

2007-2008 Influenza Season
Week 16, ending April 19, 2008

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

Synopsis: During week 16 (April 13 – 19, 2008), influenza activity continued to decrease in the United States.

- One hundred ninety (9.2%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories were positive for influenza.
- The proportion of deaths attributed to pneumonia and influenza has been above the epidemic threshold for 15 consecutive weeks.
- The proportion of outpatient visits for influenza-like illness (ILI) and acute respiratory illness (ARI) was below national and region-specific baseline levels.
- One state reported widespread influenza activity; four states reported regional influenza activity; 14 states reported local influenza activity; 29 states and the District of Columbia reported sporadic influenza activity; one state reported no influenza activity; and one state did not report.

National and Regional Summary of Select Surveillance Components

	Data for current week				Data cumulative for the season				
	Sentinel Provider ILI*	DoD and VA ARI*	% pos. for flu†	Number of jurisdictions reporting regional or widespread activity‡	A (H1)	A (H3)	A Unsub-typed	B	Pediatric Deaths
Nation	Normal	Normal	9.2%	5 of 51	2164	5994	18587	10006	68
New England	Normal	Normal	13.5%	2 of 6	95	210	981	1002	8
Mid-Atlantic	Normal	Normal	16.9%	3 of 3	209	350	1190	1361	12
East North Central	Normal	Normal	12.9%	0 of 5	185	1413	627	560	8
West North Central	Normal	Normal	16.4%	0 of 7	106	236	3023	1703	6
South Atlantic	Normal	Normal	10.1%	0 of 9	351	1822	4724	1640	7
East South Central	Normal	Normal	14.6%	0 of 4	37	758	145	144	6
West South Central	Normal	Normal	5.3%	0 of 4	109	497	5988	1711	8
Mountain	Normal	Normal	10.2%	0 of 8	530	469	999	1075	6
Pacific	Normal	Normal	12.5%	0 of 5	542	239	910	810	7

* Elevated means the % of visits for ILI or ARI 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

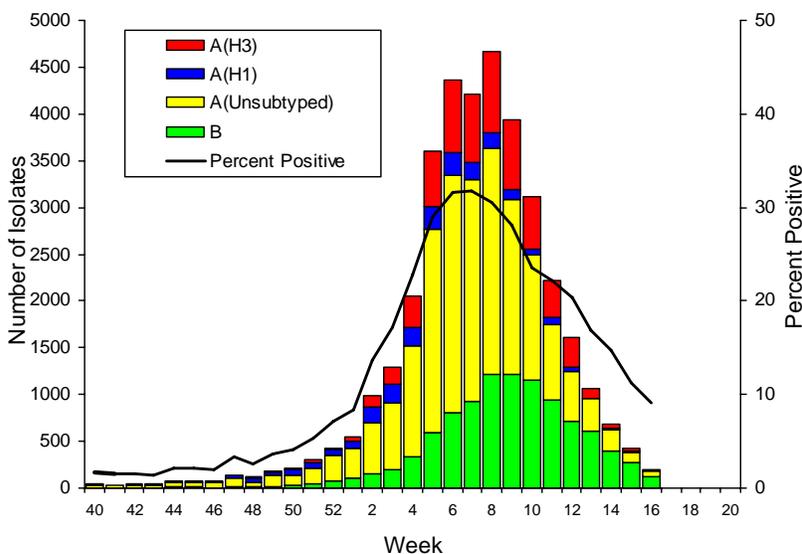
‡ Includes all 50 states and the District of Columbia

Laboratory Surveillance: During week 16, WHO and NREVSS laboratories reported 2,070 specimens tested for influenza viruses, 190 (9.2%) of which were positive, including 14 influenza A (H3) viruses, 49 influenza A viruses that were not subtyped, and 127 influenza B viruses.

Since September 30, 2007, WHO and NREVSS laboratories have tested a total of 199,321 specimens for influenza viruses and 36,751 (18.4%) were positive. Among the 36,751 influenza viruses, 26,745 (72.8%) were influenza A viruses and 10,006 (27.2%) were influenza B viruses. Eight thousand one hundred fifty-eight (30.5%) of the 26,745 influenza A viruses have been subtyped: 2,164 (26.5%) were influenza A (H1) viruses and 5,994 (73.5%) were influenza A (H3) viruses.

