FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

2014-2015 Influenza Season
Week 51 ending December 20, 2014

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

Synopsis: During week 51 (December 14-20, 2014), influenza activity continued to increase in the United States.

- **Viral Surveillance**: Of 21,858 specimens tested and reported by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories during week 51, 6,152 (28.1%) were positive for influenza.
- **Pneumonia and Influenza Mortality**: The proportion of deaths attributed to pneumonia and influenza (P&I) was at the epidemic threshold.
- **Influenza-associated Pediatric Deaths**: Four influenza-associated pediatric deaths were reported.
- **Influenza-associated Hospitalizations**: A cumulative rate for the season of 9.7 laboratory-confirmed influenza-associated hospitalizations per 100,000 population was reported.
- **Outpatient Illness Surveillance**: The proportion of outpatient visits for influenza-like illness (ILI) was 5.5%, above the national baseline of 2.0%. All 10 regions reported ILI at or above region-specific baseline levels. Puerto Rico and 22 states experienced high ILI activity; six states experienced moderate ILI activity; New York City and eight states experienced low ILI activity; 14 states experienced minimal ILI activity; and the District of Columbia had insufficient data.
- **Geographic Spread of Influenza**: The geographic spread of influenza in 36 states was reported as widespread; Guam, Puerto Rico, and 10 states reported regional activity; the District of Columbia, the U.S. Virgin Islands, and two states reported local activity; and two states reported sporadic activity.

National and Regional Summary of Select Surveillance Components

	Data for current week			Data cumulative since September 28, 2014 (week 40)				
HHS Surveillance Regions*	**Out-patient ILI†**	**Number of jurisdictions reporting regional or widespread activity§**	**% respiratory specimens positive for flu‡**	**A(H1N1) pdm09**	**A (H3)**	**A (Subtyping not performed)**	**B**	**Pediatric Deaths**
Nation	Elevated	48 of 54	28.1%	64	11,006	15,185	1,962	15
Region 1	Elevated	6 of 6	11.3%	1	204	146	19	0
Region 2	Elevated	3 of 4	14.8%	21	389	524	46	0
Region 3	Elevated	5 of 6	27.1%	2	1,260	568	72	1
Region 4	Elevated	8 of 8	20.7%	2	1,142	4,745	876	4
Region 5	Elevated	6 of 6	34.6%	8	3,069	3,905	195	4
Region 6	Elevated	5 of 5	28.4%	10	1,353	3,280	517	3
Region 7	Elevated	4 of 4	24.2%	6	836	657	74	0
Region 8	Elevated	6 of 6	35.9%	6	1,129	1,096	56	1
Region 9	Elevated	3 of 5	13.1%	5	468	171	66	2
Region 10	Elevated	2 of 4	25.5%	3	1,156	93	41	0

*http://www.hhs.gov/iea/regional/

† Elevated means the % of visits for ILI is at or above the national or region-specific baseline.

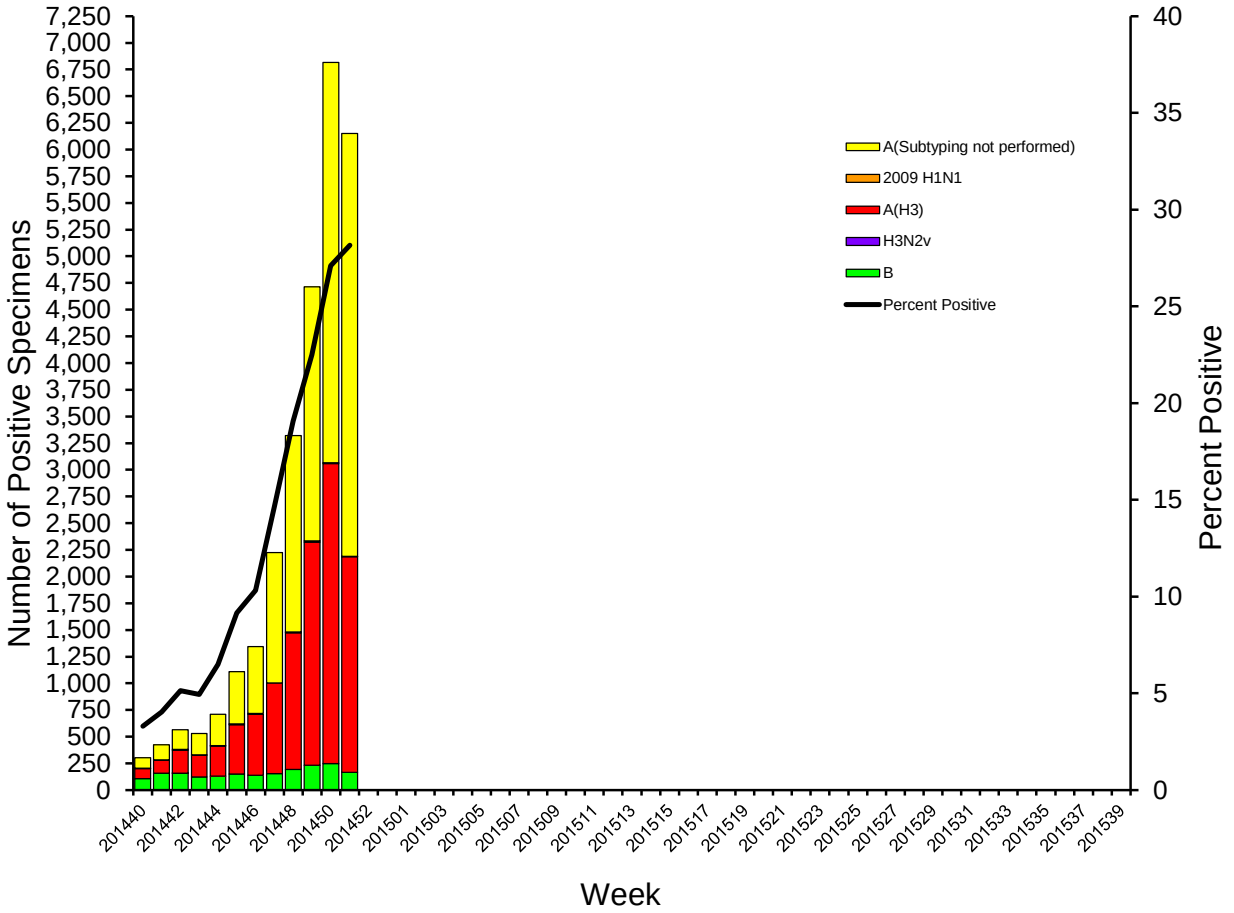
§ Includes all 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands.

