CDC Influenza Division Key Points
May 1, 2015

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Summary Key Messages

- This week's FluView (http://www.cdc.gov/flu/weekly/) report indicates that influenza activity is low in the United States.
- CDC posted an end-of-season spotlight on April 27, 2015 available at: http://www.cdc.gov/flu/news/2014-2015-flu-season-wrapup.htm.
- Antiviral drugs are a second line of defense against influenza and can be used to treat flu illness.
- CDC recommends that all hospitalized and high-risk patients (either hospitalized or outpatient) with suspected influenza should be treated as soon as possible with influenza antiviral medications without waiting for confirmatory influenza testing. For further guidance on the appropriate use of antiviral agents and dosing information, see CDC's Summary of Influenza Antiviral Treatment Recommendations for Clinician *(http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm)*.
- While antiviral drugs work best when given early, therapeutic benefit has been observed even when treatment is initiated later.

FluView Activity Update

- According to this week's FluView report, flu activity continues to decline and flu-like illness is below national baseline levels for the third week. However, three states (Connecticut, Massachusetts, and New York) continue to report widespread flu activity.
- Influenza B viruses now account for 89% of all influenza viruses reported. Influenza viruses circulate year-round, though at low levels in the summer in the United States.
- Below is a summary of the key flu indicators for the week ending April 25, 2015:
    - For the week ending April 25, the proportion of people seeing their health care provider *(http://www.cdc.gov/flu/weekly/index.htm#OISmap)* for influenza-like illness (ILI) remained at 1.4%, and is below the national baseline of 2.0% for the third week. However, two of 10 regions (Regions 1 and 8) reported ILI at or above region-specific baseline levels. ILI was above or at baseline for 20 weeks this season, making this the longest season in more than a decade. For the past 13 seasons, ILI has remained at or above the national baseline for between one and 19 weeks each season.

- New York City and 49 states experienced minimal ILI activity *(http://www.cdc.gov/flu/weekly/index.htm#ilimap)*. The District of Columbia and one state (Colorado) did not have sufficient data to calculate an activity level. Puerto Rico experienced low ILI activity. ILI activity data indicate the amount of flu-like illness that is occurring in each state.
- Widespread influenza activity was reported by three states (Connecticut, Massachusetts, and New York); the same states reported widespread flu activity during the previous week. Guam and nine states reported regional geographic influenza *(http://www.cdc.gov/flu/weekly/#S5)* activity. Local flu activity was reported by Puerto Rico and 14 states. Sporadic flu activity was reported by the District of Columbia, the U.S. Virgin Islands, and 21 states. Three states reported no influenza activity; an increase from two states during the previous week. Geographic spread data show how many areas within a state or territory are seeing flu activity.
- A total of 17,584 laboratory-confirmed influenza-associated hospitalizations *(http://www.cdc.gov/flu/weekly/#S6)* have been reported through the Influenza Hospitalization Surveillance Network (FluSurv-NET) since October 1, 2014. This translates to a cumulative overall rate of 64.3 hospitalizations per 100,000 population. This is higher than the cumulative overall hospitalization rate during 2012-2013, which was 43.9 per 100,000 people.
    - The hospitalization rate in people 65 years and older is 316.8 per 100,000, which is the highest hospitalization rate recorded since data collection on laboratory-confirmed influenza-associated hospitalization in adults began during the 2005-2006 season. This is the highest rate of any age group. Last week, the hospitalization rate in people 65 years and older was 313.8 per 100,000. Previously, the highest recorded hospitalization rate was 183.2 per 100,000, which was the cumulative hospitalization rate for people 65 years and older for the 2012-2013 season. (The 2012-2013 season was the last H3N2-predominant season.)
    - The hospitalization rate for children 0-4 years is 56.4 per 100,000 population. During the 2012-2013 season, the overall hospitalization rate for that age group was 67.0 per 100,000 cumulatively that season.
    - 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 *(http://www.cdc.gov/flu/weekly/index.htm#S2)* attributed to pneumonia and influenza (P&I) based on the 122 Cities Mortality Reporting System was 6.7%, and remains below the epidemic threshold of 6.9%. The percentage of P&I attributed deaths was at or above the epidemic

threshold for 12 consecutive weeks this season. The highest P&I percentage this season was 9.3% and occurred during week 2. During 2012-2013, P&I peaked at 9.9%. This is comparable to recorded percentages for past severe seasons, including the 2003-2004 season when P&I reached 10.4%.

