

California Influenza Surveillance Project

California Department of Public Health

2008-2009

Influenza Update

Influenza Surveillance for August 27 – September 2, 2009

As the current H1N1 pandemic 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. Effective July 15, 2009, local health departments are no longer asked to report outpatient cases. Effective August 12, 2009, local health departments have been asked to report hospitalized cases of pandemic (H1N1) 2009 as weekly aggregate numbers. Intensive care unit (ICU) cases and fatal cases continue to be reported with individual case report forms.

This week, overall influenza activity in California remained “regional” (defined by the CDC as outbreaks of influenza or increases in ILI and recent laboratory confirmed influenza in at least two but less than half the regions of the state). Laboratory detections of pandemic (H1N1) 2009 continue to decline. Reports of influenza like illness and hospitalizations for pneumonia and influenza remain similar to previous weeks.

Nationally, during week 34 (August 23-29, 2009), influenza activity increased in the United States. 97% of all subtyped influenza A viruses being reported to CDC were 2009 influenza A (H1N1) viruses. One influenza-associated pediatric death was reported and was associated with a 2009 influenza A (H1N1) virus infection. The proportion of outpatient visits for influenza-like illness (ILI) was below the national baseline.

1. **Pandemic (H1N1) 2009 Epi- Surveillance Update** (Updated September 2, 2009)

Highlights:

- Effective August 12, 2009, local health departments began reporting hospitalized pandemic (H1N1) 2009 cases as weekly aggregate numbers. From August 26 – September 1, 2009, 135 hospitalized/fatal cases were reported; there have been 1,663 hospitalizations and/or fatalities, with 468 cases requiring intensive care, reported to date.
- CDPH received 16 reports of fatal pandemic (H1N1) 2009 cases this week; a total of 144 pandemic (H1N1) 2009 deaths have been reported to CDPH to date.
- In recent weeks, almost all influenza A-positive specimens tested by PCR at VRDL and by the Respiratory Laboratory Network have been subsequently confirmed as pandemic (H1N1) 2009, reflecting that the predominant circulating influenza strain in California at present is pandemic (H1N1) 2009.
- Surveillance for the detection of antiviral resistance in pandemic (H1N1) 2009 influenza is ongoing. To date, of 364 specimens tested, VRDL has detected the H275Y mutation that confers resistance to oseltamivir in only one specimen; this result was confirmed by the CDC. This is the first time that this mutation has been detected by the VRDL and provides strong evidence for the importance of enhanced surveillance for antiviral resistance testing. 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 released a *Summary of Interim Guidance on Antiviral Recommendations for Pandemic (H1N1) 2009 Virus Infection in the July 22, 2009 Health Alert*, that can be found on CAHAN at: https://cahan.ca.gov/cahan/Portal%20Content/Alert%20Details/CDPH%20Health%20Alert%207_22_09.pdf
- Eighteen (18) new cases meeting the case definition for severe pediatric influenza were reported this week, including one fatality; 17 of the cases are confirmed/probable pandemic (H1N1), and additional testing is pending for the remaining case.

a. California case counts for pandemic (H1N1) 2009 hospitalizations and fatalities in humans:

Table 1. Provisional number of pandemic (H1N1) 2009 hospitalizations, ICU and fatal cases in California, by local health jurisdiction, April 3 – September 1, 2009.

