FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

2009-2010 Influenza Season
Week 43 ending October 31, 2009

All data are preliminary and may change as more reports are received.

Synopsis: During week 43 (October 25-31, 2009), influenza activity remained elevated in the U.S.

- 5,258 (37.2%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza.
- Over 99% of all subtyped influenza A viruses being reported to CDC were 2009 influenza A (H1N1) viruses.
- The proportion of deaths attributed to pneumonia and influenza (P&I) was above the epidemic threshold.
- Eighteen influenza-associated pediatric deaths were reported. Fifteen of these deaths were associated with 2009 influenza A (H1N1) virus infection and three were associated with an influenza A virus for which the subtype was undetermined.
- The proportion of outpatient visits for influenza-like illness (ILI) was above the national baseline. All 10 regions reported ILI above region-specific baseline levels.
- Forty-eight states reported geographically widespread influenza activity, two states reported regional influenza activity, the District of Columbia reported local influenza activity; Puerto Rico and Guam reported sporadic influenza activity, and the U.S. Virgin Islands did not report.

National and Regional Summary of Select Surveillance Components

	Data for current week			Data cumulative since August 30, 2009 (Week 35)*						
HHS Surveillance Regions**	Out-patient ILI†	% positive for flu‡	Number of jurisdictions reporting regional or widespread activity§	A (H1)	A (H3)	2009 A (H1N1)	A (unable to sub-type)¥	A (Subty-ping not perfor-med)	B	Pediatric Deaths
Nation	Elevated	37.2%	50 of 54	18	35	32,814	331	15,285	102	85
Region 1	Elevated	29.6%	6 of 6	5	2	867	5	138	7	0
Region 2	Elevated	21.6%	2 of 4	1	5	349	0	251	3	1
Region 3	Elevated	53.4%	5 of 6	1	6	6,494	17	815	10	6
Region 4	Elevated	20.8%	8 of 8	0	1	3,090	56	3,348	13	21
Region 5	Elevated	49.9%	6 of 6	4	15	5,119	81	861	10	6
Region 6	Elevated	20.4%	5 of 5	0	3	1,977	4	3,234	10	33
Region 7	Elevated	45.3%	4 of 4	4	1	2,677	136	743	8	1
Region 8	Elevated	40.7%	6 of 6	2	0	5,053	1	5,112	36	7
Region 9	Elevated	36.9%	4 of 5	0	1	5,438	23	677	3	6
Region 10	Elevated	33.1%	4 of 4	1	1	1,750	8	106	2	4

*Influenza season officially begins each year at week 40. This season data from week 35 will be included to show the trend of influenza activity before the official start of the 2009-10 influenza season.

**HHS regions (Region 1 CT, ME, MA, NH, RI, VT; Region 2: NJ, NY, Puerto Rico, US Virgin Islands; Region 3: DE, DC, MD, PA, VA, WV; Region 4: AL, FL, GA, KY, MS, NC, SC, TN; Region 5: IL, IN, MI, MN, OH, WI; Region 6: AR, LA, NM, OK, TX; Region 7: IA, KS, MO, NE; Region 8: CO, MT, ND, SD, UT, WY; Region 9: AZ, CA, Guam, HI, NV; and Region 10: AK, ID, OR, WA).

† Elevated means the % of visits for ILI is at or above the national or region-specific baseline.

‡ National data are for current week; regional data are for the most recent three weeks.

§ Includes all 50 states, the District of Columbia, Guam, Puerto Rico, and U.S. Virgin Islands.

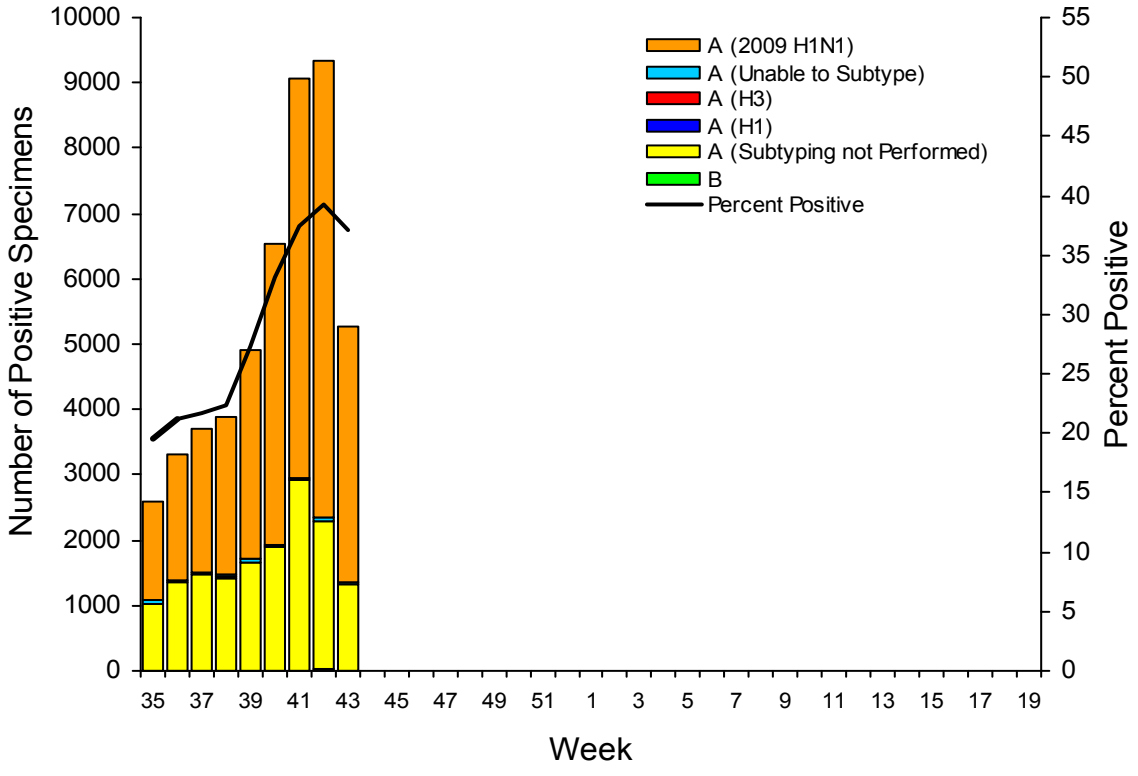
¥ The majority of influenza A viruses that cannot be sub-typed as seasonal influenza viruses are 2009 A (H1N1) influenza viruses upon further testing.

