Arizona Department of Health Services

ARIZONA – INFLUENZA SUMMARY
2013-2014 Influenza Season

Summary

This report summarizes influenza activity for the 2013-2014 season (September 29, 2013 through September 27, 2014). Surveillance activities performed by ADHS remained unchanged overall from the 2012-2013 season.

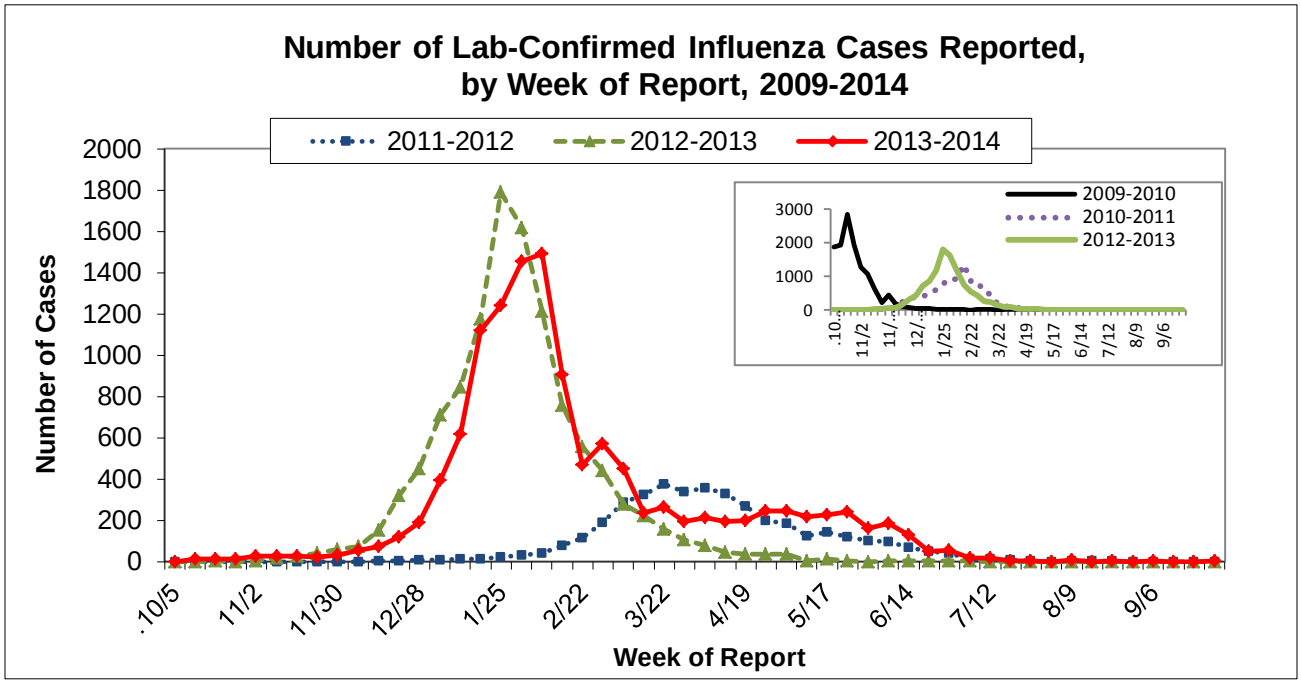
The first case of influenza with apparent in-state acquisition was confirmed at the Arizona State Public Health Laboratory in week 40 (late September). Influenza activity increased more substantially in January, with peak activity in February, and confirmed cases continuing into June. The 2013-2014 season was predominated by influenza A (H1N1) pdm09 followed by an increase of influenza B at the end of the season, with very low levels of influenza A (H3) circulating.

Laboratory-Confirmed Influenza Activity

Positive influenza tests are reported to ADHS by laboratories under Arizona Administrative Code R9-6-204. This reporting includes many types of tests, such as rapid antigen tests, direct fluorescent antigen tests, viral cultures, or molecular testing.

The 2013-2014 influenza season was severe, and the weekly number of laboratory-confirmed influenza cases reported was similar to those reported during the previous 2012-2013 season. After the 2010-2011 season, we reflected that the higher weekly numbers during the peak of activity in that season could result from either increased levels of disease in the community or also increased popularity of rapid diagnostic testing. For the 2013-2014 season, we know of no specific changes in testing or reporting practices, though it is possible that increased media coverage may have affected testing or reporting practices, leading to an increase in reported laboratory-confirmed cases.

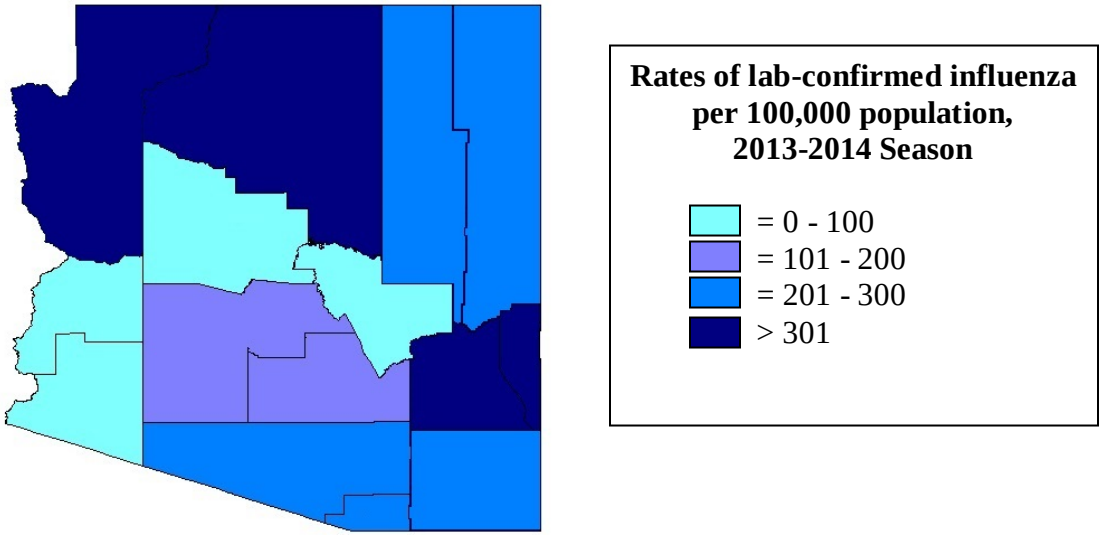
Influenza B infection was confirmed at the Arizona State Public Health Laboratory in a case without recent travel history in week 40 (late September). Reporting of laboratory-confirmed cases began to increase in December, with peak activity in February.



Laboratory-Confirmed Cases Reported, by County

The table below includes all reported laboratory-confirmed influenza reports, regardless of testing method. While Maricopa and Pima Counties have the most cases, Graham, Greenlee, Coconino and Mohave Counties reported the highest population rates. Differences in rates may reflect not only differences in the level of influenza virus circulating in the community, but also testing and reporting practices.

County	Number of Laboratory-Confirmed Cases	Rate per 100,000 population
Apache	184	257.3
Cochise	334	254.3
Coconino	515	383.9
Gila	35	65.3
Graham	308	827.5
Greenlee	66	782.3
La Paz	8	39.0
Maricopa	6,658	174.4
Mohave	646	322.7
Navajo	241	224.3
Pima	2,354	240.1
Pinal	715	190.8
Santa Cruz	142	299.5
Yavapai	92	43.1
Yuma	145	74.1
Total	**12,443**	194.7



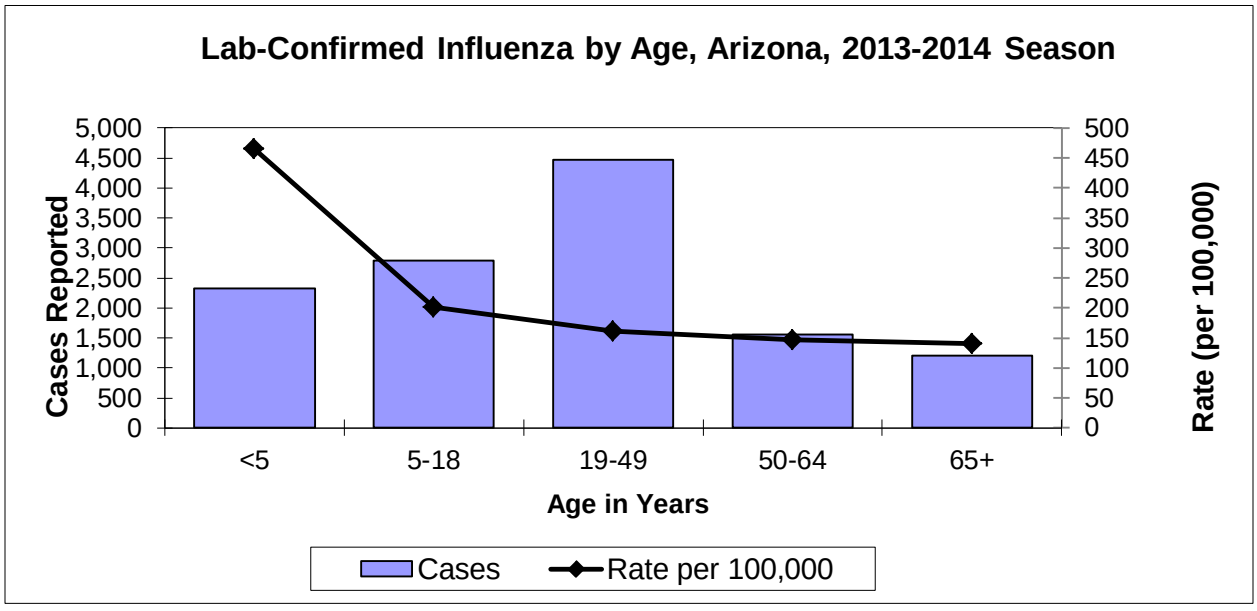
Influenza Activity by Age

The age groups affected by influenza vary somewhat season-to-season, depending in part on the circulating influenza types and subtypes and any previous immunity in the community. Variations in age groups of reported influenza cases can also be caused by differences in laboratory testing and reporting practices year-to-year. The age distribution of cases reported in the 2013-2014 season is similar to other seasons, with exception of a somewhat higher proportion of cases reported among adults 19 to 49 years.

Age Group of Reported Influenza Cases, 2010-2011 through 2013-2014 Seasons

Age Group	2013-2014 Season (N=12,443)	2012-2013 Season (N=11,301)	2011-2012 Season (N=4,004)	2010-2011 Season (N=9,822)
0 to 4 years	2,319 (19%)	2,114 (19%)	750 (19%)	2,244 (23%)
5 to 18 years	2,797 (22%)	3,013 (27%)	1,053 (26%)	2,677 (27%)
19 to 49 years	4,478 (36%)	3,107 (27%)	1,352 (34%)	2,982 (30%)
50 to 64 years	1,563 (13%)	1,156 (10%)	400 (10%)	799 (8%)
65 years or older	1,205 (10%)	1,799 (16%)	436 (11%)	1,043 (11%)
Unknown age	81 (1%)	112 (1%)	13 (0.3%)	77 (1%)

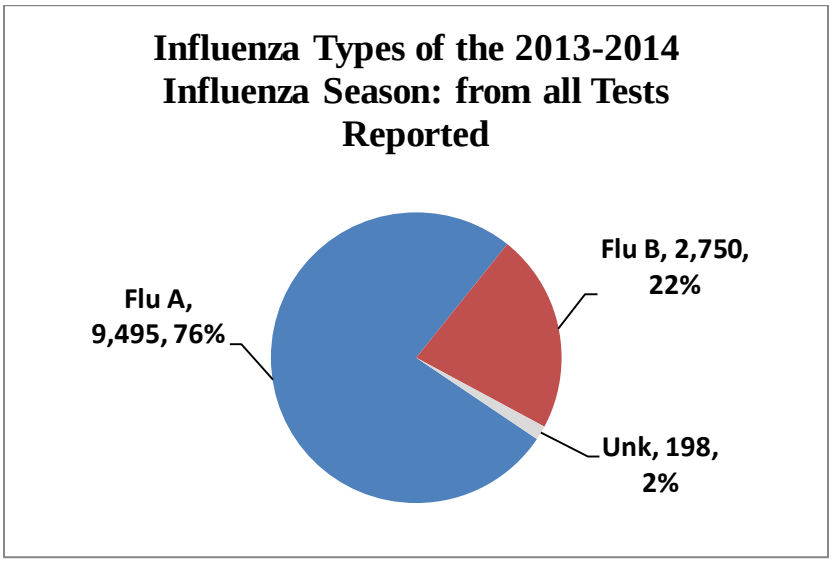
While large numbers of laboratory-confirmed cases were reported among older children and young and middle-aged adults, the rate of reported influenza cases was by far highest in children less than five years of age and decreased with age.



Influenza Types and Subtypes

There are two main types of influenza – Type A and Type B – that cause illness in people. Influenza A viruses can be further divided into subtypes such as A (H1) or A (H3). While most tests can distinguish between influenza A and B, only specialized testing, such as that done at the State Public Health Laboratory, can differentiate subtypes.

During the 2013-2014 season, 76% of reported cases were influenza A, which was similar to the past season. Influenza B cases were somewhat more likely to be in school-aged children than influenza A cases, with 33% of influenza B cases in the 5 to 18 year age group, compared to 20% of influenza A cases.



Influenza Type, by Season

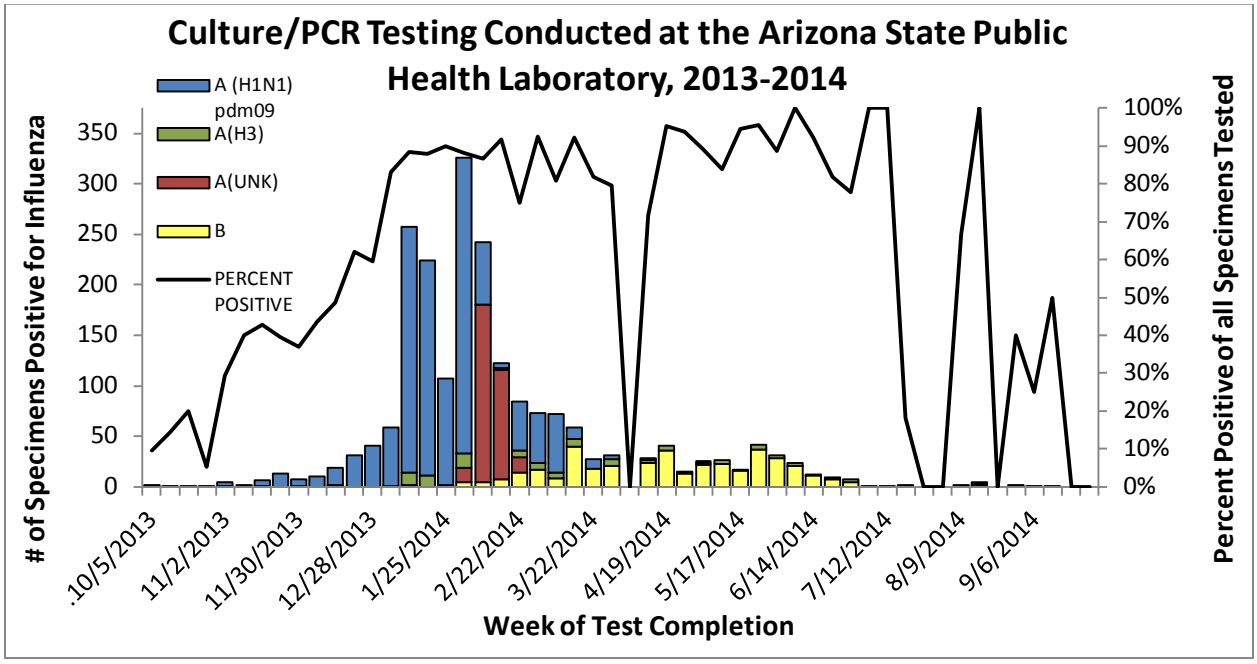
	2013-2014 Number (Percent)	2012-2013 Number (Percent)	2011-2012 Number (Percent)	2010-2011 Number (Percent)
Total	12,443 (100%)	11,301 (100%)	4,004 (100%)	9,822 (100%)
Influenza A	9,495 (76%)	8,064 (71%)	2,820 (70%)	7,244 (74%)
Influenza B	2,750 (22%)	2,957 (26%)	1,078 (27%)	2,279 (23%)
Unknown	198 (2%)	280 (3%)	106 (3%)	299 (3%)

Influenza Type, by Age Group, 2013-2014 Influenza Season

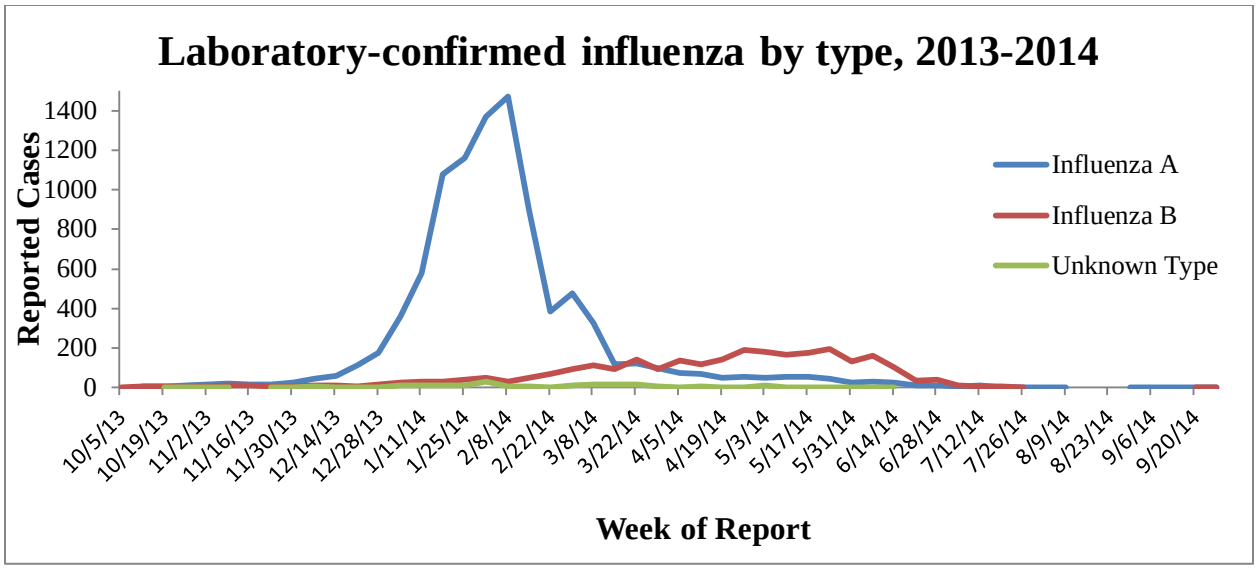
Age Group	All Confirmed Cases (N=12,443)	Influenza A (N=9,495)	Influenza B (N=2,750)	Unknown Type (N=198)
0 to 4 years	2,319 (19%)	1,771 (19%)	510 (19%)	38 (19%)
5 to 18 years	2,797 (22%)	1,854 (20%)	895 (33%)	48 (24%)
19 to 49 years	4,478 (36%)	3,549 (37%)	869 (32%)	60 (30%)
50 to 64 years	1,563 (13%)	1,309 (14%)	222 (8%)	32 (16%)
65 years or older	1,205 (10%)	951 (10%)	236 (9%)	18 (9%)
Unknown age	81 (1%)	61 (1%)	18 (1%)	2 (1%)

Viral culture and molecular testing (reverse transcriptase polymerase chain reaction or RT-PCR) are the methods used to identify subtypes of circulating influenza viruses, which can help health professionals make the best treatment and vaccination decisions. Another indicator used to evaluate the level of influenza activity is the percent of specimens submitted for influenza testing that are positive for influenza; during the peak of an influenza season, high percentages of specimens are positive.

During the 2013-2014 season, 61% of positive specimens at the Arizona State Public Health Laboratory (ASPHL) were influenza A (H1N1) pdm09, 6% were influenza A (H3), 15% were influenza A unknown subtype and 18% were influenza B.



The epidemiologic curve of all reported tests, below, further illustrates the concomitant circulation of A and B viruses, though in different proportions. Influenza A viruses seemed to have peaked in the beginning of February, where influenza B viruses began to increase in the beginning of February and were detected through the beginning of June.



RT-PCR and culture data from all laboratories that perform these tests are shown in the table below.

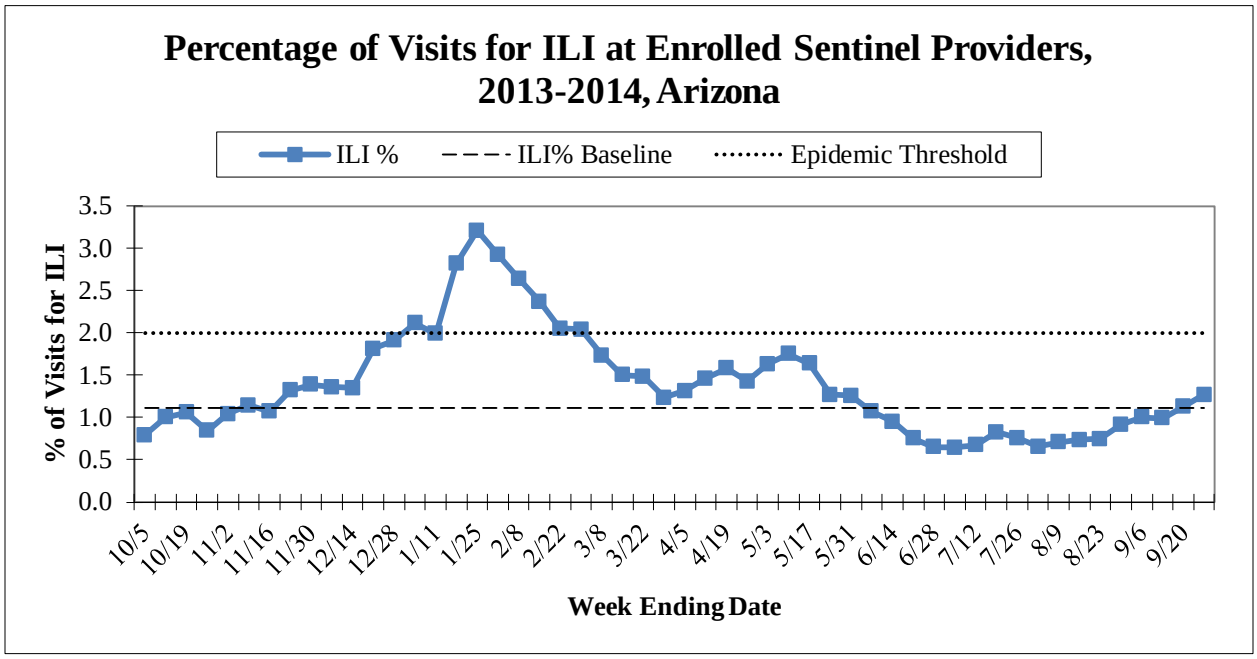
Influenza confirmed by RT-PCR or culture, by season, from any laboratory

	2013-2014 Number (Percent)	2012-2013 Number (Percent)	2011-2012 Number (Percent)	2010-2011 Number (Percent)
Influenza Type/Subtype	3,522 (100%)	3,245 (100%)	1,564 (100%)	3,176 (100%)
Influenza A (H1N1) pdm09	1,470 (42%)	80 (2%)	594 (38%)	483 (15%)
Influenza A (H3)	151 (4%)	1,586 (49%)	351 (22%)	1,239 (39%)
Influenza A (Unsubtyped)	1,170 (33%)	830 (26%)	255 (16%)	748 (24%)
Influenza B	731 (21%)	749 (23%)	364 (23%)	706 (22%)

Influenza-Like Illness (ILI) Surveillance from Sentinel Providers

ILI is defined as a fever of at least 100ºF plus either a cough or a sore throat. Approximately 80 sentinel providers around the state report the total number of outpatient visits to their offices and the number of visits for ILI each week. We use the percentage of visits for ILI as an indicator of likely influenza activity. The state ILI baseline is 1.1% and the epidemic threshold is 2.0% for 2013-2014. The baseline is defined as the mean of the state ILI% in weeks in the 2010-2013 flu seasons in which two or more consecutive weeks each accounted for less than 2% of the season's total number of specimens testing positive for influenza at the Arizona State Public Health Laboratory. The epidemic threshold is defined as the mean plus two standard deviations.

The percentage of visits for ILI showed similar seasonality to the laboratory-reported influenza data. It exceeded the epidemic threshold from early January through early March and peaked in late January.



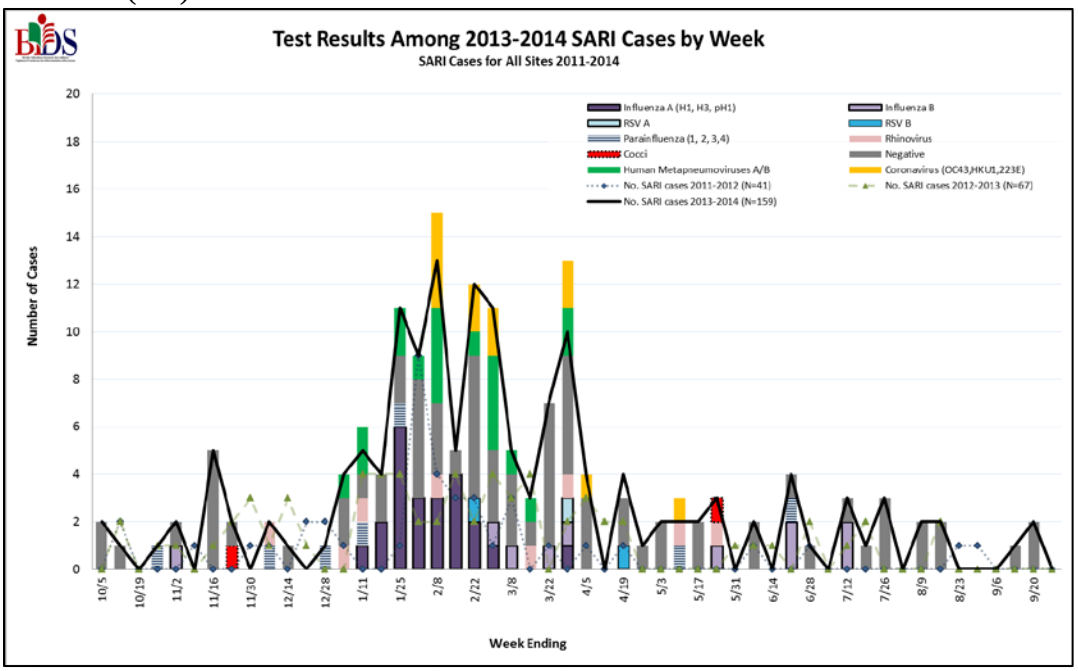
Severe Acute Respiratory Infections (SARI) Surveillance

Severe acute respiratory infections (SARI) surveillance is conducted at selected hospitals in counties along the Sonora, Mexico, border by the Office of Border Health's Border Infectious Disease Surveillance (BIDS) program. SARI is defined as a hospital admission with a fever of at least 100ºF plus either a cough or a sore throat. This surveillance facilitates the detection of circulating influenza strains and allows us to monitor various causes of morbidity and mortality among inpatients with SARI.

SARI cases are tested using an RT-PCR viral panel that detects: influenza A (H1) seasonal subtype, A (H3) seasonal subtype, A (H1N1) pdm09, and B; respiratory syncytial virus A and B; parainfluenza virus 1, 2, 3, and 4; human metapneumoviruses A/B; rhinovirus; adenovirus (B, C, and E); and coronavirus (NL63, HKU1, 229E, and OC43). Bacterial testing is conducted for *Mycoplasma pneumonia*, *Chlamydia pneumonia*, *Legionella pneumophila* and *Bordetella pertussis* if a bacterial specimen is available for off-site testing. However, if a bacterial specimen is not submitted, patient chart reviews are conducted to find additional bacterial testing results performed on site. Lastly, serum from these patients is also tested for coccidioidomycosis.

In total, 159 patients were confirmed as SARI cases in the 2013-2014 season. Four were not tested because no specimens were sent to the lab. Out of 155 tested SARI cases, 76 (49%) were positive for a viral pathogen, two (1%) were positive for cocci and 77 (50%) tested negative for all pathogens. Influenza was positive in 33 cases (21%).

Seventy-nine (50%) of the 159 cases were male. Seventy-eight (49%) were 65 years of age or older, 34 (21%) were between the ages of 50 and 64, and 39 (25%) were between the ages of 25 and 49 years of age. Seventy-nine (50%) of the cases were non-Hispanic white, 58 (36%) were of Hispanic racial/ethnic background, 13 (8%) were Native American, 5 (3%) were African American and 3 (2%) was Asian.

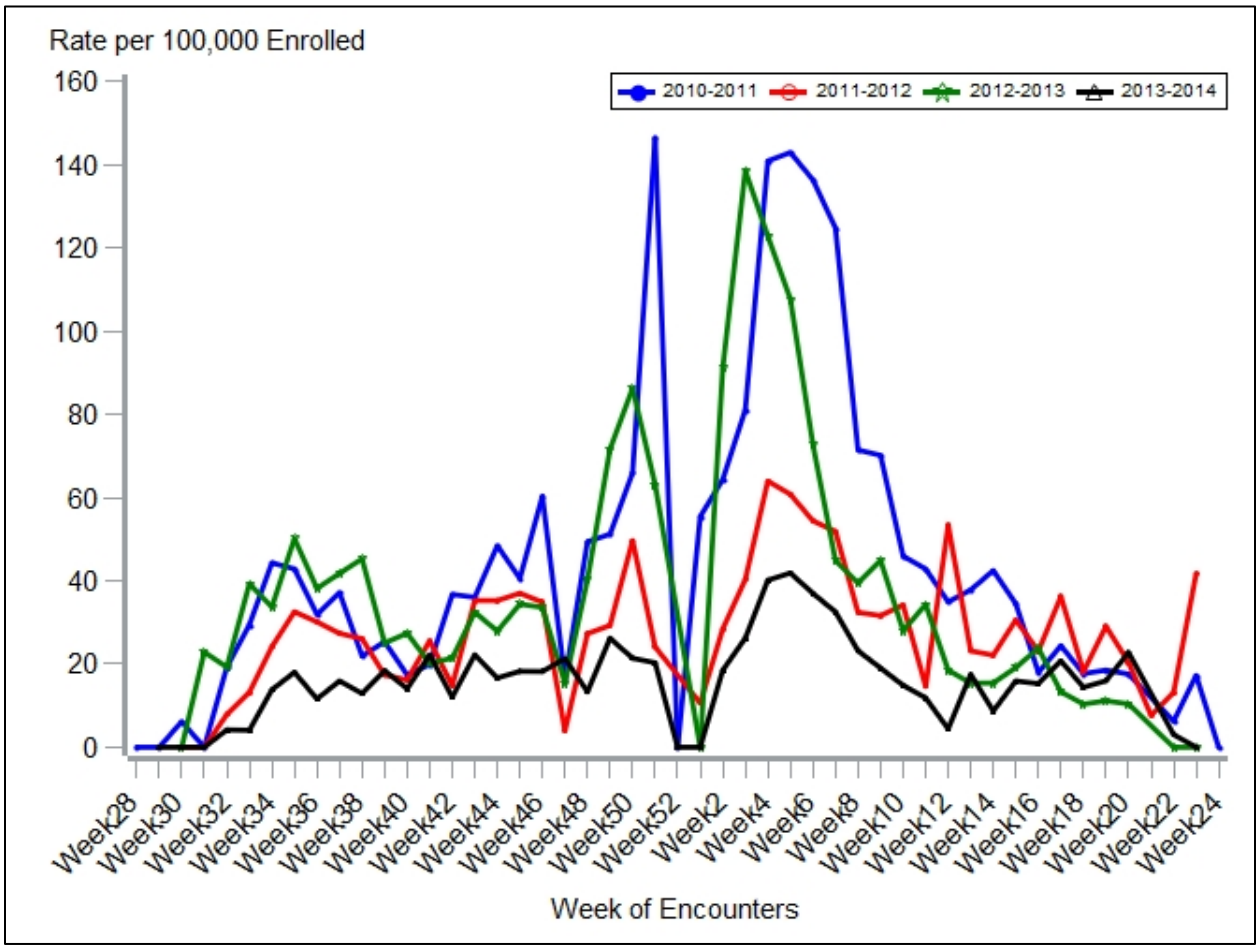


Influenza-Like Illness (ILI) Surveillance from Participating Arizona Schools

School nurses in approximately 140 Arizona schools around the state use a specific computer program (the Child Health Indicator Program) for electronic management of student health records. The graph presents the weekly trend of ILI syndromes reported among students during the school years of 2010-2011, 2011-2012, 2012-2013 and 2013-2014. The school nurse encounters are not diagnosed cases of communicable diseases but are based on the nursing codes that school nurses enter to track student conditions. The numbers in the graph are only from schools that used CHIP during the school year.

ILI among school children was relatively low compared to last season, and showed a small peak in December (week 50) with the largest increase in February (weeks 5 and 6).

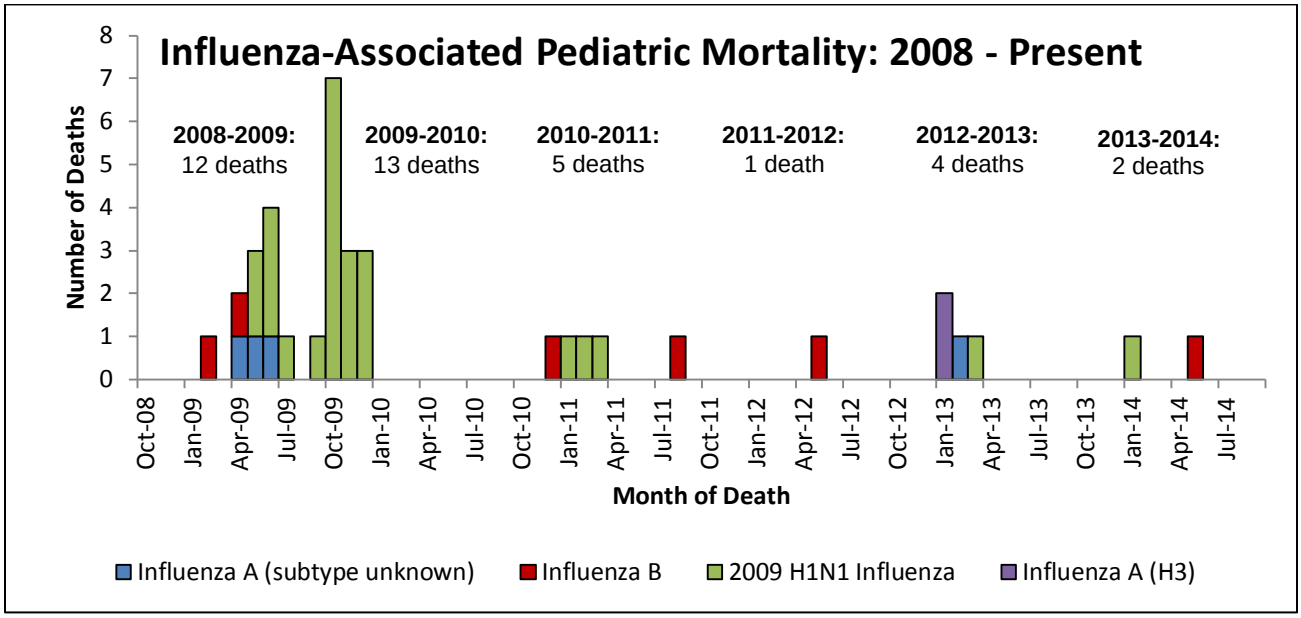
Influenza-Like Illness per 100,000 Students Enrolled in Participating Schools, Arizona, 2010-2014



Influenza-Associated Pediatric Mortality

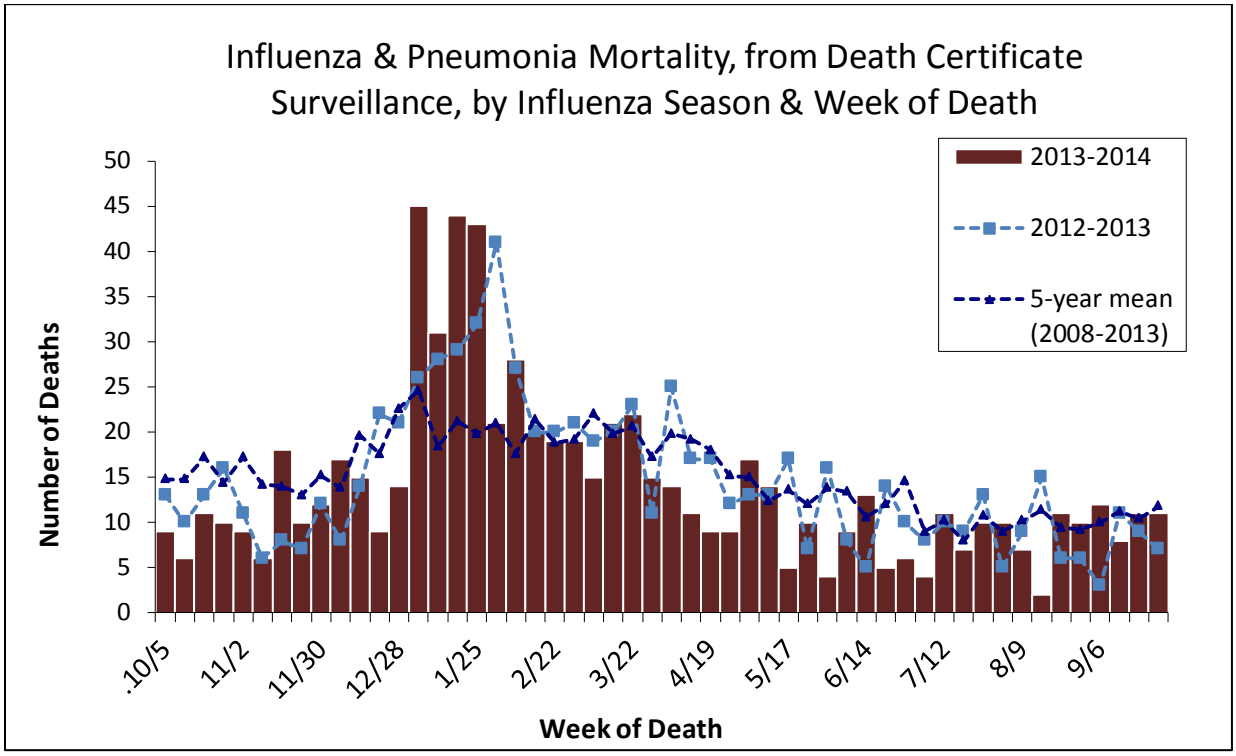
Influenza-associated pediatric deaths are reportable to public health departments in Arizona (R9-6-202). Four influenza-associated pediatric deaths were reported and investigated during the 2012-2013 season compared to one during the 2011-2012 season and five during the 2010-2011 season. The 2008-2009 and 2009-2010 seasons showed an increase in influenza-associated deaths in children related to the circulation of the 2009 H1N1 virus, with 12 and 13 deaths reported in those seasons, respectively.

Two influenza-associated pediatric deaths were reported in the 2013-2014 season: one in week 4 and one in week 22. The first reported case was a Yuma County child with underlying medical conditions and was PCR positive for influenza A (H1N1) pdm 09. The second reported case was a Maricopa County child with no underlying medical conditions and was PCR positive for influenza B infection.



Pneumonia and Influenza Mortality from Death Certificates

Influenza-associated deaths in adults are not reportable in Arizona, and thus the number of laboratory-confirmed deaths each year is not available. Many influenza-related deaths are due to complications of influenza infection, including pneumonia, and influenza is infrequently listed as the cause of death on death certificates. Influenza mortality surveillance often uses the category of "pneumonia and influenza" (P & I) on death certificates as an indicator of the severity of an influenza season or of the trends within a season, even though not all pneumonias are associated with influenza. See the CDC website for more information http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm



During the 2013-2014 season, 729 pneumonia or influenza deaths occurred. This is lower than the 763 deaths reported in the previous 2012-2013 season. The mean and median ages for the 729 P & I deaths in the 2013-2014 season were 75.1 and 79 years, respectively. 11 (2%) deaths were in persons less than 25 years of age; 154 (21%) in persons ages 25 through 64 years; and 564 (77%) in persons aged 65 years or older. 373 (51%) of deaths were among males and 425 (58%) deaths occurred in an inpatient setting.

Summer Laboratory-Reported Influenza

Each year, Arizona stops counting rapid diagnostic tests as confirmed cases if they are collected 14 days after the collection date of the last PCR- or culture-confirmed test at ASPHL. This is done because of the high likelihood that rapid diagnostic tests performed in periods with no known virus circulation are false positives. For 2014, rapid tests with collection dates after July 15th, 2014, were not counted as confirmed. Positive results of other tests were still counted.

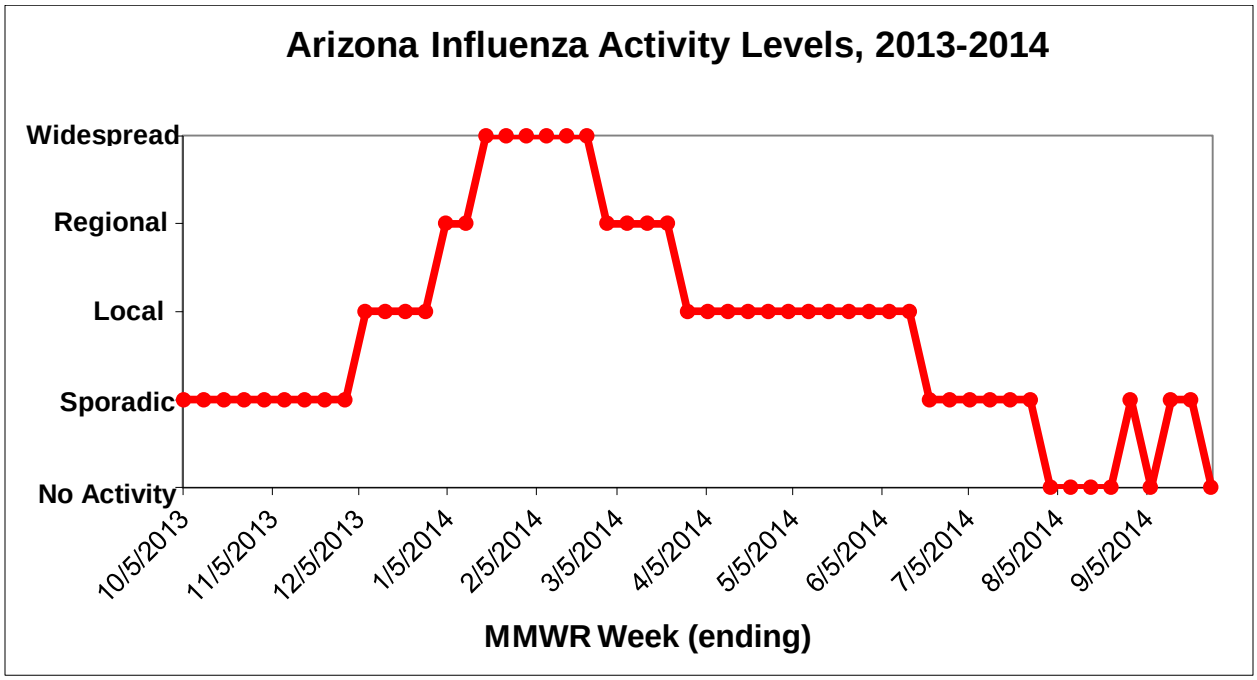
Fourteen laboratory-confirmed influenza cases were identified during the period when rapid tests were no longer counted. Seven were confirmed by RT-PCR or culture at ASPHL and were residents of Maricopa County. Of the 14 confirmed cases, three were originally identified by rapid diagnostic tests, one by direct or indirect fluorescent antibody testing, nine by PCR, and one by culture. Additional information is below:

MMWR Week	Month	Influenza (sub)type	Age group	Out of state travel?
30	July	1 Influenza B	Adult	No
31	July	1 Influenza A (H3)	Adult	No
32	August	1 Influenza A (H1N1) pdm09, 2 Influenza A (H3), 1 Influenza B	3 Children, 1 Adult	1 Yes, 1 No, 2 Unknown
34	August	1 Influenza B	Adult	Unknown
35	August	1 Influenza A (H3)	Adult	Yes
36	August	1 Influenza A (H3), 1 Influenza B	2 Adults	2 Yes
37	September	1 Influenza A (H3)	Adult	Yes
38	September	1 Influenza A (H3)	1 Child	Unknown
39	September	2 Influenza A (H3)	2 Adults	1 Yes, 1 Unknown

An additional 27 cases were reported and ruled out during the summer surveillance period. 19 (70%) were positive rapid diagnostic tests; 1 of these was forwarded to ASPHL for confirmatory testing, which was negative, and 18 were not tested further. 2 (8%) were positive by DFA/IFA and neither were sent to ASPHL for further testing. 6 (22%) were sent to ASPHL with no prior testing, all negative by PCR.

Arizona Influenza Activity Levels

Each week, October through May, ADHS reports an influenza activity level to CDC. (See definitions at the end of this report.) Widespread activity in Arizona is often in February or March. During the 2013-2014 season, Arizona reported widespread activity from mid-January through most of February.



Glossary of Key Terms

2013-2014 Influenza Season – The season is defined by surveillance weeks. The first day of the 2013-2014 influenza season was September 29th, 2013, or week 40 and the 2013-2014 surveillance season continued through September 27th, 2014, or week 39.

Rates: All rates described in this report are calculated using 2010 population denominators from the Vital Statistics Office at ADHS, and are derived from data from the National Vital Statistics and State Demographer's Offices. County- or age-specific denominators are used when appropriate. For further information, see http://www.azdhs.gov/plan/menu/info/pop/index.php?pg=2010.

Activity Levels: Indicator of the geographic spread of influenza activity, reported to CDC by all states each week.

Widespread: Increased influenza-like illness from sentinel providers (ILI) in three or more regions and large numbers of laboratory-confirmed influenza cases in those regions.

Regional: Increased ILI in two regions and elevated numbers of laboratory-confirmed influenza cases in those regions.

Local: Increased ILI in one region and elevated numbers of laboratory-confirmed influenza cases in that region.

Sporadic: No increase in ILI activity and only isolated laboratory-confirmed influenza cases.

No Activity: No increase in ILI activity and no laboratory-confirmed influenza cases.

Pneumonia and Influenza Mortality: Many influenza-related deaths are due to complications of influenza infection, including pneumonia, and influenza is infrequently listed as the cause of death on death certificates. Surveillance from death certificates often uses the category of "pneumonia and influenza" as an indicator, although not all pneumonias are associated with influenza. See the CDC website for more information http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm.