

California Influenza Surveillance Project

Viral and Rickettsial Disease Laboratory

2008-2009

Influenza Update

Pandemic (H1N1) 2009 Surveillance for Week 27 (July 5 – July 11, 2009)

As the current pandemic of Pandemic (H1N1) 2009 influenza unfolds, CDPH continues to perform surveillance and provide PCR testing for influenza, confirmatory testing for pandemic (H1N1) 2009, and guidance and assistance to our local public health partners. Local health departments are currently asked to report all cases, with detailed report of hospitalizations, fatalities and outbreaks of pandemic (H1N1) 2009 influenza cases, to CDPH. Laboratory testing is no longer recommended for outpatients but sporadic reports of non-hospitalized cases and sentinel provider surveillance data are also used to monitor H1N1 activity statewide.

1. Epi- Surveillance Update (Updated 7/9/2009)

Highlights:

- CDPH has received reports of 2,469 cases (1,945 confirmed, 524 probable) from 45 local health jurisdictions.
- 54 hospitalized cases were reported this week. A total of 287 cases have been hospitalized, with 85 requiring intensive care.
- Nine fatal cases were reported this week in Alameda (1), Los Angeles (1), Sacramento (1), San Diego (3), San Francisco (1), San Mateo (1), and Santa Cruz (1) counties. These were the first H1N1-related deaths reported in San Francisco and Santa Cruz this year. A total of 32 fatal cases have been reported from the following counties: Alameda (3), Contra Costa (3), Los Angeles (3), Marin (1), Orange (5), Sacramento (2), San Bernardino (1), San Diego (5), San Francisco (1), San Mateo (4), Santa Clara (1), Santa Cruz (1), Solano (1), and Sonoma (1).
- Of all cases reported, 47 (38 confirmed, 9 probable) have been in pregnant women.
- Of all cases reported, 90 (77 confirmed, 13 probable) have occurred in healthcare workers.
- The majority of reported cases to date have been individuals under 35 years of age. In recent weeks, the median age of new reported cases has increased, reflecting current testing and reporting recommendations for hospitalized cases. The median age of hospitalized cases (26 years) is older than the median age for cases overall (17 years).
- The proportion of influenza A-positive specimens tested by PCR at VRDL that is subsequently confirmed as pandemic (H1N1) 2009 is about 98%, reflecting that the predominant circulating influenza strain in California at present is pandemic (H1N1) 2009.
- Outbreaks of influenza-like illness suspected or confirmed to be due to pandemic (H1N1) 2009 influenza appear to be increasing, with the majority occurring in community settings, such as schools and day-cares, rather than in institutional settings; this reflects the age distribution seen for the pandemic (H1N1) 2009 outbreak overall, with a relative sparing of older individuals.
- On July 3, 2009 the Department of Health of Hong Kong SAR China detected a pandemic (H1N1) 2009 influenza virus resistant to oseltamivir in a 16-year-old traveler from San Francisco. The virus was isolated from a specimen taken as the result of screening for respiratory symptoms and fever at the Hong Kong International Airport on June 11. This oseltamivir resistant virus isolate was sensitive

(susceptible) to zanamivir. The patient had apparently had only mild symptoms before traveling and did not seek medical treatment. She had no history of exposure to ill contacts or travelers and had not traveled herself. Neither the patient nor the patient's family received oseltamivir prior to the testing for antiviral resistance. Influenza surveillance during the time the patient was ill did not reveal any clusters or outbreaks of ILI in the community.

- The San Francisco case is the third case of oseltamivir-resistant pandemic (H1N1) 2009 influenza identified – previous cases have occurred in Denmark and Japan. Persons with infections caused by oseltamivir-resistant viruses have all had mild illness and oseltamivir-resistant viruses have not been identified among close contacts. All three cases have had the same single-point mutation (His274Tyr). Both the Denmark and Japan cases were taking oseltamivir. Investigation is ongoing to determine the possible sources of exposure for acquisition of an oseltamivir-resistant virus in the most recent case.
- Surveillance for the detection of antiviral resistance in pandemic (H1N1) 2009 influenza is ongoing. VRDL has performed retrospective antiviral resistance testing of available banked specimens from the San Francisco Bay Area, as well as Northern and Southern California. To date, 50 specimens, including 18 from San Francisco, have tested negative for the resistance mutation. Among 202 pandemic (H1N1) 2009 viruses tested by CDC this year, none have been resistant to oseltamivir. VRDL and CDC will continue prospective antiviral resistance testing from a sampling of pandemic (H1N1) 2009 influenza viruses through the summer and the 2009-10 influenza season.
- At this time, the data indicate that the prevalence of oseltamivir-resistant pandemic (H1N1) 2009 is quite limited. CDPH does not recommend any changes in antiviral guidance at this time.