‡ National data are for current week; regional data are for the most recent three weeks.

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

	Week 51	Data Cumulative since September 28, 2014 (Week 40)
No. of specimens tested	21,858	178,004
No. of positive specimens (%)	6,152 (28.1%)	28,218 (15.9%)
Positive specimens by type/subtype		
Influenza A	5,987 (97.3%)	26,256 (93.0%)
A(H1N1)pmd09	1 (0.02%)	64 (0.2%)
H3	2,022 (33.8%)	11,006 (41.9%)
Subtyping not performed	3,964 (66.2%)	15,185 (57.8%)
Influenza B	165 (2.7%)	1,962 (7.0%)

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2014-15



Influenza Virus Characterization*:

CDC has characterized 305 influenza viruses [10 A(H1N1)pdm09, 239 A(H3N2), and 56 influenza B viruses] collected by U.S. laboratories since October 1, 2014.

Influenza A Virus [249]

- **A(H1N1)pdm09 [10]:** All 10 H1N1 viruses tested were characterized as A/California/7/2009-like, the influenza A (H1N1) component of the 2014-2015 Northern Hemisphere influenza vaccine.

- **A(H3N2) [239]:** Seventy-eight (32.6%) of the 239 H3N2 viruses tested have been characterized as A/Texas/50/2012-like, the influenza A (H3N2) component of the 2014-2015 Northern Hemisphere influenza vaccine. One hundred sixty-one (67.4%) of the 239 viruses tested showed either reduced titers with antiserum produced against A/Texas/50/2012 or belonged to a genetic group that typically shows reduced titers to A/Texas/50/2012. Among viruses that showed reduced titers with antiserum raised against A/Texas/50/2012, most were antigenically similar to A/Switzerland/9715293/2013, the H3N2 virus selected for the 2015 Southern Hemisphere influenza vaccine. A/Switzerland/9715293/2013 is related to, but antigenically and genetically distinguishable, from the A/Texas/50/2012 vaccine virus. A/Switzerland-like H3N2 viruses were first detected in the United States in small numbers in March of 2014 and began to increase through the spring and summer.

Influenza B Virus [56]

Thirty-nine (70%) of the influenza B viruses tested belong to B/Yamagata/16/88 lineage and the remaining 17 (30%) influenza B viruses tested belong to B/Victoria/02/87 lineage.

- **Yamagata Lineage [39]:** All 39 B/Yamagata-lineage viruses were characterized as B/Massachusetts/2/2012-like, which is included as an influenza B component of the 2014-2015 Northern Hemisphere trivalent and quadrivalent influenza vaccines.

- **Victoria Lineage [17]:** Fifteen (88%) of the 17 B/Victoria-lineage viruses were characterized as B/Brisbane/60/2008-like, the virus that is included as an influenza B component of the 2014-2015 Northern Hemisphere quadrivalent influenza vaccine. Two (12%) of the B/Victoria-lineage viruses tested showed reduced titers to B/Brisbane/60/2008.

*CDC routinely uses hemagglutination inhibition (HI) assays to antigenically characterize influenza viruses year-round to compare how similar currently circulating influenza viruses are to those included in the influenza vaccine, and to monitor for changes in circulating influenza viruses. However, a portion of recent influenza A(H3N2) viruses do not grow to sufficient hemagglutination titers for antigenic characterization by HI. For many of these viruses, CDC is also performing genetic characterization to infer antigenic properties.

Antiviral Resistance: Testing of influenza A(H1N1)pdm09, A(H3N2), and influenza B virus isolates for resistance to neuraminidase inhibitors (oseltamivir, zanamivir, and peramivir) is performed at CDC using a functional assay. Additional A(H1N1)pdm09 and A(H3N2) clinical samples are tested for mutations of the virus known to confer oseltamivir resistance. The data summarized below combine the results of both testing methods. These samples are routinely obtained for surveillance purposes rather than for diagnostic testing of patients suspected to be infected with antiviral-resistant virus.

High levels of resistance to the adamantanes (amantadine and rimantadine) persist among A(H1N1)pdm09 and A(H3N2) viruses (the adamantanes are not effective against influenza B viruses). Therefore, data from adamantane resistance testing are not presented below.

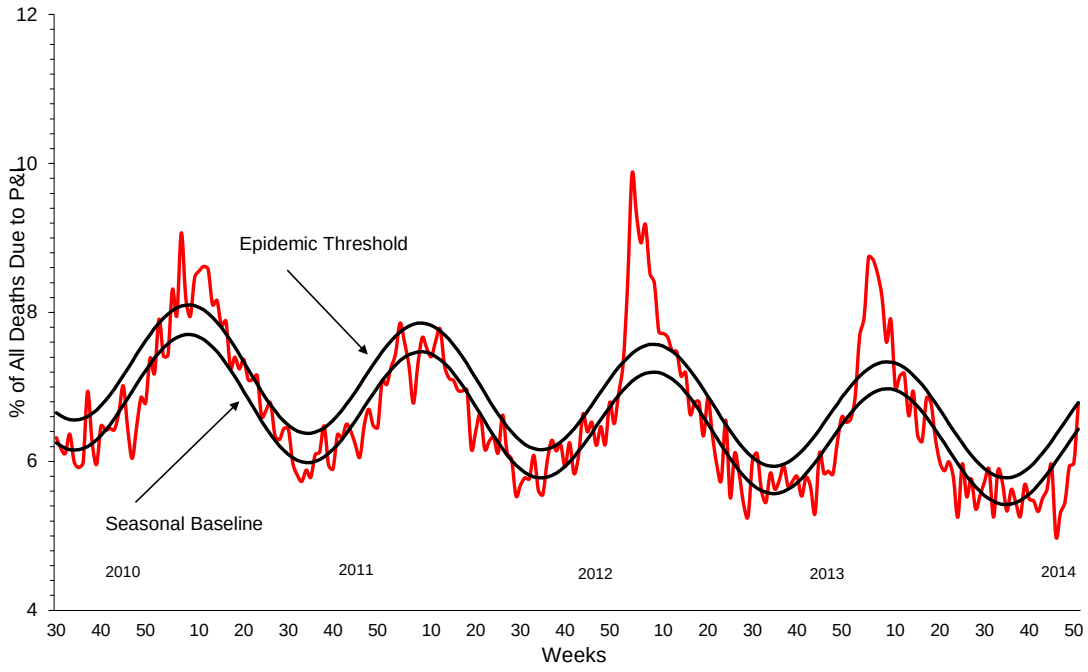
Neuraminidase Inhibitor Resistance Testing Results on Samples Collected Since October 1, 2014

