

## Untitled note



### 2017-2018 Influenza Season Week 43 ending October 28, 2017

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

#### Synopsis:

During week 43 (October 22-28, 2017), influenza activity was low in the United States.

- **Viral Surveillance:** The most frequently identified influenza virus type reported by public health laboratories during week 43 was influenza A. The percentage of respiratory specimens testing positive for influenza in clinical laboratories is low.
- **Novel Influenza A Virus:** Three human infections with novel influenza A viruses were reported.
- **Pneumonia and Influenza Mortality:** The proportion of deaths attributed to pneumonia and influenza (P&I) was below the system-specific epidemic threshold in the National Center for Health Statistics (NCHS) Mortality Surveillance System.
- **Influenza-associated Pediatric Deaths:** One influenza-associated pediatric death was reported that occurred during the 2016-2017 season.
- **Outpatient Illness Surveillance:** The proportion of outpatient visits for influenza-like illness (ILI) was 1.5%, which is below the national baseline of 2.2%. All 10 regions reported ILI below region-specific baseline levels. One state experienced moderate ILI activity, four states experienced low ILI activity, New York City and 45 states experienced minimal ILI activity, and the District of Columbia and Puerto Rico had insufficient data.
- **Geographic Spread of Influenza:** The geographic spread of influenza in Guam and four states was reported as regional; Puerto Rico and 12 states reported local activity; the District of Columbia and 31 states reported sporadic activity; one state reported no activity; and the U.S. Virgin Islands and two states did not report.

### National and Regional Summary of Select Surveillance Components

HHS Surveillance Regions*	Data for current week			Data cumulated
	Out-patient ILI†	Number of jurisdictions	% respiratory specimens	A(H1N1)pdm09

		reporting regional or widespread activity <sup>§</sup>	positive for flu in clinical laboratories <sup>‡</sup>	Influenza test results
<b>Nation</b>	Normal	5 of 54	2.9%	53
<b>Region 1</b>	Normal	0 of 6	0.7%	1
<b>Region 2</b>	Normal	0 of 4	1.5%	2
<b>Region 3</b>	Normal	0 of 6	1.0%	2
<b>Region 4</b>	Normal	1 of 8	5.7%	23
<b>Region 5</b>	Normal	0 of 6	0.9%	3
<b>Region 6</b>	Normal	3 of 5	2.3%	7
<b>Region 7</b>	Normal	0 of 4	0.4%	2
<b>Region 8</b>	Normal	0 of 6	0.9%	4
<b>Region 9</b>	Normal	1 of 5	2.4%	3
<b>Region 10</b>	Normal	0 of 4	2.3%	6

\*<https://www.hhs.gov/about/agencies/iea/regional-offices/index.html>

† 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 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, which include both public health and clinical laboratories located in all 50 states, Puerto Rico, and the District of Columbia, report to CDC the total number of respiratory specimens tested for influenza and the number positive for influenza by virus type. In addition, public health laboratories also report the influenza A subtype (H1 or H3) and influenza B lineage information of the viruses they test and the age or age group of the persons from whom the specimens were collected.

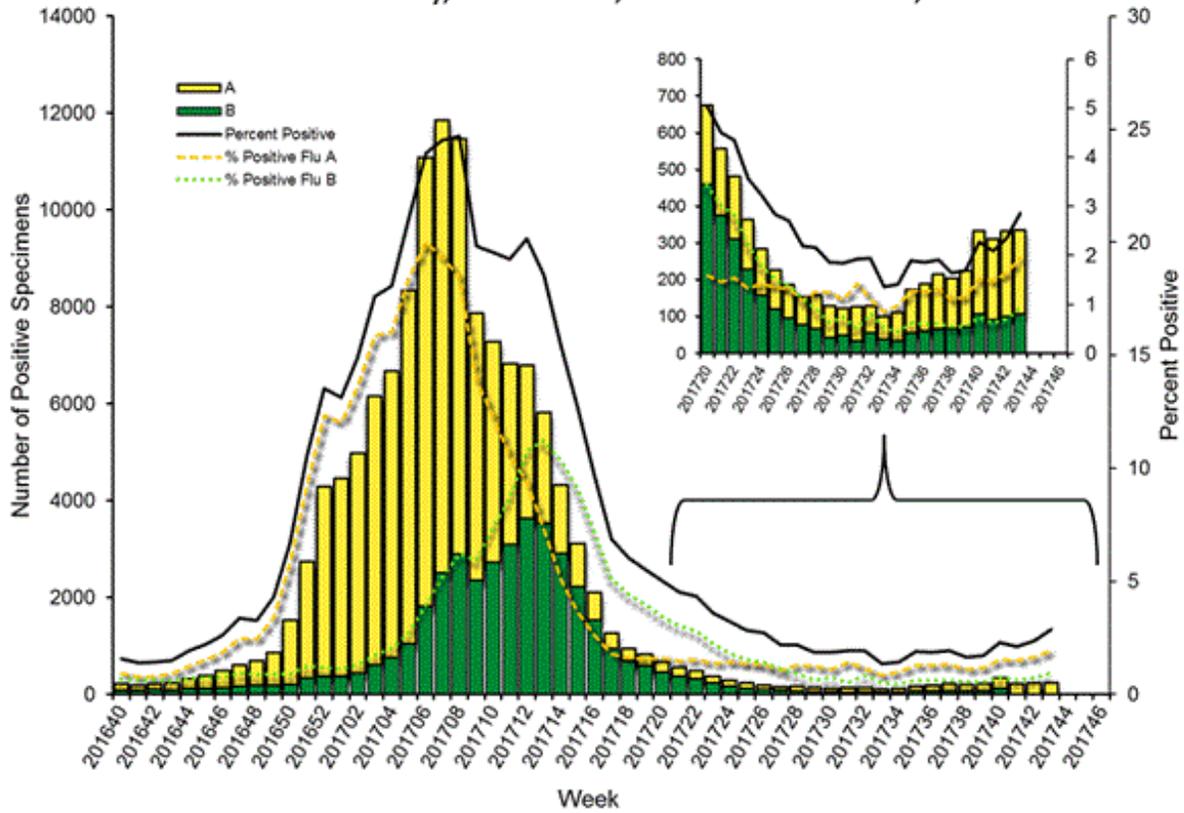
Additional virologic data, including national, regional and select state-level data, can be found at: <http://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>. Age group proportions and totals by influenza subtype reported by public health laboratories can be found at:

[http://gis.cdc.gov/grasp/fluview/flu\\_by\\_age\\_virus.html](http://gis.cdc.gov/grasp/fluview/flu_by_age_virus.html).

The results of tests performed by clinical laboratories are summarized below.

<b>October 1, 2017 (Week 40)</b>			<b>Data Cumulative since</b>
	<b>Week 43</b>		
<b>No. of specimens tested</b>	11,775	55,515	
<b>No. of positive specimens (%)</b>	336 (2.9%)	1,313 (2.4%)	
<b><i>Positive specimens by type</i></b>			
<b>Influenza A</b>	228 (67.9%)	905 (68.9%)	
<b>Influenza B</b>	108 (32.1%)	408 (31.1%)	

Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories,  
National Summary, October 2, 2016 – October 28, 2017



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The results of tests performed by public health laboratories, as well as the age group distribution of influenza positive tests, during the current week are summarized below.

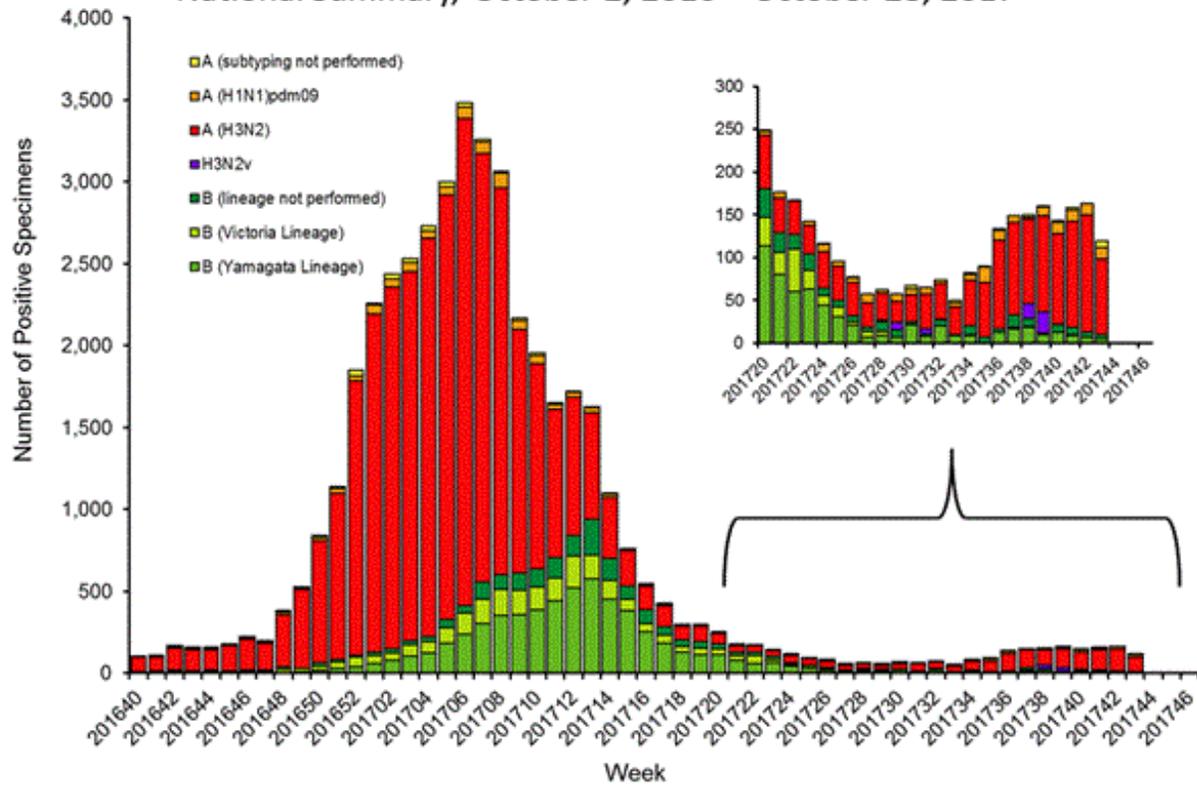
