FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

2009-2010 Influenza Season
Week 10 ending March 13, 2010

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

Synopsis: During week 10 (March 7-13, 2010), influenza activity remained at approximately the same levels as last week in the U.S.

- 200 (5.6%) 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.
- All subtyped influenza A viruses reported to CDC were 2009 influenza A (H1N1) viruses.
- The proportion of deaths attributed to pneumonia and influenza (P&I) was below the epidemic threshold.
- Two influenza-associated pediatric deaths were reported. One death was associated with 2009 influenza A (H1N1) virus infection and one death was associated with an influenza A virus for which the subtype was undetermined.
- The proportion of outpatient visits for influenza-like illness (ILI) was 1.8%, which is below the national baseline of 2.3%. One of 10 regions (Region 4) reported ILI above its region-specific baseline level.
- No states reported widespread influenza activity. Three states reported regional influenza activity. Puerto Rico and eight states reported local influenza activity. The District of Columbia, Guam and 31 states reported sporadic influenza activity. Eight states reported no 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	Normal	5.6%	3 of 54	34	62	65,424	289	22,064	277	267
Region 1	Normal	2.3%	0 of 6	4	4	3,398	14	502	11	6
Region 2	Normal	1.5%	0 of 4	8	5	1,789	0	2,391	12	18
Region 3	Normal	1.6%	0 of 6	3	10	10,680	48	1,450	18	14
Region 4	Elevated	15.4%	3 of 8	0	7	9,238	95	4,518	82	50
Region 5	Normal	3.1%	0 of 6	8	25	9,450	47	1,575	19	36
Region 6	Normal	4.4%	0 of 5	2	3	4,883	19	5,324	50	71
Region 7	Normal	5.9%	0 of 4	3	1	3,221	3	836	9	8
Region 8	Normal	1.0%	0 of 6	4	2	9,837	0	3,930	56	16
Region 9	Normal	0.7%	0 of 5	0	4	8,325	49	1,214	17	38
Region 10	Normal	0.7%	0 of 4	2	1	4,603	14	324	3	10

*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). Use of the national baseline for regional data or regional baselines for state data is not appropriate.

† 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.

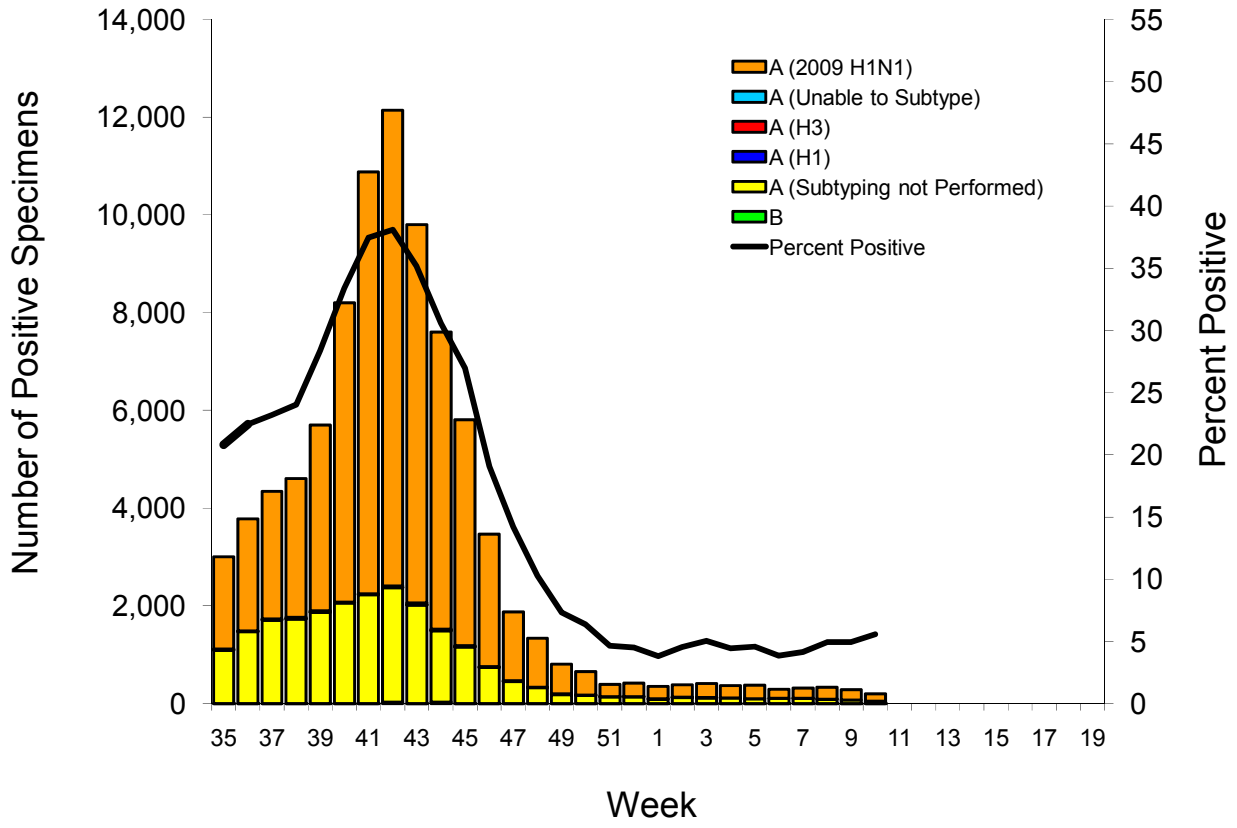
¥ Subtyping results for the majority of specimens in this category were inconclusive because of low virus titers.

