Center for
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Prevalence of Obesity and Healthy Weight in California Counties, 2001

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

HIGHLIGHTS:

About 19 percent of adults in California, more than 4.7 million people, were obese in 2001.

Only 43.2 percent of all adults, about 9.9 million Californians, were at a healthy weight in 2001.

Marin County had the lowest age-adjusted adult obesity rate, 10.9 percent, while Merced County had the highest rate, 29.9 percent.

Marin County had the largest proportion of adult residents at a healthy weight, 60.1 percent while Tulare County had the smallest proportion, 30.0percent.

Obesity among adults has increased at an epidemic rate over the last 20 years in the United States (U.S.); even more alarming is the trend in children, with the percentage of overweight children and adolescents more than doubling since the early 1970s.[3] Obesity occurs when individuals consistently consume more calories than they use and is roughly equivalent to an average of 30 pounds overweight.[4,5] The public health impact of overweight and obesity is substantial, both in terms of disease burden and cost. According to the National Institutes of Health, obesity and overweight can increase the risk of illness and death from many chronic diseases, including hypertension, type 2 diabetes, coronary heart disease, stroke, osteoarthritis, and cancers of the breast, prostate, and colon.[4] In California, the direct cost of adult medical expenses attributable to obesity is estimated to be $7,675 million, almost half paid through Medicare and Medi-Cal.[6]

The U.S. Department of Health and Human Services (DHHS) has made the problem of overweight and obesity one of its top priorities. The federal Centers for Disease Control and Prevention (CDC) has established state-based Nutrition and Physical Activity Programs to Prevent Obesity to support state health departments and their partners in developing and implementing nutrition and physical activity interventions to prevent obesity and chronic diseases. The DHHS *Healthy People 2010* (HP2010) initiative also has established several multi-year national objectives to reduce the burden of obesity in the U.S.[7] These objectives include increasing the number of adults maintaining a healthy weight, reducing the proportion of adults who are obese, and reducing the proportion of children and adolescents who are overweight or obese. Related objectives include increasing physical activity and the consumption of fruits and vegetables, encouraging breastfeeding, and reducing food insecurity. More

[1]California Department of Health Services, Center for Health Statistics
[2]California Department of Health Services, Cancer Control Branch, Cancer Prevention and Nutrition Section
[3]United States Department of Health and Human Services, Centers for Disease Control and Prevention. "Overweight and Obesity." Available at http://www.cdc.gov/nccdphp/dnpa/obesity . Accessed January, 2004.
[4]National Institutes of Health. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: the Evidence Report.* NIH Publication No. 98-4083. September, 1998. National Institutes of Health: Washington D.C.
[5]National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. "Understanding Adult Obesity." Available at http://www.niddk.nih.gov/health/nutrit/pubs/unders.htm#causes. Accessed January 2004.
[6]Finkelstein EA, Fiebelkorn IC, Wang G. State-level estimates of annual medical expenditures attributable to obesity. *Obesity Research* 2004; 12(1):18-24.
[7]United 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.

broad-based objectives focus on improving the promotion of healthy eating, physical activity, and weight management in communities, schools, worksites, the media, and healthcare settings by communicating in a culturally and linguistically competent manner.

This report presents data on obesity and healthy weight in adults in California's counties. All data come from the California Health Interview Survey (CHIS 2001). The "Methods" section, on page four, contains definitions of the terms "obesity" and "healthy weight", a description of the CHIS 2001 design, and a discussion of the analytic methods used herein. The report uses the terms "rate", "percent", and "proportion" interchangeably.

Prevalence of Obesity in Adults

Crude rates. More than 4.7 million Californians, or 19.0 percent of all adults, were obese in 2001 (Table 1, page 5). There was considerable variation in rates of obesity across counties, from a low of 11.6 percent of adults in San Francisco County to a high of 29.4 percent in Merced County.

