

2008-2009 Influenza Season Week 32 ending August 15, 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 32 (August 9-15, 2009), influenza activity remained stable in the United States; however, there were still higher levels of influenza-like illness than is normal for this time of year.

- A total of 7,983 hospitalizations and 522 deaths associated with 2009 influenza A (H1N1) viruses have been reported to CDC.
- During week 32:
 - 525 (15.6%) 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.
 - 98% 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 below the epidemic threshold.
 - Four influenza-associated pediatric deaths were reported and all were associated with a 2009 influenza A (H1N1) virus infection.
 - The proportion of outpatient visits for influenza-like illness (ILI) was below national and region-specific baseline levels.
 - Two states reported geographically widespread influenza activity, eight states and Puerto Rico reported regional influenza activity, 14 states and the District of Columbia reported local influenza activity, and 26 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)	2009 A (H1N1)	A (unable to sub-type)¶	A (Subtyping not performed)	B	Pediatric Deaths
Nation	Normal	15.6%	11 of 52	8,174	3,947	34,076	776	19,107	10,816	105
Region I	Normal	4.4%	1 of 6	583	305	2,885	13	1,700	820	4
Region II	Normal	4.7%	2 of 3	297	228	1,821	21	2,385	714	19
Region III	Normal	20.6%	0 of 6	1,250	220	4,188	20	1,024	1,364	10
Region IV	Normal	24.3%	4 of 8	896	408	3,803	56	3,158	1,296	9
Region V	Normal	16.6%	0 of 6	1,661	205	8,266	198	872	1,421	17
Region VI	Normal	24.6%	0 of 5	830	302	3,210	7	4,663	2,666	15
Region VII	Normal	19.3%	0 of 4	534	84	1,029	107	530	537	0
Region VIII	Normal	14.9%	0 of 6	533	219	1,392	75	1,729	501	9
Region IX	Normal	25.8%	3 of 4	1,200	1,655	5,013	65	2,522	806	19
Region X	Normal	29.2%	1 of 4	390	321	2,469	214	524	691	3

* 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 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 32
No. of specimens tested	3,366
No. of positive specimens (%)	525 (15.6%)
Positive specimens by type/subtype	
Influenza A	524 (99.8%)
A (2009 H1N1)	366 (69.8%)
A (subtyping not performed)	135 (25.8%)
A (unable to subtype)	15 (2.9%)
A (H3)	4 (0.8%)
A (H1)	4 (0.8%)
Influenza B	1 (0.2%)

During week 32, seasonal influenza A (H1) and A (H3) and B viruses co-circulated at low levels with 2009 influenza A (H1N1) viruses. 98% of all subtyped influenza A viruses being reported to CDC this week were 2009 influenza A (H1N1) viruses.

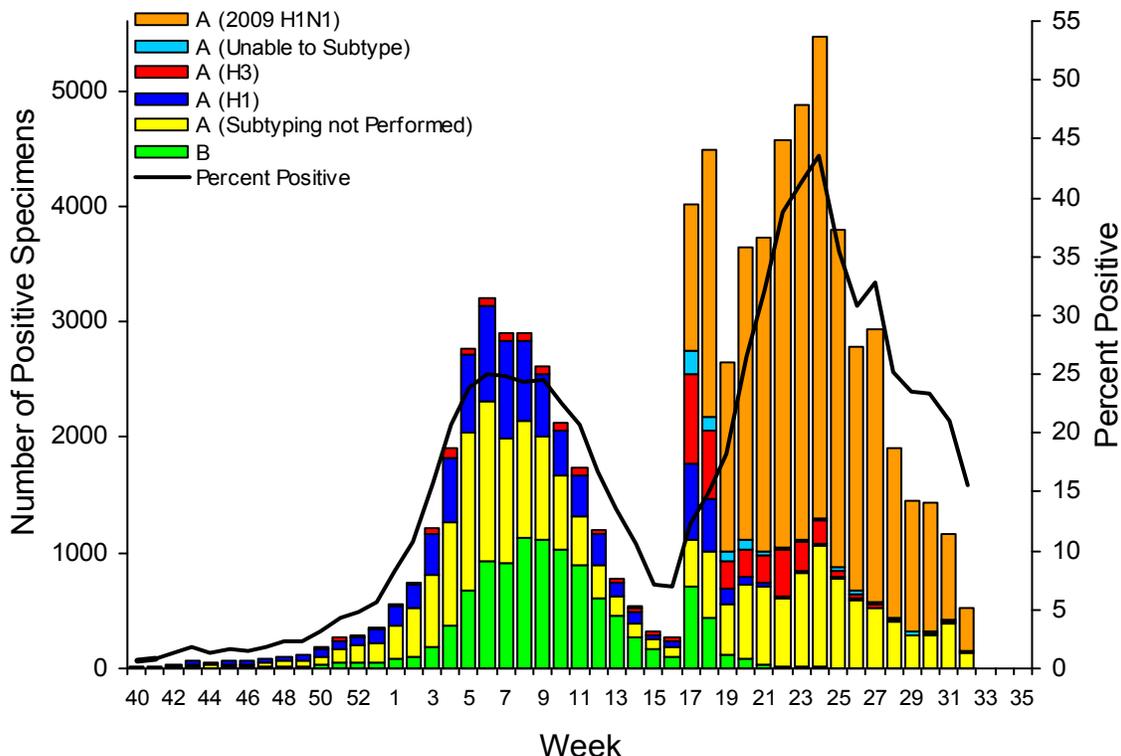
The unusually high percentage of specimens testing positive for influenza by WHO and NREVSS collaborating laboratories remained higher during week 32 than is typically seen this time of year, and may be due in part to changes in testing practices by health care providers, triaging of specimens by public health laboratories, an increase in the number of specimens collected from outbreaks, and other factors.

