

2007-2008 Influenza Season Week 20, ending May 17, 2008

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

Some of the pediatric influenza hospitalization data for the 2007-2008 season from one site in the New Vaccine Surveillance Network (NVSN) has recently been found to contain some errors. The data has been reanalyzed and this report has been updated to include the corrected analysis. Other influenza surveillance systems data are unaffected.

This is the final report of the 2007-2008 season.

Synopsis: During week 20 (May 11 – 17, 2008), influenza activity continued to decrease in the United States.

- Twenty-one (1.9%) 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 19 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.
- 23 states reported sporadic influenza activity; 26 states and the District of Columbia 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	1.9%	0 of 51	2173	6101	19831	11348	72
New England	Normal	Normal	1.9%	0 of 6	97	260	1261	1343	8
Mid-Atlantic	Normal	Normal	2.2%	0 of 3	209	355	1958	1964	13
East North Central	Normal	Normal	2.9%	0 of 5	185	1430	630	600	10
West North Central	Normal	Normal	2.8%	0 of 7	107	252	3052	1792	5
South Atlantic	Normal	Normal	4.0%	0 of 9	352	1826	4792	1767	8
East South Central	Normal	Normal	0.0%	0 of 4	37	760	152	148	6
West South Central	Normal	Normal	3.2%	0 of 4	109	499	6045	1770	8
Mountain	Normal	Normal	2.7%	0 of 8	531	476	1006	1097	6
Pacific	Normal	Normal	5.8%	0 of 5	546	243	935	867	8

* 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

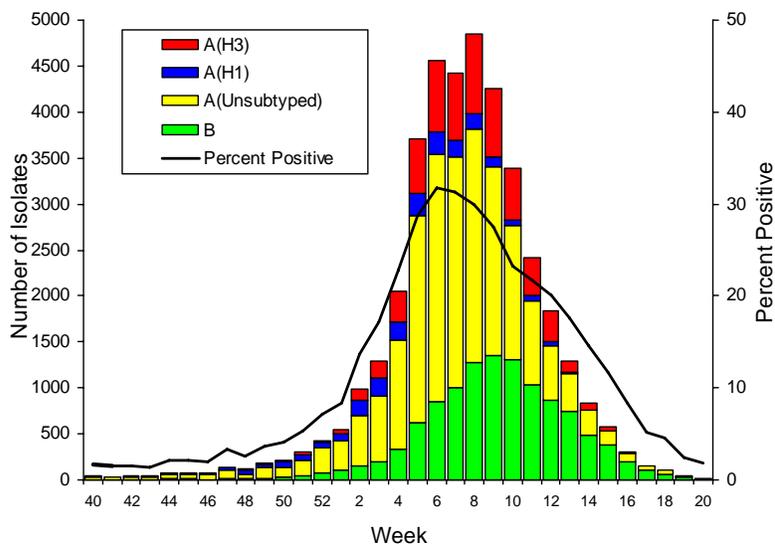
‡ Includes all 50 states and the District of Columbia

Laboratory Surveillance: During week 20, WHO and NREVSS laboratories reported 1,140 specimens tested for influenza viruses, 21 (1.9%) of which were positive, including seven influenza A viruses that were not subtyped and 14 influenza B viruses.

Since September 30, 2007, WHO and NREVSS laboratories have tested a total of 220,666 specimens for influenza viruses and 39,453 (17.9%) were positive. Among the 39,453 influenza viruses, 28,105 (71.2%) were influenza A viruses and 11,348 (28.8%) were influenza B viruses. Eight thousand two hundred seventy-four (29.4%) of the 28,105 influenza A viruses have been subtyped: 2,173 (26.3%) were influenza A (H1) viruses and 6,101 (73.7%) 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 20 (March 23 – May 17, 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 947 influenza viruses [395 influenza A (H1N1), 280 influenza A (H3N2), and 272 influenza B viruses] collected by U.S. laboratories since September 30, 2007.

Influenza A (H1N1) [395]

- Two hundred sixty-seven (68%) of the 395 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 (5%) of the 395 viruses showed somewhat reduced titers with antisera produced against A/Solomon Islands/3/2006.
- One hundred eight (27%) of the 395 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) [280]

- Fifty-nine (21%) of the 280 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 eighty-two (65%) of the 280 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.
- Thirty-nine (14%) of the 280 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) [272]

Victoria lineage [8]

- Eight (3%) of the 272 influenza B viruses characterized belong to the B/Victoria lineage of viruses.
 - Six (75%) of these eight 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 eight viruses showed somewhat reduced titers with antisera produced against B/Ohio/01/2005 and B/Malaysia/2506/2004.