U.S. Virologic Surveillance: WHO and NREVSS collaborating laboratories located in all 50 states and Washington D.C., report to CDC the number of respiratory specimens tested for influenza and the number positive by influenza type and subtype. The results of tests performed during the current week are summarized in the table below.

	Week 43
No. of specimens tested	14,151
No. of positive specimens (%)	5,258 (37.2%)
Positive specimens by type/subtype	
Influenza A	5,244 (99.7%)
A (2009 H1N1)	3,889 (74.2%)
A (subtyping not performed)	1,310 (25.0%)
A (unable to subtype)	41 (0.8%)
A (H3)	2 (0.0%)
A (H1)	2 (0.0%)
Influenza B	14 (0.3%)

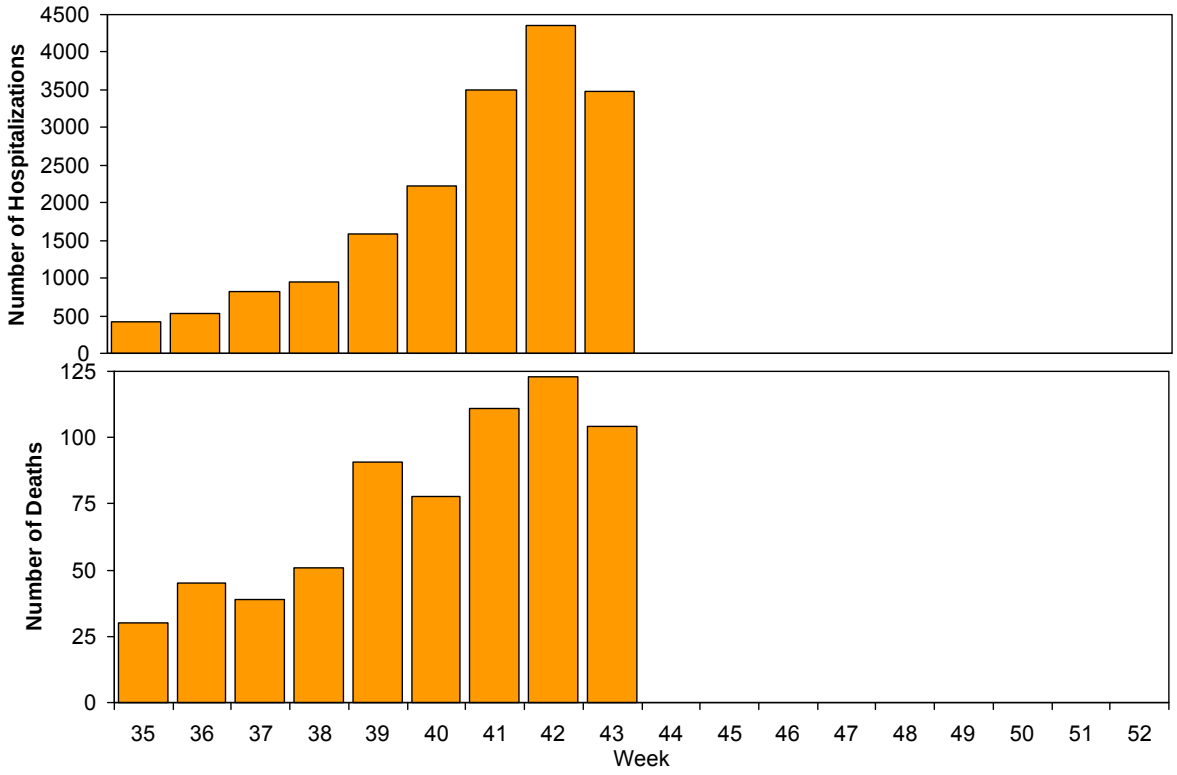
During week 43, seasonal influenza A (H1), A (H3), and B viruses co-circulated at low levels with 2009 influenza A (H1N1) viruses. Over 99% of all subtyped influenza A viruses reported to CDC this week were 2009 influenza A (H1N1) viruses.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, August 30-October 31, 2009



Pneumonia and Influenza Hospitalization and Death Tracking: This new system was implemented on August 30, 2009, and replaces the weekly report of laboratory confirmed 2009 H1N1-related hospitalizations and deaths that began in April 2009. Jurisdictions can now report to CDC counts of hospitalizations and deaths resulting from all types or subtypes of influenza, not just those from 2009 H1N1 influenza virus. To allow jurisdictions to implement the new case definition, counts were reset to zero on August 30, 2009. From August 30 – October 31, 2009, 17,838 laboratory-confirmed influenza associated hospitalizations and 672 laboratory-confirmed influenza associated deaths were reported to CDC. CDC will continue to use its traditional surveillance systems to track the progress of the 2009-10 influenza season.

