

## **Influenza**

Agent: Influenza virus; Types A, B and (rarely) C cause human disease.

Mode of Transmission: Directly from person-to-person, primarily through inhalation of droplets released through coughing or sneezing. Less commonly, the influenza virus can be transmitted by contact with a contaminated object or surface and then touching one's mouth or nose.

Signs/Symptoms: Fever, headache, muscle pain, fatigue, sore throat and cough; influenza can also lead to pneumonia, especially in those with underlying medical conditions (e.g., lung or heart disease).

Prevention: Annual vaccination is the primary prevention strategy; antiviral medications are sometimes used with high-risk populations (e.g., nursing home residents) to prevent illness or lessen illness severity. Transmission may be reduced by washing hands frequently or using alcohol-based hand-sanitizers; avoiding touching the eyes, nose, and mouth with contaminated hands; and covering the nose and mouth with a tissue or the bend of the elbow when coughing or sneezing. Persons who are sick with influenza symptoms are encouraged to stay home to avoid spreading the disease to others.

Other Important Information: The influenza virus changes slightly from year to year (antigenic drift), making it necessary to prepare a new vaccine each year. Periodically, the virus will change to form a completely new subtype (antigenic shift), which can lead to pandemics.

## **Influenza Surveillance**

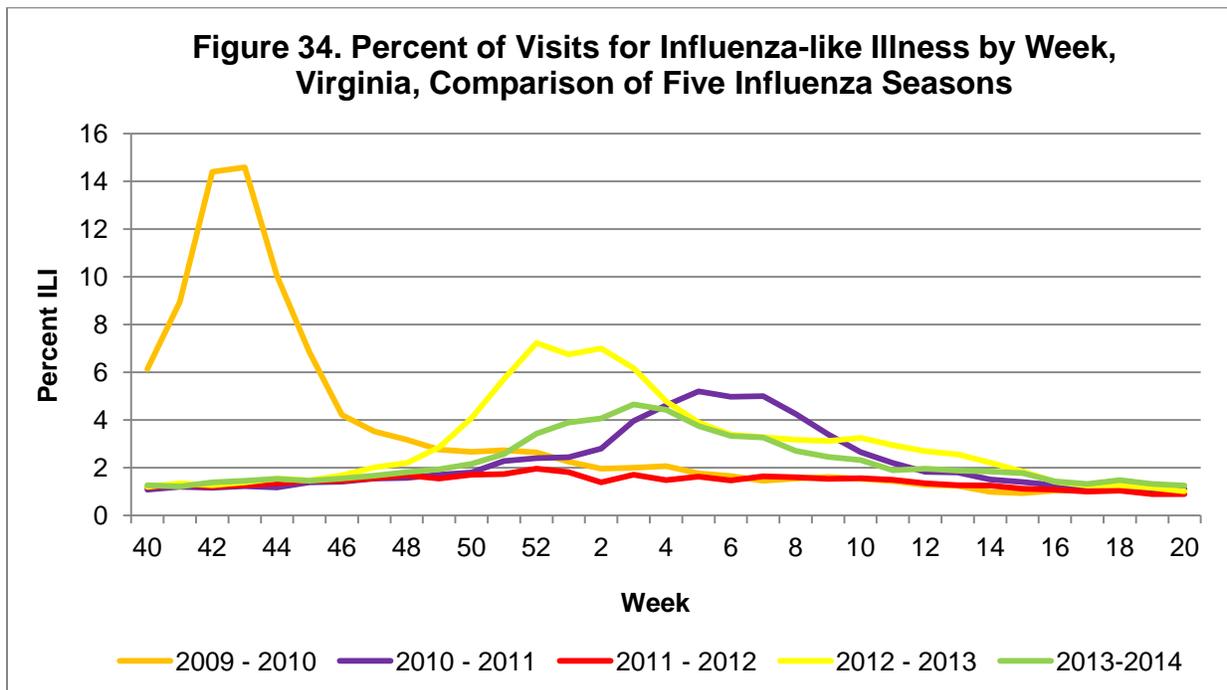
The seasonal influenza virus subtype that predominantly circulated during the 2013-2014 season was A/2009 pH1N1 (the subtype responsible for the 2009 pandemic). Small numbers of A (H3) and B were also identified.

