

2009-2010 Influenza Season Week 47 ending November 28, 2009

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

Synopsis: During week 47 (November 22-28, 2009), influenza activity continued to decrease in the U.S.

- 956 (15.4%) 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 ninth consecutive week.
- Seventeen influenza-associated pediatric deaths were reported. Twelve of these deaths were associated with 2009 influenza A (H1N1) virus infection and five were associated with an influenza A virus for which the subtype was undetermined.
- The proportion of outpatient visits for influenza-like illness (ILI) was 3.7% which is above the national baseline of 2.3%. Eight of the 10 regions reported ILI at or above region-specific baseline levels. Regions 6 and 10 reported ILI below their region specific baselines.
- Twenty-five states reported geographically widespread influenza activity, 17 states reported regional influenza activity, the District of Columbia, Puerto Rico and six states reported local influenza activity, and Guam, the U.S. Virgin Islands and two states reported sporadic influenza activity.

National and Regional Summary of Select Surveillance Components

HHS Surveillance Regions**	Data for current week			Data cumulative since August 30, 2009 (Week 35)*						
	Out-patient ILI†	% positive for flu‡	Number of jurisdictions reporting regional or widespread activity§	A (H1)	A (H3)	2009 A (H1N1)	A (unable to subtype)¶	A (Subtyping not performed)	B	Pediatric Deaths
Nation	Elevated	15.4%	42 of 54	24	42	55,179	407	17,903	176	189
Region 1	Elevated	31.9%	6 of 6	5	2	2,702	11	437	10	4
Region 2	Elevated	23.7%	2 of 4	1	5	956	0	910	5	6
Region 3	Elevated	37.9%	4 of 6	3	6	9,838	39	1,376	14	11
Region 4	Elevated	16.4%	8 of 8	0	4	6,016	87	3,870	44	38
Region 5	Elevated	29.1%	4 of 6	6	16	8,414	42	1,242	12	24
Region 6	Normal	8.3%	5 of 5	0	3	2,653	19	4,362	28	60
Region 7	Elevated	13.6%	2 of 4	4	1	3,196	152	922	3	3
Region 8	Elevated	17.6%	3 of 6	3	1	9,374	0	3,600	50	12
Region 9	Elevated	24.4%	4 of 5	0	3	7,642	44	1,002	6	22
Region 10	Normal	40.7%	4 of 4	2	1	4,388	13	182	4	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 viruses in this category were inconclusive because of low virus titers.

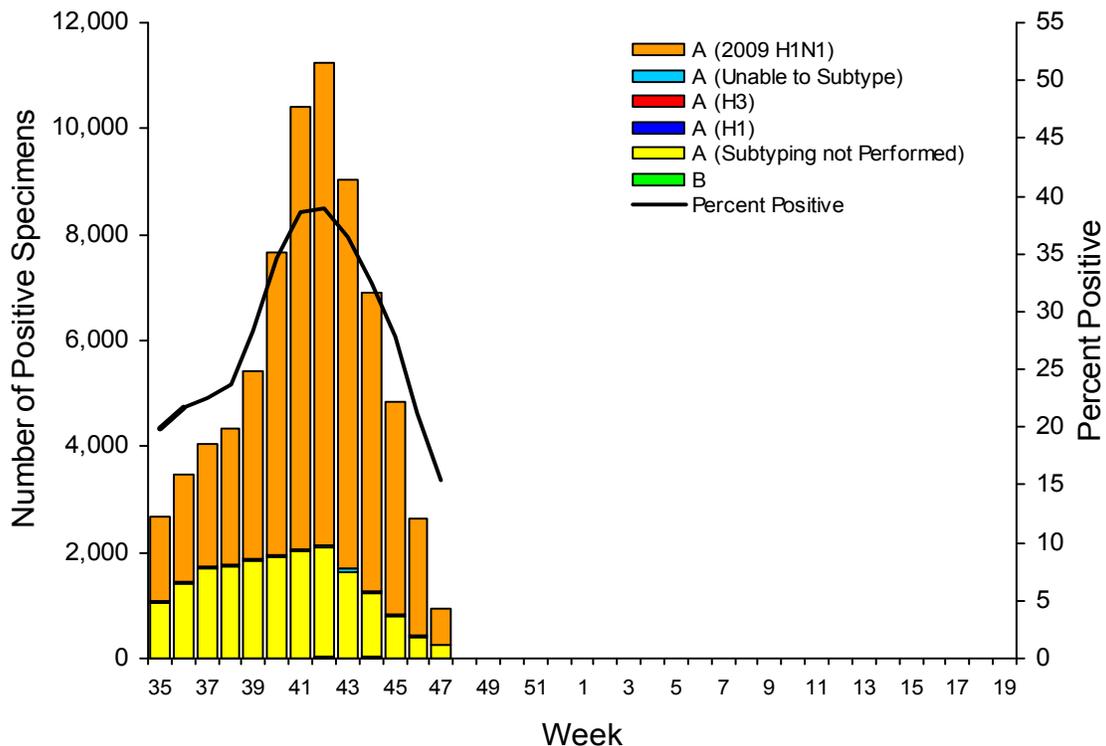
U.S. Virologic Surveillance: WHO and NREVSS collaborating laboratories located in all 50 states and Washington D.C., report to CDC the number of respiratory specimens tested for influenza and the number positive by influenza type and subtype. The results of tests performed during the current week are summarized in the table below.