During the 2008-09 influenza 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 2009 influenza A (H1N1) virus infection in the United States, and this virus has been the predominant circulating influenza strain since testing and reporting of 2009 influenza A (H1N1) viruses by U.S. WHO collaborating laboratories began during week 17 (week ending May 2, 2009).

Because of the extensive spread of 2009 influenza A (H1N1) within the United States, it has become extremely resource intensive for local and state health departments to count individual cases. In addition, since only a small proportion of persons with respiratory illness are tested for 2009 influenza A (H1N1) infection, confirmed and probable case counts represent a significant underestimate of the true number of 2009 influenza A (H1N1) cases in the United States. As a result, CDC no longer reports individual case counts; only hospitalizations and deaths associated with confirmed 2009 influenza A (H1N1) are reported each week on the CDC H1N1 influenza website (<http://www.cdc.gov/h1n1flu/update.htm>).

As of August 21, 2009, 7,983 hospitalizations and 522 deaths (11 deaths in individuals 0-4 years, 77 deaths in individuals 5-24 years, 222 deaths in adults 25-49 years, 145 deaths in adults 50-64 years, 51 deaths in adults age 65 and older, and 16 deaths for which age was no reported) associated with 2009 influenza A (H1N1) virus have been identified by CDC and state and local public health departments.

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



Antigenic Characterization: CDC has antigenically characterized 2,101 seasonal human influenza viruses [1,186 influenza A (H1), 221 influenza A (H3) and 694 influenza B viruses] collected by U.S. laboratories since October 1, 2008, and 327 2009 influenza A (H1N1) viruses.

All 1,186 seasonal influenza A (H1) viruses are related to the influenza A (H1N1) component of the 2008-09 influenza vaccine (A/Brisbane/59/2007). Two hundred ten (95%) of 221 influenza A (H3N2) viruses tested are related to the A (H3N2) vaccine component (A/Brisbane/10/2007) and 11 viruses (5%) tested showed reduced titers with antisera produced against A/Brisbane/10/2007.

All 327 2009 influenza A (H1N1) viruses are related to the A/California/07/2009 (H1N1) reference virus selected by WHO as a potential candidate for 2009 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-six (11%) of 694 influenza B viruses tested belong to the B/Yamagata lineage and are related to the vaccine strain (B/Florida/04/2006). The remaining 618 (89%) 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 are 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 2009 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, 1,146 seasonal influenza A (H1N1), 245 influenza A (H3N2), 650 influenza B, and 376 2009 influenza A (H1N1) viruses have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir). Also, 1,151 seasonal influenza A (H1N1), 245 influenza A (H3N2), and 431 2009 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.

	Viruses tested (n)	Resistant Viruses, Number (%)	Viruses tested (n)	Resistant Viruses, Number (%)	Viruses tested (n)	Resistant Viruses, Number (%)
		Oseltamivir		Zanamivir		Adamantanes
Seasonal Influenza A (H1N1)	1,146	1,141 (99.6%)	1,146	0 (0)	1,151	6 (0.5%)
Influenza A (H3N2)	245	0 (0)	245	0 (0)	245	245 (100%)
Influenza B	650	0 (0)	650	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	853	4** (0.5)	376	0 (0)	431	431 (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.

