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**Seasonal Influenza (Flu)**

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**2009-2010 Influenza Season Week 44 ending November 7, 2009**

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

**Synopsis:**

During week 44 (November 1-7, 2009), influenza activity decreased slightly in the U.S.

- 3,834 (30.1%) 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 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 for the sixth consecutive week.
- Thirty-five influenza-associated pediatric deaths were reported. Twenty-six of these deaths were associated with 2009 influenza A (H1N1) virus infection, eight were associated with an influenza A virus for which the subtype was undetermined, and one was associated with an influenza B virus infection.
- The proportion of outpatient visits for influenza-like illness (ILI) was 6.7% which is above the national baseline of 2.3%. All 10 regions reported ILI above region-specific baseline levels.
- Forty-six states reported geographically widespread influenza activity, Puerto Rico and four states reported regional influenza activity, the District of Columbia reported local influenza activity, Guam reported sporadic influenza activity, and the U.S. Virgin Islands did not report.

**National and Regional Summary of Select Surveillance Components**

HHS Surveillance Regions*	Data for current week			Data cumulative for the season						
	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(Subtyping not performed)	B	Pediatric Deaths
<b>Nation</b>	Elevated	30.1 %	51 of 54	33	35	40,819	357	15,837	138	117
<b>Region 1</b>	Elevated	34.7 %	6 of 6	5	2	1,224	7	241	7	0
<b>Region 2</b>	Elevated	27.2 %	3 of 4	1	5	451	0	629	3	2
<b>Region 3</b>	Elevated	53.6 %	5 of 6	1	6	8,110	17	1,058	13	8
<b>Region 4</b>	Elevated	19.1 %	8 of 8	0	1	3,457	74	3,573	21	25
<b>Region 5</b>	Elevated	47.3 %	6 of 6	4	15	6,416	82	1,033	11	11
<b>Region 6</b>	Elevated	17.5 %	5 of 5	0	3	2,079	4	4,071	24	44
<b>Region 7</b>	Elevated	39.1 %	4 of 4	4	1	2,954	140	824	14	2
<b>Region 8</b>	Elevated	34.3 %	6 of 6	17	0	7,736	1	3,426	40	8
<b>Region 9</b>	Elevated	30.1 %	4 of 5	0	1	5,820	23	821	3	12
<b>Region 10</b>	Elevated	34.5 %	4 of 4	1	1	2,572	9	161	2	5

\*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

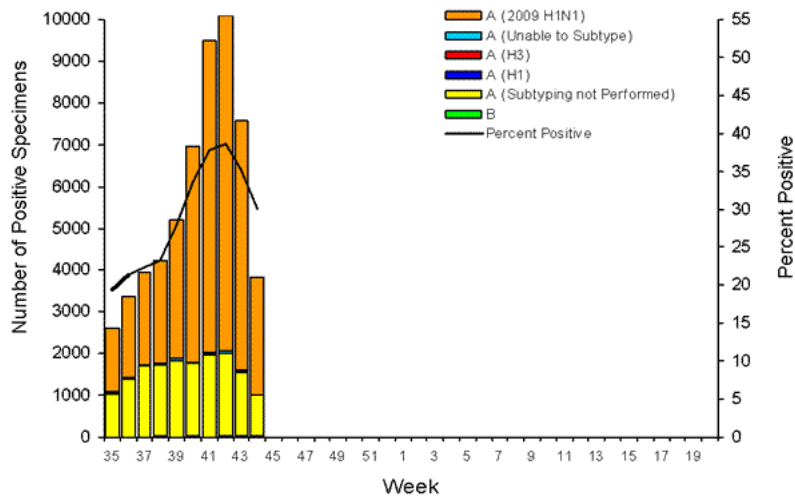
**U.S. Virologic Surveillance:**

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.