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 10
No. of specimens tested	3,582
No. of positive specimens (%)	200 (5.6%)
Positive specimens by type/subtype	
Influenza A	197 (98.5%)
A (2009 H1N1)	148 (75.1%)
A (subtyping not performed)	49 (24.9%)
A (unable to subtype)	0 (0.0%)
A (H3)	0 (0.0%)
A (H1)	0 (0.0%)
Influenza B	3 (1.5%)

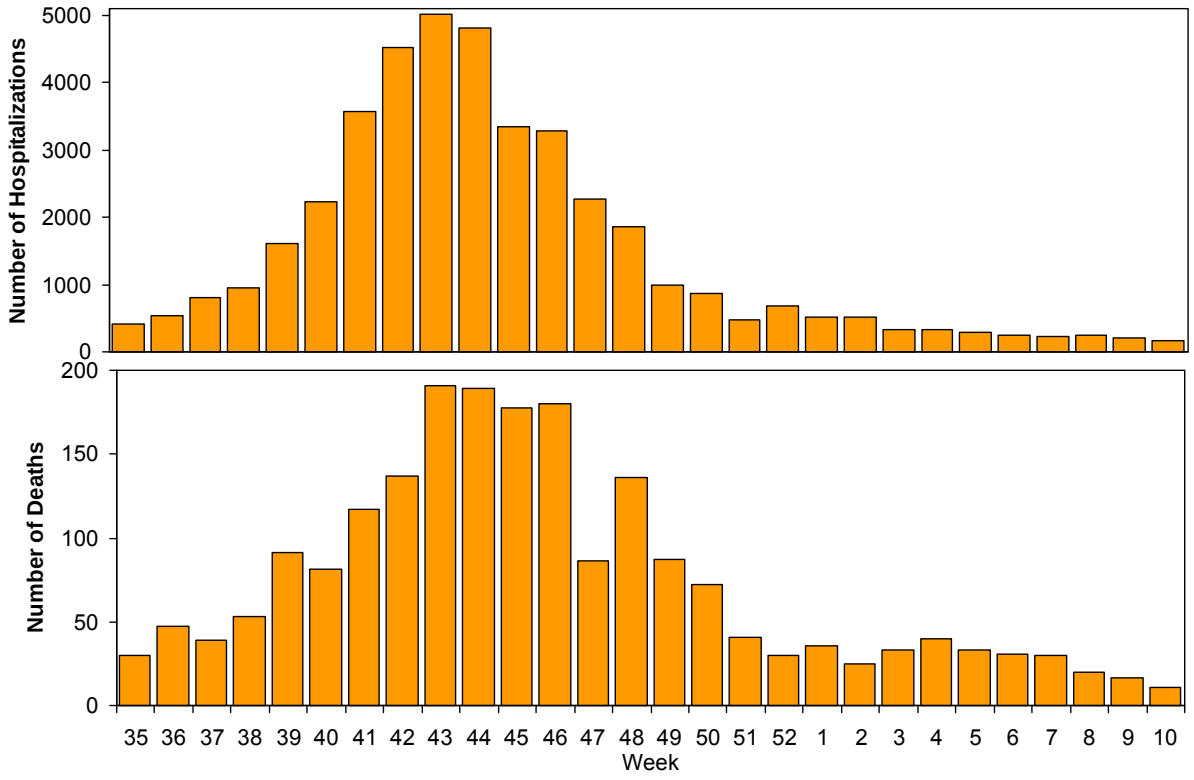
During week 10, three influenza B viruses were reported and all subtyped influenza A viruses reported to CDC this week were 2009 influenza A (H1N1) viruses.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, August 30, 2009-March 13, 2010



Pneumonia and Influenza Hospitalization and Death Tracking: The Aggregate Hospitalization and Death Reporting Activity (AHDRA) 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 report to CDC the number of hospitalizations and deaths resulting from all types or subtypes of influenza, not just those associated with 2009 H1N1. Counts were reset to zero on August 30, 2009. From August 30, 2009 – March 13, 2010, 41,322 laboratory-confirmed influenza-associated hospitalizations and 2,061 laboratory-confirmed influenza-associated deaths were reported to CDC.

Weekly Laboratory-Confirmed Influenza-Associated Hospitalizations and Deaths Reported to AHDRA, National Summary, August 30, 2009 – March 13, 2010



Antigenic Characterization: CDC has antigenically characterized two seasonal influenza A (H1N1), 12 influenza A (H3N2), 22 influenza B, and 1,585 2009 influenza A (H1N1) viruses collected since September 1, 2009.

Both seasonal influenza A (H1N1) viruses tested were related to the influenza A (H1N1) component of the 2009-10 Northern Hemisphere influenza vaccine (A/Brisbane/59/2007).

The 12 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 and 2010-11 Northern Hemisphere vaccine formulations.

Influenza B viruses currently circulating globally can be divided into two distinct lineages represented by the B/Yamagata/16/88 and B/Victoria/02/87 viruses. The influenza B component of the 2009-10 and 2010-11 Northern Hemisphere vaccines belongs to the B/Victoria lineage. The 22 influenza B viruses tested belong to the B/Victoria lineage and are related to the influenza vaccine component for the 2009-10 and 2010-11 Northern Hemisphere influenza B vaccine strain (B/Brisbane/60/2008).

One thousand five hundred eighty (99.7%) of 1,585 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 as a component in the 2010-11 Northern Hemisphere vaccine. Five viruses (0.3%) tested showed reduced titers with antiserum 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 different 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.

