



Center for Health Statistics



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COUNTY HEALTH FACTS No. 04-08

County Health Facts is a series of reports using California Health Interview Survey data to describe the health status of California's counties.

2001 HIGHLIGHTS:

About 67.4 percent of Californians aged 65 and older, more than 2.5 million people, received a flu shot.

About 72.5 percent of Californians aged 65 and older with a high-risk health condition received a flu shot.

Sonoma County had the highest proportion of residents aged 65 and older receiving flu shots, 81.0 percent.

Imperial County had the lowest proportion of older residents receiving flu shots, 45.8 percent.

Influenza Vaccination in California Counties, 2001

By Laura E. Lund, M.A.¹

Influenza (“the flu”) is a contagious respiratory illness caused by viruses. The flu can produce mild to severe symptoms, including fever (usually high), headache, extreme tiredness, dry cough, sore throat, runny or stuffy nose, and muscle aches.² Gastrointestinal symptoms, such as nausea, vomiting, and diarrhea, are much more common among children than adults. According to the Centers for Disease Control and Prevention (CDC), an estimated 10 to 20 percent of United States (U.S.) residents get the flu each year. Annually about 114,000 people in the U.S. are hospitalized for flu-related complications and 36,000 die from complications of the flu.

CDC recommends annual vaccinations to prevent the flu.² In addition, the U.S. Department of Health and Human Services *Healthy People 2010* (HP2010) initiative has established several multi-year national objectives to reduce the burden of the flu in the U.S.³ These objectives include increasing the proportion of adults receiving annual flu vaccinations, especially adults age 65 and older and those with high-risk conditions such as heart disease, diabetes, and chronic respiratory disease.

This report presents data on influenza vaccination (“flu shot”) in adults aged 65 and older in California’s counties. All data come from the California Health Interview Survey (CHIS 2001).⁴ The terms “rate”, “percent”, and “proportion” are used interchangeably throughout this report to refer to flu vaccination incidence. (See “Methods” on page three for further discussion of the analytic methods used in this report and CHIS 2001 survey design).

Influenza Vaccination among Persons Aged 65 and Older

More than 2.5 million Californians aged 65 and older, or about 67.4 percent of persons in this age group, received a flu shot in 2001 (Table 1, page 4). There was considerable variation in flu shot rates across counties, from a low of 45.8 percent in Imperial County to a high of 81.0 percent in Sonoma County. Comparing county rates with the overall California rate, only one county, Imperial, had a flu shot rate significantly below California’s rate of 67.4 percent. Seven counties (Sonoma, El Dorado, Sacramento, Solano, Shasta, San Luis Obispo, and San Diego) had rates significantly higher than the State rate.

¹California Department of Health Services, Center for Health Statistics

²Centers for Disease Control and Prevention. Key Facts About the Flu: Overview. URL: <http://www.cdc.gov/flu/keyfacts.htm>.

³United States Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington D.C.: U.S. Government Printing Office. November 2000.

⁴CHIS 2001 asked respondents aged 65 and older, “During the past 12 months, have you had a flu shot?” Answers to this question provide a 12-month incidence estimate for flu vaccination.

HP2010 Objective 14-29a is to increase to 90 percent the proportion of non-institutionalized adults aged 65 and older receiving an annual influenza vaccination. No counties in California achieved this target.

Influenza Vaccination among Persons aged 65 and Older with High-Risk Conditions

Individuals with heart disease, diabetes, and chronic respiratory disease are at especially high risk for serious, and often fatal, complications resulting from the flu. This report refers to persons as “high-risk” if they had one or more of the following conditions: heart disease, diabetes, or asthma.⁵ Individuals are “lower-risk” if they had none of these conditions. Among high-risk Californians aged 65 and older, 72.5 percent, more than one million, received a flu shot in 2001 (Table 2, page 5). El Dorado County had the highest proportion of high-risk residents receiving flu shots, 86.2 percent. Imperial County had the lowest rate, 40.1 percent. Four counties and one region (San Diego, Shasta, Sonoma, El Dorado, and Tehama/Glenn/Colusa) had flu shot rates that were significantly higher than the State rate of 72.5 percent. Only one county, Imperial, had a rate significantly below California’s rate overall.

