

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. Children may also have gastrointestinal symptoms, such as nausea, vomiting, or diarrhea. Complications of influenza can include lower respiratory tract involvement (e.g., bronchitis), viral or bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.

Prevention: Annual vaccination is the primary prevention strategy; antiviral medications are supplemental to vaccine and may be used 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

In Virginia, influenza surveillance is conducted throughout the year. However, efforts are most intensively focused during the period of highest influenza 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 case of influenza, but instead monitor indicators of illness within the community. For the 2014-2015 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. 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.

National Overview of 2014-2015 Influenza Season

According to the Centers for Disease Control and Prevention (CDC), during the 2014-2015 influenza season, influenza A (H3N2) viruses predominated. Smaller numbers of B and A (2009 H1N1) influenza viruses were also identified. Although this season had lower rates of death for influenza-like illness compared to recent years, hospitalization rates among patients aged 65 years and older were higher.

Most of the influenza A (H3N2) circulating viruses were different from the strain contained in the 2014-2015 influenza vaccine. Nationally, of 1,324 influenza A (H3N2) viruses tested by the CDC, only 19% (246) were antigenically similar to the strain contained in the vaccine. On the

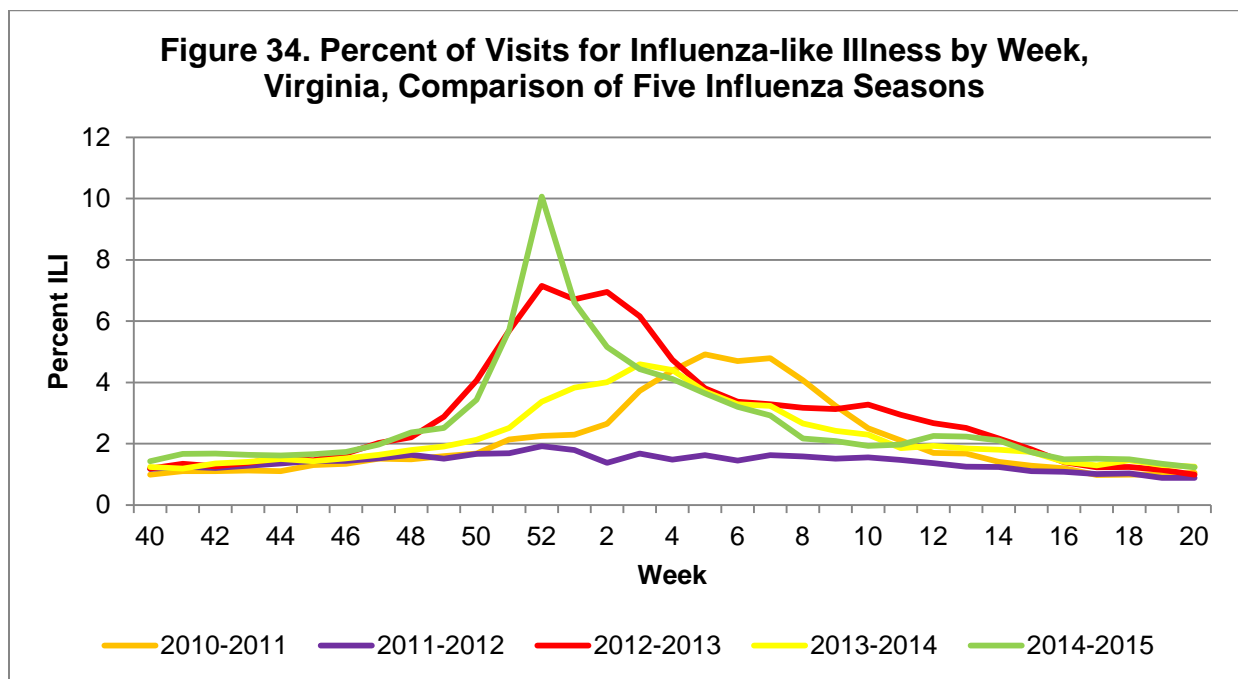
other hand, all of the influenza A (2009 H1N1) viruses, 98% of the influenza B (Yamagata lineage) viruses, and 98% of the influenza B (Victoria lineage) viruses tested by the CDC were antigenically similar to the 2014-2015 vaccine components.

