

## **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 and should be obtained yearly; 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.

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 three seasonal influenza virus subtypes that predominantly circulated during the 2012-2013 season included A(H3), A/2009 H1N1 (the subtype responsible for the 2009 pandemic), and B.

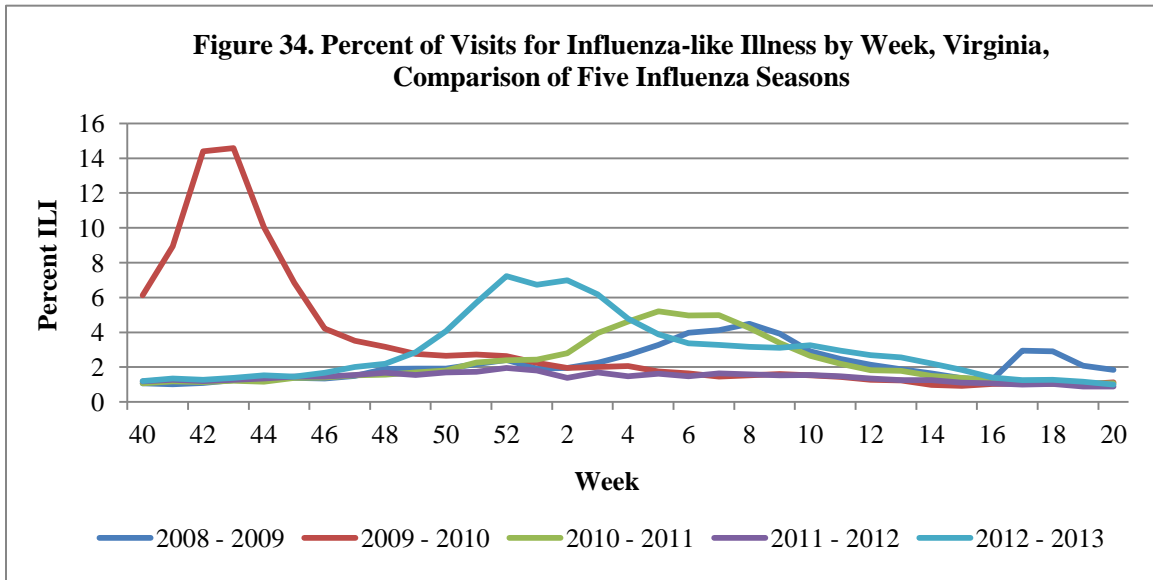
Influenza surveillance is conducted throughout the year in Virginia. However, efforts are most intensively focused during the period of highest disease activity, which normally begins in early October (week 40) and ends in late May (week 20). Surveillance efforts in Virginia do not count every individual with influenza but instead monitor indicators of illness within the community. For the 2012-2013 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 2012-2013 influenza season, 118 emergency department and urgent care facilities provided data to VDH for surveillance monitoring.

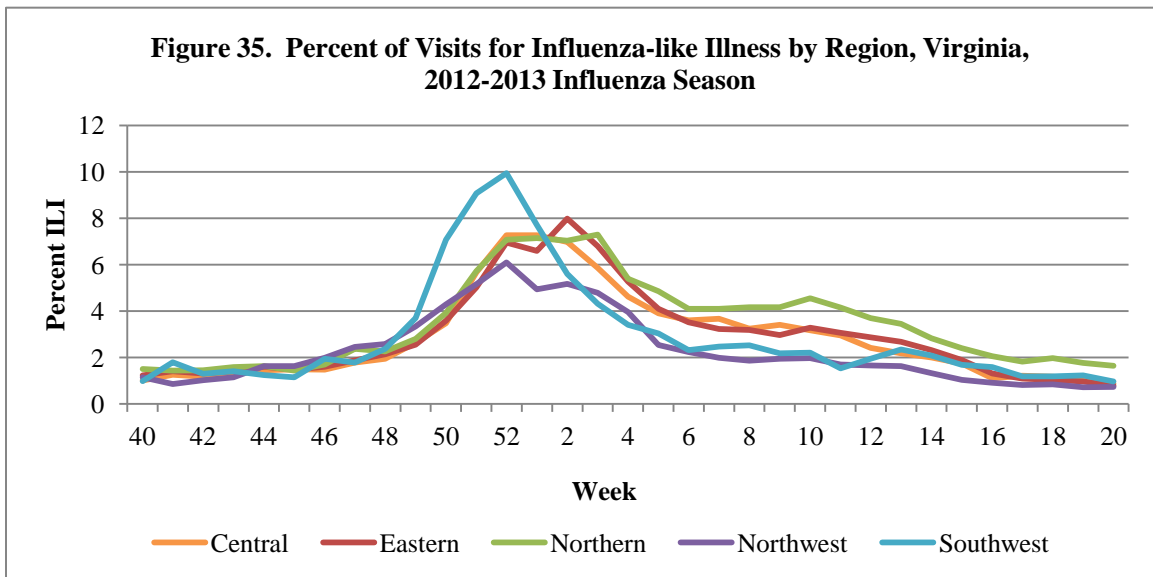
According to the Centers for Disease Control and Prevention (CDC), the 2012-2013 influenza season was a reminder of how unpredictable and severe influenza can be. Influenza activity began early in the United States and was high for 15 weeks. Nationally, the weekly percentage of outpatient visits for ILI, as reported by the U.S. Outpatient ILI Surveillance Network (ILINet), peaked in late December (week 52) at 6.1%. In comparison, the 2011-2012 season peaked at 2.4% in mid-March. The 2012-2013 season was also more severe than recent seasons. Hospitalization rates, especially in older adults,

were the highest recorded since CDC began tracking those data, and deaths attributed to pneumonia and influenza (P & I) were the highest recorded in nearly a decade. In Virginia, the proportion of patient visits for ILI during the 2012-2013 season peaked at 7.2% during the week ending December 29, 2012 (week 52) (Figure 34).



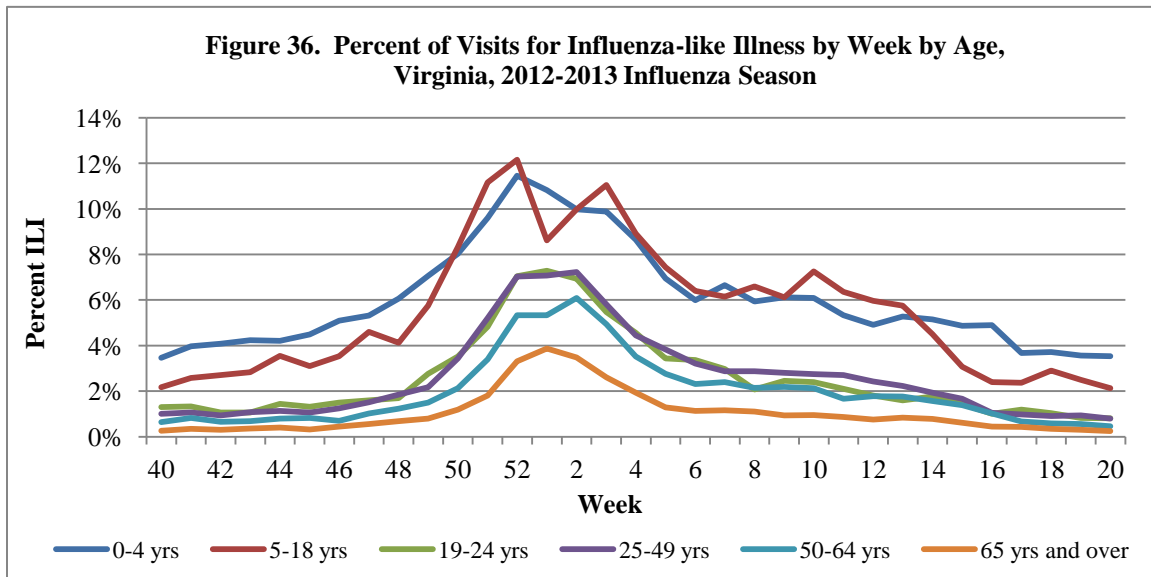
### Influenza-like Illness by Region

In Virginia, ILI activity varied by region throughout the 2012-2013 season. Peak activity occurred in late December (week 52) in the southwest, central, and northwest health planning regions. The remaining regions followed, peaking in mid-January (Figure 35). The southwest region experienced the highest proportion of visits for ILI (9.9%). The eastern, central, northern, and northwest regions experienced the following peaks: 8.0% (week 2), 7.3% (week 52), 7.3% (week 3), and 6.1% (week 52) respectively.



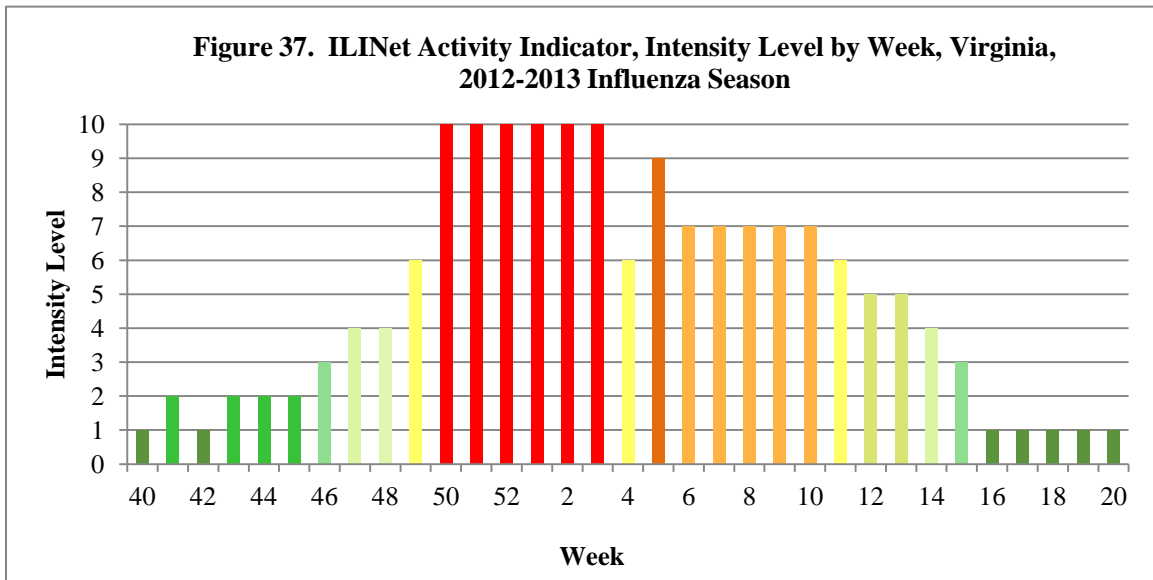
## Influenza-like Illness by Age

Analyzing ILI activity by age provides additional insight into disease patterns. While historically influenza vaccination efforts have often targeted the elderly due to concerns over complications of infection, the youngest age groups show the highest proportions of health care visits to emergency departments and urgent care facilities for ILI. In contrast to previous influenza seasons, the highest proportion of visits due to ILI occurred in the 5-18 year age group. The largest proportion of visits for ILI usually occurs in the 0-4 age group. The smallest proportion of visits for ILI occurred in the 65 years and older age group (Figure 36).



## Influenza Intensity Levels

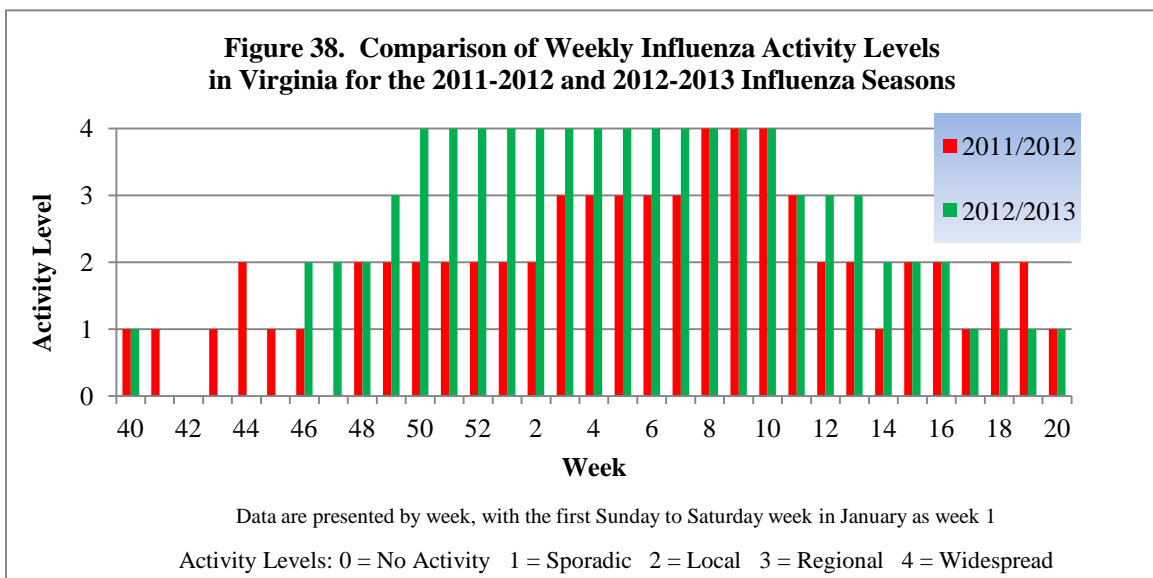
CDC reported weekly influenza intensity levels (ranging from 1 to 10) each week on a map by state. This measure, introduced during the 2010-2011 season, is calculated by comparing the percent of patient visits due to ILI for that week compared to the average proportion of ILI visits that occurred during a designated baseline period for which there is minimal or no influenza virus circulation. During the 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. During the 2011-2012 season, influenza intensity did not reach above a minimal level (levels 1-3). Virginia's intensity levels for the 2012-2013 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 2012-2013 influenza season began with a level of sporadic influenza activity in early October, and returned to no activity for five weeks (weeks 41 to 45). The level increased to local in mid November (week 46) and reached widespread in mid-December. The influenza activity level remained widespread for 13 weeks (Figure 38). The prior season, 2011-2012, reported only three weeks of widespread influenza activity. During the 2010-2011 season, influenza activity became widespread in late December (week 51) and stayed at this level for 14 weeks.

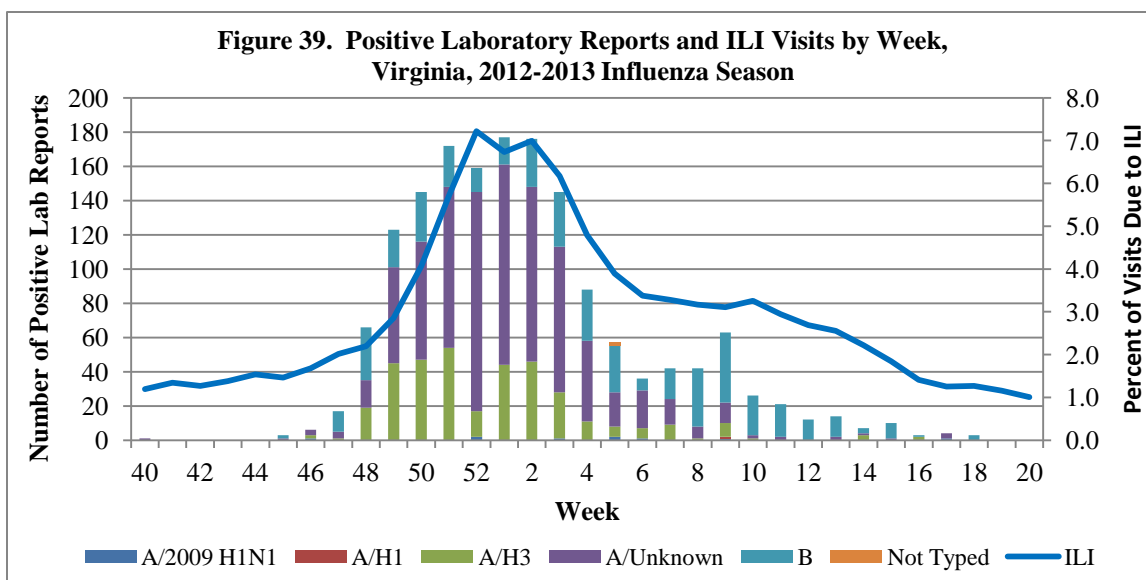


## Laboratory Surveillance

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 month from patients exhibiting influenza-like illness and sentinel providers participating in the Influenza Incidence Surveillance Project (described later) submitted specimens from the first ten patients with ILI each week.

During the season, influenza A(unk), A(H3), 2009 H1N1, and B were all circulating in the state, as shown in Figure 39. It is important to note that A(unk) does not represent a new or unknown strain, but only the inability of the confirmatory tests that were used to distinguish between types of influenza A. The predominant influenza strain circulating in Virginia varied by week and region. Laboratory tests indicated that 72% of positive influenza findings were influenza A (all subtypes) and 28% were influenza B. In comparison, in the previous flu season, 83.2% of viruses were identified as influenza A (all subtypes) and 16.8% as influenza B. As more providers have gained access to quicker, more reliable testing methods such as PCR, the volume of confirmatory testing has significantly increased. During the 2012-2013 season, Virginia received 1,624 confirmatory influenza laboratory reports, compared to 89 during the prior season.



