California Influenza Surveillance Project

California Department of Public Health

2008-2009

Influenza Update

Influenza Surveillance for August 6 – August 12, 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.

This week, overall influenza activity in California was downgraded to "regional" [defined by the CDC as outbreaks of influenza or increases in influenza-like illness (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 and reports of ILI continue to decline.

1. **Pandemic (H1N1) 2009 Epi- Surveillance Update** (Updated August 12, 2009)

   Highlights:

   - CDPH received 165 reports of hospitalized pandemic (H1N1) 2009 cases this week; for a total, to-date of 1,057 hospitalizations, with 318 cases requiring intensive care.
   - CDPH received 12 reports of fatal pandemic (H1N1) 2009 cases this week; a total of 104 pandemic (H1N1) 2009 deaths have been reported to CDPH to date.
   - 253 hospitalized and fatal cases have been female and of childbearing age (15-44 years); 90 (36%) were pregnant.
   - 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 260 specimens tested at VRDL, all have tested negative for the resistance mutation. 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.
   - Fourteen (14) new cases meeting the case definition for severe pediatric influenza were reported this week, including two fatalities; all 14 cases are confirmed/probable pandemic (H1N1) 2009**.**

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

Table 1. Provisional number of pandemic (H1N1) 2009 hospitalizations and fatal cases in California, by local health jurisdiction, April 3 - August 11, 2009.

Jurisdiction	Total Hospitalizations[a]	Incidence of Hospitalizations per 100,000 population	Deaths[b]
CALIFORNIA	1057	2.79	104
County Undetermined	0	0.00	0
Alameda	82	5.32	8
Berkeley City	3	2.80	0
Butte	13	5.73	0
Contra Costa	83	7.80	6
El Dorado	3	1.61	1
Fresno	19	1.97	2
Humboldt	3	2.24	0
Imperial	6	3.25	0
Inyo	1	5.24	0
Kern	7	0.82	0
Kings	1	0.62	0
Lake	2	3.00	0
Long Beach City	20	4.06	1
Los Angeles	109	1.04	15
Madera	2	1.26	0
Marin	21	8.28	3
Mendocino	4	4.33	0
Merced	3	1.12	0
Monterey	8	1.86	1
Napa	4	2.84	1
Orange	127	3.98	12
Pasadena City	2	1.33	0
Placer	1	0.29	1
Riverside	12	0.55	1
Sacramento	83	5.77	5
San Benito	3	4.80	0
San Bernardino	30	1.40	3
San Diego	155	4.89	15
San Francisco	40	4.91	6
San Joaquin	29	4.01	2
San Luis Obispo	2	0.75	1
San Mateo	31	4.22	7
Santa Barbara	6	1.39	0
Santa Clara	65	3.56	4
Santa Cruz	2	0.75	1
Shasta	2	1.06	0
Solano	10	2.29	2
Sonoma	22	4.48	4
Stanislaus	32	5.82	2
Tulare	6	1.31	0
Yolo	3	1.48	0

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

[b] 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

Case report forms and medical records are reviewed for accuracy. The number of hospitalized/fatal cases may be an underestimate, as some cases may not be identified.

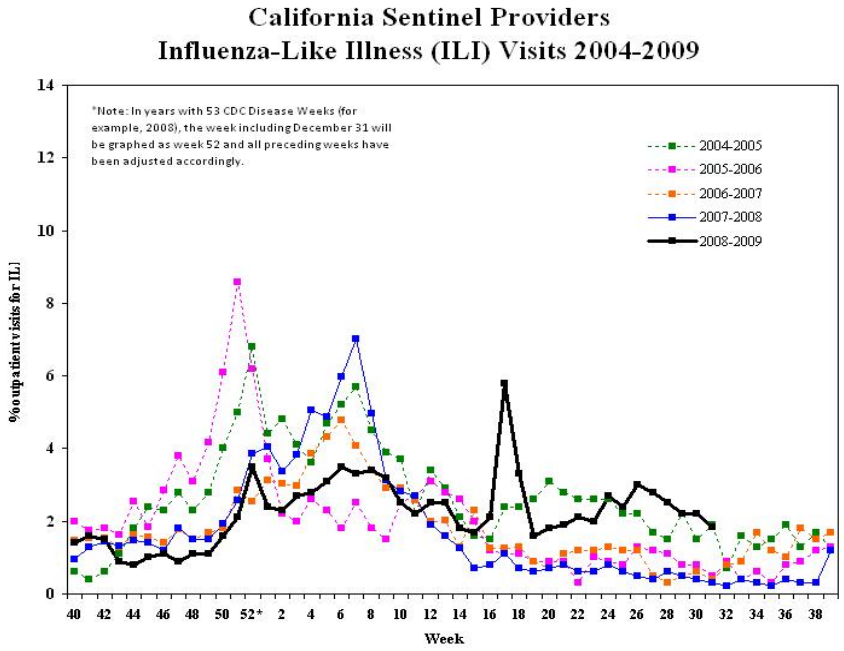
Figure 1 shows hospitalized and fatal cases reported from April 3 – August 11, 2009, by onset date. A total of 165 new hospitalized cases were reported to CDPH in the past week, which is a decrease from the week prior, when 193 new reports were received. It is worth noting that the median lag time between date of illness onset to date of report to CDPH is 16 days (range: 1 – 104 days).