	Week 47
No. of specimens tested	6,224
No. of positive specimens (%)	956 (15.4%)
Positive specimens by type/subtype	
Influenza A	950 (99.4%)
A (2009 H1N1)	708 (74.5%)
A (subtyping not performed)	233 (24.5%)
A (unable to subtype)*	8 (0.8%)
A (H3)	1 (0.1%)
A (H1)	0 (0.0%)
Influenza B	6 (0.6%)

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

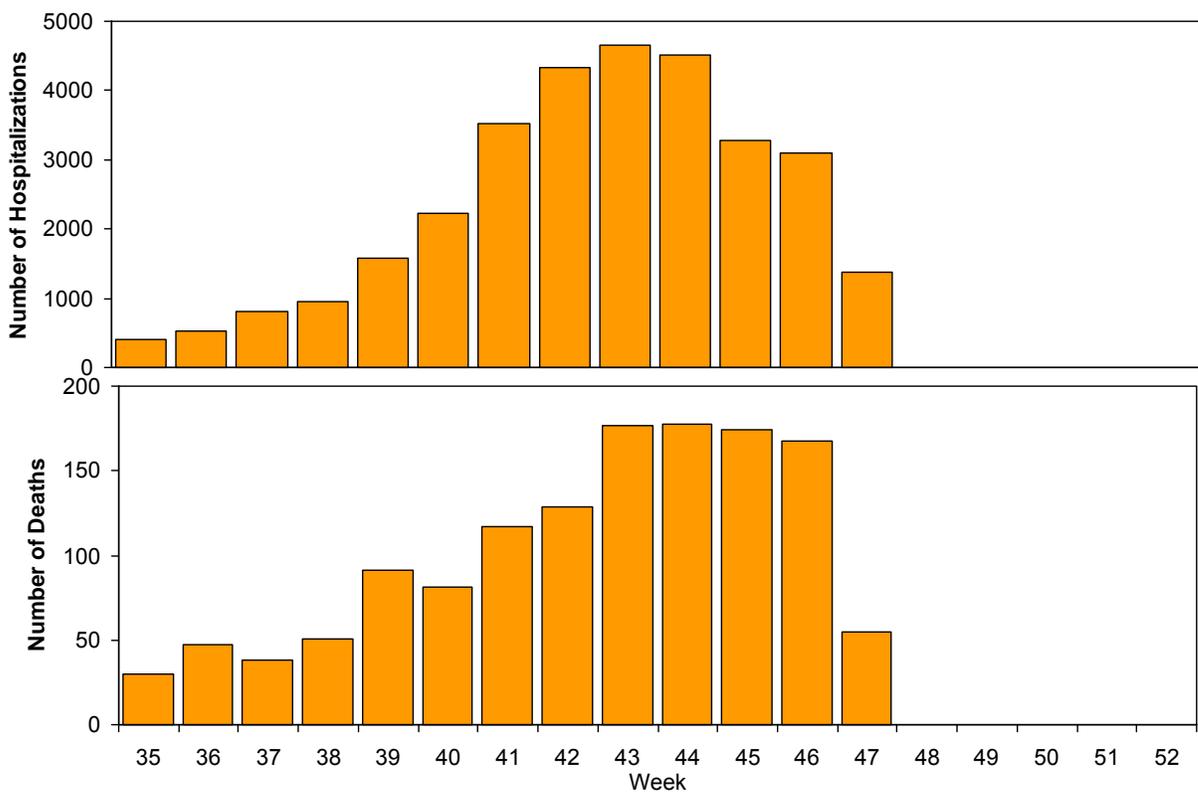
During week 47, seasonal influenza A (H3N2) and influenza B viruses co-circulated at low levels with 2009 influenza A (H1N1) viruses. Over 99% of all subtyped influenza A viruses reported to CDC this week were 2009 influenza A (H1N1) viruses.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, August 30-November 28, 2009



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 28, 2009, 31,320 laboratory-confirmed influenza-associated hospitalizations and 1,336 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 28, 2009



Antigenic Characterization: CDC has antigenically characterized one seasonal influenza A (H1N1), three influenza A (H3N2), four influenza B, and 499 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 three 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).