During the 2007-08 season, influenza A (H1), A (H3), and B viruses have co-circulated in the United States. Influenza A (H3) viruses have predominated during the season overall, however, the most commonly reported influenza virus has varied by week. From week 40 through week 3 (September 30, 2007 – January 19, 2008) influenza A (H1) viruses were more frequently reported; from week 4 through week 12 (January 20 – March 22, 2008), influenza A (H3) viruses were more commonly reported; and from weeks 13 through 16 (March 23 – April 19, 2008), more influenza B than influenza A viruses were reported. The predominant virus has also varied by region. Influenza A (H3) viruses have been reported more frequently than A (H1) viruses in seven of the nine surveillance regions (East North Central, East South Central, Mid-Atlantic, New England, South Atlantic, West North Central, and West South Central) while influenza A (H1) viruses have predominated this season in two regions (Mountain and Pacific).

U.S. WHO/NREVSS Collaborating Laboratories
National Summary, 2007-08



Composition of the 2008-09 Influenza Vaccine: WHO and FDA have recommended that the 2008-09 trivalent influenza vaccine for the Northern Hemisphere contain A/Brisbane/59/2007-like (H1N1), A/Brisbane/10/2007-like (H3N2), and B/Florida/4/2006-like viruses. All three components have been changed from the 2007-08 Northern Hemisphere vaccine formulation. A/Brisbane/10/2007-like (H3N2) and B/Florida/4/2006-like viruses are currently included in the 2008 Southern Hemisphere vaccines. This recommendation was based on surveillance data related to epidemiology and antigenic characteristics, serological responses to 2007-08 vaccines, and the availability of candidate strains and reagents.

Antigenic Characterization: CDC has antigenically characterized 660 influenza viruses [330 influenza A (H1N1), 161 influenza A (H3N2), and 169 influenza B viruses] collected by U.S. laboratories since September 30, 2007.

Influenza A (H1N1) [330]

- Two hundred twenty (67%) of the 330 viruses were characterized as A/Solomon Islands/3/2006-like, the influenza A (H1N1) component of the 2007-08 influenza vaccine for the Northern Hemisphere and the 2008 influenza A (H1N1) component for the Southern Hemisphere.
- Twenty (6%) of the 330 viruses showed somewhat reduced titers with antisera produced against A/Solomon Islands/3/2006.
- Ninety (27%) of the 330 viruses were characterized as A/Brisbane/59/2007-like. A/Brisbane/59/2007 is a recent genetic/antigenic variant which evolved from A/Solomon Islands/03/2006. An A/Brisbane/59/2007-like virus is the WHO recommended strain for the 2008-09 Northern Hemisphere vaccine formulation.

Influenza A (H3N2) [161]

- Thirty-five (22%) of the 161 viruses were characterized as A/Wisconsin/67/2005-like, the influenza A (H3N2) component of the 2007-08 influenza vaccine for the Northern Hemisphere.
- One hundred fifteen (71%) of the 161 viruses were characterized as A/Brisbane/10/2007-like. A/Brisbane/10/2007-like viruses are a recent antigenic variant which evolved from, but are antigenically distinct from, A/Wisconsin/67/2005-like viruses. A/Brisbane/10/2007-like virus is the recommended influenza A (H3N2) component for the 2008 Southern Hemisphere and 2008-09 Northern Hemisphere vaccines.
- Eleven (7%) of the 161 viruses showed somewhat reduced titers with antisera produced against A/Wisconsin/67/2005 and A/Brisbane/10/2007.