Age-adjusted rates. After adjusting for differences in county age distributions, Marin County had the lowest proportion of obese adults, 10.9 percent (Table 1), while Merced County continued to have the highest proportion, 29.9 percent. Comparing county proportions with the overall California rate, eight counties (Marin, San Francisco, Sonoma, Santa Cruz, Santa Clara, Orange, San Luis Obispo, and San Diego) had rates of adult obesity significantly below California's age-adjusted rate of 19.1 percent. Sixteen counties or regions (Tehama/Glenn/Colusa, Fresno, Tulare, Solano, San Bernardino, Madera, Stanislaus, Siskiyou/Lassen/Trinity/Modoc, Mendocino/Lake, Kern, Monterey/San Benito, Sutter/Yuba, San Joaquin, Kings, Imperial, and Merced) had obesity rates significantly higher than the State rate.

HP2010 Objective 19-2. HP2010 Objective 19-2 is to reduce to 15 percent the proportion of adults who are obese. Although the majority of counties and regions, and California overall, had age-adjusted rates that were significantly higher than the objective, fifteen counties or regions (Tuolumne/Calaveras/Amador/Inyo/Mariposa/Mono/Alpine, Orange, Santa Cruz, Placer, Ventura, Nevada/Plumas/Sierra, Santa Clara, Napa, San Mateo, El Dorado, Marin, San Francisco, Sonoma, San Diego, and San Luis Obispo) had age-adjusted obesity rates that were equal to or smaller than the target rate of 15 percent.

Prevalence of Healthy Weight in Adults

Crude rates. About 9.9 million Californians, or 43.2 percent of all adults, had a healthy weight in 2001 (Table 2, page 6). There was considerable variation in rates of healthy weight across counties, from a low of 30.4 percent of adults in Tulare County, to a high of 57.3 percent in Marin County.

Age-adjusted rates. After adjusting for differences in county age distributions, Tulare County continued to have the lowest proportion of adults with a healthy weight, 30.0 percent, while Marin County continued to have the highest proportion, 60.1 percent (Table 2). Comparing county rates with the overall California rate, eleven counties and one region (Tulare, Merced, Imperial, Fresno, San Joaquin, Madera, Kings, Stanislaus, San Bernardino, Solano, Kern, and Monterey/San Benito) had healthy weight rates significantly below California's age-adjusted rate of 43.0 percent. Six counties and one region (Alameda, Orange, Sonoma, Santa Clara, San Francisco, Marin, and Nevada/Plumas/Sierra) had healthy weight rates that were significantly higher than the State rate.

HP2010 Objective 19-1. HP2010 Objective 19-1 is to increase to 60 percent the proportion of adults who are at a healthy weight. Only one county (Marin) had an age-adjusted healthy weight rate that was equal to the HP2010 target rate of 60 percent.

Summary

Obesity is extremely prevalent in California, with more than 4.7 million Californians, or 19.0 percent of all adults, having a body mass index of 30.0 or greater. Conversely, only a 43.2 percent minority of Californians, 9.9 million adults, had a healthy weight in 2001. Obesity is a significant public health problem for counties throughout the State, with age-adjusted obesity rates ranging from 10.9 percent in Marin County to 29.9 percent in Merced County. Age-adjusted county-level healthy weight rates ranged from 30.0 percent in Tulare County to 60.1 percent in Marin County. Only Marin County met HP2010's recommended healthy weight goal.

An effective public health approach to the very serious problem of obesity prevention and treatment must be large-scale, comprehensive, and take place at national, state, and local levels. The California Department of Health Services (CDHS) has identified seven strategies as the most promising for reducing obesity and overweight. These strategies are to:

- Increase rates of physical activity;
- Decrease physical inactivity, especially television watching by children;
- Increase the consumption of fruits and vegetables;
- Increase the initiation and prolong the duration of breastfeeding;
- Decrease the consumption of high calorie, low nutrient foods;
- Decrease rates of food insecurity and hunger; and
- Improve access to prevention, early intervention, and treatment strategies for overweight and obesity in the health care system.

CDHS is committed to applying these strategies to help Californians reach and maintain a healthy weight. Many CDHS programs work to prevent and reduce obesity, including the Cancer Prevention and Nutrition Section, California Obesity Prevention Initiative (COPI), California Project LEAN, the California Center for Physical Activity, the CDHS Nutrition and Physical Activity Action Team, and the Women Infants and Children Supplemental Nutrition Program. Through large-scale public awareness campaigns such as the *California 5 a Day Campaign*, CDHS promotes increased consumption of fruits and vegetables, increased participation in physical activity, and optimal use of nutrition assistance programs to reduce food insecurity and hunger. Through the *California Nutrition Network*, CDHS funds more than 180 projects promoting these objectives. CDC-funded COPI brought together key stakeholders and experts in nutrition, physical activity, and obesity to identify strategies to address the societal, technological, and environmental influences on obesity. A sampling of additional activities and interventions undertaken by these programs include: finding innovative methods for increasing physical activity and decreasing television viewing time among elementary and middle school children; identifying gaps and opportunities in available data and for obesity prevention and treatment in Medi-Cal managed care health plans and other provider settings; promoting breastfeeding and healthy pre-gestation weight, healthy weight gain in pregnancy, and healthy postpartum weight for high-risk populations; and planning and convening the biennial Childhood Obesity Conference.

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Methods

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

Analysis: This report provides both crude and age-adjusted rates for adults as measures of obesity and healthy weight prevalence. Crude rates reflect the actual number of persons with obesity or a healthy weight in a county. However, since obesity is more common as people age and having a healthy weight is more common among younger persons than in older adults, counties with a larger proportion of older persons will tend to have higher crude rates of obesity and lower crude rates of healthy weight than counties with fewer older persons. Age-adjustment statistically controls for these differences in county age structures. Therefore, age-adjusted rates rather than crude rates should be used for comparing prevalence differences between counties or between a county and the State. Details on the methods used to calculate crude and age-adjusted rates are available from the first author.

The report presents 95 percent confidence intervals (CIs) for each rate. Because CHIS collects data 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. Rates are significantly different from each other when their confidence intervals do not overlap. When comparing county or State rates with HP2010 Objectives in this report, a rate is not considered significantly different from an HP2010 Objective if the confidence interval of the rate includes the target rate for the HP2010 objective.

Body mass index scores (BMI) determined assignment to obesity or healthy weight status, according to HP2010 recommendations. BMI is equal to:

$$\frac{\text{weight in kilograms}}{\text{height in meters} \times \text{height in meters}}$$

According to HP2010, adults with a BMI greater than or equal to 30.0 are obese, and adults with a BMI greater than or equal to 18.5 and less than 25 have a healthy weight. Cases with missing information for height or weight were excluded from this analysis.

Limitations: The CHIS data are self-reported by respondents to the survey. Therefore, the data 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, Office of Health Information & Research, MS 5103, P.O. Box 997410, Sacramento, CA, 95899-7410.

TABLE 1
PREVALENCE OF OBESITY (BMI≥30.0) AMONG ADULTS IN CALIFORNIA, BY COUNTY OR REGION, 2001

County of Residence	Age-adjusted Rate[1]	95% Confidence Interval		Crude Rate[1]	95% Confidence Interval		Estimated N[2]
		Lower	Upper		Lower	Upper	
Marin*	10.9	8.0	13.8	11.7	8.9	14.5	23,100
San Francisco*	11.9	10.3	13.5	11.6	9.8	13.3	73,900
Sonoma*	13.8	11.1	16.4	14.2	11.4	16.9	49,200
Orange*	14.9	13.4	16.5	14.9	13.2	16.6	301,500
HP 2010 Objective 19-2	**15.0**	**-**	**-**	**-**	**-**	**-**	**-**
Santa Cruz*	15.1	12.2	17.9	14.8	11.8	17.9	28,900
Santa Clara*	15.4	13.3	17.4	15.3	13.2	17.5	199,600
Nevada/Plumas/Sierra	15.4	12.0	18.8	14.9	12.0	17.9	14,300
San Luis Obispo*	15.7	12.8	18.6	15.5	12.6	18.5	30,800
Placer	15.7	12.7	18.7	16.0	13.1	19.0	28,900
Napa	16.0	13.1	18.9	16.7	13.7	19.8	16,300
San Diego*	16.2	14.7	17.8	15.8	14.2	17.4	336,300
Tuolumne/Calaveras/ Amador/Inyo/Mariposa/ Mono/Alpine	16.6	13.4	19.8	16.9	14.0	19.9	24,200
Ventura	16.6	14.0	19.3	16.7	13.8	19.5	90,600
San Mateo	16.8	14.0	19.5	16.9	14.0	19.8	95,400
El Dorado	17.2	14.1	20.4	17.9	14.5	21.4	22,100
Alameda	17.9	15.8	20.1	17.9	15.3	20.5	193,800
Santa Barbara	18.1	15.4	20.8	16.8	14.2	19.5	51,400
California	**19.1**	**18.7**	**19.5**	**19.0**	**18.6**	**19.4**	**4,728,600**
Los Angeles	19.8	19.0	20.6	19.6	18.7	20.5	1,360,800
Yolo	19.9	16.6	23.1	18.0	14.7	21.4	22,000
Contra Costa	20.1	17.4	22.7	20.2	17.6	22.9	140,600
Butte	20.3	17.0	23.5	19.6	16.3	22.8	30,700
Riverside	20.6	18.1	23.1	20.4	17.9	22.9	225,000
Sacramento	21.4	18.8	24.0	21.2	18.6	23.8	185,400
Shasta	21.6	17.9	25.2	21.5	18.1	24.8	28,100
Humboldt/Del Norte	21.7	18.3	25.0	21.3	17.8	24.8	25,900
Solano*	22.8	20.4	25.2	23.0	20.6	25.5	65,800
Siskiyou/Lassen/Trinity/ Modoc*	23.5	19.6	27.5	23.5	20.1	27.0	19,400
San Bernardino*	23.7	21.2	26.1	23.6	21.1	26.1	275,400
Mendocino/Lake*	24.1	20.0	28.2	23.5	20.1	26.9	26,800
Tehama/Glenn/Colusa*	24.2	20.7	27.7	24.0	20.6	27.4	18,700
Tulare*	24.3	20.9	27.6	23.7	20.2	27.2	60,300
Madera*	24.4	20.7	28.0	24.4	20.9	28.0	21,900
Stanislaus*	25.2	21.5	28.9	25.0	21.4	28.7	79,800
Monterey/San Benito*	25.5	21.6	29.3	25.7	21.8	29.6	81,400
Kern*	25.6	22.6	28.6	25.7	22.7	28.7	118,900
Sutter/Yuba*	25.8	22.1	29.5	25.5	21.9	29.1	25,900
San Joaquin*	26.6	23.3	29.9	26.7	23.4	29.9	108,400
Fresno*	26.6	23.4	29.9	26.0	22.7	29.2	142,800
Kings*	27.5	24.0	31.0	27.1	23.4	30.9	23,900
Imperial*	29.0	24.9	33.0	28.7	24.7	32.8	30,200
Merced*	29.9	26.0	33.8	29.4	25.5	33.2	41,800

[1]Rate is per 100 county or State population.
[2]Estimated by multiplying the crude rate times the county or State population, rounded to the nearest hundred.
*Age-adjusted 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.
Prepared by: Department of Health Services, Center for Health Statistics.

TABLE 2
PREVALENCE OF HEALTHY WEIGHT (BMI ≥ 18.5 and BMI <25.0) AMONG ADULTS IN CALIFORNIA, BY COUNTY OR REGION, 2001

County of Residence	Age-adjusted Rate[1]	95% Confidence Interval		Crude Rate[1]	95% Confidence Interval		Estimated N[2]
		Lower	Upper		Lower	Upper	
Tulare*	30.0	26.0	34.0	30.4	26.4	34.5	77,500
Merced*	30.6	26.7	34.5	31.1	27.2	35.0	44,300
Imperial*	31.8	27.5	36.0	32.3	28.0	36.6	33,900
San Joaquin*	32.7	29.1	36.3	32.7	29.3	36.1	132,900
Fresno*	33.1	29.4	36.7	33.9	30.2	37.6	186,500
Madera*	34.6	29.9	39.2	34.5	30.4	38.6	30,900
Kings*	35.0	30.5	39.5	35.8	31.3	40.8	31,500
Monterey/San Benito*	36.1	31.7	40.4	36.1	31.9	40.3	114,300
Stanislaus*	36.2	31.8	40.7	36.6	32.4	40.7	116,500
Solano*	36.9	33.6	40.2	36.6	33.6	39.6	104,800
Kern*	37.3	33.5	41.1	37.3	33.8	40.8	172,500
Shasta	37.8	33.0	42.6	37.6	33.6	41.6	49,200
Sutter/Yuba	37.9	33.4	42.5	38.2	34.1	42.3	38,800
Mendocino/Lake	38.0	32.8	43.2	37.3	33.2	41.4	42,500
Tehama/Glenn/Colusa	38.6	33.9	43.3	38.5	34.5	42.6	30,000
San Bernardino*	38.8	35.6	42.0	39.1	36.1	42.0	456,700
Sacramento	39.1	35.3	42.8	39.3	36.0	42.6	343,500
Riverside	39.8	36.3	43.3	40.3	37.2	43.3	444,100
Los Angeles	41.3	40.1	42.5	41.7	40.6	42.8	2,898,231
Humboldt/Del Norte	41.8	37.3	46.3	42.2	38.2	46.3	51,300
Santa Barbara	42.6	38.3	46.9	44.2	40.2	48.2	134,800
San Luis Obispo	42.9	38.1	47.7	43.3	39.3	47.4	85,900
California	**43.0**	**42.4**	**43.6**	**43.2**	**42.6**	**43.8**	**9,894,200**
Butte	43.6	38.7	48.4	44.6	40.5	48.7	69,900
Ventura	43.6	39.2	48.4	43.3	39.6	47.0	235,465
Tuolumne/Calaveras/ Amador/Inyo/Mariposa/ Mono/Alpine	43.6	38.0	49.3	42.8	38.8	46.8	61,100
Contra Costa	44.5	40.3	48.8	43.8	40.3	47.2	304,200
Yolo	44.6	40.0	49.1	48.1	43.7	52.5	58,600
Placer	44.9	39.6	50.2	44.3	40.2	48.5	79,900
Siskiyou/Lassen/Trinity/ Modoc	44.9	39.4	50.4	42.8	38.9	46.8	35,300
San Diego	45.3	42.6	48.1	46.1	43.8	48.4	982,400
Napa	45.6	40.3	50.9	44.8	40.5	49.2	43,700
Santa Cruz	45.6	40.7	50.5	46.5	42.2	50.7	90,300
Alameda*	46.8	43.8	49.7	46.9	43.7	50.2	508,800
El Dorado	47.7	41.1	54.3	45.4	40.8	49.9	55,800
Orange*	47.9	45.0	50.9	48.0	45.6	50.4	973,000
San Mateo	48.6	43.5	53.6	47.9	44.0	51.8	270,000
Sonoma*	49.3	43.7	55.0	49.0	44.8	53.3	170,200
Santa Clara*	49.6	45.9	53.4	49.6	46.5	52.7	645,300
Nevada/Plumas/Sierra*	50.1	44.0	56.3	47.8	43.8	52.8	45,800
San Francisco*	56.4	52.8	59.9	57.1	54.3	59.8	364,600
HP2010 Objective 19-1	**60.0**	**-**	**-**	**-**	**-**	**-**	**-**
Marin*	60.1	53.1	67.0	57.3	53.0	61.5	112,800

[1]Rate is per 100 county or State population.
[2]Estimated by multiplying the crude rate times the county or State population, rounded to the nearest hundred.
*Age-adjusted 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.
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