**October 1, 2017 (Week 40)**

	<b>Week 43</b>		<b>Data Cumulative since</b>
<b>No. of specimens tested</b>	694	3,265	
<b>No. of positive specimens*</b>	119	583	
<b>Positive</b>			

<b><i>specimens by type/subtype</i></b>		
<b>Influenza A</b>	109 (91.6%)	520 (89.3%)
<b>A(H1N1)pmd09</b>	14 (12.8%)	53 (10.2%)
<b>H3</b>	88 (80.7%)	455 (87.5%)
<b>Subtyping not performed</b>	7 (6.4%)	12 (2.3%)
<b>Influenza B</b>	10 (8.4%)	62 (10.7%)
<b>Yamagata lineage</b>	5 (50.0%)	34 (54.8%)
<b>Victoria lineage</b>	0 (0%)	1 (1.6%)
<b>Lineage not performed</b>	5 (50.0%)	27 (43.5%)

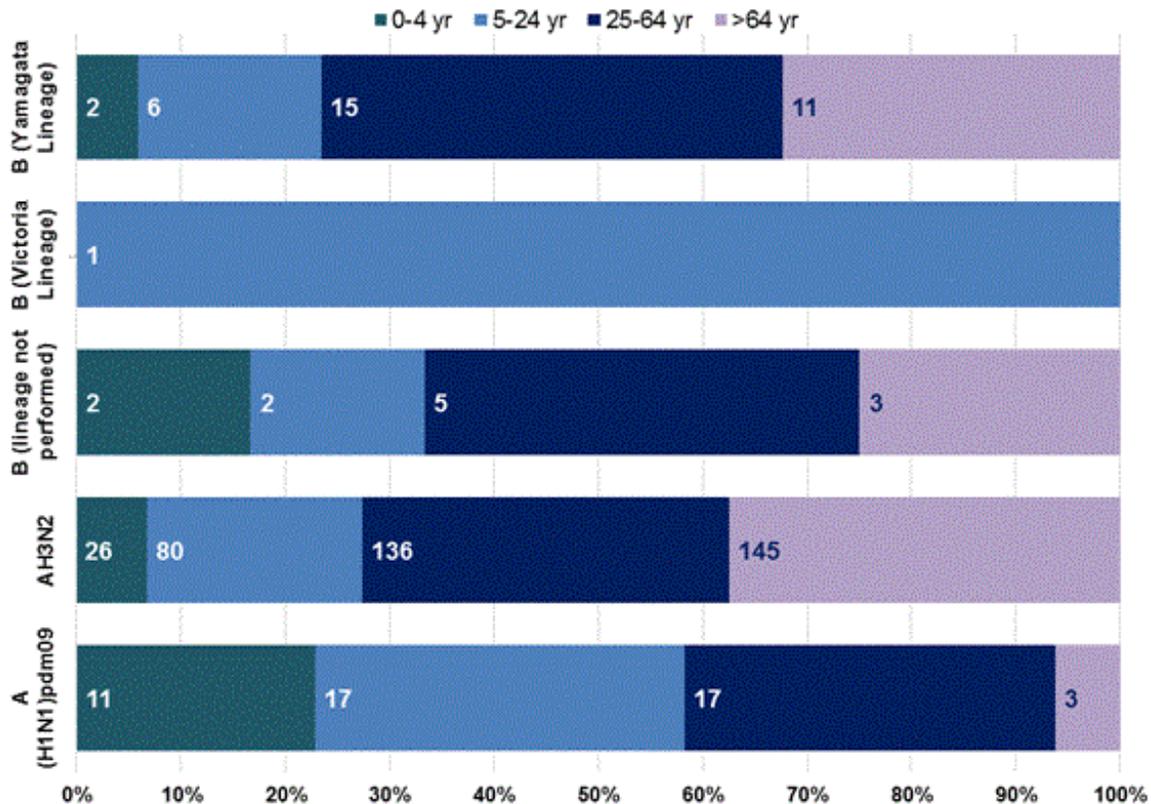
\*The percent of specimens testing positive for influenza is not reported because public health laboratories often receive samples that have already tested positive for influenza at a clinical laboratory and therefore percent positive would not be a valid indicator of influenza activity. Additional information is available at <http://www.cdc.gov/flu/weekly/overview.htm>.

## Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, October 2, 2016 – October 28, 2017



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## Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, Age Groups by Type and Subtype, 2017-2018 Season



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## Novel Influenza A Virus:

Three human infections with novel influenza A viruses were reported by three states (Colorado [1], Nebraska [1], and Michigan [1]) during week 43. Two infections were with influenza A(H3N2) variant (H3N2v) viruses and one infection was with an influenza A(H1N2) variant (H1N2v) virus. The patient in Colorado reported exposure to swine at an agricultural event during the week preceding illness onset. The patient in Nebraska reported no contact with swine during the week preceding illness onset, however a member of same household did report exposure to swine. The patient in Michigan is a close contact of a laboratory-confirmed H3N2v infection that was reported earlier this year. While exposure to swine was reported for the patient, that exposure occurred more than a week preceding illness onset, which is outside of the typical incubation period. It is possible that limited human-to-human transmission occurred. No ongoing human-to-human transmission has been identified.

A total of 65 variant virus infections have been reported to CDC so far during 2017. Sixty-one of these were influenza A (H3N2) variant (H3N2v) viruses (Delaware [1], Maryland [39], Michigan [2], Nebraska [1], North Dakota [1], Ohio [15], Pennsylvania [1], and Texas [1]) and

four were influenza A (H1N2) variant (H1N2v) viruses (Colorado [1] and Ohio [3]). Six of the 65 infections resulted in hospitalization; but all patients recovered.

Early identification and investigation of human infections with novel influenza A viruses are critical so that the risk of infection can be more fully understood and appropriate public health measures can be taken. Additional information on influenza in swine, variant influenza infection in humans, and strategies to interact safely with swine can be found at <http://www.cdc.gov/flu/swineflu/index.htm>.

## Influenza Virus Characterization:

CDC characterizes influenza viruses through one or more tests including [genomic sequencing](#), [hemagglutination inhibition \(HI\)](#) and/or neutralization assays. These data are used to compare how similar currently circulating influenza viruses are to the reference viruses used for developing influenza vaccines, and to monitor for changes in circulating influenza viruses. Antigenic and genetic characterization of circulating influenza viruses can give an indication of the influenza vaccine's ability to produce an immune response against the wide array of influenza viruses co-circulating, but [vaccine effectiveness estimates](#) are needed to determine how much protection has been provided to the population by vaccination.

For nearly all influenza-positive surveillance samples received at CDC, next-generation sequencing is performed to determine the genetic identity of circulating influenza viruses. Viruses can be classified into genetic groups/clades based on analysis of their HA gene segments using phylogenetics and key amino acid changes ([Klimov Vaccine 2012](#)). A representative subset of influenza-positive surveillance samples are antigenically characterized. However, a proportion of influenza A(H3N2) viruses lack sufficient hemagglutination titers for antigenic characterization using hemagglutination inhibition assays. Therefore, CDC selects a representative subset of influenza A(H3N2) viruses for antigenic characterization using the virus neutralization focus reduction assay to assess the ability of various antisera to neutralize infectivity of the test viruses.

It is important to monitor circulating influenza viruses for evidence of genetic changes. However, genetic changes do not always result in antigenic change. Extensive genetic variation may exist in circulating viruses, with no evidence of substantial antigenic drift. Close monitoring of influenza viruses is required to better assess the potential impact on public health.

## Genetic Characterization

During May 21 – October 28, 2017, 2,318 influenza positive specimens were collected and reported by public health laboratories in the United States (Figure, left). CDC genetically characterized 476 influenza viruses [64 influenza A(H1N1)pdm09, 283 influenza A(H3N2), and 129 influenza B viruses] collected by U.S. laboratories.

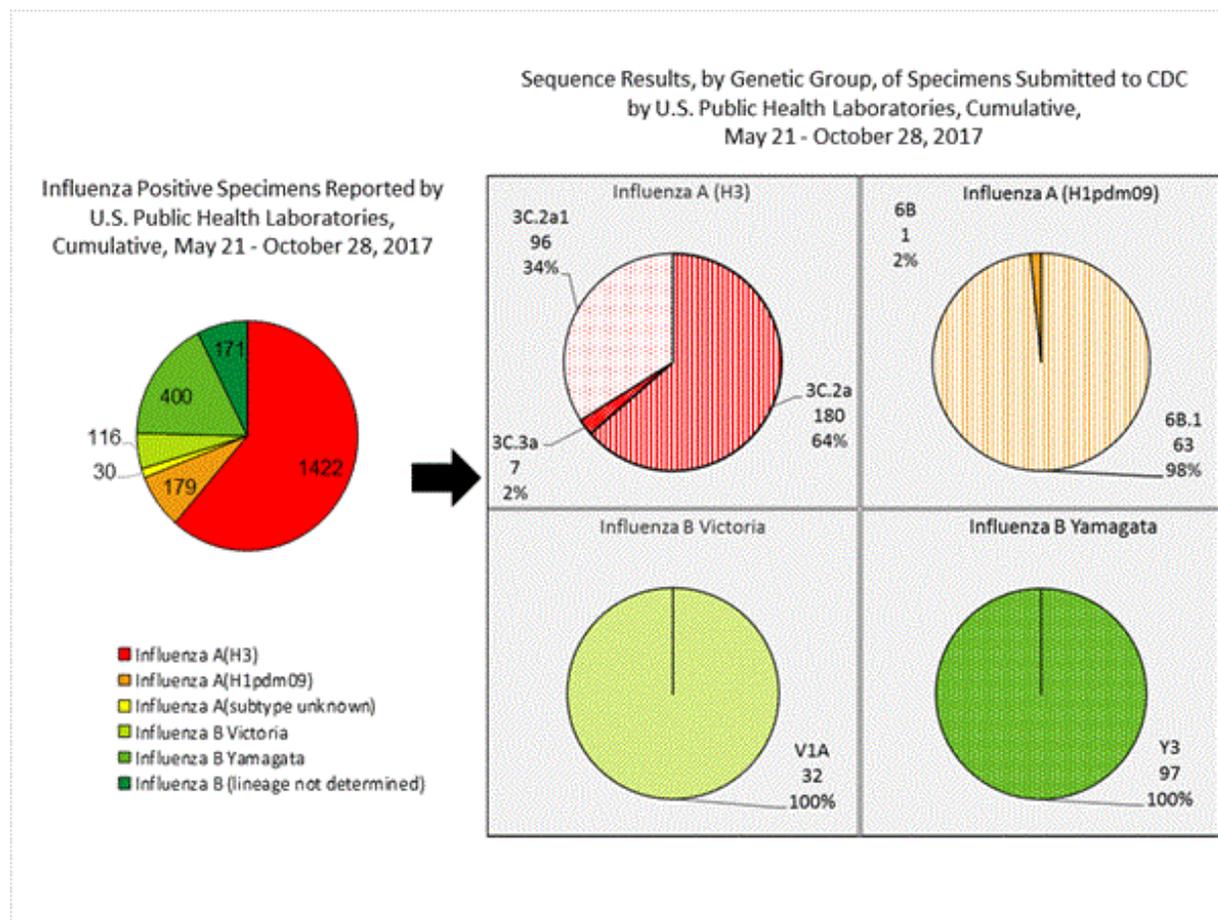
### Influenza A Viruses

- **A (H1N1)pdm09 [64]:** The HA gene segment of all influenza A(H1N1)pdm09 viruses analyzed showed that one virus belonged to clade 6B, with the remainder belonging to 6B.1, the same genetic clade as the vaccine reference virus, A/Michigan/45/2015.
- **A (H3N2) [283]:** Phylogenetic analysis of the HA genes indicate that multiple clades/subclades are circulating. The HA genes show extensive diversity and belong to clades 3C.2a, subclade 3C.2a1 or 3C.3a, with 3C.2a predominating. The vaccine reference virus, A/Hong Kong/4801/2014, belongs to the genetic clade 3C.2a.

### Influenza B Viruses

- **B/Victoria [32]:** The HA of influenza B/Victoria-lineage viruses all belonged to genetic group V1A, the same genetic clade as the vaccine reference virus, B/Brisbane/60/2008.
- Two subgroups of viruses within V1A have been detected with a double or triple deletion of amino acids in the HA. The majority of the double deletion viruses were identified in the United States, while no triple deletion viruses have been identified in the United States
- **B/Yamagata [97]:** The HA of influenza B/Yamagata-lineage viruses analyzed all belonged to genetic group Y3, the same genetic clade as the vaccine reference virus, B/Phuket/3073/2013.

The majority of U.S. viruses submitted for characterization come from state and local public health laboratories. Due to [Right Size Roadmap](#) considerations, specimen submission guidance issued to the laboratories request that, if available, 2 influenza A (H1N1), 2 A influenza (H3N2), and 2 influenza B viruses be submitted every other week. Because of this, the number of each virus type/subtype characterized should be approximately equal. In the figure below, the results of tests performed by public health labs are presented on the left and sequence results by genetic group of specimens submitted to CDC are presented on the right.



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## Antigenic Characterization

During May 21 – October 28, 2017, CDC antigenically characterized 274 influenza viruses [56 influenza A(H1N1)pdm09, 127 influenza A(H3N2), and 91 influenza B viruses] collected by U.S. laboratories. Antigenic similarity is evaluated by comparing cell-propagated circulating viruses with cell-propagated reference viruses representing the recommended vaccine components of the Northern Hemisphere 2017-18 vaccine.

### Influenza A Virus [183]

- **A (H1N1)pdm09 [56]:** All 56 influenza A(H1N1)pdm09 viruses were antigenically characterized using ferret post-infection antisera as A/Michigan/45/2015 (H1N1)pdm09-like.
- **A (H3N2) [127]:** 123 of 127 (96.8%) influenza A(H3N2) viruses were antigenically characterized as A/Hong Kong/4801/2014-like by HI testing or neutralization testing. Among the viruses that reacted poorly with ferret antisera raised against A/Hong Kong/4801/2014-like viruses, all belong to genetic group 3C.3a.

## Influenza B Virus [91]

- **Victoria Lineage [32]:** 21 of 32 (65.6%) B/Victoria-lineage viruses were antigenically characterized using ferret post-infection antisera as B/Brisbane/60/2008-like. Among the viruses that reacted poorly with ferret antisera raised against B/Brisbane/60/2008-like viruses, all were double deletion viruses.
- **Yamagata Lineage [59]:** All 59 (100%) B/Yamagata-lineage viruses were antigenically characterized using ferret post-infection antisera as B/Phuket/3073/2013-like.

## Antiviral Resistance:

During May 21-October 28, 2017, 436 specimens (61 influenza A(H1N1)pdm09, 250 influenza A(H3N2), and 125 influenza B viruses) collected in the United States were tested for susceptibility to the neuraminidase inhibitors (oseltamivir, zanamivir, and peramivir). All tested viruses were sensitive to all three recommended antiviral medications.

The majority of recently circulating influenza viruses are susceptible to the neuraminidase inhibitor antiviral medications, oseltamivir, zanamivir, and peramivir; however, rare sporadic instances of oseltamivir-resistant and peramivir-resistant influenza A (H1N1)pdm09 viruses and oseltamivir-resistant influenza A (H3N2) viruses have been detected worldwide. Antiviral treatment as early as possible is recommended 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>.

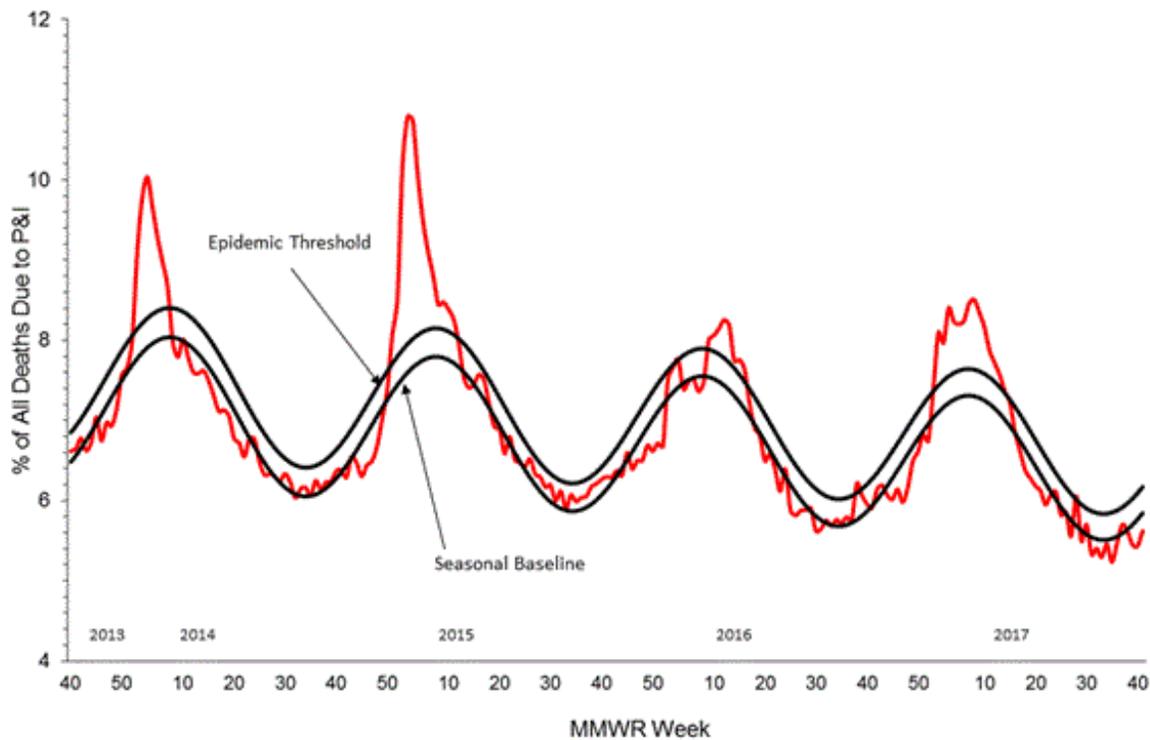
## [Pneumonia and Influenza \(P&I\) Mortality Surveillance:](#)

Based on National Center for Health Statistics (NCHS) mortality surveillance data available on November 2, 2017, 5.6% of the deaths occurring during the week ending October 14, 2017 (week 41) were due to P&I. This percentage is below the epidemic threshold of 6.2% for week 41.

Background: Weekly mortality surveillance data include a combination of machine coded and manually coded causes of death collected from death certificates. There is a backlog of data requiring manual coding within NCHS mortality surveillance data. The percentages of deaths due to P&I are higher among manually coded records than more rapidly available machine coded records and may result in initially reported P&I percentages that are lower than percentages calculated from final data. Efforts continue to reduce and monitor the number of records awaiting manual coding.

Region and state-specific data are available at <http://gis.cdc.gov/grasp/fluview/mortality.html>.

Pneumonia and Influenza Mortality from  
the National Center for Health Statistics Mortality Surveillance System  
Data through the week ending October 14, 2017, as of November 2, 2017



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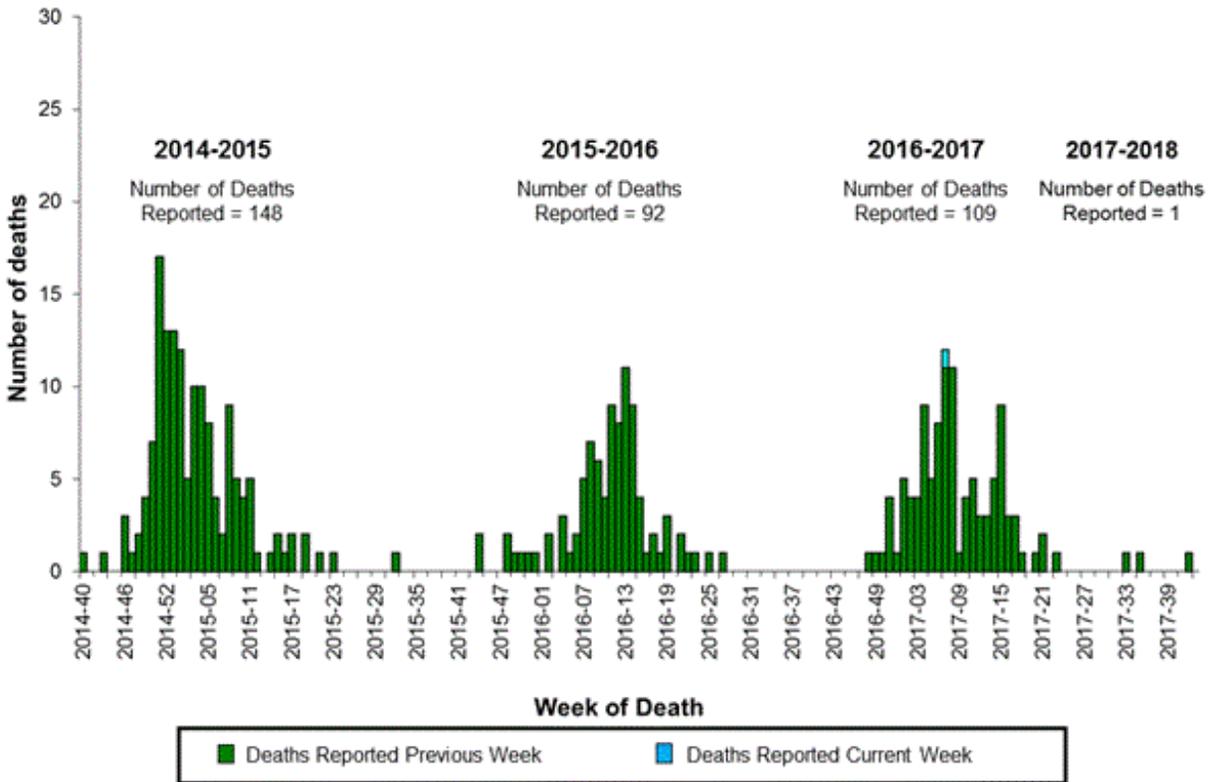
## Influenza-Associated Pediatric Mortality:

One influenza-associated pediatric death that occurred during the 2016-2017 season was reported to CDC during week 43. This death was associated with an influenza A (H3) virus and occurred during week 7 (the week ending February 18, 2017). This death brings the total number of reported influenza-associated pediatric deaths occurring during that season to 109.

One influenza-associated pediatric death for the 2017-2018 season has been reported to CDC.

Additional data can be found at: <http://gis.cdc.gov/GRASP/Fluview/PedFluDeath.html>.

## Number of Influenza-Associated Pediatric Deaths by Week of Death: 2014-2015 season to present



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## [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. FluSurv-NET estimated hospitalization rates will be updated weekly starting later this season.

Additional FluSurv-NET data can be found at:

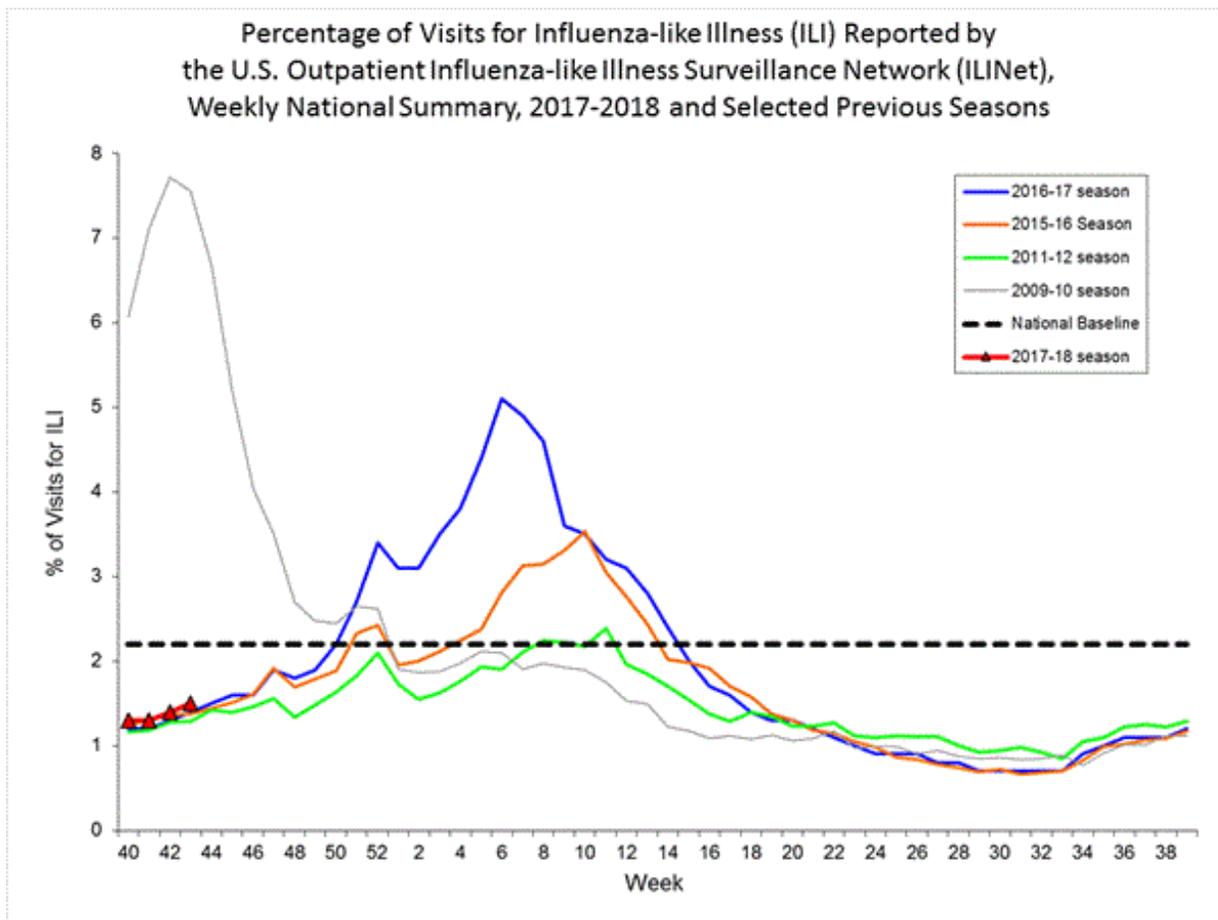
<http://gis.cdc.gov/GRASP/Fluview/FluHospRates.html> and  
<http://gis.cdc.gov/grasp/fluview/FluHospChars.html>.

## [Outpatient Illness Surveillance:](#)

Nationwide during week 43, 1.5% 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 below the national baseline of 2.2%. (ILI is defined as fever (temperature of

100°F [37.8°C] or greater) and cough and/or sore throat.)

Additional ILINet data, including national, regional and select state-level data, are available at <http://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>.



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On a regional level, the percentage of outpatient visits for ILI ranged from 0.7% to 2.3% during week 43. All 10 regions reported a proportion of outpatient visits for ILI below their region-specific baseline levels.

## **[ILINet State 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 43, the following ILI activity levels were experienced:

- One state experienced moderate ILI activity (Wyoming)
- Four states experienced low ILI activity (Georgia, Louisiana, South Carolina, and South Dakota).
- New York City and 45 states experienced minimal ILI activity (Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, 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, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin).
- Data were insufficient to calculate an ILI activity level from the District of Columbia and Puerto Rico.

Click on map to launch interactive tool

\*This map uses the proportion of outpatient visits to health care providers for ILI 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 disproportionately 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 are preliminary and may change as more data are 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 43, the following influenza activity was reported::

Additional data can be found at <https://gis.cdc.gov/grasp/fluview/FluView8.html>.

- Regional influenza activity was reported by Guam and four states (Georgia, Louisiana, Oklahoma, and Texas).
- Local influenza activity was reported by Puerto Rico and 12 states (Alaska, Arizona, California, Connecticut, Kentucky, Maine, Massachusetts, Mississippi, New Mexico, Ohio, South Carolina, and Tennessee).

- Sporadic influenza activity was reported by the District of Columbia and 31 states (Alabama, Arkansas, Colorado, Delaware, Florida, Hawaii, Idaho, Indiana, Illinois, Iowa, Kansas, Maryland, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Oregon, Pennsylvania, South Dakota, Utah, Vermont, Virginia, Washington, Wisconsin, and Wyoming).
- No activity was reported by one state (Rhode Island).
- The U.S. Virgin Islands and two states (New Hampshire and West Virginia) did not report.

## **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.

**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>

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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>

