California Influenza Surveillance Project

California Department of Public Health

2008-2009

Influenza Update

Influenza Surveillance for August 13 – August 19, 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 have declined in recent weeks. Reports of influenza-like illness and hospitalizations for pneumonia and influenza are similar to previous weeks.

1. **Pandemic (H1N1) 2009 Epi- Surveillance Update** (Updated August 19, 2009)

   Highlights:

   - This week, local health departments began reporting hospitalized pandemic (H1N1) 2009 cases as aggregate numbers. From August 12 – August 18, 2009, 296 hospitalized cases were reported; there have been 1,353 hospitalizations, with 360 cases requiring intensive care, to date. Please note that due to the recent change in reporting recommendations, the numbers reported this week may include duplicate or missing reports as well as reports of cases from prior weeks on whom case report forms had not yet been completed, and they should be considered provisional at this time.
   - CDPH received 11 reports of fatal pandemic (H1N1) 2009 cases this week; a total of 115 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.
   - During this week, the CDPH Viral and Rickettsial Diseases Laboratory detected a specimen with the H275Y resistance mutation (associated with oseltamivir resistance); the result was confirmed by the D. 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. To date, 308 specimens have been tested at VRDL for the resistance mutation; all but one have tested negative for the 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.

- Seventeen (17) new cases meeting the case definition for severe pediatric influenza were reported this week, including one fatality; 15 of the cases are confirmed/probable pandemic (H1N1) 2009 (additional testing is pending for the remaining two cases)**.**

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 18, 2009.

Jurisdiction	Total Hospitalizations, ICU cases and Deaths[a]	Incidence of Hospitalizations per 100,000 population	Deaths[b]
CALIFORNIA	1353	3.57	115
County Undetermined	0	0.00	0
Alameda	87	5.65	9
Berkeley City	3	2.80	0
Butte	14	6.17	0
Contra Costa	114	10.71	6
El Dorado	3	1.61	1
Fresno	21	2.18	4
Humboldt	3	2.24	0
Imperial	8	4.33	0
Inyo	1	5.24	0
Kern	9	1.05	0
Kings	2	1.24	0
Lake	3	4.50	0
Long Beach City	43	8.73	2
Los Angeles	136	1.30	16
Madera	2	1.26	0
Marin	25	9.86	3
Mendocino	4	4.33	0
Merced	13	4.86	1
Monterey	22	5.11	1
Napa	4	2.84	1
Orange	193	6.05	13
Pasadena City	2	1.33	0
Placer	2	0.59	1
Riverside	17	0.78	1
Sacramento	92	6.40	6
San Benito	3	4.80	0
San Bernardino	40	1.87	3
San Diego	179	5.65	16
San Francisco	41	5.04	6
San Joaquin	38	5.25	2
San Luis Obispo	2	0.75	1
San Mateo	37	5.04	7
Santa Barbara	6	1.39	0
Santa Clara	74	4.06	4
Santa Cruz	7	2.62	1
Shasta	3	1.59	0
Solano	14	3.21	2
Sonoma	38	7.73	5
Stanislaus	35	6.37	2
Tulare	7	1.53	0
Yolo	6	2.96	1

[a] This number does not include reports of hospitalized cases not yet validated by LHJ, represents cases ever 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. Also, local health jurisdictions were asked to include in this week's aggregate numbers all cases that have not yet been reported to CDPH, regardless of report date to their jurisdiction. Consequently, the number of hospitalized/fatal cases went up from 1067 cases last week to 1353 cases this week.

The incidence of hospitalizations by age group is shown in Table 2. The incidence rate remains highest among children, especially those under 1 year old.

Table 2. Total number of hospitalized and/or fatal cases reported and incidence rate of pandemic (H1N1) 2009 in California, April 3 - August 18, 2009