Influenza B (B/Victoria/02/87 and B/Yamagata/16/88 lineages) [169]

Victoria lineage [8]

- Eight (5%) of the 169 influenza B viruses characterized belong to the B/Victoria lineage of viruses.
 - Six (75%) of these 8 viruses were characterized as B/Ohio/01/2005-like. The recommended influenza B component for the 2007-08 influenza vaccine is a B/Malaysia/2506/2004-like virus, belonging to the B/Victoria lineage. B/Ohio/01/2005 is a recent B/Malaysia/2506/2004-like reference strain.
 - Two (25%) of these 8 viruses showed somewhat reduced titers with antisera produced against B/Ohio/01/2005 and B/Malaysia/2506/2004.

Yamagata lineage [161]

- One hundred sixty-one (95%) of the 169 influenza B viruses characterized belong to the B/Yamagata lineage of viruses.
 - One hundred fifty-six (97%) of these 161 viruses were identified as B/Florida/04/2006-like, the recommended influenza B component for the 2008-09 Northern Hemisphere vaccine formulation.
 - Five (3%) of these 161 viruses showed a somewhat reduced titer with antiserum produced against B/Florida/04/2006.

These data indicate similarities and differences between a sample of circulating strains and this year's vaccine strains as determined by laboratory studies. Interim results from a study carried out with the Marshfield Clinic in Wisconsin found vaccine effectiveness of 58% against circulating influenza A (H3N2) viruses, based on data collected from Jan 21 through Feb 8, 2008. No vaccine

effectiveness against influenza B viruses was found. No influenza A (H1N1) viruses were identified through Feb 8 and, thus, no vaccine effectiveness estimate is available for H1N1 viruses. These interim results suggest that vaccination provided substantial protection against H3N2 influenza-associated medically attended illness in the study population. Enrollment in this study concluded on March 28, 2008, and final results will be available later this year. Additional information on this study can be found at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5715a1.htm>

Antiviral Resistance: In the United States, two groups of antiviral drugs have been approved by FDA for use in treating or preventing influenza virus infections. These two groups of antiviral drugs are: neuraminidase inhibitors (oseltamivir and zanamivir) and adamantanes (amantadine and rimantadine). A description of these drugs can be found at: <http://www.cdc.gov/flu/protect/antiviral/index.htm>.

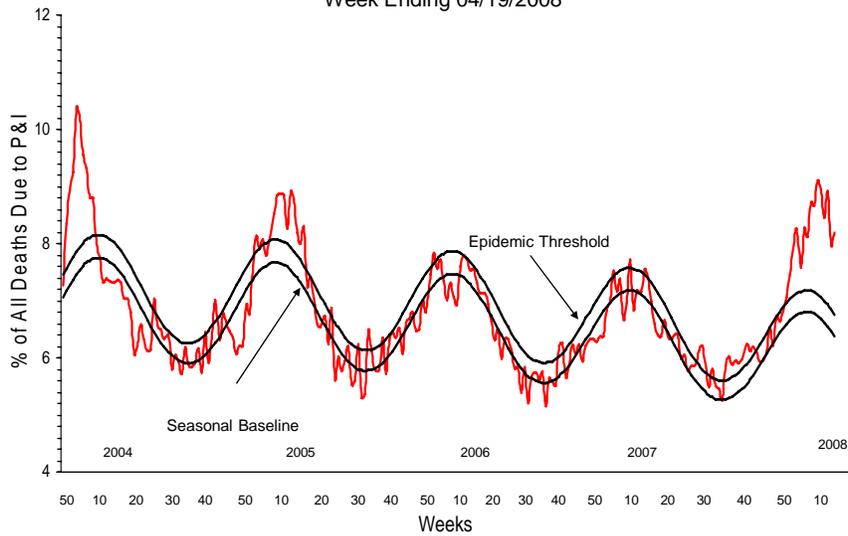
Neuraminidase Inhibitor Antiviral Drugs: So far this season, 1,195 influenza A and B viruses from the United States have been tested for antiviral resistance. Eighty-seven (8.3%) of 1,048 influenza A viruses tested, and 0 (0.0%) of 147 influenza B viruses tested have been found to be resistant to oseltamivir. Currently all of the resistant viruses are influenza A (H1N1) viruses, with 87 (10.4%) of 838 influenza A (H1N1) viruses tested exhibiting a genetic mutation that confers oseltamivir resistance. All tested viruses retain their sensitivity to zanamivir. Additional information on antiviral resistance can be found at: <http://www.cdc.gov/flu/about/qa/antiviralresistance.htm>

Adamantane Antiviral Drugs: Resistance to the adamantanes continues to be high among influenza A (H3N2) viruses with 278 (99.6%) of 279 influenza A (H3N2) viruses tested resistant to the adamantanes. Adamantane resistance among influenza A (H1N1) viruses has also been detected but at a lower level. Of 755 influenza A (H1N1) viruses tested, 83 (11.0%) were resistant to the adamantanes. The adamantanes are not effective against influenza B viruses. Since late January, influenza A (H3N2) viruses have predominated in the United States, and during week 16, 100% of influenza A viruses subtyped were A (H3N2).

Based on the level of oseltamivir resistance observed in only one influenza subtype, H1N1, persisting high levels of resistance to the adamantanes in H3N2 viruses, and the predominance of H3N2 viruses circulating in the United States during the 2007-08 season with co-circulation of influenza B viruses, CDC continues to recommend the use of oseltamivir and zanamivir for the treatment or prevention of influenza. Use of amantadine or rimantadine is not recommended. Guidance on influenza antiviral use can be found at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5606a1.htm>

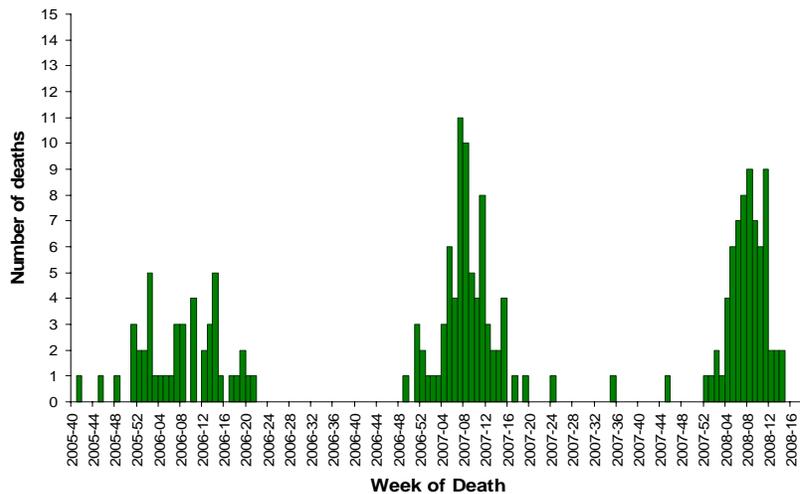
Pneumonia and Influenza (P&I) Mortality Surveillance: During week 16, 8.2% of all deaths reported through the 122 Cities Mortality Reporting System were reported as due to P&I. This percentage is above the epidemic threshold of 6.8% for week 16. Including week 16, P&I mortality has been above epidemic threshold for 15 consecutive weeks.

Pneumonia and Influenza Mortality
for 122 U.S. Cities
Week Ending 04/19/2008



Influenza-Associated Pediatric Mortality: Two influenza-associated pediatric deaths were reported to CDC during week 16 (AZ (1), NH (1)). These deaths occurred during weeks 13 – 14 (March 23 – April 5, 2008). Since September 30, 2007, CDC has received a total of 68 reports of influenza-associated pediatric deaths that occurred during the current season.

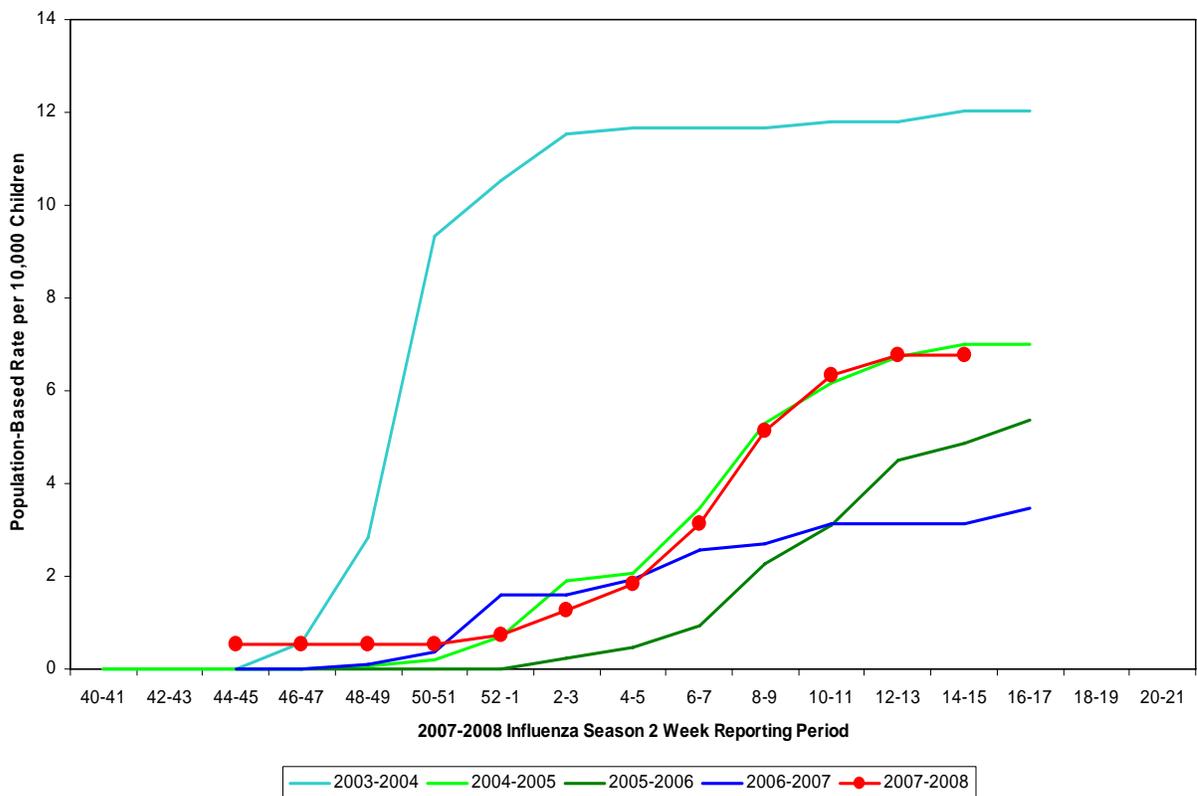
Number of Influenza-Associated Pediatric Deaths
by Week of Death:
2005-06 season to present



Influenza-Associated Pediatric Hospitalizations: Laboratory-confirmed influenza-associated pediatric hospitalizations are monitored in two population-based surveillance networks: the New Vaccine Surveillance Network (NVSN) and the Emerging Infections Program (EIP). These two systems provide updates of surveillance data every two weeks. As a result of differing dates for initiating surveillance in the 2007-08 season, these updates occur on alternating weeks.

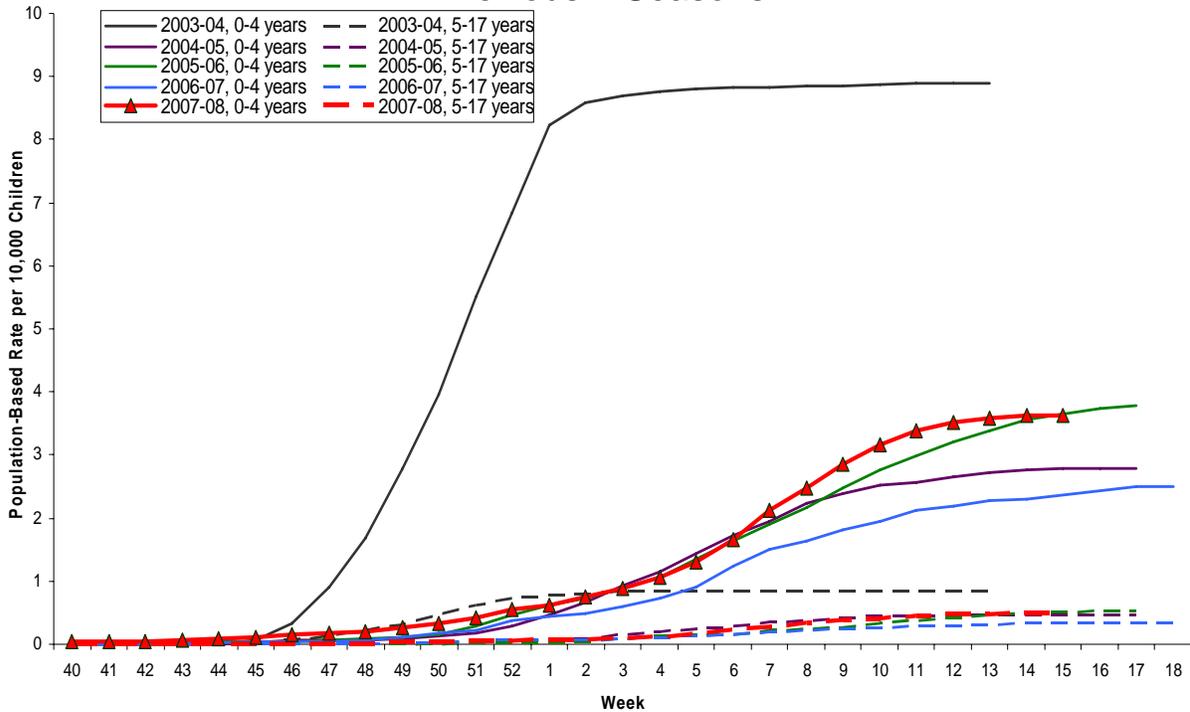
During November 4, 2007 to April 5, 2008, the preliminary laboratory-confirmed influenza-associated hospitalization rate for children 0-4 years old in the NVSN was 6.78 per 10,000.

NVSN Influenza Laboratory-Confirmed Cumulative Hospitalization Rates for Children 0 - 4 Years, 2007- 08 and Previous 4 Seasons



During September 30 – April 12, 2008, the preliminary laboratory-confirmed influenza-associated hospitalization rate reported by the EIP for children 0–17 years old was 1.38 per 10,000. For children aged 0-4 years and 5-17 years, the rate was 3.62 per 10,000 and 0.48 per 10,000, respectively.

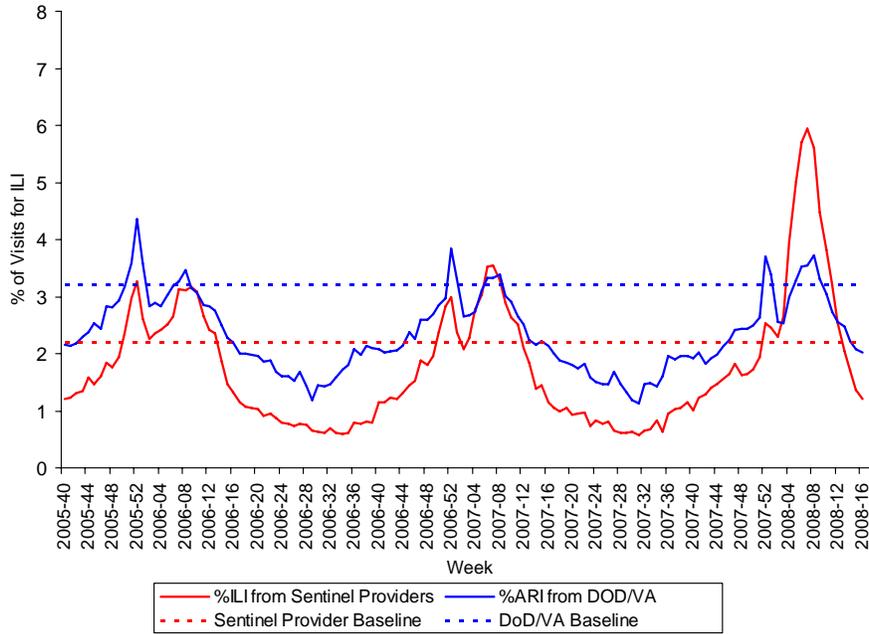
EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates for Children Aged 0-4 and 5-17 yrs, 2007-2008 and Previous 4 Seasons



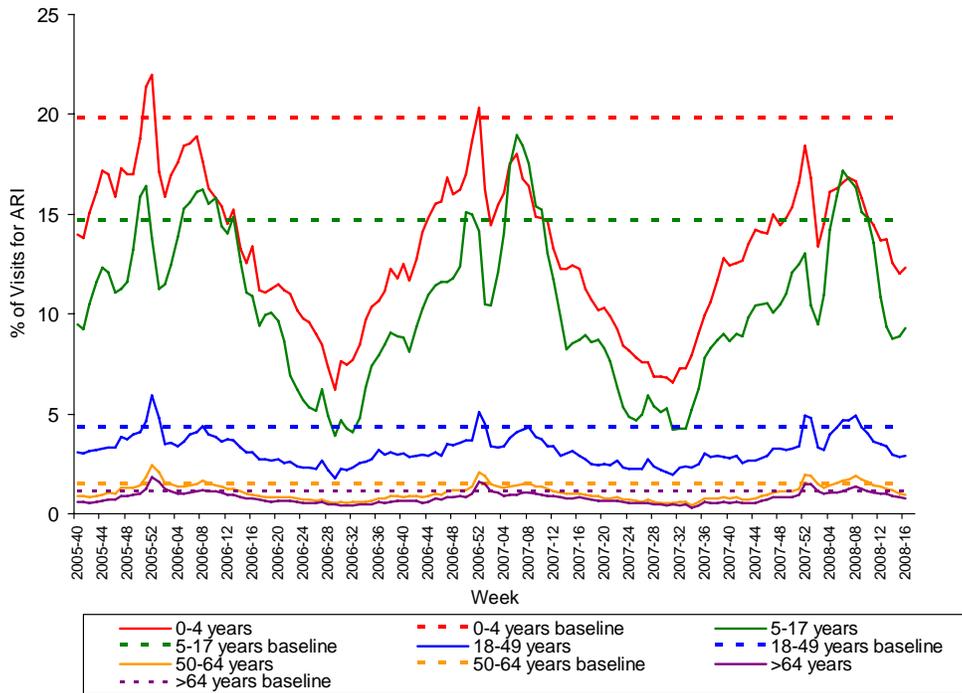
Outpatient Illness Surveillance: Nationwide during week 16, 1.2% of outpatient visits reported through the U.S. Influenza Sentinel Provider Surveillance Network were due to influenza-like illness (ILI), which was below the national baseline of 2.2%. On a regional level, the percentage of outpatient visits for ILI ranged from 0.7% to 2.8%. All nine regions reported ILI below their region-specific baselines.

During week 16, 2.0% of patient visits to Department of Veteran’s Affairs (VA) and Department of Defense (DoD) outpatient treatment facilities were for acute respiratory illness (ARI), which was below the national baseline of 3.2%. On a regional level, the percentage of visits for ARI ranged from 1.1% to 2.5%, and was below region-specific baselines in all nine regions. All five age groups reported ARI below their age-specific baselines.

Percentage of Visits for ILI & ARI Reported by Sentinel Providers and BioSense Outpatient Facilities, National Summary