	Oseltamivir		Zanamivir		Peramivir	
	Virus Samples tested (n)	Resistant Viruses, Number (%)	Virus Samples tested (n)	Resistant Viruses, Number (%)	Virus Samples tested (n)	Resistant Viruses, Number (%)
Influenza A (H3N2)	248	0 (0.0)	248	0 (0.0)	248	0 (0.0)
Influenza B	55	0 (0.0)	55	0 (0.0)	55	0 (0.0)
Influenza A(H1N1)pmd09	11	0 (0.0)	11	0 (0.0)	11	0 (0.0)

In the United States, all recently circulating influenza viruses have been susceptible to the neuraminidase inhibitor antiviral medications, oseltamivir, zanamivir, and peramivir; however, rare sporadic instances of oseltamivir-resistant A(H1N1)pdm09 and A(H3N2) viruses have been detected worldwide. Antiviral treatment with oseltamivir, zanamivir, or peramivir is recommended as early as possible for patients with confirmed or suspected influenza who have severe, complicated, or progressive illness; who require hospitalization; or who are at high risk for serious influenza-related complications. Additional information on recommendations for treatment and chemoprophylaxis of influenza virus infection with antiviral agents is available at http://www.cdc.gov/flu/antivirals/index.htm.

Pneumonia and Influenza (P&I) Mortality Surveillance: During week 51, 6.8% of all deaths reported through the 122 Cities Mortality Reporting System were due to P&I. This percentage was at the epidemic threshold of 6.8% for week 51.

Pneumonia and Influenza Mortality for 122 U.S. Cities
Week ending December 20, 2014

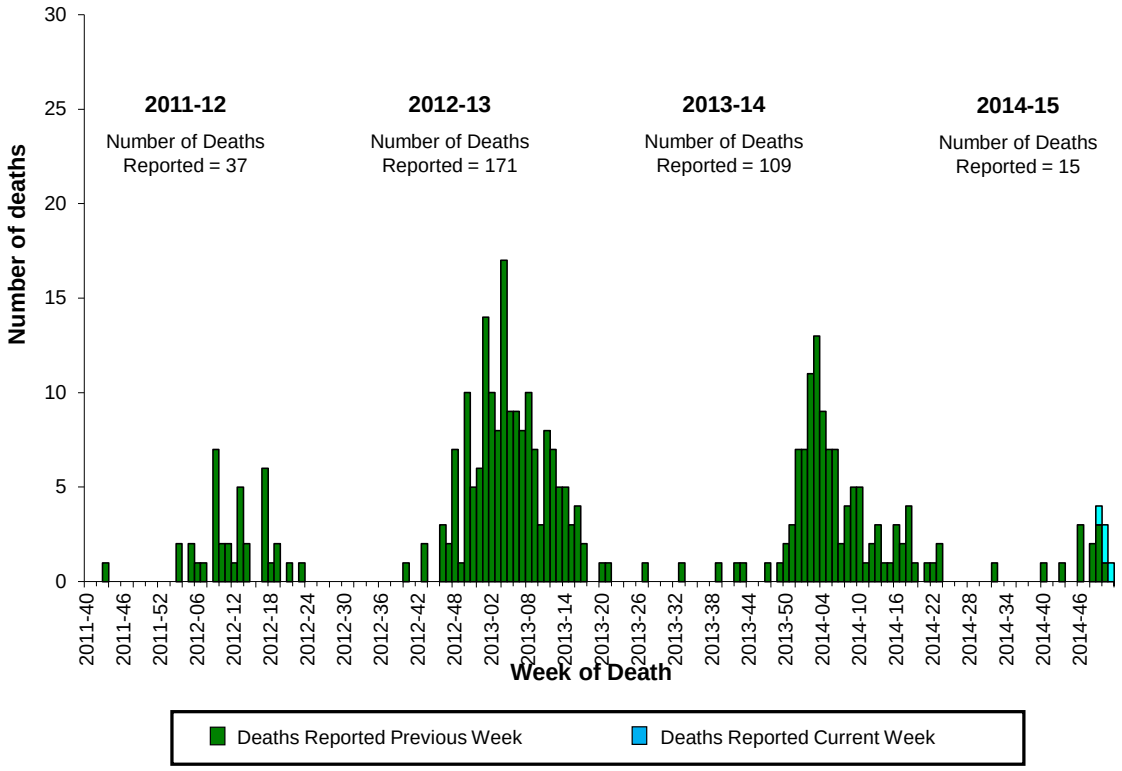


For the 2014-2015 influenza season, CDC/Influenza Division and the National Center for Health Statistics (NCHS) are collaborating on a pilot project to use NCHS mortality surveillance data for the rapid assessment of pneumonia and influenza (P&I) mortality. To view the data, please click here.