Since the vaccine was not as well-matched to circulating viruses as in previous seasons, the 2014-2015 influenza vaccine offered reduced protection against most circulating influenza strains. Based on data collected from November 10, 2014 through January 30, 2015, the CDC determined that the 2014-2015 influenza vaccine was 19% [95% confidence interval (CI) = 7%–29%] effective in preventing medical visits against all influenza across all age groups, and was 18% (CI = 6%–29%) and 45% (CI = 14%–65%) effective in preventing medical visits associated with influenza A (H3N2) and influenza B (Yamagata lineage), respectively.

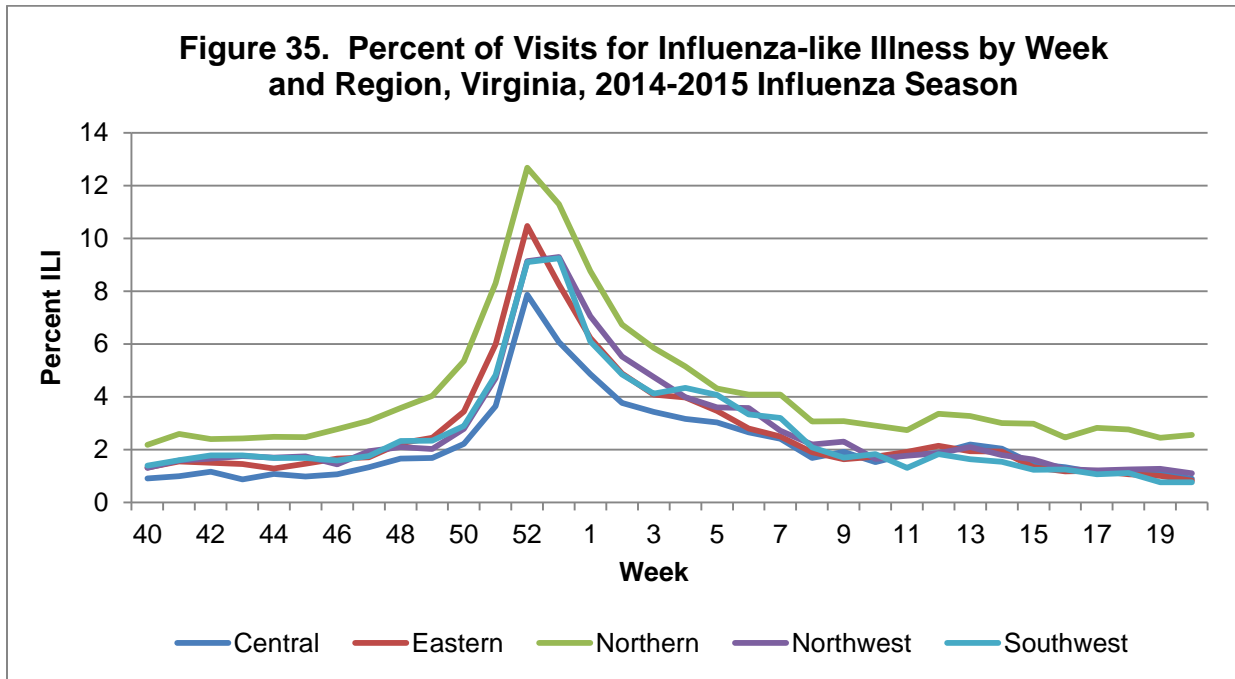
Influenza-like Illness Surveillance

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 2014-2015 influenza season, 133 emergency department and urgent care facilities provided data to VDH for surveillance monitoring.

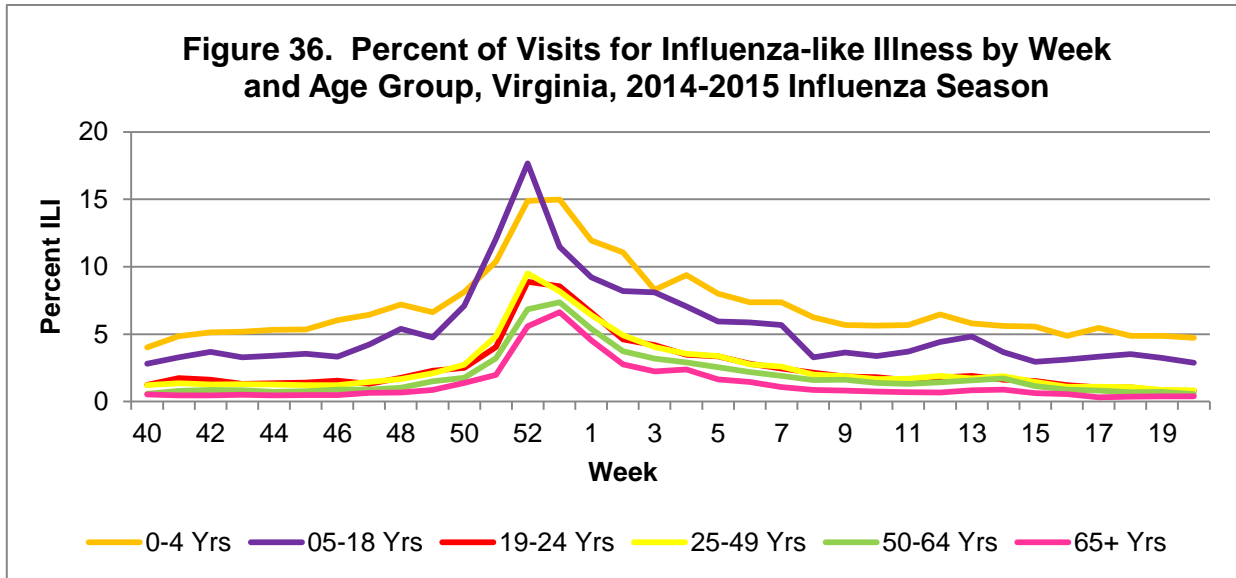
Nationally, the weekly percentage of outpatient visits for ILI to healthcare providers participating in the Outpatient Influenza-Like Illness Surveillance Network (ILINet) was at or above the national baseline level of 2% for 20 consecutive weeks during the 2014-2015 influenza season. Across the U.S., the peak percentage of outpatient visits for ILI was 6%, and occurred in late December (week 52). In Virginia, the proportion of patient visits for ILI during the 2014-2015 season peaked at 10% during the week ending December 27, 2014 (week 52) (Figure 34).



ILI activity in each of the health planning regions peaked in late December/early January (weeks 52 or 53), with the northern region experiencing the highest proportion of visits for ILI (12.7%) (Figure 35). The peak ILI proportions in the other regions were as follows: eastern, 10.5%; northwest, 9.3%; southwest, 9.2%; and central, 7.9%.