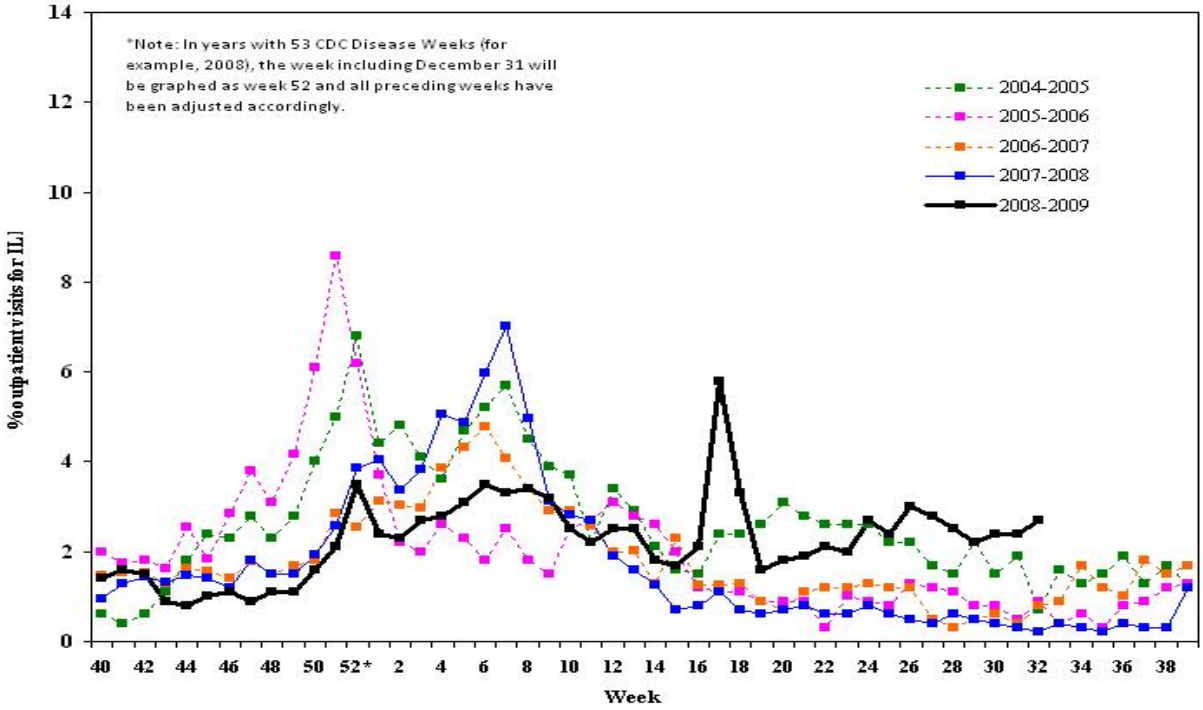
Age category, in years	Number of cases	Cumulative number of cases	Incidence per 100,000 population
<1	84	84	14.74
1-4	110	194	4.98
5-18	243	437	3.21
19-24	157	594	4.53
25-35	234	828	3.98
36-49	212	1040	2.64
50-64	237	1277	3.54
65+	76	1353	1.74

As of August 18, 2009, CDPH received 1,209 case report forms for hospitalized and/or fatal cases. The median age of these cases is 28 years (range: <1–92 years). Fever (89%) 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 77% of cases, with obesity (44%) and lung disease (36%) being the most common. Among women of child-bearing age, 111 (39%) 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; less than half had chest radiograph findings consistent with pneumonia (Table 3).

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 increased and has remained steady. A total of 45 sentinel providers reported during Week 32 (August 9 – 15, 2009).

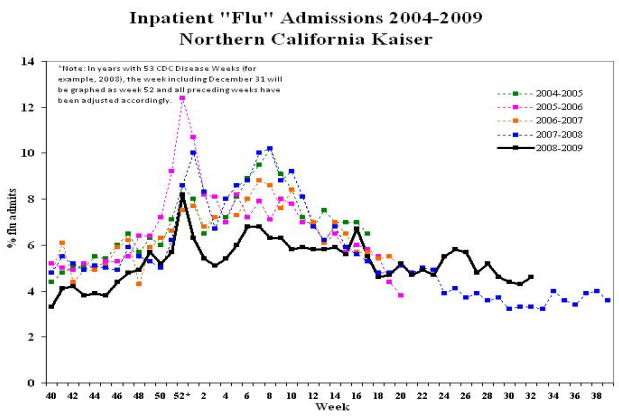
Figure 1. California Sentinel Providers – Influenza-Like Visits, 2004-2009.

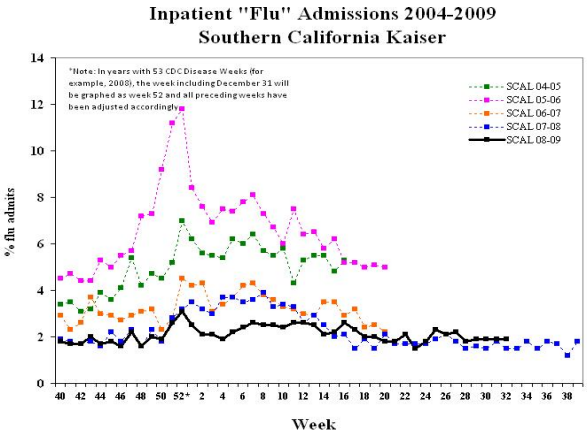


3. Kaiser Permanente Hospitalization Data ("Flu Admits")

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). Hospitalizations for pneumonia and influenza (P&I) are slightly higher than this time last year in Northern California, but remain similar to this time last year in Southern California.