Composition of the 2010-11 Influenza Vaccine: WHO has recommended vaccine strains for the 2010-11 Northern Hemisphere trivalent influenza vaccine, and FDA has made the same recommendations for the U.S. influenza vaccine. Both agencies recommend that the vaccine contain A/California/7/2009-like (2009 H1N1), A/Perth/16/2009-like (H3N2), and B/Brisbane/60/2008-like (B/Victoria lineage) viruses. A seasonal influenza A (H1N1) component is not included in the 2010-11 formulation and the A (H3N2) component has been changed from the 2009-10 Northern Hemisphere vaccine formulation. This recommendation was based on surveillance data related to epidemiology and antigenic characteristics, serological responses to 2009-10 trivalent seasonal and 2009 H1N1 monovalent vaccines, and the availability of candidate strains and reagents.

Antiviral Resistance: Since September 1, 2009, one seasonal influenza A (H1N1), 12 influenza A (H3N2), 17 influenza B, and 1,495 2009 influenza A (H1N1) virus isolates have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir), and 2,554 2009 influenza A (H1N1) original clinical samples were tested for a single known mutation in the virus that confers oseltamivir resistance. In addition, one seasonal influenza A (H1N1), 12 influenza A (H3N2), and 1,549 2009 influenza A (H1N1) virus isolates have been tested for resistance to the adamantanes (amantadine and rimantadine). The results of antiviral resistance testing performed on these viruses are summarized in the table below. Additional laboratories perform antiviral testing and report their results to CDC, and positive results from that testing are included in the footnote.

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)	1	1 (100.0)	0	0 (0)	1	0 (0)
Influenza A (H3N2)	12	0 (0)	0	0 (0)	12	12 (100.0)
Influenza B	17	0 (0)	0	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	4,049	49†‡ (1.2)	1,495	0 (0)	1,549	1,545 (99.7)

*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. Three additional oseltamivir resistant 2009 influenza A (H1N1) virus has been identified by these laboratories since September 1, 2009, bringing the total number to 52.

All subtyped influenza A viruses reported during week 10 were 2009 influenza A (H1N1) viruses, and nearly all of 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, are at higher risk for influenza complications, or who have lower respiratory tract or progressive disease. Additional information on antiviral recommendations for treatment and chemoprophylaxis of influenza virus infection is available at http://www.cdc.gov/H1N1flu/recommendations.htm.

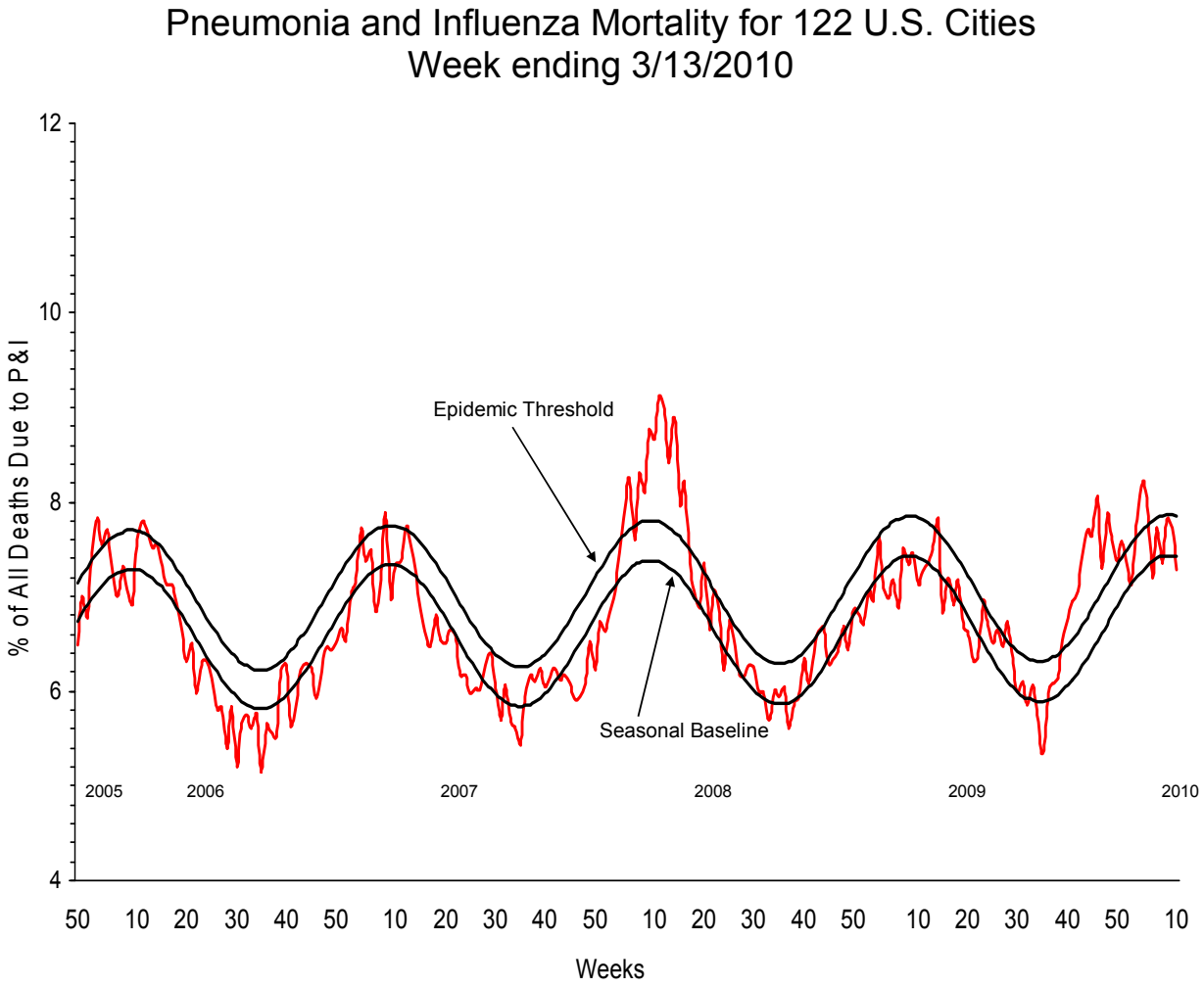
2009 influenza A (H1N1) viruses were tested for oseltamivir resistance by a neuraminidase inhibition assay and/or detection of genetic sequence mutation, depending on the type of specimen tested. Original clinical samples were examined for a single known mutation in the virus that confers oseltamivir 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 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. A total of 61 cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified in the United States since April 2009. No cases have been newly identified since last week. Fifty-two of these specimens were collected after September 1, 2009. The proportion of oseltamivir-resistant 2009 H1N1 viruses does