Influenza-Associated Pediatric Mortality: Four influenza-associated pediatric deaths were reported to CDC during week 51. Three deaths were associated with an influenza A (H3) virus and occurred during weeks 49 and 50 (weeks ending December 6 and December 13, 2014, respectively). One death was associated with an influenza B virus and occurred during week 51 (week ending December 20, 2014).

A total of 15 influenza-associated deaths have been reported during the 2014-2015 season from nine states (Arizona [1], Colorado [1], Florida [2], Minnesota [2], North Carolina [2], Nevada [1], Ohio [2], Texas [3], and Virginia [1]).

Number of Influenza-Associated Pediatric Deaths by Week of Death: 2011-2012 season to present



Influenza-Associated Hospitalizations: The Influenza Hospitalization Surveillance Network (FluSurv-NET) conducts population-based surveillance for laboratory-confirmed influenza-related hospitalizations in children younger than 18 years of age (since the 2003-2004 influenza season) and adults (since the 2005-2006 influenza season).

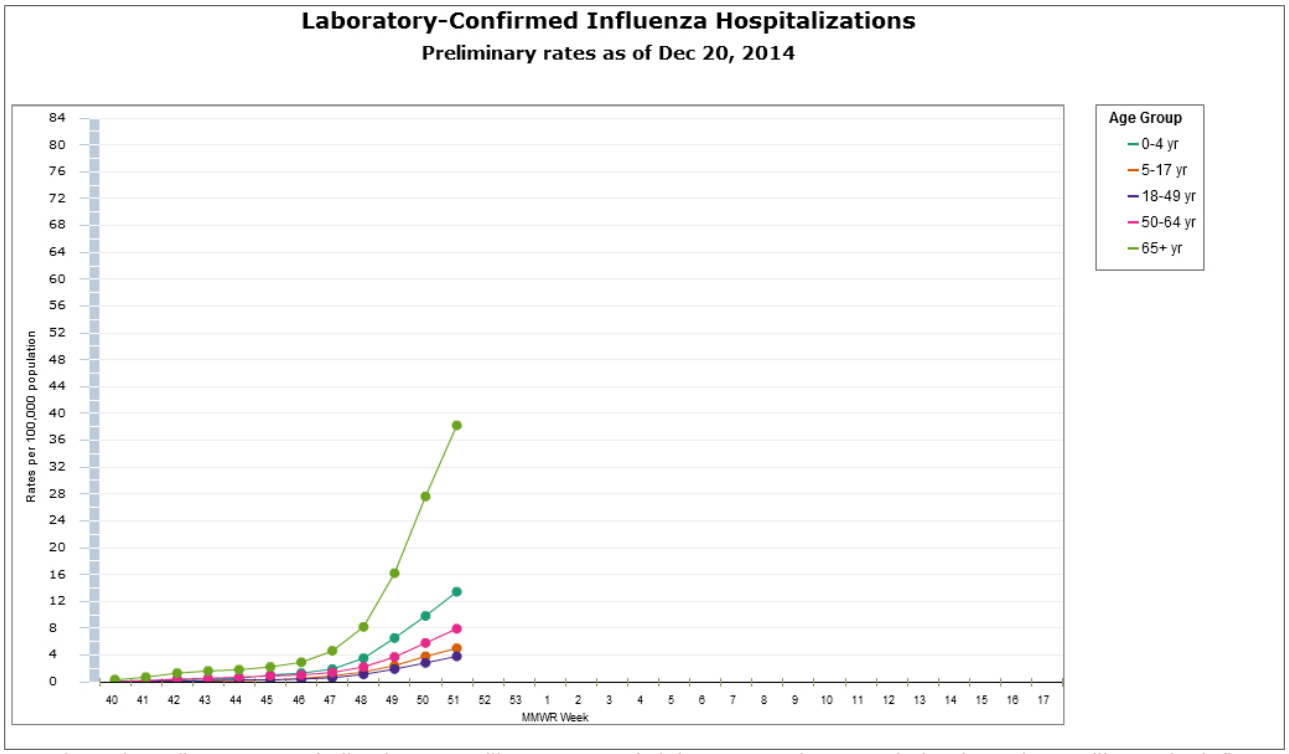
The FluSurv-NET covers more than 70 counties in the 10 Emerging Infections Program (EIP) states (CA, CO, CT, GA, MD, MN, NM, NY, OR, and TN) and additional Influenza Hospitalization Surveillance Project (IHSP) states. The IHSP began during the 2009-2010 season to enhance surveillance during the 2009 H1N1 pandemic. IHSP sites included IA, ID, MI, OK and SD during the 2009-2010 season; ID, MI, OH, OK, RI, and UT during the 2010-2011 season; MI, OH, RI, and UT during the 2011-2012 season; IA, MI, OH, RI, and UT during the 2012-2013 season; and MI, OH, and UT during the 2013-2014 and 2014-15 seasons.

Data gathered are used to estimate age-specific hospitalization rates on a weekly basis, and describe characteristics of persons hospitalized with severe influenza illness. The rates provided are likely to be an underestimate as influenza-related hospitalizations can be missed, either because testing is not performed, or because cases may be attributed to other causes of pneumonia or other common influenza-related complications.