Weekly Laboratory-Confirmed Influenza-Associated Hospitalizations and Deaths, National Summary, August 30 – October 31, 2009



Antigenic Characterization: CDC has antigenically characterized one seasonal A (H1N1), two A (H3N2) and 239 2009 influenza A (H1N1) viruses collected since September 1, 2009.

One seasonal influenza A (H1N1) virus was tested and is related to the influenza A (H1N1) component of the 2009-10 Northern Hemisphere influenza vaccine (A/Brisbane/59/2007).

Both influenza A (H3N2) viruses tested showed reduced titers with antisera produced against A/Brisbane/10/2007, the 2009-2010 Northern Hemisphere influenza A (H3N2) vaccine component, and were antigenically related to A/Perth/16/2009, the WHO recommended influenza A (H3N2) component of the 2010 Southern Hemisphere vaccine formulation.

Two hundred thirty-eight (99.6%) of 239 2009 influenza A (H1N1) viruses tested are related to the A/California/07/2009 (H1N1) reference virus selected by WHO as the 2009 H1N1 vaccine virus and one virus (0.4%) tested showed reduced titers with antisera produced against A/California/07/2009.

Annual influenza vaccination is expected to provide the best protection against those virus strains that are related to the vaccine strains, but limited to no protection may be expected when the vaccine and circulating virus strains are so differenct as to be from different lineages. Antigenic characterization of 2009 influenza A(H1N1) viruses indicates that these viruses are only distantly related antigenically and genetically to seasonal influenza A(H1N1) viruses, suggesting that little to no protection would be expected from vaccination with seasonal influenza vaccine. It is too early in the influenza season to determine if seasonal influenza viruses will circulate widely or how well the vaccine and circulating strains will match.

Antiviral Resistance: Since September 1, 2009, 256 2009 influenza A (H1N1) virus isolates have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir), and 628 2009 influenza A (H1N1) original clinical samples were tested for a single known mutation in the virus that confers oseltamivir resistance. In addition, one influenza A (H3N2) and 152 influenza A (H1N1) virus isolates have been tested for resistance to the adamantanes (amantadine and rimantadine). Additional laboratories perform antiviral testing and report their results to CDC. The results of antiviral resistance testing performed on these viruses are summarized in the table below.

Antiviral Resistance Testing Results on Samples Collected Since September 1, 2009.

	Viruses tested (n)	Resistant Viruses, Number (%) Oseltamivir	Viruses tested (n)	Resistant Viruses, Number (%) Zanamivir	Isolates tested (n)	Resistant Viruses, Number (%) Adamantanes
Seasonal Influenza A (H1N1)	0	0 (0)	0	0 (0)	0	0 (0)
Influenza A (H3N2)	0	0 (0)	0	0 (0)	1	1 (100)
Influenza B	0	0 (0)	0	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	884	2†‡ (0.2)	256	0 (0)	152	152 (100)

*The adamantanes (amantadine and rimantadine) are not effective against influenza B viruses.
†Two screening tools were used to determine oseltamivir resistance: sequence analysis of viral genes and a neuraminidase inhibition assay.
‡ Additional laboratories perform antiviral resistance testing and report their results to CDC. Two additional oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified by these laboratories since September 1, 2009, bringing the total number to 4. One previously reported case was reclassified after additional testing did not confirm oseltamivir resistance.

Over 99% of the subtyped influenza A viruses reported during week 43 were 2009 influenza A (H1N1) viruses, and all 2009 H1N1 viruses tested since April 2009 have been resistant to the adamantanes (amantadine and rimantadine).