not represent the prevalence of oseltamivir-resistant 2009 H1N1 in the U.S. Most cases were tested because drug resistance was suspected. All tested viruses retain their sensitivity to the neuraminidase inhibitor zanamivir. Of the 61 total cases identified since April 2009, 49 patients had documented exposure to oseltamivir through either treatment or chemoprophylaxis, eight patients are under investigation to determine exposure to oseltamivir, three patients had no documented oseltamivir exposure, and in one patient exposure cannot be determined. Occasional development of oseltamivir resistance during treatment or prophylaxis is not unexpected. Enhanced surveillance, an increased availability of testing performed at CDC, and an increasing number of public health and other clinical laboratories performing antiviral resistance testing increase the number of cases of oseltamivir resistant 2009 influenza A (H1N1) viruses detected. All cases are 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 10, 7.3% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was below the epidemic threshold of 7.9% for week 10.



Influenza-Associated Pediatric Mortality: Two influenza-associated pediatric deaths were reported to CDC during week 10 (Oklahoma and Texas). One death was associated with 2009 influenza A (H1N1) virus infection and one death was associated with an influenza A virus for which the subtype was undetermined. The deaths reported during week 10 occurred January 31 and February 27, 2010.

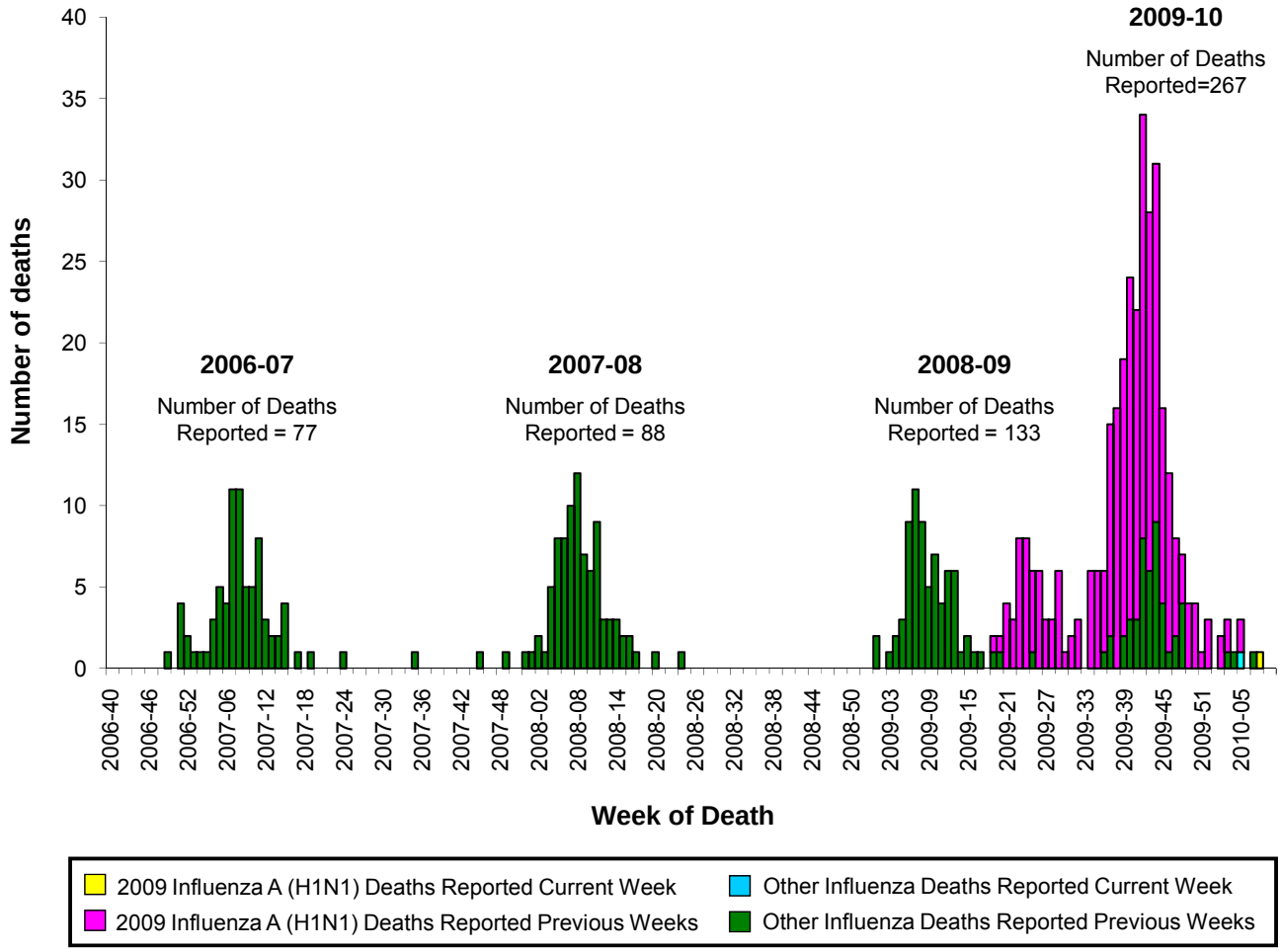
Since August 30, 2009, CDC has received 267 reports of influenza-associated pediatric deaths that occurred during the current influenza season (48 deaths in children less than 2 years old, 30 deaths in children 2-4 years old, 99 deaths in children 5-11 years old, and 90 deaths in children 12-17 years old). Two hundred eighteen (82%) of the 267 deaths were due to 2009 influenza A (H1N1) virus infections, 48 were associated with an influenza A virus for which the subtype is undetermined, and one was associated with an influenza B virus infection. A total of 278 deaths in children associated with 2009 influenza A (H1N1) virus infection have been reported to CDC.