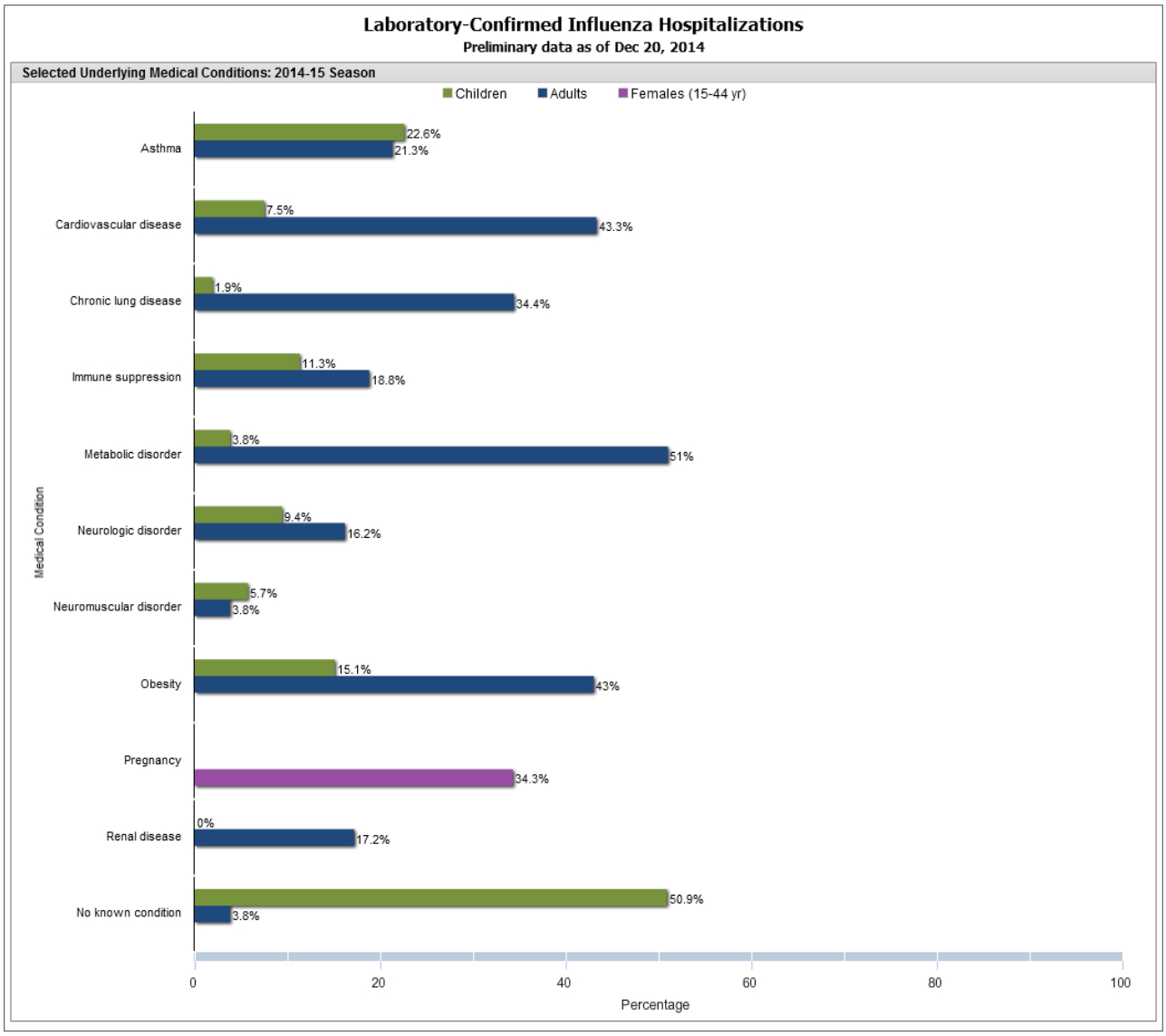
Between October 1, 2014 and December 20, 2014, 2,643 laboratory-confirmed influenza-associated hospitalizations were reported. The overall hospitalization rate was 9.7 per 100,000 population. The highest rate of hospitalization was among adults aged ≥65 years (38.3 per 100,000 population), followed by children aged 0-4 years (13.4 per 100,000 population). Among all hospitalizations, 2,529 (95.7%) were associated with influenza A, 100 (3.8%) with influenza B, nine (0.3%) with influenza A and B co-infection, and five (0.2%) had no virus type information. Among those with influenza A subtype information, 760 (99.9%) were H3N2 virus and one (0.1%) was 2009 H1N1.

Clinical findings are preliminary and based on 367 (14%) cases with complete medical chart abstraction. The majority (96%) of hospitalized adults had at least one reported underlying medical condition; the most commonly reported were metabolic disorders, cardiovascular disease, and obesity. There were 53 hospitalized children with complete medical chart abstraction, 27 (51%) had no identified underlying medical conditions. The most commonly reported underlying medical conditions among pediatric patients were asthma and obesity. Among the 35 hospitalized women of childbearing age (15-44 years), 12 were pregnant.

Additional FluSurv-NET data can be found at: http://gis.cdc.gov/GRASP/Fluview/FluHospRates.html and http://gis.cdc.gov/grasp/fluview/FluHospChars.html.



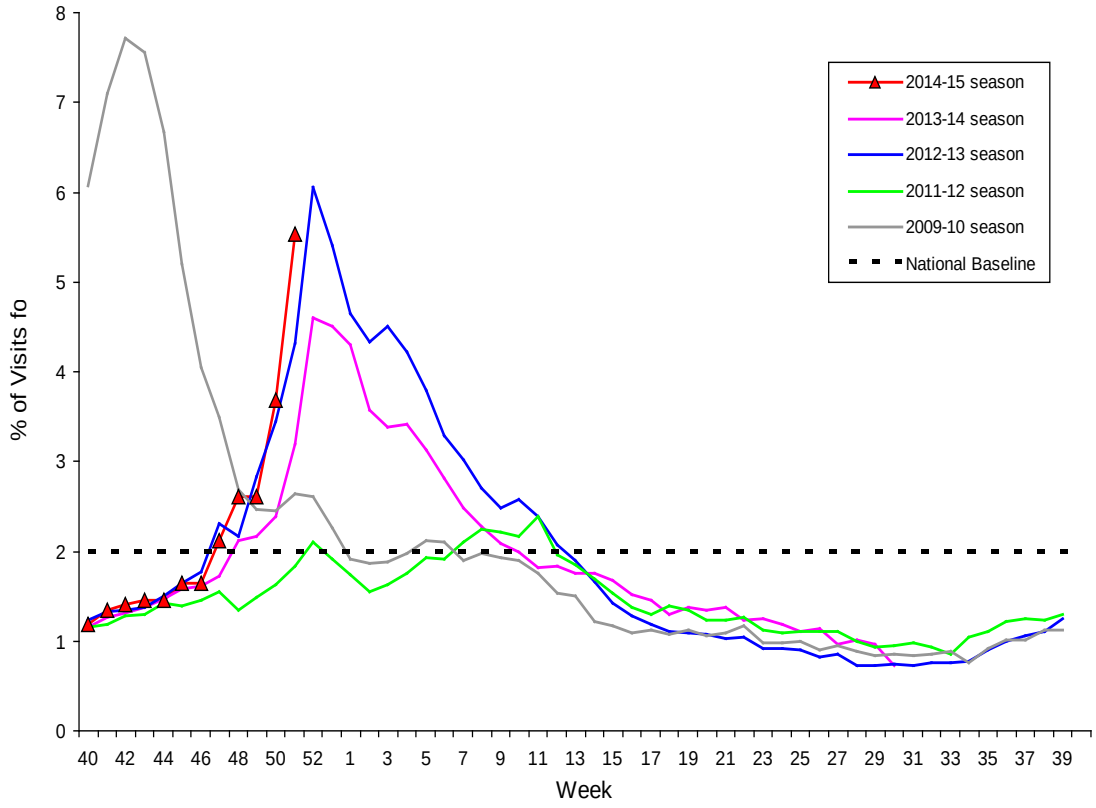
Data from the Influenza Hospitalization Surveillance Network (FluSurv-NET), a population-based surveillance for influenza related hospitalizations in children and adults in 13 US states. Incidence rates are calculated using the National Center for Health Statistics' (NCHS) population estimates for the counties included in the surveillance catchment area.