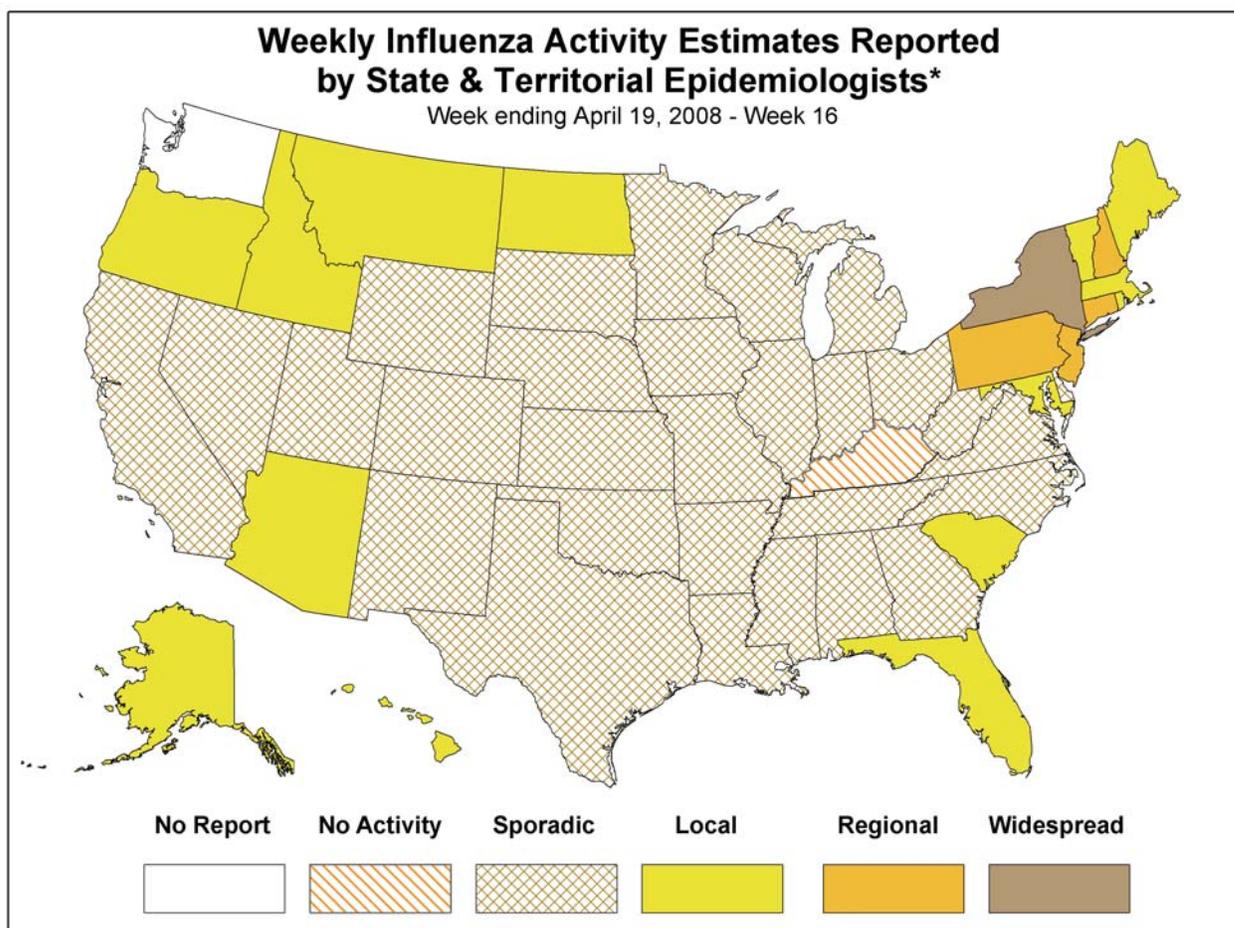


Percentage of Visits for ARI by Age Group Reported by DoD/VA Outpatient Clinics - National Summary



Geographic Spread of Influenza as Assessed by State and Territorial Epidemiologists: During week 16 the following influenza activity was reported:

- Widespread activity was reported by one state (New York).
- Regional activity was reported by four states (Connecticut, New Hampshire, New Jersey, and Pennsylvania).
- Local influenza activity was reported by 14 states (Alaska, Arizona, Florida, Hawaii, Idaho, Maine, Maryland, Massachusetts, Montana, North Dakota, Oregon, Rhode Island, South Carolina, and Vermont).
- Sporadic influenza activity was reported by the District of Columbia and 29 states (Alabama, Arkansas, California, Colorado, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, North Carolina, Ohio, Oklahoma, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming).
- No influenza activity was reported by one state (Kentucky).
- One state did not report (Washington).



* 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: April 25, 2008.