Influenza surveillance is conducted throughout the year in Virginia. However, efforts are most intensively focused during the period of highest disease activity, which normally begins in early October (week 40) and ends in late May (week 20). Surveillance efforts in Virginia do not count every individual with influenza but instead monitor indicators of illness within the community. For the 2013-2014 influenza season, data sources included visits for influenza-like illness to hospital emergency departments and urgent care centers, laboratory reports, evaluations of outbreak investigations, influenza-associated pediatric deaths, and school absenteeism data. These data sources are used to determine weekly influenza levels, provide insight on the severity of illness, and characterize influenza virus subtypes circulating in the community.

## **Influenza-like Illness Surveillance**

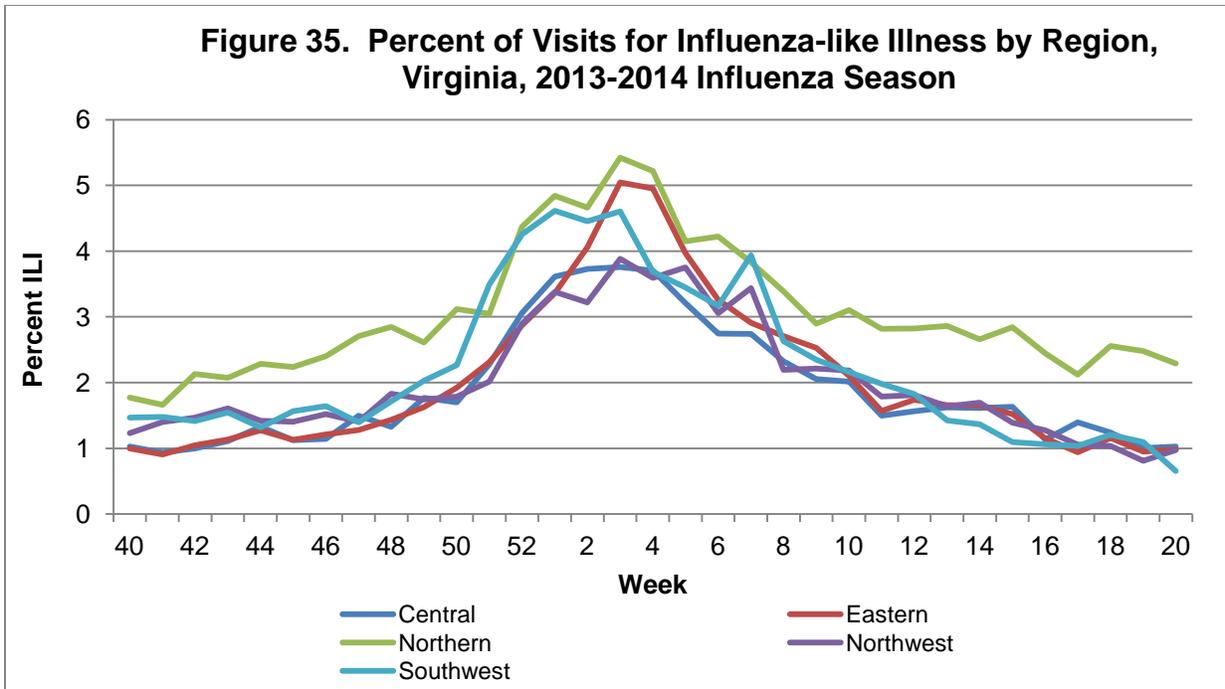
The Virginia Department of Health (VDH) receives information regarding patient visits to emergency departments and urgent care facilities for influenza-like illness (ILI) symptoms. ILI symptoms include a complaint of fever and cough or fever and sore throat. Other illnesses may show similar symptoms, but the strategy has proven to be a reliable indicator of influenza activity during flu season. During the 2013-2014 influenza season, 118 emergency department and urgent care facilities provided data to VDH for surveillance monitoring.