To date, CDPH has received 1,067 reports of hospitalized and/or fatal cases. The incidence rate of hospitalized/fatal cases is highest among children, especially infants (Figure 2). The median age is 27 years (range: <1 – 92 years). Fever (88%) and shortness of breath (54%) 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 76% of cases, with obesity (41%) and lung disease (35%) being the most common. Among women of child-bearing age, 90 (36%) were pregnant. Secondary bacterial infections (*Staphylococcus aureus*, Group A *Streptococcus*, *Streptococcus pneumoniae*) were present in 4% of reported cases. Eighty-two percent of hospitalized/fatal cases received antivirals and less than half had chest radiograph findings consistent with pneumonia (Table 2).

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 3 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 increased steadily until Week 26 (June 28 - July 4, 2009). Outpatient visits for ILI have been declining since Week 26. A total of 41 sentinel providers reported during Week 31 (August 2 – 8, 2009).

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

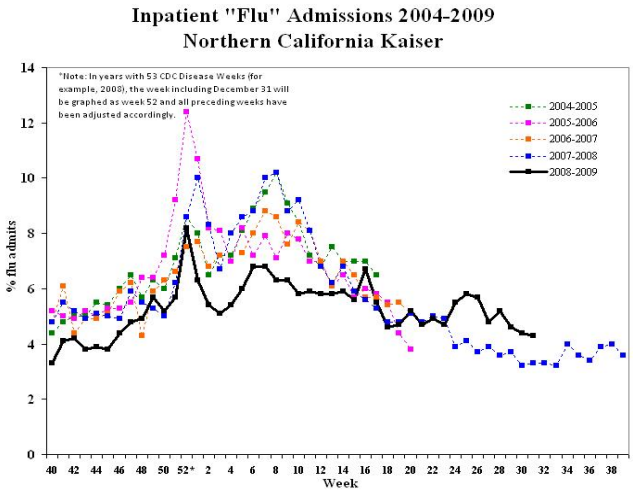


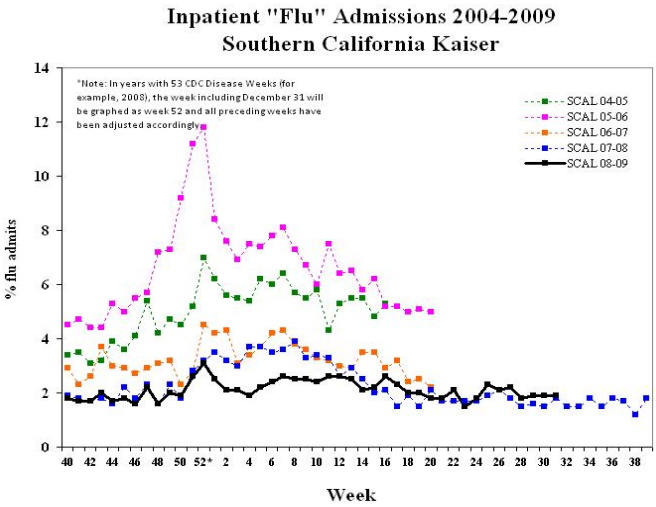
3. Kaiser Permanente Hospitalization Data ("Flu Admits")

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 4 and 5 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). Hospitalizations of pneumonia and influenza (P&I) in Northern California are declining while Southern California remains steady.