- Five influenza-associated pediatric deaths *(http://www.cdc.gov/flu/weekly/index.htm#S3)* were reported to CDC during the week ending April 25.
  - Two deaths were associated with an influenza A (H3) virus and occurred during weeks 3 and 8 (the weeks ending January 24 and February 28, 2015, respectively). Three deaths were associated with an influenza B virus and occurred during weeks 10, 12, and 15 (the weeks ending March 14, March 28, and April 18, 2015, respectively).
  - A total of 133 influenza-associated pediatric deaths have been reported for the 2014-2015 season at this time.
- Nationally, the percentage of respiratory specimens *(http://www.cdc.gov/flu/weekly/index.htm#S1)* testing positive for influenza viruses in the United States during the week ending April 25 slightly decreased from 7.6% to 6.5%. For the most recent three weeks, the regional percentage of respiratory specimens testing positive for influenza viruses ranged from 4.2% to 14.6%.
- Influenza A (H3N2) viruses *(http://www.cdc.gov/flu/weekly/index.htm#whomap)* have predominated overall during the 2014-2015 flu season, accounting for more than 99% of all subtyped influenza A viruses. However influenza B viruses have accounted for the largest proportion of circulating viruses since early March. During week 16, 89% of all influenza positive specimens reported were influenza B viruses, and influenza B viruses predominated in all 10 regions. It is not uncommon for there to be a second wave of flu activity toward the end of the flu season with another seasonal influenza virus. Influenza A (H1N1) pdm09 viruses have been detected rarely this season.
- CDC has antigenically or genetically characterized *(http://www.cdc.gov/flu/professionals/laboratory/antigenic.htm)* 1,865 influenza viruses, including 49 influenza A (H1N1)pdm09, 1,220 influenza A (H3N2) viruses and 596 influenza B viruses, collected in the United States since October 1, 2014.
  - All 49 influenza A (H1N1)pdm09 viruses tested were 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.
  - 243 (19.9%) of the 1,220 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 977 (80.1%) influenza A (H3N2) viruses tested were different from A/Texas/50/2012. The majority of these 977 influenza A (H3N2) viruses were antigenically similar to A/Switzerland/9715293/2013, the influenza A (H3N2) component of the 2015 Southern Hemisphere influenza vaccine and 2015-2016 Northern Hemisphere influenza vaccine.
- 396 (97.3%) of the 407 B/Yamagata-lineage viruses were characterized as B/Massachusetts/2/2012-like, which is included as an influenza B component of the 2014-2015 Northern Hemisphere trivalent and quadrivalent influenza vaccines. Eleven (2.7%) of the B/Yamagata-lineage viruses tested showed reduced titers to B/Massachusetts/2/2012.
- 184 (97.4%) of the 189 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. Five (2.6%) of the B/Victoria-lineage viruses tested showed reduced titers to B/Brisbane/60/2008.

