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## Summary

This report summarizes influenza activity for the 2011-2012 season (October 2011 through September 2012). This was a mild influenza season as seen by numerous surveillance indicators. Surveillance activities performed by ADHS remained unchanged overall from the 2010-2011 season.

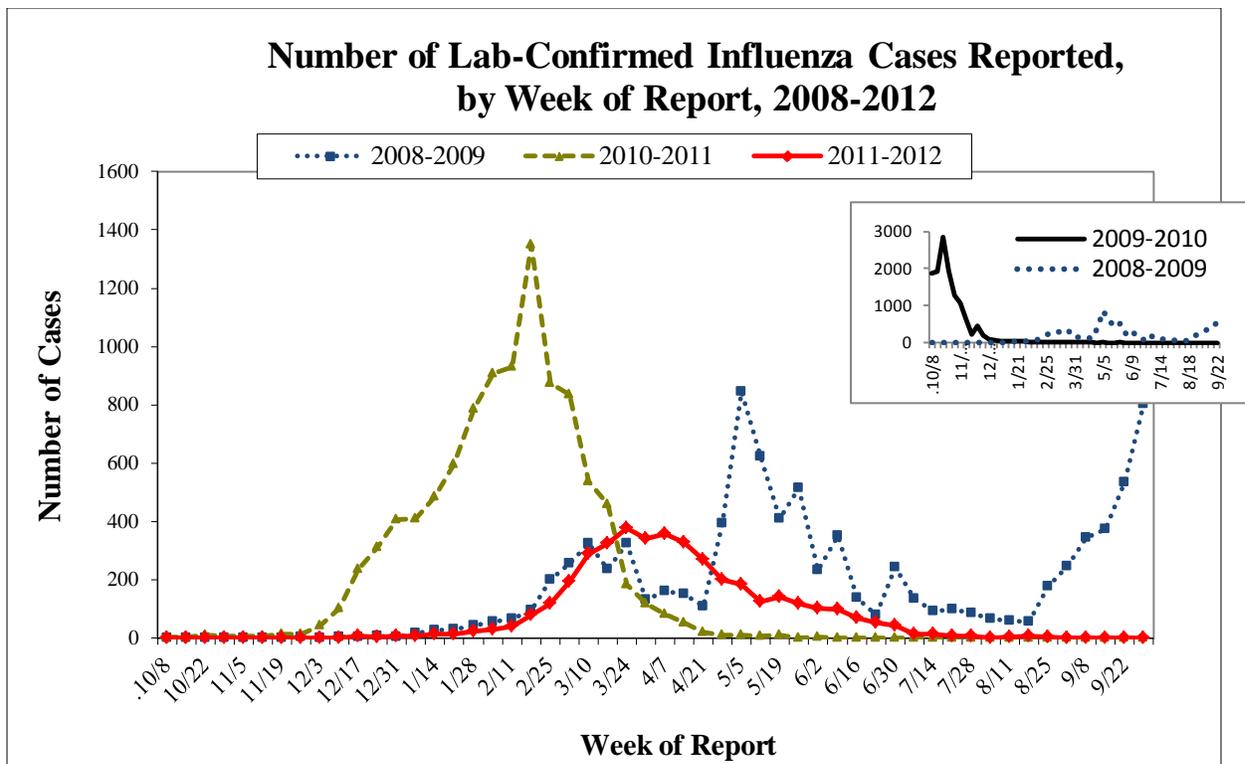
The first case of influenza with apparent in-state acquisition was confirmed at the Arizona State Public Health Laboratory in week 50 (mid-December), three weeks later than previously seen in other seasons. Influenza activity increased more substantially in February, with peak activity in March and April, and confirmed cases continuing into June and July. Influenza A accounted for the majority of cases throughout the season, with both A (H3) and A (H1N1)pdm09 circulating in the state; influenza B cases predominated in the later part of the season. Overall, however, all surveillance measures indicated a mild season.

## 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 2011-2012 influenza season was mild, and the weekly number of laboratory-confirmed influenza cases reported never approached the numbers reported during the 2008-2009 or 2010-2011 seasons, let alone the volume at the height of the pandemic. 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 2011-2012 season we know of no changes in testing or reporting practices that would cause a decrease in reported laboratory-confirmed cases. Our other surveillance indicators and national data corroborate that the 2011-2012 numbers likely truly reflect a mild season.