Among the 267 deaths in children, 141 children had specimens collected for bacterial culture from normally sterile sites and 49 (34.8%) of the 141 were positive; *Streptococcus pneumoniae* was identified in 11 (22.4%) of the 49 children and *Staphylococcus aureus* was identified in 14 (28.6%) of the 49 children. Four *S. aureus* isolates were sensitive to methicillin, nine were methicillin resistant, and one did not have sensitivity testing performed. Thirty-two (65.3%) of the 49 children with bacterial coinfections were five years of age or older, and 17 (34.7%) of the 49 children were 12 years of age or older.

Laboratory-Confirmed Influenza-Associated Pediatric Deaths by Date and Type/Subtype of Influenza.

Date	2009 H1N1 Influenza	Influenza A-Subtype Unknown	Seasonal Influenza	Total
Number of Deaths REPORTED for Current Week – Week 10 (Week ending March 13, 2010)	1	1	0	2
Number of Deaths OCCURRED since August 30, 2009	218	48	1	267
Number of Deaths OCCURRED since April 26, 2009	278	51	2	331

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

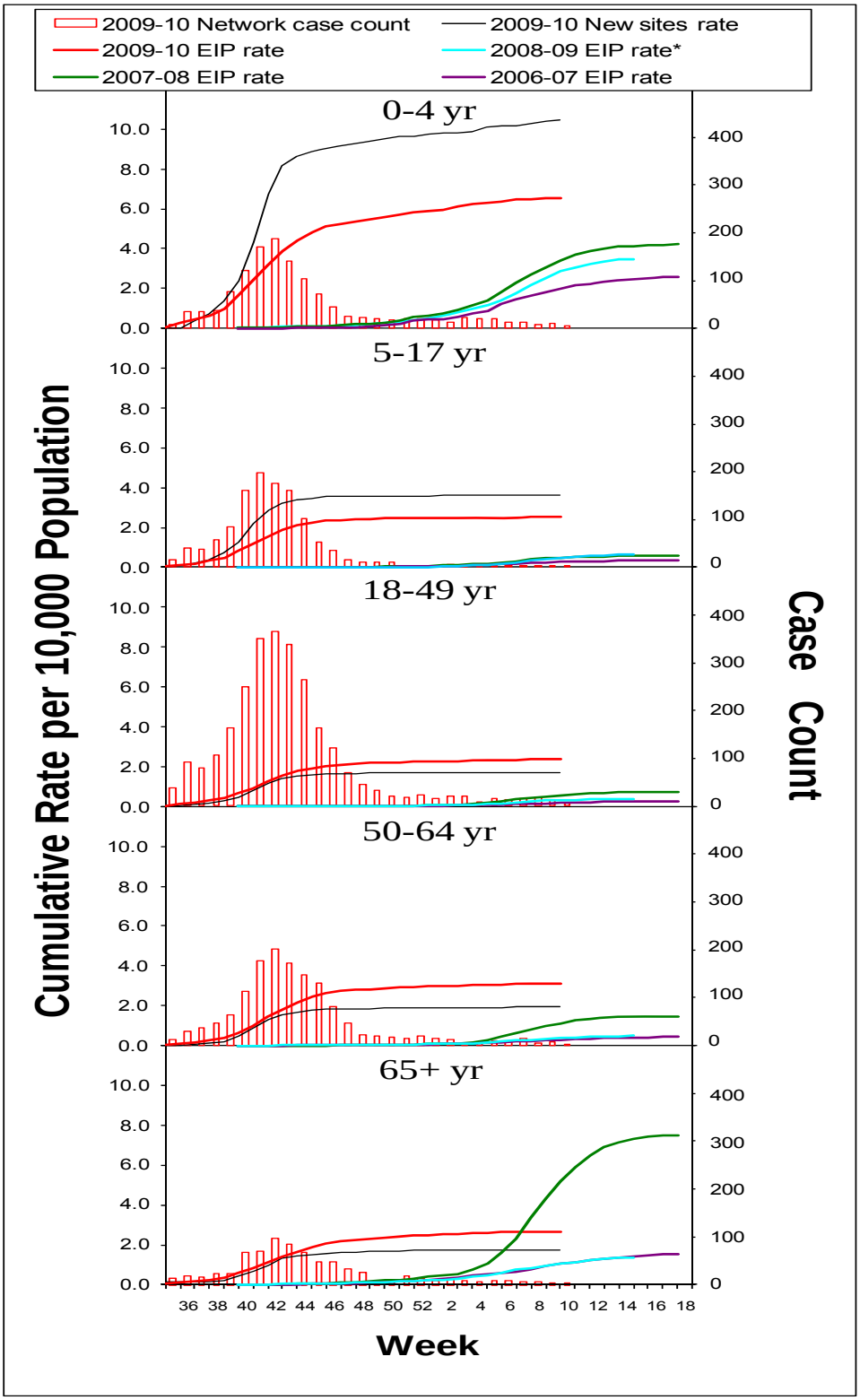