Jurisdiction	Total Hospitalizations, ICU cases and Deaths ^{a,b}	Incidence of Hospitalizations per 100,000 population	Deaths ^c
CALIFORNIA	1663	4.39	144
County Undetermined	0	0.00	0
Alameda	107	6.95	10
Berkeley City	5	4.67	1
Butte	14	6.17	0
Contra Costa	130	12.21	6
El Dorado	3	1.61	1
Fresno	48	4.98	7
Humboldt	7	5.22	1
Imperial	8	4.33	0
Inyo	1	5.24	0
Kern	14	1.64	0
Kings	3	1.86	0
Lake	3	4.50	0
Long Beach City	43	8.73	2
Los Angeles	182	1.74	23
Madera	2	1.26	0
Marin	29	11.44	4
Mendocino	4	4.33	0
Merced	18	6.72	1
Monterey	31	7.20	1
Napa	5	3.55	1
Orange	211	6.61	18
Pasadena City	2	1.33	0
Placer	5	1.47	2
Riverside	21	0.96	2
Sacramento	95	6.61	6
San Benito	4	6.41	0
San Bernardino	55	2.57	7
San Diego	233	7.35	18
San Francisco	52	6.39	6
San Joaquin	59	8.15	2
San Luis Obispo	4	1.49	1
San Mateo	39	5.31	7
Santa Barbara	14	3.25	0
Santa Clara	72	3.95	4
Santa Cruz	10	3.75	1
Shasta	5	2.64	0
Siskiyou	1	2.13	0
Solano	15	3.44	2
Sonoma	43	8.75	6
Stanislaus	46	8.37	3
Tulare	12	2.63	0
Yolo	8	3.95	1

^a This number does not include reports of hospitalized cases not yet validated by LHJ, represents cases ever hospitalized

^b Includes the following individuals: (1) non-fatal hospitalized cases, (2) fatal hospitalized cases, (3) fatal non-hospitalized cases

^c Not all fatal cases were hospitalized.

Bold indicates the first report of hospitalized and/or fatal cases by the county

b. Characteristics of pandemic (H1N1) 2009 hospitalized/fatal cases in California

As of August 12, 2009, hospitalized cases are reported to CDPH as weekly aggregate numbers. Due to this recent change in reporting we are unable to ascertain duplicate reports.

The incidence of hospitalized and/or fatal cases is shown in Table 2. The incidence rate of hospitalized and/or fatal cases remains highest among children, particularly those under 1 year old (18.60 cases per 100,000).

As of September 1, 2009, CDPH has received 500 case report forms of severe (admitted to ICU or fatal) cases of pandemic (H1N1) 2009 (Table 3). The median age is 33 years (range: <1-87 years). Fever (88% of patients) and shortness of breath (67%) remain the most common symptoms. Of those with known race and/or ethnicity, Hispanics and Non-Hispanic Whites account for more than half of the cases. Chronic co-morbid illness is present in 85% of cases, with obesity (51%) and lung disease (37%) being the most common. Among women of child-bearing age, 24 (23%) were pregnant. Secondary bacterial infections (*Staphylococcus aureus*, Group A *Streptococcus*, *Streptococcus pneumoniae*) were present in 7% of reported cases. Eighty-five percent of ICU/fatal cases received antivirals; 69% had chest radiograph findings consistent with pneumonia.

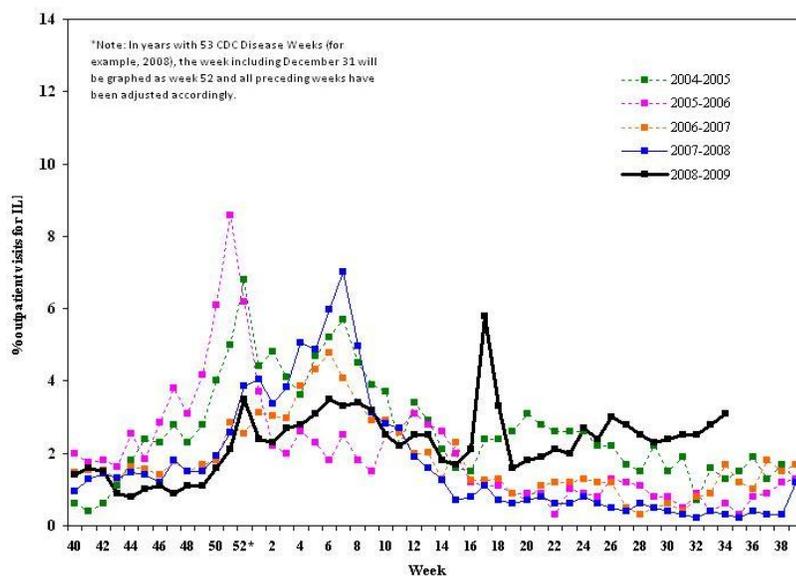
The case report form used to report ICU and fatal cases of pandemic (H1N1) 2009 is available at: <http://www.cdph.ca.gov/pubsforms/forms/Documents/PandemicH1N1HospFatalCaseReportForm.doc>

A template for reporting aggregate hospitalized cases is available at: <http://www.cdph.ca.gov/pubsforms/forms/Documents/H1N1LHJAggHospitalizedCaseReportTemplate.xls>

2. 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. These data are reported weekly as a percentage of total visits. Figure 1 shows a peak in Weeks 17-18 (April 26 – May 9, 2009) when pandemic (H1N1) 2009 was first identified. ILI appears to be increasing. A total of 39 sentinel providers reported during Week 34 (August 23 – 29, 2009).

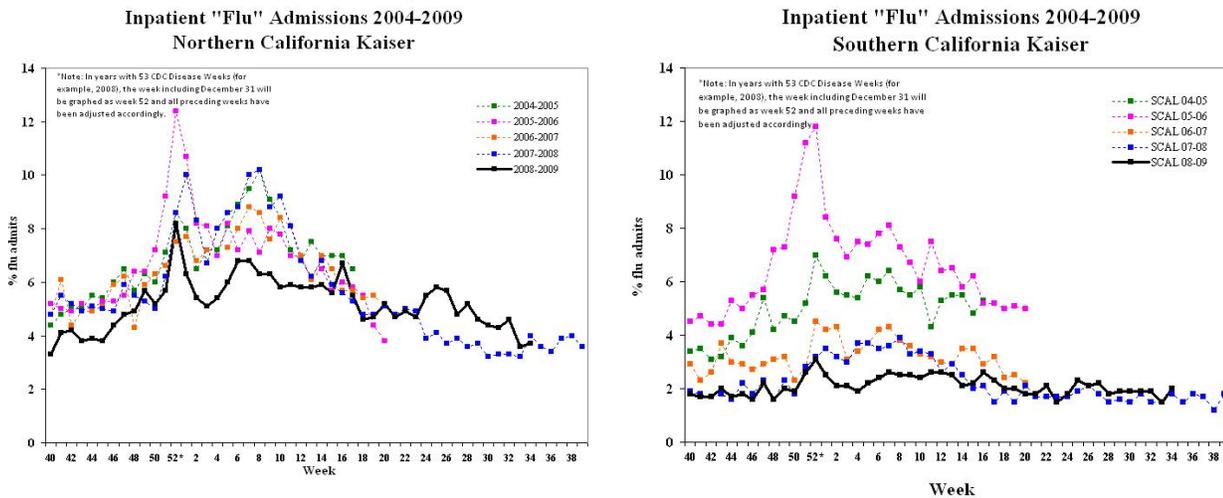
Figure 1. California Sentinel Providers – Influenza-Like Illness Visits, 2004-2009.



3. Kaiser Permanente Hospitalization Data ("Flu Admissions")

The admission diagnoses of flu, pneumonia, and influenza ("Flu Admissions") 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 show that in both northern and southern California, the percentage of Kaiser hospitalizations for pneumonia and influenza (P&I) peaked during Week 17 (April 26 – May 2, 2009), with a smaller peak occurring in Week 24 (June 14 – June 20, 2009).

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



4. Laboratory Surveillance Update

VRDL Influenza PCR Results (Updated September 2, 2009)

- VRDL performs PCR testing for influenza A, influenza A subtypes H1 and H3, 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 5,060 specimens for pandemic (H1N1) 2009 testing, including specimens submitted by sentinel providers.
- Of 4,508 specimens tested at VRDL for influenza A, 3,079 (68%) have been positive.
- A total of 1,032 influenza A-positive specimens have been subtyped at VRDL.
- Of 2,099 unsubtypeable specimens tested at VRDL for pandemic (H1N1) 2009, 1,900 (91%) have been positive.

Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results (Updated September 2, 2009)

As noted in Table 2 below, during Week 34 (August 23 – 29, 2009), 35% of specimens received by the Respiratory Laboratory Network were positive for influenza A. This is similar to the previous week, when 34% of specimens were positive for influenza A. Due to a change in testing policy, some labs within the RLN are no longer subtyping Flu A specimens. Of the RLN labs that performed subtyping during week 34, all but one specimen was unsubtypeable, making Pandemic (H1N1) 2009 the predominant strain circulating in California at this time.

Table 2. Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results, Week 34 (August 23 – 29, 2009)

	Total tested	Flu A (% of total)	H1 (% of Flu A)	H3 (% of Flu A)	Unsubtypeable (% of Flu A)
All RLN*	668	233 (35%)	0 (0%)	1 (1%)	212 (91%)
Northern	160	38 (24%)	0 (0%)	0 (0%)	18 (47%)
Central	275	113 (41%)	0 (0%)	0 (0%)	113 (100%)
Southern	233	82 (35%)	0 (0%)	1 (1%)	81 (99%)

* 17 RLN laboratories reporting, including:

Northern CA: Contra Costa, El Dorado, San Francisco, Santa Clara, Shasta, Sonoma

Central CA: Fresno, San Joaquin, Tulare

Southern CA: Long Beach, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Ventura

Laboratory Positive Results Data (Updated September 2, 2009)

Table 3 shows positive influenza and other virus results from sentinel laboratories, local public health laboratories, and VRDL.

Table 3. Influenza and other respiratory virus detections, August 23 – August 29, 2009.

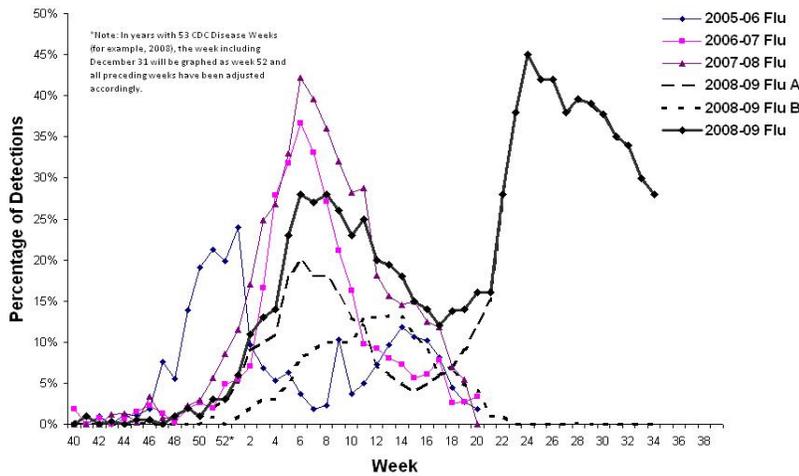
		Sentinel Laboratories/Respiratory Laboratory Network[‡]	Sentinel Providers
Week 34	Number of Sites Reporting	25	1062 specimens submitted (488 positive by PCR)
	Influenza A	613 ^a Total tested week 34: 2180	0 Total tested week 34: 0
	Influenza B	0 Total tested week 34: 1500	0 Total tested week 34: 0
	RSV	0 Total tested week 34: 1124	N/A
	Other Respiratory Viruses	0 Total tested week 34: 91	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 (35); Contra Costa (14); El Dorado (1); Fresno (38); Long Beach (6); Los Angeles (69); Napa (1), Orange (28); Placer (22); Riverside (17); Sacramento (65); San Bernardino (7); San Diego (24); San Francisco (13); San Joaquin (30); San Mateo (11); Santa Barbara (1); Santa Clara (38); Shasta (4); Solano (12); Sonoma (63); Stanislaus (19); Tulare (83); Ventura (6); Yolo (6)

Laboratory detections peaked in week 24 (June 14 –20, 2009) and have been steadily declining since week 25 (June 21 – 27, 2009; Figure 5).

Figure 4. Influenza detections at sentinel laboratories/Respiratory Laboratory Network (RLN), 2005-2009.



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. During Week 33 (August 16 – 22, 2009), VRDL detected a specimen with the H275Y resistance mutation (associated with oseltamivir resistance); this result was confirmed by the CDC. This is the first case of this mutation detected by VRDL.

Table 4. Antiviral resistance testing at VRDL, 2009*.

Pandemic (H1N1)	Oseltamivir Resistant	Adamantanes Resistant
VRDL testing	1/364	73/73

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