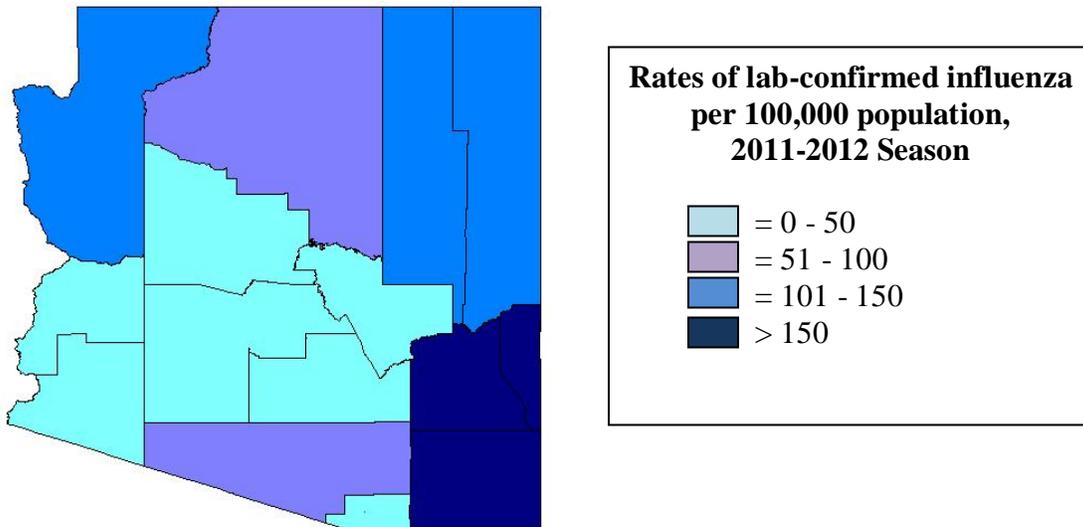
Additionally, the influenza season started late and continued later than in any other season since influenza laboratory-reporting began in 2004, excluding the 2009 pandemic. Confirmation of influenza A (H3) at the Arizona State Public Health Laboratory in a case with no recent travel history occurred in week 50 (mid-December), three or more weeks later than in any other recorded season. Reporting of laboratory-confirmed cases began to increase in February, with peak activity in March and April, and confirmed cases continuing into June and July.



## 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, Greenlee, Graham, and Cochise 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	92	128
Cochise	242	185
Coconino	114	85
Gila	19	35
Graham	89	236
Greenlee	55	656
La Paz	1	5
Maricopa	1808	47
Mohave	266	133
Navajo	141	131
Pima	967	98
Pinal	145	38
Santa Cruz	23	48
Yavapai	32	15
Yuma	10	5
<b>Total</b>	<b>4,004</b>	<b>62</b>



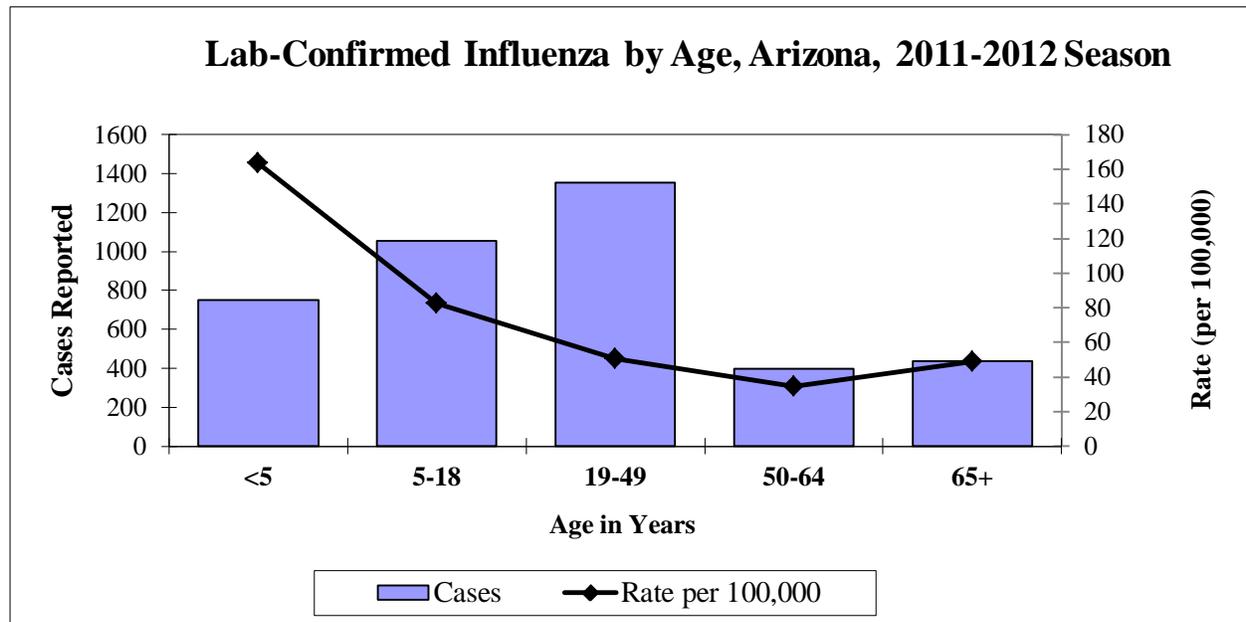
## Influenza Activity by Age

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 2011-2012 season is similar to other seasons.

### Age Group of Reported Influenza Cases, 2008-2009 through 2011-2012 Seasons

Age Group	2011-2012 Season (N=4,004)	2010-2011 Season (N=9,822)	2009-2010 Season (N=13,030)	2008-2009 Season (N=9,159)
0 to 4 years	750 (19%)	2,244 (23%)	2,531 (19%)	1,444 (16%)
5 to 18 years	1,053 (26%)	2,677 (27%)	4,943 (38%)	4,220 (46%)
19 to 49 years	1,352 (34%)	2,982 (30%)	4,137 (32%)	2,695 (29%)
50 to 64 years	400 (10%)	799 (8%)	951 (7%)	459 (5%)
65 years or older	436 (11%)	1,043 (11%)	315 (2%)	271 (3%)
Unknown age	13 (0.3%)	77 (1%)	153 (1%)	70 (1%)