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





5. Laboratory Surveillance Update

VRDL Influenza PCR Results (Updated August 19, 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 4,429 specimens for pandemic (H1N1) 2009-related testing.
- Of 3,737 specimens tested at VRDL for influenza A, 2,476 (66%) have been positive.
- A total of 1,001 influenza A-positive specimens have been subtyped at VRDL.
- Of 1,740 unsubtypeable specimens tested at VRDL for pandemic (H1N1) 2009, 1,615 (93%) have been positive.

Respiratory Laboratory Network (RLN) Influenza PCR Surveillance Results (Updated August 19, 2009)

As noted in Table 4 below, during Week 32 (August 9 – 15, 2009), 44% of specimens received by the Respiratory Laboratory Network were positive for influenza A. This is a slight decrease from the previous week, when 47% of specimens were positive for influenza A. All 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 32 (August 9 – 15, 2009)

	Total tested	Flu A (% of total)	Unsubtypeable (% of Flu A)
All RLN*	**463**	**202 (44%)**	**202 (100%)**
Northern	196	58 (30%)	58 (100%)
Central	150	68 (45%)	68 (100%)
Southern	117	76 (65%)	76 (100%)

* 12 RLN laboratories reporting, including:
Northern CA: Contra Costa, El Dorado, San Francisco, Santa Clara, Shasta, Sonoma
Central CA: Fresno, Tulare
Southern CA: Long Beach, Los Angeles, Riverside, Ventura

Laboratory Positive Results Data (Updated August 19, 2009)

Table 5 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 9– August 15, 2009.

		Sentinel Laboratories/Respiratory Laboratory Network‡	Sentinel Providers
Week 32	Number of Sites Reporting	22	972 specimens submitted (467 positive by PCR)
	Influenza A	619[a] Total tested week 32: 2055	0 Total tested week 32: 0
	Influenza B	0 Total tested week 32: 1540	0 Total tested week 32: 0
	RSV	0 Total tested week 32: 1156	N/A
	Other Respiratory Viruses	4[b] Total tested week 32: 215	N/A

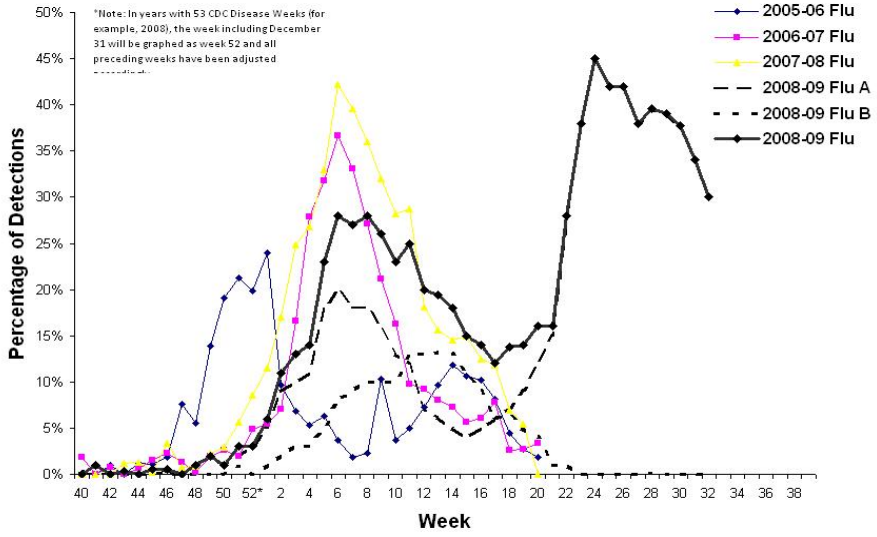
‡Sentinel laboratories are hospital, academic, private, and public health laboratories located throughout California that provide data on the number of laboratory-confirmed influenza and other respiratory virus detections and isolations. The Respiratory Laboratory Network (RLN) is a network of 23 local 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 (48); Contra Costa (23); El Dorado (2); Fresno (41); Long Beach (23); Los Angeles (102); Marin (2); Merced (1); Napa (2), Orange (30); Placer (20); Riverside (22); Sacramento (50); San Diego (24); San Francisco (14); San Joaquin (29); San Mateo (11); Santa Clara (40); Shasta (3); Solano (11); Sonoma (60); Stanislaus (8); Tulare (46); Ventura (3); Yolo (2); Unknown (2)

[b] adenovirus (1); parainfluenza type 1 (2); parainfluenza type 3 (1)

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 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 this week, 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	**1/308**	**68/68**

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