

INFLUENZA & RSV ANNUAL REPORT

Division of Disease Control, Office of Epidemiology
Phoenix AZ



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CDC

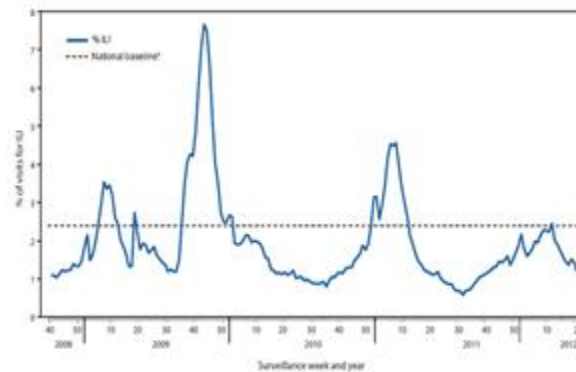


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SUMMARY

This report summarizes the influenza activity in Maricopa County for the 2015-2016 Season (October 4, 2015 [MMWR WK 40] to October 3, 2016 [MMWR WK 39]). Maricopa County Department of Public Health (MCDPH) influenza surveillance is a collaborative effort between MCDPH, Arizona Department of Health Services (ADHS), Centers for Disease Control and Prevention (CDC), and local community partners such as health care providers, emergency departments, community health clinics, Office of Vital Statistics, Office of the Medical Examiner, and local schools. Information on influenza activity is based on several influenza indicators such as: laboratory-confirmed cases, influenza like illness (ILI) activity, absenteeism information from schools, pneumonia and influenza (P&I) mortality, influenza -associated pediatric mortality, and summer surveillance activity. Typically, influenza peaks in January or February; however, widespread influenza activity can occur as early as October or as late as May during a flu season. Influenza cases reported to MCDPH represent a small proportion of the true number of cases of influenza. Many people do not visit the doctor when ill and not every patient exhibiting ILI symptoms is tested.



Based on influenza indicators in Maricopa County, this season was severe, experiencing widespread activity throughout the state of Arizona for 10 weeks. The previous three seasons only recorded widespread activity for 6 or 7 weeks. The first locally-acquired case of influenza in Maricopa County was laboratory confirmed on October 4, 2015 ([table 1](#)). Peak influenza activity occurred in the fourth week of February, which was five weeks later compared to the previous season ([table 1](#)). Influenza type A accounted for the majority of laboratory confirmed cases ([graph 2](#)). Reverse transcription polymerase chain reaction (RT-PCR) and viral culture testing suggested that the A/H1N1 virus was the most common viral subtype circulating during the 2015-2016 season ([graph 3](#)).

Influenza-like illness (ILI) activity in hospitals during the 2015-2016 season followed almost the exact trend as the 2014-2015 season, only about two weeks later and slightly higher. In hospital emergency departments, the percentage of visits due to ILI reported this season was higher and later in the season compared to the previous season ([graph 5](#)).

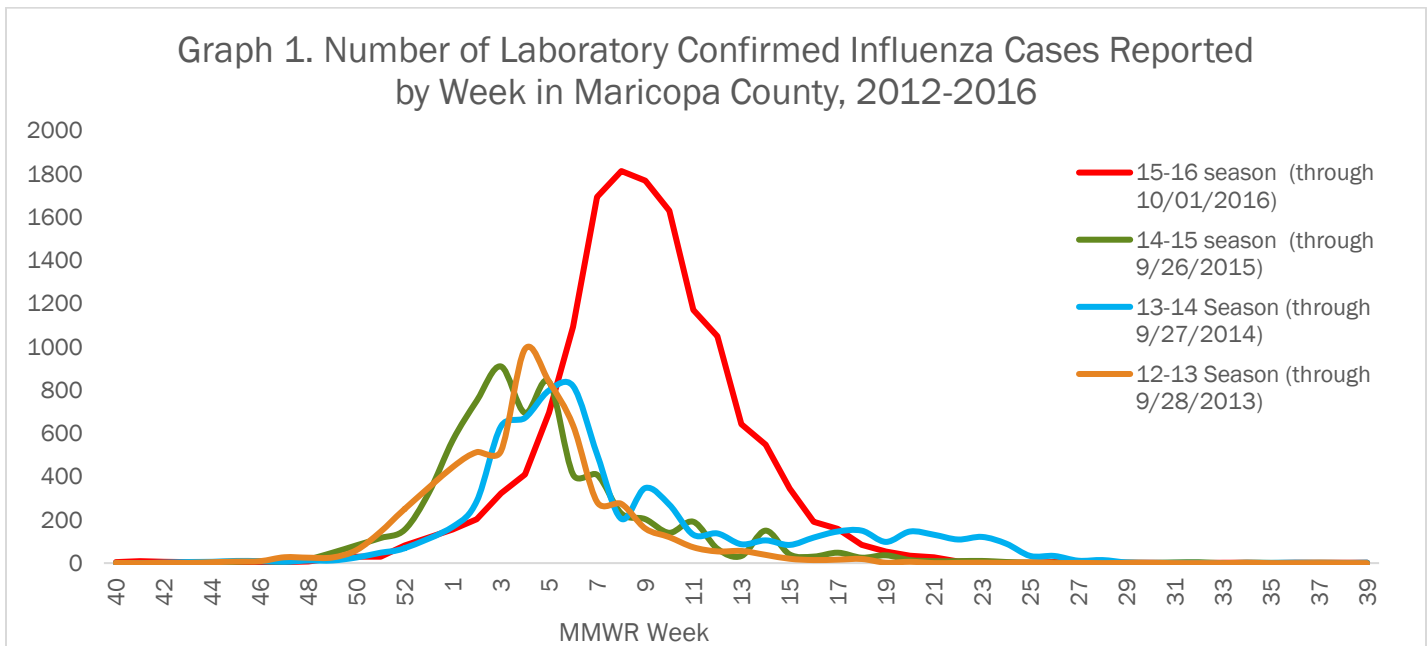
Pneumonia and influenza (P&I) mortality overall was higher compared to the previous season ([table 4](#)). The 2015-2016 Influenza season claimed 3 Pediatric deaths, the previous three seasons combined only saw 2 deaths in a child.

Respiratory Syncytial Virus (RSV) activity was considerably higher compared to last season and peaked in early February ([graph 12](#)).

Table 1. Influenza Activity Levels in Maricopa County				
	2015-2016	2014-2015	2013-2014	2012-2013
First Locally-Acquired Confirmed Case	10/4/2015	10/3/2014	10/4/2013	10/30/2012
Weeks w/Widespread Activity (AZ)	Weeks 5 - 14	Weeks 1 - 6	Weeks 3 - 8	Weeks 1 - 7
Weeks w/Hospital ILI above Regional Threshold	Weeks 51 - 16	Weeks 50 - 11	Weeks 52 - 9	Weeks 51 - 9
Weeks w/Outpatient visits above the threshold	Weeks 45 - 52, 1-21, 23, 35-36	Weeks 48, 50 - 52, 1-10 & 12-14	Weeks 51 - 11	Weeks 2 - 4
Peak Week	Week 8	Week 3	Week 6	Week 6
Number of Pediatric Deaths	3	1	1	0
Total Cases	14,318	6,604	6,658	5,638

LABORATORY CONFIRMED INFLUENZA

Influenza is a laboratory reportable disease under Arizona Administrative Code R9-204. Influenza seasons run from week 40 to week 39. The first locally acquired case (without travel history) in the 2015-2016 season was recorded on October 04, 2015. This season there were 14,318 laboratory confirmed cases of influenza in Maricopa County. This represents a 117 % increase in the total number of cases from the 2014-2015 influenza season, which had a total of 6,604 confirmed cases ([table 1](#)). Influenza activity was widespread from weeks 5-14 (1/29/2016-3/8/2016) and peaked in week 8 when 1,812 cases were reported ([graph 1](#)). (NOTE: For graphs of multiple years, MMWR dates refer to the 2015-2016 season.)