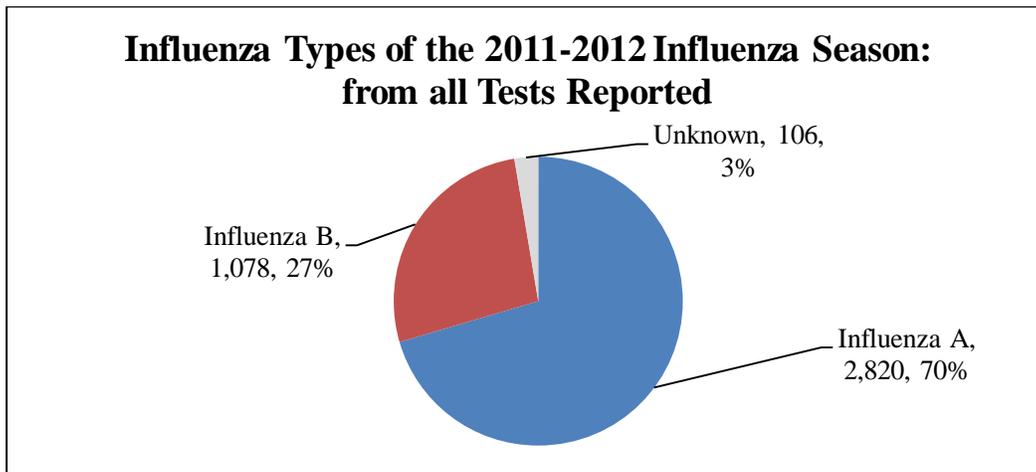
While large numbers of laboratory-confirmed cases were reported among older children and young adults, the rate of reported influenza cases was by far highest in children less than five years of age and decreased with age, increasing slightly among adults 65 years or older.



## 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 2011-2012 season, 70% of reported cases were influenza A, a somewhat lower proportion than in any of the past three seasons. Influenza B cases were somewhat more likely to be of younger age than influenza A cases, with 51% of influenza B cases under the age of 19 years, compared to 42% of influenza A cases.



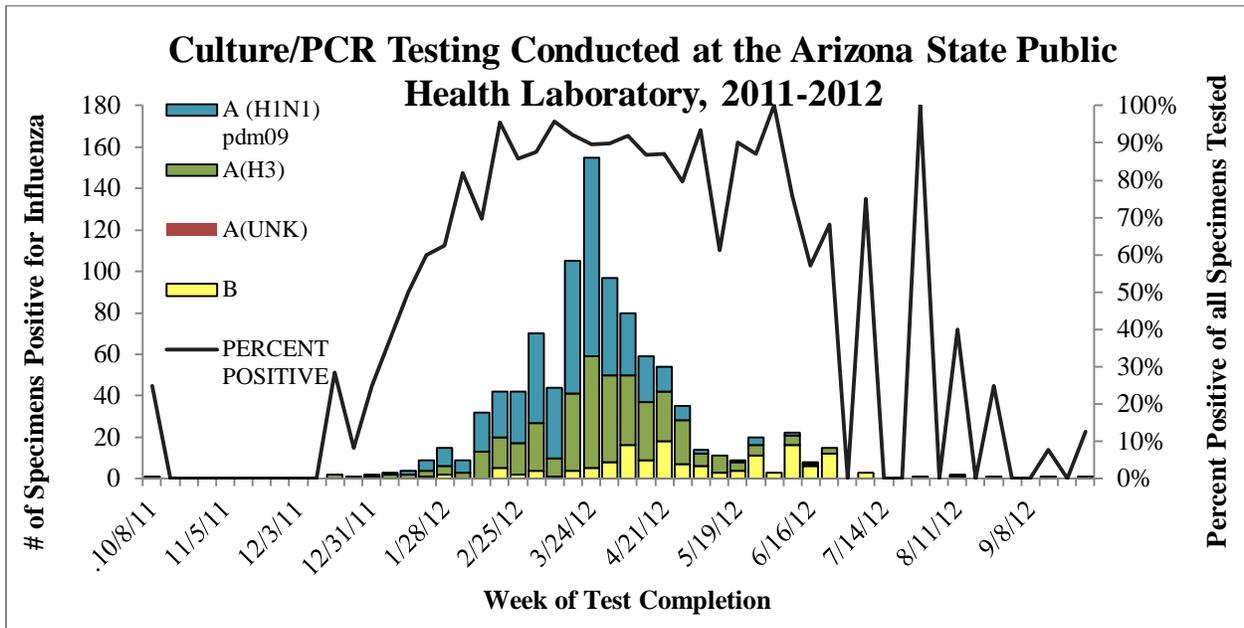
### Influenza Type, by Season

	2011-2012 Number (Percent)	2010-2011 Number (Percent)	2009-2010 Number (Percent)	2008-2009 Number (Percent)
<b>Total</b>	4,004 (100%)	9,822 (100%)	13,030 (100%)	9,149 (100%)
<b>Influenza A</b>	2,820 (70%)	7,244 (74%)	12,931 (99%)	7,262 (79%)
<b>Influenza B</b>	1,078 (27%)	2,279 (23%)	34 (0.3%)	1,691 (18%)
<b>Unknown</b>	106 (3%)	299 (3%)	65 (0.5%)	196 (2%)