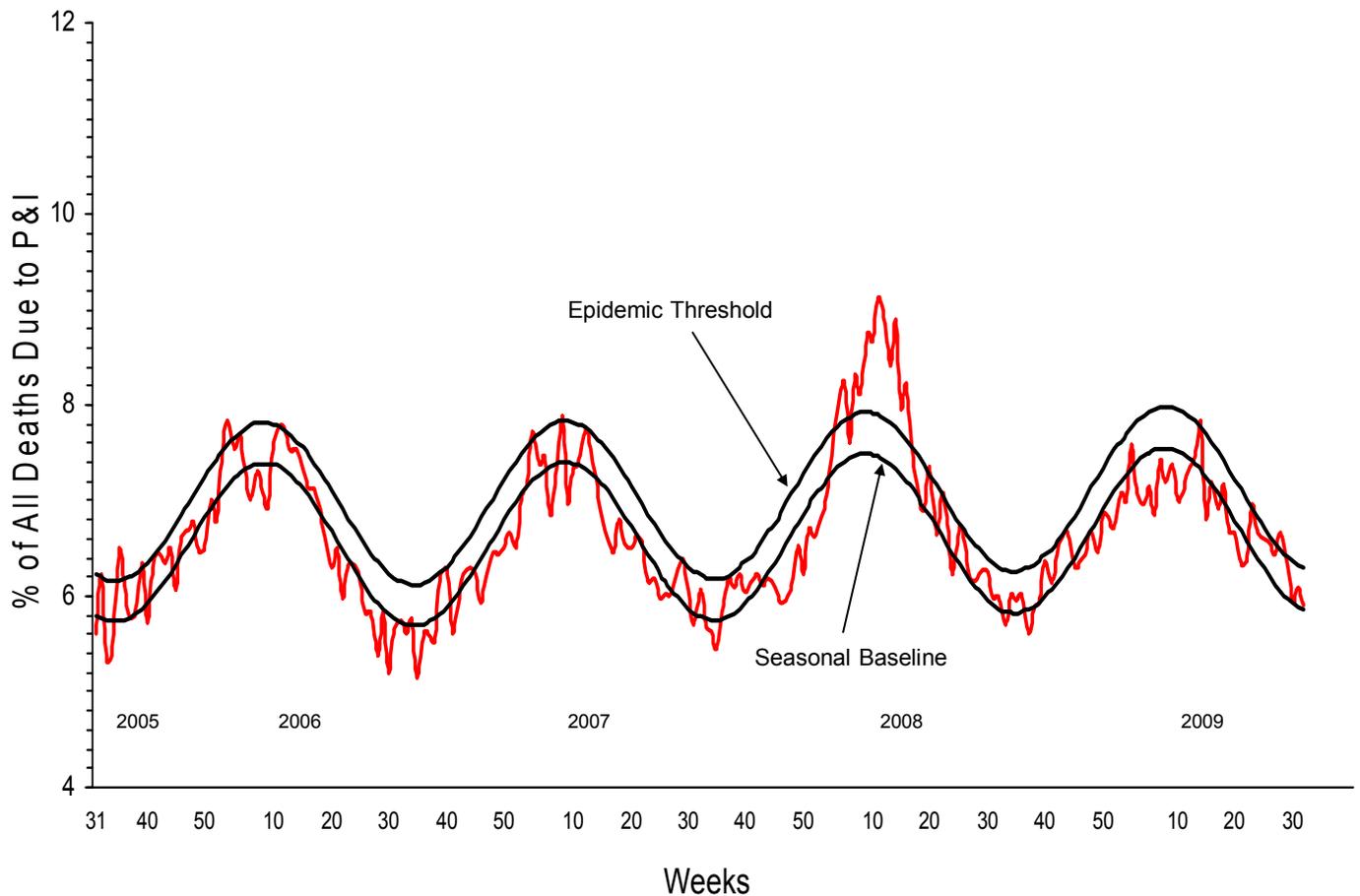
2009 influenza A (H1N1) viruses were tested for oseltamivir resistance by a neuraminidase inhibition assay and/or detection of genetic sequence mutation, depending on the type of specimen tested: original clinical samples were examined for a single known mutation in the virus that confers oseltamivir 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. Of the four oseltamivir resistant 2009 influenza A (H1N1) viruses, two were original clinical samples detected by the neuraminidase inhibition assay, and two were viral isolates detected by sequence analysis of a neuraminidase gene.

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, including two viruses in the United States. All tested viruses retain their sensitivity to the other neuraminidase inhibitor zanamivir. Additional information on antiviral recommendations for treatment and chemoprophylaxis of 2009 influenza A (H1N1) infection is available at <http://www.cdc.gov/h1n1flu/recommendations.htm>. All 2009 influenza A (H1N1) viruses tested to date are 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 2009 influenza A (H1N1) virus infection who are hospitalized or who are at higher risk for seasonal influenza complications.

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 seasonal influenza A (H1N1) viruses tested retain their sensitivity to zanamivir. The three dually-resistant viruses represent less than 1% 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 32, 5.9% of all deaths reported through the 122-Cities Mortality Reporting System were due to P&I. This percentage was below the epidemic threshold of 6.3% for week 32.

Pneumonia and Influenza Mortality for 122 U.S. Cities
Week ending 8/15/2009

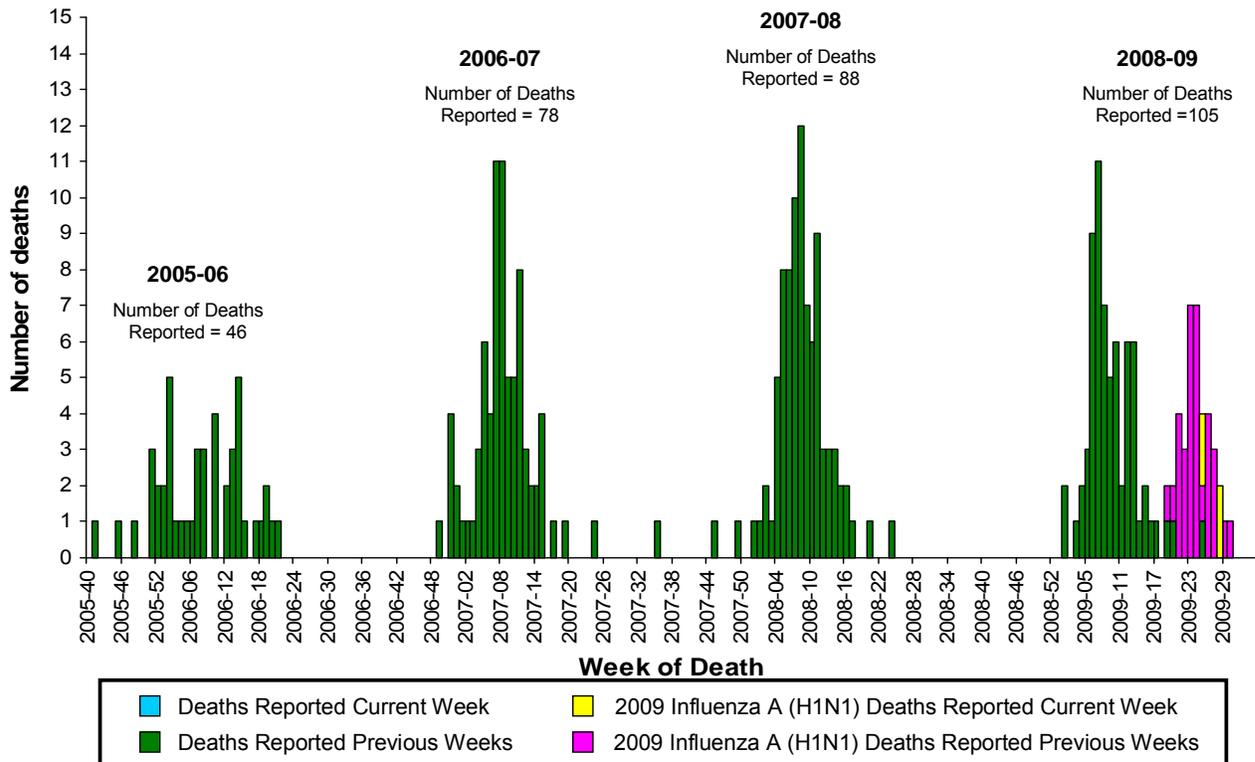


Influenza-Associated Pediatric Mortality: Four influenza-associated pediatric deaths were reported to CDC during week 32 (Arizona, Florida, Washington, and Wisconsin). These deaths were associated with 2009 influenza A (H1N1) virus infection. The deaths reported this week occurred between June 21 and July 18, 2009. Since September 28, 2008, CDC has received 105 reports of influenza-associated pediatric deaths that occurred during the current influenza season, 37 of which were due to 2009 influenza A (H1N1) virus infections.

Of the 44 children who had specimens collected for bacterial culture from normally sterile sites, 16 (36.4%) were positive; *Staphylococcus aureus* was identified in 10 (62.5%) of the 16 children. Four of the *S. aureus* isolates were sensitive to methicillin and six were methicillin resistant. Fourteen (87.5%) of the 16 children with bacterial coinfections were five years of age or older and 10 (62.5%) of the 16 children were 12 years of age or older. Thirteen (35.1%) of the 37 children with confirmed 2009 influenza A (H1N1) infection had a specimen collected from a normally sterile site; two (15.4%) of the 13 children had a positive bacterial culture (methicillin resistant *S. aureus* and *Streptococcus constellatus*). 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

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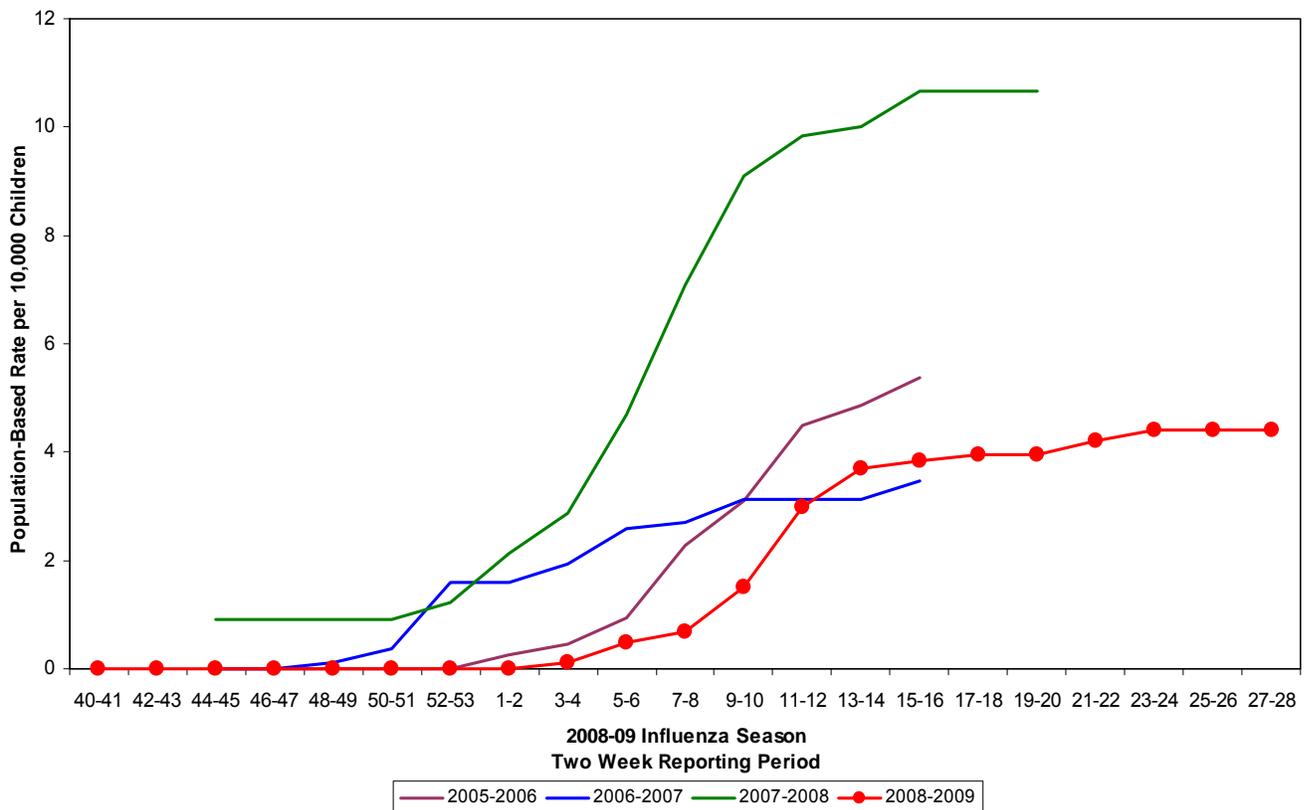