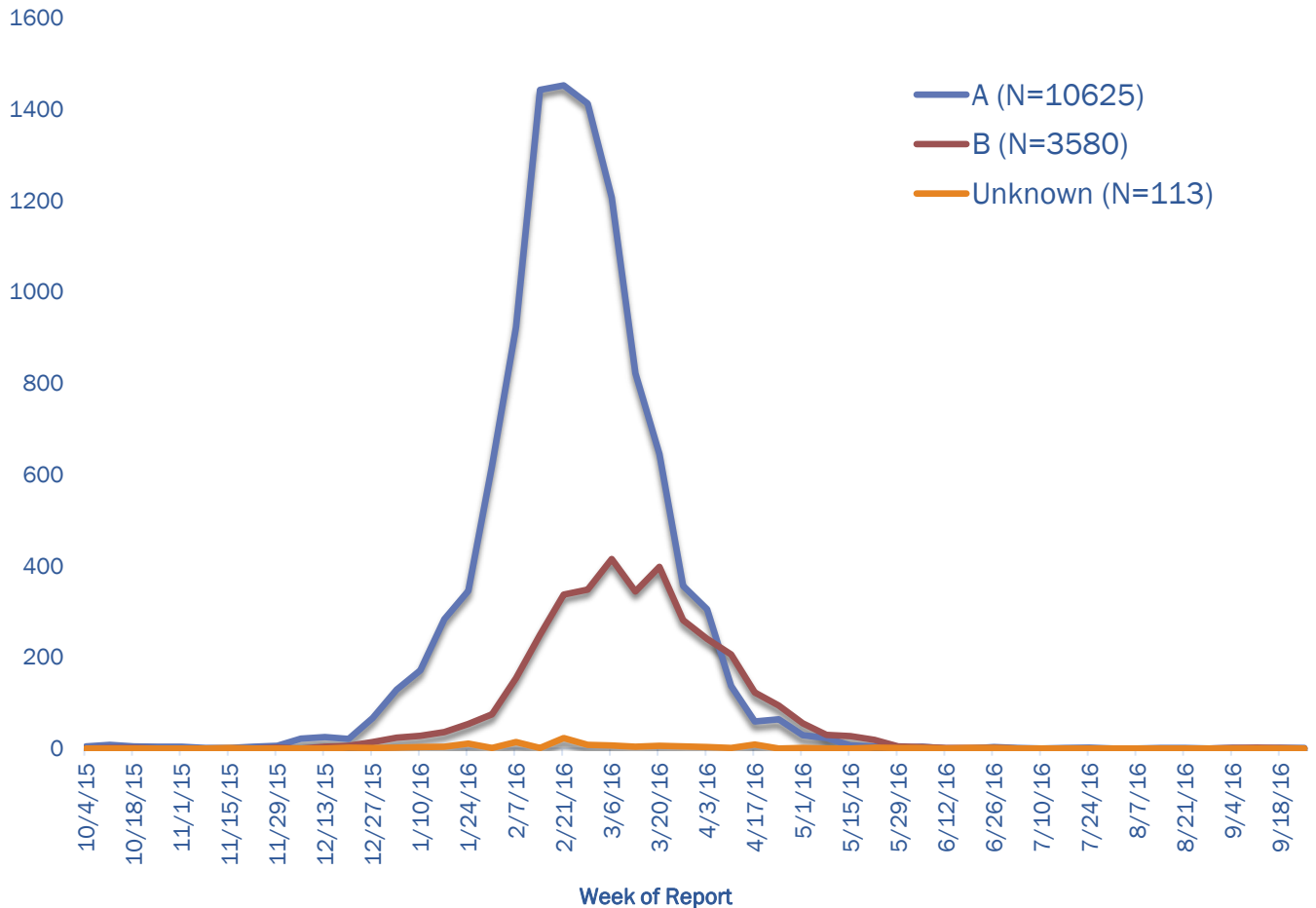
INFLUENZA TYPES AND SUBTYPES

Table 2. Types/Subtypes of Influenza, 2015-2016 Season, Maricopa County

Total	14318	100.0%
Type A	10625	74%
<i>Subtype 2009 H1N1</i>	699	7%
<i>Subtype H3</i>	433	4%
<i>Subtyping not performed or unknown</i>	9493	89%
Type B	3580	25%
Type Unknown	113	1%

Influenza type A (74%) was the dominant strain circulating this season. Type B (25%) also circulated in the 2015-2016 Influenza season and 1% was type unknown (table 2). Influenza A activity peaked during week 8 (2/21-2/27/2016) which corresponds with the overall peak of this season (graph 2) and Influenza B activity peaked during week 10 (3/6-3/12/2016).

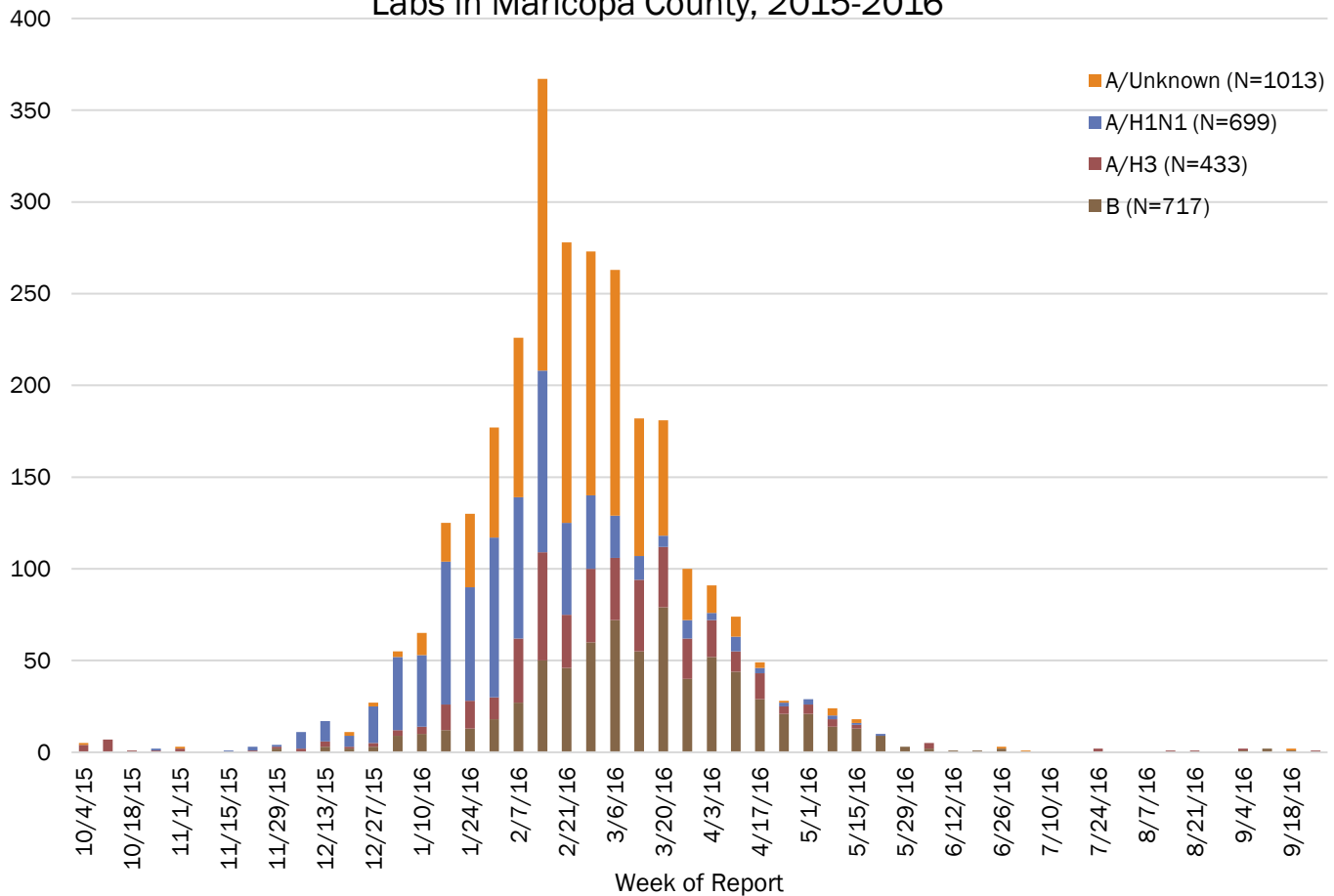
Graph 2. Influenza Activity by Type in Maricopa County, 2015-2016



