

# **Influenza and Other Respiratory Diseases Surveillance Report 2012–2013 Season**

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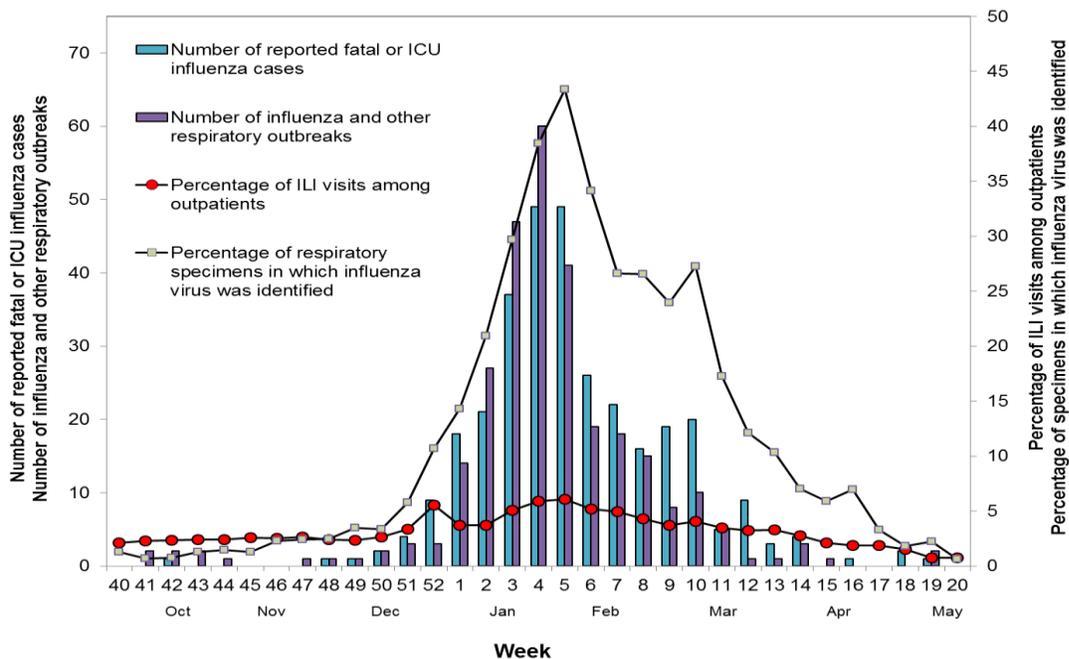
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# Synopsis

The 2012–13 influenza season was moderately severe and began early in many areas in the United States, particularly the south central and south eastern regions.<sup>1,2</sup> For these regions, influenza activity began increasing in November and peaked in late December. In contrast, influenza activity in California, as measured by most clinical and laboratory parameters, did not begin increasing until late December, peaking in late January (Figure 1). This timing is consistent with what has been seen in prior non-pandemic influenza seasons in California. Influenza A (H3N2) [seasonal A (H3)] was the predominant virus detected in both California and the nation; influenza B and influenza A (H1N1)pdm09 [2009 A (H1)] viruses were also detected to a lesser extent.

**Figure 1. Selected influenza surveillance parameters, California Department of Public Health, 2012–13**



Both the percentage of influenza-like illness (ILI) visits among outpatients and the percentage of laboratory detections for influenza peaked during the week ending February 2, 2013 (6.1% and 43.3%, respectively). These levels of activity were comparable to levels seen during the peak of the 2007–08 influenza season, which was considered to be moderately severe. A total of 345 respiratory outbreaks were reported in 2012–13; of those associated with influenza, the majority were influenza A (H3) and occurred in congregate living facilities.

Thirteen laboratory-confirmed influenza-associated pediatric deaths were reported to the California Department of Public Health during the 2012–13 season. This number is within the range (5 in 2007–08 to 37 in 2008–09) reported since surveillance for fatal pediatric influenza cases was first initiated in 2003. A total of 335 cases of influenza-associated severe illness or death among persons less than 65 years of age were reported to CDPH, compared to 196 cases during the 2011–12 season. However, more data are needed to interpret these numbers, as surveillance for severely ill or fatal influenza cases <65 years of age was only initiated in 2009, and reporting of non-fatal ICU cases is voluntary.

# Influenza Surveillance Data

## A. CDPH Virologic Surveillance

CDPH obtains data on laboratory-confirmed influenza and other respiratory viruses from a number of laboratories throughout the state. These laboratories include 28 public health laboratories, collectively known as the Respiratory Laboratory Network (RLN), and 11 clinical, commercial, academic and hospital laboratories, which are referred to as sentinel laboratories.

During the 2012–13 influenza season, these 39 participating laboratories tested 58,421 specimens for influenza. Of the 58,421 specimens tested, 13,258 (22.7%) were positive for influenza; of these, 9,832 (74.2%) were influenza A and 3,426 (25.8%) were influenza B. A total of 4,377 (44.5%) influenza A specimens were subtyped; 3,802 (86.9%) were seasonal A (H3) and 575 (13.1%) were 2009 A (H1).

While seasonal influenza A (H3) was the predominant influenza strain circulating in California during the 2012–13 season, the proportion of influenza B viruses identified by RLN and sentinel laboratories increased toward the latter half of the season. These virologic surveillance data are similar to national findings.<sup>1,2</sup> The proportion of specimens testing positive for all types of influenza first exceeded 10% - an indication that higher than normal levels of influenza virus were circulating - during the week ending December 29, 2012. The proportion of influenza-positive specimens peaked at 43.3% during the week ending February 2, 2013, and declined to less than 10% during the week ending April 6, 2013.

### 1. Respiratory Laboratory Network (RLN) Surveillance Results

The RLN laboratories offer polymerase chain reaction (PCR) testing for influenza A and B, including influenza A subtyping, and testing using the R-Mix shell vial culture system to identify five other common respiratory viruses [respiratory syncytial virus (RSV), adenovirus, and parainfluenza virus types 1-3].

Of 7,745 specimens tested by the RLN from September 30, 2012 through May 18, 2013, 4,752 (61.4%) were positive for influenza; of these, 3,715 (78.2%) were influenza A and 1,039 (21.9%) were influenza B (Table 1). Of the 3,715 influenza A specimens, 3,288 (88.5%) were seasonal A (H3), 328 (8.8%) were 2009 A (H1), and 99 (2.7%) were not subtyped. In addition, 753 specimens were tested using R-Mix; 73 (9.7%) were positive for non-influenza respiratory viruses, including RSV.