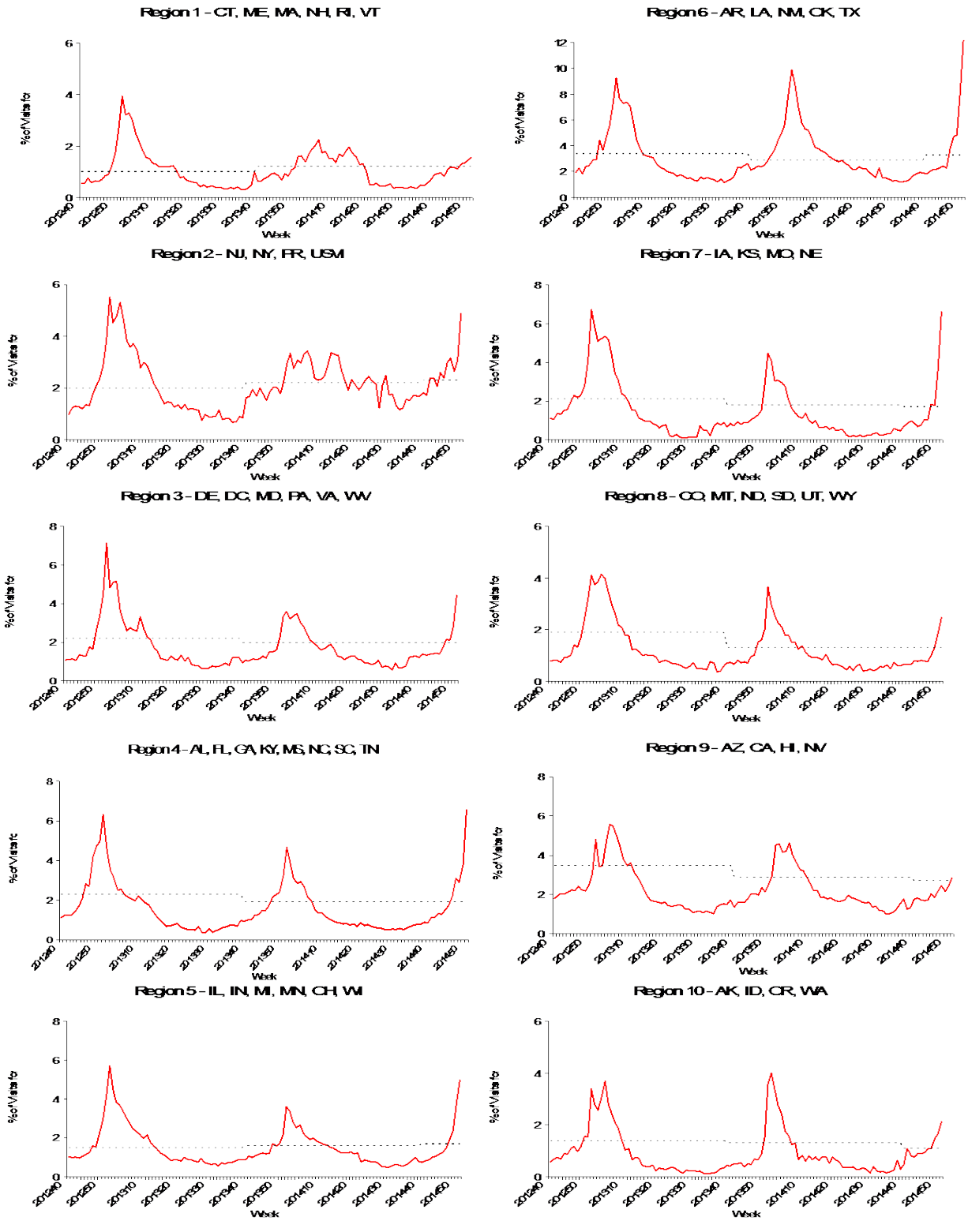
FluSurv-NET data are preliminary and displayed as they become available. Therefore, figures are based on varying denominators as some variables represent information that may require more time to be collected. Data are refreshed and updated weekly. Asthma includes a medical diagnosis of asthma or reactive airway disease; Cardiovascular diseases include conditions such as coronary heart disease, cardiac valve disorders, congestive heart failure, and pulmonary hypertension; does not include isolated hypertension; Chronic lung diseases include conditions such as chronic obstructive pulmonary disease, bronchiolitis obliterans, chronic aspiration pneumonia, and interstitial lung disease; Immune suppression includes conditions such as immunoglobulin deficiency, leukemia, lymphoma, HIV/AIDS, and individuals taking immunosuppressive medications; Metabolic disorders include conditions such as diabetes mellitus; Neurologic diseases include conditions such as seizure disorders, cerebral palsy, and cognitive dysfunction; Neuromuscular diseases include conditions such as multiple sclerosis and muscular dystrophy; Obesity was assigned if indicated in patient's medical chart or if body mass index (BMI) >30 kg/m^2; Pregnancy percentage calculated using number of female cases aged between 15 and 44 years of age as the denominator; Renal diseases include conditions such as acute or chronic renal failure, nephrotic syndrome, glomerulonephritis, and impaired creatinine clearance; No known condition indicates that the case did not have any known high risk medical condition indicated in medical chart at the time of hospitalization.