When influenza subtype testing was performed, *A/H1N1* was the most common influenza subtype. Laboratories in Maricopa County reported 14,318 confirmed influenza cases this season, 2,862 cases

tested positive by RT-PCR or viral culture. Overall, 36 % of these specimens tested positive for Type A/Unknown, 24% were A/H1N1, 15% were A/H3 and Type B were 25% (graph 3). Type B was only 9.3% of the confirmed cases in 2014-2015 season.

Graph 3. Influenza Cases Confirmed by RT-PCR or Culture from All Labs in Maricopa County, 2015-2016



The CDC says
 “Everyone 6 months of age and older should get a flu vaccine every season.”



INFLUENZA ACTIVITY BY AGE AND GENDER

The demographic breakdown of laboratory confirmed cases in Maricopa

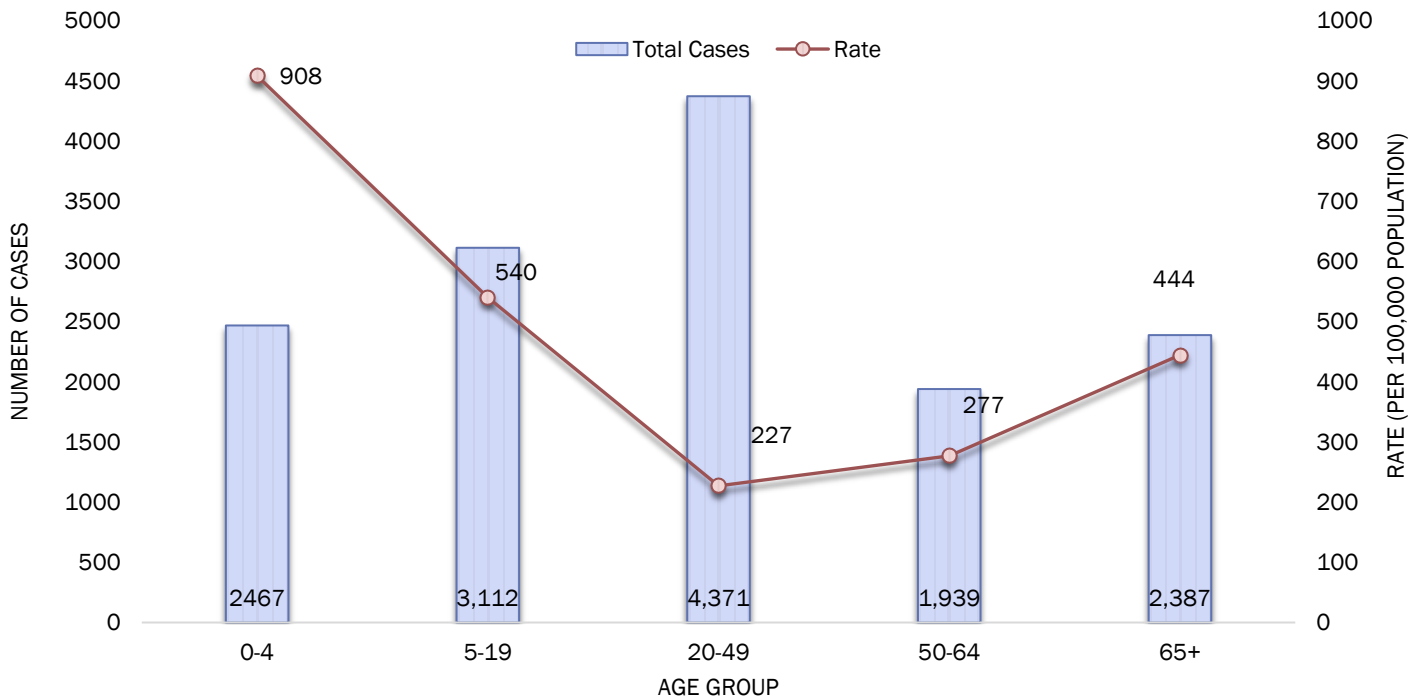
County is shown here ([table 3](#)). Slightly under half of reported cases were female. The majority of all cases were reported in those ages 5-19 and 20-49. However the rate of reported cases was highest among children 0-4 years of age, followed by ages 65+ ([graph 4](#)).



Table 3. Confirmed Cases by Gender and Age, 2015-2016, Maricopa County

	TOTAL	%
GENDER		
Female	6,718	47%
Male	5,744	40%
Unknown	1,856	13%
Total	14,318	100%
AGE GROUP		
0-4	2,467	17%
5-19	3,112	22%
20-49	4,371	31%
50-64	1,939	14%
65+	2,387	17%
Unknown	42	0%
Total	14,318	100%

Graph 4. Rates of Confirmed Influenza Cases by Age Group per 100,000 Residents, 2015-2016 in Maricopa County