Yamagata lineage [264]

- Two hundred sixty-four (97%) of the 272 influenza B viruses characterized belong to the B/Yamagata lineage of viruses.
 - Two hundred forty-two (92%) of these 264 viruses were identified as B/Florida/04/2006-like, the recommended influenza B component for the 2008-09 Northern Hemisphere vaccine formulation.
 - Twenty-two (8%) of these 264 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>

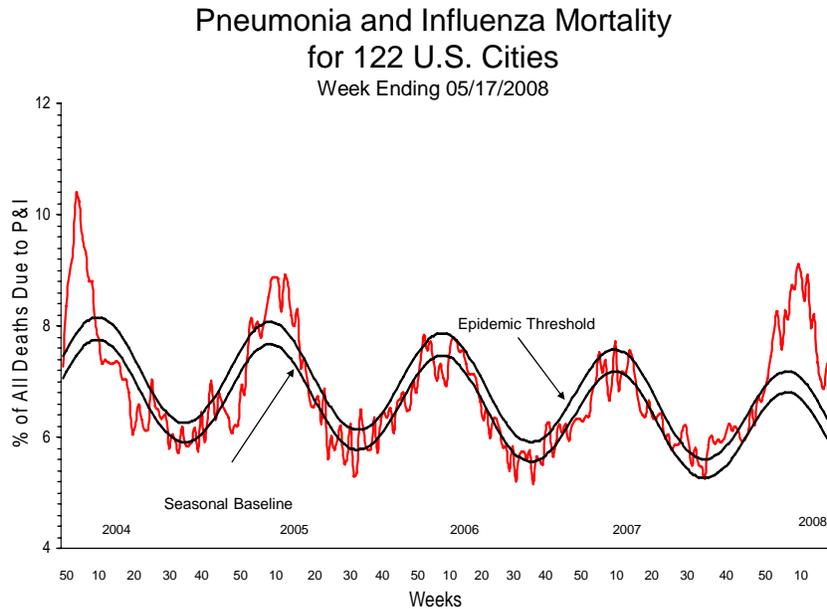
Antiviral Resistance: In the United States, two groups of antiviral drugs have been approved by FDA for use in treating or preventing influenza virus infections. These two groups of antiviral drugs are: neuraminidase inhibitors (oseltamivir and zanamivir) and adamantanes (amantadine and rimantadine). 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, 1,646 influenza A and B viruses from the United States have been tested for antiviral resistance. One hundred seven (8.0%) of 1,341 influenza A viruses tested, and 0 (0.0%) of 305 influenza B viruses tested have been found to be resistant to oseltamivir. Currently all of the resistant viruses are influenza A (H1N1) viruses, with 107 (10.9%) of 979 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 425 (99.8%) of 426 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 883 influenza A (H1N1) viruses tested, 94 (10.6%) were resistant to the adamantanes. The adamantanes are not effective against influenza B viruses. Influenza A (H3N2) viruses have predominated in the United States during the 2007-08 season. Among influenza A viruses subtyped during the most recent three weeks (April 27 – May 17, 2008), 75.0% were influenza A (H3N2).

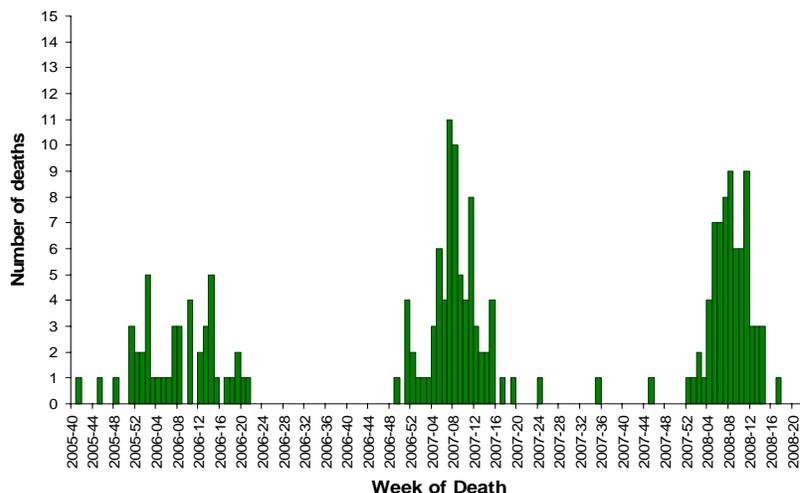
Based on the level of oseltamivir resistance observed in only one influenza subtype, H1N1, persisting high levels of resistance to the adamantanes in H3N2 viruses, and the predominance of H3N2 viruses circulating in the United States during the 2007-08 season with co-circulation of influenza B viruses, 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 20, 7.3% 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 6.3% for week 20. Including week 20, P&I mortality has been above epidemic threshold for 19 consecutive weeks.



Influenza-Associated Pediatric Mortality: Two influenza-associated pediatric deaths were reported to CDC during week 20 [CA (1) and IL (1)]. One death occurred during week 5 (January 27-February 2, 2008) and the other during week 14 (March 30-April 5, 2008). Since September 30, 2007, CDC has received a total of 72 reports of influenza-associated pediatric deaths that occurred during the current season.

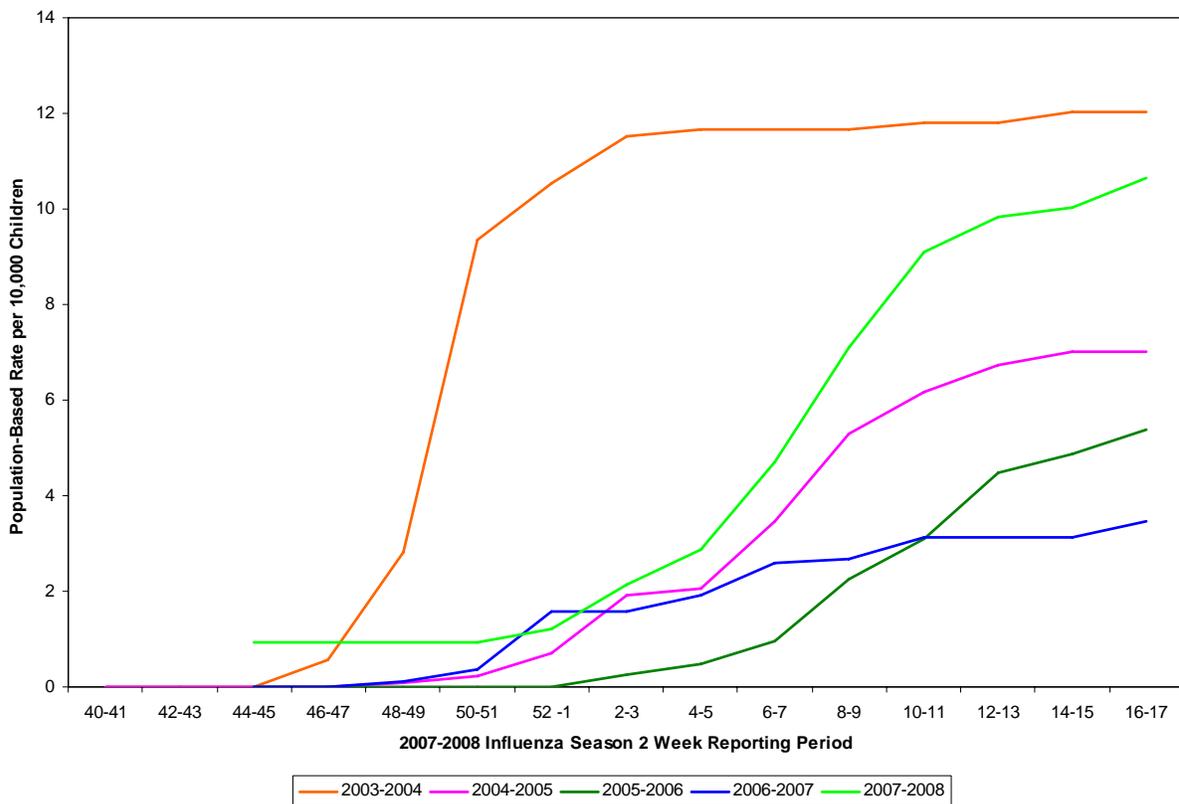
**Number of Influenza-Associated Pediatric Deaths
by Week of Death:
2005-06 season to present**



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.

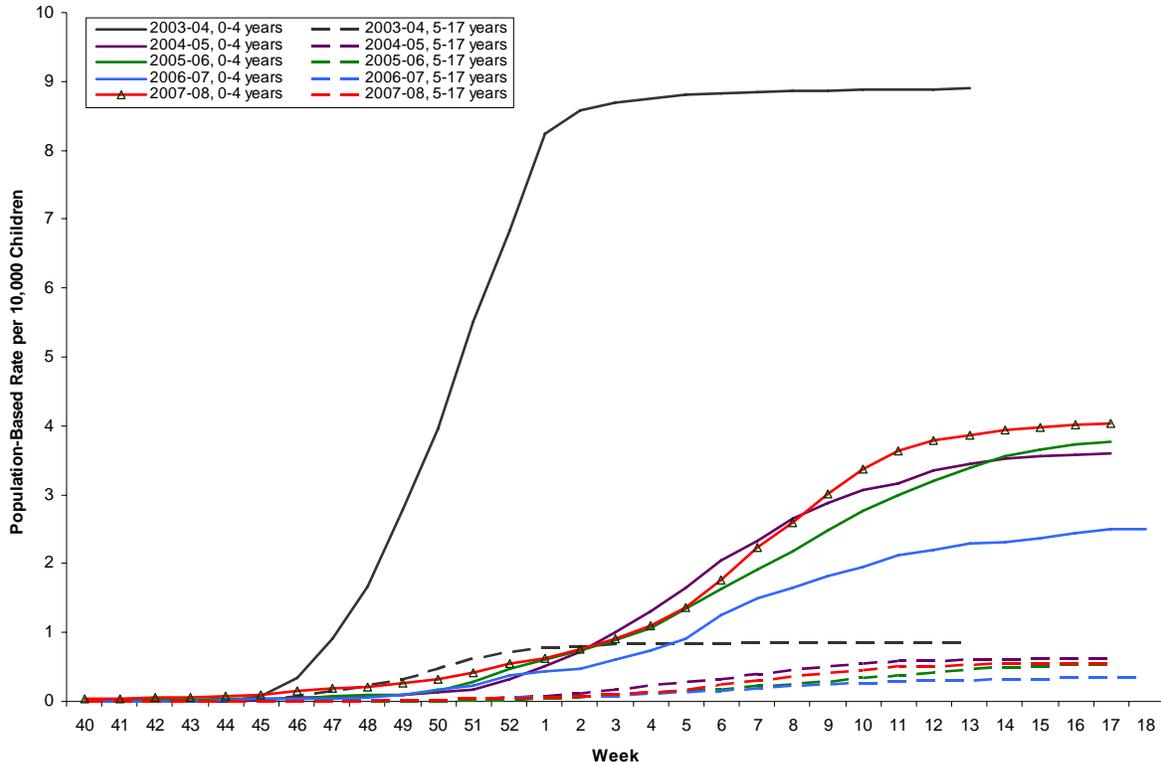
During November 4, 2007 to May 3, 2008, the preliminary laboratory-confirmed influenza-associated hospitalization rate for children 0-4 years old in the NVSN was 10.66 per 10,000.

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



During September 30, 2007 – May 10, 2008, the preliminary laboratory-confirmed influenza-associated hospitalization rate reported by the EIP for children 0–17 years old was 1.54 per 10,000. For children aged 0-4 years and 5-17 years, the rate was 4.03 per 10,000 and 0.55 per 10,000, respectively.

