

California Influenza Surveillance Project

California Department of Public Health

2008-2009

Influenza Update

Influenza Surveillance for August 20 – August 26, 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 were no longer asked to report outpatient cases. Effective August 12, 2009, local health departments are asked to report hospitalized cases of pandemic (H1N1) 2009 as weekly aggregate numbers. Intensive care unit cases and fatal cases will 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.

1. Pandemic (H1N1) 2009 Epi- Surveillance Update (Updated August 26, 2009)

Highlights:

- Effective August 12, 2009, local health departments began reporting hospitalized pandemic (H1N1) 2009 cases as weekly aggregate numbers. From August 19 – August 25, 2009, 175 hospitalized/fatal cases were reported; there have been 1,528 hospitalizations and/or fatalities, with 412 cases requiring intensive care, to date.
- CDPH received 13 reports of fatal pandemic (H1N1) 2009 cases this week; a total of 128 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 313 specimens tested at VRDL, all but one have tested negative for the resistance mutation. Last week, VRDL detected a specimen with the H275Y resistance mutation (associated with oseltamivir resistance); the 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. The specimen was obtained from a hospitalized patient in Northern California. 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

- Ten (10) new cases meeting the case definition for severe pediatric influenza were reported this week, including one fatality; all of the cases are confirmed/probable pandemic (H1N1).

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

Table 1. Provisional number and incidence of pandemic (H1N1) 2009 hospitalizations, ICU and fatal cases in California, by local health jurisdiction, April 3 - August 25, 2009.

Jurisdiction	Total Hospitalizations, ICU cases and Deaths ^{a,b}	Incidence of Hospitalizations per 100,000 population	Deaths ^c
CALIFORNIA	1528	4.04	128
County Undetermined	0	0.00	0
Alameda	100	6.49	9
Berkeley City	4	3.73	1
Butte	14	6.17	0
Contra Costa	126	11.83	6
El Dorado	3	1.61	1
Fresno	43	4.46	4
Humboldt	7	5.22	1
Imperial	8	4.33	0
Inyo	1	5.24	0
Kern	10	1.17	0
Kings	2	1.24	0
Lake	3	4.50	0
Long Beach City	42	8.52	2
Los Angeles	154	1.47	20
Madera	2	1.26	0
Marin	29	11.44	4
Mendocino	4	4.33	0
Merced	15	5.60	1
Monterey	31	7.20	1
Napa	4	2.84	1
Orange	202	6.33	14
Pasadena City	2	1.33	0
Placer	3	0.88	1
Riverside	16	0.73	1
Sacramento	91	6.33	6
San Benito	4	6.41	0
San Bernardino	43	2.01	7
San Diego	221	6.97	17
San Francisco	41	5.04	6
San Joaquin	52	7.18	2
San Luis Obispo	4	1.49	1
San Mateo	36	4.90	7
Santa Barbara	10	2.32	0
Santa Clara	71	3.89	4
Santa Cruz	10	3.75	1
Shasta	5	2.64	0
Solano	13	2.98	2
Sonoma	43	8.75	5
Stanislaus	39	7.10	2
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

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>

Table 2. Characteristics of ICU and/or fatal cases of pandemic (H1N1) in California, April 3–August 25, 2009.

		SEVERE CASES [~]
		No. (%)
Number		439
Sex ^{**}	Male	221 (50%)
	Female	218 (50%)
Age	Median (years)	33
	Mean (years)	34
	Min - Max	<1 - 87 years
	0 - 18 years	116 (26%)
Race/Ethnicity ^{**}	Hispanic	134 (40%)
	Non-Hispanic White	108 (33%)
	Asian/ Pacific Islander	45 (14%)
	Black	32 (10%)
	Other	10 (3%)
	Native American	2 (1%)
Symptoms	Fever	390 (89%)
	Shortness of breath	295 (67%)
	Nausea / vomiting	139 (32%)
	Altered mental status	49 (11%)
Chronic co-morbid illness [*]		373 (85%)
	Chronic lung disease [†]	166 (38%)
	Obesity ^{**€}	157 (51%)
	Chronic cardiac disease [§]	88 (20%)
	Metabolic disease	105 (24%)
	Other immunosuppression [¶]	65 (15%)
	Neuromuscular disorder	69 (16%)
	Pregnancy ^{***}	24 (26%)
Secondary bacterial infections [‡]		31 (7%)
	<i>Staphylococcus aureus</i> [#]	13 (3%)
	Group A <i>Streptococcus</i>	7 (2%)
	<i>Streptococcus pneumoniae</i>	11 (3%)
Clinical Findings and Course		
	Infiltrates on chest radiograph	305 (69%)
	Mechanical ventilation ^{**}	247 (65%)
	Antiviral treatment ^{**}	317 (84%)
ICU		412 (94%)

^{**} Includes cases with known information only

^{*} Conditions listed are not mutually exclusive due to the presence in some patients of multiple underlying chronic diseases