* Based on 2014 Census population estimates for Maricopa County

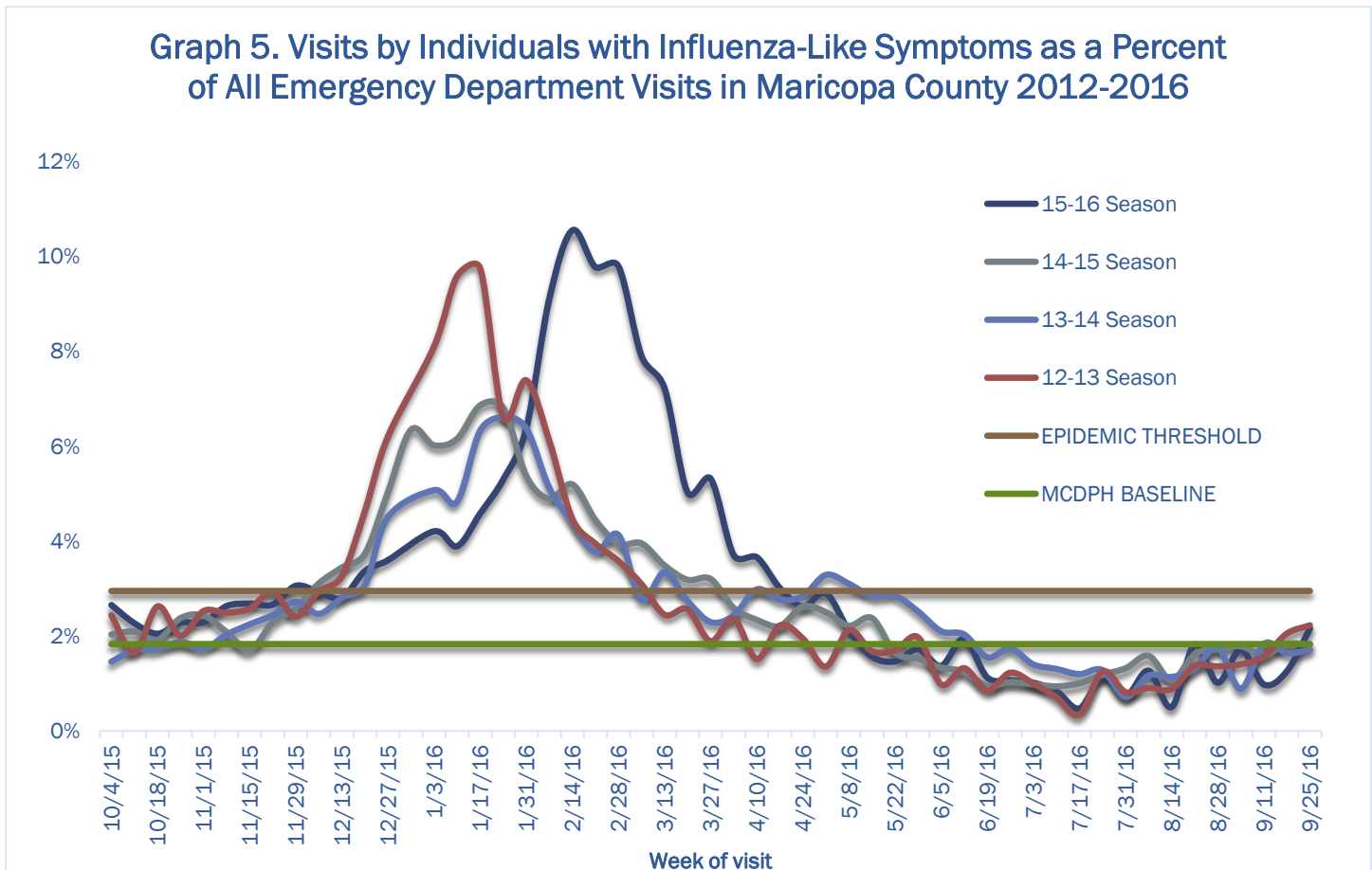
ILI INDICATORS

In order to estimate the severity of an influenza season, MCDPH collects data on influenza-like illness because not all suspect cases of influenza can be tested. Influenza Like Illness (ILI) is defined as a fever greater than or equal to 100°F **AND** cough or sore throat in the absence of a known cause other than influenza. MCDPH uses the following sources to estimate the incidence of ILI: emergency department visits, sentinel site (outpatient clinic) visits, and student absenteeism.

Emergency Department Visits:

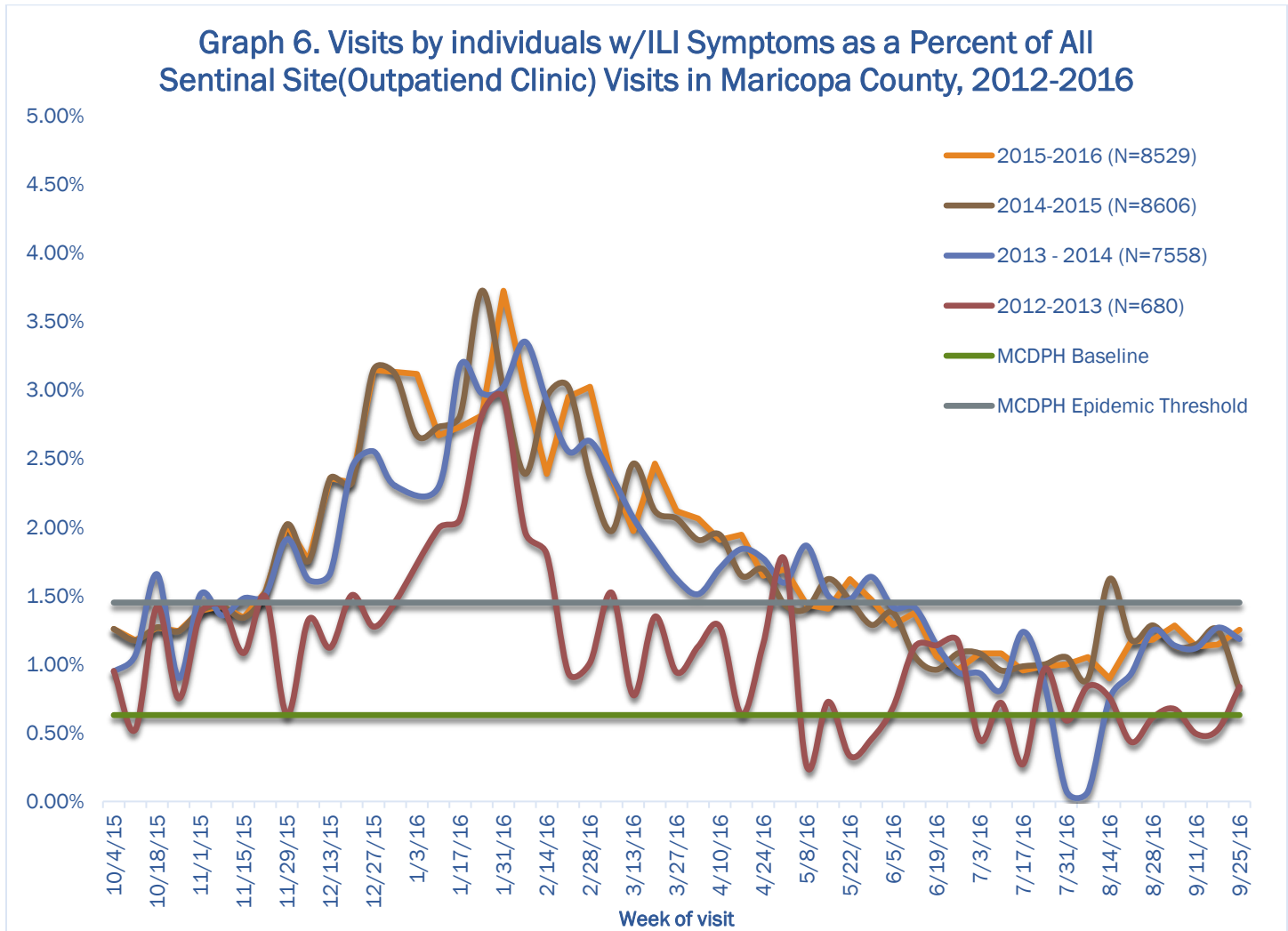
Every week local emergency departments report visits due to ILI and total number of emergency department visits. The percent of visits due to ILI is compared to the MCDPH baseline and epidemic threshold for emergency departments each week to show the level of influenza activity (see [Appendix](#) and [graph 5](#)). The MCDPH baseline ([see Note for definition](#)) for this season is 2% and MCDPH epidemic threshold is 3%. ILI activity was slightly higher this season compared to the 2014-2015 season. Peak ILI activity occurred during week 7 (2/14-2/20/2016), when 11% of all emergency department visits were due to ILI. This peak occurred the five weeks later than it did in the 2014-2015 season, when 7% of all emergency department visits were due to ILI.

Graph 5. Visits by Individuals with Influenza-Like Symptoms as a Percent of All Emergency Department Visits in Maricopa County 2012-2016



Sentinel Site Surveillance

Maricopa County sentinel sites (outpatient clinics) report each week the total number of visits as well as influenza-like illness visits to CDC. The percentage of ILI visits is compared to the MCDPH baseline and epidemic threshold each week to show the level of influenza activity ([graph 6](#)). Our participating sentinel sites in influenza surveillance stayed the same in 2015-2016 as 2014-2015 which include Wesley Health Center, CIGNA clinics, Adelante clinics and ASU Student Healthcare Center.



Ten emergency departments participating in ILI reporting

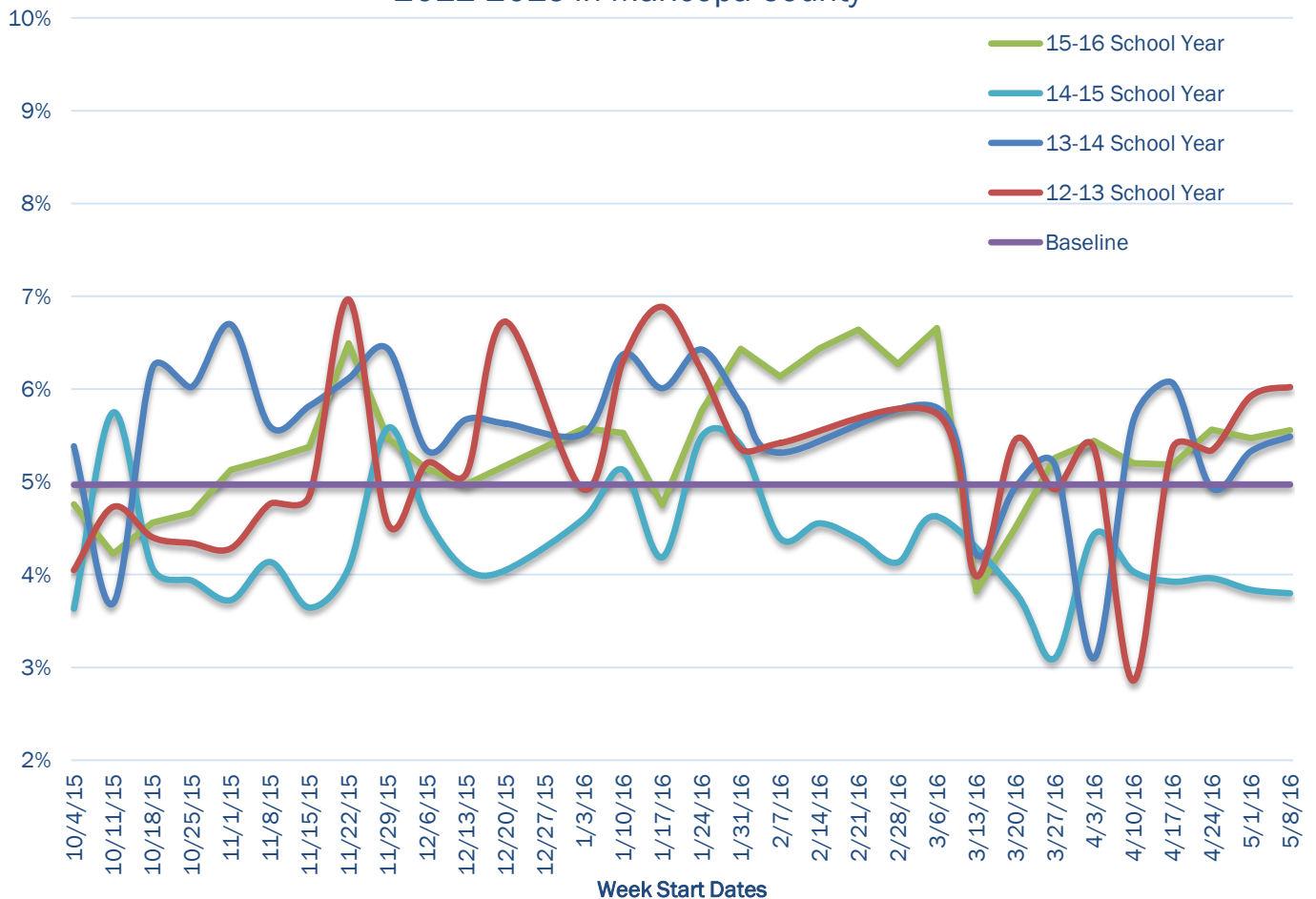


Note: The baseline is developed by calculating the mean percentage of patient visits for ILI at Emergency Departments or Out-patient Clinics respectively during non-influenza weeks for the previous three seasons and adding two standard deviations. A non-influenza week is defined as periods of two or more consecutive weeks in which each week accounted for less than 2% of the season's total number of specimens that tested positive for influenza in public health laboratories.

School Surveillance

Maricopa County uses a web-based school surveillance system to collect student absenteeism data. Participation of schools in the surveillance increased from 84 schools in 2014-2015 to 132 schools in 2015-2016 representing 7 school districts. During the 2015-2016, week 10 (3/6-3/12/2016) had the highest percent of absenteeism due to ILI ([graph 7](#)).

Graph 7. Student Absenteeism as a Percent of Total Enrollment
2012-2016 in Maricopa County

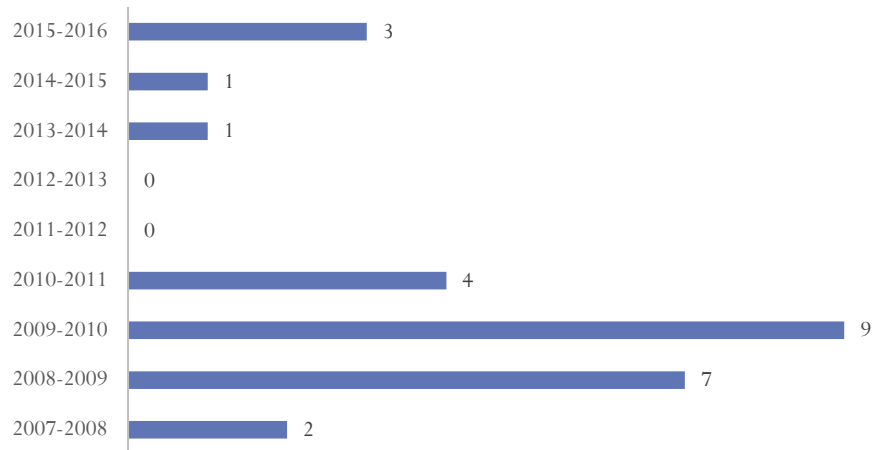


INFLUENZA MORTALITY

Pediatric Influenza-associated deaths are reportable in Arizona. Many influenza-related fatalities are attributed to complications of influenza infection, including pneumonia.

