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Seasonal Influenza (Flu)

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FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

2009-2010 Influenza Season Week 49 ending December 12, 2009

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

Synopsis:

During week 49 (December 6-12, 2009), influenza activity continued to decrease in the U.S.

- 391 (6.9%) 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 for the eleventh consecutive week.
- Nine influenza-associated pediatric deaths were reported. Eight of these deaths were associated with 2009 influenza A (H1N1) virus infection and one was associated with an influenza A virus for which the subtype was undetermined.
- The proportion of outpatient visits for influenza-like illness (ILI) was 2.6% which is above the national baseline of 2.3%. Five of the 10 regions reported ILI at or above region-specific baseline levels. Regions 3, 6, 7, 8 and 10 reported ILI below their region specific baselines.
- Eleven states reported geographically widespread influenza activity, 20 states reported regional influenza activity, the District of Columbia, Puerto Rico, and 11 states reported local influenza activity, the U.S. Virgin Islands and eight states reported sporadic influenza activity, and Guam reported no influenza activity.

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(Subtyping not performed)**	**B**	**Pediatric Deaths**
Nation	Elevated	6.9 %	31 of 54	26	46	58,381	309	18,330	190	212
Region 1	Elevated	18.2 %	5 of 6	5	2	3,213	14	459	10	5
Region 2	Elevated	13.6 %	2 of 4	2	4	1,201	0	1,039	4	6
Region 3	Normal	9.8 %	3 of 6	3	7	10,441	45	1,428	15	12
Region 4	Elevated	11.1 %	7 of 8	0	4	6,432	88	4,009	50	41
Region 5	Elevated	14.7 %	3 of 6	6	19	9,058	56	1,287	11	28
Region 6	Normal	3.5 %	3 of 5	0	3	3,192	43	4,432	37	63
Region 7	Normal	6.2 %	1 of 4	3	1	3,252	3	752	3	5
Region 8	Normal	9.5 %	1 of 6	5	2	9,575	0	3,667	50	13
Region 9	Elevated	15.2 %	4 of 5	0	3	7,937	47	1,085	8	30
Region 10	Normal	21.6 %	2 of 4	2	1	4,080	13	172	2	9

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

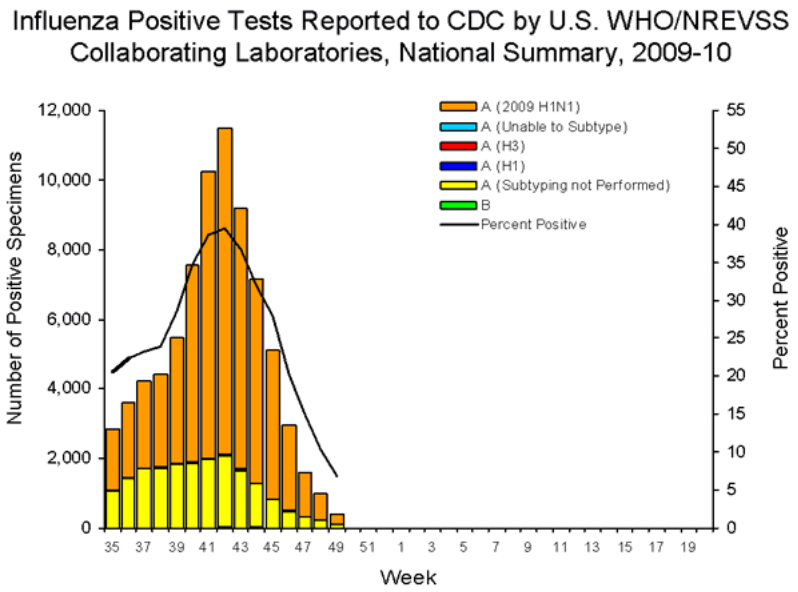
U.S. Virologic Surveillance:

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 49
No. of specimens tested	5,640
No. of positive specimens (%)	391 (6.9%)
Positive specimens by type/subtype	
Influenza A	389 (99.5%)
A (2009 H1N1)	273 (70.2%)
A (subtyping not performed)	108 (27.8%)
A (unable to subtype)*	6 (1.5%)
A (H3)	2 (0.5%)
A (H1)	0 (0.0%)
Influenza B	2 (0.5%)

*Subtyping results for five of the six specimens in this category were inconclusive because of low virus titers, and additional testing is pending for one specimen.

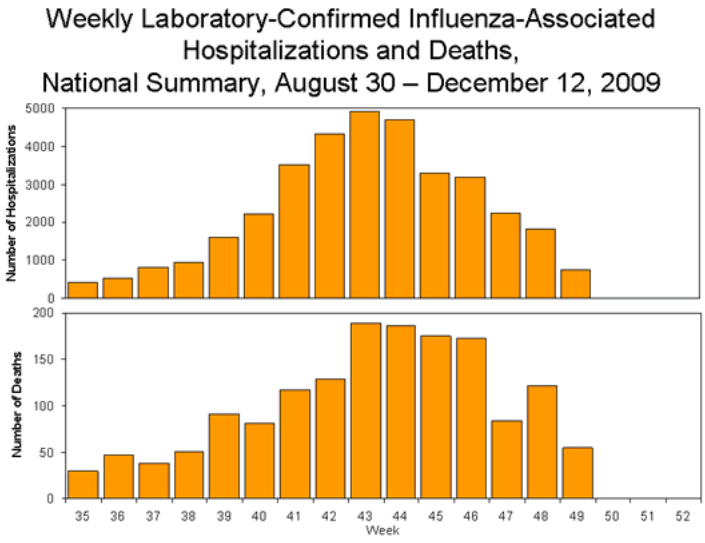
During week 49, seasonal influenza A (H3N2) and influenza B viruses co-circulated at low levels with 2009 influenza A (H1N1) viruses. Over 99% of all subtyped influenza A viruses reported to CDC this week were 2009 influenza A (H1N1) viruses.



View WHO-NREVSS Regional Bar Charts | View Chart Data | View Full Screen | View PowerPoint Presentation

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 – December 12, 2009, 35,309 laboratory-confirmed influenza-associated hospitalizations and 1,567 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.



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Antigenic Characterization:

CDC has antigenically characterized one seasonal influenza A (H1N1), four influenza A (H3N2), four influenza B, and 612 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).

The four 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.

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 vaccine belongs to the B/Victoria lineage. The four influenza B viruses tested belong to the B/Victoria lineage and are related to the influenza vaccine component for the 2009-10 Northern Hemisphere influenza vaccine (B/Brisbane/60/2008).

Six hundred ten (99.7%) of 612 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 two viruses (0.3%) tested showed a reduced titer 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. It is too early in the influenza season to determine if seasonal influenza viruses will circulate widely or how well the seasonal vaccine and circulating strains will match.

Antiviral Resistance:

Since September 1, 2009, one seasonal influenza A (H1N1), five influenza A (H3N2), one influenza B, and 599 2009 influenza A (H1N1) virus isolates have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir), and 1,693 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), five influenza A (H3N2), and 552 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 Vi
		Oseltamivir		Zanamivir		Ada
Seasonal Influenza A (H1N1)	1	1 (100.0)	0	0 (0)	1	
Influenza A (H3N2)	5	0 (0)	0	0 (0)	5	
Influenza B	1	0 (0)	0	0 (0)	N/A*	
2009 Influenza A (H1N1)	2,292	32†‡ (1.4)	599	0 (0)	552	5

*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) virus has been identified by these laboratories since September 1, 2009, bringing the total number to 34.

Over 99% of all of the subtyped influenza A viruses reported during week 49 were 2009 influenza A (H1N1) viruses, and the majority 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 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.