- Since October 1, 2014, CDC has tested 47 influenza A (H1N1)pdm09, 3,032 influenza A (H3N2), and 621 influenza B viruses for resistance to neuraminidase inhibitors (oseltamivir, zanamivir, and peramivir). While the vast majority of the viruses that have been tested are sensitive to oseltamivir, zanamivir, and peramivir, so far this season, one influenza A (H1N1)pdm09 virus showed resistance to oseltamivir and peramivir. (Because H1N1 viruses have been so rare this season, one virus accounts for 2.1% of the H1N1 viruses analyzed for antiviral resistance this season.)
  - Previously, the neuraminidase inhibitors oseltamivir and zanamivir were the only recommended influenza antiviral drugs *(http://www.cdc.gov/flu/antivirals/index.htm)*. On December 19, 2014, the U.S. Food and Drug Administration approved Rapivab (peramivir) *(http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm427755.htm)* to treat influenza infection in adults.
  - As in recent past seasons, high levels of resistance to the adamantanes (amantadine and rimantadine) continue to persist among influenza A (H1N1)pdm09 and influenza A (H3N2) viruses. Adamantanes are not effective against influenza B viruses.
- FluView *(http://www.cdc.gov/flu/weekly)* is available – and past issues are archived *(http://www.cdc.gov/flu/weekly/pastreports.htm)* – on CDC's website.

Note: Delays in reporting may mean that data changes over time. The most up to date data for all weeks during the 2014-2015 season can be found on the current FluView *(http://www.cdc.gov/flu/weekly)*.

2015-2016 Northern Hemisphere and U.S. Influenza Vaccine Composition

- Influenza viruses are always changing.
- The composition of the Northern Hemisphere seasonal influenza vaccine is reviewed annually and updated as needed to increase the likelihood that circulating influenza viruses and vaccine viruses will be similar during the upcoming season.
- Experts review global influenza laboratory and surveillance data and data on the candidate vaccine viruses that are available for vaccine production.
- The similarity between vaccine viruses and circulating influenza viruses is one important factor that contributes to how well the vaccine works.
- The World Health Organization (WHO) meets to make the vaccine composition recommendation for the entire Northern Hemisphere. The U.S. Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee (VRBPAC) convenes after the WHO meeting to make the recommendation for the vaccine composition for the United States.
- On February 25-26, 2015, international experts from CDC and other Collaborating Centers and Essential Regulatory Laboratories *(http://www.who.int/influenza/gisrs_laboratory/collaborating_centres/list/en/)*, such as FDA, gathered at the World Health Organization (WHO) Consultation and Information meeting *(http://www.who.int/influenza/vaccines/virus/recommendations/consultation201502/en/)* to review the data and recommend the vaccine composition for the upcoming Northern Hemisphere 2015-2016 influenza vaccine.
- WHO selected the following vaccine viruses:
    - an A/California/7/2009 (H1N1)pdm09-like virus, which is the same strain for the 2014-15 influenza vaccine
    - an A/Switzerland/9715293/2013 (H3N2)-like virus, which is a different strain from the 2014-15 influenza vaccine (but the same strain selected in September 2014 for the 2015 Southern Hemisphere vaccine)
    - a B/Phuket/3073/2013-like (B/Yamagata lineage) virus, which is a different strain from the 2014-15 influenza vaccine (but the same strain selected for the 2015 Southern Hemisphere vaccine)
    - WHO also recommended that quadrivalent vaccines with two influenza B viruses contain the above three viruses and a B/Brisbane/60/2008-like (B/Victoria

lineage) virus, which is the same strain recommended as a second influenza B strain for the 2014-2015 quadrivalent vaccines.

