

FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division



Synopsis:

During the 2010--11 influenza season, influenza activity first began to increase in the southeastern United States in November and peaked nationally in early February. Compared with the previous influenza season (2009--10, including the pandemic), a higher rate of hospitalization was observed for persons aged ≥ 65 years during the 2010--11 season; however lower hospitalization rates were observed in younger populations than during the pandemic year. Overall, the percentages of outpatient visits for influenza-like illness (ILI) were lower during the 2010--11 season than the 2009--10 pandemic influenza season. In the United States, influenza A (H3N2) was the predominant virus; however, 2009 influenza A (H1N1) and influenza B viruses also circulated widely, and the predominant virus varied by U.S. Department of Health and Human Service (HHS) region and by week.

Virologic Surveillance

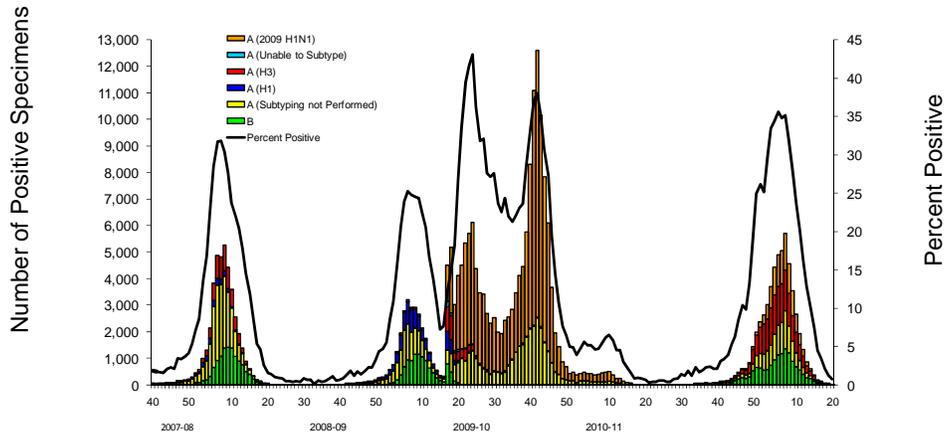
During October 3, 2010--May 21, 2011, World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories in the United States tested 256,399 specimens for influenza viruses; 55,403 (22%) were positive. Of the positive specimens, 40,875 (74%) were influenza A viruses and 14,528 (26%) were influenza B viruses. Among the influenza A viruses, 28,661 (70%) were subtyped; 17,781 (62%) were influenza A (H3N2) viruses, and 10,880 (38%) were 2009 influenza A (H1N1) viruses.

The proportion of specimens testing positive for influenza during the 2010--11 season first exceeded 10% during the week ending November 27, 2010, indicating higher levels of virus circulation. The proportion peaked at 36% during the week ending February 5, 2011, and declined to $<10\%$ during the week ending April 16, 2011.

Although influenza A (H3N2) viruses predominated, 2009 influenza A (H1N1) and influenza B viruses also circulated widely. The relative proportion of each type and subtype of influenza virus varied by HHS region and week. From early November through early December, influenza B viruses accounted for 43%--48% of influenza viruses reported nationally, with the largest numbers reported from the southeastern states (HHS Region 4). Influenza B viruses were predominant in Region 4 from early November through late December. The proportion of 2009 influenza A (H1N1) viruses increased nationally, beginning in January, and peaked during the week ending March 5, 2011, when 49% of all subtyped influenza A viruses were 2009 influenza A (H1N1) viruses. Although during January-April, 2011 influenza A (H3N2) viruses predominated nationally, 2009

influenza A (H1N1) predominated in five of the 10 regions (Regions 3, 4, 5, 8, and 9) for 5--7 consecutive weeks, ranging from the week ending January 8, 2011 to the week ending April 2, 2011.