**Table 1. RLN surveillance results, September 30, 2013–May 18, 2013**

	Total RLN*	Northern CA	Central CA	Southern CA
	No. (%)	No. (%)	No. (%)	No. (%)
<b>Number of specimens tested by PCR</b>	<b>7,745</b>	<b>2,522</b>	<b>1730</b>	<b>3,493</b>
<b>Number of specimens negative for influenza</b>	<b>2,991 (38.6)<sup>†</sup></b>	<b>1,458 (57.8)<sup>†</sup></b>	<b>403 (23.3)<sup>†</sup></b>	<b>1,130 (32.4)<sup>†</sup></b>
<b>Number of specimens positive for influenza</b>	<b>4,754 (61.4)<sup>†</sup></b>	<b>1,064 (42.2)<sup>†</sup></b>	<b>1327 (76.7)<sup>†</sup></b>	<b>2,363 (67.6)<sup>†</sup></b>
Influenza A	3,715 (78.1) <sup>‡</sup>	973 (91.4) <sup>‡</sup>	916 (69.0) <sup>‡</sup>	1,826 (77.3) <sup>‡</sup>
<i>Seasonal A (H3)</i>	3,288 (88.5) <sup>§</sup>	827 (85.0) <sup>§</sup>	821 (89.6) <sup>§</sup>	1640 (89.8) <sup>§</sup>
<i>2009 A (H1)</i>	328 (8.8) <sup>§</sup>	93 (9.6) <sup>§</sup>	68 (7.4) <sup>§</sup>	167 (9.1) <sup>§</sup>
<i>Subtyping not performed</i>	99 (2.7) <sup>§</sup>	53 (5.4) <sup>§</sup>	27 (2.9) <sup>§</sup>	19 (1.0) <sup>§</sup>
Influenza B	1,039 (21.9) <sup>‡</sup>	91 (8.6) <sup>‡</sup>	411 (31.0) <sup>‡</sup>	537 (22.7) <sup>‡</sup>
<b>Number of specimens tested by R-mix</b>	<b>753</b>	<b>187</b>	<b>259</b>	<b>307</b>
RSV	49 (6.5) <sup>¶</sup>	13 (7.0) <sup>¶</sup>	22 (8.5) <sup>¶</sup>	14 (4.6) <sup>¶</sup>
Other respiratory viruses	24 (3.2) <sup>¶,††</sup>	3 (1.6) <sup>¶</sup>	10 (3.9) <sup>¶</sup>	11 (3.6) <sup>¶</sup>

\* Participating laboratories:

Northern California: Alameda, Contra Costa, El Dorado, Humboldt, Marin, Placer, Sacramento, San Francisco, San Mateo, Santa Clara, Shasta, Solano, Sonoma

Central California: Fresno, Monterey, San Joaquin, Stanislaus, Tulare

Southern California: Kern, Long Beach, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura

† Percent of total specimens tested for influenza by PCR

‡ Percent of specimens positive for influenza

§ Percent of influenza A positives

¶ Percent of total specimens tested by R-mix

†† Parainfluenza type 3 (10), parainfluenza type 2 (9), adenovirus (5)

## 2. Sentinel Laboratory Surveillance

The sentinel laboratories use various methods to test for influenza, including rapid test, direct fluorescent assay, viral culture and PCR.

From September 30, 2012 through May 18, 2013, the sentinel laboratories tested a total of 50,676 specimens for influenza; 8,504 (16.8%) were positive. Of the 8,504 specimens that tested positive for influenza, 6,117 (71.9%) were influenza A and 2,387 (28.1%) were influenza B (Table 2). The highest weekly percentage of influenza detections in the sentinel laboratories occurred during Week 5 (January 27–February 2, 2013), when 36.5% (1351/3702) of specimens were positive for influenza. Of 47,541 specimens tested for RSV by the sentinel laboratories, 7,720 (16.2%) were positive.

**Table 2. Influenza and RSV detections in Sentinel Laboratories\*, September 30, 2012–May 18, 2013**

	No. (%)
<b>Total specimens tested for influenza</b>	<b>50,676</b>
<b>Number of specimens negative for influenza</b>	<b>42,172 (83.2)<sup>†</sup></b>
<b>Number of specimens positive for influenza</b>	<b>8,504 (16.8)<sup>†</sup></b>
Influenza A	6,117 (71.9) <sup>‡</sup>
<i>Seasonal A (H3)</i>	514 (8.4) <sup>§</sup>
<i>2009 A (H1)</i>	247 (4.0) <sup>§</sup>
<i>Subtyping not performed</i>	5,356 (87.6) <sup>§</sup>
Influenza B	2,387 (28.1) <sup>‡</sup>
<b>Total specimens tested for RSV</b>	<b>47,541</b>
RSV	7,720 (16.2)

\* Participating laboratories: Children's Hospital Central California, Children's Hospital Oakland, Kaiser Permanente Northern California, Kaiser Permanente Southern California, Long Beach Memorial Medical Center, Rady Children's Hospital San Diego, San Francisco General Hospital, San Ysidro Health Center, Stanford University Medical Center, UCLA Medical Center, UCSF Medical Center

† Percent of total specimens tested for influenza

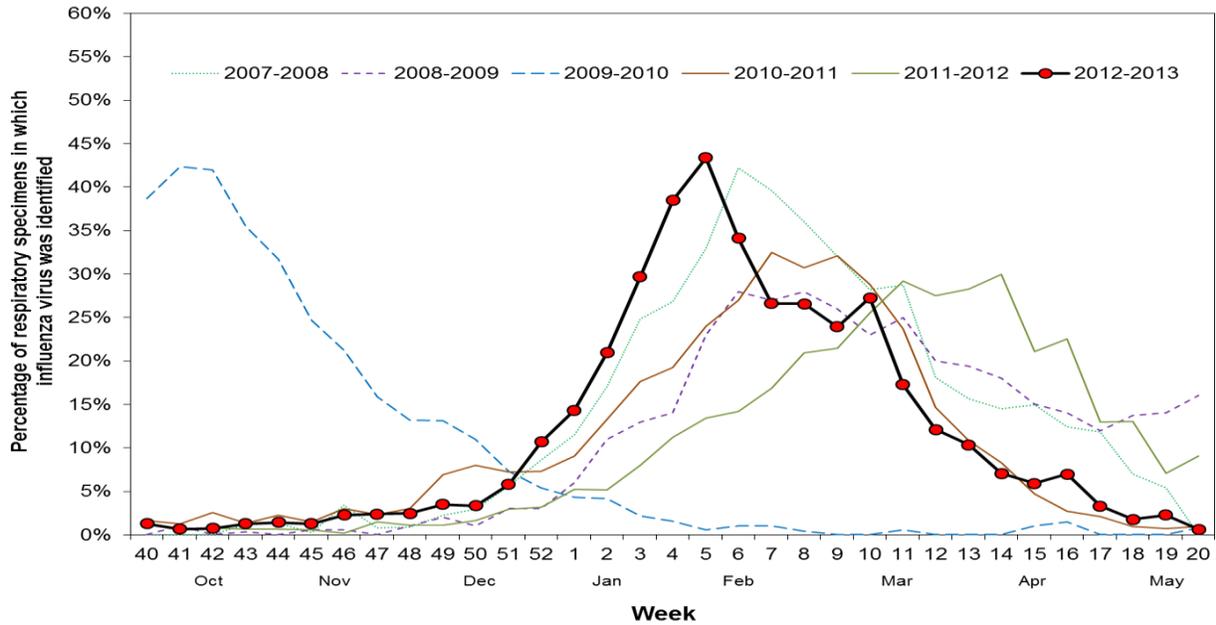
‡ Percent of specimens positive for influenza

