical judgment, if treatment can be initiated within 48 hours of illness onset.
- The antiviral medications that are currently recommended for treatment of influenza are oral oseltamivir and inhaled zanamivir.
- More information is available at http://www.cdc.gov/flu/professionals/antivirals/index.htm.
- Additional information from a recent Clinician Outreach Communications Activity (COCA) call with updates and recommendations for clinicians regarding the 2013-2014 flu season is available at: http://emergency.cdc.gov/coca/calls/2014/callinfo_012314.asp.

2014-2015 Influenza Vaccine Composition

- Because influenza viruses are always changing, the composition of the influenza vaccine is reviewed each year to see whether it needs to be updated so that circulating viruses and vaccine viruses are matched.
- In February each year, international experts gather at the World Health Organization (WHO) to review influenza virus surveillance and laboratory data.
- They also look at available vaccine candidate viruses (virus isolates that can be used in the manufacturing processes for influenza vaccines) and recommend what vaccine viruses should be used to make the upcoming season's vaccine.
- While WHO makes a recommendation for each hemisphere (Northern and Southern), the Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee (VRBPAC) reviews WHO's recommendation and makes the official recommendation for flu vaccines to be used in the United States during the Northern Hemisphere influenza season.
- On February 20, 2014, WHO announced their recommended flu vaccine composition for the Northern Hemisphere.

- The WHO-recommended vaccine viruses for the 2014-15 northern hemisphere influenza season are the same as those for the northern hemisphere 2013-14 and 2014 southern hemisphere influenza seasons.
- WHO recommends that influenza vaccines for use in the 2014-15 northern hemisphere influenza season contain the following:
    - an A/California/7/2009 (H1N1)pdm09-like virus
    - an A/Texas/50/2012 (H3N2)-like virus
    - a B/Massachusetts/2/2012-like virus.
- WHO also recommends that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Brisbane/60/2008-like virus.
- More information about the WHO recommendation is available at http://www.who.int/influenza/vaccines/virus/recommendations/201402_qanda_recommendation.pdf.
- Later this month, VRBPAC will announce its recommendations for the vaccine viruses to be included in the 2014-2015 influenza vaccines licensed for use in the United States.
- More information about selecting vaccine viruses for the seasonal flu vaccine is available on the CDC website at http://www.cdc.gov/flu/about/season/vaccine-selection.htm.