According to the Centers for Disease Control and Prevention (CDC), the 2013-2014 influenza season was the first since the 2009 pH1N1 pandemic in which pH1N1 viruses predominated. The season was characterized overall by lower levels of outpatient illness and mortality than influenza A (H3N2)-predominant seasons, but nationally higher rates of hospitalization among adults aged 50-64 years were observed when compared with recent years. Nationally, the weekly percentage of outpatient visits for ILI to healthcare providers participating in the U.S. Outpatient Influenza-Like Illness Surveillance Network (ILINet) was at or above the national baseline level of 2.0% for 15 consecutive weeks during the 2013-2014 influenza season. Across the U.S., the peak percentage of outpatient visits for ILI was 4.6%, and occurred in late December (week 52). In Virginia, the proportion of patient visits for ILI during the 2013-2014 season peaked at 4.6% during the week ending January 18, 2014 (week 3) (Figure 34).



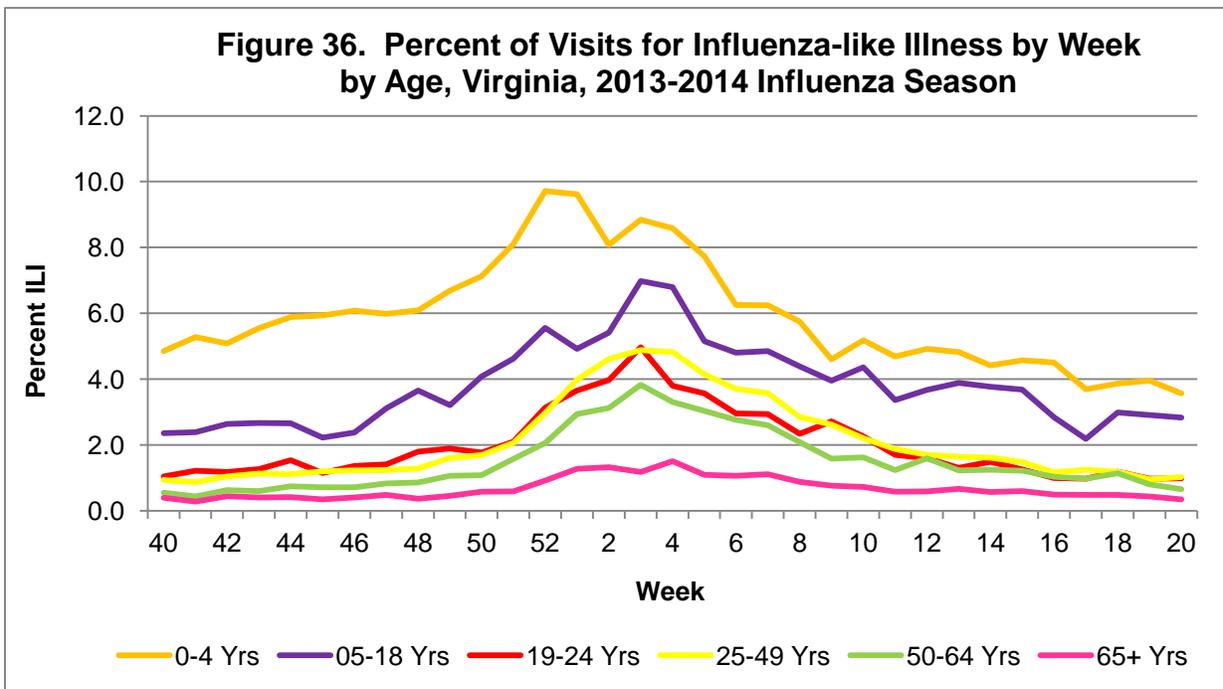
### Influenza-like Illness by Region

In Virginia, ILI activity varied by region throughout the 2013-2014 season. Peak activity occurred first in the southwest region of the state during early January (week 1). The remaining health planning regions (central, eastern, northern, and northwest) followed, peaking in mid-January (week 3) (Figure 35). The northern region experienced the highest proportion of visits for ILI (5.4%). The highest proportion of visits for ILI in the remaining regions follow: eastern, 5.0% (week 3); central, 3.8% (week 3); northern, 3.9% (week 3); and northwest, 4.6% (week 1).



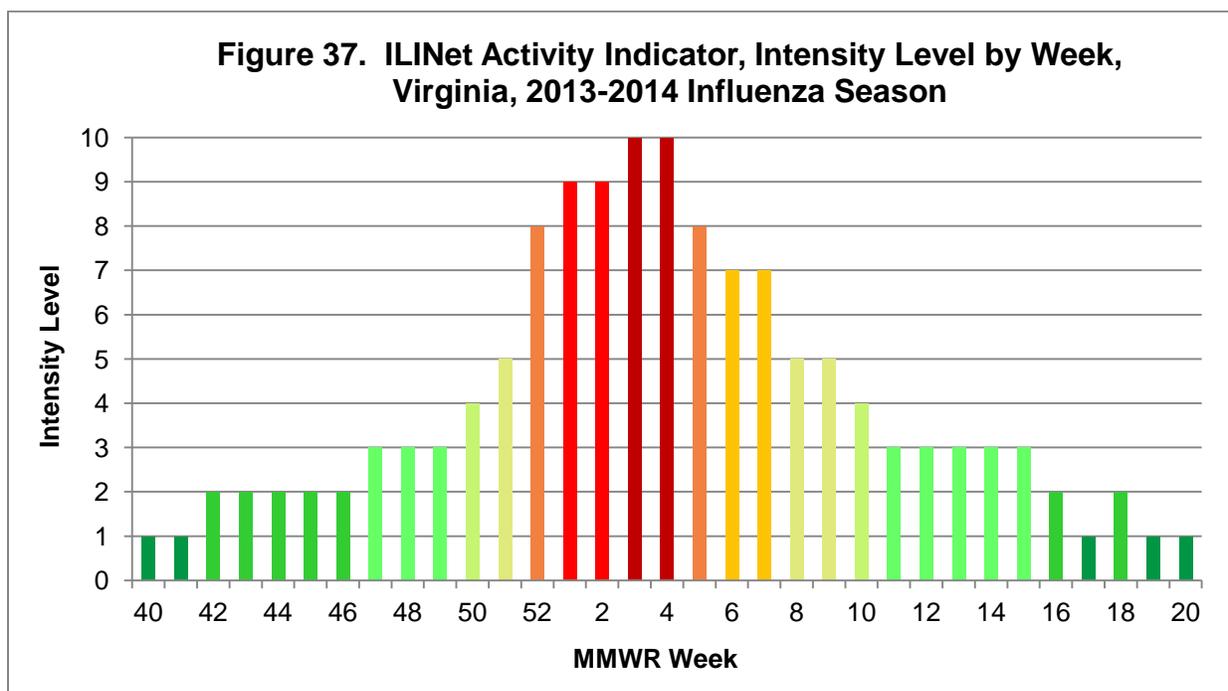
### Influenza-like Illness by Age

Analyzing ILI activity by age provides additional insight into disease patterns. While influenza vaccination efforts have historically often targeted the elderly due to concerns over complications of infection, the youngest age groups show the largest proportions of healthcare visits to emergency departments and urgent care facilities for ILI. The largest proportion of visits due to ILI occurred in the 0-4 year age group. The smallest proportion of visits for ILI occurred in the 65 years and older age group (Figure 36).



## Influenza Intensity Levels

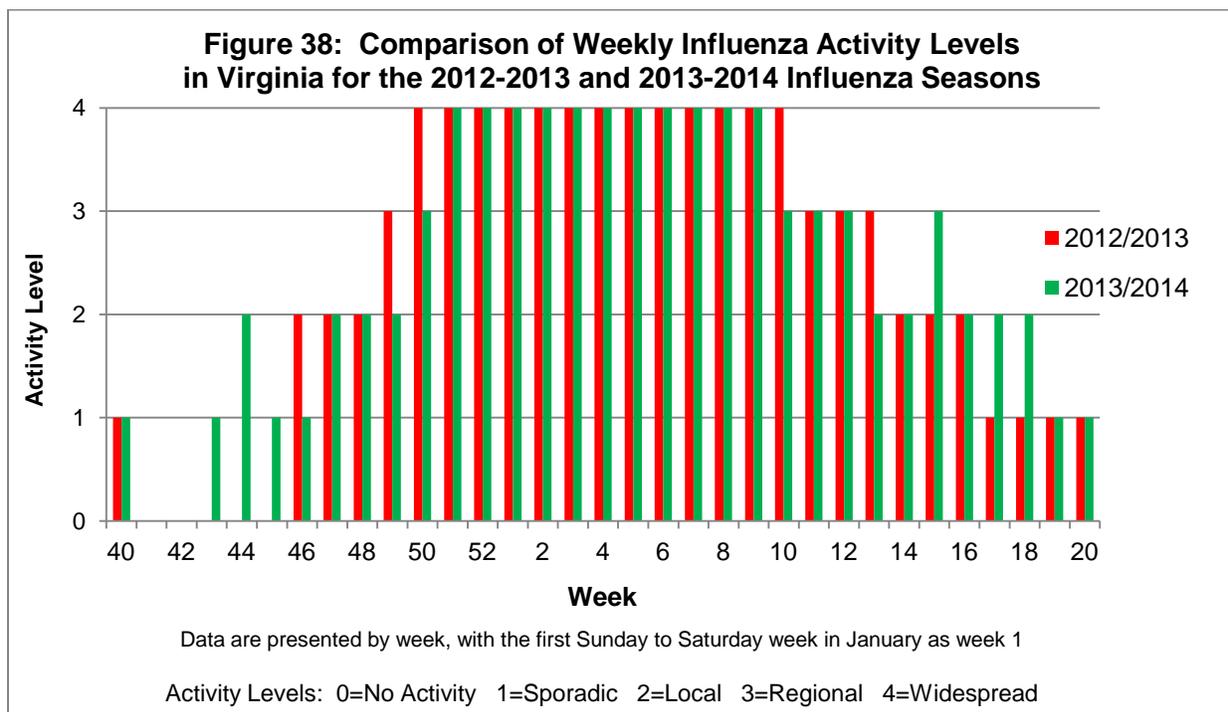
CDC reported weekly influenza intensity levels (ranging from 1 to 10) by state. This measure, introduced during the 2010-2011 season, is calculated by comparing the percent of patient visits due to ILI for that week to the average proportion of ILI visits that occurred during a designated baseline period for which there is minimal or no influenza virus circulation. During the 2013-2014 season, influenza intensity in Virginia slowly increased during the fall and reached high intensity levels in late December, with a significant increase from low to high during week 52. The level remained at high intensity for a six week period, although the level stayed at 10 for only two weeks in January. In early February, the intensity level decreased to moderate and remained there until late February. During the previous 2012-2013 season, influenza intensity slowly increased during the fall and reached high intensity levels in mid-December. The level remained at 10 for a six week period, decreased to moderate in early February and remained there until late March. Virginia's intensity levels for the 2013-2014 season are presented by week in Figure 37.



## Influenza Activity Levels

Virginia follows CDC guidelines to describe the geographic distribution of influenza activity. The weekly activity level is based on ILI data, laboratory findings, and outbreak occurrences, and is classified into the following categories: no activity, sporadic, local, regional, or widespread. The levels are not indicators of the severity of influenza illness but instead serve as a gauge for the geographic distribution of influenza activity around the state. Six weeks of ILI data, collected during the summer months of July through September, are used to establish baseline thresholds for the five health planning regions. ILI activity is considered elevated when a region exceeds its threshold.

The 2013-2014 influenza season began with a level of sporadic influenza activity in early October and returned to no activity for two weeks (weeks 41 and 42). The level increased to local during week 44, dropped to sporadic for two weeks, and then remained at local from mid-November to early December (weeks 47-49). Virginia reached widespread activity in late December and remained widespread for 11 weeks (Figure 38). The prior season, 2012-2013, reported 13 weeks of widespread activity. During the 2011-2012 season, only three weeks of widespread influenza activity were reported.

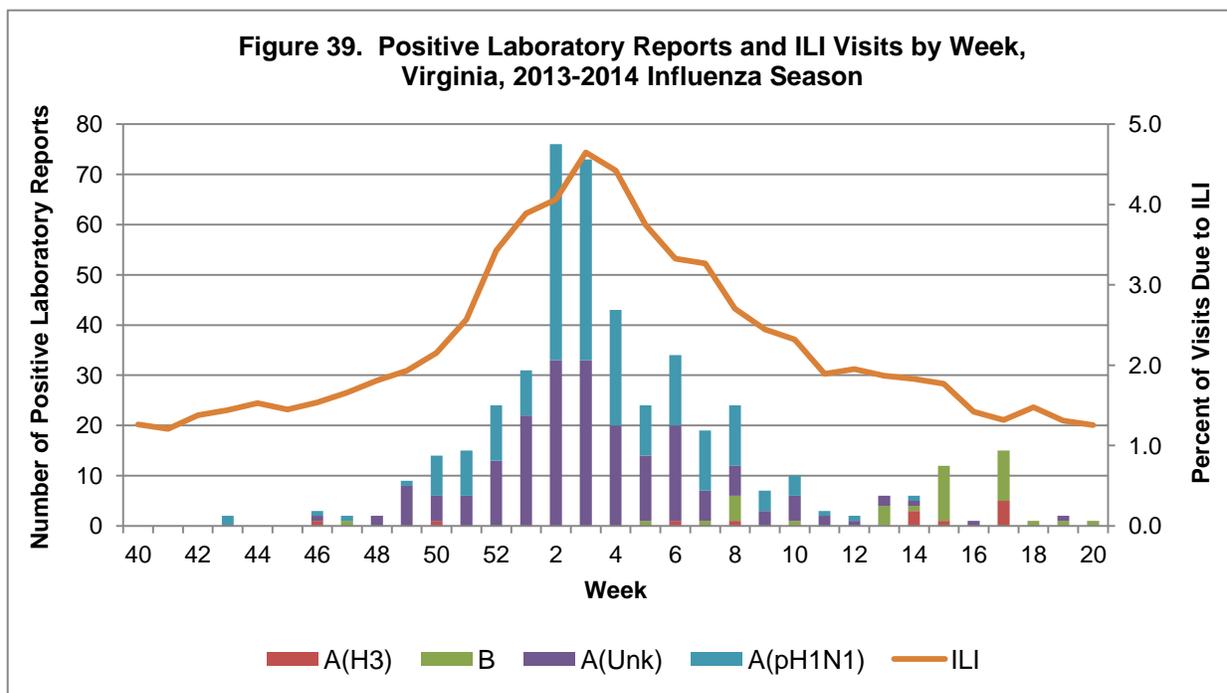


## Laboratory Surveillance

Laboratory surveillance for influenza uses findings from three testing procedures: DFA (direct fluorescent antibody), PCR (polymerase chain reaction) and viral culture. Rapid antigen tests are not included. Information comes from specimens submitted by sentinel providers, specimens from outbreaks, influenza reporting by private laboratories, and findings from Virginia facilities participating in the National Respiratory and Enteric Virus Surveillance System (NREVSS).