§ Percent of influenza A positives

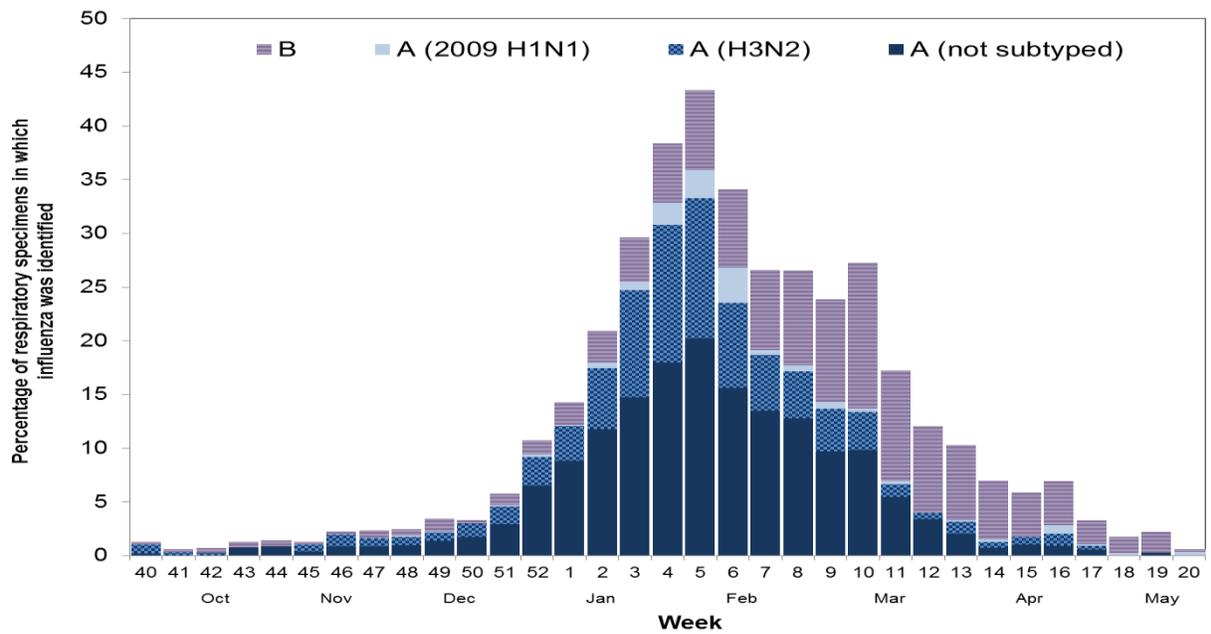
### 3. Combined RLN and Sentinel Laboratory Surveillance Results

Figures 2 and 3 summarize the combined laboratory data from both the RLN and the sentinel laboratories. The overall level of activity seen during the 2012–13 season was comparable to that of the 2007–08 season, which was considered moderately severe (Figure 2). The majority of influenza detections identified by the RLN and sentinel laboratories during the 2012–13 season were seasonal influenza A (H3) and influenza B (Figure 3). Consistent with previous non-pandemic influenza seasons, RSV activity preceded influenza activity (Figure 4). RSV was also the most frequently detected virus among non-influenza respiratory viruses (Figure 5).

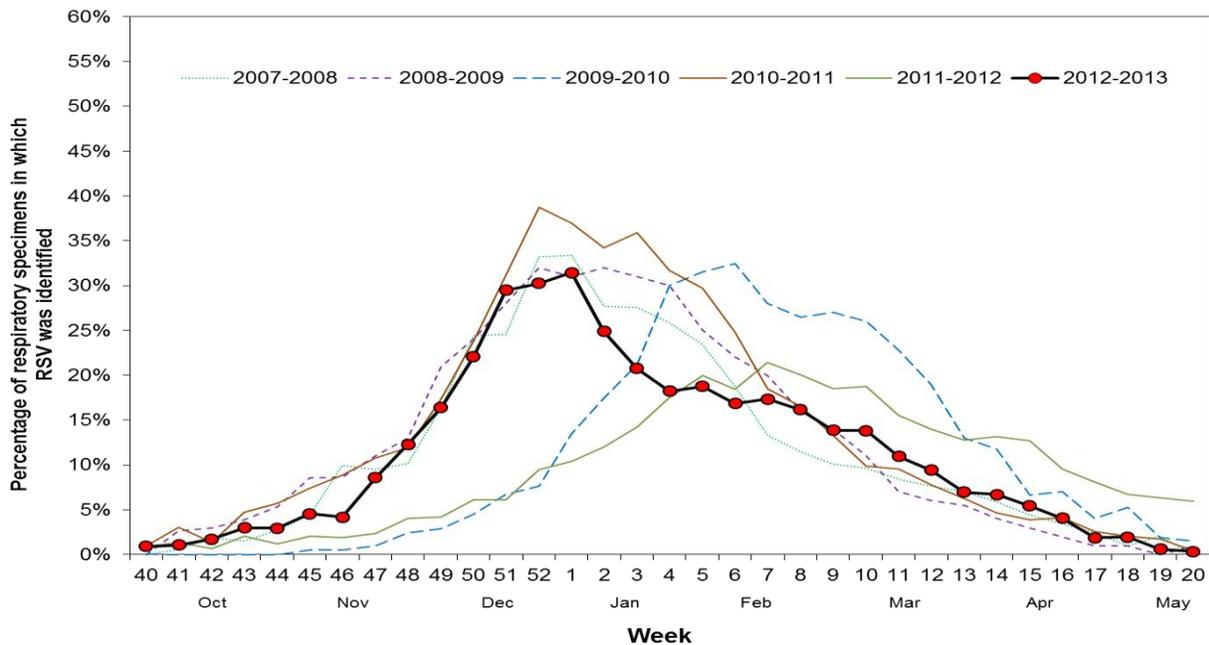
**Figure 2. Percentage of specimens from which influenza was detected in Respiratory Laboratory Network and Sentinel Laboratories, 2007–13**



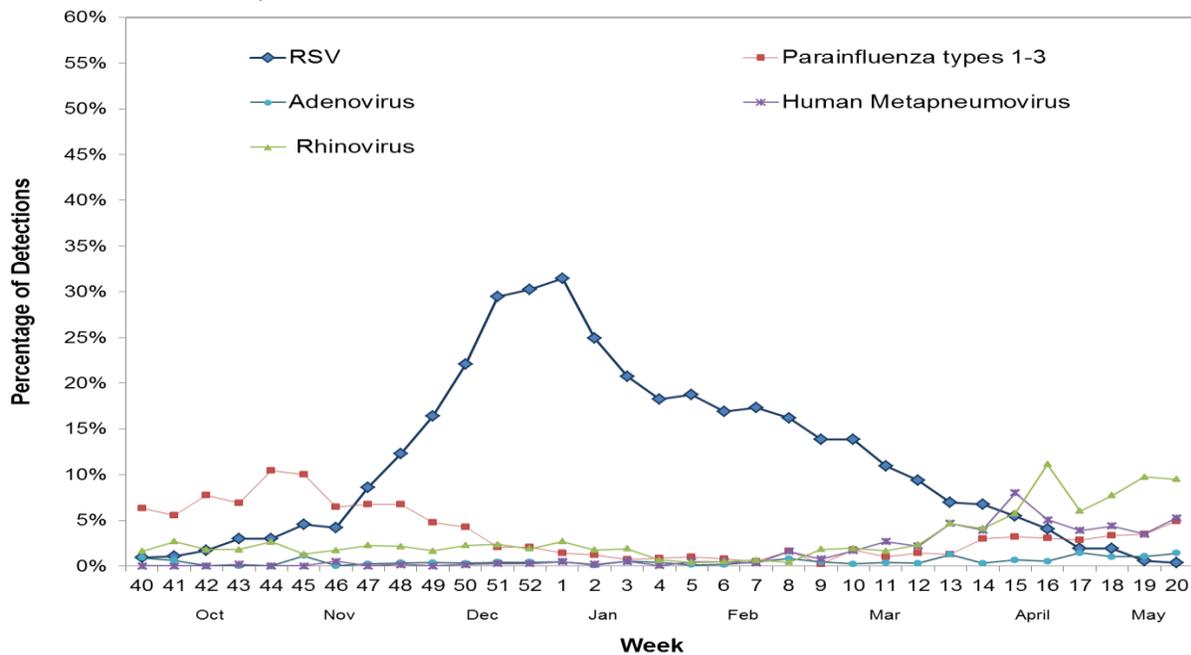
**Figure 3. Percentage of influenza types and subtypes in Respiratory Laboratory Network and Sentinel Laboratories, 2012–13**