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





5. Laboratory Surveillance Update

VRDL Influenza PCR Results (Updated August 12, 2009)

- 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 4,346 specimens for pandemic (H1N1) 2009-related testing.
- Of 3,668 specimens tested at VRDL for influenza A, 2,418 (66%) have been positive.
- A total of 1,001 influenza A-positive specimens have been subtyped at VRDL.
- Of 1,678 unsubtypeable specimens tested at VRDL for pandemic (H1N1) 2009, 1,544 (92%) have been positive.

Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results (Updated August 12, 2009)

As noted in Table 3 below, during Week 31 (August 2 – 8, 2009), 35% of specimens received by the Respiratory Laboratory Network were positive for influenza A. This is a decrease from the previous week, when 48% of specimens were positive for influenza A. All but one of the influenza A-positive samples tested this week was unsubtypeable, indicating that pandemic (H1N1) 2009 continues to be the predominant strain circulating in California at this time.

Table 2. Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results, Week 31 (August 2 – 8, 2009)

	Total tested	Flu A (% of total)	H1 (% of Flu A)	H3 (% of Flu A)	Unsubtypeable (% of Flu A)
All RLN*	**430**	**151 (35%)**	**0 (0%)**	**1 (1%)**	**150 (99%)**
Northern	207	80 (39%)	0 (0%)	0 (0%)	80 (100%)
Central	131	35 (27%)	0 (0%)	0 (0%)	35 (100%)
Southern	92	36 (39%)	0 (0%)	1 (3%)	1 (97%)

* 11 RLN laboratories reporting, including:
Northern CA: Contra Costa, Marin, Monterey, San Francisco, Santa Clara, Shasta, Sonoma
Central CA: Tulare
Southern CA: Long Beach, Orange, Ventura

Laboratory Positive Results Data

The table below 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 2– August 8, 2009.

		Sentinel Laboratories/Respiratory Laboratory Network‡	Sentinel Providers
Week 31	**Number of Sites Reporting**	19	948 specimens submitted (418 positive by PCR)
	Influenza A	675[a] Total tested week 31: 2222	0 Total tested week 31: 0
	Influenza B	1[b] Total tested week 31: 1698	0 Total tested week 31: 0
	RSV	2[c] Total tested week 31: 1278	N/A
	Other Respiratory Viruses	2[d] Total tested week 31: 192	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 (41); Contra Costa (42); Fresno (11); Long Beach (31); Los Angeles (71); Marin (11); Merced (1); Monterey (2); Napa (4), Orange (56); Placer (25); Riverside (14); Sacramento (68); San Bernardino (1); San Diego (26); San Francisco (26); San Joaquin (20); San Mateo (10); Santa Clara (48); Shasta (1); Solano (15); Sonoma (100); Stanislaus (11); Tulare (33); Ventura (4); Yolo (2); Unknown (1)

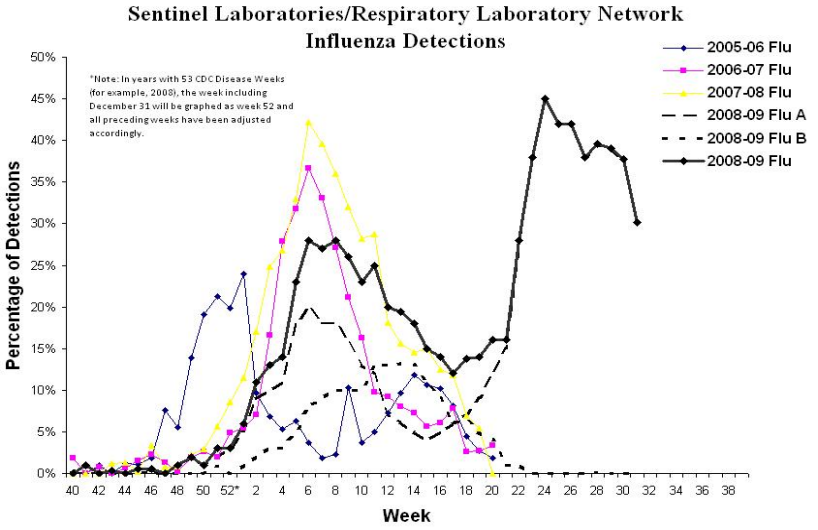
[b] San Mateo (1)

[c] Alameda (2)

[d] adenovirus (1); parainfluenza type 2 (1)

Figure 4 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 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.

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

Pandemic (H1N1)	Oseltamivir Resistant	Adamantanes Resistant
VRDL	**0/260**	**68/68**

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