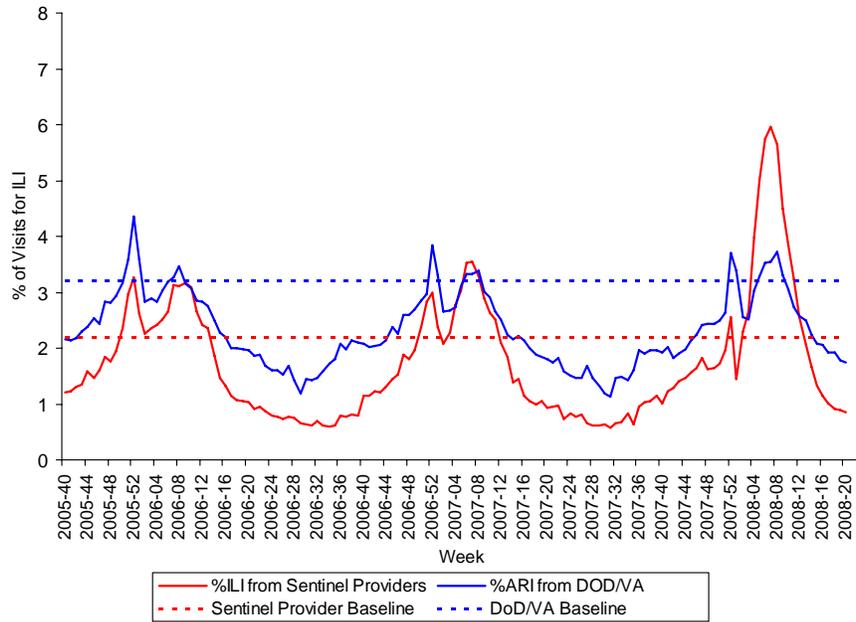
EIP Influenza Laboratory-Confirmed Cumulative Hospitalization Rates for Children Aged 0-4 and 5-17 yrs, 2007-2008 and Previous 4 Seasons



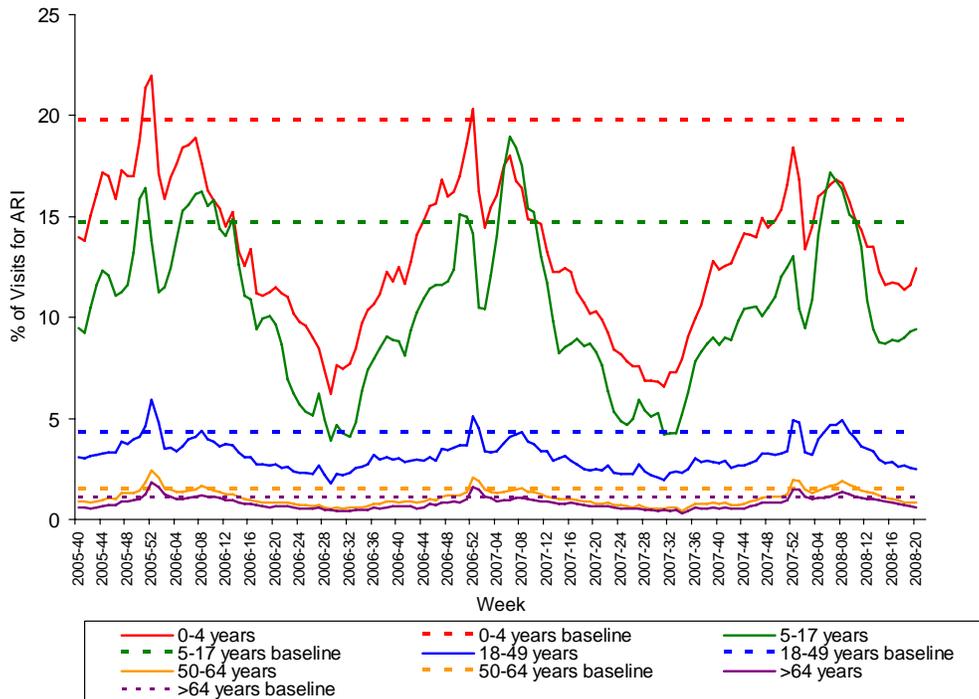
Outpatient Illness Surveillance: Nationwide during week 20, 0.8% of outpatient visits reported through the U.S. Influenza Sentinel Provider Surveillance Network were due to influenza-like illness (ILI), which was below the national baseline of 2.2%. On a regional level, the percentage of outpatient visits for ILI ranged from 0.2% to 1.4%. All nine regions reported ILI below their region-specific baselines.