**Figure 4. RSV detections in Respiratory Laboratory Network and Sentinel Laboratories, 2007–13**



**Figure 5. Non-influenza respiratory virus detections in Respiratory Laboratory Network and Sentinel Laboratories, 2012–13**



**4. Influenza Virus Strain Characterization**

A total of 95 influenza viruses from California were strain-typed by the Centers for Disease Control and Prevention (CDC) during the 2012–13 influenza season; 92 (96.8%) of these specimens matched components of the 2012–13 influenza vaccine for the Northern Hemisphere (Table 3). All of the 75 influenza A viruses were characterized as A/California/7/2009-like or

A/Victoria/361/2011-like, which matched the vaccine viruses, but 3 (15.0%) of the 20 influenza B viruses belonged to the B/Victoria lineage, which was not a component of the vaccine. These findings were similar to what was seen nationwide. Almost all of the influenza A viruses submitted to CDC from U.S. laboratories were well-matched to the influenza A components of the vaccine, while 33.7% of the influenza B viruses were a mismatch.<sup>1,2</sup>

**Table 3. Influenza virus antigenic characterization, 2012–13 season**

	<b>California (N=95)</b>	<b>United States (N=2,452)</b>
<b>Influenza A (2009 H1N1)</b>	<b>32</b>	<b>252<sup>^</sup></b>
A/California/7/2009-like*	32 (100.0%)	249 (98.8%)
<b>Influenza A (H3N2)</b>	<b>43</b>	<b>1324<sup>†</sup></b>
A/Victoria/361/2011-like*	43 (100.0%)	1,319 (99.6%)
<b>Influenza B</b>	<b>20</b>	<b>876</b>
B/Wisconsin/01/2010-like (Yamagata)*	17 (85.0%)	581 (66.3%)
B/Brisbane/60/2008-like (Victoria)	3 (15.0%)	295 (33.7%)

\* Matches component of the 2012-13 influenza vaccine for the Northern Hemisphere.

<sup>^</sup> An additional 3 viruses showed reduced titers with antiserum produced against A/California/7/2009

<sup>†</sup> An additional 5 viruses showed reduced titers with antiserum produced against A/Victoria/361/2011

## 5. Antiviral Resistance Testing

The CDPH Viral and Rickettsial Diseases Laboratory (VRDL) tests selected influenza isolates for resistance to neuraminidase inhibitors. Influenza A (2009 H1) and influenza A (H3N2) viruses are tested using pyrosequencing for a single known mutation that confers oseltamivir resistance (H275Y). Since high levels of resistance to adamantanes (amantadine and rimantadine) are observed among the circulating influenza A viruses, adamantane resistance testing is not performed at the CDPH-VRDL on a routine basis.

During the 2012–13 influenza season, CDPH-VRDL tested 91 influenza isolates for antiviral resistance; none were resistant to neuraminidase inhibitors (Table 4).

**Table 4. Number of specimens tested for antiviral resistance, California, 2012–13 season**

	<b>Neuraminidase Inhibitors Resistance</b>
<b>Influenza A (2009 H1N1)</b>	0/8
<b>Influenza A (H3N2)</b>	0/83

CDC also performs antiviral resistance testing as part of routine surveillance. Influenza A (2009 H1), influenza A (H3N2), and influenza B virus isolates are tested for resistance to oseltamivir and zanamivir. During the 2012–13 influenza season, a total of 3,626 specimens were tested; 4 (0.1%) were resistant to neuraminidase inhibitors.

## 6. Novel Influenza A Viruses

Neither the RLN nor the CDPH-VRDL identified any influenza viruses by polymerase chain reaction (PCR) typing or subtyping that were suggestive of a novel virus infection.

### B. Case-Based Surveillance

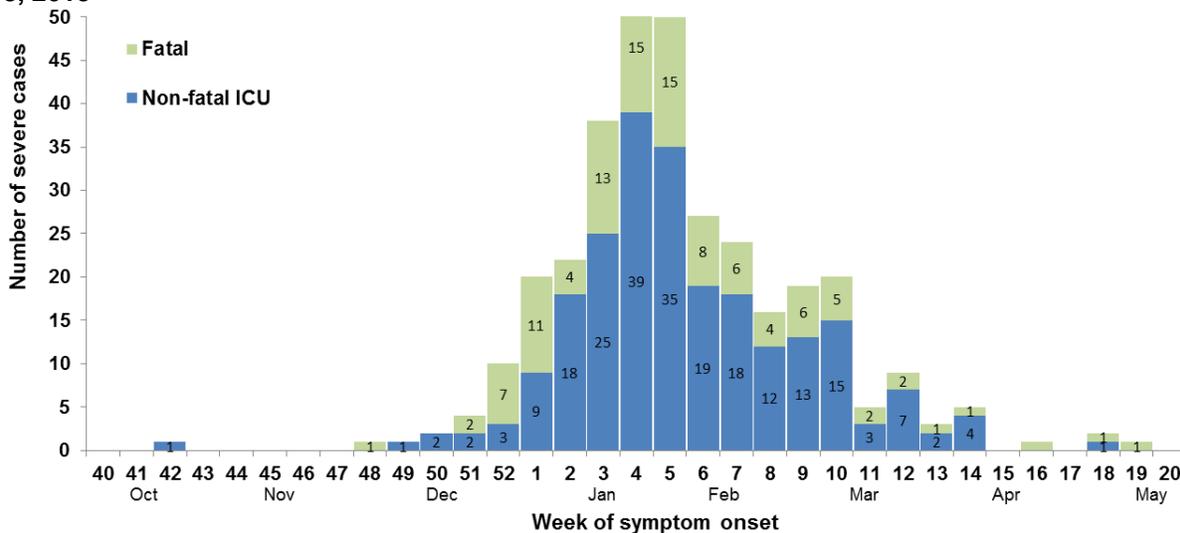
#### 1. Influenza-Associated Critical Illness and Mortality in Californians <65 years old

Laboratory-confirmed influenza-associated deaths among patients under 65 years of age are currently reportable in California [Title 17, California Code of Regulations (CCR) §2500]. Since the 2009 H1N1 influenza pandemic, LHJs have also voluntarily reported to CDPH all laboratory-confirmed influenza cases <65 years requiring hospitalization in an intensive care unit.

##### *Epidemiologic curve of ICU and fatal cases under age 65 years*

During the 2012–13 influenza season, CDPH received 335 reports of influenza-associated severe illness or deaths among persons <65 years old; 229 (68.4%) were non-fatal ICU cases and 106 (31.6%) were fatal cases. Figure 6 shows the number of fatal and non-fatal ICU cases by week of symptom onset. Illness onset dates ranged from October 15, 2012 through May 9, 2013; however, the majority of patients became ill from late December through mid-March. Peak activity occurred during Weeks 3 through 6 (January 13–February 9, 2013).