Individuals who died of influenza-associated pneumonia may or may not have influenza listed as a cause of death. As a result, it is suspected that influenza deaths are often underreported. In order to estimate the burden of influenza mortality, pneumonia and influenza (P&I) deaths are grouped together and used as an indicator of the severity of a flu season.

Graph 8. Pediatric Influenza Deaths by Influenza Season (2007-2016) in Maricopa County



The table above shows the number of P&I deaths recorded during the current and previous influenza seasons ([table 4](#)). The number of all P&I deaths is higher in this season compared to last season, those directly attributed to influenza was 6% compared to the 1% from last season, including three pediatric flu deaths.

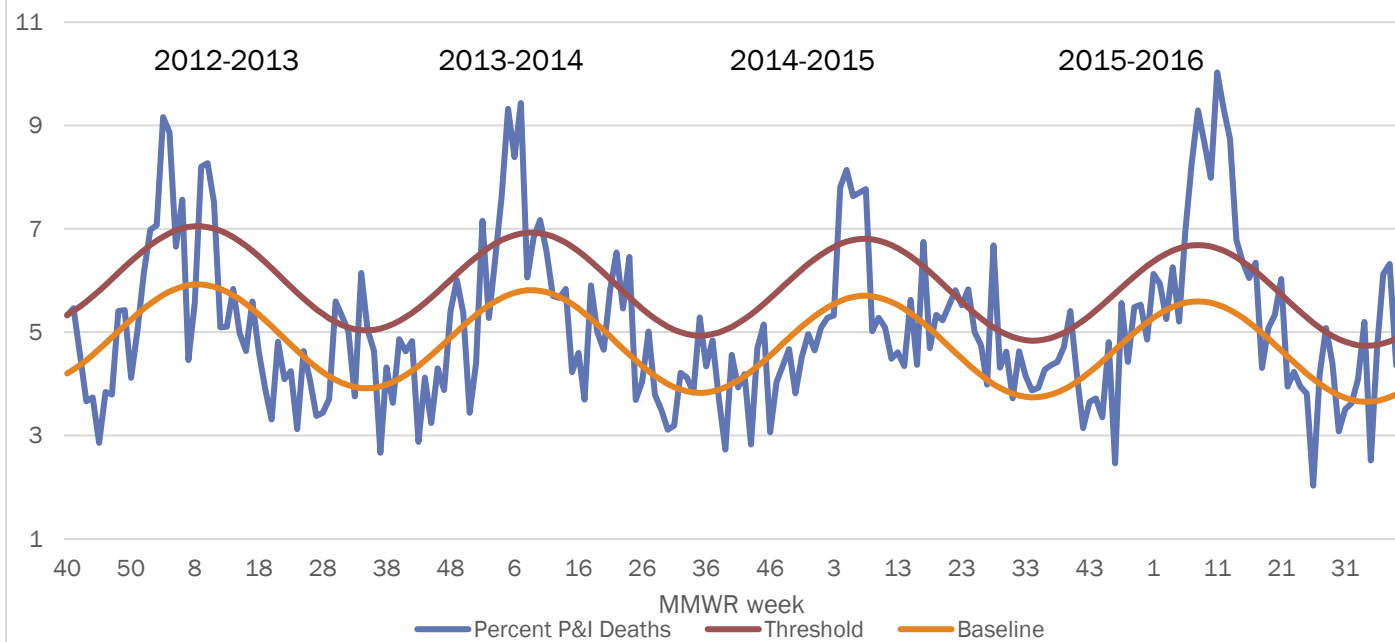
Table 4. Pneumonia and Influenza (P&I) Deaths, 2015-16 & 2014-15 Seasons, Maricopa County

	Current Season (2015-2016) As of [10/3/2016]		Last Season (2014-2015) As of [10/2/2015]	
	Pneumonia and Influenza	Influenza	Pneumonia and Influenza	Influenza
Pediatric (Under Age 18)	13	3	13	1
Adult (18 and Over)	1496	87	1281	12

Source: MCDPH Office of Vital Statistics

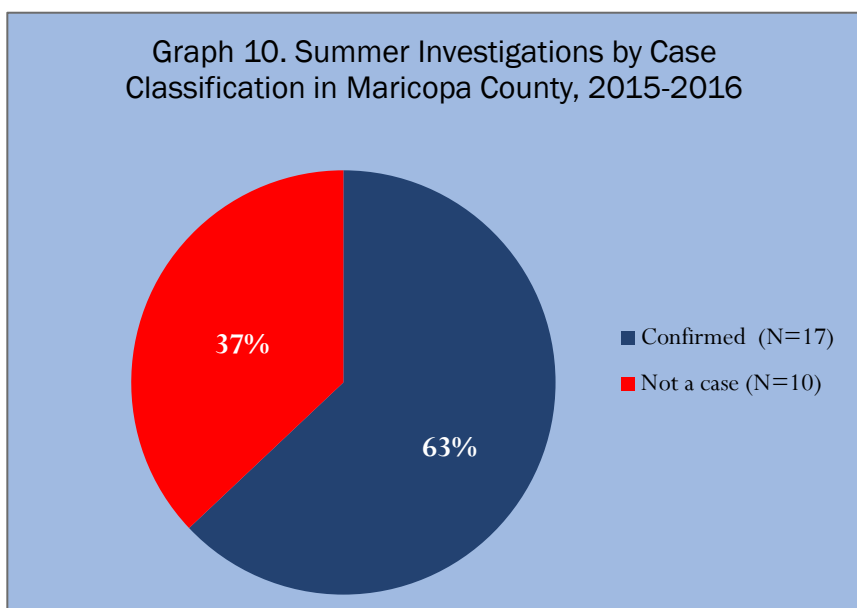
The percent of all deaths due to P&I is plotted against the baseline and threshold value calculated for each week. Baselines and thresholds are calculations using historical P&I data to estimate what levels are expected for that time of the year. When levels exceed the epidemic threshold, this indicates elevated influenza activity. During the 2015-2016 season, the percent of deaths due to P&I exceeded the epidemic threshold 22 times ([graph 8](#)).

Graph 9. P&I Related Deaths as a Percent of Total Deaths, 2012-13 through 2015-2016, Maricopa County



SUMMER INFLUENZA SURVEILLANCE

Each year Maricopa County stops counting rapid tests if they are collected 14 days after the collection date of the last RT-PCR or viral culture confirmed case at the Arizona State Laboratory. This is because there is a high likelihood of false positive results from rapid tests during the summer. After June 16, 2016, individuals that only had positive rapid tests were not considered cases. During the summer surveillance period, a case is only considered confirmed if they have a positive RT-PCR or viral culture test. Confirmed cases are further investigated by MCDPH in order to acquire hospitalization status and travel history.



A total of 27 cases were reported during this period, of which 17 were confirmed and then investigated. ([graph 9](#)). The majority of these cases tested positive for influenza

A (graph 10) . Furthermore, the majority of the cases acquired influenza outside of Maricopa County (table 5). Almost 50% of confirmed summer influenza cases were hospitalized (table 5).