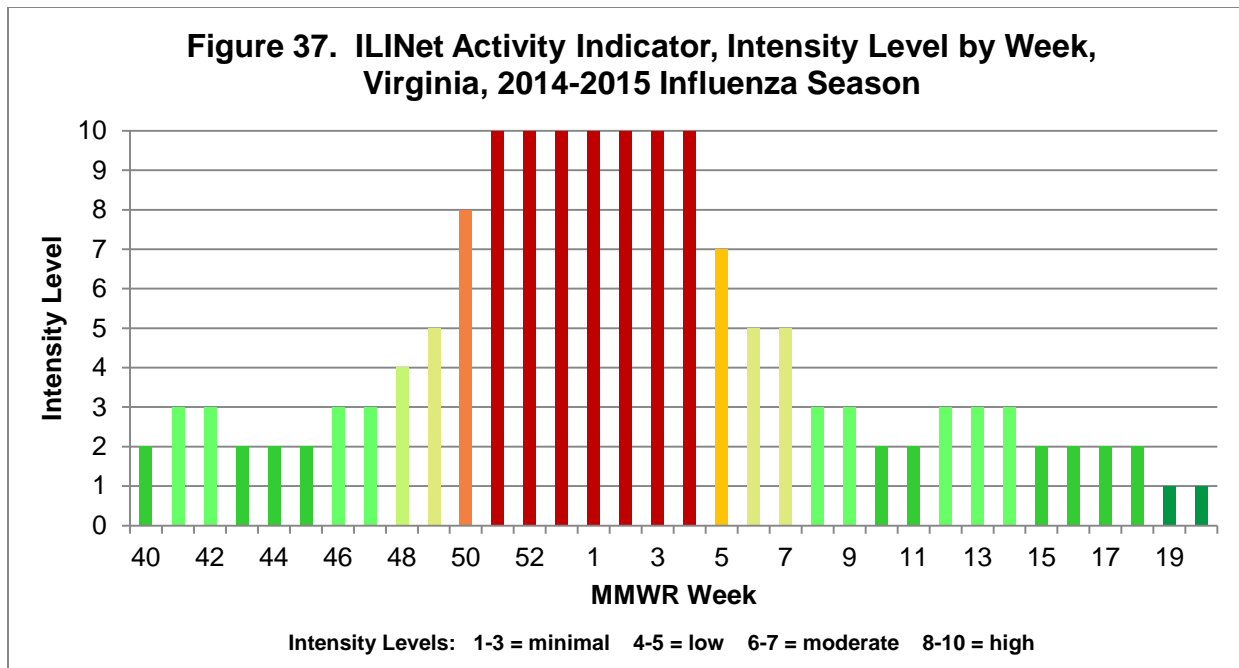


Analyzing ILI activity by age provides additional insight into disease patterns. While influenza vaccination efforts have historically often targeted the elderly due to concerns over complications of infection, the youngest age groups show the largest proportions of healthcare visits to emergency departments and urgent care facilities for ILI. Specifically, the largest proportion of visits due to ILI occurred in the 5-18 year age group during week 52 (17.7%). For all other weeks during the influenza season, the 0-4 year age group experienced the largest proportion of visits due to ILI. 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 2014-2015 season, influenza intensity in Virginia slowly increased during the fall and reached high intensity levels in mid to late December, with a notable increase from low to high between weeks 49 and 50. The level remained at high intensity for an eight week period, staying at 10 throughout the month of January. In early February, the intensity level decreased to moderate, and then reached low intensity by the middle of the month. During the previous 2013-2014 season, influenza activity also gradually increased during the fall and reached high intensity levels in late December. The level remained at 10 for a 2 week period that season, decreased to moderate in early February, and reached low levels during late February and early March. Influenza intensity levels for Virginia for the 2014-2015 season are presented by week in Figure 37.

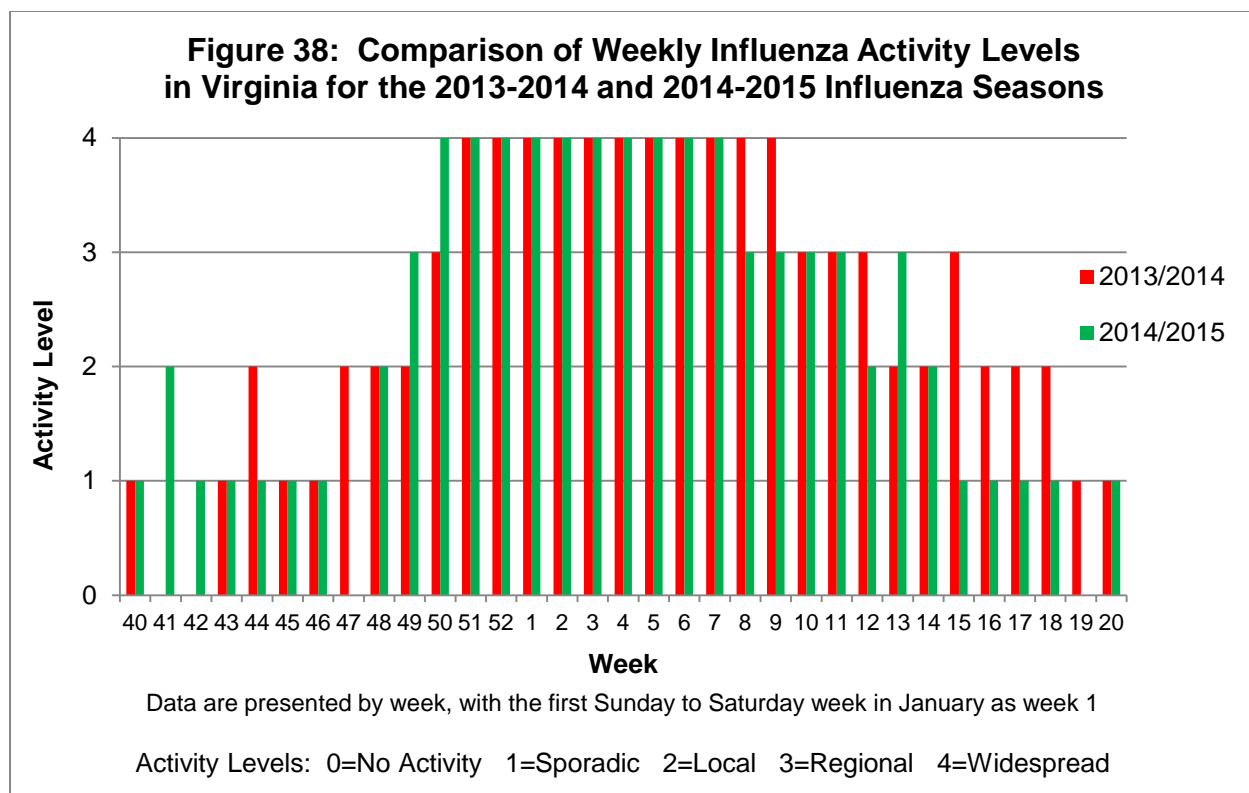


Influenza Activity Levels

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 visits in a region exceed the regional threshold.

The 2014-2015 influenza season began with a level of sporadic influenza activity in early October and increased to local influenza activity during week 41. The influenza activity level returned to sporadic for five weeks (weeks 42-46), dropping to no activity during week 47. Virginia reached widespread activity in late December (week 50) and remained widespread for 11 weeks until late February (Figure 38). This is equal to the number of weeks of widespread activity reported during the 2013-2014 season and is similar to the average of the past five influenza seasons (10 weeks).

Figure 38: Comparison of Weekly Influenza Activity Levels in Virginia for the 2013-2014 and 2014-2015 Influenza Seasons



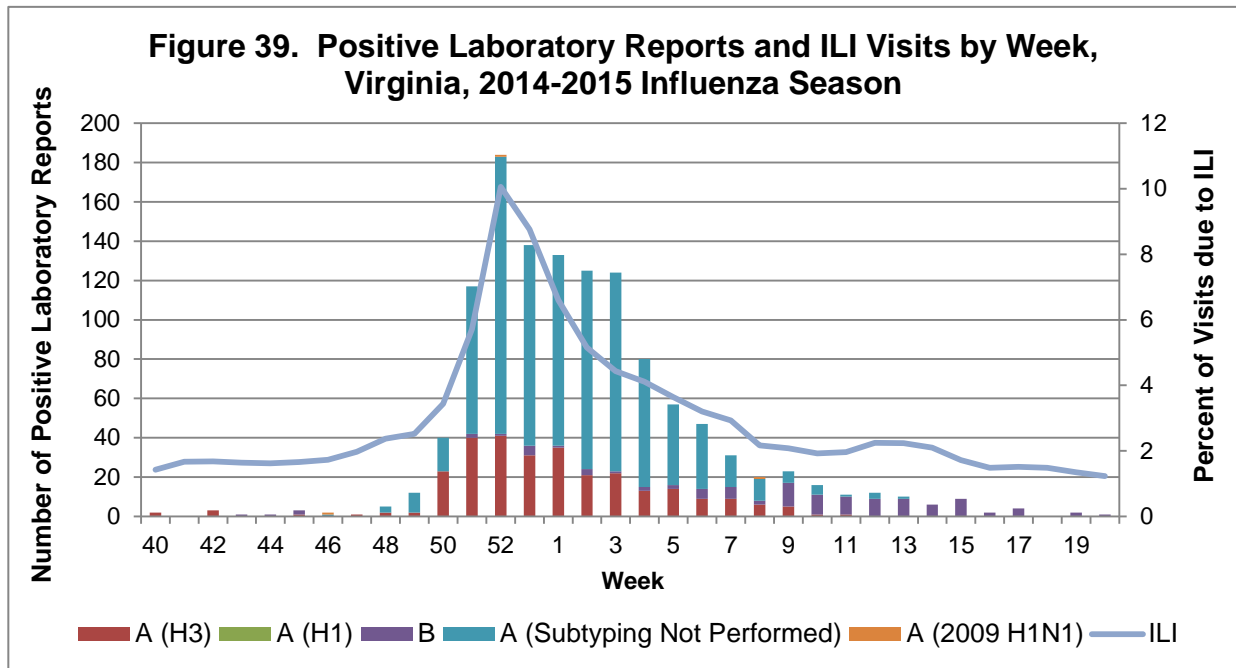
Laboratory Surveillance

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 is obtained from specimens submitted by sentinel providers, specimens obtained during outbreaks, influenza reporting by private laboratories, and laboratory 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 Virginia. 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 (subtyping not performed), A (H3), A (2009 H1N1) and B were all circulating in the state, as shown in Figure 39. Influenza A (H3) viruses predominated during the 2014-2015 influenza season. Laboratory tests indicated that 91% of positive influenza findings were influenza A (all subtypes) and 9% were influenza B. This is similar to the 2013-2014 season where 92% of viruses were identified as influenza A (all subtypes) and 8% 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 2014-

2015 season, Virginia received more than 1,200 unique confirmatory influenza laboratory reports. This is nearly three times the number of confirmatory reports received during the 2013-2014 season.



Influenza Outbreaks

During the 2014-2015 season, 152 influenza outbreaks were reported to VDH. In comparison, 30 outbreaks of influenza were reported during the 2013-2014 season, and 163 reported during the 2012-2013 season. Specimens from 120 influenza outbreaks tested positive for the influenza virus (by rapid test or confirmatory lab report), confirming 47 (39%) as influenza A (H3)-associated, 55 (43%) as influenza A-associated, 2 (2%) as influenza B-associated, and 16 (13%) as unspecified subtype. No outbreaks were attributed to influenza A (2009 H1N1). The first confirmed influenza outbreak was reported in early October and occurred in a nursing home in the northwest region. During the previous season, the first outbreak occurred much later in the season (mid-December). During the 2014-2015 season, outbreaks were reported from 43 assisted living facilities, 32 schools (K-12), 5 pre-school facilities, 2 independent living facilities, and 2 adult daycare programs. Nearly half of the reported influenza outbreaks (45%, 68 outbreaks) occurred in healthcare facilities (nursing homes or other medical facilities that are not related to long-term care). By region, the largest percentage of outbreaks (28%, 43 outbreaks) were reported from the northwest region, followed by the southwest and central regions (22% each, 34 and 33 outbreaks, respectively), northern region (15%, 23 outbreaks), and eastern region (13%, 19 outbreaks). An average of 26 cases was associated with each influenza outbreak, with a range of 2 to 215 cases per outbreak. A total of 228 hospitalizations were associated with these outbreaks.

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. Five pediatric influenza-associated deaths were reported during the 2014-2015 influenza season. The first and second deaths occurred in pre-school age children (0-4 years) from the eastern region. Both children tested positive for influenza A (H3). The third death occurred in a young school-age child (5-12 years) from the northern region due to influenza A (rapid test). The fourth death occurred in a teenage child (13-17 years) from the central region and was due to influenza A (rapid test). The fifth death occurred in a young school-age child (5-12 years) from the eastern region. Influenza A was identified by rapid test. During the 2013-2014 influenza season, four 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 daily and made available to 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 2014-2015 season, school divisions provided absenteeism data for 307 schools. While school absenteeism provides a general, but not influenza-specific measure of illness, school absenteeism data are useful for monitoring illness activity and identifying schools with possible outbreaks during the influenza season.

Unique Presentations of Influenza-Like Illness

Influenza-Associated Parotitis

During the 2014-2015 season, the CDC was notified of an occurrence of parotitis (swelling of parotid gland or salivary glands) in persons with lab-confirmed influenza. This uncommon influenza complication, called influenza-associated parotitis, was diagnosed in patients who had lab-confirmed influenza, clinical diagnosis or clinical signs and symptoms of parotitis, and symptom onset on or after October 1, 2014.

In Virginia, 10 cases of influenza-associated parotitis were identified. Of these, seven were positive for influenza A (H3) by PCR, one was positive for influenza A by rapid testing, and two were positive for influenza by rapid testing (unspecified if A or B). Influenza-associated parotitis predominantly affected children and young adults (mean age = 16 years, median age = 18 years, range = 1-33 years). The majority of cases (80%) were male; two (20%) were female. Of the five health planning regions, three were affected, with six cases (60%) reported from the central region, three cases (30%) from the northwest region, and one case (10%) reported from the northern region. An additional case was identified in a Virginia hospital but was determined to be in a resident of West Virginia.

Influenza-Associated Rash

The 2014-2015 influenza season also saw an unusual manifestation of morbilliform (i.e., maculopapular) rash in individuals with laboratory-confirmed influenza in several states. VDH initiated enhanced surveillance to identify individuals with morbilliform rash who were negative for measles (by IgG, IgM antibody serology, or PCR test), had lab-confirmed influenza (by rapid diagnostic test, fluorescent antibody, enzyme immunoassay, PCR test, or viral culture) and had onset of rash and influenza-like illness on or after October 1, 2014.

Three cases of morbilliform rash associated with influenza were identified in Virginia. One case occurred in a male school-age child (5-18 years) from the central region and two cases, one male and one female, were identified in older adults (50-64 years) from the northwest region.