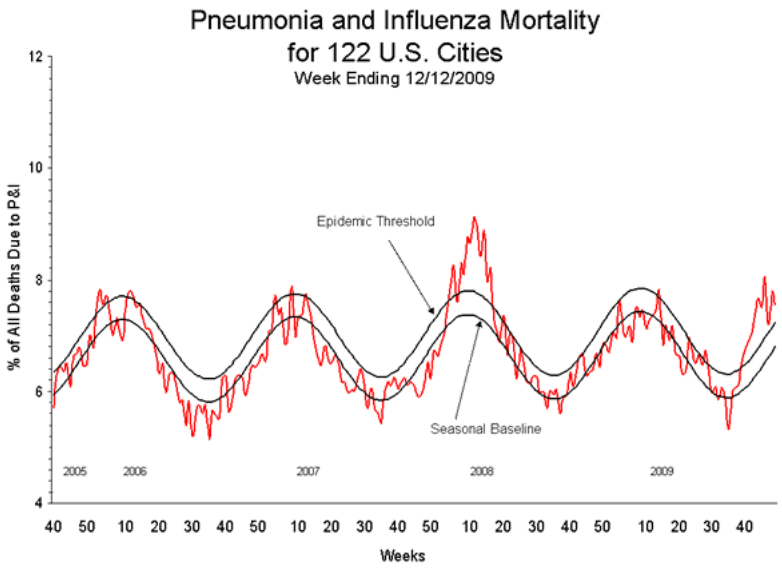
2009 influenza A (H1N1) viruses were tested for oseltamivir resistance by a neuraminidase inhibition assay and/or detection of genetic sequence mutation, depending on the type of specimen tested. Original clinical samples were examined for a single known mutation in the virus that confers oseltamivir 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. A total of 44 cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified in the United States since April 2009, including 15 newly identified cases since last week. In specimens collected since September 1, 2009, 34 cases have been identified in the United States. 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 44 total cases identified, 27 patients had documented exposure to oseltamivir through either treatment or chemoprophylaxis, 15 patients are under investigation to determine exposure to oseltamivir, and two patients had no documented oseltamivir exposure. 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 49, 7.6% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was above the epidemic threshold of 7.2% for week 49. Including week 49, P&I mortality has been above threshold for 11 consecutive weeks.



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Influenza-Associated Pediatric Mortality

Nine influenza-associated pediatric deaths were reported to CDC during week 49 (California [3], Florida, Kentucky, Massachusetts, North Carolina, Oklahoma, and Texas). Eight of these deaths were associated with 2009 influenza A (H1N1) virus infection and one was associated with an influenza A virus for which the subtype is undetermined. The deaths reported during week 49 occurred between August 23 and December 5, 2009.

One death associated with 2009 influenza A (H1N1) virus infection reported during week 49 occurred in August during the 2008-09 season, bringing the total number of reported pediatric deaths occurring during that season to 130.

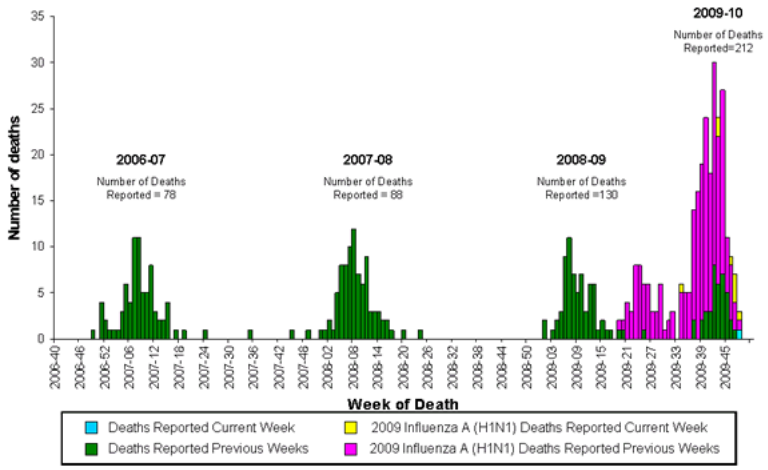
Since August 30, 2009, CDC has received 212 reports of influenza-associated pediatric deaths that occurred during the current influenza season (39 deaths in children less than 2 years old, 22 deaths in children 2-4 years old, 78 deaths in children 5-11 years old, and 73 deaths in children 12-17 years old). One hundred seventy-two (81%) of the 212 deaths were due to 2009 influenza A (H1N1) virus infections, 39 were associated with influenza A virus for which the subtype is undetermined, and one was associated with an influenza B virus infection. A total of 232 deaths in children associated with 2009 influenza A (H1N1) virus infection have been reported to CDC.