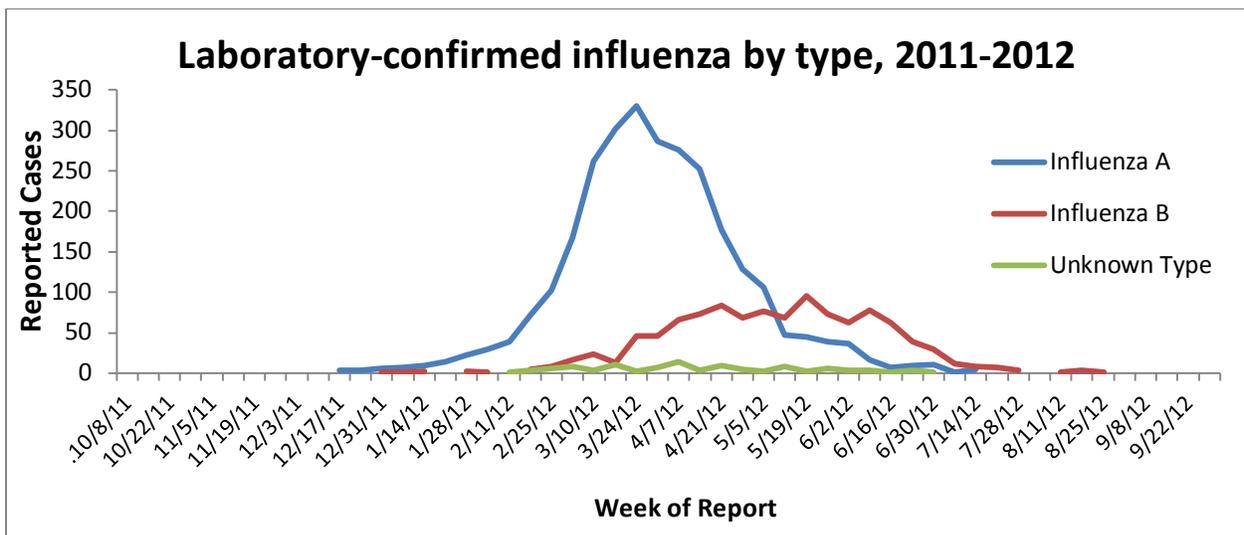
### Influenza Type, by Age Group, 2011-2012 Influenza Season

Age Group	All Confirmed Cases (N=4,004)	Influenza A (N=2,820)	Influenza B (N=1,078)	Unknown Type (N=106)
<b>0 to 4 years</b>	750 (19%)	546 (19%)	176 (16%)	28 (26%)
<b>5 to 18 years</b>	1,053 (26%)	648 (23%)	377 (35%)	28 (26%)
<b>19 to 49 years</b>	1,352 (34%)	981 (35%)	336 (31%)	35 (33%)
<b>50 to 64 years</b>	400 (10%)	298 (11%)	95 (9%)	7 (7%)
<b>65 years or older</b>	436 (11%)	340 (12%)	89 (8%)	7 (7%)
<b>Unknown age</b>	13 (0.3%)	7 (0.2%)	5 (1%)	1 (0.3%)

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. The influenza subtype can be determined by a test called hemagglutination inhibition (HI) using viral isolates or by using subtype-specific primers for RT-PCR. 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 2011-2012 season, 47% of positive specimens at ASPHL were influenza A (H1N1) pdm09, 38% were influenza A (H3), and 15% were influenza B. Arizona experienced both influenza A subtypes throughout the season, with influenza B increasing later in the season, as illustrated by the ASPHL data above and the epidemiologic curve of all reported tests below.



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

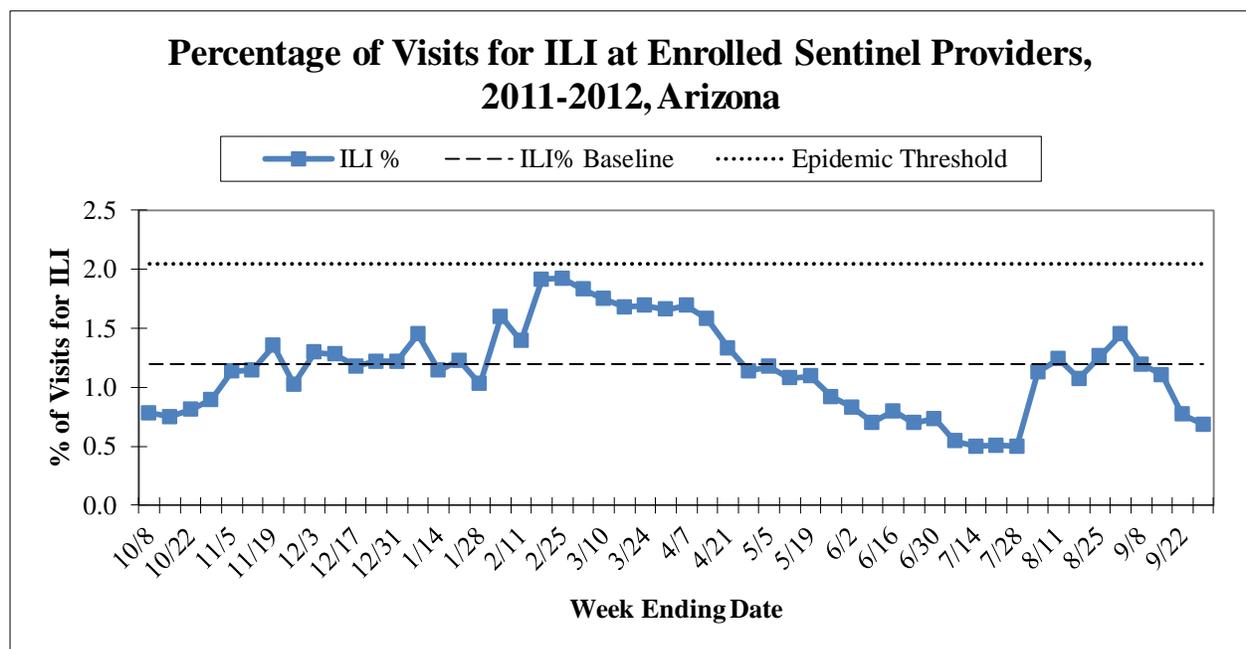
**Influenza confirmed by RT-PCR or culture, by season, from any laboratory**