	<b>Week 44</b>
<b>No. of specimens tested</b>	14,151
<b>No. of positive specimens (%)</b>	3,834 (30.1%)
<b>Positive specimens by type/subtype</b>	
<b>Influenza A</b>	3,815 (99.5%)
<b>A (2009 H1N1)</b>	2,830 (74.2%)
<b>A (subtyping not performed)</b>	971 (25.5%)
<b>A (unable to subtype)</b>	14 (0.4%)
<b>A (H3)</b>	0 (0.0%)
<b>A (H1)</b>	0 (0.0%)
<b>Influenza B</b>	19 (0.5%)

During week 44, influenza B viruses co-circulated at low levels with 2009 influenza A (H1N1) viruses. 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, 2009-10

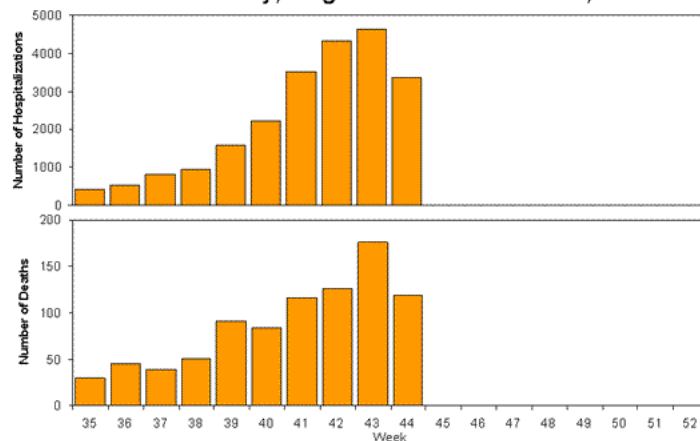


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### Pneumonia and Influenza Hospitalization and Death Tracking:

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 – November 7, 2009, 22,364 laboratory-confirmed influenza associated hospitalizations and 877 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 – November 7, 2009



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### Antigenic Characterization:

CDC has antigenically characterized one seasonal influenza A (H1N1), two influenza A (H3N2) and 320 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.

Three hundred and nineteen (99.7%) of 320 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 (0.3%) 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 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. 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, 315 2009 influenza A (H1N1) virus isolates have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir), and 761 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 2009 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.

	Samples tested (n)	Resistant Viruses, Number (%)		Samples tested (n)	Resistant Viruses, Number (%)		Samples tested (n)	Resistant Viruses, Number (%)
		Osetamivir	Zanamivir		Osetamivir	Zanamivir		
Seasonal Influenza A (H1N1)	0	0 (0)	0 (0)	0	0 (0)	0 (0)	0	0 (0)
Influenza A (H3N2)	0	0 (0)	0 (0)	0	0 (0)	0 (0)	1	1 (100)
Influenza B	0	0 (0)	0 (0)	0	0 (0)	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	1076	3† (0.3)	0 (0)	315	0 (0)	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 or 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 5.

All of the subtyped influenza A viruses reported during week 44 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>.

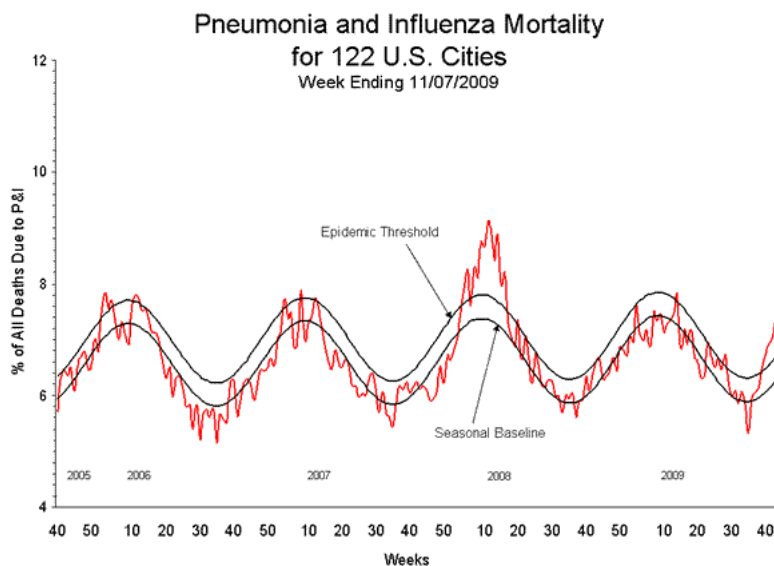
2009 influenza A (H1N1) viruses were tested for oseltamivir resistance by a neuraminidase inhibition assay and/or detection of genetic sequence mutation, depending on the type of specimen tested. Original clinical samples were examined for a single known mutation in the virus that confers oseltamivir 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, five cases have been identified in the United States, and a total of 15 cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified in the United States since April 2009 (12 viruses identified by CDC and three viruses identified by additional laboratories). The 15 total cases include a new case detected from a specimen collected before September 1, 2009. All tested viruses retain their sensitivity to the neuraminidase inhibitor zanamivir. Thirteen patients (including 11 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 44, 7.7% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was above the epidemic threshold of 6.8% for week 44. Including week 44, P&I mortality has been above threshold for six consecutive weeks.



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## Influenza-Associated Pediatric Mortality

Thirty-five influenza-associated pediatric deaths were reported to CDC during week 44 (Alabama, Arizona, Arkansas [2], California [8], Delaware, Georgia, Illinois, Michigan [2], Missouri, New Jersey, Ohio [2], Oklahoma [3], Tennessee [2], Texas [6], Utah, Virginia, and Washington). Twenty-six of these deaths were associated with 2009 influenza A (H1N1) virus infection, eight were associated with an influenza A virus for which the subtype is undetermined, and one was associated with an influenza B virus infection. These deaths occurred between March 15 and November 7, 2009.

Three deaths reported during week 44, including the death associated with influenza B virus infection, occurred during the 2008-09 season, bringing the total number of reported pediatric deaths occurring during that season to 127.

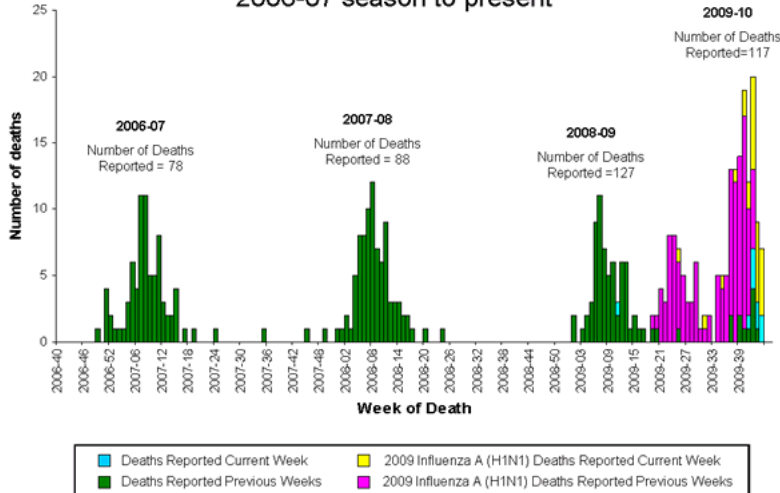
Since August 30, 2009, CDC has received 117 reports of influenza-associated pediatric deaths that occurred during the current influenza season (18 deaths in children less than 2 years old, 12 deaths in children 2-4 years old, 41 deaths in children 5-11 years old, and 46 deaths in children 12-17 years old). Ninety-eight (84%) of the 117 deaths were due to 2009 influenza A (H1N1) virus infections, and the remaining 19 were associated with influenza A virus for which the subtype is undetermined. A total of 156 deaths in children associated with 2009 influenza A (H1N1) virus infection have been reported to CDC.