Influenza-Associated Hospitalizations: Laboratory-confirmed influenza-associated hospitalizations are monitored in two population-based surveillance networks: the New Vaccine Surveillance Network (NVSN) and the Emerging Infections Program (EIP).

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 (the week ending July 18, 2009).

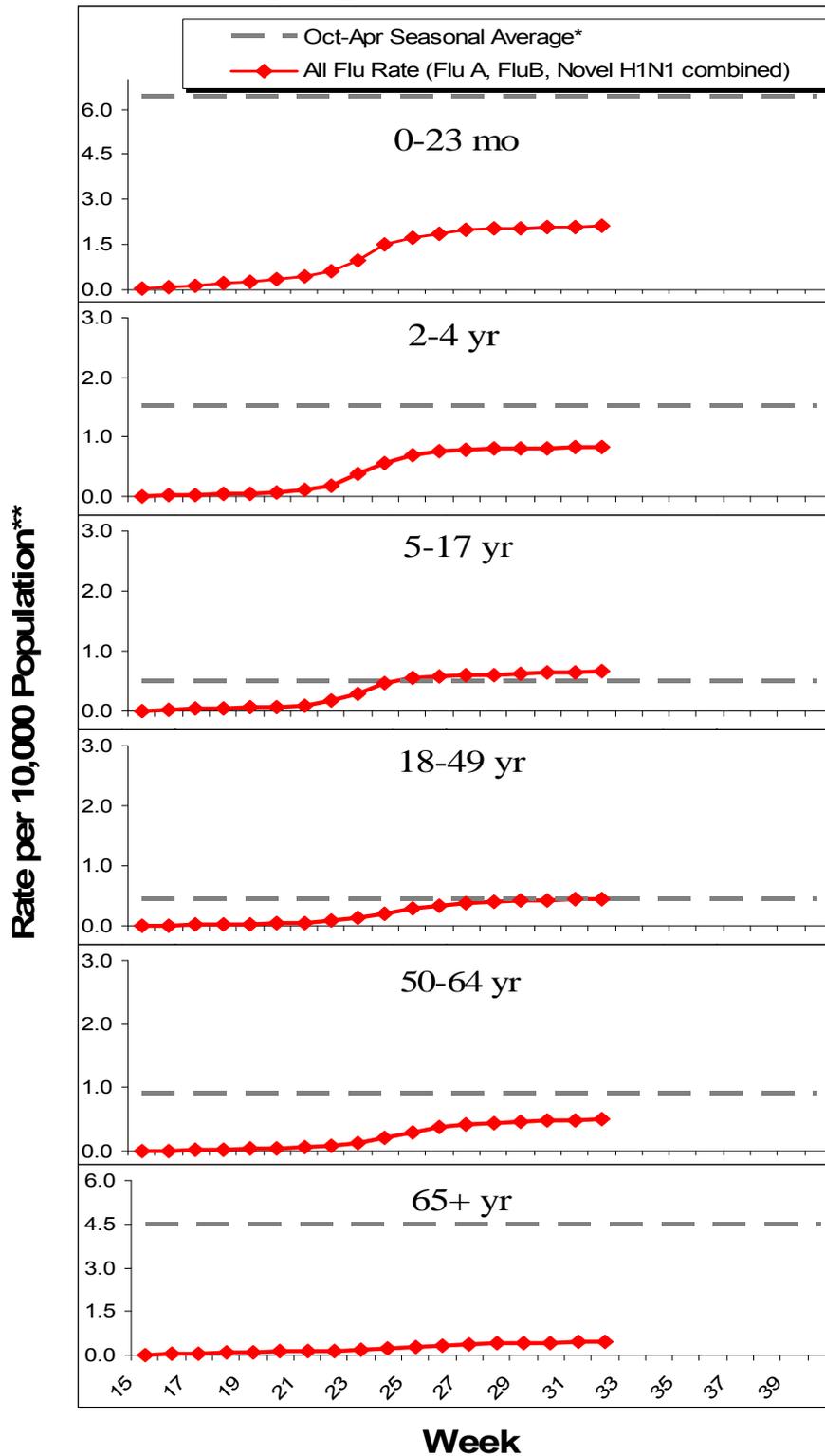
NVSN Influenza Laboratory-Confirmed Cumulative Hospitalization Rates for Children 0 - 4 Years, 2008-09 and Previous Three Seasons



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

Rates for children aged 0-23 months, 2-4 years, and 5-17 years were 2.1, 0.8, and 0.7 per 10,000, respectively. Rates for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 0.4, 0.5, and 0.5 per 10,000, respectively.