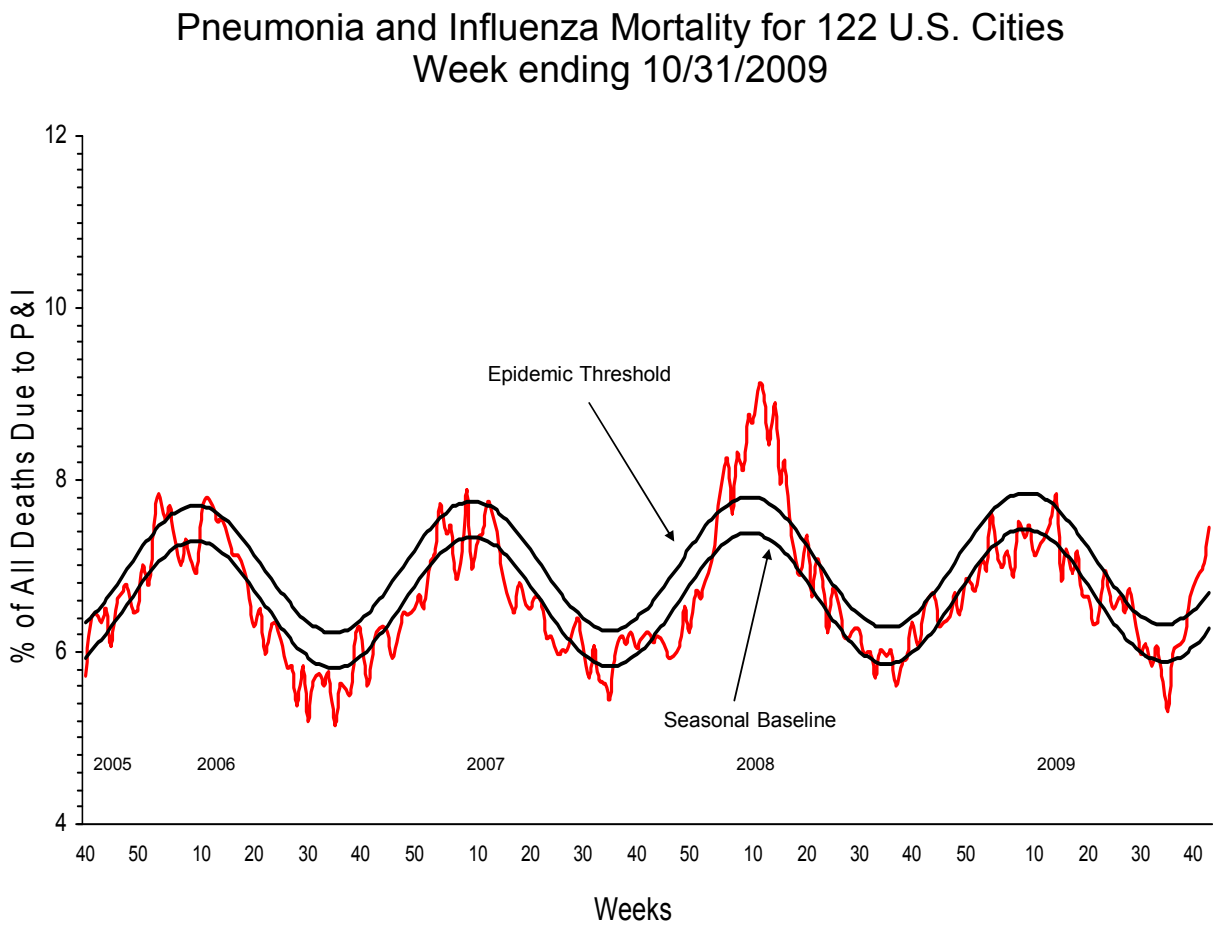
Antiviral treatment with oseltamivir or zanamivir is recommended for all patients with confirmed or suspected influenza virus infection who are hospitalized or who are at higher risk for influenza complications. Additional information on antiviral recommendations for treatment and chemoprophylaxis of influenza virus infection is available at http://www.cdc.gov/H1N1flu/recommendations.htm.

2009 influenza A (H1N1) viruses were tested for oseltamivir resistance by a neuraminidase inhibition assay and/or detection of genetic sequence mutation, depending on the type of specimen tested. Original clinical samples were examined for a single known mutation in the virus that confers oseltamivir resistance in currently circulating seasonal influenza A (H1N1) viruses, while influenza virus isolates were tested using a neuraminidase inhibition assay that determines the presence or absence of neuraminidase inhibitor resistance, followed by the neuraminidase gene sequence analysis of resistant viruses.

The majority of 2009 influenza A (H1N1) viruses are susceptible to the neuraminidase inhibitor antiviral medication oseltamivir; however, rare sporadic cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been detected worldwide. Since September 1, 2009, four cases have been identified in the United States, and a total of 14 cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified in the United States since April 2009 (11 viruses identified by CDC and three viruses identified by additional laboratories). The 14 total cases include a new case detected from a specimen collected before September 1, 2009, and one previously reported case was reclassified after additional testing did not confirm oseltamivir resistance. All tested viruses retain their sensitivity to the neuraminidase inhibitor zanamivir. Twelve patients (including 10 of the viruses detected at CDC and two viruses identified by the additional laboratories) had documented exposure to oseltamivir through either treatment or chemoprophylaxis, one patient is under investigation to determine exposure to oseltamivir, and one patient had no documented oseltamivir exposure. Occasional development of oseltamivir resistance during treatment or prophylaxis is not unexpected. Enhanced surveillance is expected to detect additional cases of oseltamivir resistant 2009 influenza A (H1N1) viruses, and such cases will be investigated to assess the spread of resistant strains in the community.

To prevent the spread of antiviral resistant virus strains, CDC reminds clinicians and the public of the need to continue hand and cough hygiene measures for the duration of any symptoms of influenza, even while taking antiviral medications (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5832a3.htm).

Pneumonia and Influenza (P&I) Mortality Surveillance: During week 43, 7.4% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was above the epidemic threshold of 6.7% for week 43. Including week 43, P&I mortality has been above threshold for five consecutive weeks.

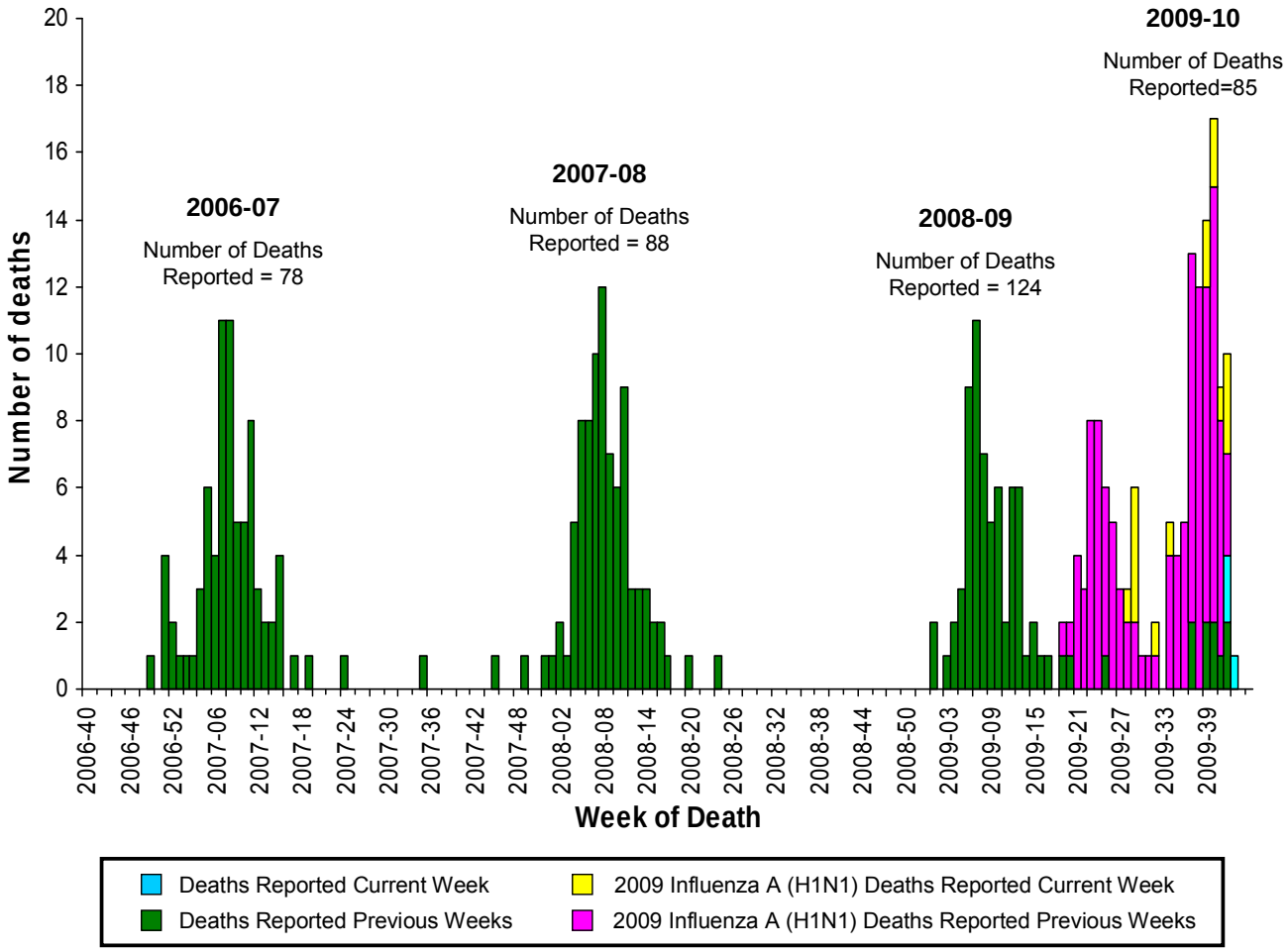


Influenza-Associated Pediatric Mortality: Eighteen influenza-associated pediatric deaths were reported to CDC during week 43 (California [8], Indiana, Louisiana [2], Mississippi, New York, Oklahoma, Texas [2], Virginia, and West Virginia). Fifteen of these deaths were associated with 2009 influenza A (H1N1) virus infection and three were associated with an influenza A virus for which the subtype is undetermined. These deaths occurred between July 12 and October 31, 2009. Seven deaths reported during week 43 occurred during the 2008-09 season, bringing the total number of reported pediatric deaths occurring during that season to 124. Since August 30, 2009, CDC has received 85 reports of influenza-associated pediatric deaths that occurred during the current influenza season (12 deaths in children less than 2 years old, nine deaths in children 2-4 years old, 30 deaths in children 5-11 years old, and 34 deaths in individuals 12-17 years old). Seventy-three of the 85 deaths were due to 2009 influenza A (H1N1) virus infections, and the remaining 12 were associated with influenza A virus for which the subtype is undetermined. A total of 129 deaths in children associated with 2009 influenza A (H1N1) virus infection have been reported to CDC.

Among the 85 deaths in children, 53 children had specimens collected for bacterial culture from normally sterile sites and 17 (32.1%) of the 53 were positive; *Staphylococcus aureus* was identified

in eight (47.1%) of the 17 children. One *S. aureus* isolate was sensitive to methicillin, six were methicillin resistant, and one did not have sensitivity testing performed. Twelve (70.6%) of the 17 children with bacterial coinfections were five years of age or older, and five (29.4%) of the 17 children were 12 years of age or older.

Number of Influenza-Associated Pediatric Deaths by Week of Death: 2006-07 season to present