Outpatient Illness Surveillance: Nationwide during week 51, 5.5% 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 2.0%. *(ILI is defined as fever (temperature of 100°F [37.8°C] or greater) and cough and/or sore throat.)*

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2014-2015 and Selected Previous Seasons



On a regional level, the percentage of outpatient visits for ILI ranged from 1.6% to 12.4% during week 51. All 10 regions reported a proportion of outpatient visits for ILI at or above their region-specific baseline levels.

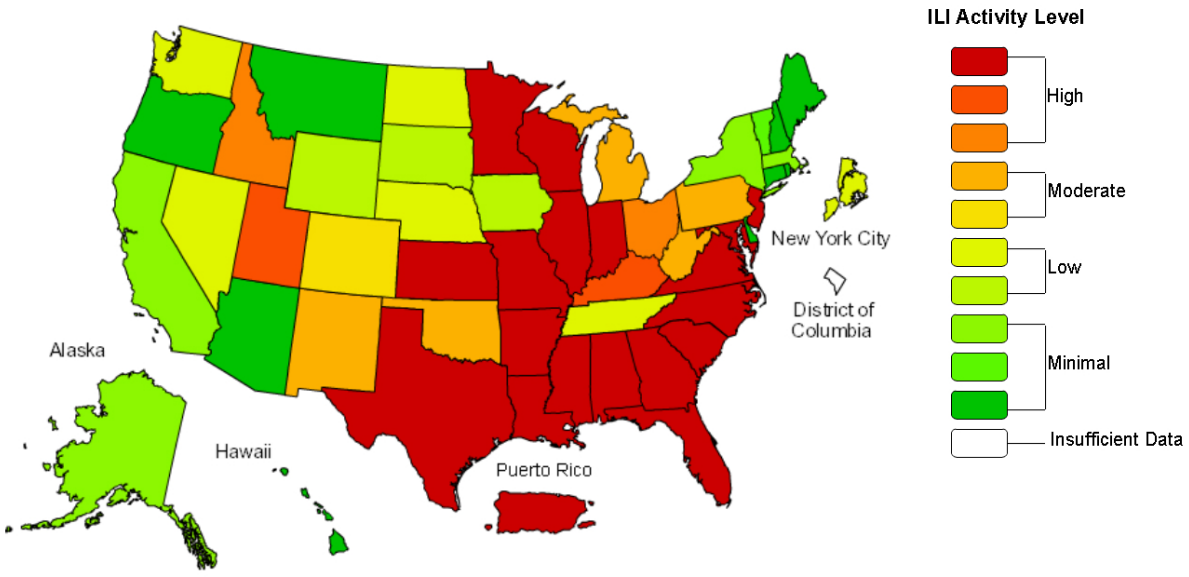

Region 1 - CT, ME, MA, NH, RI, VT
Region 6 - AR, LA, NM, OK, TX
Region 2 - NJ, NY, PR, USVI
Region 7 - IA, KS, MO, NE
Region 3 - DE, DC, MD, PA, VA, WV
Region 8 - CO, MT, ND, SD, UT, WY
Region 4 - AL, FL, GA, KY, MS, NC, SC, TN
Region 9 - AZ, CA, HI, NV
Region 5 - IL, IN, MI, MN, OH, WI
Region 10 - AK, ID, OR, WA
% of Visits for
Week
NOTE: Scales differ between regions
% ILI
Baseline*
*Use of the regional baselines for state data is not appropriate.

ILINet Activity Indicator Map: Data collected in ILINet are used to produce a measure of ILI activity* by state. Activity levels are based on the percent of outpatient visits in a state due to ILI and are compared to the average percent of ILI visits that occur during weeks with little or no influenza virus circulation. Activity levels range from minimal, which would correspond to ILI activity from outpatient clinics being below, or only slightly above, the average, to high, which would correspond to ILI activity from outpatient clinics being much higher than average.

During week 51, the following ILI activity levels were experienced:

- Puerto Rico and 22 states (Alabama, Arkansas, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, New Jersey, North Carolina, Ohio, South Carolina, Texas, Utah, Virginia, and Wisconsin) experienced high ILI activity.
- Six states (Colorado, Michigan, New Mexico, Oklahoma, Pennsylvania, and West Virginia) experienced moderate ILI activity.
- New York City and eight states (Iowa, Nebraska, Nevada, North Dakota, South Dakota, Tennessee, Washington, and Wyoming) experienced low ILI activity.
- 14 states (Alaska, Arizona, California, Connecticut, Delaware, Hawaii, Maine, Massachusetts, Montana, New Hampshire, New York, Oregon, Rhode Island, and Vermont) experienced minimal ILI activity.
- Data were insufficient to calculate an ILI activity level from the District of Columbia.

Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet
2014-15 Influenza Season Week 51 ending Dec 20, 2014

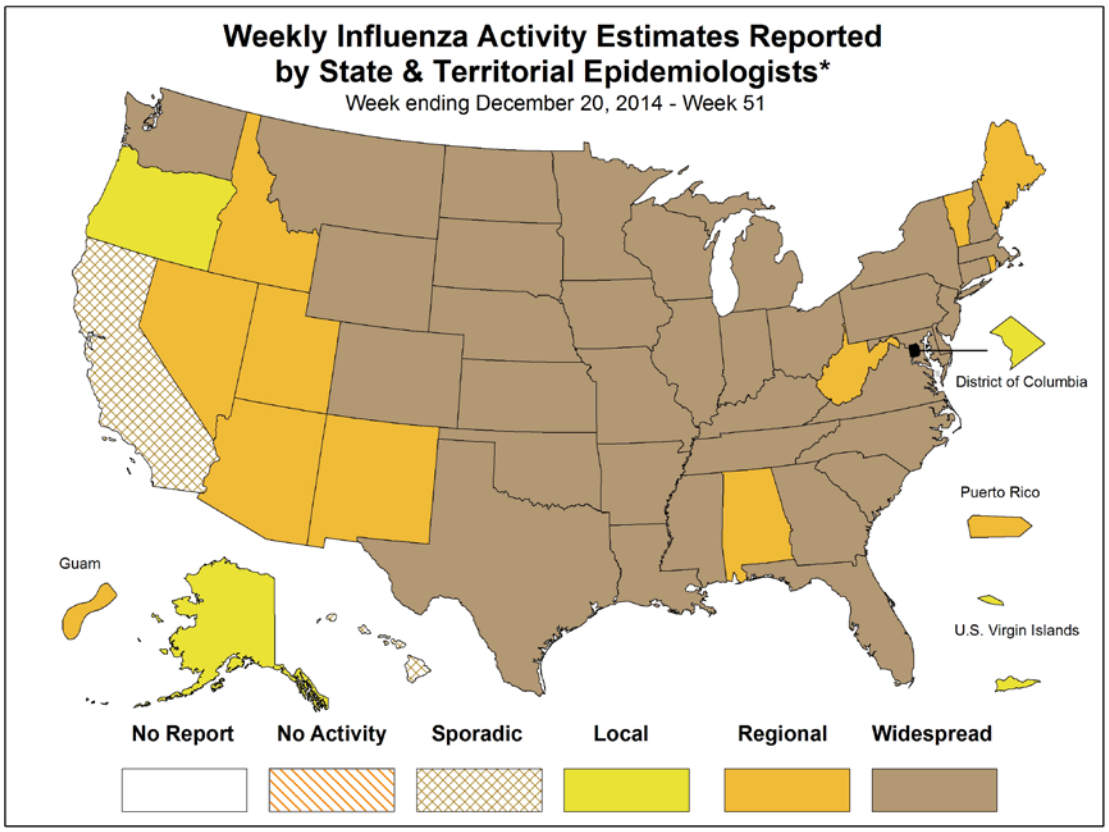


*This map uses the proportion of outpatient visits to health care providers for influenza-like illness to measure the ILI activity level within a state. It does not, however, measure the extent of geographic spread of flu within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels.
Data collected in ILINet may disproportionally represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state.
Data displayed in this map are based on data collected in ILINet, whereas the State and Territorial flu activity map is based on reports from state and territorial epidemiologists. The data presented in this map is preliminary and may change as more data is received. Differences in the data presented here by CDC and independently by some state health departments likely represent differing levels of data completeness with data presented by the state likely being the more complete.

Geographic Spread of Influenza as Assessed by State and Territorial Epidemiologists: The influenza activity reported by state and territorial epidemiologists indicates geographic spread of influenza viruses, but does not measure the severity of influenza activity.

During week 51, the following influenza activity was reported:

- Widespread influenza activity was reported by 36 states (Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, Washington, Wisconsin, and Wyoming).
- Regional influenza activity was reported by Guam, Puerto Rico and 10 states (Alabama, Arizona, Idaho, Maine, Nevada, New Mexico, Rhode Island, Utah, Vermont, and West Virginia).
- Local influenza activity was reported by the District of Columbia, the U.S. Virgin Islands, and two states (Alaska and Oregon).
- Sporadic influenza activity was reported by two states (California and Hawaii).



* This map indicates geographic spread & does not measure the severity of influenza activity

Additional National and International Influenza Surveillance Information

FluView Interactive: FluView includes enhanced web-based interactive applications that can provide dynamic visuals of the influenza data collected and analyzed by CDC. These FluView Interactive applications allow people to create customized, visual interpretations of influenza data, as well as make comparisons across flu seasons, regions, age groups and a variety of other demographics. To access these tools, visit http://www.cdc.gov/flu/weekly/fluviewinteractive.htm.

U.S. State and local influenza surveillance: Click on a jurisdiction below to access the latest local influenza information.

Alabama	Alaska	Arizona	Arkansas	California
Colorado	Connecticut	Delaware	District of Columbia	Florida
Georgia	Hawaii	Idaho	Illinois	Indiana
Iowa	Kansas	Kentucky	Louisiana	Maine
Maryland	Massachusetts	Michigan	Minnesota	Mississippi
Missouri	Montana	Nebraska	Nevada	New Hampshire
New Jersey	New Mexico	New York	North Carolina	North Dakota
Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island
South Carolina	South Dakota	Tennessee	Texas	Utah
Vermont	Virginia	Washington	West Virginia	Wisconsin
Wyoming	New York City	Virgin Islands		

Google Flu Trends: Google Flu Trends uses aggregated Google search data in a model created in collaboration with CDC to estimate influenza activity in the United States. For more information and activity estimates from the United States and worldwide, see http://www.google.org/flutrends/.

World Health Organization: Additional influenza surveillance information from participating WHO member nations is available through FluNet and the Global Epidemiology Reports.

WHO Collaborating Centers for Influenza located in Australia, China, Japan, the United Kingdom, and the United States (CDC in Atlanta, Georgia).

Europe: WHO/Europe at http://www.flunewseurope.org/ and the European Centre for Disease Prevention and Control at http://ecdc.europa.eu/en/publications/surveillance_reports/influenza/Pages/weekly_influenza_surveillance_overview.aspx

Public Health Agency of Canada: The most up-to-date influenza information from Canada is available at http://www.phac-aspc.gc.ca/fluwatch/.

Public Health England: The most up-to-date influenza information from the United Kingdom is available at https://www.gov.uk/government/statistics/weekly-national-flu-reports.

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An overview of influenza surveillance, including a description of the NCHS mortality surveillance data, is available at: http://www.cdc.gov/flu/weekly/overview.htm.

Report prepared: December 29, 2014.