During week 20, 1.7% 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 0.8% to 2.1%, 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

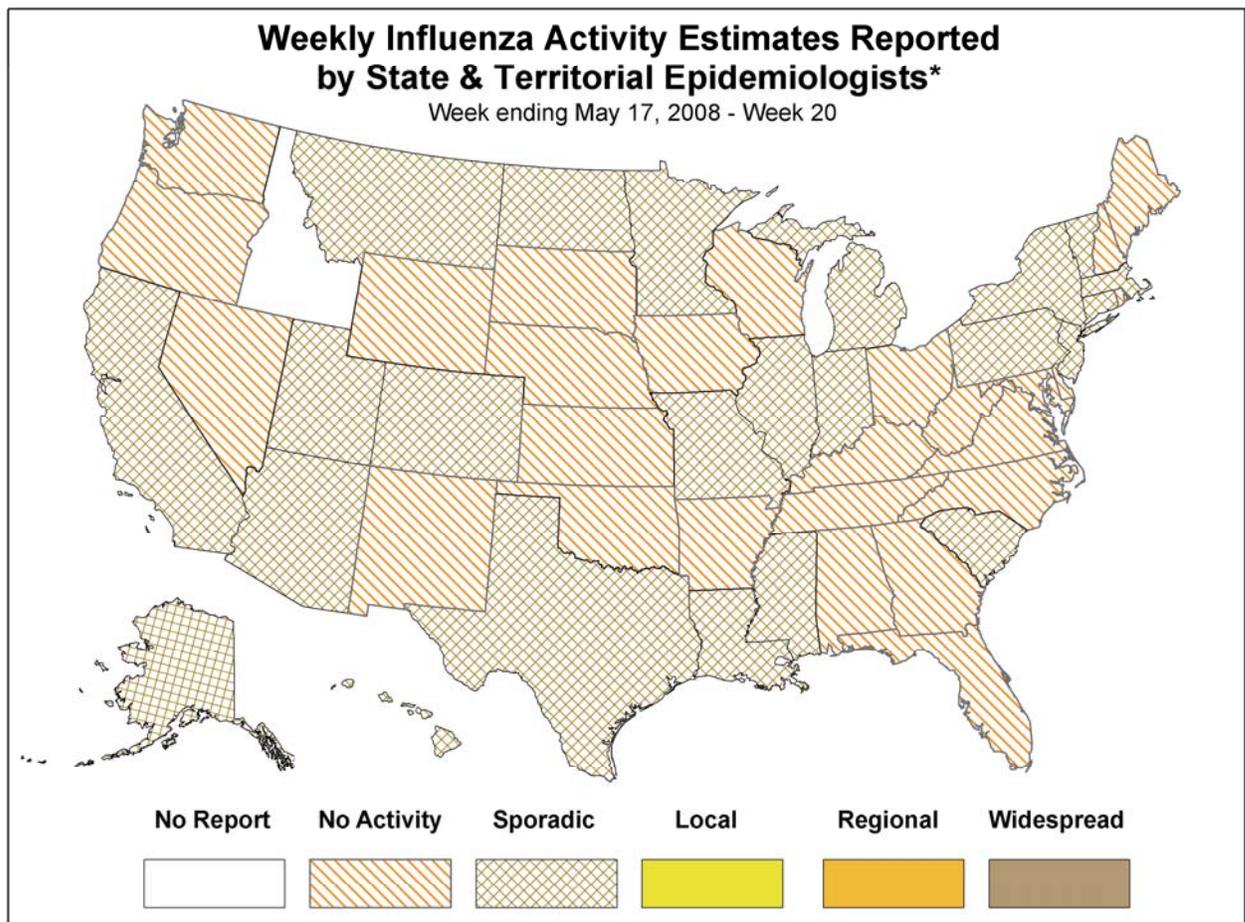


Percentage of Visits for ARI by Age Group Reported by DoD/VA Outpatient Clinics - National Summary



Geographic Spread of Influenza as Assessed by State and Territorial Epidemiologists: During week 20 the following influenza activity was reported:

- Sporadic influenza activity was reported by 23 states (Alaska, Arizona, California, Colorado, Connecticut, Hawaii, Illinois, Indiana, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, New Jersey, New York, North Dakota, Pennsylvania, South Carolina, Texas, Utah, and Vermont).
- No influenza activity was reported by the District of Columbia and 26 states (Alabama, Arkansas, Delaware, Florida, Georgia, Iowa, Kansas, Kentucky, Maine, Maryland, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Virginia, Washington, West Virginia, Wisconsin, and Wyoming).
- One state (Idaho) did not report.



* 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: May 23, 2008.