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

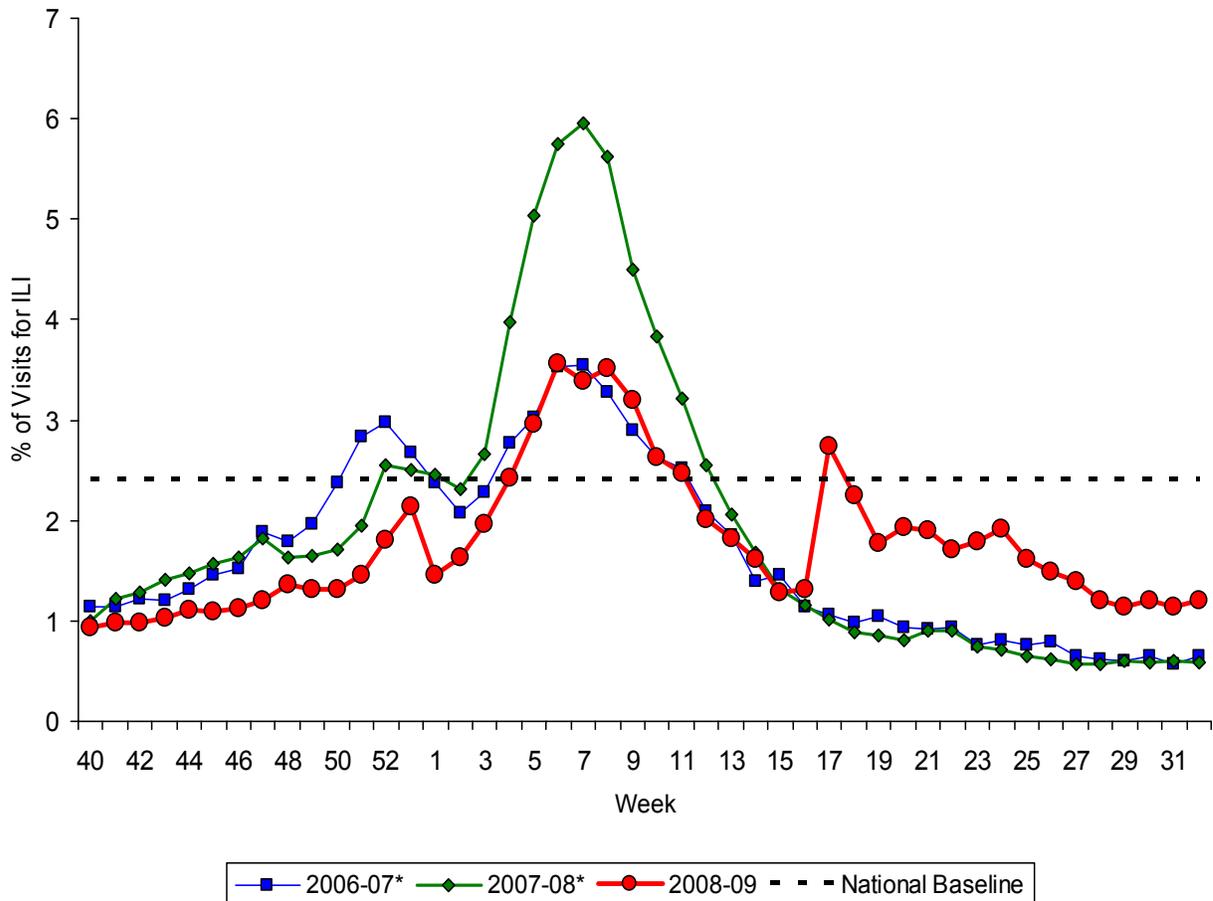


*This value represents an age group-specific average influenza rate from October 1 to April 30 from the 2005-06, 2006-07, and 2007-08 influenza seasons.

