

**2008-2009 Influenza Season
Week 28 ending July 18, 2009**

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

On June 11, the World Health Organization raised the pandemic alert level from Phase 5 to Phase 6 indicating that an influenza pandemic is underway.

Synopsis: During week 28 (July 12-18, 2009), influenza activity decreased in the United States; however, there were still higher levels of influenza-like illness than is normal for this time of year.

- Nine hundred fourteen (20.5%) 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 novel influenza A (H1N1) viruses.
- The proportion of deaths attributed to pneumonia and influenza (P&I) was above the epidemic threshold.
- Five influenza-associated pediatric deaths were reported and four of the five deaths were associated with novel influenza A (H1N1) virus infection.
- The proportion of outpatient visits for influenza-like illness (ILI) was below national and region-specific baseline levels.
- Seven states reported geographically widespread influenza activity, 13 states and Puerto Rico reported regional influenza activity, 13 states and the District of Columbia reported local influenza activity, and 17 states reported sporadic influenza activity.

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)	Novel A (H1N1)	A (unable to sub-type)¶	A (Subty-ping not performed)	B	Pediatric Deaths
Nation	Normal	20.5%	21 of 52	7,941	2,583	23,426	717	17,165	10,664	95
Region I	Normal	15.9%	3 of 6	564	297	2,548	13	1,681	816	4
Region II	Normal	16.5%	3 of 3	294	195	937	20	2,353	714	18
Region III	Normal	35.7%	5 of 6	1,249	219	3,766	16	986	1,363	10
Region IV	Normal	25.7%	4 of 8	831	131	1,130	51	2,643	1,225	6
Region V	Normal	24.5%	0 of 6	1,651	201	7,965	184	857	1,420	16
Region VI	Normal	20.8%	1 of 5	800	280	2,443	5	4,352	2,629	15
Region VII	Normal	24.3%	0 of 4	521	77	603	115	503	536	0
Region VIII	Normal	14.1%	0 of 6	531	217	1,161	63	1,610	499	7
Region IX	Normal	18.0%	4 of 4	1,111	647	967	40	1,674	771	17
Region X	Normal	29.7%	1 of 4	389	319	1,906	210	506	691	2

* HHS regions (Region I: CT, ME, MA, NH, RI, VT; Region II: NJ, NY, Puerto Rico, US Virgin Islands; Region III: DE, DC, MD, PA, VA, WV; Region IV: AL, FL, GA, KY, MS, NC, SC, TN; Region V: IL, IN, MI, MN, OH, WI; Region VI: AR, LA, NM, OK, TX; Region VII: IA, KS, MO, NE; Region VIII: CO, MT, ND, SD, UT, WY; Region IX: AZ, CA, Guam, HI, NV; and Region X: 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, and Puerto Rico

¶ The majority of influenza A viruses that cannot be sub-typed as seasonal influenza viruses are novel 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.

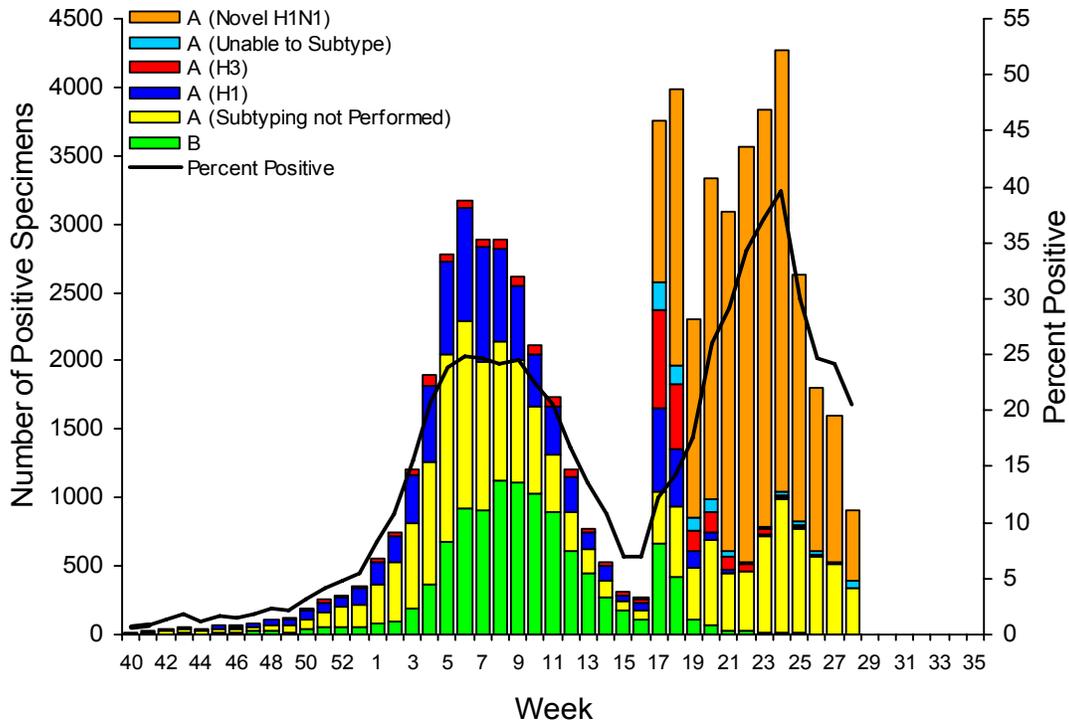
During the 2008-09 season, influenza A (H1), A (H3), and B viruses have co-circulated in the United States. On April 15 and 17, 2009, CDC confirmed the first two cases of novel influenza A (H1N1) virus in the United States. As of July 24, 2009, 43,771 confirmed and probable infections with novel influenza A (H1N1) virus and 302 deaths (7 deaths in individuals 0-4 years, 48 deaths in individuals 5-24 years, 124 deaths in adults 25-49 years, 71 deaths in adults 50-64 years, 26 deaths in adults age 65 and older, and 26 deaths with unknown age) have been identified by CDC and state and local public health departments. Reporting of novel influenza A (H1N1) viruses by U.S. WHO collaborating laboratories began during week 17 (week ending May 2, 2009). The results of tests performed during the current week are summarized in the table below.