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2007-08 through 2010-11



Novel Influenza A Viruses

Five cases of human infection with a novel influenza A virus were reported during the 2010--11 influenza season from three states. All five cases were infected with swine-origin influenza A (H3N2) viruses. Two cases occurred in September (Pennsylvania and Wisconsin), one case in October (Pennsylvania), and two cases in November (Minnesota). Two of the five cases occurred in adults, and three occurred in children. Two of the five cases were hospitalized; all five have recovered fully from their illness. The two cases in Pennsylvania were not related. The cases in Wisconsin and Pennsylvania had direct contact with swine or lived in areas close to swine farms. The two cases from Minnesota occurred in a father (index case) and child. The father had a nasopharyngeal swab positive for swine-origin influenza A (H3N2) virus and had direct swine exposure 6 days before illness onset. The child, whose infection with swine-origin influenza A (H3N2) virus was confirmed several weeks later by serologic testing, did not have direct swine exposure and most likely acquired infection from close contact with her father. Other persons in the same household also had ILI during the same period, but serologic results were either negative or inconclusive.

Antigenic Characterization

CDC has antigenically characterized 2,494 influenza viruses collected between October 1, 2010 and May 21, 2011, and submitted by U.S. laboratories. Those have included 613 2009 influenza A (H1N1) viruses, 1,139 influenza A (H3N2) viruses, and 742 influenza B viruses. Of the 613 2009 influenza H1N1 viruses tested, 612 (99.8%) were characterized as A/California/7/2009-like, the 2009 influenza A (H1N1) component of the 2010--11 Northern Hemisphere influenza vaccine. One virus (0.2%) of the 613 tested showed reduced titers with antiserum produced against A/California/7/2009. Of the 1,139 influenza A (H3N2) viruses, 1,103 (96.8%) were characterized as A/Perth/16/2009-like, the influenza A (H3N2) component of the 2010--11 influenza vaccine for the Northern Hemisphere. Of the 1,139 tested, 36 (3.2%) showed reduced titers with antiserum produced against A/Perth/16/2009.

Of the 742 influenza B viruses tested, 699 (94%) belonged to the B/Victoria lineage and 698 (99.9%) of these were characterized to be B/Brisbane/60/2008-like, the influenza B vaccine component for the 2010--11 Northern Hemisphere influenza vaccine. One (0.1%) of the 699 viruses belonging to the B/Victoria lineage showed reduced titers with antisera produced against B/Brisbane/60/2008. Of the 742 viruses tested, 43 (5.8%) belonged to the B/Yamagata lineage.

Antiviral Resistance

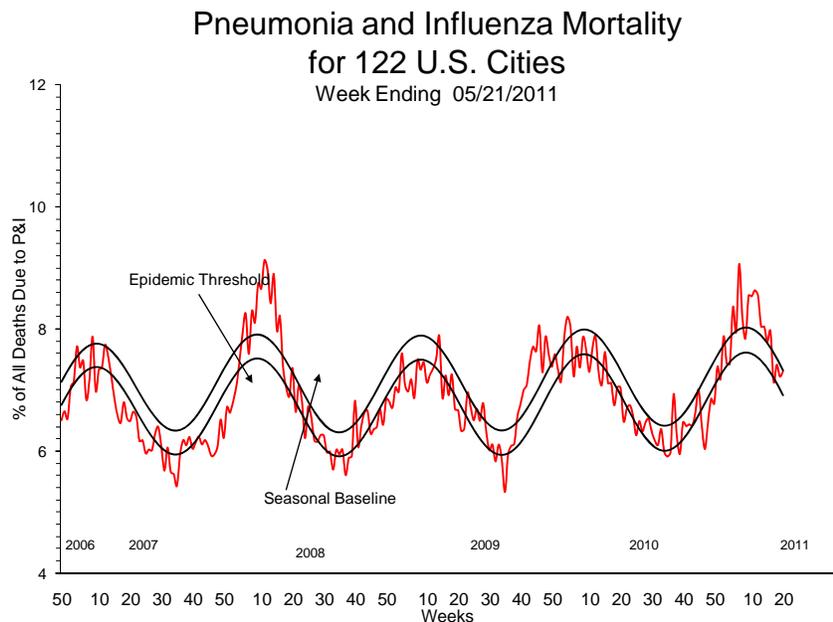
Since October 1, 2010, a total of 5,758 influenza virus specimens have been tested for antiviral resistance. All 723 influenza B viruses tested were sensitive to both oseltamivir and zanamivir. Among the 806 influenza A (H3N2) viruses tested for resistance to oseltamivir, two (0.2%) were found to be resistant. All 784 influenza A (H3N2) viruses tested for resistance to zanamivir were sensitive. Among the 4,229 2009 influenza A (H1N1) viruses tested for resistance to oseltamivir, 39 (0.9%) were found to be resistant, and all of the 771 viruses tested for resistance to zanamivir were found to be sensitive. High levels of resistance to the adamantanes (i.e., amantadine and rimantadine) persist among 2009 influenza A (H1N1) and influenza A (H3N2) viruses currently circulating globally.