There are no HP2010 objectives specific to influenza vaccination in non-institutionalized high-risk adults aged 65 and older. However, applying the target of 90 percent for all persons aged 65 and older from HP2010 Objective 14-29a, three counties and one region (Shasta, Sonoma, El Dorado, and Tehama/Glenn/Colusa) had flu shot rates that achieved the HP2010 target rate in the high-risk group.

Flu shot rates were generally lower among lower-risk Californians compared to rates in the high-risk group (Table 3, page 6). About 64.1 percent of lower-risk Californians, 1.4 million adults aged 65 and older, received a flu shot in 2001. Sonoma County had the highest proportion of lower-risk residents receiving a flu shot, 78.8 percent. Imperial County had the lowest rate, 49.5 percent. Four counties (Solano, Sacramento, El Dorado, and Sonoma) had rates significantly higher than the State rate of 64.1 percent. Only one county, Imperial, had a rate significantly below California’s rate overall. For the lower-risk group, there were no counties with vaccination rates that achieved the HP2010 target of 90 percent.

Summary

Many Californians aged 65 and older are following national public health recommendations to get a flu shot every year, with 67.4 percent receiving a flu shot in 2001. However, the State lags far behind the Healthy People 2010 recommendation that at least 90 percent of adults aged 65 and older receive an annual influenza vaccination. Even among persons with health conditions that place them at high risk for serious, even fatal, complications from the flu, the vaccination rate is only 72.5 percent. Flu vaccination rates among persons aged 65 and older ranged from 45.8 percent in Imperial County to 81.0 percent in Sonoma County, with no counties achieving the HP2010 objective. This means that many Californians remain at risk from the serious and possibly life-threatening complications of this preventable disease.

The Immunization Branch of the California Department of Health Services provides leadership and support to public and private sector efforts to protect the population against vaccine-preventable diseases. For more information on flu prevention and immunization activities in California, contact the Immunization Branch at <http://www.dhs.ca.gov/ps/dcdc/izgroup/>.

⁵CHIS 2001 asked respondents: “Has a doctor ever told you that you have any kind of heart disease?”; “{Other than during pregnancy} Has a doctor ever told you that you have diabetes or sugar diabetes?”; “Has a doctor ever told you that you have asthma?” CHIS 2001 did not ask respondents about types of respiratory disease other than asthma.

Methods

Data: The California Health Interview Survey (CHIS 2001) is a population-based household telephone survey, representative of the non-institutionalized adult population of California, with more than 55,000 Californians participating. In addition to statewide data, CHIS 2001 provides representative samples for California counties with populations greater than 100,000. For smaller counties, CHIS 2001 provides representative data estimates for contiguous county groups, referred to as “regions” in this report. Respondents to the survey were randomly selected California residents aged 18 and older living in households with telephones. CHIS 2001 is a collaboration of the University of California at Los Angeles Center for Health Policy Research, the California Department of Health Services, and the Public Health Institute. More information on the CHIS 2001 sample is available at <http://www.chis.ucla.edu>.

Analysis: In this report, age-specific rates for persons 65 years old and older are provided as measures of 12-month flu vaccination incidence. Details on the methods used to calculate rates are available from the author.

The 95 percent confidence intervals (CIs) are presented for each rate. Because CHIS data are collected through a sampling method, there may be some random error in the rate estimate. The CIs represent the range of values likely to contain the “true” population rate 95 percent of the time. In this report, rates are considered to be significantly different from each other when their confidence intervals do not overlap. When comparing county or State rates to HP2010 objectives in this report, a rate is not considered significantly different from an HP2010 objective if the confidence intervals of the rate include the target rate for the HP2010 objective.