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

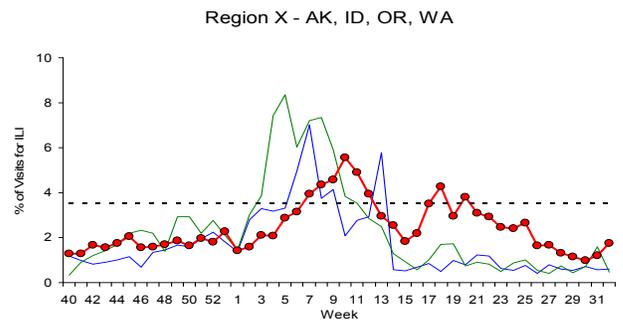
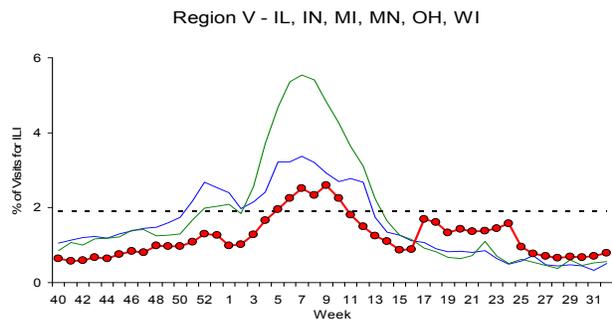
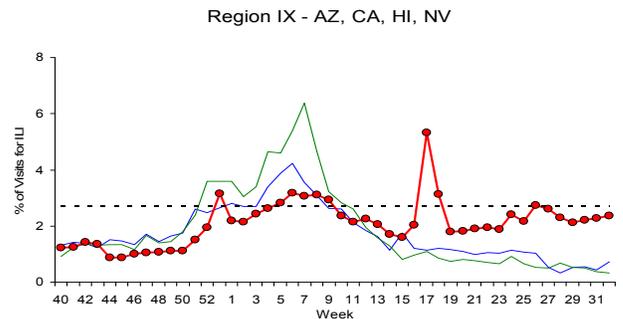
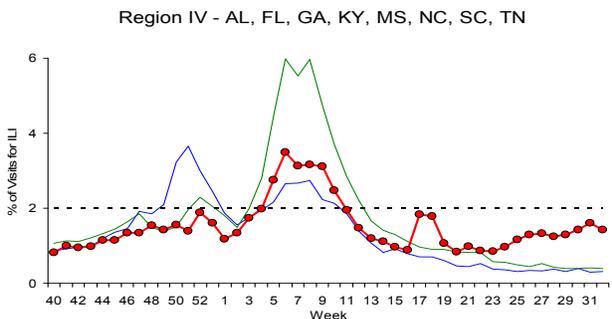
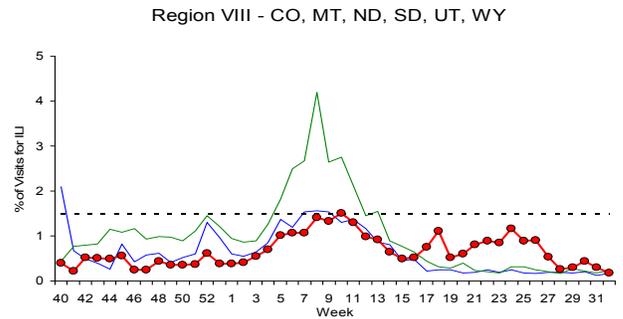
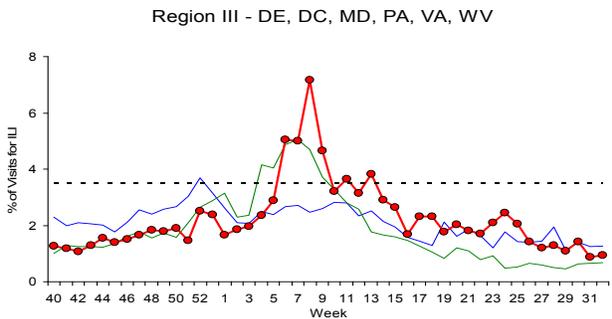
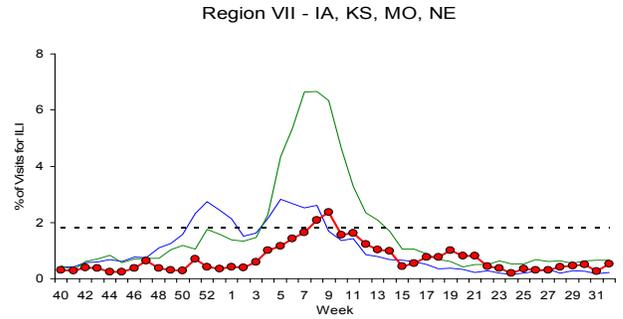
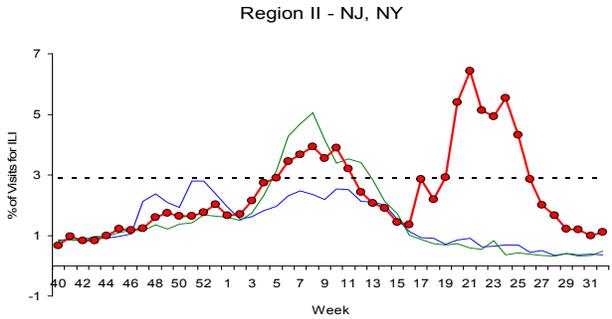
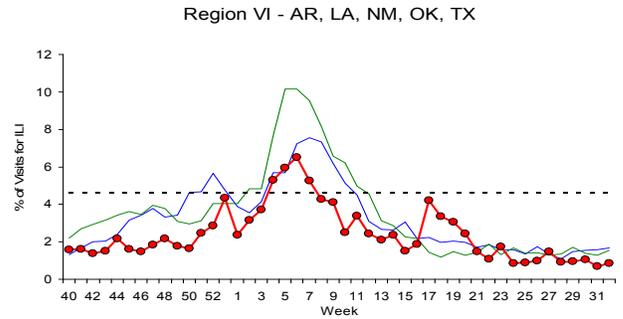
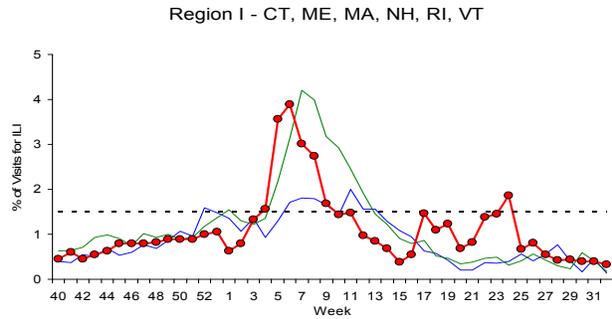
Outpatient Illness Surveillance: Nationwide during week 32, 1.2% of patient visits reported through the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) were due to influenza-like illness (ILI). This percentage is below the national baseline of 2.4%.

