Weekly U.S. Influenza Surveillance Report

Key Updates for Week 52, ending December 28, 2019

Seasonal influenza activity in the United States is high and continues to increase. Activity has been elevated for eight weeks.

Viruses

Clinical Labs

The percentage of respiratory specimens testing positive for influenza at clinical laboratories increased from 23.0% last week to 26.3% this week.

Public Health Labs

Nationally, B/Victoria viruses are most common followed by A(H1N1)pdm09 viruses. The predominant virus varies by region and age group. There is low circulation of A(H3N2) and B/Yamagata viruses.

Virus Characterization

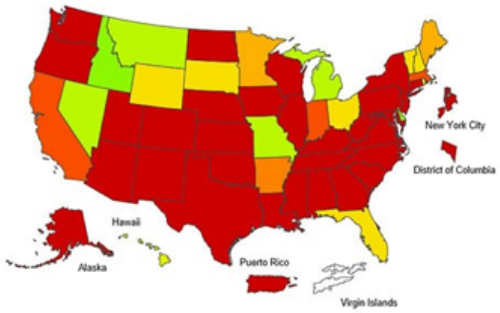
Genetic and antigenic characterization and antiviral susceptibility of influenza viruses collected in the U.S. this season is summarized in this report.

Illness

Outpatient Illness: ILINet

Visits to health care providers for influenza-like illness (ILI) increased from 5.1% last week to 6.9% this week. All regions were above their baselines and continuing to increase.

Outpatient Illness: ILI Activity Map



The number of jurisdictions experiencing high ILI activity increased to 37 this week compared to 28 last week.

Geographic Spread

The number of jurisdictions reporting regional or widespread influenza activity increased to 50 this week compared to 48 last week.

Severe Disease

Hospitalizations

The overall hospitalization rate for the season increased to 9.2 per 100,000. This is similar to what has been seen at this time during recent seasons.

P&I Mortality

The percentage of deaths attributed to pneumonia and influenza is 5.5% which is below the epidemic threshold.

Pediatric Deaths

Five new influenza-associated pediatric deaths occurring during the 2019-2020 season were reported this week. The total for the season is 27.

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

A description of the CDC influenza surveillance system, including methodology and detailed descriptions of each data component is available on the surveillance methods page.

Additional information on the current and previous influenza seasons for each surveillance component are available on FluView Interactive.

Key Points

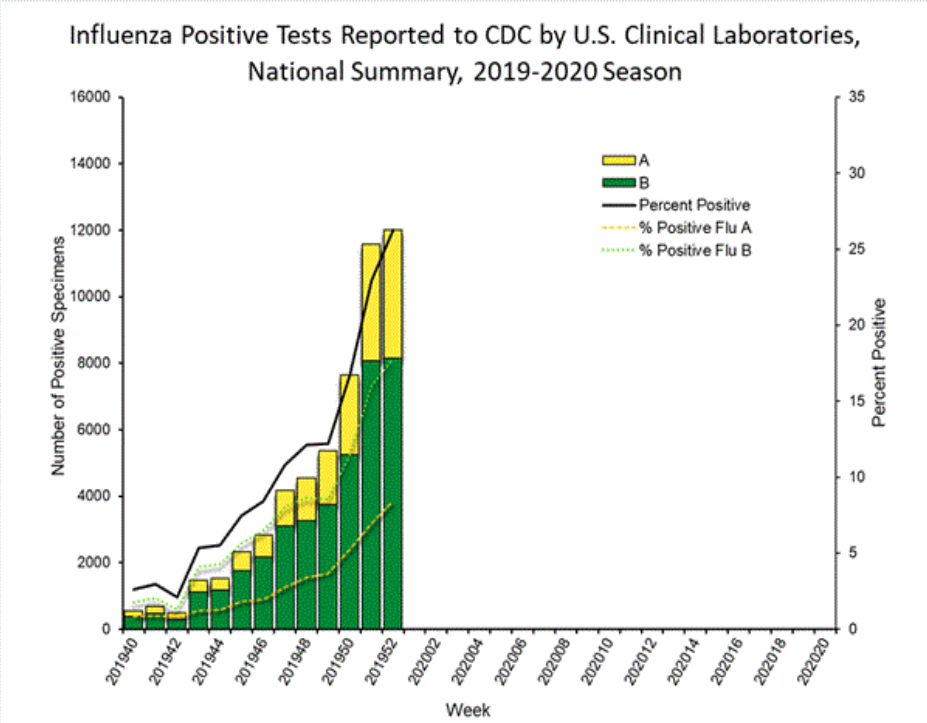
- Influenza activity is high nationally with outpatient visits for ILI and the percentage of respiratory specimens testing positive for influenza at levels similar to what have been seen at the peak of recent seasons. However, this week's data may in part be influenced by changes in healthcare seeking behavior that can occur during the holidays.
- Influenza B/Victoria viruses are predominant nationally, which is unusual for this time of year. A(H1N1)pdm09 viruses are the next most common. A(H3N2) and B/Yamagata viruses are circulating at very low levels.
- CDC estimates that so far this season there have been at least 6.4 million flu illnesses, 55,000 hospitalizations and 2,900 deaths from flu.
- It's not too late to get vaccinated. Flu vaccination is always the best way to prevent flu and its potentially serious complications.
- Antiviral medications are an important adjunct to flu vaccine in the control of influenza. Almost all (>99%) of the influenza viruses tested this season are susceptible to the four FDA-approved influenza antiviral medications recommended for use in the U.S. this season.