Cases with missing information for flu vaccination were excluded from this analysis. CHIS 2001 did not ask about flu vaccination in persons under age 65.

Limitations: The CHIS 2001 data are self-reported by respondents to the survey, and may be subject to error, such as respondent failure to recall information about existing health conditions. Only persons living in households with telephones were included in the survey. Participation in CHIS is voluntary; persons who refused to participate may be different than those who were interviewed. Details on response rates, respondent characteristics, and other survey information can be obtained at <http://www.chis.ucla.edu>.

For more information on CHIS 2001 contact Laura E. Lund, CHIS Coordinator, California Department of Health Services, Center for Health Statistics, Office of Health Information and Research, MS 5103, P.O. Box 997410, Sacramento, CA 95899-7410.

**TABLE 1
12-MONTH INCIDENCE OF INFLUENZA VACCINATION IN CALIFORNIA
AMONG PERSONS AGED 65 AND OLDER, BY COUNTY OR REGION, 2001**

County of Residence	Flu Vaccination Rate ¹	95% Confidence Interval		Estimated N ²
		Lower	Upper	
Imperial*	45.8	36.7	55.0	7,000
Kings	57.6	46.9	68.2	6,000
Merced	58.2	50.1	66.3	12,000
Riverside	63.1	57.3	68.9	131,000
Siskiyou/Lassen/Trinity/Modoc	63.9	57.1	70.6	10,000
Los Angeles	63.9	61.5	66.3	603,000
Kern	64.0	56.5	71.4	45,000
Napa	64.0	57.2	70.8	13,000
San Bernardino	64.1	57.7	70.6	95,000
Orange	64.4	59.5	69.4	174,000
San Mateo	65.0	58.0	71.9	62,000
Tuolumne/Calaveras/Amador/Inyo/Mariposa/Mono/Alpine	65.5	58.9	72.2	22,000
San Francisco	65.9	59.5	72.2	78,000
Nevada/Plumas/Sierra	66.4	59.9	73.0	16,000
Tulare	66.6	58.6	74.6	26,000
Fresno	66.8	59.7	73.9	55,000
Ventura	66.8	59.2	74.4	52,000
California	67.4	66.3	68.6	2,504,000
Butte	67.6	60.5	74.6	25,000
Sutter/Yuba	67.6	59.8	75.4	12,000
Stanislaus	67.6	59.5	75.7	33,000
Santa Clara	67.7	61.1	74.3	115,000
Contra Costa	67.7	60.9	74.4	75,000
Tehama/Glenn/Colusa	68.7	61.3	76.0	11,000
Santa Barbara	68.8	61.8	75.7	35,000
Humboldt/Del Norte	68.9	60.3	77.6	14,000
Marin	69.2	61.4	76.9	24,000
Mendocino/Lake	69.4	62.5	76.3	18,000
Yolo	70.0	60.7	79.2	12,000
Monterey/San Benito	70.8	63.0	78.7	32,000
Madera	70.9	64.0	77.8	11,000
San Joaquin	71.0	64.2	77.8	47,000
Alameda	71.5	64.6	78.5	109,000
Placer	72.9	66.0	79.8	22,000
Santa Cruz	73.2	63.1	83.3	21,000
San Diego*	73.3	69.1	77.4	236,000
San Luis Obispo*	76.3	70.1	82.5	30,000
Shasta*	77.6	71.6	83.5	20,000
Solano*	77.9	72.5	83.3	28,000
Sacramento*	78.3	72.6	84.0	105,000
El Dorado*	80.6	74.5	86.8	17,000
Sonoma*	81.0	74.6	86.8	48,000
HP2010 Objective 14-29a	90.0	--	--	--

¹Rate is per 100 persons aged 65 and older.
²The number of persons receiving a flu shot was calculated by estimating the proportion of the population aged 65 and older receiving a flu shot, and multiplying that proportion times the county or State population of persons aged 65 and older, then rounding to the nearest thousand.
*County rate is significantly different from State rate.

Sources: University of California at Los Angeles Center for Health Policy Research and State of California, Department of Health Services. 2001 California Health Interview Survey.
State of California, Department of Finance. Race/Ethnic Population with Age and Sex Detail, 2000 (December, 1998).
Prepared by: Department of Health Services, Center for Health Statistics.

TABLE 2
12-MONTH INCIDENCE OF FLU VACCINATION IN CALIFORNIA
AMONG HIGH-RISK PERSONS¹ AGED 65 AND OLDER, BY COUNTY OR REGION, 2001

County of Residence	Flu Vaccination Rate ²	95% Confidence Interval		Estimated N ³
		Lower	Upper	
Imperial*	40.1	26.5	53.7	3,000
Stanislaus	59.9	45.2	74.5	11,000
Kings	63.5	50.4	76.6	3,000
Marin	64.1	49.8	78.5	7,000
Merced	64.3	52.3	76.4	6,000
Fresno	64.9	53.7	76.1	23,000
San Bernardino	65.3	55.1	75.4	43,000
San Mateo	65.9	54.8	77.1	24,000
Tulare	66.1	53.6	78.7	11,000
Riverside	67.3	57.8	76.7	56,000
Butte	68.5	56.5	80.4	10,000
Tuolumne/Calaveras/Amador/Inyo/Mariposa/Mono/Alpine	68.8	57.5	80.1	8,000
Yolo	69.1	55.6	82.6	5,000
Ventura	69.3	57.3	81.3	22,000
Los Angeles	69.9	66.1	73.7	259,000
Kern	70.0	58.4	81.7	18,000
Mendocino/Lake	70.3	59.9	80.6	8,000
Sutter/Yuba	70.4	59.1	81.7	5,000
Nevada/Plumas/Sierra	70.4	60.3	80.5	7,000
Siskiyou/Lassen/Trinity/Modoc	70.8	61.3	80.2	5,000
San Francisco	71.1	60.7	81.4	27,000
Santa Barbara	71.3	60.1	82.6	13,000
California	72.5	70.7	74.2	1,060,000
Napa	72.8	63.0	82.6	6,000
Alameda	73.6	62.6	84.7	51,000
Orange	74.0	66.7	81.2	73,000
Humboldt/Del Norte	74.4	61.7	87.1	6,000
Madera	74.4	65.1	83.8	5,000
San Joaquin	75.0	65.4	84.5	20,000
Santa Clara	75.2	64.5	85.8	48,000
Contra Costa	77.5	68.6	86.4	36,000
Sacramento	79.0	70.7	87.4	46,000
Placer	80.3	70.9	89.7	9,000
Monterey/San Benito	81.4	69.7	93.2	12,000
San Luis Obispo	81.8	72.7	90.9	11,000
Santa Cruz	81.8	70.0	93.6	7,000
Solano	82.0	74.2	89.8	12,000
San Diego*	82.4	77.2	87.6	102,000
Shasta*	82.5	74.6	90.4	10,000
Tehama/Glenn/Colusa*	83.6	75.0	92.2	6,000
Sonoma*	85.3	75.0	95.6	16,000
El Dorado*	86.2	77.2	95.1	7,000
HP2010 Objective 14-29a	90.0	--	--	--

¹"High-risk" refers to individuals who have one or more of the following conditions: heart disease, diabetes, asthma.
²Rate is per 100 high-risk persons aged 65 and older.
³The number of high-risk persons receiving a flu shot was calculated by estimating the proportion of the population aged 65 and older at high risk and receiving a flu shot, and multiplying that proportion times the county or State population of persons aged 65 and older, then rounding to the nearest thousand.
*County rate is significantly different from State rate.