Composition of the 2011--12 Influenza Vaccine

The Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee recommended that the 2011--12 trivalent influenza vaccine for the United States contain A/California/7/2009-like (H1N1), A/Perth/16/2009-like (H3N2), and B/Brisbane/60/2008-like viruses. This represents no change to any of the three components from the 2010--11 influenza vaccine formulation used in the United States or from the current formulation of the 2011 Southern Hemisphere influenza vaccines. These recommendations were based on antigenic analyses of influenza viruses that circulated in the United States and worldwide during 2010--11, epidemiologic data, postvaccination serologic studies in humans, and the availability of candidate vaccine strains and reagents.

Pneumonia and Influenza (P&I) Mortality Surveillance

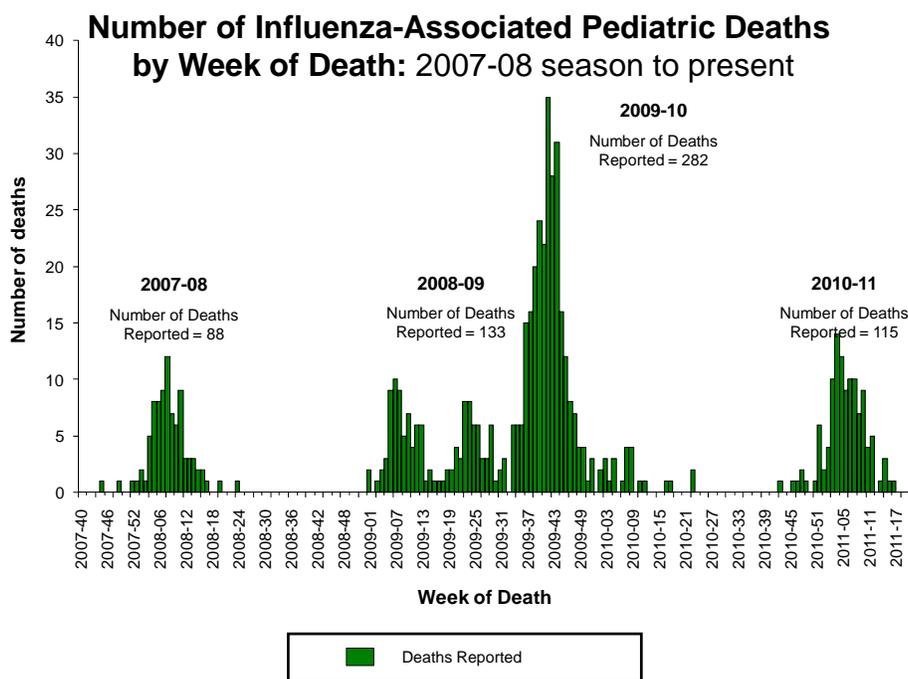
During the 2010--11 influenza season, the percentage of deaths attributed to pneumonia and influenza (P&I) exceeded the epidemic threshold for 13 consecutive weeks, during the weeks ending January 29 to April 23, 2011 (weeks 4--16). The percentage of deaths attributed to P&I peaked at 9.0% during the week ending February 12, 2011 (week 6). From the 2007--08 season through the 2009--10 season, the peak percentage of deaths attributed to P&I ranged from 8.0% to 9.1% and the total number of consecutive weeks above the epidemic threshold ranged from one to 11.



In April 2009, in response to the emergence of the 2009 influenza A (H1N1) virus, the Council of State and Territorial Epidemiologists (CSTE) initiated reporting of influenza-associated hospitalizations and deaths to CDC. On August 30, 2009, CDC and CSTE instituted modified case definitions for aggregate reporting of influenza-associated hospitalizations and deaths. This cumulative jurisdiction-level reporting is referred to as the Aggregate Hospitalization and Death Reporting Activity (AHDRA) surveillance system. AHDRA surveillance continued on a voluntary basis during the 2010-11 season. From October 3, 2010, to May 21, 2011, a total of 311 laboratory-confirmed, influenza-associated deaths were reported to CDC through AHDRA. The mean number of jurisdictions reporting influenza-associated deaths per week through AHDRA was 21 (range: 12--23). The number of deaths peaked during the week ending March 12, 2011 (week 10).

Influenza-Associated Pediatric Mortality

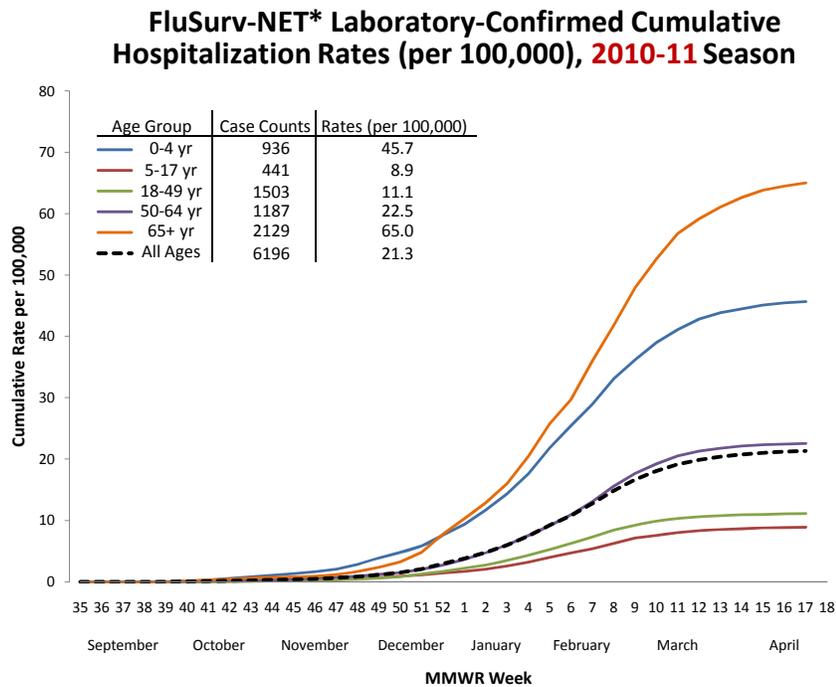
One hundred fifteen deaths associated with laboratory-confirmed influenza virus infections occurring from October 3, 2010 – May 21, 2011 among children aged <18 years during the 2010-11 influenza season were reported to CDC. These deaths were reported from 34 states, Chicago, and New York City. The mean and median ages of children who died were 6.8 years and 5.7 years, respectively; 16 children were aged <6 months, 17 were aged 6-23 months, 21 were aged 2-4 years, 32 were aged 5-11 years, and 29 were aged 12-17 years. Of the 115 deaths, 44 were associated with infections caused by influenza B viruses, 30 with 2009 influenza A (H1N1) virus, 21 with influenza A (H3N2) viruses, and 20 with influenza A virus for which the subtype was not determined. For comparison, during the 2009 pandemic, 348 pediatric deaths were reported to CDC during April 15, 2009 – October 2, 2010. Before the pandemic, 67 influenza-associated pediatric deaths were reported for the 2008--09 season, and 88 deaths were reported for the 2007--08 season.



Influenza-Associated Hospitalizations

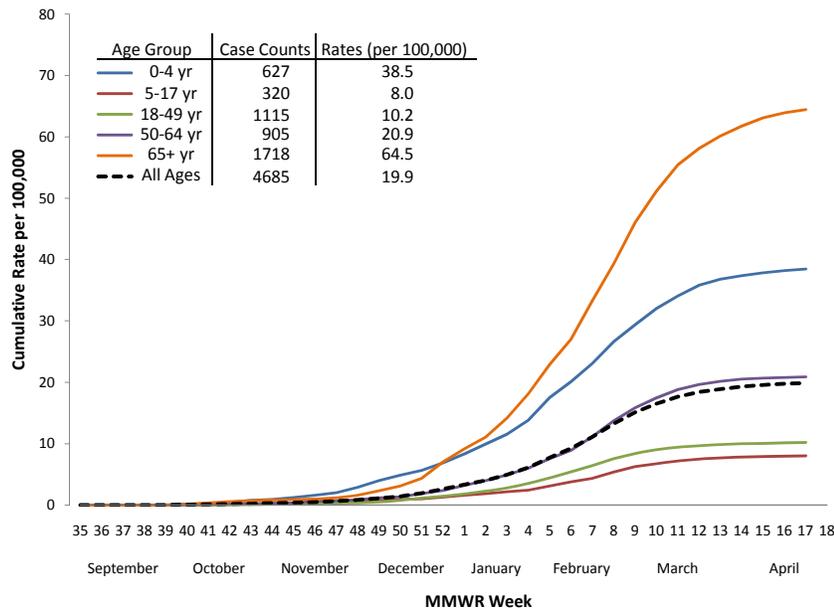
CDC monitors hospitalizations associated with laboratory-confirmed influenza infections using the FluSurv-NET surveillance system. FluSurv-NET is a population-based surveillance network comprised of 10 surveillance sites of the Emerging Infections Program (EIP) and six sites that were added during the 2009--10 influenza season. Based on FluSurv-NET surveillance data, the cumulative hospitalization rate (per 100,000 population) for October 1, 2010--

April 30, 2011, was 43.8 among children aged 0--4 years, 8.9 among children aged 5--17 years, 11.1 among adults aged 18--49 years, 22.5 among adults aged 50--64 years, and 65.0 among adults aged ≥65 years. The cumulative hospital rate (per 100,000) for all age groups from October 1, 2010—April 30, 2011, was 21.3 per 100,000. Based on EIP data alone, the cumulative hospitalization rate (per 100,000) for October 1, 2010--April 30, 2011, was 38.5 among children aged 0--4 years, 8.0 among children aged 5--17 years, 10.2 among adults aged 18--49 years, 20.9 among adults aged 50--64 years, and 64.5 among adults aged ≥65 years. The cumulative hospital rate (per 100,000) for all age groups since October 1, 2010, was 19.9 per 100,000. During the past three seasons, rates for EIP sites have ranged from 34.6--67.3 per 100,000 for children aged ≤4 years, 5.8--25.2 for children aged 5--17 years, 3.6--24.4 for adults aged 18--49 years, 4.8--32.1 for adults aged 50--64, and 13.5--75.1 for adults aged ≥65 years.



*FluSurv-NET results include surveillance at EIP sites and at sites in six additional states (ID, MI, OH, OK, RI, UT)

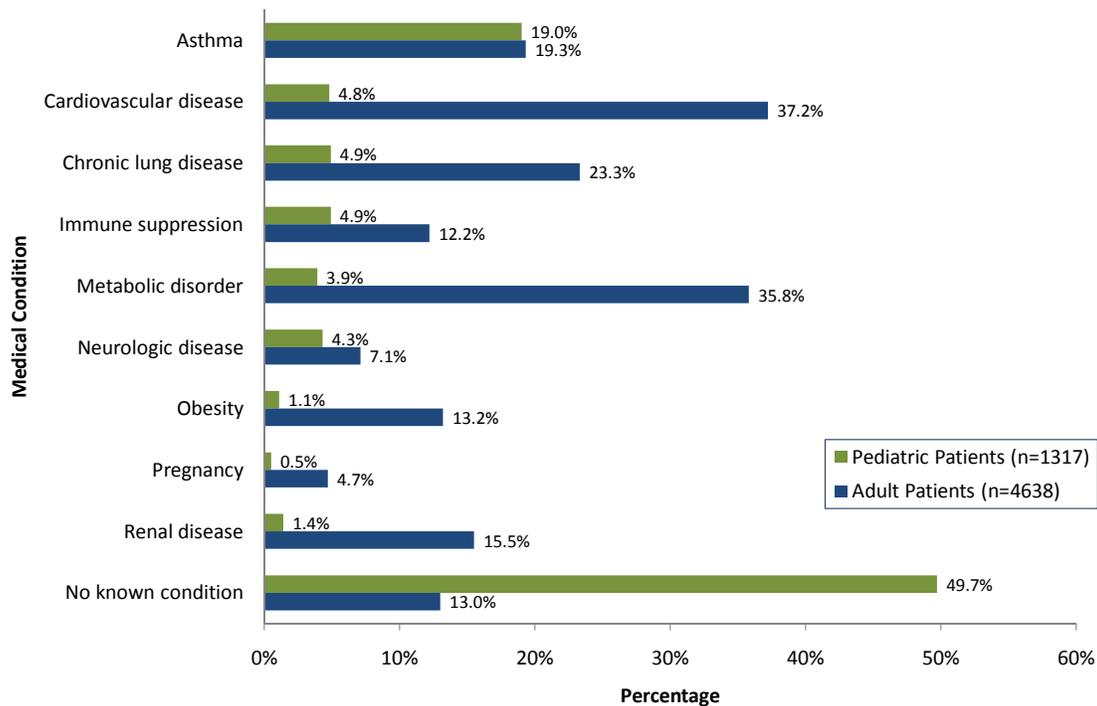
EIP* Laboratory-Confirmed Cumulative Hospitalization Rates (per 100,000), 2010-11 Season