U.S. Virologic Surveillance

Clinical Laboratories

The results of tests performed by clinical laboratories nationwide are summarized below. Data from clinical laboratories (the percentage of specimens tested that are positive for influenza) are used to monitor whether influenza activity is increasing or decreasing.

	Week 52	Data Cumulative since September 29, 2019 (week 40)
No. of specimens tested	45,749	450,253
No. of positive specimens (%)	12,016 (26.3%)	55,251 (12.3%)
Positive specimens by type		
Influenza A	3,859 (32.1%)	16,247 (29.4%)
Influenza B	8,157 (67.9%)	39,004 (70.6%)



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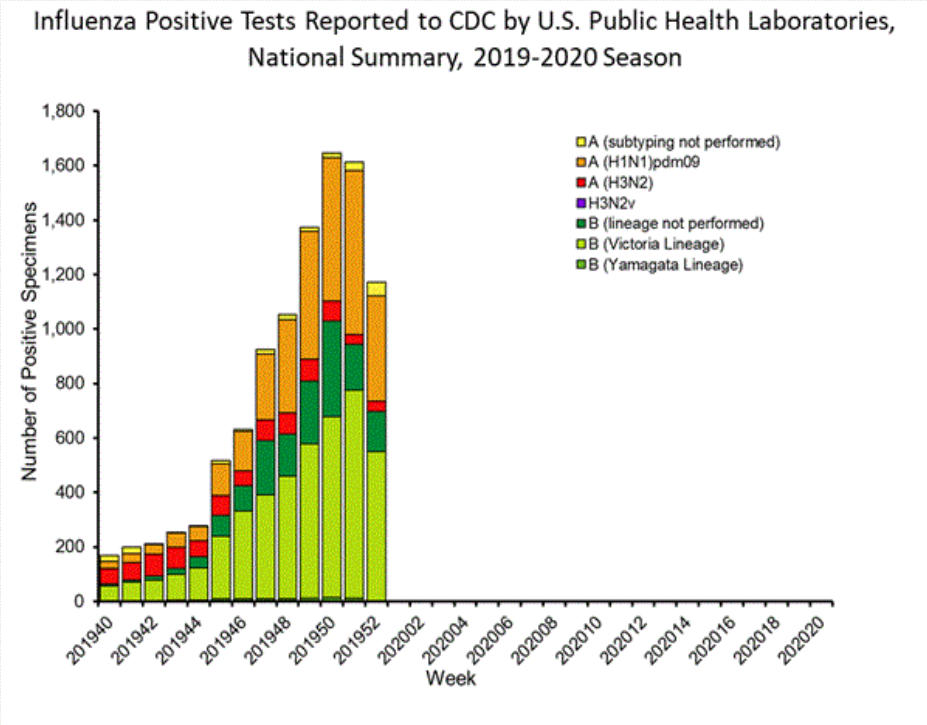
Public Health Laboratories

The results of tests performed by public health laboratories nationwide are summarized below. Data from public health laboratories are used to monitor the proportion of circulating viruses that belong to each influenza subtype/lineage.

	Week 52	Data Cumulative since September 29, 2019 (week 40)
No. of specimens tested	1,618	24,350
No. of positive specimens	1,172	10,034
Positive specimens by type/subtype		
Influenza A	474 (40.4%)	4,090 (40.8%)
(H1N1)pdm09	387 (91.3%)	3,028 (78.1%)
H3N2	37 (8.7%)	849 (21.9%)
Subtyping not performed	50	213
Influenza B	698 (59.6%)	5,944 (59.2%)
Yamagata lineage	2 (0.4%)	95 (2.1%)
Victoria lineage	548 (99.6%)	4,342 (97.9%)

Lineage not performed	148	1,507

Nationally influenza B/Victoria viruses have been reported more frequently than other influenza viruses this season followed by A(H1N1)pdm09. The predominant virus varies by region. Regional and state level data about circulating influenza viruses can be found on FluView Interactive. The predominant virus also varies by age group. Nationally, influenza B/Victoria viruses are the most commonly reported influenza viruses among children age 0-4 years (48% of reported viruses) and 5-24 years (59% of reported viruses), while A(H1N1)pdm09 viruses are the most commonly reported influenza viruses among persons 25-64 years (42% of reported viruses) and 65 years of age and older (43% of reported viruses). Additional age data can be found on FluView Interactive.



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Additional virologic surveillance information for current and past seasons:
Surveillance Methods | FluView Interactive: National, Regional, and State Data or Age Data

Influenza Virus Characterization

CDC performs genetic and antigenic characterization of U.S. viruses submitted from state and local health laboratories using Right Size Roadmap submission guidance. These data are used to compare how similar the currently circulating influenza viruses are to the reference viruses used for developing new influenza vaccines and to monitor evolutionary changes that continually occur in circulating influenza. CDC also tests susceptibility of influenza viruses to antiviral medications including the neuraminidase inhibitors (oseltamivir, zanamivir, and peramivir) and the PA endonuclease inhibitor baloxavir.

CDC **genetically characterized** 714 influenza viruses collected in the U.S. from September 29, 2019, to December 28, 2019.

Virus Subtype or Lineage	Genetic Characterization				
	Total No. of Subtype/Lineage Tested	Clade	Number (% of subtype/lineage tested)	Subclade	Number (% of subtype/lineage tested)
A/H1	205				
		6B.1A	205 (100%)		
A/H3	189				
		3C.2a	189 (100%)	2a1	189 (100%)
				2a2	0
				2a3	0
				2a4	0
		3C.3a	0	3a	0
B/Victoria	295				
		V1A	295 (100%)	V1A	0
				V1A.1	31 (10.5%)
				V1A.3	264 (89.5%)
B/Yamagata	25				
		Y3	25 (100%)		

CDC **antigenically characterizes** a subset of influenza viruses by hemagglutination inhibition (HI) or neutralization based Focus Reduction assays (FRA). Antigenic drift is evaluated by comparing antigenic properties of cell-propagated reference viruses representing currently recommended vaccine components with those of cell-propagated circulating viruses. CDC antigenically characterized 167 influenza viruses collected in the United States from September 29, 2019, to December 28, 2019.

Influenza A Viruses

- **A (H1N1)pdm09:** 66 A(H1N1)pdm09 viruses were antigenically characterized by HI with ferret antisera, and all were antigenically similar (reacting at titers that were within 4-fold of the homologous virus titer) to cell-propagated A/Brisbane/02/2018-like reference viruses representing the A(H1N1)pdm09 component for the 2019-20 Northern Hemisphere influenza vaccines.
- **A (H3N2):** 41 A(H3N2) viruses were antigenically characterized by FRA with ferret antisera, and 14 (34.1%) were antigenically similar to cell-propagated A/Kansas/14/2017-like reference viruses representing the A(H3N2) component for the 2019-20 Northern Hemisphere influenza vaccines.

Influenza B Viruses

- **B/Victoria:** 50 B/Victoria lineage viruses, including viruses from both co-circulating sub-clades, were antigenically characterized by HI with ferret antisera, and 29 (58%) were antigenically similar to cell-propagated B/Colorado/06/2017-like reference viruses representing the B/Victoria component for the 2019-20 Northern Hemisphere influenza vaccines.
- **B/Yamagata:** 10 B/Yamagata lineage viruses were antigenically characterized by HI with ferret antisera, and all 10 (100%) were antigenically similar to cell-propagated B/Phuket/3073/2013-like reference viruses representing the B/Yamagata component for the 2019-20 Northern Hemisphere influenza vaccines.

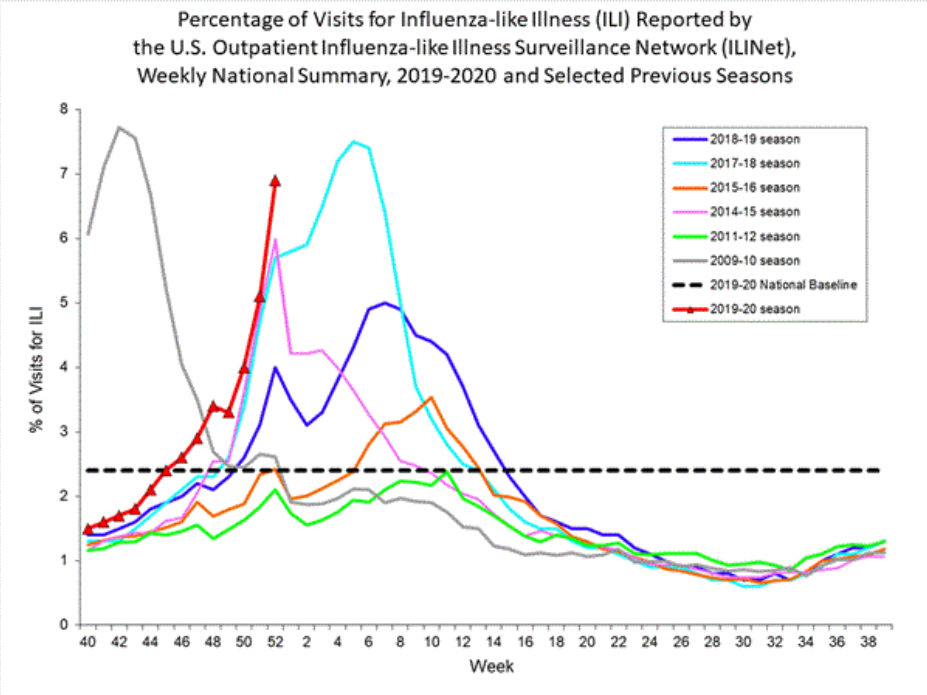
CDC assesses **susceptibility of influenza viruses to the antiviral medications** oseltamivir, zanamivir, peramivir, and baloxavir using next generation sequence analysis supplemented by laboratory assays. Viruses collected in the United States since September 29, 2019, were tested for antiviral susceptibility as follows:

Antiviral Medication			Total Viruses	A/H1	A/H3	B/Victoria	B/Yamagata
Neuraminidase Inhibitors	Oseltamivir	Viruses Tested	707	204	185	293	25
		Reduced Inhibition	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
		Highly Reduced Inhibition	1 (0.1%)	1 (0.5%)	(0.0%)	(0.0%)	(0.0%)
	Peramivir	Viruses Tested	707	204	185	293	25
		Reduced Inhibition	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
		Highly Reduced Inhibition	1 (0.1%)	1 (0.5%)	(0.0%)	(0.0%)	(0.0%)
	Zanamivir	Viruses Tested	707	204	185	293	25
		Reduced Inhibition	1 (0.1%)	(0.0%)	(0.0%)	1 (0.3%)	(0.0%)
		Highly Reduced Inhibition	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
PA Endonuclease Inhibitor	Baloxavir	Viruses Tested	727	208	195	298	26
		Reduced Susceptibility	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)

Outpatient Illness Surveillance

ILINet

Nationwide during week 52, 6.9% 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 2.4%. The increase in the percentage of patient visits for ILI during week 52 compared to week 51 may be influenced in part by a reduction in routine healthcare visits surrounding the holidays occurring during week 52 as has occurred during previous seasons.



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On a regional level, the percentage of outpatient visits for ILI ranged from 3.8% to 13.9% during week 52. All regions reported a percentage of outpatient visits for ILI which is equal to or above their region-specific baselines.

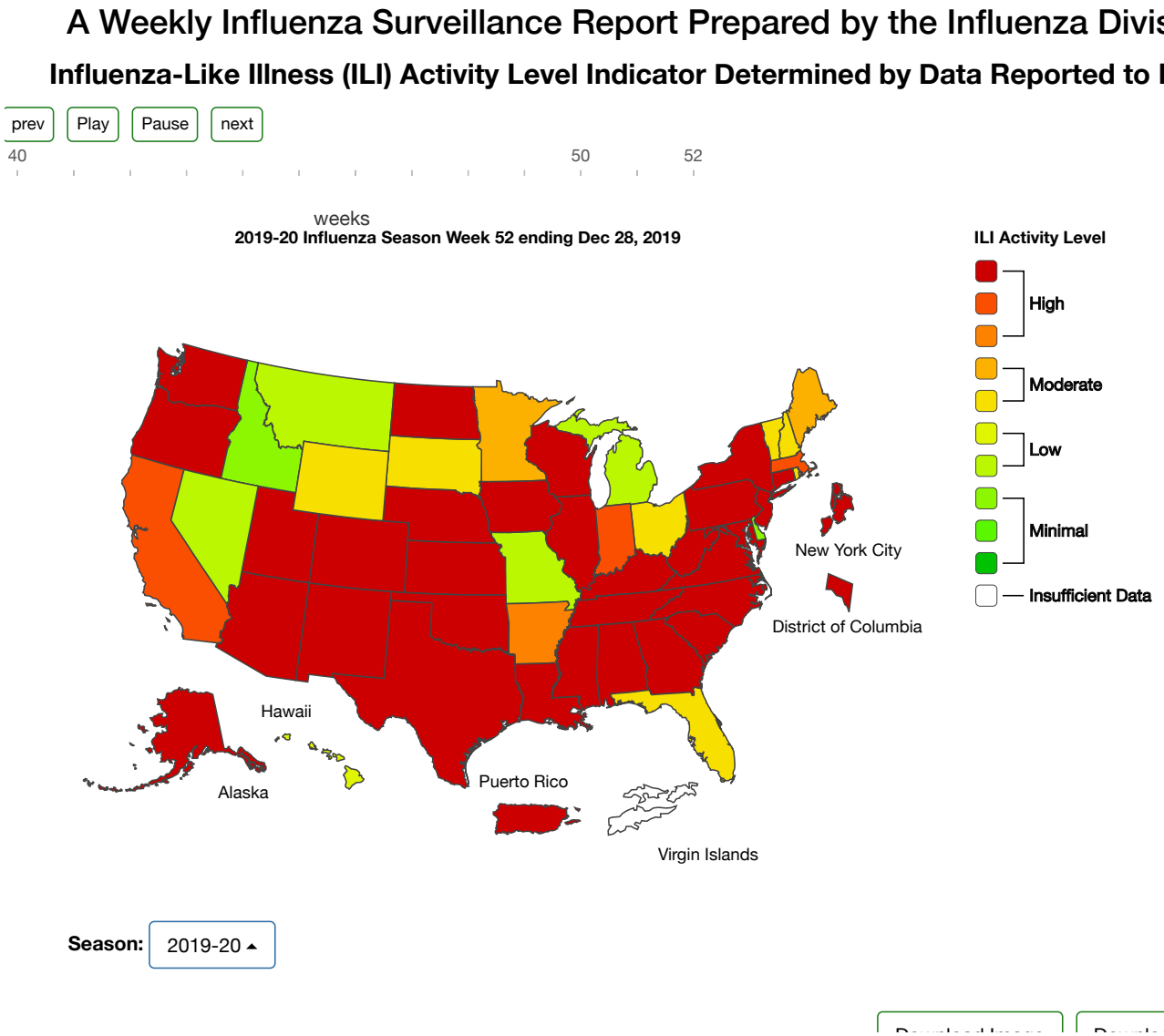
ILI Activity Map

Data collected in ILINet are used to produce a measure of ILI activity* by state.

During week 52, the following ILI activity levels were experienced:

- High – the District of Columbia, New York City, Puerto Rico, and 34 states (Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Nebraska, New Jersey, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin)
- Moderate – nine states (Florida, Maine, Minnesota, New Hampshire, Ohio, Rhode Island, South Dakota, Vermont, and Wyoming)
- Low – five states (Hawaii, Michigan, Missouri, Montana, and Nevada)

- Minimal – two states (Delaware and Idaho)
- Data were insufficient to calculate an ILI activity level from the U.S. Virgin Islands.



*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. 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.

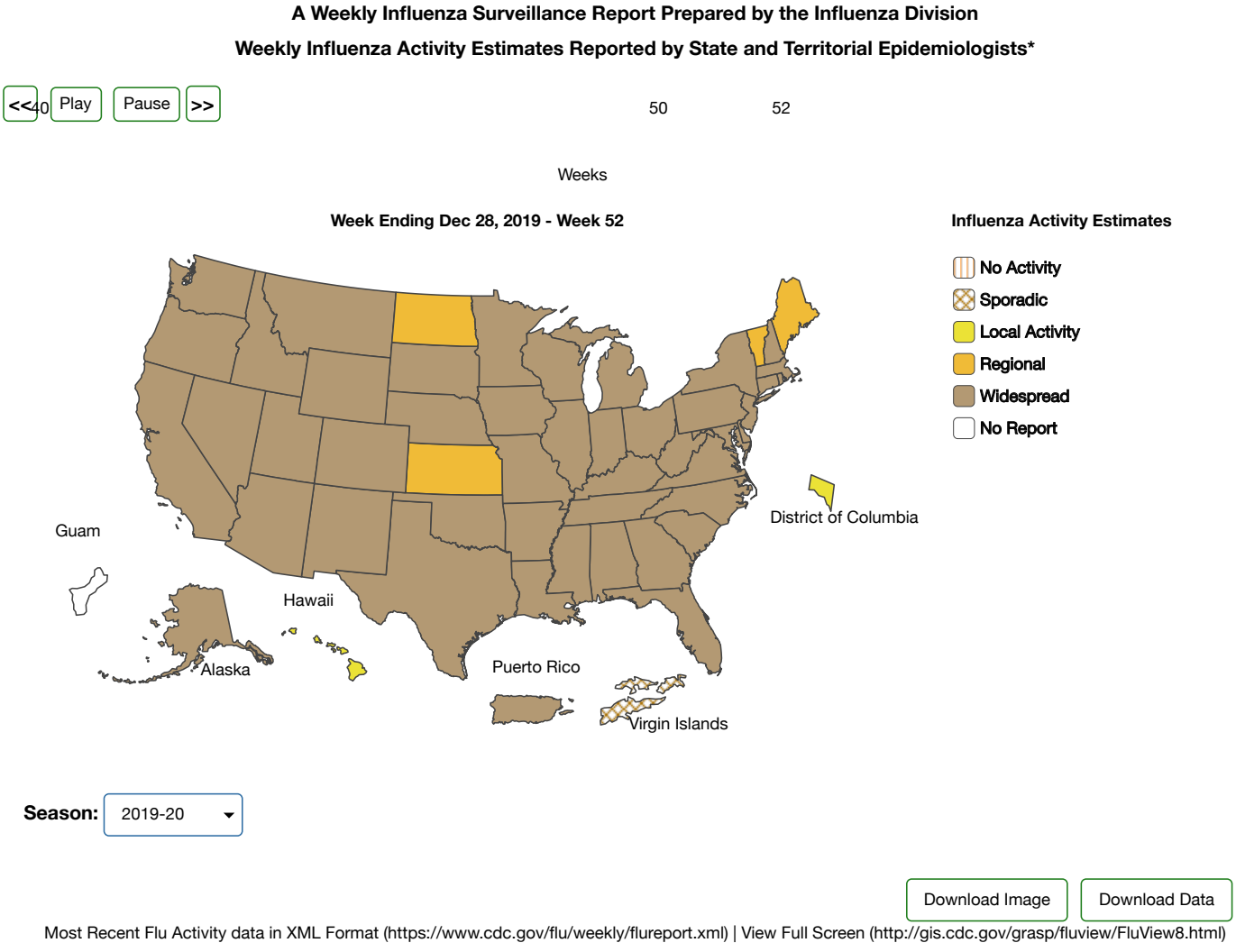
Additional information about medically attended visits for ILI for current and past seasons:
Surveillance Methods | FluView Interactive: National, Regional, and State Data or ILI Activity Map

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 52 the following influenza activity was reported:

- Widespread – Puerto Rico and 45 states (Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin and Wyoming)
- Regional – four states (Kansas, Maine, North Dakota, and Vermont)
- Local – the District of Columbia and one state (Hawaii)
- Sporadic – the U.S. Virgin Islands
- Guam did not report.



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

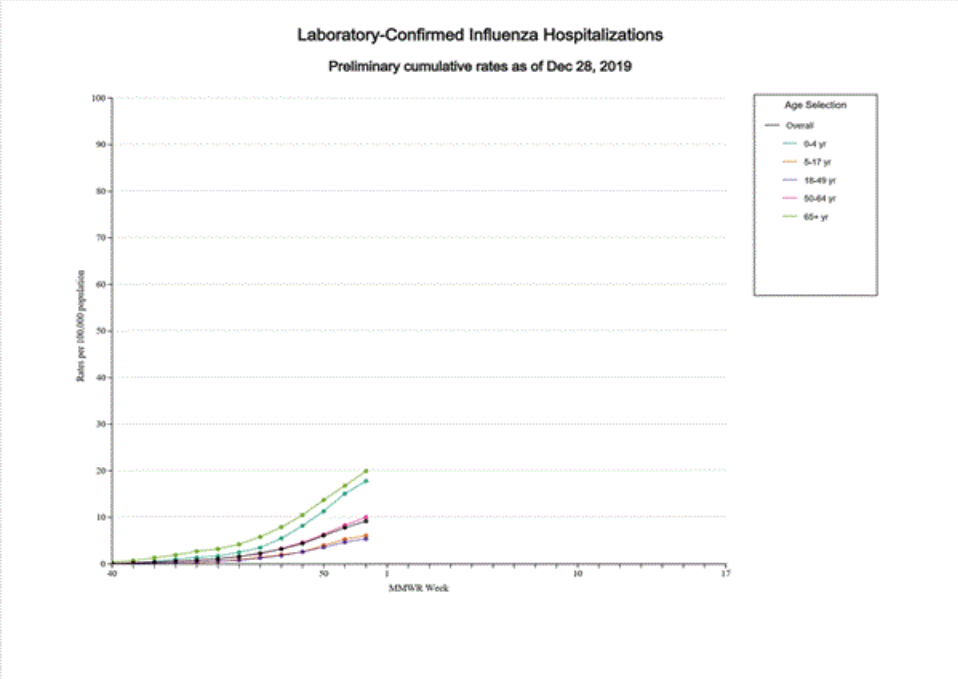
Additional geographic spread surveillance information for current and past seasons:

Surveillance Methods | FluView Interactive

Influenza-Associated Hospitalizations

The Influenza Hospitalization Surveillance Network (FluSurv-NET) conducts population-based surveillance for laboratory-confirmed influenza-related hospitalizations in select counties in the Emerging Infections Program (EIP) states and Influenza Hospitalization Surveillance Project (IHSP) states.

A total of 2,667 laboratory-confirmed influenza-associated hospitalizations were reported by FluSurv-NET sites between October 1, 2019 and December 28, 2019. The overall hospitalization rate was 9.2 per 100,000 population. The highest rate of hospitalization was among adults aged ≥65 (19.9 per 100,000 population), followed by children aged 0-4 (17.8 per 100,000 population) and adults aged 50-64 (10.0 per 100,000 population). Among 2,667 hospitalizations, 1,374 (51.5%) were associated with influenza A virus, 1,274 (47.8%) with influenza B virus, 10 (0.4%) with influenza A virus and influenza B virus co-infection, and 9 (0.3%) with influenza virus for which the type was not determined. Among those with influenza A subtype information, 259 (80.7%) were A(H1N1)pdm09 and 62 (19.3%) were A(H3N2) viruses.



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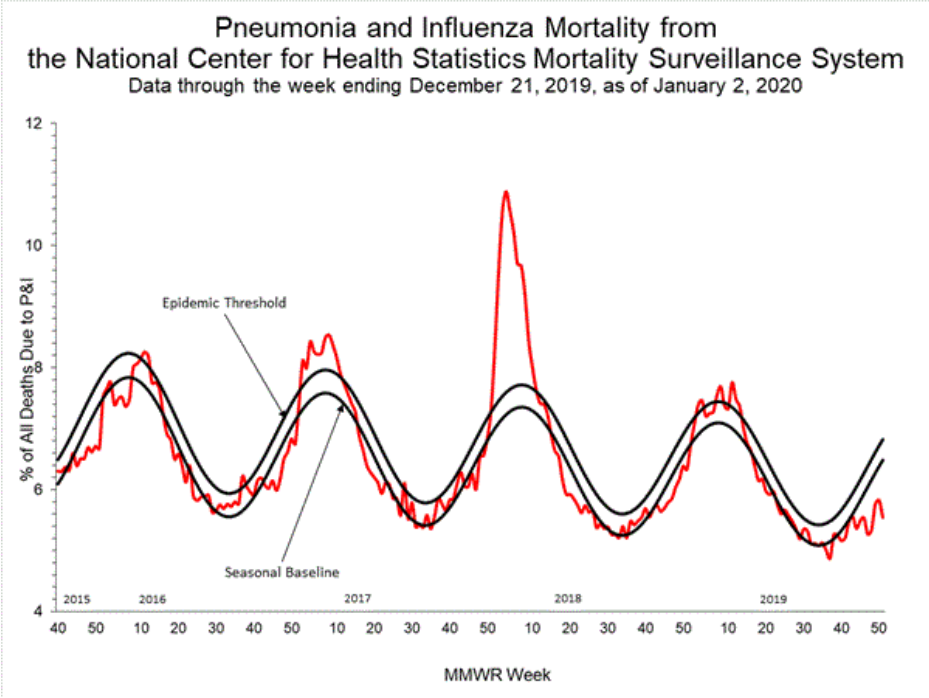
Additional hospitalization surveillance information for current and past seasons and additional age groups:
Surveillance Methods | FluView Interactive

Pneumonia and Influenza (P&I) Mortality Surveillance

Based on National Center for Health Statistics (NCHS) mortality surveillance data available on January 2, 2020, 5.5% of the deaths occurring during the week ending December 21, 2019 (week 51) were due to P&I. This percentage is below the epidemic threshold of 6.8% for week 51.



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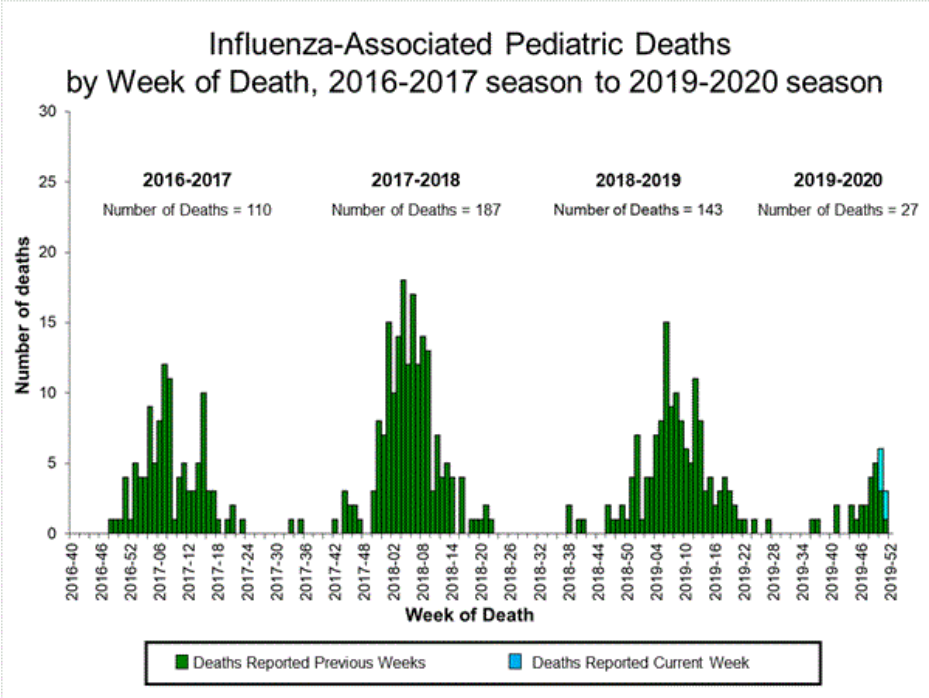
Additional pneumonia and influenza mortality surveillance information for current and past seasons:
Surveillance Methods | FluView Interactive

Influenza-Associated Pediatric Mortality

Five influenza-associated pediatric deaths occurring in weeks 50 (the week ending December 14, 2019) and 51 (the week ending December 21, 2019) were reported to CDC during week 52. Three were associated with influenza A viruses and two were associated with influenza B viruses.

A total of 27 influenza-associated pediatric deaths occurring during the 2019-2020 season have been reported to CDC.

- Eighteen deaths were associated with influenza B viruses. Five of these had the lineage determined and all were B/Victoria viruses.
- Nine deaths were associated with influenza A viruses. Four of these had subtyping performed and all were A(H1N1)pdm09 viruses.



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Additional pediatric mortality surveillance information for current and past seasons:
Surveillance Methods | FluView Interactive

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

National Institute for Occupational Safety and Health: Monthly surveillance data on the prevalence of health-related workplace absenteeism among full-time workers in the United States are available from NIOSH at https://www.cdc.gov/niosh/topics/absences/default.html

U.S. State and local influenza surveillance: Select 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	Puerto Rico	Virgin Islands	

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: For the most recent influenza surveillance information from Europe, please see WHO/Europe and the European Centre for Disease Prevention and Control at http://www.flunewseurope.org/.

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

An overview of the CDC influenza surveillance system, including methodology and detailed descriptions of each data component, is available at: http://www.cdc.gov/flu/weekly/overview.htm.

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