**Figure 6. Number of fatal and non-fatal ICU cases of all laboratory-confirmed influenza reported to the California Department of Public Health, by week of symptom onset, September 30, 2012 – May 18, 2013**



##### *Demographic characteristics and clinical features of ICU and fatal cases*

The median age of the 335 patients who had severe illness or died from influenza during the 2012–13 season was 48 years (range: 1 week–64 years); 186 (55.5%) were male (Table 5). Fatal cases (median age: 50 years; range: 4 months–64 years) were significantly older than non-fatal ICU cases (median age: 45 years; range: 1 week–64 years) [ $p=0.002$ ]. Pediatric cases under the age of 18 years accounted for 23.6% of all ICU and fatal cases.

The CDPH case-based surveillance data should be interpreted with caution due to the following limitations: exclusion of cases 65 years of age and older, voluntary reporting of ICU cases, differing degrees of participation by the LHJs, and biases in testing practices. These data are also considered provisional as some cases may still be under investigation.

**Table 5. Demographic characteristics of non-fatal ICU and fatal cases of laboratory-confirmed influenza reported to the California Department of Public Health, September 30, 2012 – May 18, 2013**

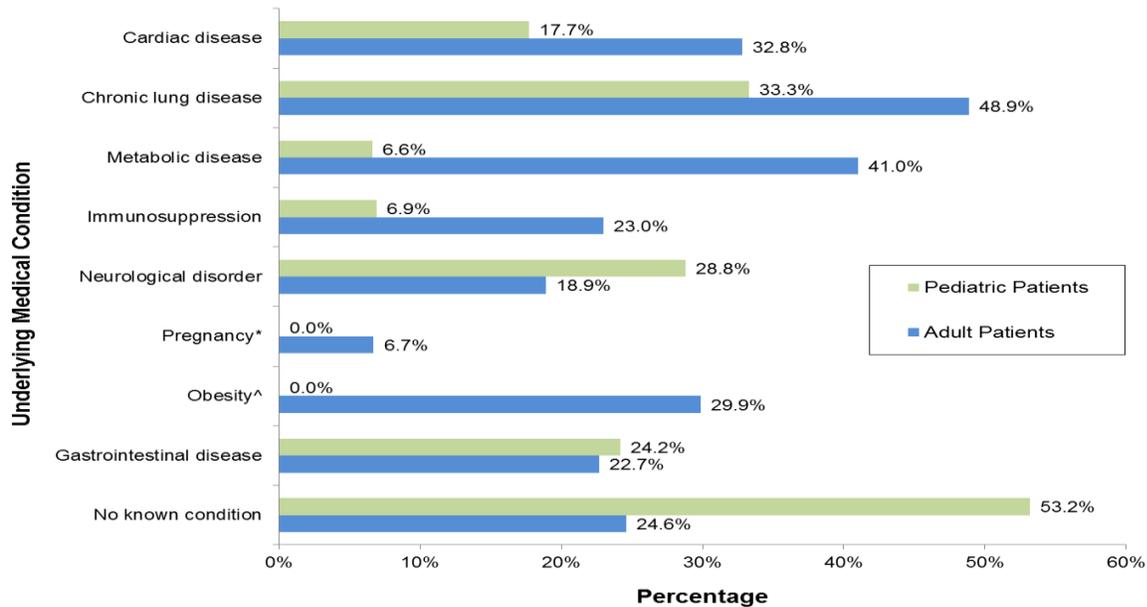
	<b>NON-FATAL ICU CASES<sup>a</sup></b>	<b>FATAL CASES</b>
	<b>No. (%)</b>	<b>No. (%)</b>
Total	229	106
Sex		
Male	125 (54.6)	61 (57.5)
Median age, in years	45	50
Age group		
0-4	38 (16.6)	7 (6.6)
5-17	28 (12.2)	6 (5.7)
18-49	67 (29.3)	39 (36.8)
50-64	96 (41.9)	54 (50.9)

<sup>a</sup> Excludes counties not participating in the voluntary reporting of influenza-associated ICU hospitalizations.

ICU - intensive care unit

Information on underlying medical conditions, including those conditions defined by the Advisory Committee for Immunization Practices (ACIP) as being associated with severe influenza, were also collected for severely ill and fatal influenza cases.<sup>3</sup> The most frequently reported underlying medical conditions among adults aged 18-64 years with available information were chronic lung disease (92/188; 48.9%), metabolic disease (80/195; 41.0%), and cardiac disease (60/183; 32.8%) [Figure 7]. Among pediatric patients with available information, the most frequently reported underlying medical conditions were chronic lung disease (20/60; 33.3%), neurological disorders (17/59; 28.8%), and gastrointestinal disease (15/62; 24.2%); 10 (50.0%) of the 20 children with chronic lung disease had underlying asthma. Forty-two (53.2%) of the pediatric patients and 63 (24.6%) of the adult patients had no known underlying conditions. Information on influenza vaccination was available for 75 patients; 24 (32%) received the 2012–13 influenza vaccine, 8 (33%) of whom were pediatric patients.

**Figure 7. Selected underlying medical conditions in non-fatal ICU and fatal cases of laboratory-confirmed influenza reported to the California Department of Public Health, September 30, 2012 – May 18, 2013**



\* Among women of childbearing age (15-44 years)

^ Excludes pediatric patients <2 years of age and pregnant women

### Circulating influenza types and subtypes

Of the 335 severely ill and fatal influenza cases reported, 248 (74.0%) were influenza A, and 87 (26.0%) were influenza B. Of the 248 influenza A detections, 133 (53.6%) were subtyped; 100 (75.2%) were seasonal A (H3), 32 (24.1%) were 2009 A (H1), and 1 (0.8%) was a co-infection with both seasonal A(H3) and 2009 A (H1). The majority of the 335 severe influenza cases reported during the 2012–13 influenza season occurred among adults aged 18-64 years (256; 76.4%). In previous seasons, the pediatric population has been disproportionately affected by influenza B, but adults aged 18-64 years accounted for 71.3% of the influenza B cases during the 2012–13 influenza season.

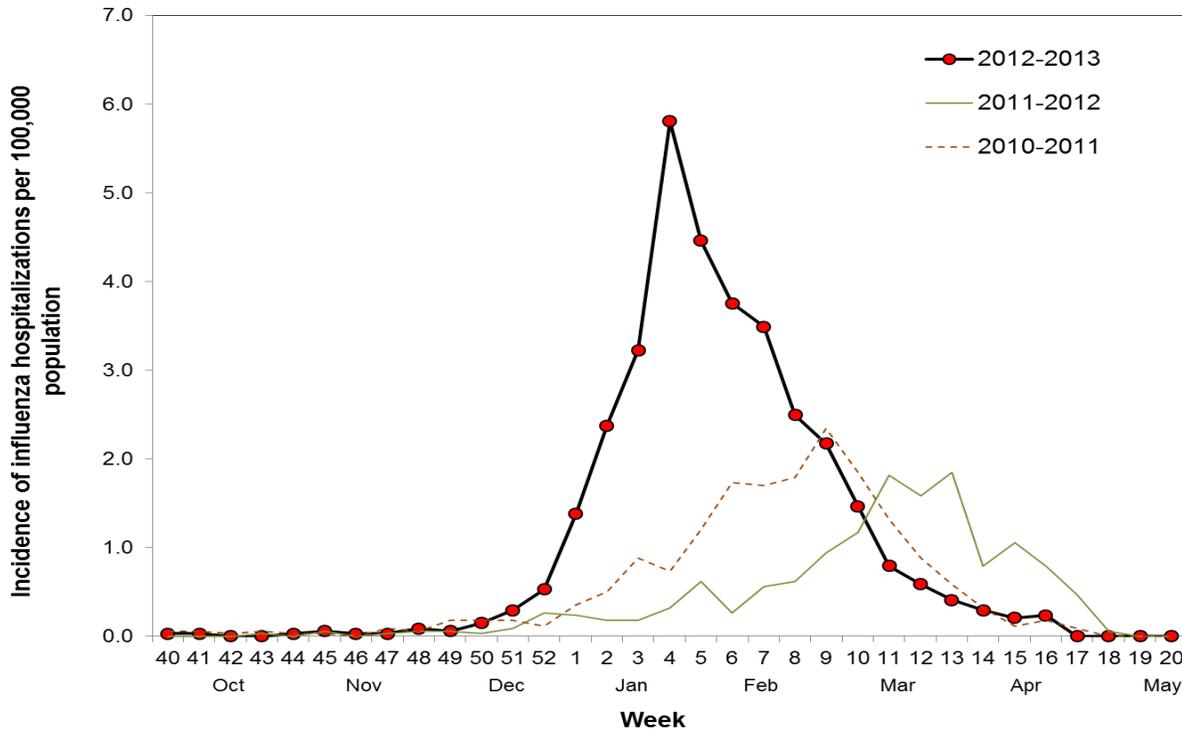
## 2. California Emerging Infections Program Data: Influenza-Associated Hospitalizations

The California Emerging Infections Program (CEIP), Influenza Surveillance Network (FluSurvNET) conducts population-based surveillance for laboratory-confirmed influenza-associated hospitalizations in all ages in Alameda, Contra Costa and San Francisco counties. FluSurvNET is a national network which covers over 80 counties in the 10 Emerging Infections Program (EIP) states (CA, CO, CT, GA, MD, MN, NM, NY, OR, and TN) and five additional states (IA, MI, OH, RI, and UT). The network represents approximately 9% of the U.S. population (~28 million people).

The incidence of influenza-associated hospitalizations per 100,000 population began increasing in late December and peaked during Week 4 (January 20–26, 2013) with an incidence of 5.8 influenza hospitalizations per 100,000 population (Figure 8). In contrast, the highest incidence rates of influenza hospitalizations reported during the 2010–11 and 2011–12 influenza seasons were 2.3 and 1.8 per 100,000 population, respectively. The majority of hospitalizations reported during the 2012–13 season were among patients aged 65 years and older.

Most patients had influenza A; of those influenza A specimens that were subtyped, the majority were seasonal A (H3).

**Figure 8. Incidence of Influenza-associated Hospitalizations in CEIP Counties, 2010–2013**



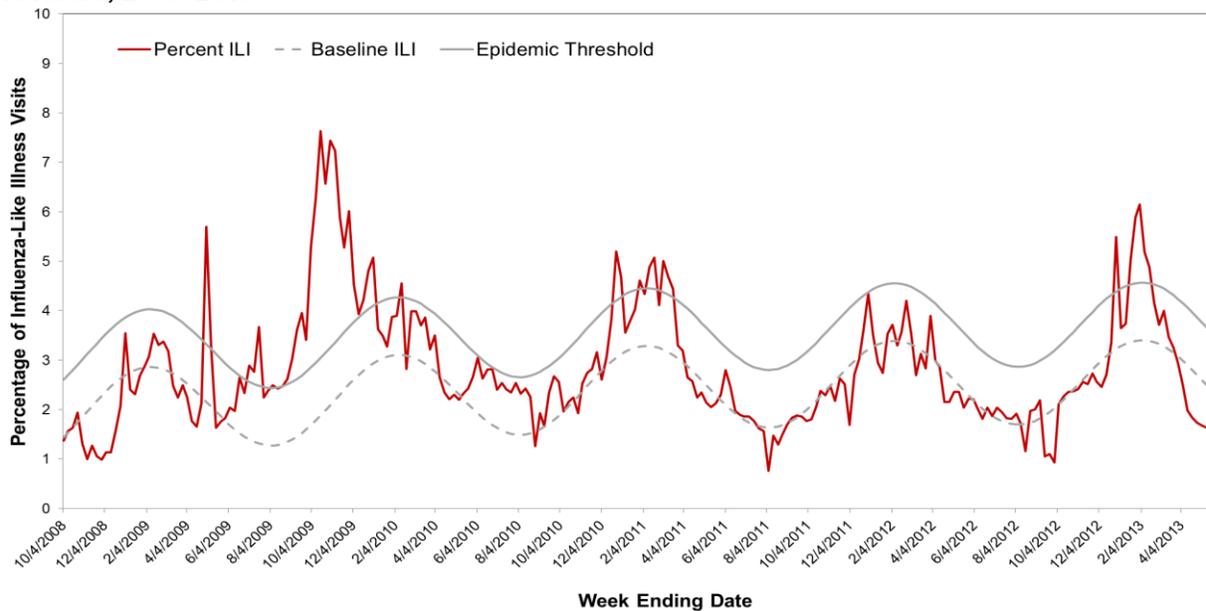
## C. Syndromic Surveillance

### 1. Influenza-like Illness Outpatient Surveillance (Sentinel Providers)

In collaboration with CDC, CDPH works with sentinel providers throughout the state to conduct year-round surveillance for influenza-like illness (ILI) in outpatients. Sentinel providers report on a weekly basis the number of patients with ILI and the total number of patients seen for any reason. ILI is defined as any illness with (1) fever ( $\geq 100^{\circ}\text{F}$  or  $37.8^{\circ}\text{C}$ ) and (2) cough and/or sore throat, in the absence of a known cause other than influenza.

In California this season, 97 sentinel providers reported ILI activity on a regular basis (i.e. at least 17 of the 33 weeks from September 30, 2012 to May 18, 2013). There was minimal ILI activity until late December, when sentinel providers began reporting increases in patients with ILI (Figure 9). ILI activity peaked during the first week of February, and then began to decrease again, returning to seasonal baseline levels in March. The percentage of visits for ILI exceeded the epidemic threshold during Week 52 (December 23–29, 2012) and Weeks 3–7 (January 13–February 16, 2013). The increase in ILI during Week 52 may have been partly due to a reduced number of routine health care visits during the holidays.

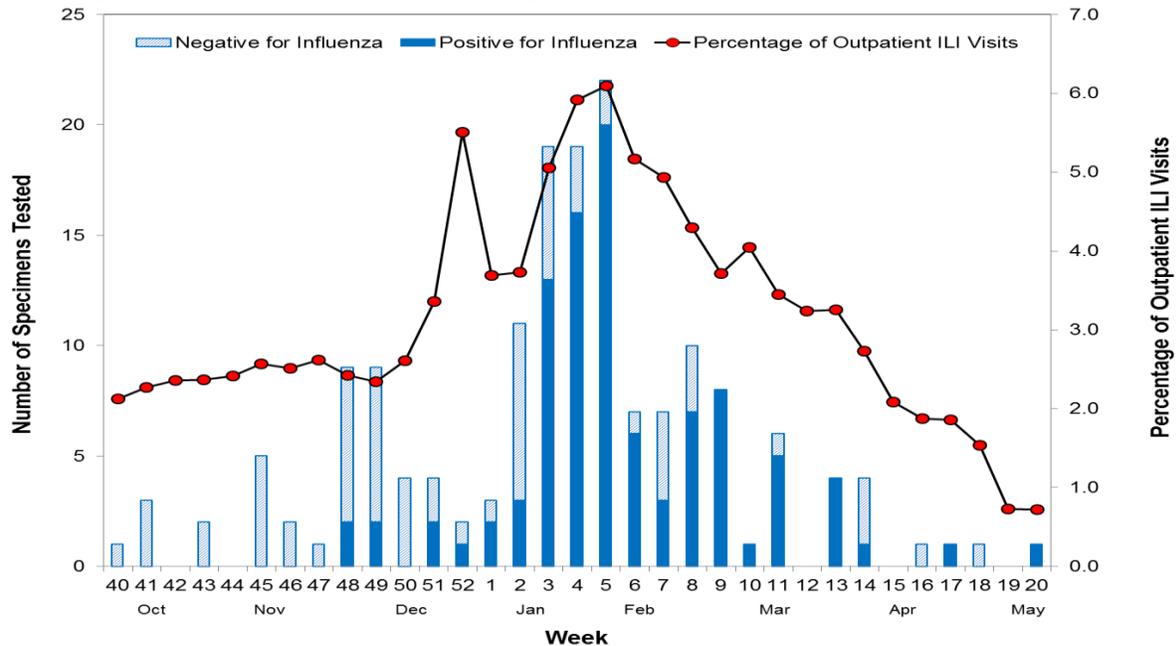
**Figure 9. Percentage of Influenza-like Illness Visits Among Patients Seen by California Sentinel Providers, 2008–2013**



The seasonal baseline was calculated using a regression model applied to data from the previous seven years. The epidemic threshold is two standard deviations above the seasonal baseline and is the point at which the observed percentage of ILI is significantly higher than would be expected at that time of the year.

Sentinel providers voluntarily submit specimens from patients with ILI to CDPH-VRDL for influenza testing. Many of these specimens are sent to CDC for further characterization, providing important information about what influenza virus strains are circulating in the community. A total of 169 respiratory specimens were submitted by sentinel providers from September 30, 2012 through May 18, 2013; 99 (59%) were positive for influenza. Of these, 70 (71%) were influenza A and 29 (29%) were influenza B. Of the 70 influenza A specimens, 69 were subtyped; 66 (96%) were seasonal A (H3) and 3 (4%) were 2009 A (H1). Figure 10 shows that the number of specimens submitted by sentinel providers that tested positive for influenza peaked in Week 5 (January 27–February 2, 2013), consistent with increases in reported ILI during the same time period.

**Figure 10. Sentinel Provider Specimens Tested by Week of Collection and Influenza Result, and Percentage of Influenza-like Illness Visits by Week of Visit, September 30, 2012–May 18, 2013**

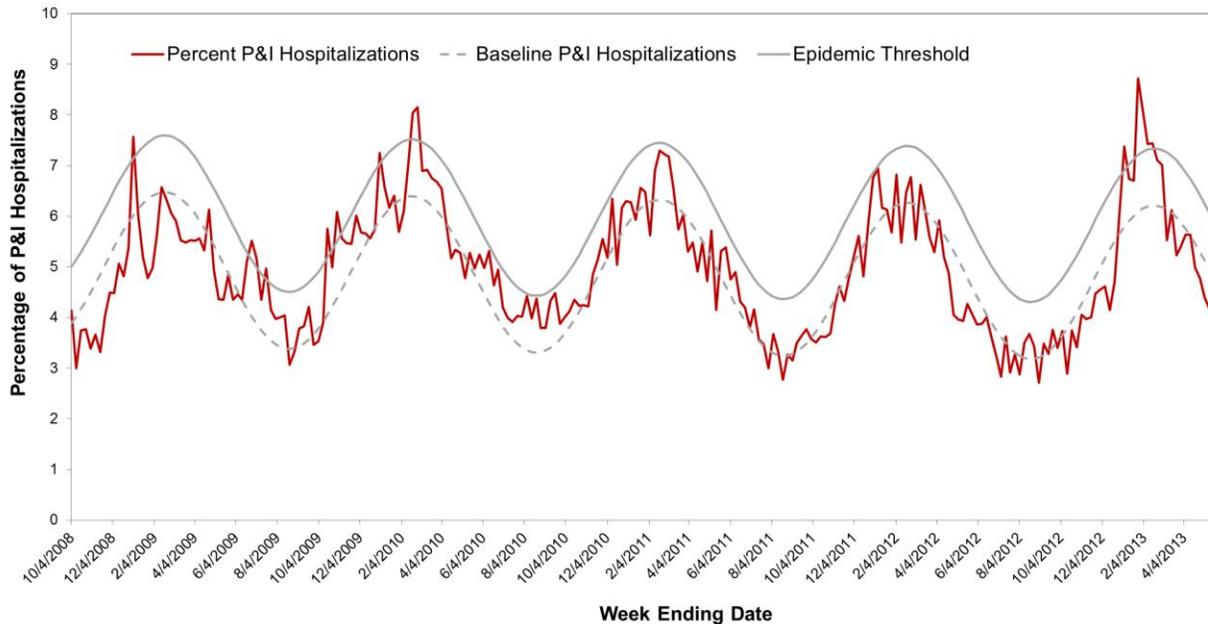


## 2. Kaiser Permanente Northern California Pneumonia and Influenza Admission Data

CDPH collaborates with Kaiser Permanente Northern California to monitor trends in influenza-related hospitalizations. Patients with admission diagnoses of “flu,” “pneumonia,” or “influenza” are defined as pneumonia and influenza (P&I) admissions. The number of P&I admissions is divided by the total number of hospital admissions occurring in the same time period to estimate the percentage of P&I admissions. Admissions for pregnancy, labor and delivery, birth, and outpatient procedures are excluded from the denominator.

During the 2012–13 influenza season, the percentage of P&I hospitalizations in Kaiser Permanente facilities in northern California began to exceed baseline levels in late December (Figure 11). The proportion of P&I hospitalizations continued to increase steadily through the end of January, then began to decrease again, returning to baseline levels in March. The burden of P&I hospitalizations in Kaiser Permanente Northern California hospitals was greater during the 2012–13 influenza season compared to the four previous influenza seasons from 2008 to 2012.

**Figure 11. Percentage of Pneumonia and Influenza Admissions in Kaiser Permanente Northern California Hospitals, 2008–2013**



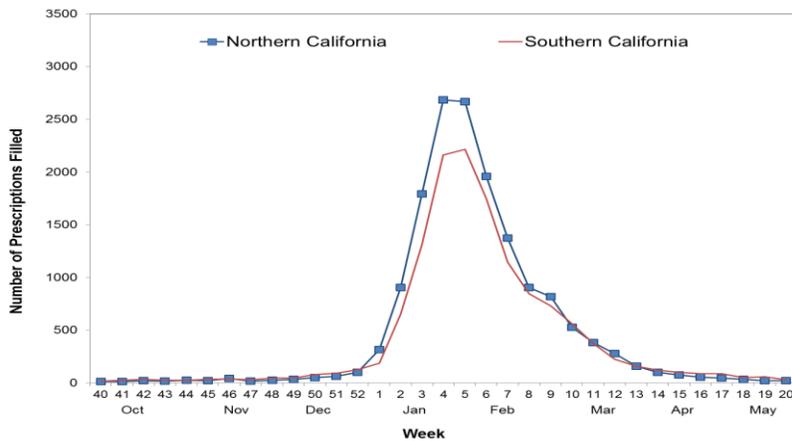
The seasonal baseline was calculated using a regression model applied to data from the previous five years. The epidemic threshold is two standard deviations above the seasonal baseline and is the point at which the observed percentage of pneumonia and influenza hospitalizations in Kaiser Permanente hospitals in northern California is significantly higher than would be expected at that time of the year.

### 3. Kaiser Permanente Pharmacy Data

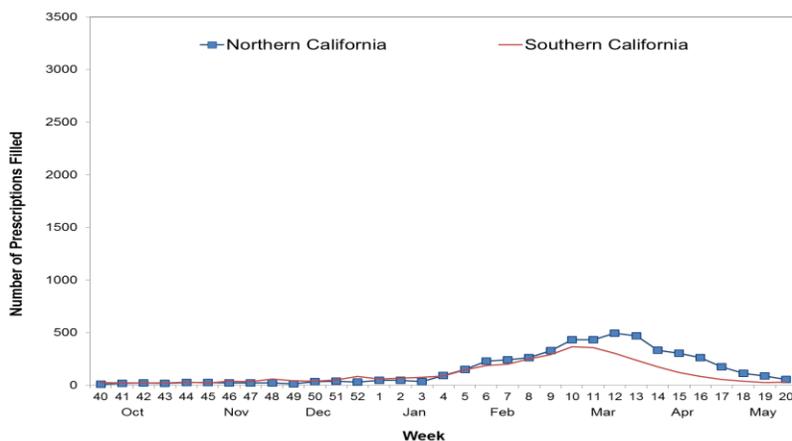
CDPH collaborates with Kaiser Permanente to monitor the number of prescriptions filled in outpatient pharmacies for antiviral medications used to treat influenza. The number of oseltamivir prescriptions filled each week serves as an indicator of influenza activity. During the 2012–13 influenza season, the number of oseltamivir prescriptions in both northern and southern California pharmacies began to increase significantly in January (Figure 12), concurrent with a statewide increase in laboratory detections of influenza and reports of outpatient ILI. The number of prescriptions may have also increased as a result of treatment recommendations distributed by Kaiser Permanente to its health care providers. At the peak of activity in late January, Kaiser Permanente outpatient pharmacies in northern California were filling over 2,600 oseltamivir prescriptions per week, while southern California pharmacies were filling over 2,000 prescriptions per week. From September 30, 2012 through May 18, 2013, a total of 28,975 prescriptions for oseltamivir were filled by Kaiser Permanente outpatient pharmacies statewide. In comparison, a total of 8,461 oseltamivir prescriptions were filled statewide during the 2011–12 influenza season.

**Figure 12. Number of Oseltamivir Prescriptions Filled in Kaiser Permanente Outpatient Pharmacies by Region and Week, 2011–12 and 2012–13 Influenza Seasons**

**2012–13 Influenza Season (September 30, 2012–May 18, 2013)**



**2011–12 Influenza Season (October 2, 2011–May 19, 2012)**



**D. Outbreaks of Respiratory Illness, Including Influenza**

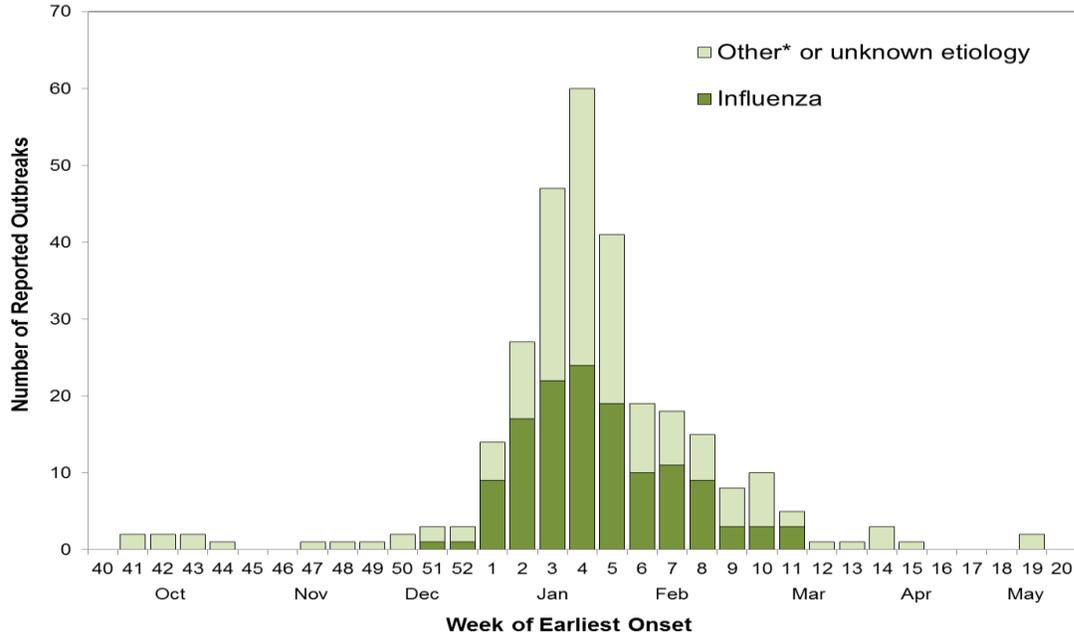
Local health departments reported a total of 345 non-tuberculosis respiratory outbreaks to CDPH from September 20, 2012 to May 18, 2013. The outbreaks were reported from 33 local health jurisdictions in multiple regions statewide. Of the 345 respiratory outbreaks, 188 (54%) had no identified etiology. Influenza was the most commonly identified pathogen in the remaining outbreaks (143; 41%). Outbreaks of laboratory-confirmed pertussis (5), respiratory syncytial virus (3), group A *Streptococcus* (1), unspecified streptococcal infection (1), legionellosis (1), parainfluenza (1), rhinovirus (1), and *Acinetobacter baumannii* (1) were also identified.

The majority (116; 81%) of the 143 influenza-associated outbreaks were associated with influenza A. An additional 19 (13%) outbreaks were associated with influenza B, and 8 (6%) outbreaks were associated with both influenza A and influenza B. Of the influenza A specimens that were subtyped, influenza A (H3) was most frequently identified. Of the 143 influenza-

associated outbreaks, 123 (86%) occurred in congregate living facilities such as skilled nursing facilities.

Local health departments also reported influenza outbreaks in schools (13; 9%), correctional facilities (4; 3%), a child care facility (1; 1%), and the general community (2; 1%). The first influenza-associated outbreak that was identified during the 2012–13 influenza season occurred in late December 2012 (Figure 13). Influenza outbreaks continued to occur through March 2013, with peak activity occurring in late January 2013.

**Figure 13. Reported respiratory outbreaks by week of earliest onset, September 30, 2012–May 18, 2013**



\*Other etiologies identified by laboratory confirmation included pertussis (5), respiratory syncytial virus (3), *Streptococcus* (2), legionellosis (1), parainfluenza (1), rhinovirus (1), and *Acinetobacter baumannii* (1).

## References

1. Centers for Disease Control and Prevention (CDC). Influenza activity – United States, 2012-13 season and composition of the 2013-14 influenza vaccine. MMWR Morb Mortal Wkly Rep. 2013 June 13; 62(23);473-479.
2. Centers for Disease Control and Prevention (CDC). FluView: A Weekly Influenza Surveillance Report Prepared by the Influenza Division [Internet]. Updated 2013 Aug 16; cited 2013 Aug 21. Available from: <http://www.cdc.gov/flu/weekly/>.
3. Centers for Disease Control and Prevention(CDC). Prevention and control of influenza with vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010. MMWR Morb Mortal Wkly Rep. 2010 Aug 6; 59(RR08):1-62.