## **Influenza Outbreaks**

During the 2012-2013 season, 163 outbreaks of influenza were reported to VDH compared to 17 outbreaks reported during the previous season. Specimens from 127 of these influenza outbreaks tested positive for the influenza virus, confirming 89 (70%) as influenza A-associated, 13 (10%) as influenza B-associated and 25 (20%) as unspecified subtype. The first confirmed outbreak was reported in late October 2012 (week 42) and occurred in a school in the northwest region. During the season, outbreaks were reported from 62 schools (K-12), 29 assisted living facilities, 9 pre-school facilities, two retirement homes, and two other facilities. More than one-third of the influenza outbreaks (36%, n=59) occurred in healthcare facilities, mostly in nursing homes (n=58), with an additional outbreak in a medical facility. By region, the largest percentage (30%, n=49) of outbreaks were reported from the northwest region, followed by the southwest region (25%, n=40), central region (19%, n=31), northern region (14%, n=23), and eastern region (12%, n=20). The number of cases associated with outbreaks ranged from 3 to 200 individuals (median: 25), with a total of 146 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. While one pediatric death occurred during calendar year 2012, this case was counted for surveillance purposes in the 2011-2012 influenza season. Two pediatric influenza-associated deaths were reported to VDH during the 2012-2013 season. Both of these deaths occurred in March 2013; one in a preschool-aged child (0-4 years) from the southwest region and one in a teen (13-17 years) from the northern region. Nationally, the number of pediatric deaths during the 2012-2013 season (158) was the highest since surveillance of pediatric influenza-associated deaths began, with the exception of the 2009 H1N1 pandemic.

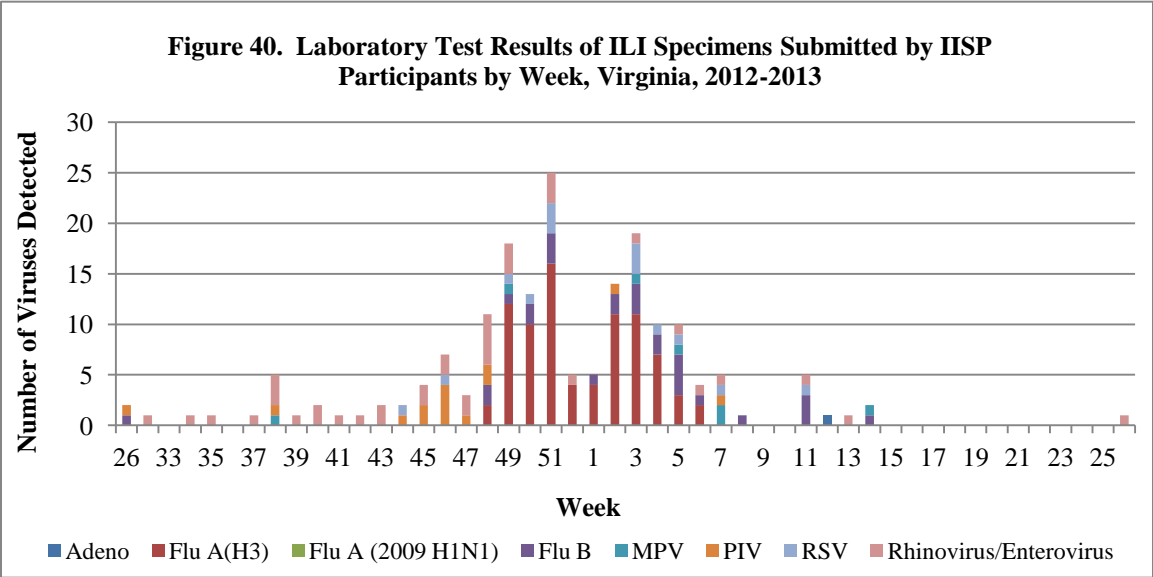
## **School Absenteeism**

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 2012-2013 season, 32 school divisions provided absenteeism data for 860 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.

## **Influenza Incidence Surveillance Project**

The Influenza Incidence Surveillance Project (IISP) is a special surveillance activity that was initiated during the 2010-2011 flu season and continued through the 2012-2013 season. The project provided valuable information about the circulating respiratory viruses that cause ILI symptoms. Six participating sentinel providers submitted data each week, by age group, on the number of patients

seen and the number with ILI. Specimens were collected from the first 10 patients seen each week with ILI symptoms and evaluated with a respiratory panel at DCLS. During the 2012-2013 project period, influenza was detected in 60% of the positive specimens (109 out of 184). When influenza was identified, the predominant circulating strain was A(H3) (Figure 40). Rhinovirus/enterovirus was the next most common virus identified, with 21% of positive specimens (n=39).



Abbreviations noted: Adeno=adenovirus; MPV=metapneumovirus; PIV=parainfluenza; RSV=respiratory syncytial virus