	Week 28
No. of specimens tested	4,468
No. of positive specimens (%)	914 (20.5%)
<i>Positive specimens by type/subtype</i>	
Influenza A	913 (99.9%)
A (novel H1N1)	522 (57.2%)
A (subtyping not performed)	339 (37.1%)
A (unable to subtype)	47 (5.1%)
A (H3)	3 (0.3%)
A (H1)	2 (0.2%)
Influenza B	1 (0.1%)

During week 28, seasonal influenza A (H1), A (H3), and B viruses co-circulated at low levels with novel influenza A (H1N1) viruses. Over 99% of all subtyped influenza A viruses being reported to CDC this week were novel influenza A (H1N1) viruses.

The increase in the percentage of specimens testing positive for influenza by WHO and NREVSS collaborating laboratories may be due in part to changes in testing practices by health care providers, triaging of specimens by public health laboratories, an increase in the number of specimens collected from outbreaks, and other factors.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2008-09



Antigenic Characterization: CDC has antigenically characterized 1,909 seasonal human influenza viruses [1,089 influenza A (H1), 196 influenza A (H3) and 624 influenza B viruses] collected by U.S. laboratories since October 1, 2008, and 242 novel influenza A (H1N1) viruses.

All 1,089 seasonal influenza A (H1) viruses are related to the influenza A (H1N1) component of the 2008-09 influenza vaccine (A/Brisbane/59/2007). One hundred eighty-eight (96%) of 196 influenza A (H3N2) viruses tested are related to the A (H3N2) vaccine component (A/Brisbane/10/2007) and eight viruses (4%) tested showed reduced titers with antisera produced against A/Brisbane/10/2007.

All 242 novel influenza A (H1N1) viruses are related to the A/California/07/2009 (H1N1) reference virus selected by WHO as a potential candidate for novel influenza A (H1N1) vaccine.

Influenza B viruses currently circulating can be divided into two distinct lineages represented by the B/Yamagata/16/88 and B/Victoria/02/87 viruses. Seventy-two (12%) of 624 influenza B viruses tested belong to the B/Yamagata lineage and are related to the vaccine strain (B/Florida/04/2006). The remaining 552 (88%) viruses belong to the B/Victoria lineage and are not related to the vaccine strain.

Data on antigenic characterization should be interpreted with caution given that antigenic characterization data is based on hemagglutination inhibition (HI) testing using a panel of reference ferret antisera and results may not correlate with clinical protection against circulating viruses provided by influenza vaccination.

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, as is seen with the two lineages of influenza B viruses. Antigenic characterization of novel influenza A (H1N1) viruses indicates that these viruses are antigenically and genetically unrelated to seasonal influenza A (H1N1) viruses, suggesting that little to no protection would be expected from vaccination with seasonal influenza vaccine.

Antiviral Resistance: Since October 1, 2008, 1,099 seasonal influenza A (H1N1), 213 influenza A (H3N2), and 620 influenza B viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Also, 1,100 seasonal influenza A (H1N1) and 216 influenza A (H3N2) viruses have been tested for resistance to the adamantanes (amantadine and rimantadine). Two hundred seventy-four novel influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Three hundred twelve novel influenza A (H1N1) viruses 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.

	Isolates tested (n)	Resistant Viruses, Number (%)		Isolates tested (n)	Resistant Viruses, Number (%)
		Oseltamivir	Zanamivir		Adamantanes
Seasonal Influenza A (H1N1)	1,099	1,094 (99.5%)	0 (0)	1,100	6 (0.5%)
Influenza A (H3N2)	213	0 (0)	0 (0)	216	216 (100%)
Influenza B	620	0 (0)	0 (0)	N/A*	N/A*
Novel Influenza A (H1N1)	274	0 (0)	0 (0)	312	312 (100%)

*The adamantanes (amantadine and rimantadine) are not effective against influenza B viruses.