Among the 117 deaths in children, 65 children had specimens collected for bacterial culture from normally sterile sites and 18 (27.7%) of the 65 were positive; *Staphylococcus aureus* was identified in eight (44.4%) of the 18 children. One *S. aureus* isolate was sensitive to methicillin, six were methicillin resistant, and one did not have sensitivity testing performed. Thirteen (72.2%) of the 18 children with bacterial coinfections were five years of age or older, and five (27.8%) of the 18 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 Flu	Total
<b>Number of Deaths REPORTED for Current Week – Week 44 (Week ending November 7, 2009)</b>	26	8	1	35
<b>Number of Deaths OCCURRED Since August 30, 2009</b>	98	19	0	117
<b>Number of Deaths OCCURRED since April 26, 2009</b>	156	22	1	179

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



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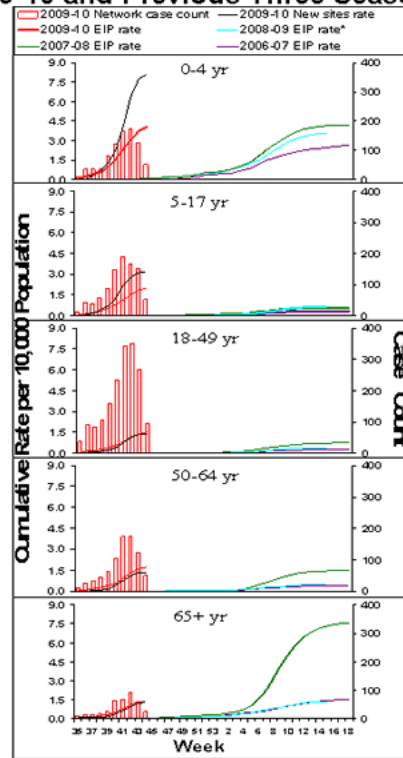
### Influenza-Associated Hospitalizations

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 – November 7, 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 4.0 (8.1) and 2.0 (3.1) per 10,000, respectively. Rates [EIP (new sites)] for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 1.5 (1.4), 1.7 (1.4) and 1.4 (1.3) per 10,000, respectively.

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



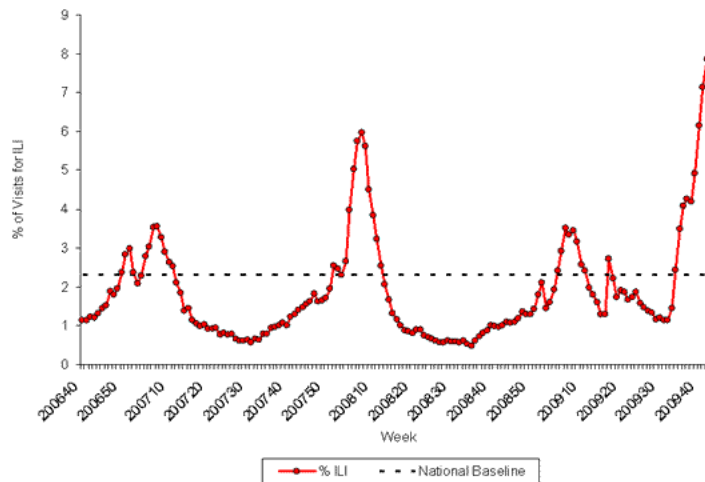
\*The 2008-09 EIP rate ended as of April 14, 2009 due to the onset of the 2009 H1N1 season.

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### Outpatient Illness Surveillance:

Nationwide during week 44, 6.7% 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 – November 7, 2009



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On a regional level, the percentage of outpatient visits for ILI ranged from 4.2% to 8.8% during week 44, and decreased in nine 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.

### 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 44, the following influenza activity was reported:
  - Widespread influenza activity was reported by 46 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,

- Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming).
- Regional influenza activity was reported by Puerto Rico and four states (Hawaii, Mississippi, Nebraska, and Texas).
  - Local influenza activity was reported by the District of Columbia.
  - Sporadic influenza activity was reported by Guam.
  - The U.S. Virgin Islands did not report.

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

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Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA 30329-4027, USA  
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