Four hundred ninety-eight (99.8%) of 499 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 (0.2%) 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, two seasonal influenza A (H1N1), five influenza A (H3N2), one influenza B, and 451 2009 influenza A (H1N1) virus isolates have been tested for resistance to the neuraminidase inhibitors (oseltamivir and zanamivir), and 1,089 2009 influenza A (H1N1) original clinical samples were tested for a single known mutation in the virus that confers oseltamivir resistance. In addition, two influenza A (H3N2) and 207 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.

	Viruses tested (n)	Resistant Viruses, Number (%)	Viruses tested (n)	Resistant Viruses, Number (%)	Isolates tested (n)	Resistant Viruses, Number (%)
		Oseltamivir		Zanamivir		Adamantanes
Seasonal Influenza A (H1N1)	2	1 (50.0)	0	0 (0)	0	0 (0)
Influenza A (H3N2)	5	0 (0)	0	0 (0)	2	2 (100)
Influenza B	1	0 (0)	0	0 (0)	N/A*	N/A*
2009 Influenza A (H1N1)	1,540	15 ^{†‡} (0.6)	451	0 (0)	207	206 (99.5)

*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 and a neuraminidase inhibition assay.

‡ Additional laboratories perform antiviral resistance testing and report their results to CDC. One additional oseltamivir resistant 2009 influenza A (H1N1) virus has been identified by these laboratories since September 1, 2009, bringing the total number to 16.

Over 99% of all of the subtyped influenza A viruses reported during week 47 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 26 cases of oseltamivir resistant 2009 influenza A (H1N1) viruses have been identified in the United States since April 2009. In specimens collected since September 1, 2009, 16 cases have been identified in the United States, including three newly identified cases since last week. The proportion of oseltamivir-resistant 2009 H1N1 viruses does not represent the prevalence of oseltamivir-resistant 2009 H1N1

Influenza-Associated Pediatric Mortality: Seventeen influenza-associated pediatric deaths were reported to CDC during week 47 (Arizona [2], California [5], Florida, Indiana [2], Michigan, Minnesota, New York, Ohio, South Dakota, and Texas [2]). Twelve of these deaths were associated with 2009 influenza A (H1N1) virus infection and five were associated with an influenza A virus for which the subtype is undetermined. The deaths reported during week 47 occurred between September 13 and November 21, 2009.

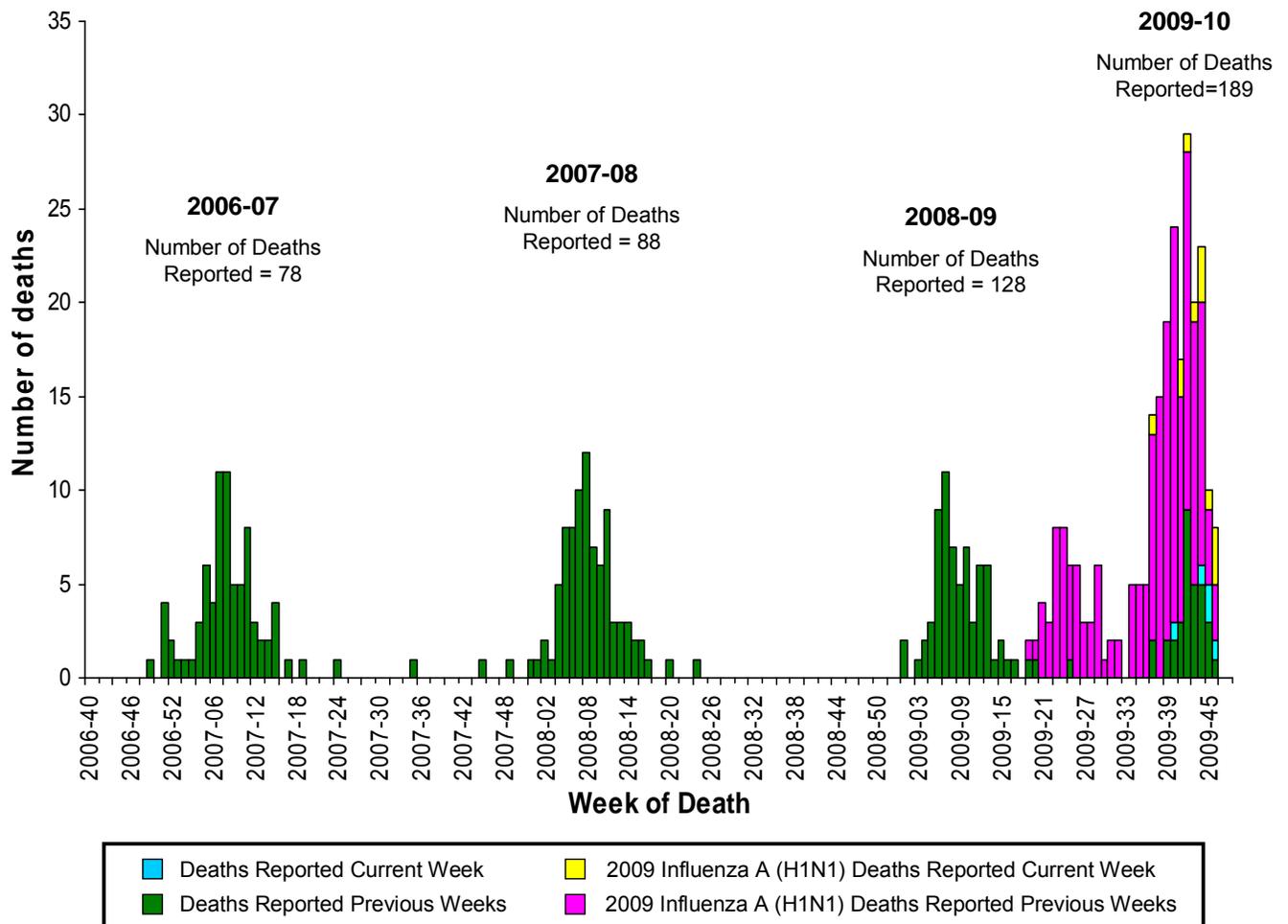
Since August 30, 2009, CDC has received 189 reports of influenza-associated pediatric deaths that occurred during the current influenza season (34 deaths in children less than 2 years old, 20 deaths in children 2-4 years old, 71 deaths in children 5-11 years old, and 64 deaths in children 12-17 years old). One hundred fifty-two (80%) of the 189 deaths were due to 2009 influenza A (H1N1) virus infections, and the remaining 37 were associated with influenza A virus for which the subtype is undetermined. A total of 210 deaths in children associated with 2009 influenza A (H1N1) virus infection have been reported to CDC.