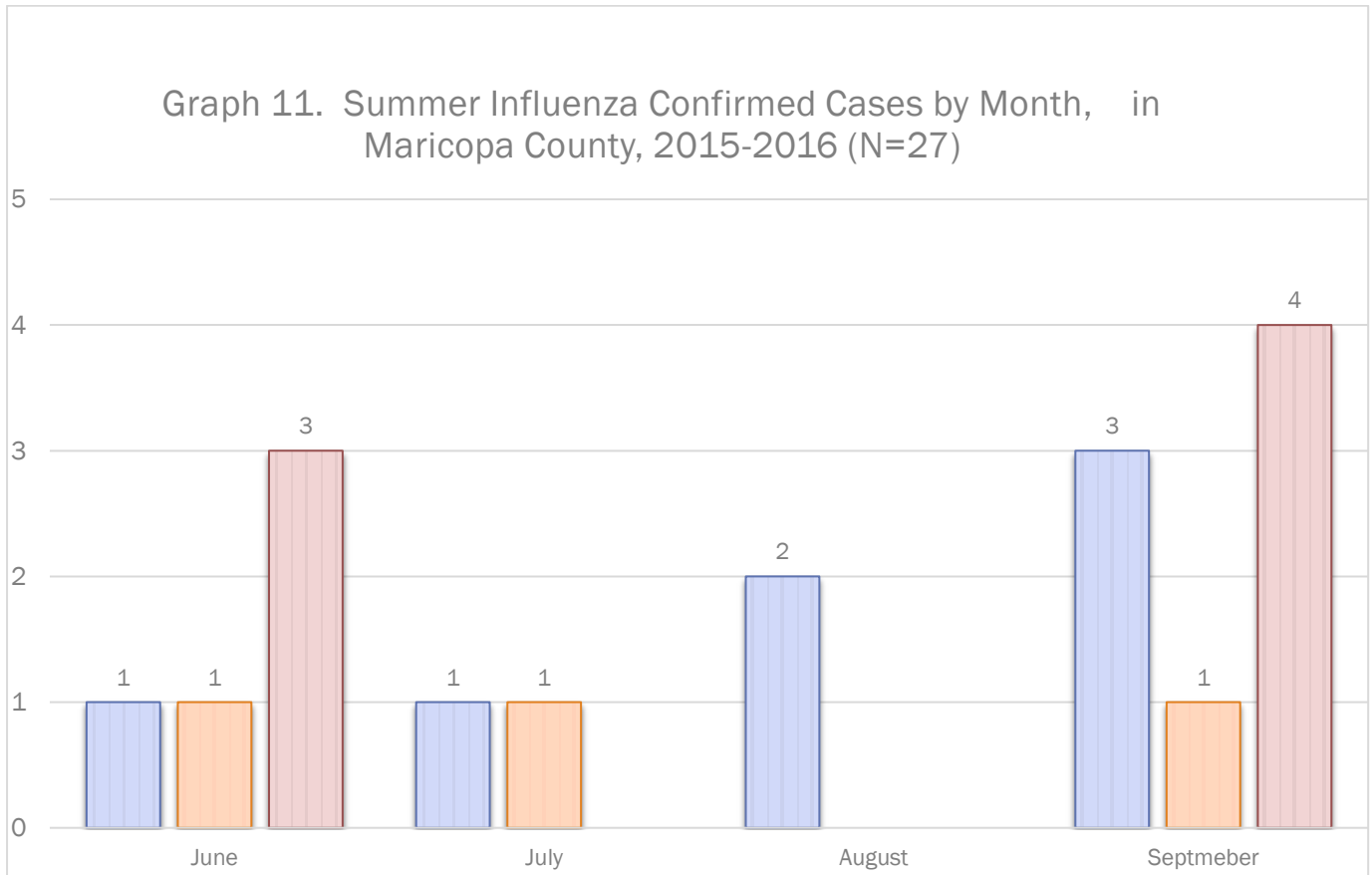
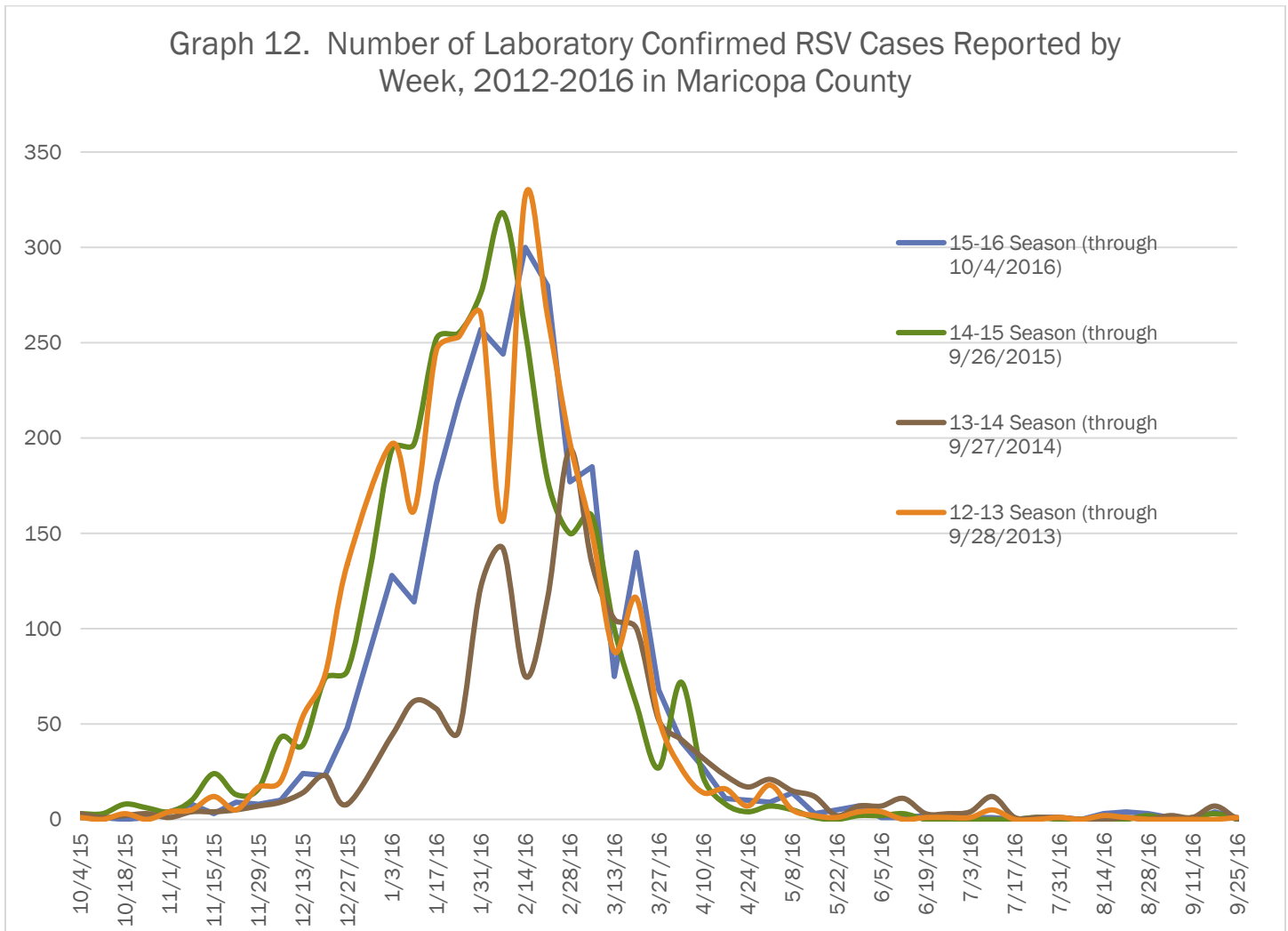