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 0.2% to 2.4%. All 10 regions reported percentages of visits for ILI below their respective region-specific baselines. ILI increased during week 32 in seven of 10 regions compared to week 31.



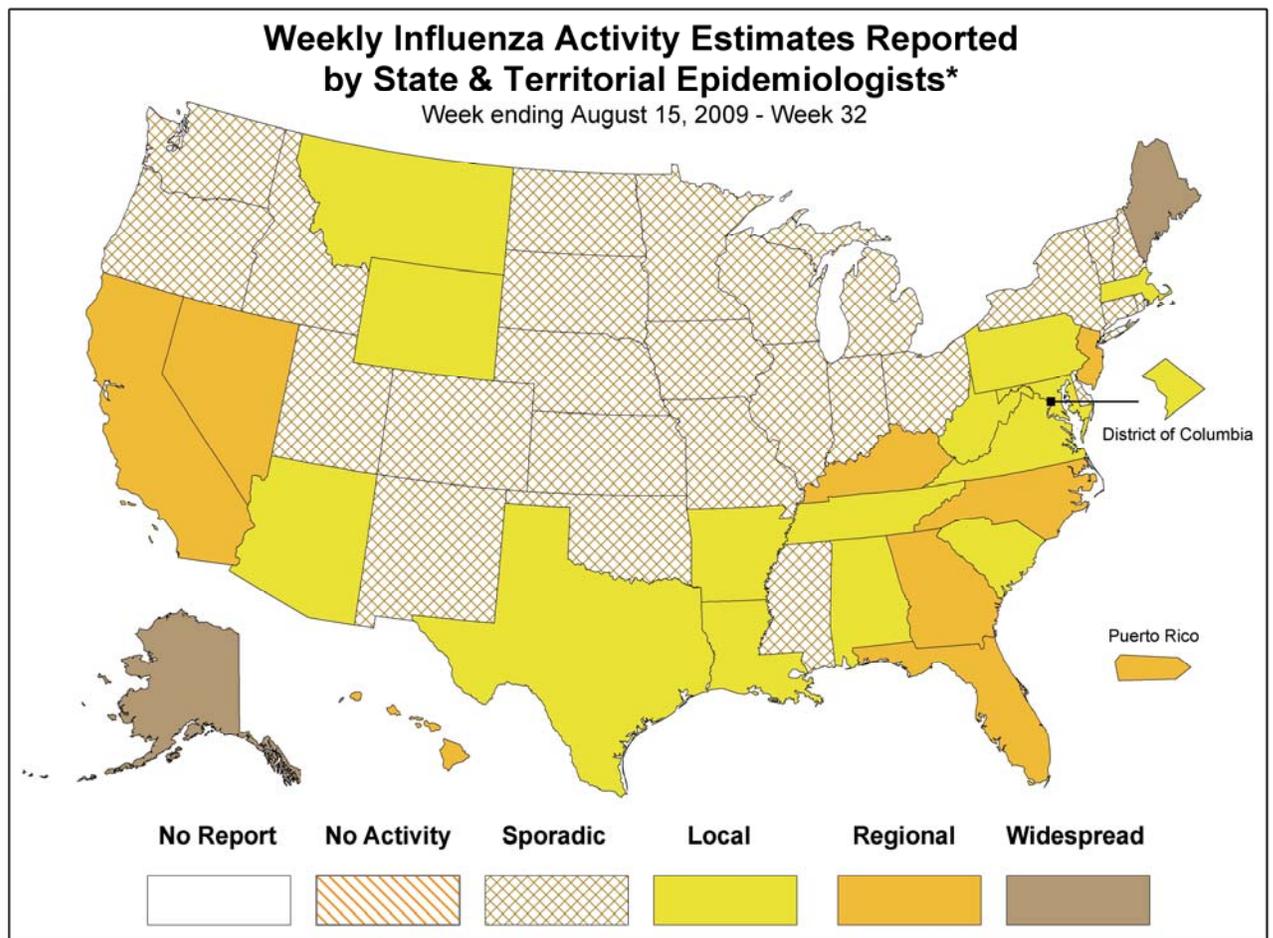
NOTE: Scales differ between regions

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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 32, the following influenza activity was reported:

- Widespread influenza activity was reported by two states (Alaska and Maine).
- Regional influenza activity was reported by Puerto Rico and eight states (California, Florida, Georgia, Hawaii, Kentucky, Nevada, New Jersey, and North Carolina).
- Local influenza activity was reported by the District of Columbia and 14 states (Alabama, Arizona, Arkansas, Louisiana, Maryland, Massachusetts, Montana, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wyoming).
- Sporadic activity was reported by 26 states (Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Utah, Vermont, Washington, and Wisconsin).



* 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: August 21, 2009.