Among the 212 deaths in children, 99 children had specimens collected for bacterial culture from normally sterile sites and 31 (31.3%) of the 99 were positive; Streptococcus pneumoniae was identified in nine (29.0%) of the 31 children and Staphylococcus aureus was identified in eight (25.8%) of the 31 children. One S. aureus isolate was sensitive to methicillin, six were methicillin resistant, and one did not have sensitivity testing performed. Twenty-one (67.7%) of the 31 children with bacterial coinfections were five years of age or older, and nine (29.0%) of the 31 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 49 (Week ending December 12, 2009)	8	1	0	9
Number of Deaths OCCURRED since August 30, 2009	172	39	1	212
Number of Deaths OCCURRED since April 26, 2009	232	42	2	276

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



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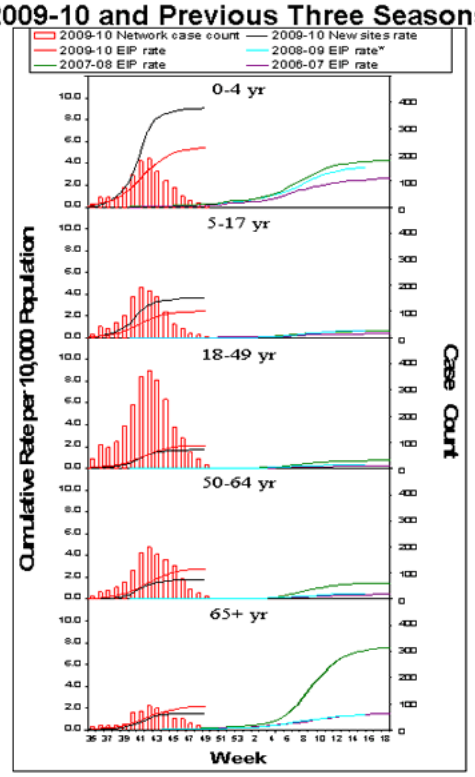
Influenza-Associated Hospitalizations

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 – December 12, 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 5.4 (9.1) and 2.4 (3.6) per 10,000, respectively. Rates [EIP (new sites)] for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 2.1 (1.7), 2.8 (1.8) and 2.2 (1.5) 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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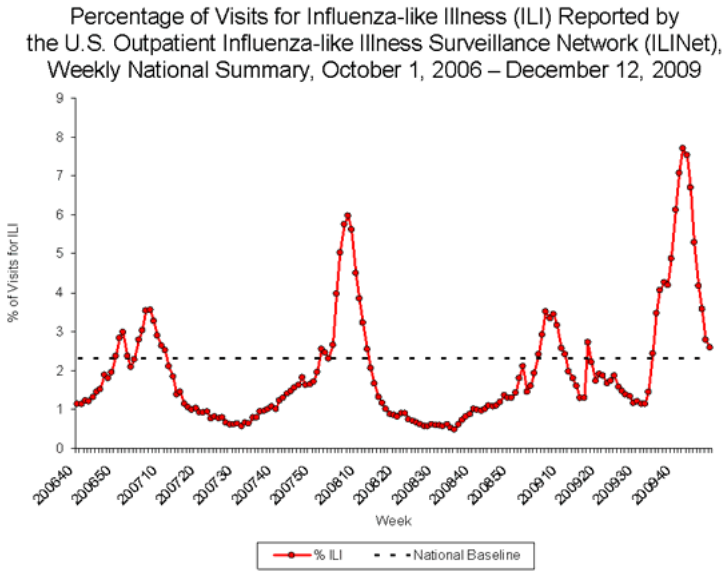
Outpatient Illness Surveillance:

Nationwide during week 49, 2.6% 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%.



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On a regional level, the percentage of outpatient visits for ILI ranged from 1.0% to 3.6% during week 49. Five of the 10 regions reported a proportion of outpatient visits for ILI above their region-specific baseline levels. Regions 3, 6, 8, 7, and 10 reported ILI below their region-specific baselines.

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 49, the following influenza activity was reported:
  - Widespread influenza activity was reported by 11 states (Alabama, Alaska, California, Delaware, Kentucky, Maine, New Hampshire, New Jersey, Nevada, New York, and Virginia).
  - Regional influenza activity was reported by 20 states (Arizona, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Louisiana, Missouri, New Mexico, North Carolina, Ohio, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, and West Virginia).
  - Local influenza activity was reported by the District of Columbia, Puerto Rico, and 11 states (Arkansas, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Oklahoma, Pennsylvania, Washington, and Wisconsin).
  - Sporadic influenza activity was reported by Guam, the U.S. Virgin Islands, and eight states (Colorado, Idaho, Iowa, Kansas, Nebraska, North Dakota, South Dakota, and Wyoming).
  - Guam reported no influenza activity.

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

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