*EIP results represent surveillance in the 10 EIP states (CA, CO, CT, GA, MD, MN, NM, NY, OR, TN)

During October 1, 2010—April 30, 2011, among the 4,638 FluSurv-NET adult patients for whom medical chart data were available, the most frequent underlying conditions were cardiovascular disease (37%), metabolic disorders (36%), and chronic lung disease (23%). Among 1,317 children hospitalized with laboratory-confirmed influenza, 50% did not have any underlying conditions, and 19% had underlying asthma or reactive airway disease.

Selected underlying medical conditions¹ in patients hospitalized with influenza, FluSurv-NET 2010-2011²

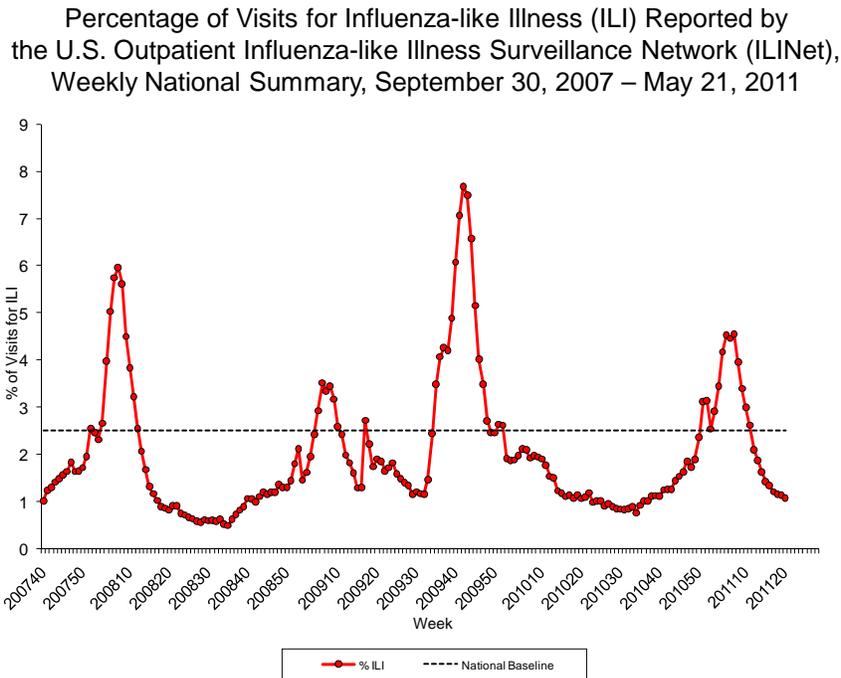


From October 3, 2010 to May 21, 2011, a total of 16,410 laboratory-confirmed, influenza-associated hospitalizations were reported to CDC through AHDRA. The median number of jurisdictions reporting hospitalizations per week through AHDRA was 22 (range: 13--24). The number of hospitalizations peaked during the week ending February 26, 2011 (week 8).