[†] Includes asthma, chronic obstructive pulmonary disorder, bronchopulmonary dysplasia/respiratory distress syndrome, bronchiolitis obliterans organizing pneumonia, Sjogren's syndrome and obstructive sleep apnea

[€] Includes cases \geq age 2 years where BMI \geq 30 (adults) or BMI-for-age is above the overweight percentile (age 2-19 years) and/or those who were clinically considered obese

[§] Includes congenital heart disease, atrial fibrillation, status-post aortic valve replacement, congestive heart failure, hypertensive heart disease and coronary artery disease

[¶] Includes immunosuppressive drugs, cancer, congenital immunodeficiency, and HIV

^{***} Includes only females of childbearing age (15-44 years)

[‡] Only includes *S. aureus*, group A *Streptococcus*, and *S. pneumoniae*

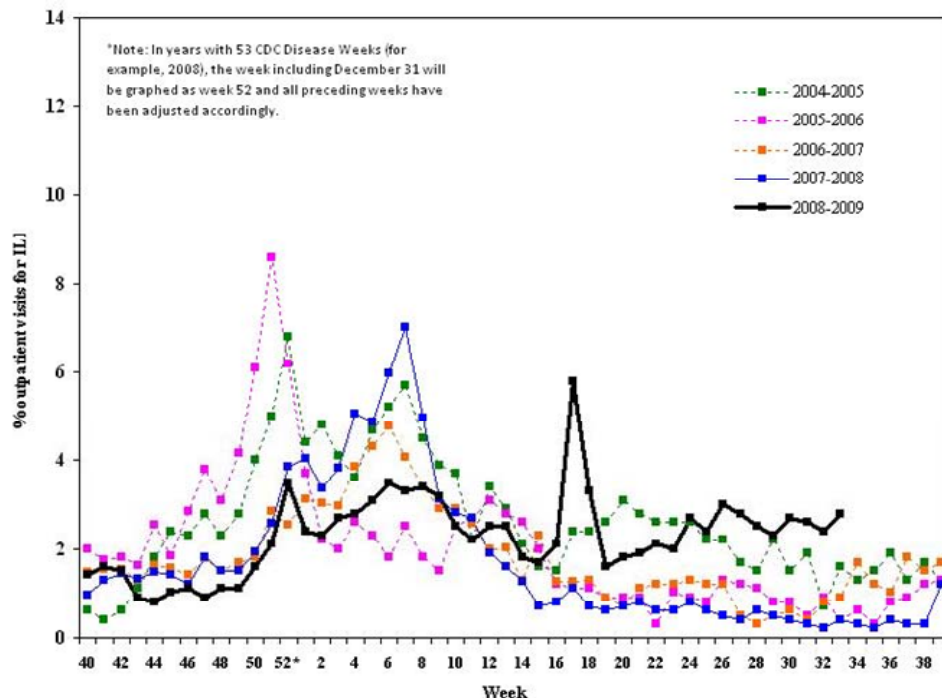
[#] Includes MRSA, MSSA, and *S. aureus* with unknown susceptibility pattern

[~] Includes cases that were In the ICU, fatal cases that were In the ICU, and fatal cases that were not In the ICU

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. After a sharp decline, the number of reported outpatient visits for ILI slightly and has remained steady. A total of 45 sentinel providers reported during Week 33 (August 16 – 22, 2009).

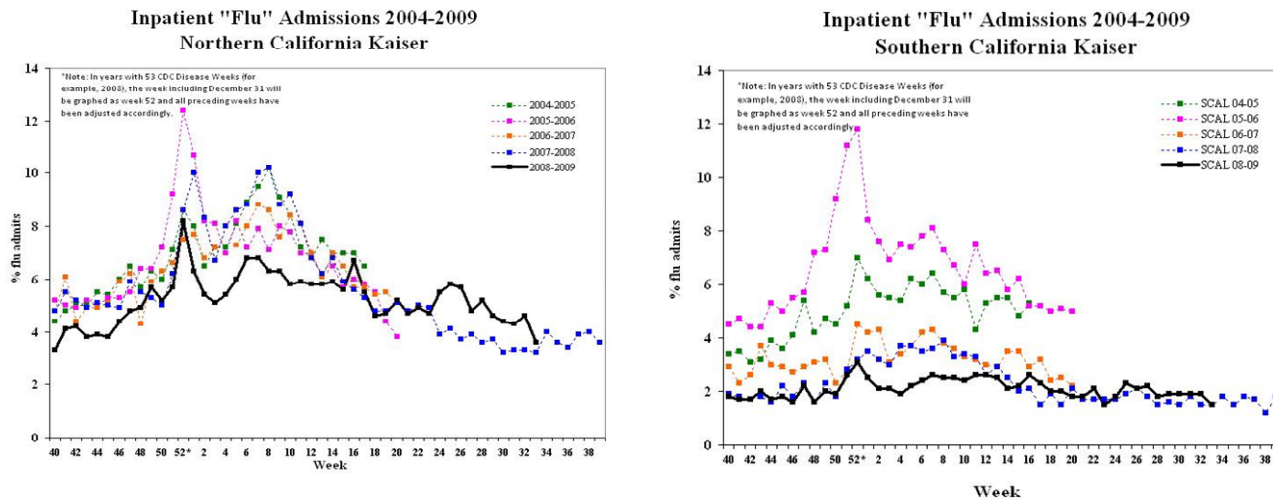
Figure 1. California Sentinel Providers – Influenza-Like Visits, 2004-2009.



3. 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 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 August 26, 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 4,925 specimens for pandemic (H1N1) 2009 testing, including specimens submitted by sentinel providers.
- Of 4,408 specimens tested at VRDL for influenza A, 3,013 (68%) have been positive.
- A total of 1,032 influenza A-positive specimens have been subtyped at VRDL.
- Of 2,039 unsubtypeable specimens tested at VRDL for pandemic (H1N1) 2009, 1,860 (91%) have been positive.

Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results (Updated August 26, 2009)

As noted in the Table 4 below, during Week 33 (August 16 – 22, 2009), 38% of specimens received by the Respiratory Laboratory Network were positive for influenza A. This is a decrease from the previous week, when 43% of specimens were positive for influenza A. All but one of the influenza A-positive samples tested this week were unsubtypeable. Pandemic (H1N1) 2009 continues to be the predominant strain circulating in California at this time.

Table 3. Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results, Week 33 (August 16 – 22, 2009)

	Total tested	Flu A (% of total)	Unsubtypeable (% of Flu A)
All RLN*	419	158 (38%)	157 (99%)
Northern	127	25 (20%)	24 (96%)
Central	206	74 (36%)	74 (100%)
Southern	86	59 (69%)	59 (100%)

* 16 RLN laboratories reporting, including:

Northern CA: Contra Costa, El Dorado, Marin, Monterey, San Francisco, Santa Clara, Shasta, Sonoma
Central CA: Fresno, San Joaquin, Tulare

Laboratory Positive Results Data (Updated August 25, 2009)

Table 4 shows positive influenza and other virus results from sentinel laboratories, local public health laboratories and VRDL.

Table 4. Influenza and other respiratory virus detections, August 16 – August 22, 2009.

		Sentinel Laboratories/Respiratory Laboratory Network [‡]	Sentinel Providers
Week 33	Number of Sites Reporting	25	1003 specimens submitted (488 positive by PCR)
	Influenza A	582 ^a Total tested week 33: 2206	8 ^e Total tested week 33: 8
	Influenza B	1 ^b Total tested week 33: 1779	0 Total tested week 33: 0
	RSV	3 ^c Total tested week 33: 1398	N/A
	Other Respiratory Viruses	3 ^d Total tested week 33: 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 (65); Contra Costa (11); El Dorado (4); Fresno (60); Imperial (1); Kern (1); Long Beach (13); Los Angeles (94); Madera (6); Marin (2); Napa (3); Orange (24); Placer (34); Riverside (11); Sacramento (63); San Bernardino (1); San Diego (24); San Francisco (11); San Joaquin (27); San Mateo (8); Santa Barbara (4); Santa Clara (29); Solano (15); Sonoma (38); Stanislaus (27); Tulare (2); Ventura (1); Yolo (3)

^b Orange (1)

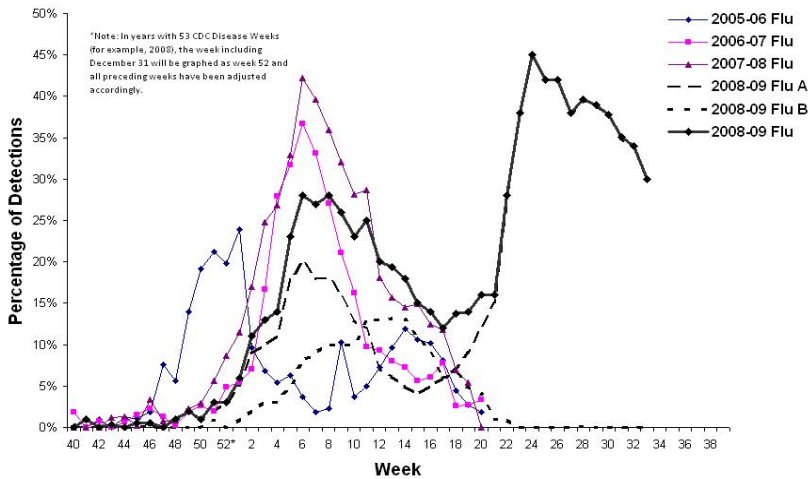
^c Los Angeles (1); San Diego (1); San Francisco (1)

^d adenovirus (1); parainfluenza type 1 (2); parainfluenza type 3 (1)

^e Sacramento (3); Santa Barbara (2); Sutter (3)

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

Figure 5. 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 5. Antiviral resistance testing at VRDL, 2009*.

Pandemic (H1N1)	Oseltamivir Resistant	Adamantanes Resistant
VRDL testing	1/313	73/73

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