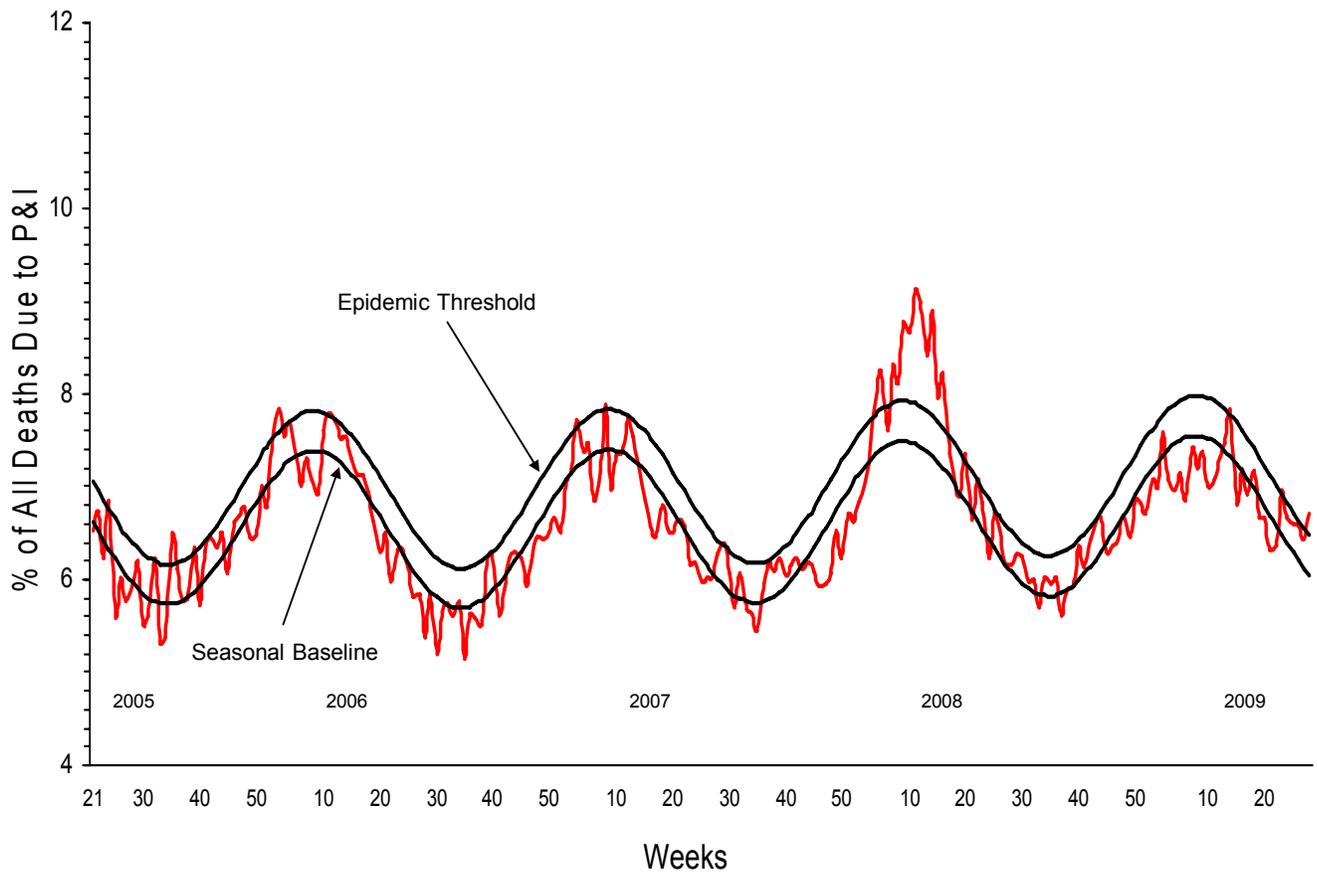
The novel influenza A (H1N1) virus is susceptible to both neuraminidase inhibitor antiviral medications zanamivir and oseltamivir. It is resistant to the adamantane antiviral medications, amantadine and rimantadine. Antiviral treatment with either oseltamivir or zanamivir is recommended for all patients with confirmed, probable or suspected cases of novel influenza A (H1N1) virus infection who are hospitalized or who are at higher risk for seasonal influenza complications.

Five cases of oseltamivir resistant novel influenza A (H1N1) viruses have been detected worldwide, none of which were detected in the United States. However, one of the three viruses was detected in a specimen collected from a child that became ill in California and subsequently traveled to Hong Kong where the respiratory specimen was collected, and the oseltamivir resistant novel H1N1 strain was detected. Enhanced antiviral resistance testing in California has not revealed any other oseltamivir resistant novel influenza A (H1N1) viruses. The other two cases of oseltamivir resistant novel H1N1 viruses were detected in Japan and Denmark. Additional information on antiviral recommendations for treatment and chemoprophylaxis of novel influenza A (H1N1) infection is available at <http://www.cdc.gov/h1n1flu/recommendations.htm>.

Three seasonal influenza A (H1N1) viruses collected between February 8 and May 11, 2009, were found to be resistant to both oseltamivir and the adamantanes (amantadine and rimantadine). All influenza A (H1N1) viruses tested retain their sensitivity to zanamivir. The three dually-resistant viruses represent less than 0.3% of all seasonal influenza A (H1N1) viruses tested during the 2008-09 influenza season, and as a result, no changes to the influenza antiviral treatment or prophylaxis recommendations will be made at this time. CDC will continue to monitor trends in antiviral resistance over the summer and throughout the upcoming 2009-10 influenza season.

Pneumonia and Influenza (P&I) Mortality Surveillance: During week 28, 6.7% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was above the epidemic threshold of 6.5% for week 28.