	2011-2012 Number (Percent)	2010-2011 Number (Percent)	2009-2010 Number (Percent)	2008-2009 Number (Percent)
<b>Influenza Type/Subtype</b>	1,564 (100%)	3,176 (100%)	7,497 (100%)	3,767 (100%)
Influenza A (H1N1) pdm09	594 (38%)	483 (15%)	6,392 (85%)	2,243 (60%)
Seasonal Influenza A (H1)	0 (0%)	0 (0%)	0 (0%)	459 (12%)
Influenza A (H3)	351 (22%)	1,239 (39%)	1 (0.01%)	382 (10%)
Influenza A (Unsubtyped)	255 (16%)	748 (24%)	1,101 (15%)	510 (14%)
Influenza B	364 (23%)	706 (22%)	3 (0.04%)	510 (14%)

**Influenza-Like Illness (ILI) Surveillance from Sentinel Providers**

ILI is defined as a fever of at least 100°F plus either a cough or a sore throat. Approximately 30 sentinel providers around the state report the number of total 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 1.2% and the epidemic threshold is 2.0%. The baseline is defined as the mean of the state ILI% in weeks in the 2008-2011 influenza seasons when <10% of specimens were positive 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, but never exceeded the state’s epidemic threshold during the 2011-2012 season.



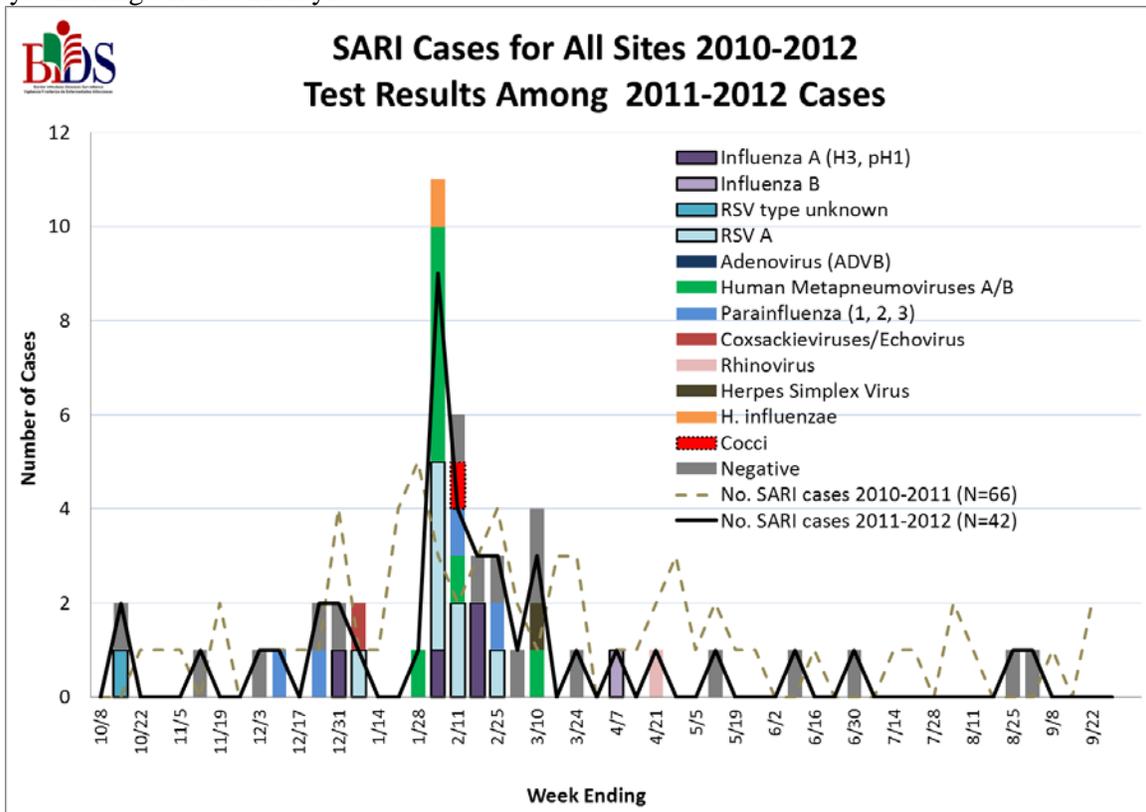
## Severe Acute Respiratory Infections (SARI) Surveillance

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 100°F 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 and B; respiratory syncytial virus A and B; parainfluenza virus 1, 2, 3, and 4; human metapneumoviruses A/B; rhinovirus; adenovirus (ADVB and ADVE); coronavirus (NL63, HKU1, 229E, and OC43); coxsackieviruses/echovirus; and bocavirus. If a lower respiratory specimen is collected it is tested by RT-PCR for *Chlamydomphila pneumoniae*, *Mycoplasma pneumoniae*, *Bordetella pertussis*, and *Legionella pneumophila* and bacteriology culture for bacterial etiologies and coinfections. Serum from these patients is also tested for coccidioidomycosis.