Table 5. Summer Influenza Cases in Maricopa County, 2015-2016					
by Place of Infection			by Hospitalization Status		
	#	%		#	%
In Maricopa County	5	29%	Hospitalized	8	47%
Outside of Arizona	4	24%	Not Hospitalized	2	12%
Outside of Maricopa County	4	24%	Unknown	7	41%
Unknown	4	23%			
Total	17	100%	Total	17	100%

RSV SURVEILLANCE

Respiratory syncytial virus (RSV) is a laboratory reportable disease in the state of Arizona. Activity is usually highest during the winter and early spring. RSV infections are most common in children. To learn more about RSV, visit the following link: <http://www.cdc.gov/rsv/>

The number of individuals with confirmed RSV tests by week from 2010-2015 are shown in graph 13. In total, there were 2,655 individuals confirmed with an RSV test this season. RSV activity was highest from January to the end of March. Peak activity occurred during week 7 (2/14/-2/20/2015), with 300 laboratory confirmed RSV cases ([graph 13](#)). The 2015-2016 RSV season was higher than the previous season by only 100 cases.



Graph 13. Number of Laboratory Confirmed RSV Cases Reported by Week, 2015-2016, Maricopa County

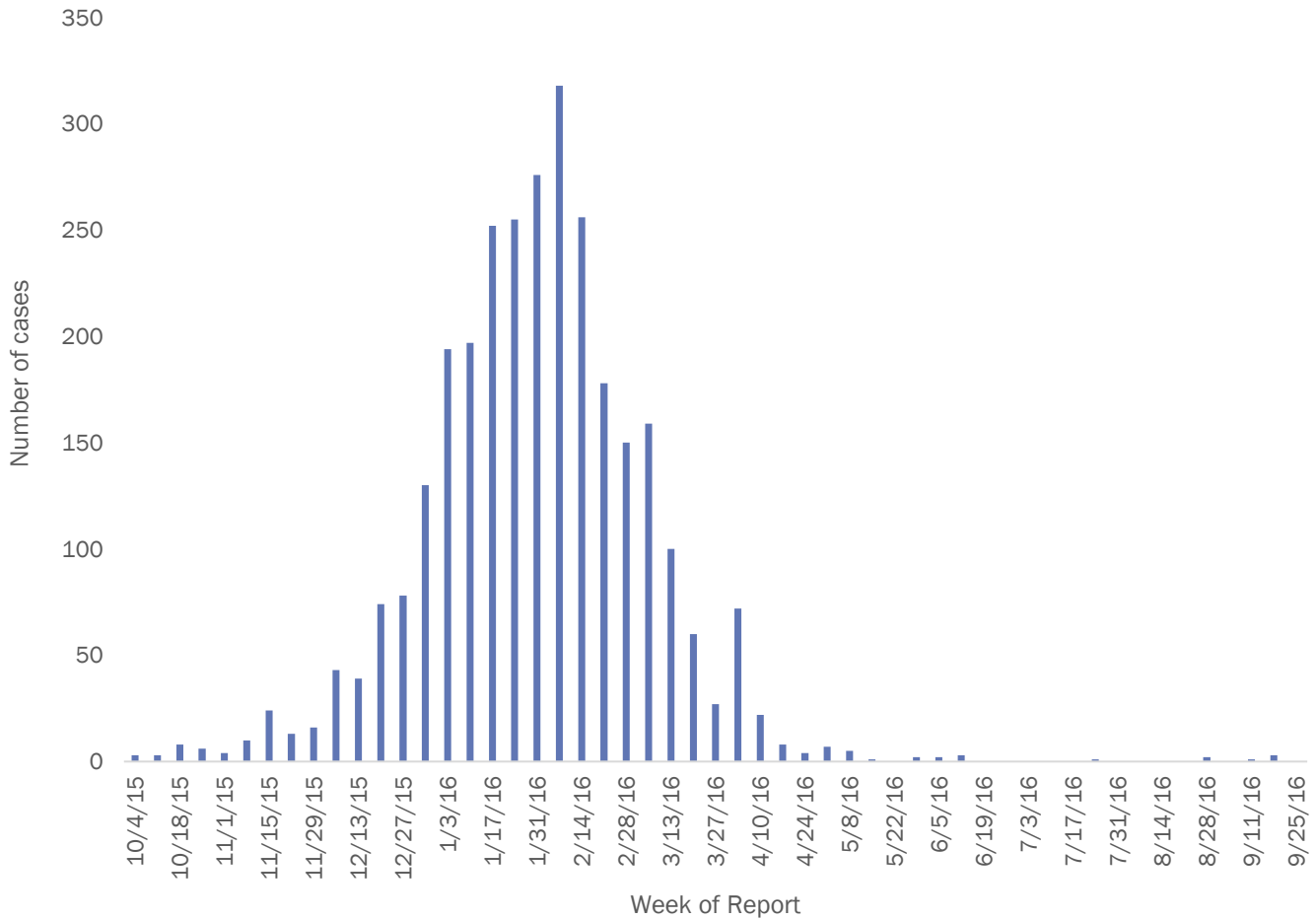


Table 6. 2015-16 Season Laboratory-Confirmed RSV Cases by Age Group, Maricopa County

Age Group	Cases	Cases per 100,000 population
Age <1	1384	2549
Age 1 - 4	732	320
Age 5 - 17	98	14
Age 18 - 64	166	7
Age 65 +	272	59



Appendix

Influenza Season: The season is defined by MMWR surveillance weeks. The influenza seasons begins on the first day of week 40 and ends on the last day of week 39 of the previous year.

Influenza Case Definition: The Centers for Disease Control and Prevention defines an influenza-like illness as having the following symptoms:

Fever of 100° degrees Fahrenheit or higher AND one of the following:

- Cough
- Sore throat

Baseline and Threshold

The baseline is developed by calculating the mean percentage of patient visits for ILI at Emergency Departments or Out-patient Clinics respectively during non-influenza weeks for the previous three seasons and adding two standard deviations. A non-influenza week is defined as periods of two or more consecutive weeks in which each week accounted for less than 2% of the season's total number of specimens that tested positive for influenza in public health laboratories.

The baseline is defined as the mean of the county ILI% in weeks in the previous flu seasons in which two or more consecutive weeks each accounted for less than 2% of the season's total number of ILI cases reported by our Emergency Departments or Outpatient Facilities. The epidemic threshold is defined as the mean plus two standard deviations.

Baseline analysis is important for monitoring any disease that is endemic in a population. For viruses like influenza, which exists year round within a population, it is important to track cases of the disease in order to prevent potential outbreaks as well as create viable public health interventions. While most influenza cases are seen during the yearly "flu season," the disease persists within the population year-round and determining the baselines will provide advanced warning of the influenza activity even during the off-season in Maricopa County.

Regions: Regions in Arizona are defined by county: Central (Gila, Maricopa, Pinal); Northern (Apache, Coconino, Navajo, Yavapai); Southern (Cochise, Graham, Greenlee, Pima, Santa Cruz); Western (La Paz, Mohave, Yuma)

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.

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