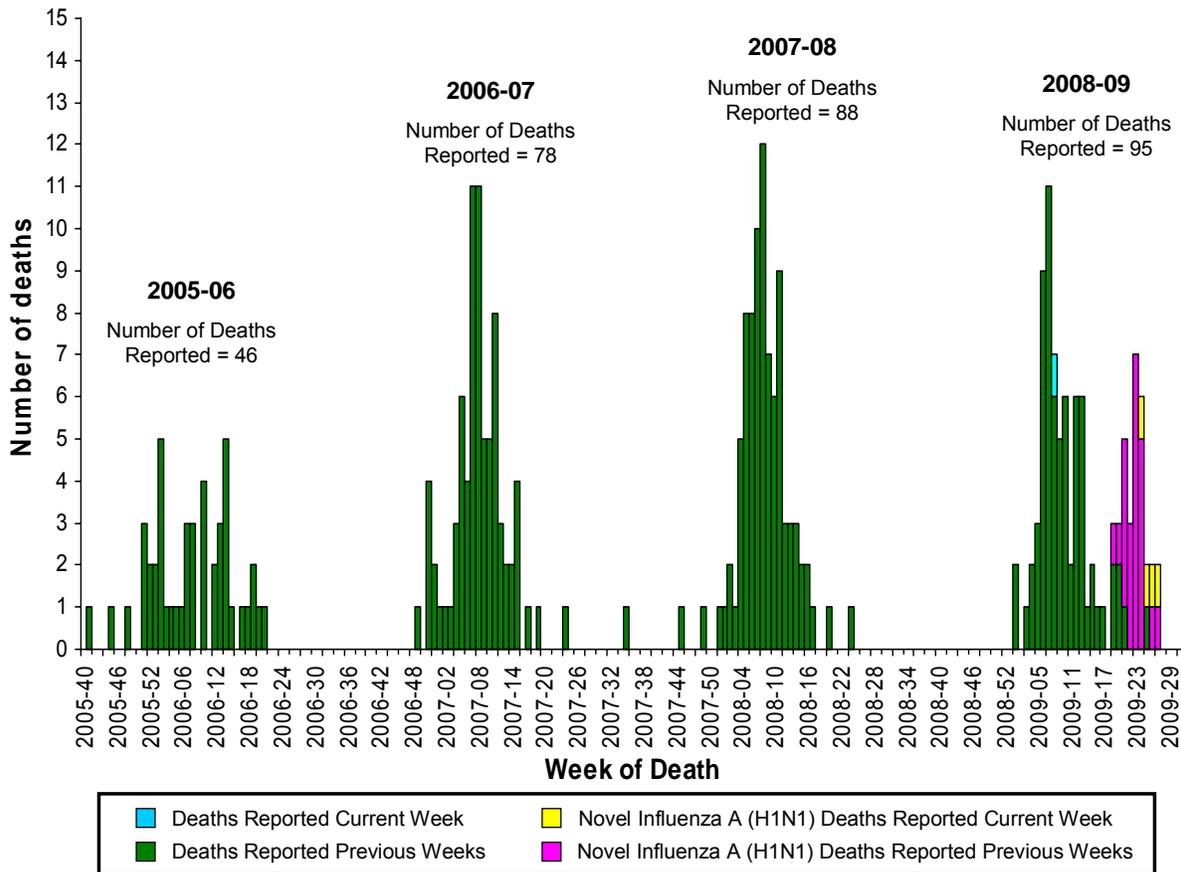
Pneumonia and Influenza Mortality for 122 U.S. Cities
Week ending 7/18/2009



Influenza-Associated Pediatric Mortality: Five influenza-associated pediatric deaths were reported to CDC during week 28 (Minnesota, New York [3], and Virginia). Four of these deaths were associated with a novel influenza A (H1N1) virus infection, and one was associated with an influenza B virus. The deaths reported this week occurred during weeks 8-27 (the weeks ending February 27-July 7, 2009). Since September 28, 2008, CDC has received 95 reports of influenza-associated pediatric deaths that occurred during the current influenza season, 27 of which were due to novel influenza A (H1N1) virus infections.

Of the 42 children who had specimens collected for bacterial culture from normally sterile sites, 17 (40.5%) were positive; *Staphylococcus aureus* was identified in 10 (58.8%) of the 17 children. Four of the *S. aureus* isolates were sensitive to methicillin and six were methicillin resistant. Fourteen (82.4%) of the 17 children with bacterial coinfections were five years of age or older and 10 (58.8%) of the 17 children were 12 years of age or older. Eleven of the 27 children with confirmed novel influenza A (H1N1) infection had a specimen collected from a normally sterile site; three of the 11 children had a positive bacterial culture. An increase in the number of influenza-associated pediatric deaths with bacterial coinfections was first recognized during the 2006-07 influenza season. In January 2008, interim testing and reporting recommendations were released regarding influenza and bacterial coinfections in children and are available at (<http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00268>).

Number of Influenza-Associated Pediatric Deaths by Week of Death:
2005-06 season to present

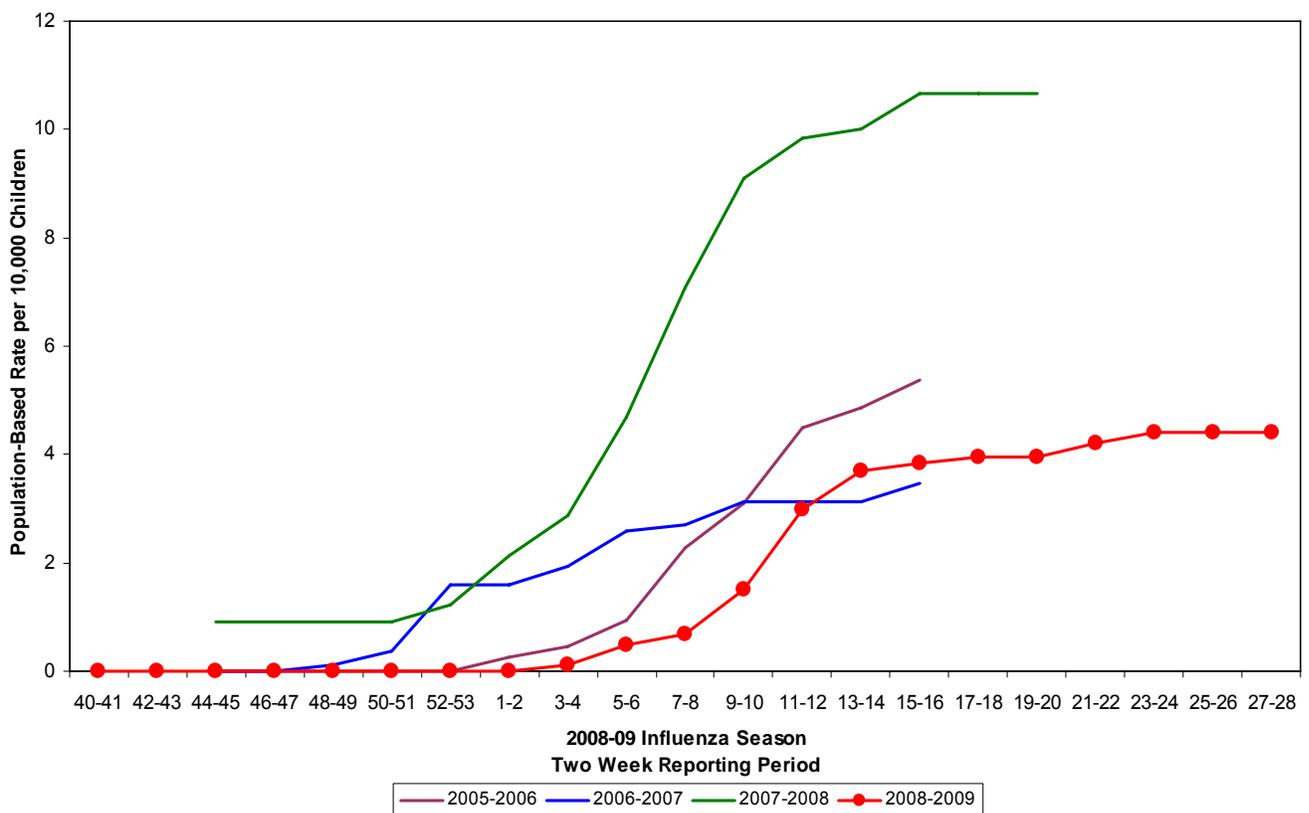


Influenza-Associated Hospitalizations: Laboratory-confirmed influenza-associated hospitalizations are monitored in two population-based surveillance networks: the New Vaccine Surveillance Network (NVSN) and the Emerging Infections Program (EIP).

During October 12, 2008 to July 11, 2009, the preliminary laboratory-confirmed influenza-associated hospitalization rate for children 0-4 years old in the NVSN was 4.42 per 10,000. Because of case identification methods utilized in this study, there is a delay from the date of hospitalization to the date of report.

Data collection for influenza-associated hospitalizations through the NVSN has been completed for the 2008-09 influenza season. There will be no updates to this system after week 28.

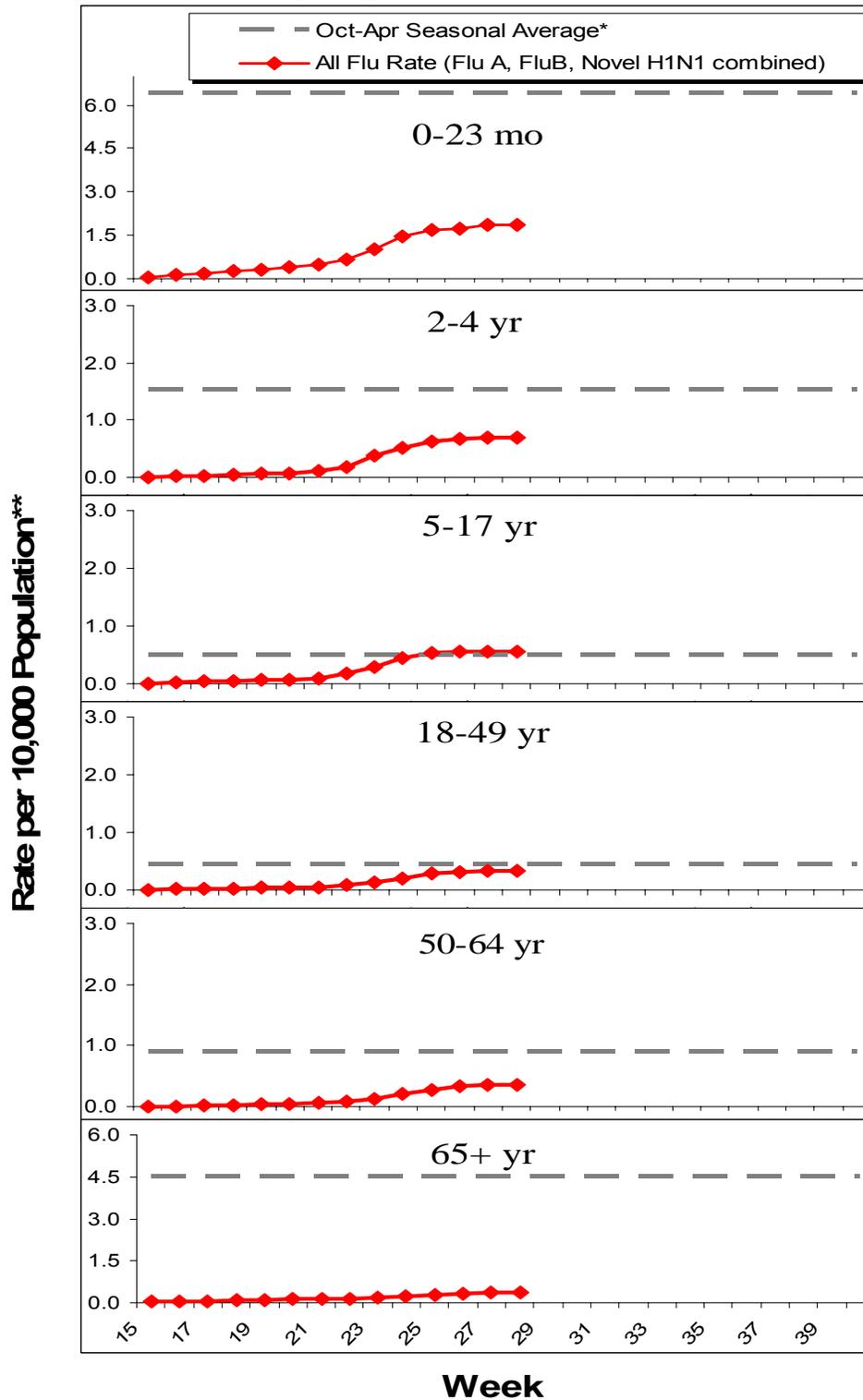
NVSN Influenza Laboratory-Confirmed Cumulative Hospitalization Rates for Children 0 - 4 Years, 2008-09 and Previous Three Seasons



During April 15, 2009 to July 18, 2009, the following preliminary laboratory-confirmed overall influenza associated hospitalization rates were reported by the EIP (*rates include type A, type B, and novel H1N1*):

Rates for children aged 0-23 months, 2-4 years, and 5-17 years were 1.9, 0.7, and 0.6 per 10,000, respectively. Rates for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 0.3, 0.4, and 0.4 per 10,000, respectively.

EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates, Spring/Summer 2009

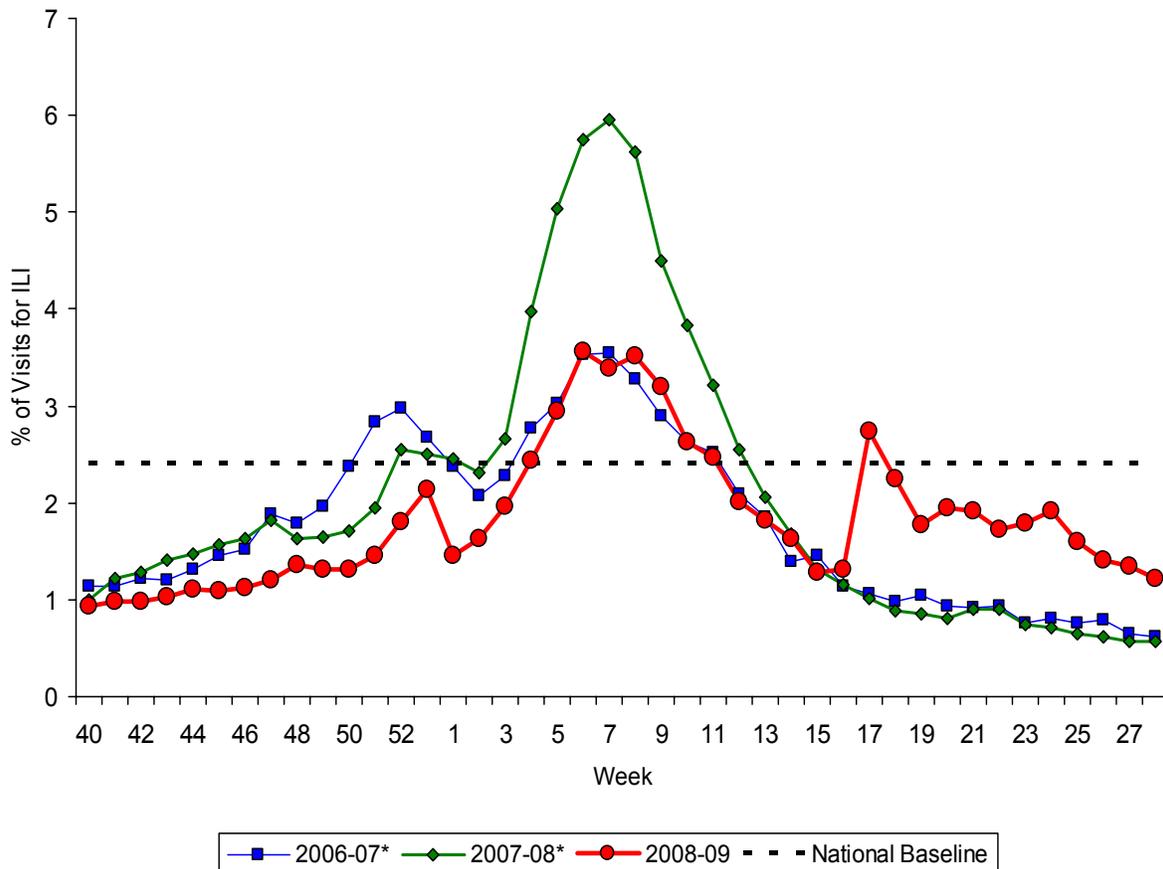


*This value represents an age group-specific average influenza rate from October 1 to April 30 from the 2005-06, 2006-07, and 2007-08 influenza seasons.

**Note: The scales for the 0-23 month and the ≥65 year age groups differ from other age groups.

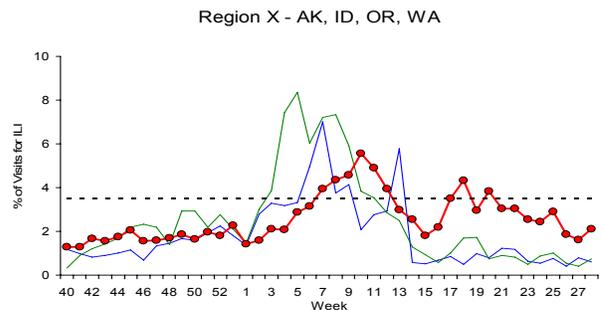
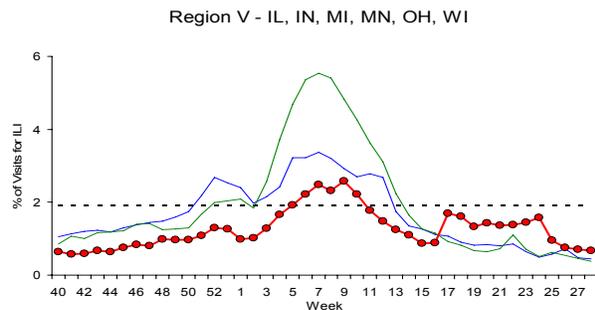
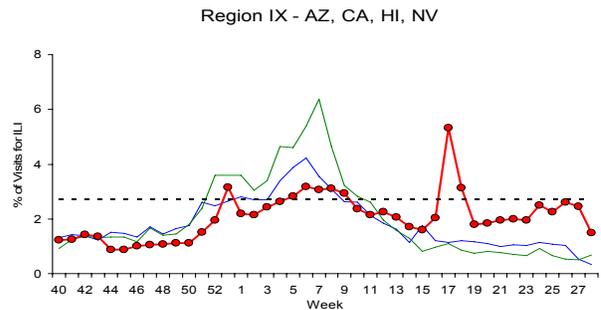
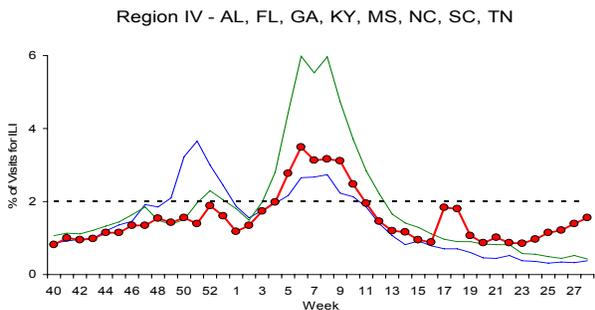
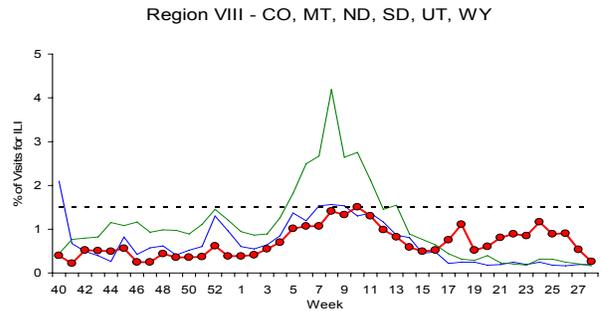
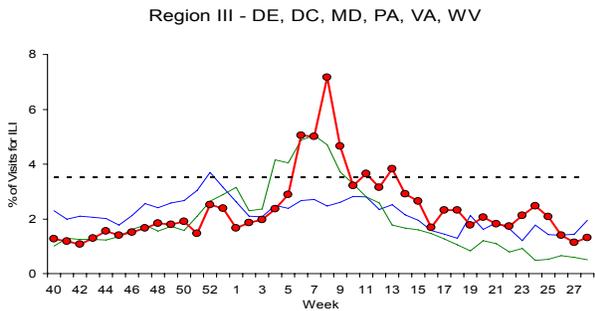
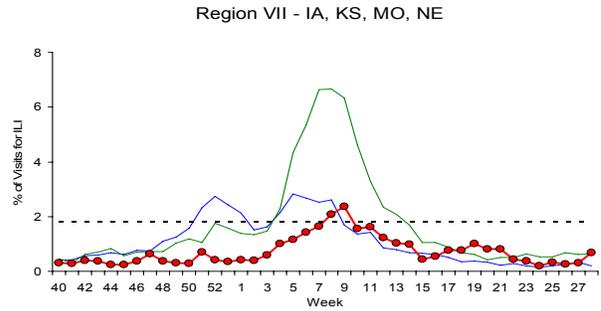
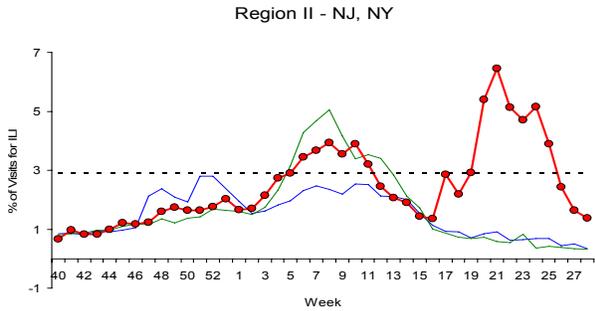
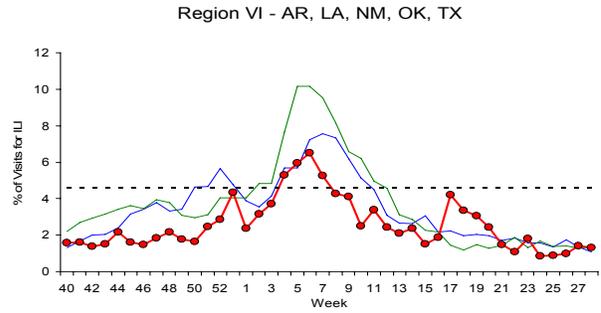
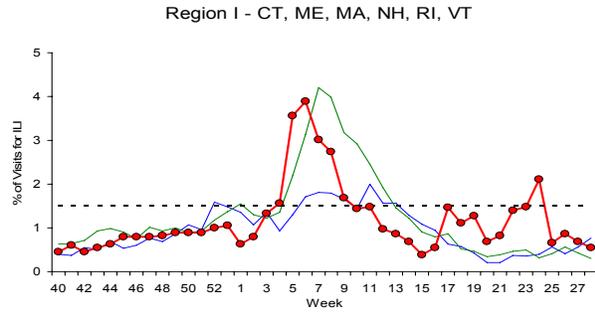
Outpatient Illness Surveillance: Nationwide during week 28, 1.2% of patient visits reported through the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) were due to influenza-like illness (ILI). This percentage is below the national baseline of 2.4%.

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), National Summary, 2008-09 and Previous Two Seasons



*There was no week 53 during the 2006-07 and 2007-08 seasons, therefore the week 53 data point for those seasons is an average of weeks 52 and 1.

On a regional level, the percentage of outpatient visits for ILI ranged from 0.3% to 2.1%. All 10 regions reported percentages of visits for ILI below their respective region-specific baselines. ILI decreased during week 28 in six of 10 regions compared to week 27.



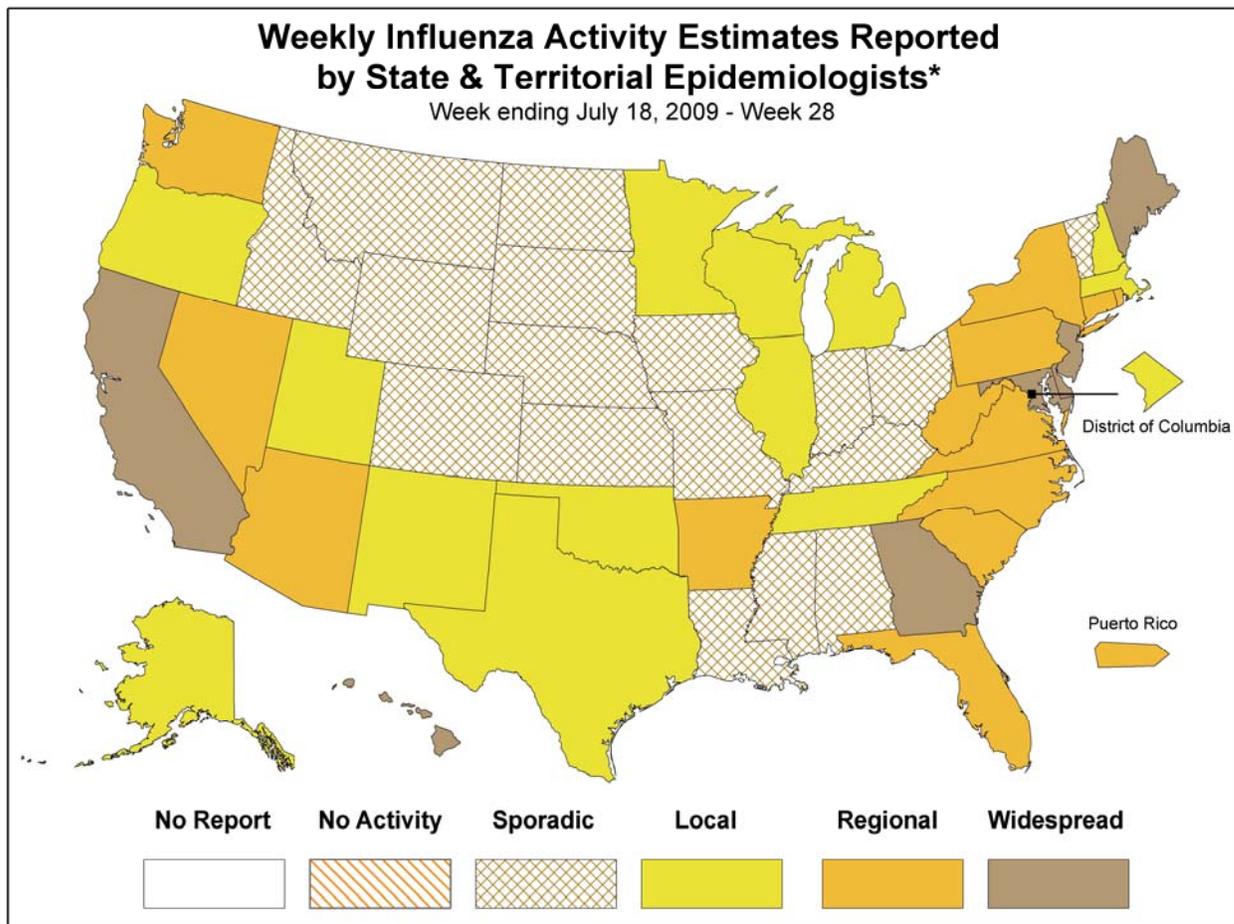
NOTE: Scales differ between regions

NOTE: There was no week 53 during the 2006-07 and 2007-08 seasons, therefore the week 53 data point for those seasons is an average of weeks 52 and 1.

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 novel influenza A (H1N1) viruses and does not measure the severity of influenza activity.

During week 28, the following influenza activity was reported:

- Widespread influenza activity was reported by seven states (California, Delaware, Georgia, Hawaii, Maine, Maryland, and New Jersey).
- Regional influenza activity was reported by Puerto Rico and 13 states (Arizona, Arkansas, Connecticut, Florida, Nevada, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Virginia, Washington, and West Virginia).
- Local influenza activity was reported by the District of Columbia and 13 states (Alaska, Illinois, Massachusetts, Michigan, Minnesota, New Hampshire, New Mexico, Oklahoma, Oregon, Tennessee, Texas, Utah, and Wisconsin).
- Sporadic activity was reported by 17 states (Alabama, Colorado, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Montana, Nebraska, North Dakota, Ohio, South Dakota, Vermont, and Wyoming).



* 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: July 24, 2009.