- On March 4, 2015 *(http://www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/BloodVaccinesandOtherBiologics/VaccinesandRelatedBiologicalProductsAdvisoryCommittee/ucm436058.htm)*, FDA's VRBPAC met and considered the recommendations made by the WHO regarding the composition of influenza virus vaccines for the upcoming influenza season (2015-2016) in the Northern Hemisphere. The committee reviewed the data gathered from the 2014-2015 strains of influenza viruses that are infecting humans, including data on how the strains are changing, and also reviewed disease trends in order to forecast which viruses are likely to circulate, and to formulate recommendations for the composition of the 2015-2016 influenza vaccine.
- FDA's VRBPAC reached consensus and concluded that the WHO-recommended influenza viruses should be used as the composition for the U.S. 2015-2016 influenza vaccines.
- The recommended *(http://www.who.int/influenza/vaccines/virus/recommendations/consultation201502/en/)* vaccine viruses for the 2015-2016 Northern Hemisphere and the United States influenza season are the same as those for the 2015 Southern Hemisphere influenza season *(http://www.who.int/influenza/vaccines/virus/candidates_reagents/2015_south/en/)*, but include two changes from the 2014-2015 U.S. influenza vaccine composition: the H3N2 virus, and one of the B virus components.
- With regard to the H1N1 vaccine component, a review of surveillance data showed that there has been little antigenic or genetic drift with circulating H1N1 viruses, and so the same influenza virus will be used for vaccine production.
- With regard to the H3N2 component of the vaccine, a review of surveillance data showed that there has been substantial genetic change and antigenic drift among circulating H3N2 viruses since A/Texas/50/2012 was selected as the 2014-2015 H3N2 vaccine component.
    - Multiple genetic groups of influenza A (H3N2) viruses are circulating globally.
    - Most (but not all) of circulating H3N2 viruses are antigenically similar to the influenza A (H3N2) virus selected for the 2015 Southern Hemisphere vaccine (A/Switzerland/9715293/2013).
    - The recommended H3N2 virus for the United States 2015-2016 vaccine is A/Switzerland/9715293/2013.
    - A/Switzerland/9715293/2013 is from a genetic group of H3N2 influenza viruses called "3C.3a".

  - Testing suggests A/Switzerland/9715293/2013 should protect against most (but not all) currently circulating H3N2 viruses.

- With regard to the influenza B component of the vaccine, a review of surveillance data showed that both lineages of influenza B viruses - B/Yamagata and B/Victoria - circulated globally this past year, with B/Yamagata viruses predominating.
- Among B/Yamagata-lineage viruses, data from global influenza surveillance show that an increasing percentage have been antigenically similar to B/Phuket/3073/2013, which is the recommended component for the 2015-2016 United States vaccine.
- More information is available on the FDA VRBPAC web site *(http://www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/BloodVaccinesandOtherBiologics/VaccinesandRelatedBiologicalProductsAdvisoryCommittee/ucm427602.htm)* and in a Question and Answer *(http://www.who.int/influenza/vaccines/virus/recommendations/201502_ganda_recommendation.pdf)* document posted on the WHO web site.

Influenza-Associated Pediatric Deaths

- Five influenza-associated pediatric deaths were reported to CDC this week.
- A total of 133 influenza-associated deaths have been reported during the 2014-2015 season.
- Because of confidentiality issues, CDC does not discuss or give details on individual pediatric death cases.
- Additional information regarding pediatric deaths is available through the Influenza-Associated Pediatric Mortality Surveillance System at http://gis.cdc.gov/GRASP/Fluview/PedFluDeath.html.
- A pediatric death is a death in a person who is a U.S. resident and younger than 18 years old resulting from a clinically compatible illness with influenza that is confirmed by an appropriate laboratory test.
- During the 2013-2014 influenza season, a total of 110 influenza-associated pediatric deaths were reported to CDC.
- A review of the available pediatric death reports from the 2013-2014 season indicates that:
  - Of the 106 deaths in which the child's medical history was known, 54% occurred in children who had underlying medical conditions that placed them at high risk of developing serious flu-associated complications. However, 46% had no recognized underlying health problems.
  - About 80% of pediatric deaths occurred in unvaccinated children.
  - These proportions 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 37 (2011-2012 season) to 171 (2012-2013 season).
- During the 2009 H1N1 pandemic — April 15, 2009 to October 2, 2010 — 358 pediatric deaths were reported to CDC.
- These deaths are a somber reminder of the danger flu poses to children.
- Typically, most flu-related pediatric deaths occur in children who have not been vaccinated against flu.
- Among children 6 months and older, 80% to 85% of flu-related pediatric deaths occur in children who have not been vaccinated.
- 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 neurologic, neuromuscular or neurodevelopmental disorder *(http://www.cdc.gov/flu/protect/neurologic-pediatric.htm)*; 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 collected through FluSurv-Net during the 2013-2014 flu season indicated that 50.3% 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 2014-2015 flu season is 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 2014-2015 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.