a. Current California case counts for pandemic (H1N1) 2009 infection in humans:

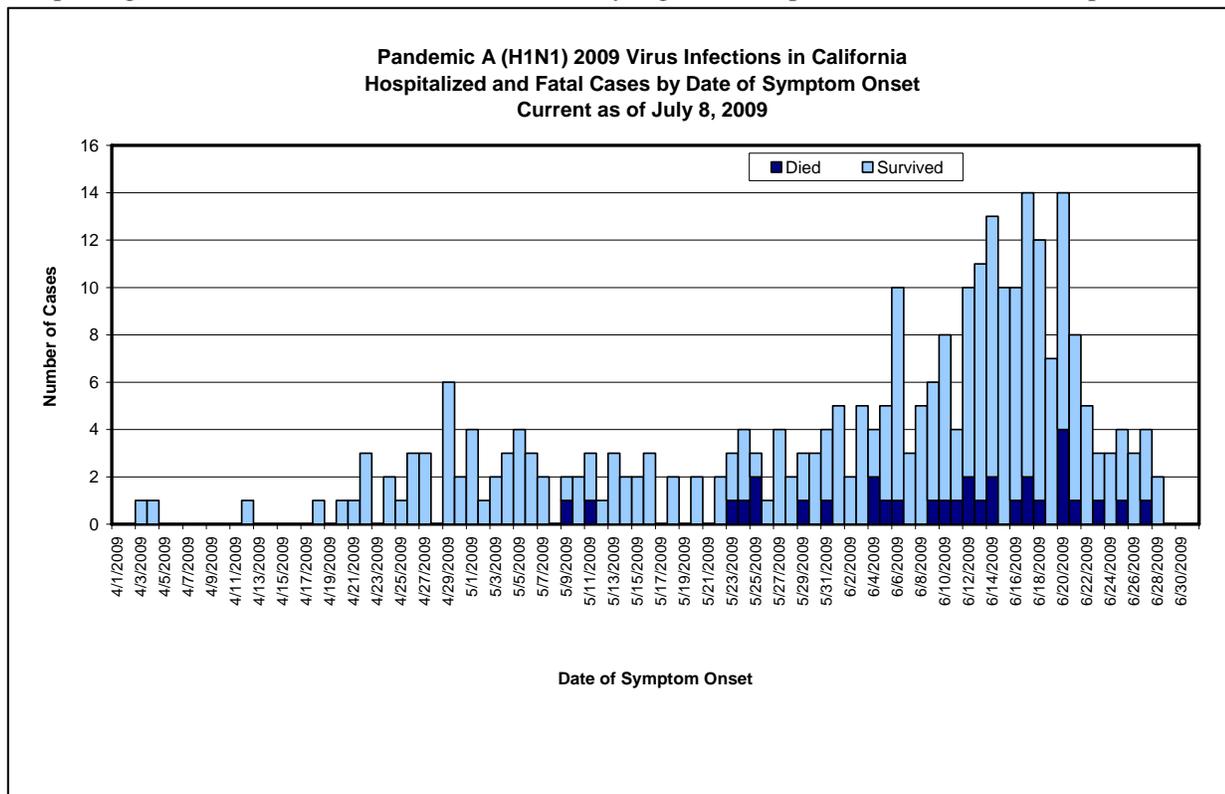
Table 1. Provisional number of pandemic (H1N1) 2009 cases by local health jurisdiction, as of 07/9/09.

Jurisdiction	Total Cases	Confirmed	Probable	Hospitalizations ^a	Deaths
CALIFORNIA	2469	1945	524	287	32
County Undetermined	0	0	0	0	0
Alameda	79	68	11	13	3
Amador	2	2	0	0	0
Berkeley City	5	4	1	1	0
Butte	12	11	1	8	0
Calaveras	1	1	0	0	0
Contra Costa	295	258	37	42	3
El Dorado	10	8	2	0	0
Fresno	19	12	7	2	0
Humboldt	3	2	1	3	0
Imperial	78	69	9	6	0
Kern	17	17	0	1	0
Kings	18	18	0	0	0
Lake	1	0	1	0	0
Long Beach City	18	14	4	1	0
Los Angeles	445	258	187	33	3
Madera	9	3	6	2	0
Marin	49	21	28	7	1
Merced	2	1	1	1	0
Mono	5	5	0	0	0
Monterey	23	17	6	2	0
Napa	1	1	0	0	0
Orange	202	192	10	29	5
Pasadena City	5	5	0	1	0
Placer	7	6	1	1	0

Pandemic (H1N1) 2009 continues to be seen in hospitalized cases in California as evidenced in Figure 4. The number of hospitalized cases reported in April and May remained steady between two to four per week, with a slight increase on April 29. The number of reported cases increased in June and has remained high, with an average of 8 cases per day in the first three weeks of June. This increase may be due, in part, to the widespread presence of the virus in the community, thus people at higher risk of complications due to influenza have a greater chance of becoming exposed.

The majority of hospitalized cases are in the age groups 5-19 years and 20-39 years. The most predominant co-morbidity is chronic lung disease and the most common symptoms are fever, cough and shortness of breath. More than 40% of hospitalized cases have developed pneumonia and more than half have been treated with antivirals (Table 4).

Figure 2. Hospitalized and fatal cases of pandemic (H1N1) 2009 in California, by date of onset. Due to some delay in reporting, the actual number of cases is most likely higher in the past week than what is depicted.



2. Laboratory Surveillance Update

VRDL Influenza PCR Results (Updated 7/9/09)

- VRDL performs PCR testing for influenza A, influenza A subtyping, and pandemic (H1N1) 2009. Some specimens are screened at local public health or reference laboratories before being submitted to VRDL for additional or confirmatory testing.
- VRDL has received 3,744 specimens for pandemic (H1N1) 2009-related testing.
- Of 3,235 specimens tested at VRDL for influenza A, 2,063 (64%) have been positive.
- A total of 1,000 influenza A-positive specimens have been subtyped at VRDL. Almost all influenza A-positive specimens that have been referred to VRDL in recent weeks have been unsubtypeable, i.e. probable pandemic (H1N1) 2009.

- Of 1,294 unsubtypeable specimens tested at VRDL for pandemic (H1N1) 2009, 1,234 (95%) have been positive.

Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results (Updated 7/9/09)

As noted in the RLN tables below, during week 26 (June 28 – July 4, 2009), approximately 48% of specimens received by the Respiratory Laboratory Network have been positive for influenza A. Of these, 98% are unsubtypeable. This is a notable difference since the beginning of this pandemic, when seasonal influenza was still circulating in approximately half of specimens tested.

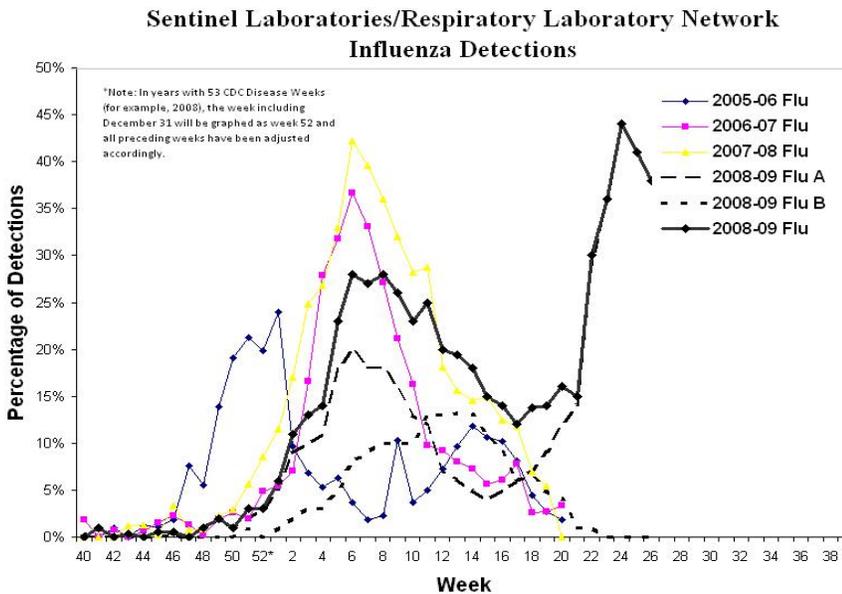
Table 2. Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results, Week 26 (June 28-July 4, 2009)

	Total tested	Flu A (% of total)	Unsubtypeable (% of Flu A)
All RLN*	266	128 (48%)	125 (98%)
Northern	120	56 (47%)	56 (100%)
Central	91	44 (48%)	41 (93%)
Southern	55	28 (51%)	28 (100%)

* 14 of 23 RLN laboratories reporting, including:
 Northern CA: Contra Costa, Marin, Monterey, San Francisco, Santa Clara, Shasta, Sonoma
 Central CA: Fresno, San Joaquin, Tulare
 Southern CA: Long Beach, San Bernardino, Santa Barbara, Ventura

Influenza Detections at Sentinel Laboratories/Respiratory Laboratory Network (RLN).

Figure 3. Influenza Detections at Sentinel Laboratories/Respiratory Laboratory Network (RLN). This figure shows that shows that laboratory detections for influenza peaked in week 24 and are declining.



Antiviral Resistance for Pandemic (H1N1) 2009

At VRDL, antiviral resistance testing is being performed on a subset of specimens tested to monitor for changing resistance patterns.

Table 3. Antiviral resistance testing at VRDL and CDC, 2009*.

Pandemic (H1N1)	Oseltamivir Resistant	Adamantanes Resistant
VRDL	0/50	37/37
CDC	0/55	Not tested

* One oseltamivir-resistant virus was identified by an outside laboratory in a San Francisco resident who traveled to Hong Kong.

An updated version of the pandemic (H1N1) 2009 case report form is available at:

<http://www.cdph.ca.gov/HealthInfo/discond/Pages/SwineInfluenzaLHD.aspx>

<http://www.cdph.ca.gov/pubsforms/forms/Documents/Novel-Influenza-A-H1N1-Virus-Case-Report-Form.doc>

Overall California Influenza Activity for Week 27 (July 5 – July 11, 2009)

This week, influenza activity in California remained “widespread” (defined by CDC as outbreaks of influenza or increases in ILI cases and recent laboratory confirmed influenza in at least half of the regions in the state) based on the high level of laboratory detections of pandemic (H1N1) 2009 throughout the state. Activity appears to be trending down although an increase in severe pediatric influenza cases was noted this week. Outbreaks continue to be reported in hospitals, long-term care facilities, summer camps, military bases and residential facilities. An increase in hospitalizations and fatalities was observed in the first few weeks of June and has remained steady.

National Influenza Activity

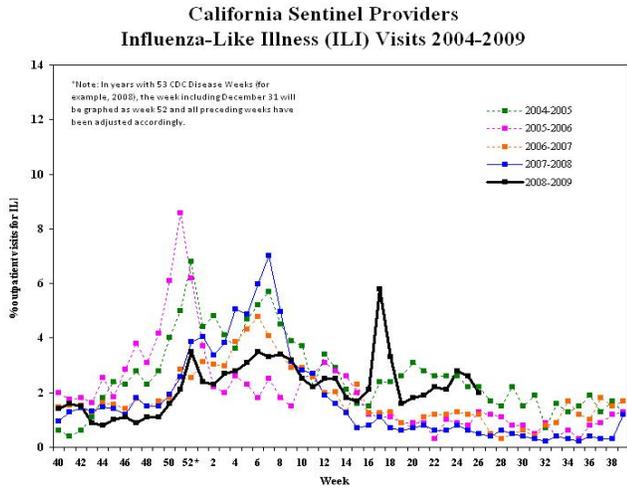
During week 26 (June 28-July 4, 2009), influenza activity decreased in the United States, however, there were still higher levels of influenza-like illness than is normal for this time of year. One thousand five hundred five (26.1%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza. Over 97% of all subtyped influenza A viruses being reported to CDC were novel influenza A (H1N1) viruses. Five influenza-associated pediatric deaths were reported and all five deaths were associated with novel influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was below national and region-specific baseline levels.

Seasonal Influenza A Surveillance

1. CDC Influenza Sentinel Providers

Sentinel providers report the number of outpatient visits for influenza-like illness (ILI) and the total number of visits per week. This data is reported weekly as a percentage of total visits. Figure 1 shows a peak in weeks 17-18 when pandemic (H1N1) 2009 was first identified. A smaller peak followed in week 24. Outpatient visits for ILI are declining, which is consistent with other seasonal influenza surveillance parameters. A total of 40 sentinel providers reported during Week 26.

Figure 1. California Sentinel Providers – Influenza-Like Visits, 2004-2009.

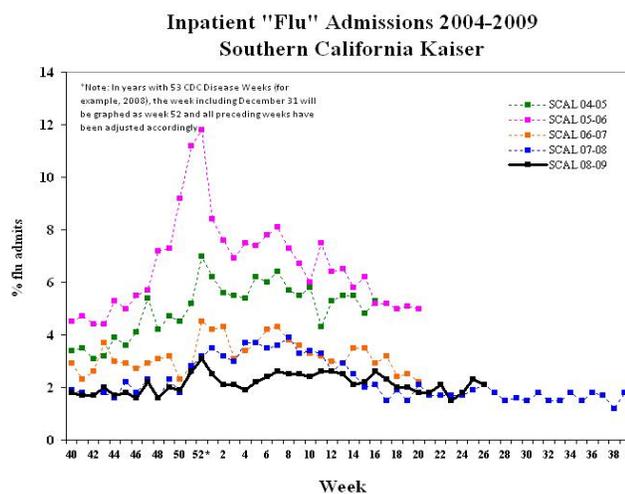
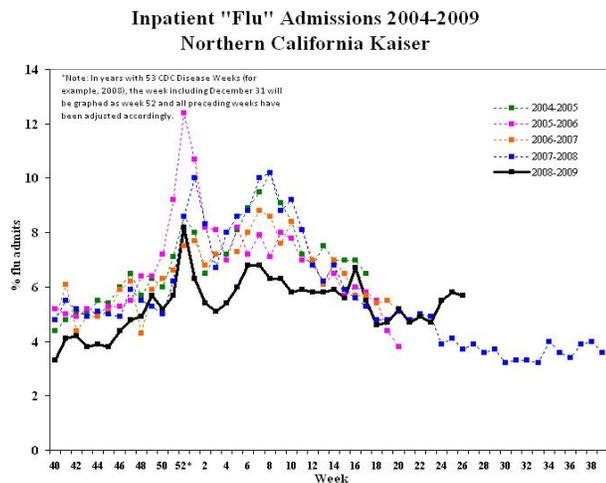


2. Kaiser Permanente Hospitalization Data (“Flu Admits”)

The admission diagnoses of flu, pneumonia, and influenza (“Flu Admits”) serve as surrogate markers for the more accurate discharge diagnoses. Influenza activity is tracked by dividing the number of Flu Admits by the total number of hospital admissions for the same day to obtain a percentage of influenza and pneumonia admissions.

Figures 2 and 3 below show that in Northern and Southern California the percentage of Kaiser hospitalizations for P&I (pneumonia and influenza) peaked during week 17 with a smaller peak in week 24. Inpatient “Flu” Admissions appear to be declining.

Figures 2-3. Inpatient “Flu” Admissions at Kaiser Facilities, 2004-2009.



5. Laboratory Positive Results Data

Positive influenza and other virus results from sentinel laboratories, local public health laboratories and VRDL. Influenza A detections continue to decrease from a peak of 1018 in week 24. There were no detections of RSV and Influenza B in week 26.

Table 2. Influenza and other respiratory virus detections, June 28– July 4, 2009.

		Sentinel Laboratories/Respiratory Laboratory Network[‡]	Sentinel Providers
Week 26	Number of Sites Reporting	20	714 specimens submitted (282 positive by PCR)
	Influenza A	724 ^a Total tested week 26: 1915 Total detections to date: 9728	0 Total tested week 26: 0 Total detections to date: 178
	Influenza B	0 Total tested week 26: 1947 Total detections to date: 4809	0 Total tested week 26: 0 Total detections to date: 104
	RSV	0 Total tested week 26: 1629 Total detections to date: 8817	N/A
	Other Respiratory Viruses	8 ^b Total tested week 26: 424 Total detections to date: 434	N/A

[‡]Sentinel laboratories are hospital, academic, private, and public health laboratories located throughout California that provide data on the number of laboratory-confirmed influenza and other respiratory virus detections and isolations. The Respiratory Laboratory Network (RLN) is a network of 23 local public health laboratories that offer enhanced diagnostic testing with the “R-mix” shell vial assay, which detects several respiratory pathogens, including influenza A and B viruses, respiratory syncytial virus, parainfluenza virus, and adenovirus. Some RLN labs also offer PCR testing for influenza A and B.

^a Alameda (114); Contra Costa (67); Fresno (27); Long Beach (30); Los Angeles (52); Marin (8); Monterey (10); Nevada (1); Orange (19); Placer (10); Riverside (5); Sacramento (59); San Benito (1); San Bernardino (29); San Diego (44); San Francisco (12); San Joaquin (7); San Luis Obispo (53); San Mateo (3); Santa Barbara (3); Santa Clara (78); Solano (49); Sonoma (20); Stanislaus (6); Tulare (12); Ventura (5)

^b parainfluenza type 3 (5); parainfluenza type 1 (1); adenovirus (1); human metapneumovirus (1)