Influenza-Associated Hospitalizations: Laboratory-confirmed influenza-associated hospitalizations are monitored using a population-based surveillance network that includes the 10 Emerging Infections Program (EIP) sites (CA, CO, CT, GA, MD, MN, NM, NY, OR and TN) and 6 new sites (IA, ID, MI, ND, OK and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

During September 1, 2009 – March 13, 2010, 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 6.5 (10.4) and 2.5 (3.6) per 10,000, respectively. Rates [EIP (new sites)] for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 2.4 (1.7), 3.1 (1.9) and 2.7 (1.8) per 10,000, respectively.

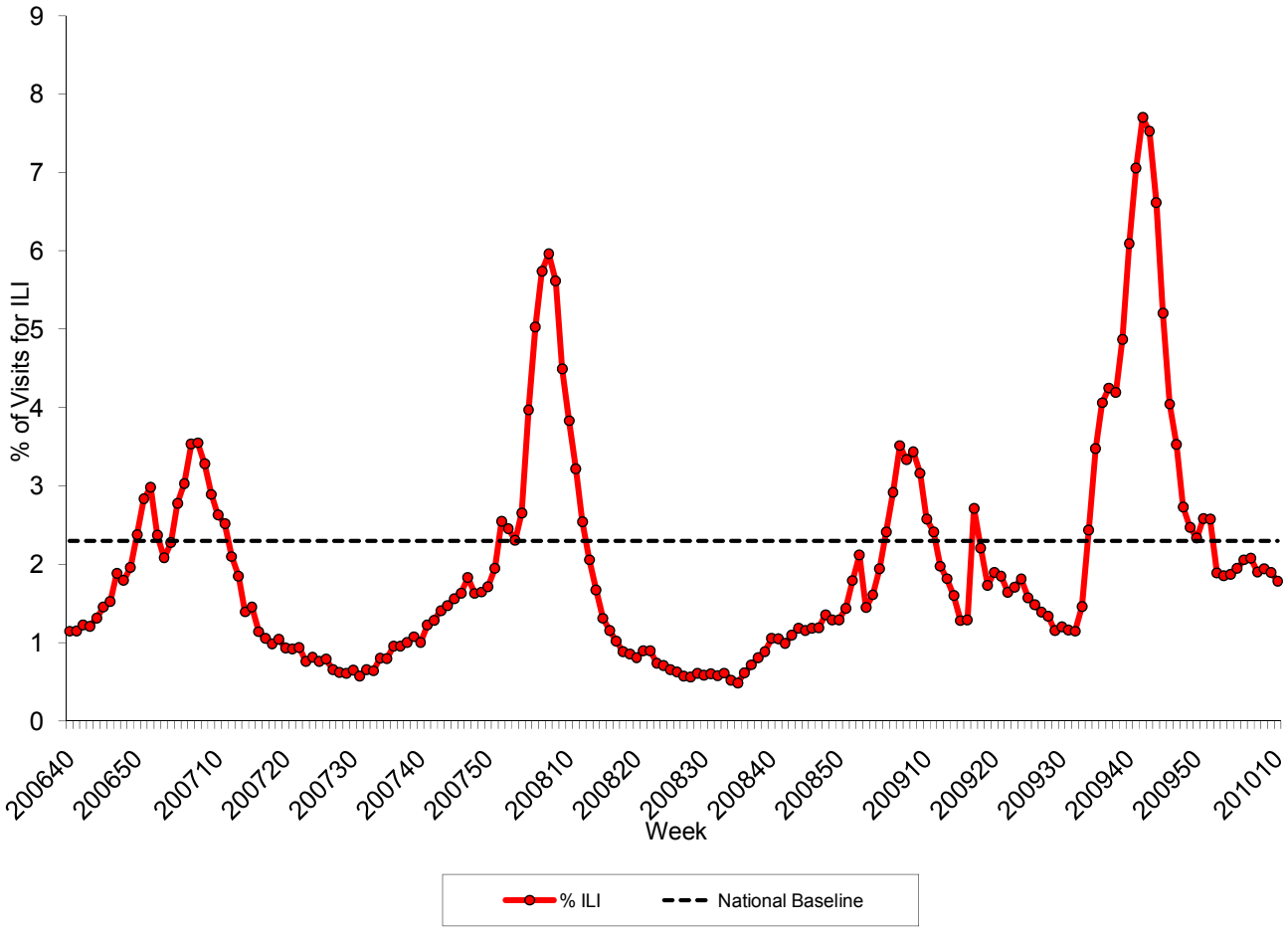
EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates, 2009-10 and Previous Three Seasons*



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

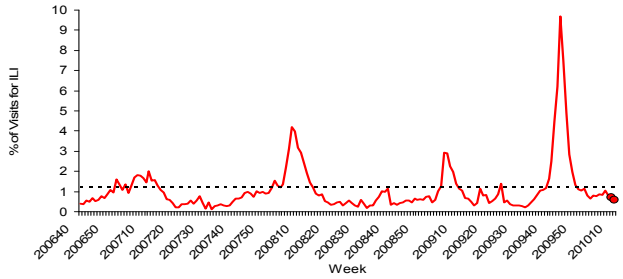
Outpatient Illness Surveillance: Nationwide during week 10, 1.8% of patient visits reported through the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) were due to influenza-like illness (ILI). This percentage is below the national baseline of 2.3%.

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 – March 13, 2010

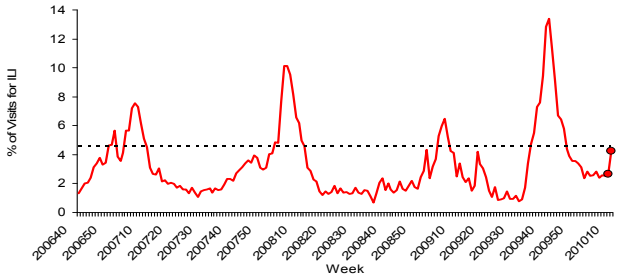


On a regional level, the percentage of outpatient visits for ILI ranged from 0.5% to 4.3% during week 10. One of the 10 regions (Region 4) reported ILI above its region-specific baseline. (Note: Use of the national baseline for regional ILI data or regional baselines for state-level data is not appropriate.)

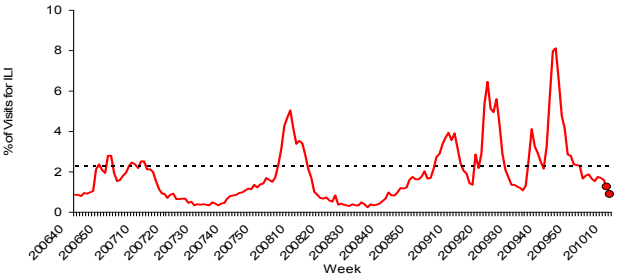
Region 1 - CT, ME, MA, NH, RI, VT



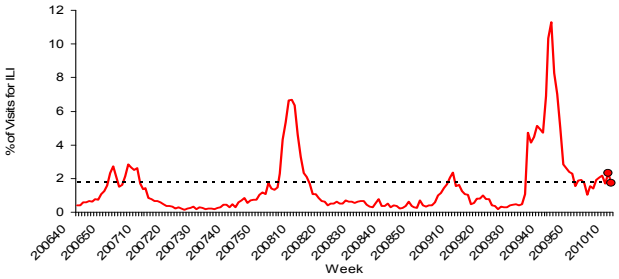
Region 6 - AR, LA, NM, OK, TX



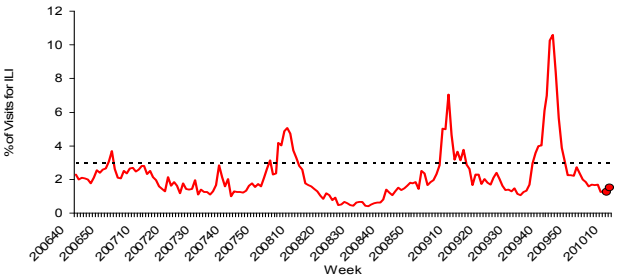
Region 2 - NJ, NY, USVI



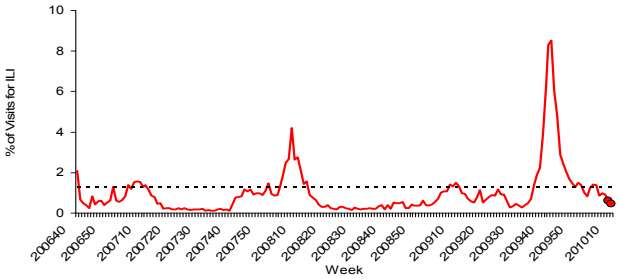
Region 7 - IA, KS, MO, NE



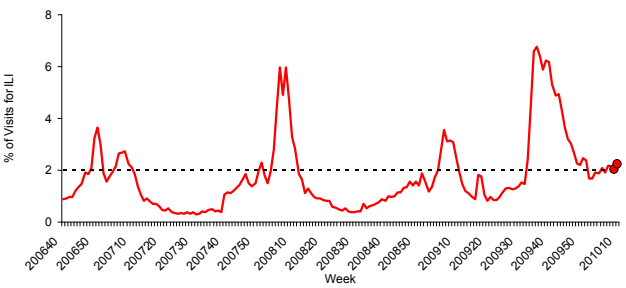
Region 3 - DE, DC, MD, PA, VA, WV



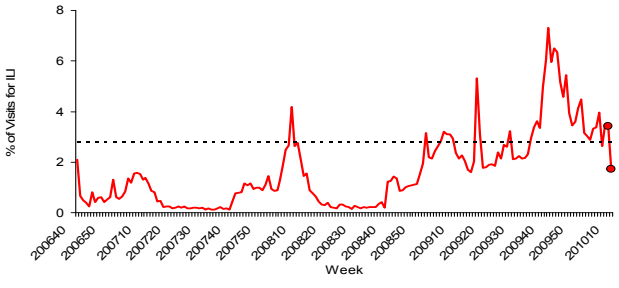
Region 8 - CO, MT, ND, SD, UT, WY



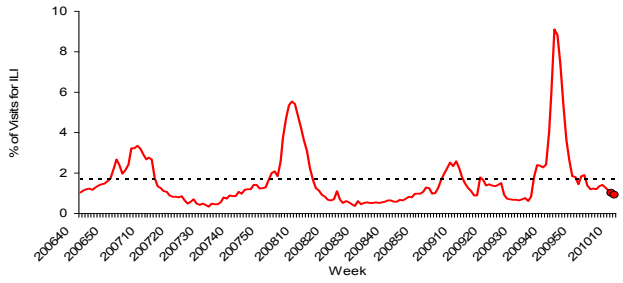
Region 4 - AL, FL, GA, KY, MS, NC, SC, TN



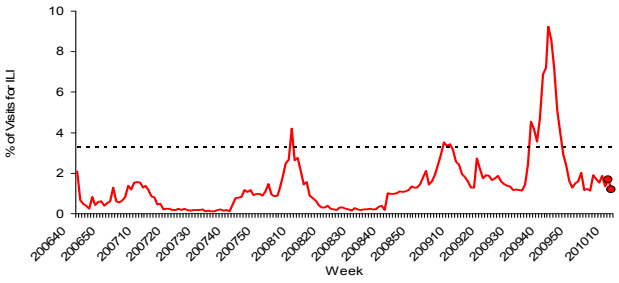
Region 9 - AZ, CA, HI, NV



Region 5 - IL, IN, MI, MN, OH, WI



Region 10 - AK, ID, OR, WA



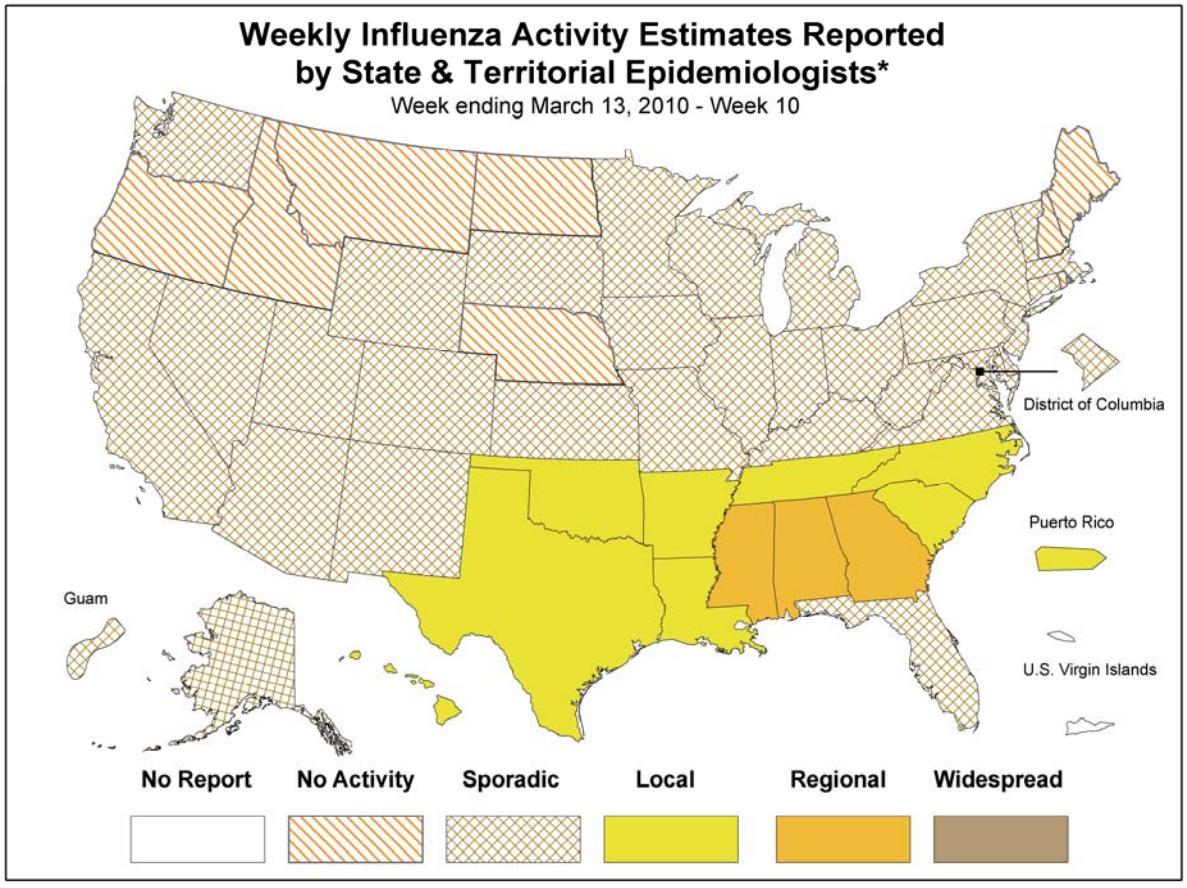
NOTE: Scales differ between regions

*Use of the regional baselines for state data is not appropriate.

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 10, the following influenza activity was reported:

- No states reported widespread influenza activity.
- Regional influenza activity was reported by three states (Alabama, Georgia, and Mississippi).
- Local influenza activity was reported by Puerto Rico and eight states (Arkansas, Hawaii, Louisiana, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas).
- Sporadic influenza activity was reported by the District of Columbia, Guam, and 31 states (Alaska, Arizona, California, Colorado, Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New Mexico, New York, Ohio, Pennsylvania, South Dakota, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming).
- Eight states (Idaho, Maine, Montana, Nebraska, New Hampshire, North Dakota, Oregon, and Rhode Island) reported no influenza activity.
- 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: March 19, 2010.