Among the 189 deaths in children, 89 children had specimens collected for bacterial culture from normally sterile sites and 28 (31.5%) of the 89 were positive; *Streptococcus pneumoniae* was identified in nine (32.1%) of the 28 children and *Staphylococcus aureus* was identified in eight (28.6%) of the 28 children. One *S. aureus* isolate was sensitive to methicillin, six were methicillin resistant, and one did not have sensitivity testing performed. Eighteen (64.3%) of the 28 children with bacterial coinfections were five years of age or older, and seven (25.0%) of the 28 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 47 (Week ending November 28, 2009)	12	5	0	17
Number of Deaths OCCURRED since August 30, 2009	152	37	0	189
Number of Deaths OCCURRED since April 26, 2009	210	40	1	251

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

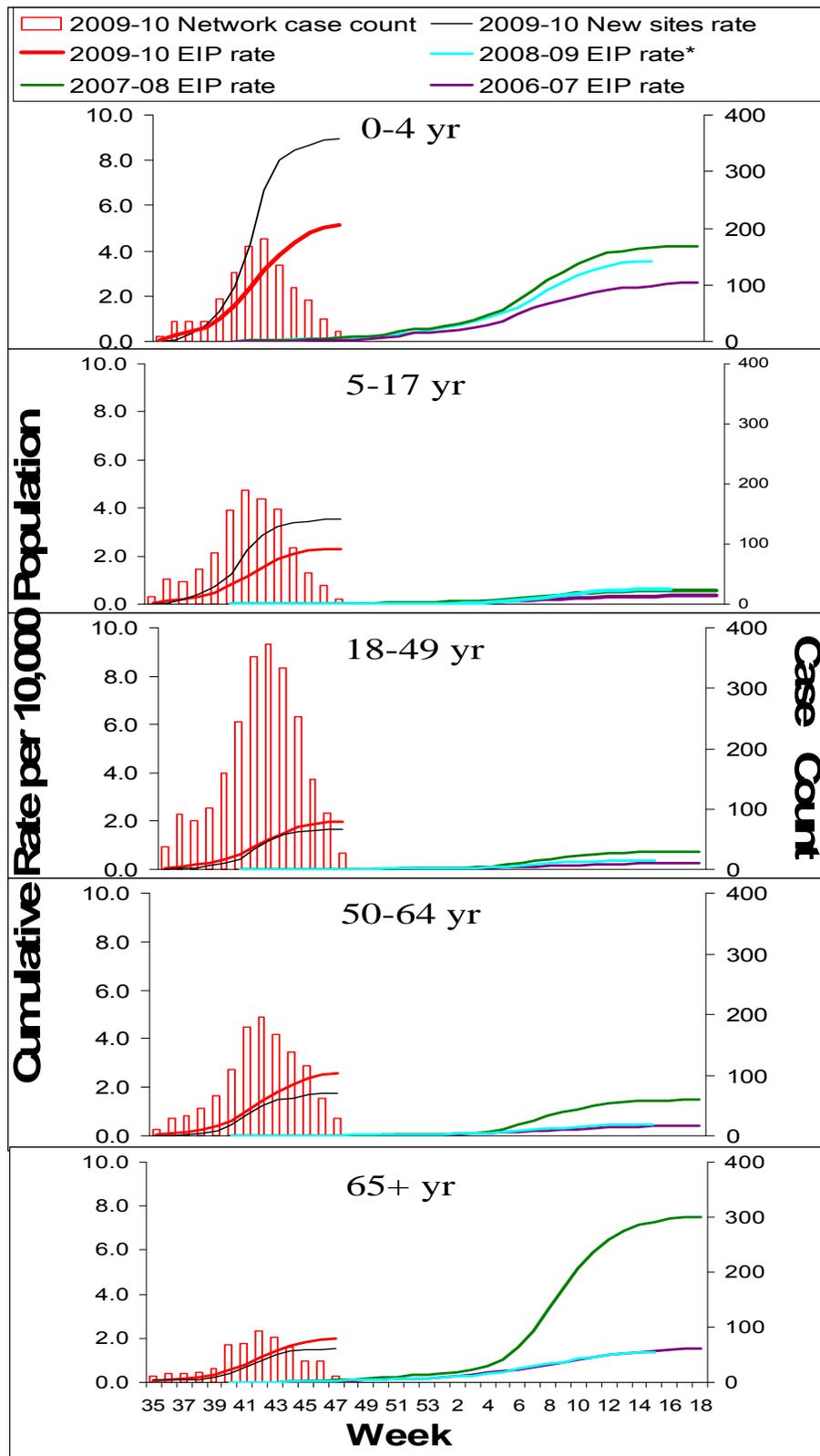


Influenza-Associated Hospitalizations: Laboratory-confirmed influenza-associated hospitalizations are monitored using a population-based surveillance network that includes the 10 Emerging Infections Program (EIP) sites (CA, CO, CT, GA, MD, MN, NM, NY, OR and TN) and 6 new sites (IA, ID, MI, ND, OK and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

During September 1, 2009 – November 28, 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 5.1 (9.0) and 2.3 (3.5) per 10,000, respectively. Rates [EIP (new sites)] for adults aged 18-49 years, 50-64 years, and ≥ 65 years were 2.0 (1.7), 2.6 (1.7) and 2.0 (1.5) per 10,000, respectively.

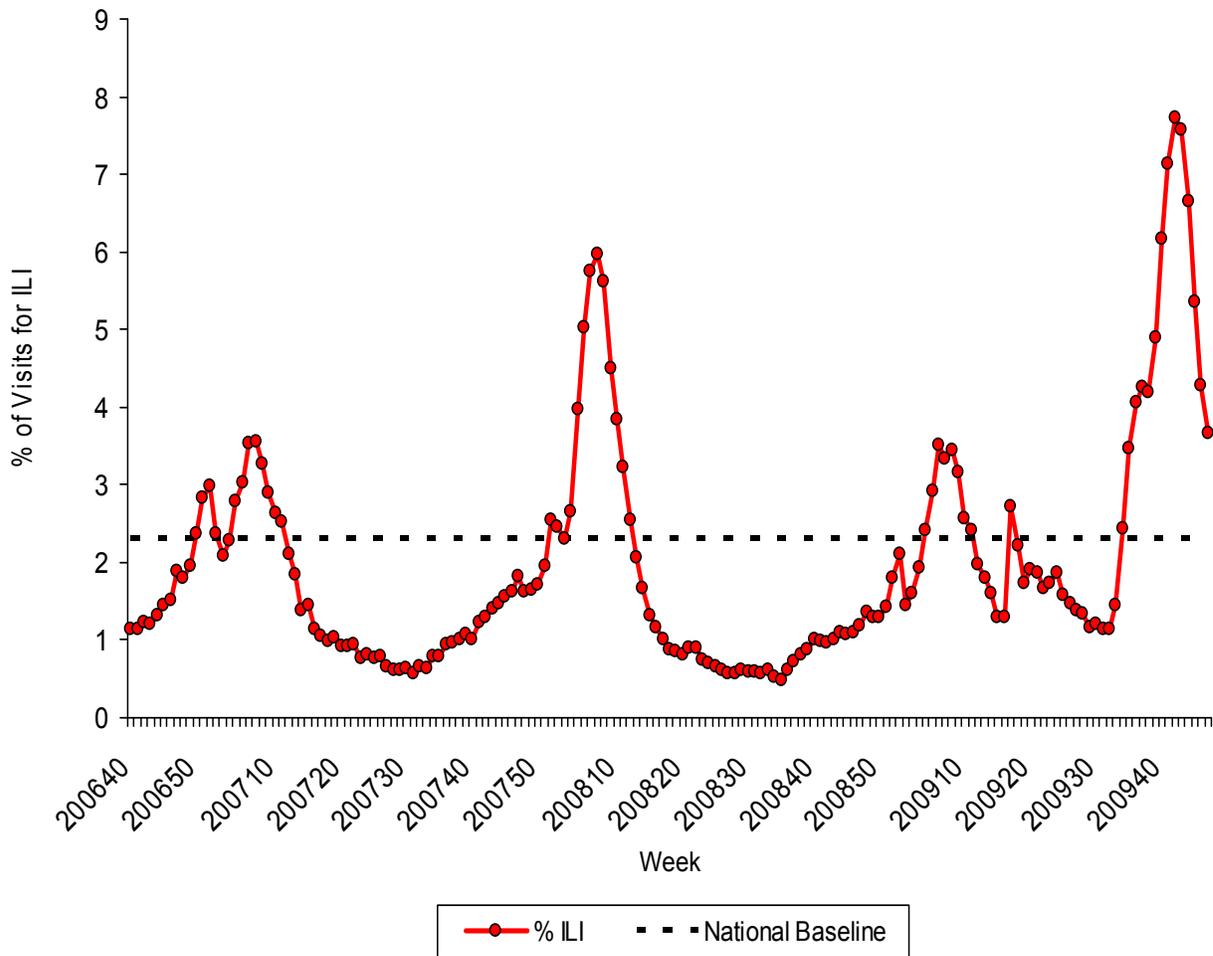
EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates, 2009-10 and Previous Three Seasons*