Sources: University of California at Los Angeles Center for Health Policy Research and State of California, Department of Health Services. 2001 California Health Interview Survey. State of California, Department of Finance. Race/Ethnic Population with Age and Sex Detail, 2000 (December, 1998). Prepared by: Department of Health Services, Center for Health Statistics.

**TABLE 3
12-MONTH INCIDENCE OF FLU VACCINATION IN CALIFORNIA
AMONG LOWER-RISK PERSONS¹ AGED 65 AND OLDER, BY COUNTY OR REGION, 2001**

County of residence	Flu Vaccination Rate ²	95% Confidence Interval		Estimated N ³
		Lower	Upper	
Imperial*	49.5	37.3	61.6	4,100
Kings	50.9	34.9	66.9	2,500
Merced	52.3	41.2	63.4	5,900
Napa	57.0	47.7	66.3	6,200
Tehama/Glenn/Colusa	58.1	47.8	68.4	5,500
Siskiyou/Lassen/Trinity/Modoc	58.1	48.7	67.5	5,200
Orange	59.3	52.8	65.8	100,400
Los Angeles	59.8	56.7	62.9	338,400
Kern	60.5	51.0	70.1	27,300
Riverside	60.9	53.6	68.2	75,500
Contra Costa	62.2	52.7	71.7	38,600
Santa Clara	63.2	54.8	71.6	67,100
Tuolumne/Calaveras/Amador/Inyo/Mariposa/Mono/Alpine	63.4	55.2	71.7	13,700
San Bernardino	63.5	55.2	71.9	51,600
San Francisco	63.6	55.6	71.6	49,900
Nevada/Plumas/Sierra	63.9	55.4	72.4	8,700
San Mateo	64.1	55.2	73.0	37,400
California	64.1	62.6	65.7	1,423,000
Humboldt/Del Norte	64.3	52.3	76.4	7,400
Sutter/Yuba	64.9	54.2	75.7	6,300
Monterey/San Benito	65.4	55.4	75.4	20,000
Ventura	65.6	55.5	75.6	30,000
Santa Barbara	66.1	57.1	75.0	20,400
San Diego	66.7	60.8	72.6	127,600
Butte	67.0	58.3	75.6	15,100
Tulare	67.3	56.7	77.9	14,600
Placer	67.3	57.8	76.9	12,100
San Joaquin	68.0	58.5	77.5	25,600
Madera	68.2	58.0	78.3	5,300
Fresno	68.3	59.1	77.4	31,400
Mendocino/Lake	68.7	59.3	78.0	9,400
Santa Cruz	69.1	55.7	82.5	13,300
Alameda	69.7	60.9	78.6	57,700
Yolo	70.4	57.7	83.1	6,800
Marin	71.0	61.7	80.3	16,200
Stanislaus	72.1	62.8	81.4	21,700
San Luis Obispo	73.1	65.0	81.2	18,200
Shasta	73.4	64.7	82.0	10,300
Solano*	75.8	68.3	83.2	15,300
Sacramento*	77.8	70.0	85.5	58,600
El Dorado*	77.9	69.6	86.1	10,000
Sonoma*	78.8	70.8	86.8	32,000
HP2010 Objective 14-29a	90.0	--	--	--

¹"Lower-risk" refers to individuals who do not have any of the following conditions: heart disease, diabetes, asthma.
²Rate is per 100 lower-risk persons aged 65 and older.
³The number of lower-risk persons receiving a flu shot was calculated by estimating the proportion of the population aged 65 and older at lower-risk and receiving a flu shot, and multiplying that proportion times the county or State population of persons aged 65 and older, then rounding to the nearest thousand.
*County rate is significantly different from State rate.

Sources: University of California at Los Angeles Center for Health Policy Research and State of California, Department of Health Services. 2001 California Health Interview Survey. State of California, Department of Finance. Race/Ethnic Population with Age and Sex Detail, 2000 (December, 1998). Prepared by: Department of Health Services, Center for Health Statistics.