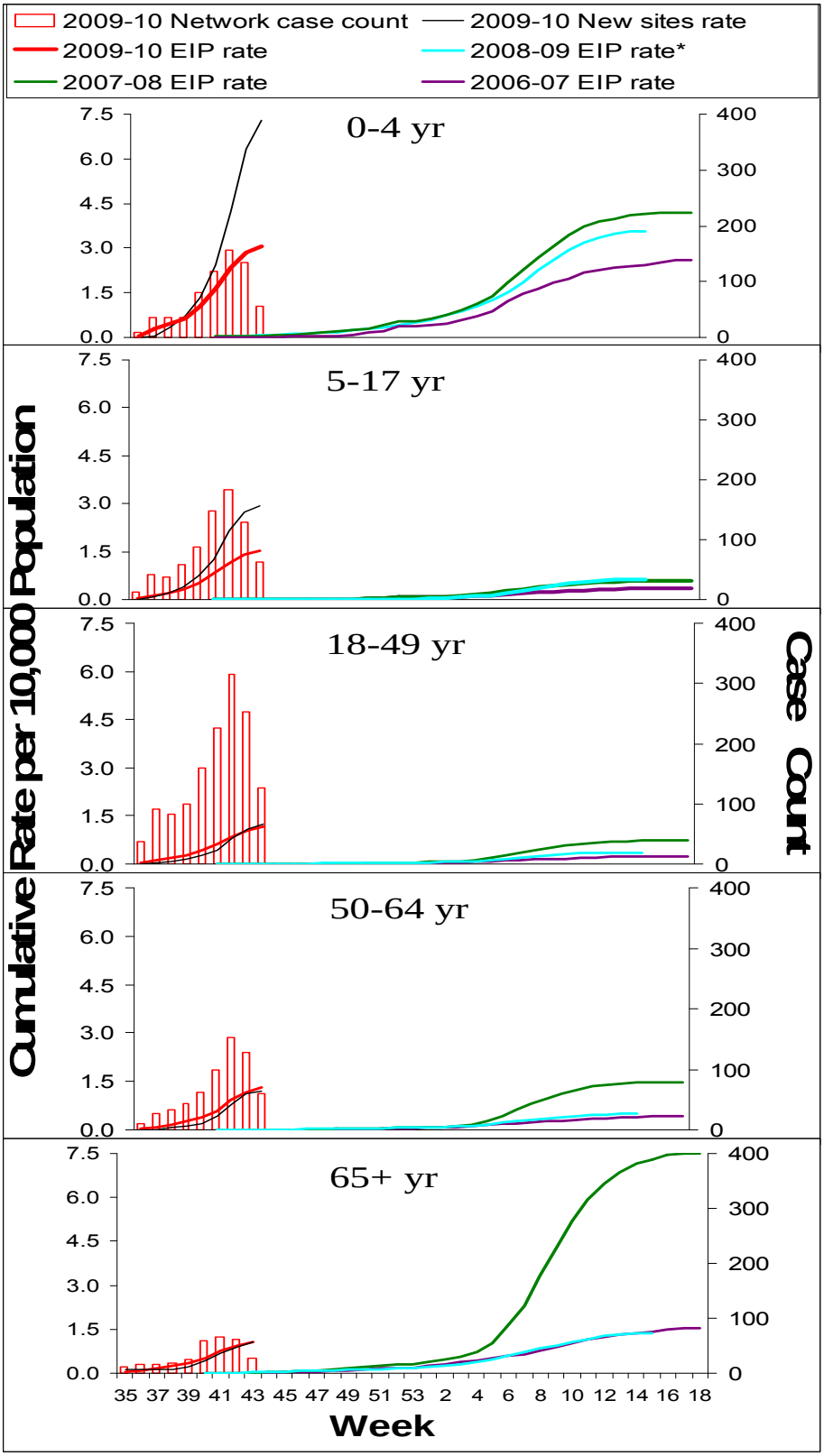


Influenza-Associated Hospitalizations: Laboratory-confirmed influenza-associated hospitalizations are monitored using a population-based surveillance network that includes the 10 Emerging Infections Program (EIP) sites (CA, CO, CT, GA, MD, MN, NM, NY, OR and TN) and 6 new sites (IA, ID, MI, ND, OK and SD).

During September 1, 2009 – October 31, 2009, the following preliminary laboratory-confirmed overall influenza associated hospitalization rates were reported by EIP and the new sites *(rates include influenza A, influenza B, and 2009 influenza A (H1N1)):*

Rates [EIP (new sites)] for children aged 0-4 years and 5-17 years were 3.1 (7.3) and 1.5 (2.9) per 10,000, respectively. Rates [EIP (new sites)] for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 1.2 (1.2), 1.3 (1.2) and 1.0 (1.1) per 10,000, respectively.

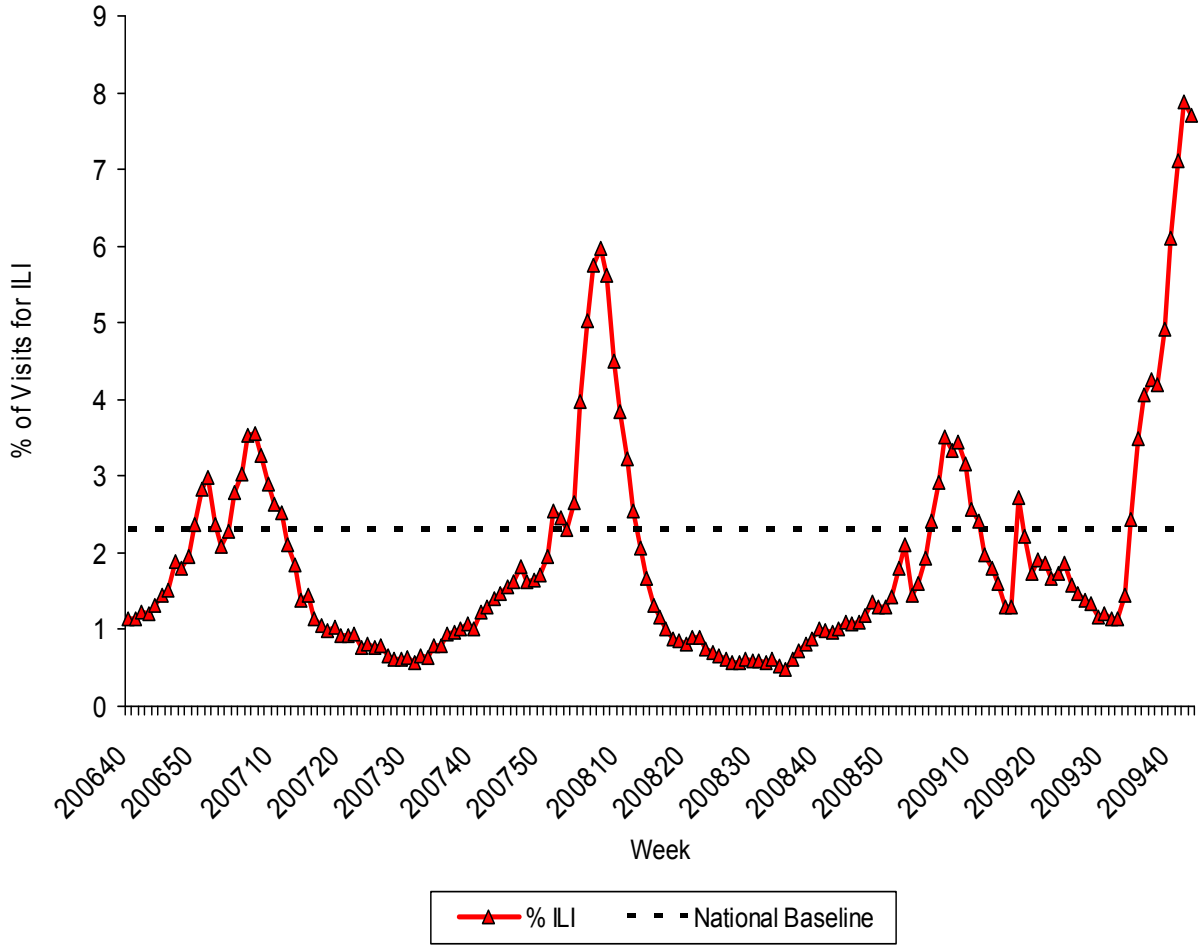
EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates, 2009-10 and Previous Three Seasons*



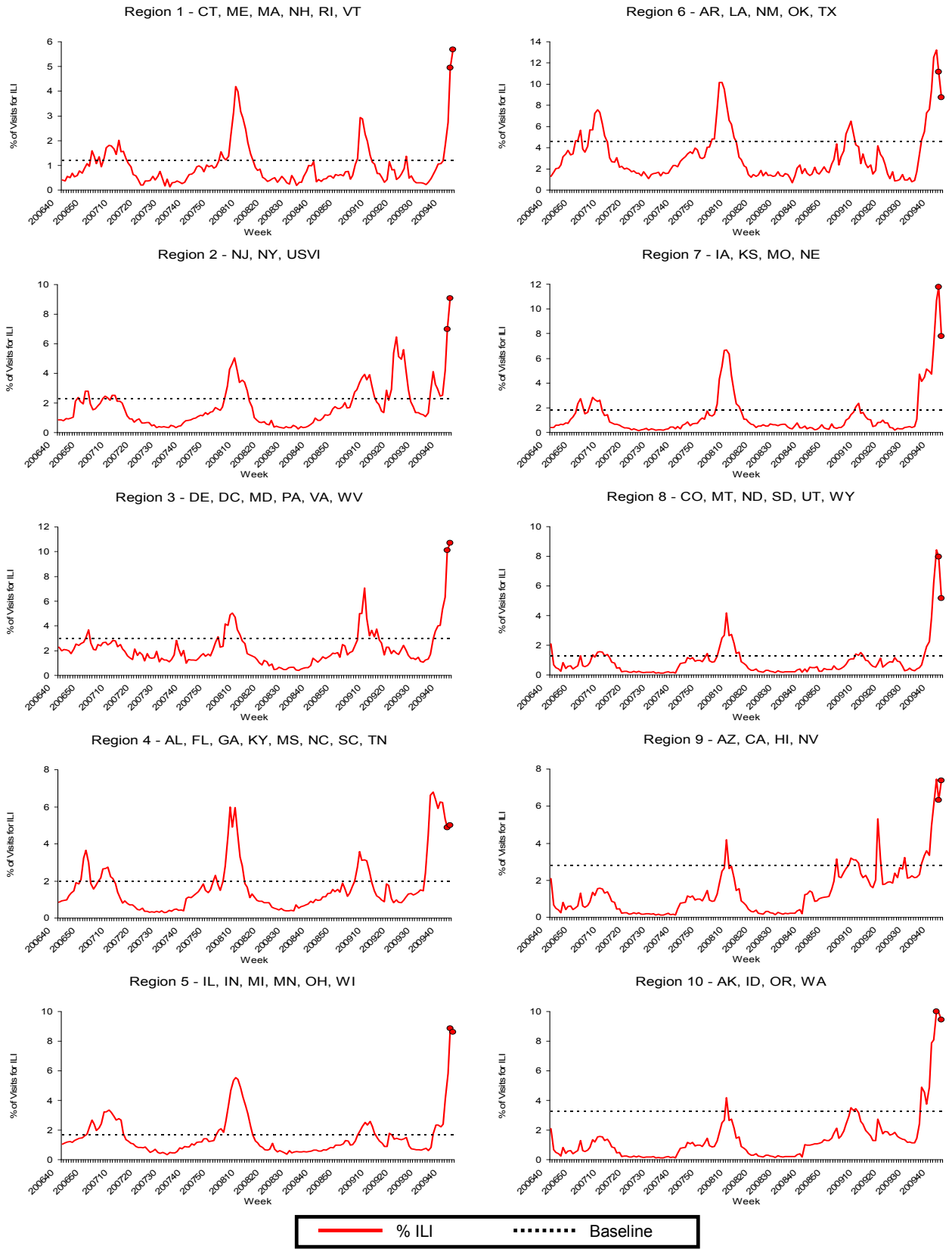
* The 2008-09 EIP rate ended as of April 14, 2009 due to the onset of the 2009H1N1 season.