Sentinel providers include private physicians and medical facilities located throughout the Commonwealth. Statewide representation is achieved through the efforts of health districts to enlist providers from their area. During the influenza season, sentinel providers submit specimens from patients with ILI to the Virginia Division of Consolidated Laboratory Services (DCLS) for analysis. Regular sentinel providers were asked to submit two specimens per week from patients exhibiting influenza-like illness.

During the season, influenza A(unknown), A(H3), A(pH1N1) and B were all circulating in the state, as shown in Figure 39. It is important to note that A(unknown) does not represent a new or unknown strain; rather, the confirmatory tests that were used were unable to distinguish between types of influenza A. Influenza A(pH1N1) viruses predominated during the 2013-2014 influenza season. Laboratory tests indicated that 92% of positive influenza findings were influenza A (all subtypes) and 8% were influenza B. In comparison, in the previous flu season, 72% of viruses were identified as influenza A (all subtypes) and 28% as influenza B. As more providers have gained access to quicker, more reliable testing methods such as PCR, the volume of confirmatory testing has increased substantially. During the 2013-2014 season, Virginia received 461 unique confirmatory influenza laboratory reports.



## Influenza Outbreaks

During the 2013-2014 season, 30 influenza outbreaks were reported to VDH. In comparison, 163 outbreaks of influenza were reported during the 2012-2013 season, and 17 were reported during 2011-2012. Specimens from 26 of these influenza outbreaks tested positive for the influenza virus, confirming 18 (69%) as influenza A-associated, 5 (19%) as influenza B-associated and 3 (12%) as unspecified subtype. The first confirmed outbreak was reported in mid-December and occurred in a school in the southwest region. During the previous season, the first outbreak occurred much earlier in the season (late October). During the 2013-2014 season, outbreaks were reported from 9 schools (K-12), 5 assisted living facilities, 1 pre-school facility, 1 military facility, 4 correctional facilities, and 5 medical facilities that were not long-term care-related. One third of the reported influenza outbreaks (33%, 10 outbreaks) occurred in healthcare facilities. By region, the largest percentage (30%, 9 outbreaks) were reported from

the northwest region, followed by the central region (23%, 7 outbreaks), northern region (20%, 6 outbreaks), southwest region (13%, 4 outbreaks), and eastern region (13%, 4 outbreaks). The number of cases associated with outbreaks ranged from 3 to 76 individuals, with a total of 41 reported hospitalizations.

## **Influenza-associated Deaths**

Virginia disease reporting regulations require physicians and directors of medical care facilities to report suspected or confirmed influenza-associated deaths in children less than 18 years of age to allow monitoring of this severe outcome of influenza illness. Four pediatric influenza-associated deaths were reported to VDH during the 2013-2014 influenza season. The first occurred in a pre-school age child (0-4 years) from the northern region and was due to influenza A(pH1N1). The second occurred in a young school-age child (5-12 years) from the northern region due to influenza A(H3). The third occurred in a teenage child (13-17 years) from the eastern region due to influenza A (rapid test). The fourth occurred in a teenage child (13-17 years) from the southwest region. The child tested positive for influenza B by PCR and invasive Group A *Streptococcus*. During the previous influenza season, two pediatric influenza-associated deaths were reported.

## **School Absenteeism**

School absenteeism surveillance was added to influenza surveillance in Virginia during the 2009-2010 pandemic season, and continues because of the valuable insights it provides. Information on absenteeism is voluntarily submitted by school divisions on a daily basis and made available to the health districts to identify emerging problems and monitor potential influenza activity in their communities. Centrally, it is evaluated by region and school level (elementary, middle, and high school) for unusual patterns. During the 2013-2014 season, school divisions provided absenteeism data for 681 schools. While school absenteeism provides a general, but not influenza-specific, measure of illness, it was useful for monitoring illness activity and identifying schools with possible outbreaks during the influenza season.