Outpatient Illness Surveillance

The weekly percentage of outpatient visits for ILI to the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) exceeded national baseline levels (2.5%) during the weeks ending December 25, 2010, through March 19, 2011 (weeks 51--11), and peaked at 4.5% during the week ending February 19, 2011 (week 7). During the two influenza seasons before the pandemic (2007--08 and 2008--09), the peak percentage of patient visits for ILI ranged from 3.5% to 6.0% and occurred during mid- to late February. During the 2009 pandemic, however, the percentage of patient visits for ILI peaked at 7.7% in late October. The peak percentage of outpatient visits for ILI varied in time by region. The percentage of outpatient visits for ILI peaked in Regions 3, 4, and 5 during the week ending February 5, 2011 (week 5), in Regions 6, 8, 9, and 10 during the week ending February 19, 2011 (week 7), and in Regions 1 and 7 during the week ending February 26, 2011 (week 8). The percentage of visits for ILI in Region 2 peaked during the week ending January 1, 2011 (week 52); however, a second

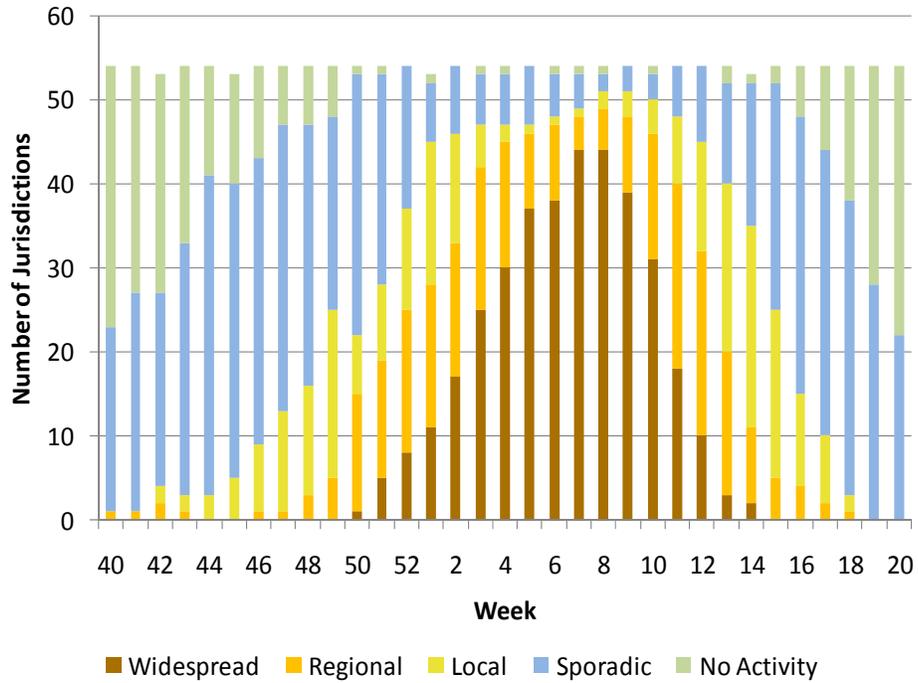
peak of similar magnitude occurred during the week ending February 26, 2011 (week 8). The increase in the percentage of visits for ILI during the week ending January 1, 2011 (week 52), likely was influenced by a reduction in preventive health-care visits during the holiday season, as has occurred during previous seasons.



Outpatient data collected in ILINet are used to produce a measure of ILI activity. The number of jurisdictions experiencing high ILI activity peaked at 19 jurisdictions during the week ending February 12, 2011 (week 6).

Geographic Spread of Influenza Assessed by State and Territorial Epidemiologists

State and territorial epidemiologists report the geographic distribution of influenza in their state through a weekly influenza activity code. The geographic distribution of influenza activity was most extensive during the week ending February 26, 2011 (week 8), when 44 jurisdictions reported widespread influenza activity and five states reported regional influenza activity. No jurisdictions reported widespread influenza activity after the week ending April 9, 2011 (week 15). The peak number of jurisdictions reporting widespread or regional activity during the previous three seasons has ranged from 49 to 50 jurisdictions.



For additional information on the 2010-11 influenza season please see the season summary MMWR (Update: Influenza Activity --- United States, 2010--11 Season, and Composition of the 2011--12 Influenza Vaccine. MMWR Morb Mortal Wkly Rep. 2011 June 3; 60(21): 705-712).