Among the 42 cases identified in the 2011-2012 season, five (12%) were positive for influenza and nine (21%) were positive for RSV. Seventeen (40%) were negative for all tested etiologies. Sixteen (38%) of 42 cases were male. Among 41 cases with age data available, sixteen (39%) were 65 years of age or older, 9 (22%) were between the ages of 25 and 49, and eight (20%) were under five years of age. Eighteen (43%) of 42 cases were of Hispanic racial/ethnic background, 12 (29%) were non-Hispanic white, and 12 (29%) were Native American.

Of the 25 SARI cases with negative rapid diagnostic influenza results, four were eventually confirmed as influenza by PCR. Among 38 with symptom duration collected, the median was 45 days, with a mean of 6 days and range of 1 to 21 days.

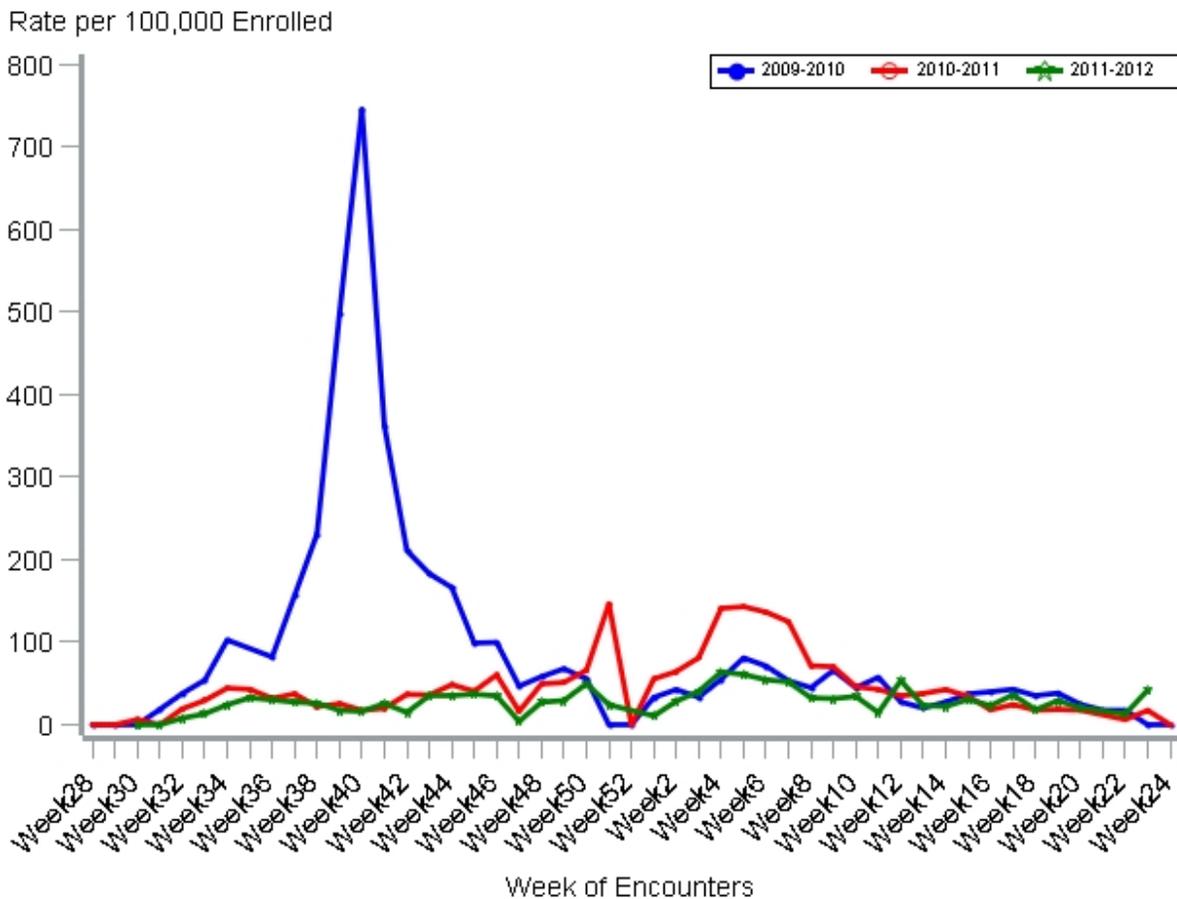


## Influenza-Like Illness (ILI) Surveillance from Participating Arizona Schools

School nurses in more than 200 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 2009-2010, 2010-2011, and 2011-2012. 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 throughout the season, but showed the most increase in January and February (weeks 4 through 7) with another small peak in March (week 12). ILI during the fall wave of the 2009 pandemic far exceeded any activity seen in our school surveillance system before or since.