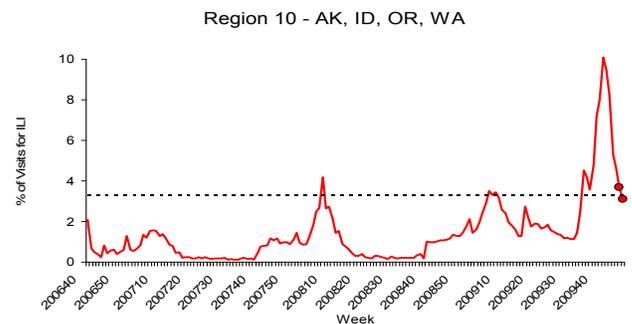
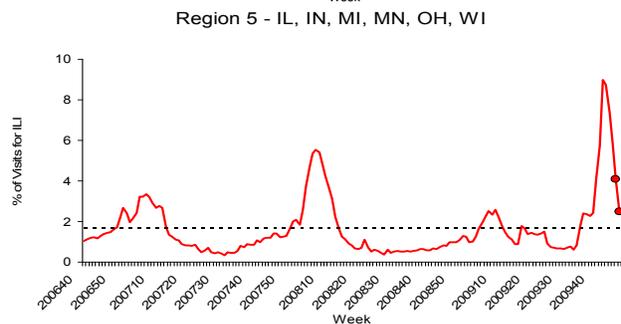
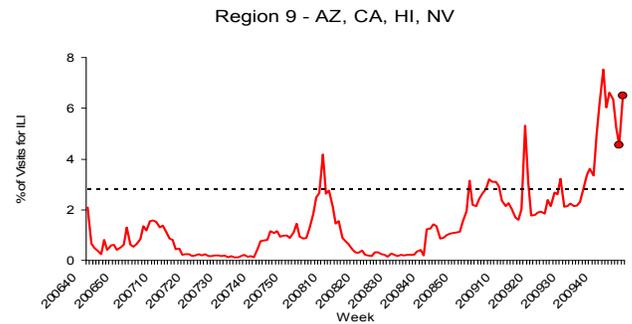
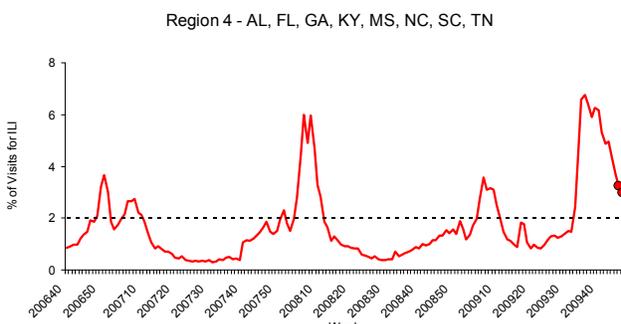
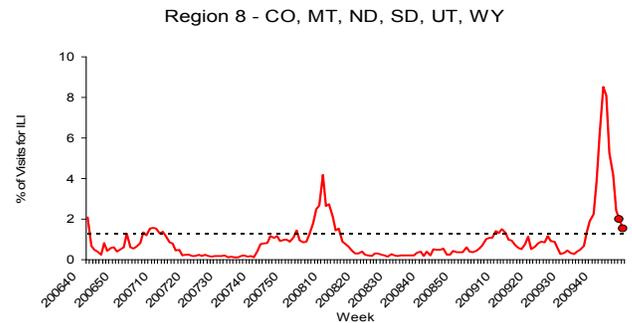
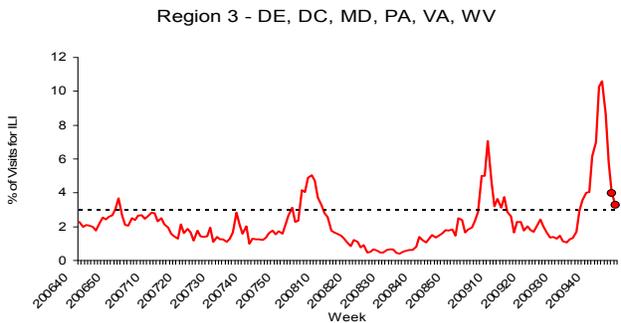
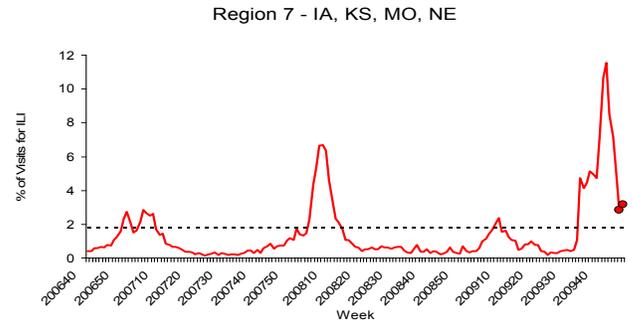
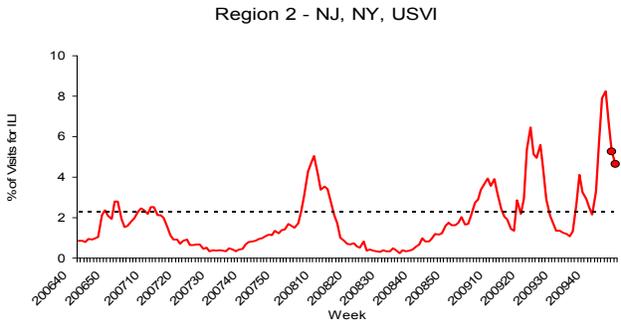
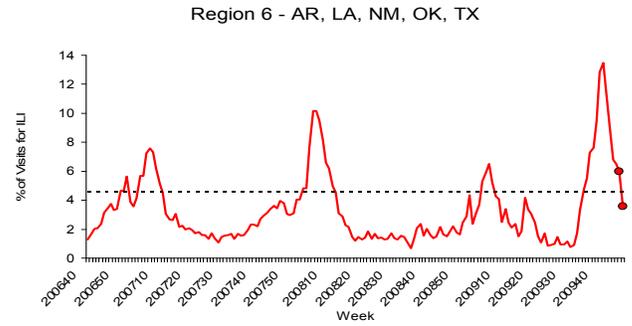
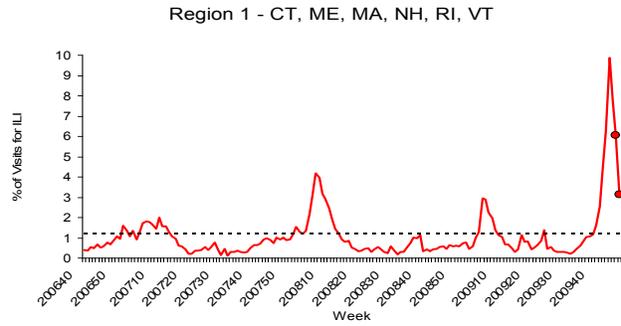
* The 2008-09 EIP rate ended as of April 14, 2009 due to the onset of the 2009 H1N1 season.

Outpatient Illness Surveillance: Nationwide during week 47, 3.7% 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 28, 2009



On a regional level, the percentage of outpatient visits for ILI ranged from 1.5% to 6.5% during week 47. Eight of the 10 regions reported a proportion of outpatient visits for ILI above their region-specific baseline levels. Regions 6 and 10 reported ILI below their region-specific baselines.

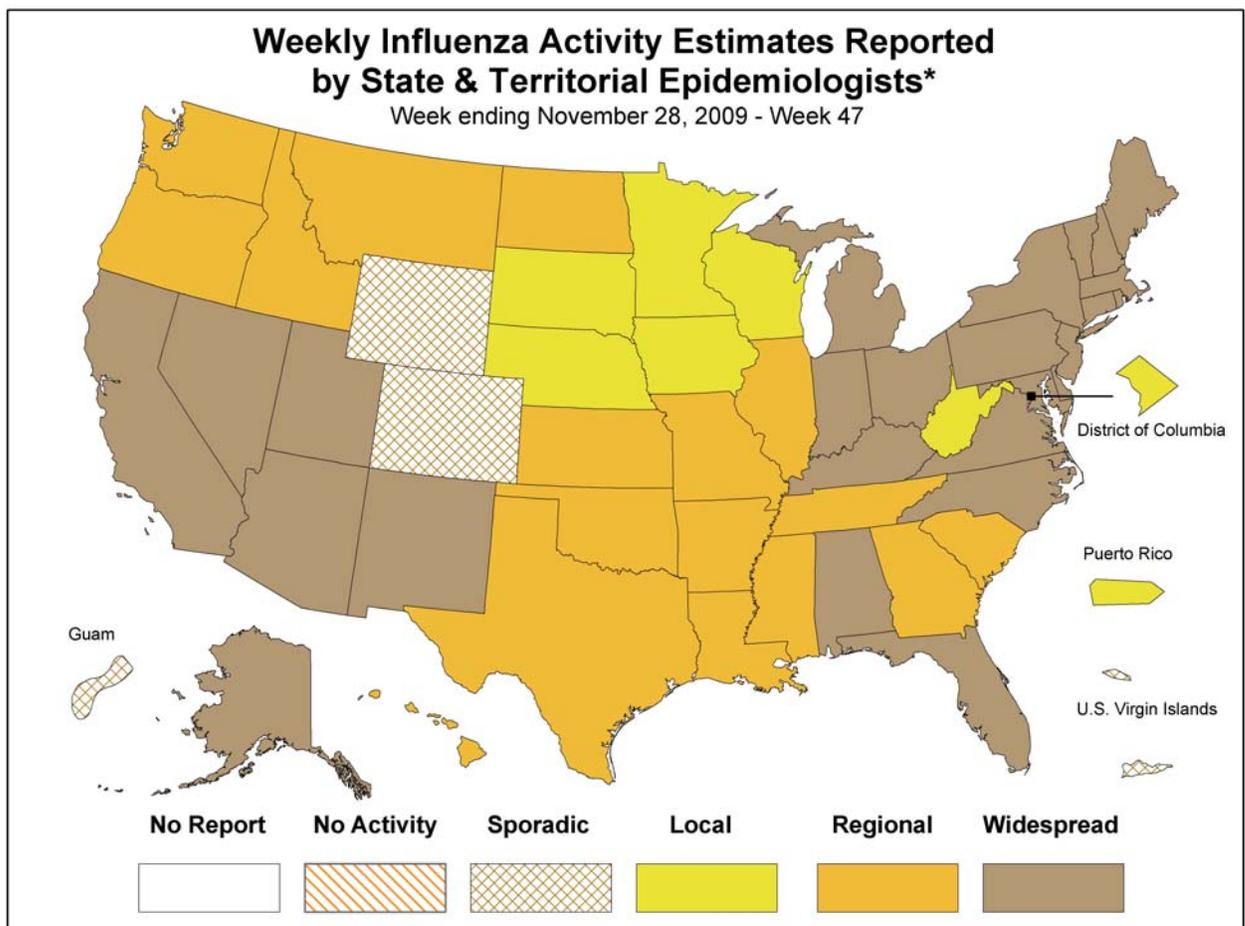


NOTE: Scales differ between regions

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 47, the following influenza activity was reported:

- Widespread influenza activity was reported by 25 states (Alabama, Alaska, Arizona, California, Connecticut, Delaware, Florida, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Utah, Vermont, and Virginia).
- Regional influenza activity was reported by 17 states (Arkansas, Georgia, Hawaii, Idaho, Illinois, Kansas, Louisiana, Mississippi, Missouri, Montana, North Dakota, Oklahoma, Oregon, South Carolina, Tennessee, Texas, and Washington).
- Local influenza activity was reported by the District of Columbia, Puerto Rico, and six states (Iowa, Minnesota, Nebraska, South Dakota, West Virginia, and Wisconsin).
- Sporadic influenza activity was reported by Guam, the U.S. Virgin Islands, and two states (Colorado 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: December 4, 2009.