Outpatient Illness Surveillance: Nationwide during week 43, 7.7% of patient visits reported through the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) were due to influenza-like illness (ILI). This percentage is above the national baseline of 2.3%.

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, October 1, 2006 - October 31, 2009



On a regional level, the percentage of outpatient visits for ILI ranged from 5.0% to 10.7% during week 43, and decreased in five of the 10 surveillance regions compared to the previous week. All 10 regions reported a proportion of outpatient visits for ILI above their region-specific baseline levels.

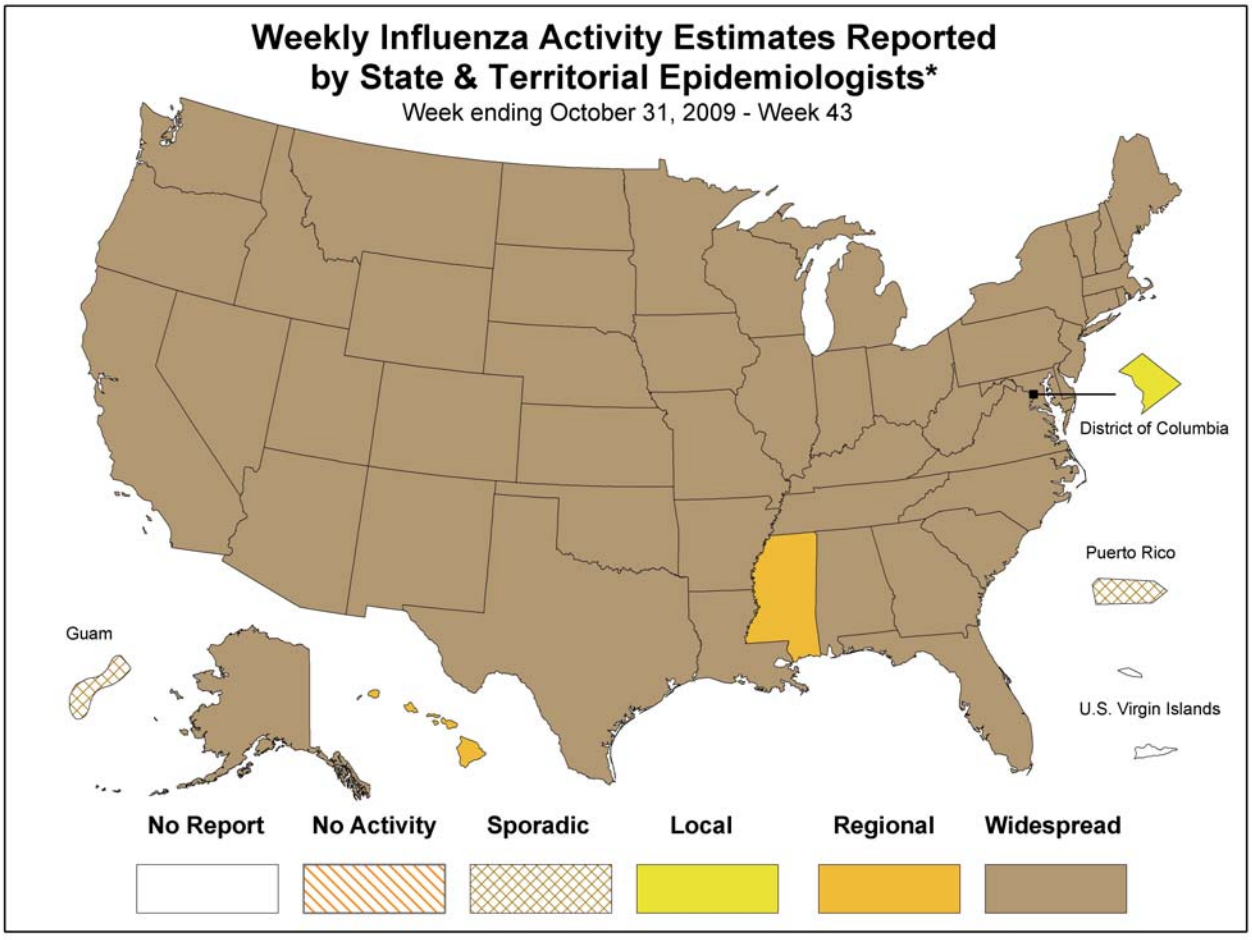


NOTE: Scales differ between regions

Geographic Spread of Influenza as Assessed by State and Territorial Epidemiologists: The influenza activity reported by state and territorial epidemiologists indicates geographic spread of both seasonal influenza and 2009 influenza A (H1N1) viruses and does not measure the severity of influenza activity.

During week 43, the following influenza activity was reported:

- Widespread influenza activity was reported by 48 states (Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming).
- Regional influenza activity was reported by two states (Hawaii and Mississippi).
- Local influenza activity was reported by the District of Columbia.
- Sporadic influenza activity was reported by Puerto Rico and Guam.
- The U.S. Virgin Islands did not report.



* This map indicates geographic spread & does not measure the severity of influenza activity

A description of surveillance methods is available at: http://www.cdc.gov/flu/weekly/fluactivity.htm

Report prepared: November 6, 2009.