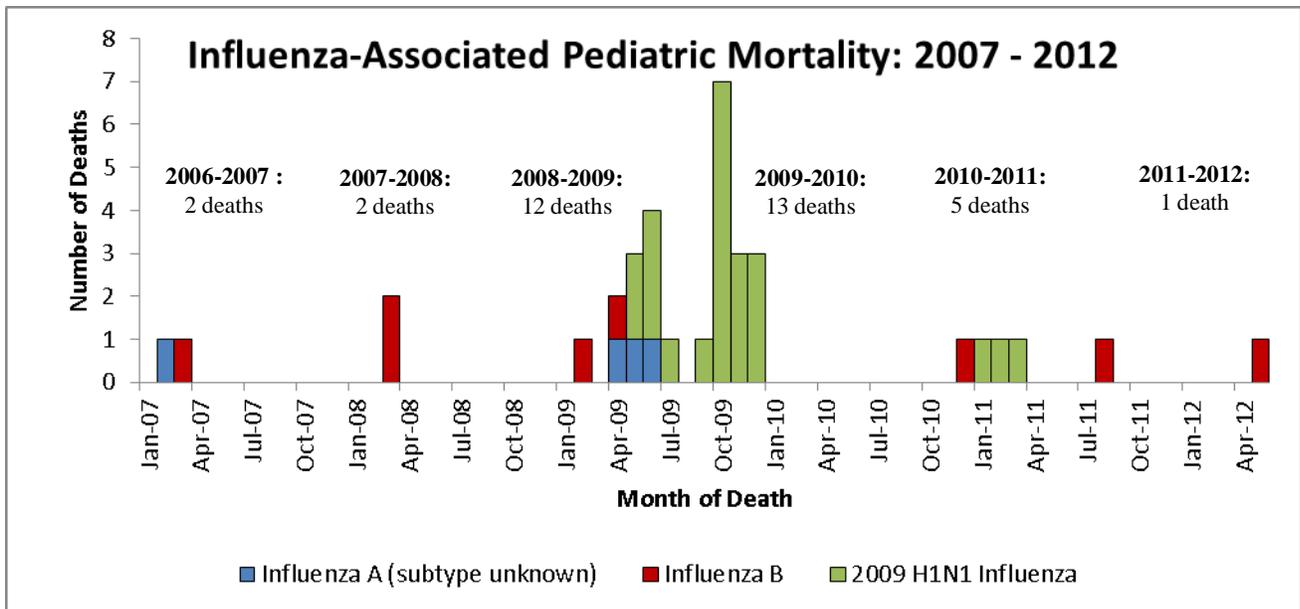
### Influenza-Like Illness Per 100,000 Students Enrolled in Participating Schools, Arizona, 2009-2012



## Influenza-Associated Pediatric Mortality

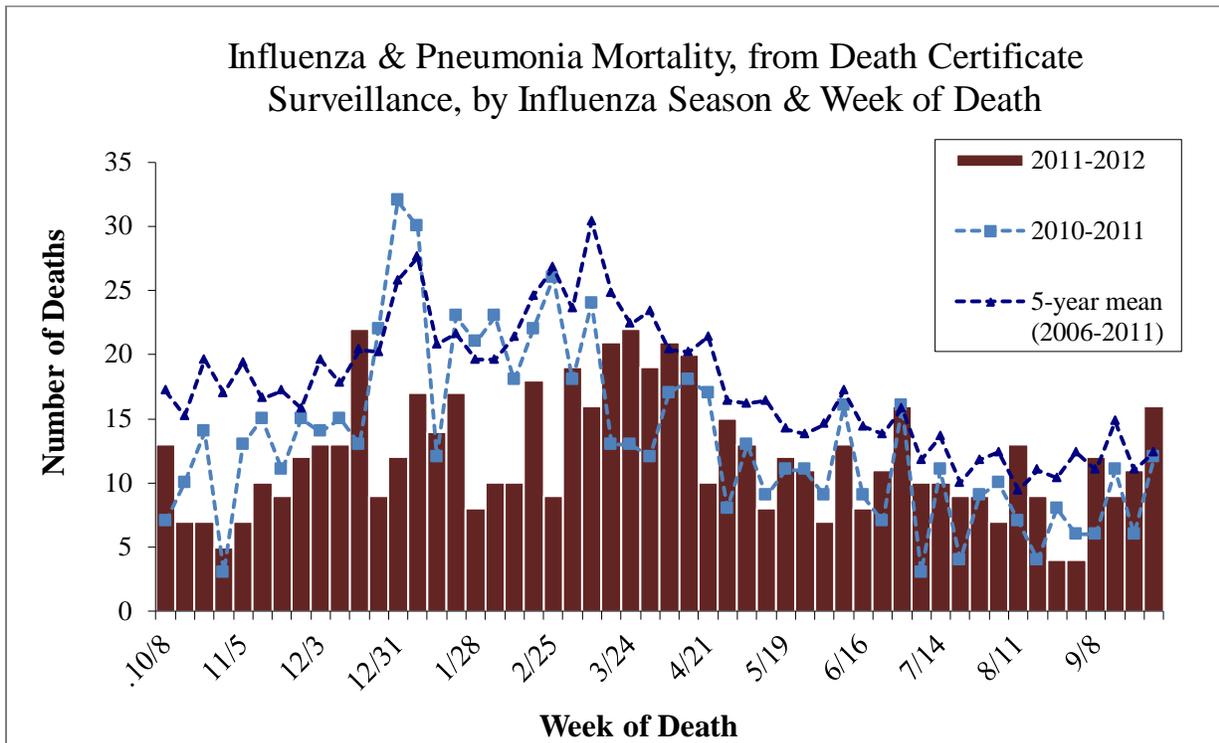
Influenza-associated pediatric deaths are reportable to public health departments in Arizona (R9-6-202). Five influenza-associated pediatric deaths were reported and investigated during the 2010-2011 season. The 2008-2009 and 2009-2010 seasons showed an increase in influenza-associated deaths in children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

Arizona's only influenza-associated pediatric death for the 2011-2012 season was identified in May (week 20). The Gila County child had an influenza B infection, as confirmed by RT-PCR at ASPHL, and also a bacterial coinfection. The child had underlying medical conditions and had not received an influenza vaccination.



## 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 may not be listed as the cause of death on death certificates. Influenza mortality surveillance often uses the category of “pneumonia and influenza” (P & I) from 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](http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm)



During the 2011-2012 season, 627 pneumonia or influenza deaths occurred. This is lower than the previous three seasons: 697 in the 2010-2011 season, 903 in 2009-2010 and 970 in 2008-2009. The mean and median ages for the 627 P & I deaths in the 2011-2012 season were 79 and 83 years, respectively. Eleven (2%) deaths were in persons less than 25 years of age; 76 (12%) in persons ages 25 through 64 years; and 540 (86%) in persons aged 65 years or older. Fifty percent of deaths were among males. Three hundred thirty-five (53%) 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 2012, rapid tests with collection dates after July 11<sup>th</sup>, 2012 were not counted as confirmed. Positive results of other tests were still counted.

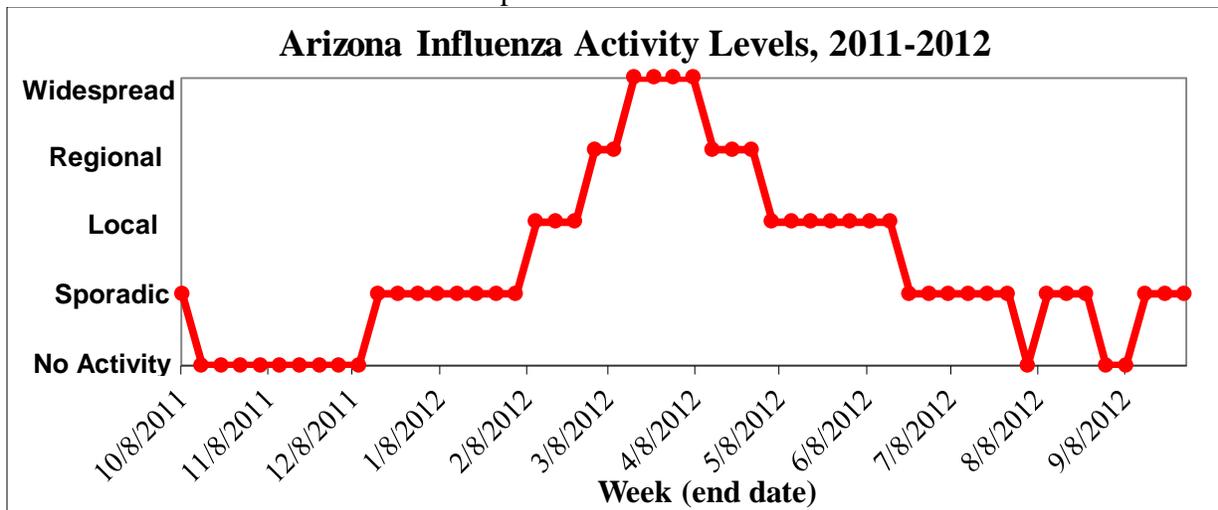
Six laboratory-confirmed influenza cases were identified during the period when rapid tests were no longer counted. All six were confirmed by RT-PCR at ASPHL and were residents of Maricopa County. Four were originally identified by rapid diagnostic tests and two by direct fluorescent antibody testing. Additional information is below:

Week reported	Influenza type	Age group	Out of state travel?
32 (August)	1 Influenza A (H3), 1 B	1 Adult, 1 Child	Yes, unknown
34 (August)	Influenza A (H3)	Child	Yes
37 (September)	Influenza B	Adult	No
38 (September)	Influenza A (H3)	Adult	Unknown
39 (September)	Influenza B	Child	No

An additional 92 positive rapid diagnostic tests that could not be confirmed were reported from the time when rapid tests were no longer counted until the first confirmed case of locally-acquired influenza in the 2012-2013 season; 48 (52%) of these were reported between weeks 28 and 39. Specimens were submitted to ASPHL for confirmatory tests for 57 (62%); hospitalization status was known for 82 (89%), of which 26 (32%) were hospitalized.

## 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 2011-2012 season, Arizona reported widespread activity during the last three weeks of March and the first week of April.



## Glossary of Key Terms

***2011-2012 Influenza Season:*** The season is defined by surveillance weeks. The first day of the 2011-2012 influenza season was October 2<sup>nd</sup>, 2011, or week 40, and the surveillance season continued through September 29<sup>th</sup>, 2012, or week 39.

***Rates:*** All rates described in this report are calculated using 2011 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/pop11/pd11.htm>.

***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](http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm).