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Health of Adults in Los Angeles County: Findings From the National Health and Nutrition Examination Survey, 1999–2004

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Abstract

Objective—Los Angeles County has the largest population of any county in the nation. Population-based estimates of health conditions for Los Angeles County are based primarily on telephone surveys, which are known to underestimate conditions of public health importance. This report presents the prevalence of selected health conditions for civilian noninstitutionalized adults aged 20 and over living in Los Angeles County households and group quarters, based on survey data using direct physical measurements.

Methods—Combined data from the 1999–2000, 2001–2002, and 2003–2004 National Health and Nutrition Examination Surveys (NHANES), conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics, were used for this report. Sample weights were recalculated for participants examined in Los Angeles County using population totals provided by the Los Angeles County Department of Public Health, excluding the institutionalized population.

Results—Compared with the nation as a whole, adults in Los Angeles County had similar rates of health conditions even after age and age-race adjustment, with a few exceptions. A significantly smaller proportion of Los Angeles County adults were obese (age-adjusted rate, 23.8%) compared with the United States (31.0%); this difference held after age-race adjustment. The age-adjusted rate of diagnosed diabetes for men was higher in Los Angeles County (9.1%) than in the nation (7.3%); however, this difference did not hold after age-race adjustment. The rates of total diabetes adjusted for age and age-race were similar for men in Los Angeles County and the United States.

Conclusions—The rates of selected health conditions in this report were similar for adults in Los Angeles County compared with adults in the United States, with the exception of obesity. The rates of obesity adjusted for age and age-race were lower among Los Angeles County adults compared with national rates. Health estimates based on direct physical measurements can be useful for local public health programs and prevention efforts.

Keywords: cross-sectional studies • epidemiologic methods • chronic disease

Introduction

National survey data based on direct physical measurements are important to benchmark the nation's health and track progress toward meeting the nation's health objectives (1). Comparable health data are needed at the local level so that public health agencies can monitor the health status of their community and track health improvement efforts (2).

Los Angeles County is the largest county in the United States in population size and comprises one of the most diverse populations in the world (3). Of the county's population, 36% is foreign-born, with more than one-third of these having moved to Los Angeles after 1985 and one in two households speaking a language other than English at home. This tremendous diversity makes it difficult to extrapolate national data to the county level. Local health data create more interest among community policymakers, organizations, and the public, and are necessary for monitoring disease burden to identify local health problems and disparities, inform local policies and programs, and allocate scarce public health resources.

The data sources currently available at the county level include vital

statistics, hospital data, reportable disease data, and data from state (California Health Interview Survey) and county (Los Angeles County Health Survey) telephone surveys. The state and county surveys in particular have been very valuable in providing information for surveillance and program evaluation, but they provide only self-reported data, which are subject to recall bias and fail to capture undiagnosed conditions. There currently are no objective prevalence measures of chronic diseases, such as diabetes and hypertension. Chronic diseases account for 80% of the Los Angeles County disease burden as measured by disability-adjusted life years (4). Using national health examination data to describe the health of adults in Los Angeles County provides local health officials with information that would otherwise be unavailable.

Methods

Data from three cycles (1999–2000, 2001–2002, and 2003–2004) of the National Health and Nutrition Examination Survey (NHANES) were combined and used for this report. NHANES is a cross-sectional survey of the civilian noninstitutionalized household population of persons living in the United States. NHANES is unique in that it combines an in-person interview with a health examination that includes collection of biologic specimens. A nationally representative sample of individuals is selected annually through a complex multistage, stratified, clustered design. Additional information on NHANES 1999–2004 is available on the NHANES website (5–7). NHANES protocol #98–12 was approved by the National Center for Health Statistics' Research Ethics Review Board, and all participants provided documented consent. For this report, the participants selected from Los Angeles County were aggregated and reweighted to match the known population totals for Los Angeles County.

Los Angeles County weighting methodology

Selection of the primary sampling units (PSUs) is the first stage of the NHANES sample design process. Los Angeles County is one of the largest counties and a self-representing PSU that is in the sample every year. A self-representing PSU represents itself and not a larger geographic area. During 1999–2004, six Los Angeles County PSUs were selected for NHANES and used for this analysis. The Los Angeles County sample weights originated with the base weights created for weighting the national sample. The weights were then adjusted for nonresponse to both the interview and examination, and then poststratified to the midpoint of 1999–2004 population totals for the county.

The screener nonresponse-adjusted base weights for sampled persons in Los Angeles County were adjusted for nonresponse to the interview. Of the 2,312 identified sampled persons in Los Angeles County, 1,724, or 75%, responded to the interview. The Chi-squared Automatic Interaction Detector (CHAID) was used to identify variables related to response propensity. The analysis performed at the interview level showed that age category (under 1, 1–11, 12–19, 20–59, and 60 and over), sex, and number of people living in the household (1–2, 3–4, 5–6, and 7 or more) were highly correlated to response propensity. A cross-classification of these categories was used to create initial interview nonresponse adjustment cells. Cells were combined in cases where the number of respondents in a cell was small (less than 25) or the nonresponse adjustment factors were larger than 2.

The interview nonresponse-adjusted weights for the respondents were poststratified to population totals provided by the Los Angeles County Department of Public Health. The interview weights were adjusted to poststrata defined by race and ethnicity (Hispanic, black, and other), age category (0–5, 6–11, 12–19, 20–39, 40–59, and 60 and over), and sex. A further adjustment was necessary to remove the institutional population from the counts. A single ratio adjustment factor was applied to all interview respondents in a given poststratification cell. The numerator of the ratio was the midpoint of the 1999–2004 population total provided by Los Angeles County with the aforementioned adjustments; the denominator was the sum of the weights for the interview respondents in that cell.

A total of 1,628, or 94%, of the 1,724 interview respondents completed the health examination. CHAID was used to create examination nonresponse adjustment cells using a process similar to the interview nonresponse adjustment. The results of a CHAID analysis showed that age category (under 1, 1–5, 6–11, 12–19, 20–59, and 60 and over), sex, number of people living in the household (1–4, 5–6, and 7 or more), and self-reported health status (excellent, very good, and other) were highly correlated to response propensity. These nonresponse-adjusted examination weights were then poststratified to the same county totals as the interview weights, using the same collapsed poststrata.

Because health characteristics vary by age, race and ethnicity, sex and income status, NHANES is designed to produce reliable health statistics for a very large number of subdomains of the general population. During 1999–2004, African-American, Mexican-American, and white persons; other persons with low income (beginning in 2000); pregnant women; adolescents aged 12–19; and persons aged 60 and over were oversampled. As a result, the weights are quite variable for samples that include a number of the subdomains mentioned. The Los Angeles County weights were examined by broad analytic domains defined by Hispanic or non-Hispanic, categorized age, and sex, and 21 examined persons had a final exam weight five times larger than the average weight of other persons in the same group. In such cases, the weights are commonly trimmed to reduce the impact of the cases with extreme weights on the outcome statistic. However, the extreme weights were kept in the data set because there was no

effect on the outcome when comparing Los Angeles County with the United States on selected health conditions. Additional information on the Los Angeles County Demographic File is available on the NHANES website (8).

Data analyses

The analytic sample consisted of adult participants aged 20 and over. Data were analyzed using SAS for Windows (release 9.1; SAS Institute Inc., Cary, N.C.) and SUDAAN (release 9.0; RTI International, Research Triangle Park, N.C.) statistical software programs. Estimates of selected health conditions were produced for both the United States and Los Angeles County. Interview weights were used in calculating the prevalence of diagnosed diabetes, since this was based on self-reported information. Examination weights were used in calculating the prevalence of hypertension, high cholesterol, overweight, and obesity. Hypertension was defined as a high measured blood pressure or taking medication to lower blood pressure. High cholesterol was defined as high serum total cholesterol or taking cholesterol-lowering medication. The category of overweight and obese was based on measured height and weight. Fasting weights were used in addition to interview weights to calculate the estimates for total diabetes. Total diabetes was defined as high fasting plasma glucose or self-reported diagnosed diabetes. Fasting weights were calculated for participants examined in the morning session who had fasted for 9 hours or more; thus, the sample sizes used for calculating total diabetes are smaller than for the other health conditions.

Weighted estimates are presented as crude, age adjusted, and age-race adjusted. The age-adjusted estimates were computed using the direct method of adjustment to the 2000 U.S. census figures (9). The estimates adjusted for age-race were computed using racial and ethnic population totals from the Current Population Survey (CPS) 2001–2002. Fifteen race and age subgroups were formed using three age groups (20–39, 40–59, and 60 and over) and five racial and ethnic groups (Mexican American, other Hispanic, non-Hispanic white, non-Hispanic black, and other races). Estimates adjusted for age-race were computed by taking the sum of products of these 15 age-race-specific estimates times the proportion of the corresponding age-race subgroup in the population as measured by the CPS. Sample weights were included in the estimation process for all analyses to account for the differential probabilities of selection, nonresponse, and noncoverage. Standard errors of the percentages were estimated using the Taylor series linearization method, which incorporates the sample weights and accounts for the sample design (10). The relative standard error (RSE) is a measure of an estimate's reliability. The RSE of an estimate is obtained by dividing the standard error of the estimate SE(r) by the estimate itself (r). This quantity is expressed as a percentage of the estimate and is calculated as RSE = $100 \times \mathrm{SE}(r)/r$. Estimates with large RSEs are considered unreliable. Estimates with an RSE of 30% or more are considered highly unreliable and are indicated by an asterisk (*). Estimates with an RSE of 40% or more are not shown. Unreliable estimates should be interpreted with caution (11).

A two-tailed t statistic at the $p < 0.05$ level of significance was used to detect differences in sociodemographic and health characteristics between adults of Los Angeles County and the United States. Terms such as "more likely," "less likely," "was higher," "was lower," and "compared with" indicate a statistically significant difference. Terms such as "similar" or "no difference" indicate that the statistics being compared were not statistically significant.

Results

Of all persons in Los Angeles County eligible to participate in NHANES during 1999–2004, 59% were aged 20 or over (n = 1,054). Of these, 712 were interviewed (67.6%) and 667 were interviewed and examined (63.3%). In the national sample, 20,228 adults aged 20 and over were identified as eligible to participate. Of these, 15,332 were interviewed (75.8%) and 14,213 were interviewed and examined (70.3%).

Sociodemographic characteristics of the interviewed-and-examined sample are presented separately (Tables 1 and 2). A significantly higher proportion of Los Angeles County adults were Mexican American (27.3%) compared with the United States (7.3%), and a higher proportion were aged 20–39 (46.1% compared with 39.5%). Significantly fewer Los Angeles County adults were non-Hispanic white persons (36.4% compared with 71.3%), and fewer were high school graduates (13.7% compared with 26.0%). Adults in Los Angeles County were more likely to live below the poverty level (31.1%) compared with adults in the United States (19.7%).

Prevalence of hypertension, high serum cholesterol, overweight and obesity, and diabetes (diagnosed and total) are presented in Tables 3–8. Because Mexican-American persons make up so much of the Los Angeles County population, the sample sizes for the "other Hispanic" and "other" population subgroups were too small to obtain stable estimates of these health conditions and are not shown.

The prevalence of hypertension (Table 3) was similar in U.S. and Los Angeles County adults, and no differences emerged after age and age-race adjustment of the estimates. Hypertension increased with age among U.S. and Los Angeles County adults. The proportion of adults with high cholesterol was similar in the United States and Los Angeles County (Table 4), and no differences were detected after age and age-race adjustment.

There were no differences in the prevalence of overweight and obese combined between U.S. and Los Angeles County adults (Table 5). However, the prevalence of obesity was lower among adults in Los Angeles County (23.6%) compared with the United States (31.1%). The age-adjusted obesity rate (23.8% compared with

31.0%) and the rate adjusted for age-race (21.4% compared with 31.0%) were also statistically lower (Table 6).

The prevalence of diagnosed diabetes was similar between Los Angeles County and U.S. adults; although the age-adjusted rate of diagnosed diabetes was higher among Los Angeles County men (9.1%) compared with U.S. men (7.3%), this difference did not hold after adjusting for both age and race (Table 7). The prevalence of total diabetes was similar for the United States and Los Angeles County (Table 8). Estimates of diagnosed and total diabetes could not be made for all age and race subgroups because of small cell sizes.

Discussion

Two characteristics of the NHANES sample design allowed for the production of county-based health estimates. First, of all the PSUs selected each year to represent the United States, Los Angeles County was the only one chosen with certainty (i.e., with a probability of selection equal to 1). This was due to its population density (measure of size) and large Mexican-American population, which was a target group for oversampling. Therefore, the total sample size for Los Angeles County is six times the average PSU size in NHANES 1999–2004, providing an adequate sample size for the analysis presented in this report. Second, the sample is representative of the target population in Los Angeles County because the county was chosen as a self-representing PSU (meaning it represented only itself and not a larger geographic area). These elements provided a unique opportunity for estimating health conditions for Los Angeles County, which cannot be done for any other county sampled for NHANES.

This is the first report to describe the health characteristics of the Los Angeles County adult population based on direct physical measurements. Because of the expense of population-based health examination surveys, few communities have invested in such an effort except for New York City, which in 2004 conducted the New York City HANES (2), and the state of Wisconsin, which fielded the Survey of the Health of Wisconsin in 2008 (12). Most local public health agencies use information collected from telephone surveys to monitor community health. Research has shown that many population-based studies using self-reported health information underestimate the true prevalence of conditions, particularly among selected demographic subgroups. Vargas et al. found a striking difference in the prevalence of hypertension among Mexican-American men in the United States when comparing self-reported questionnaire information with measured systolic and diastolic brachial blood pressures from NHANES III (13). The self-reported hypertension prevalence, 19.0% (95% CI 16.7–21.3), was significantly lower than the prevalence based on measurements, 26.6% (95% CI 23.8–29.4). The latter estimate was based on the definition of hypertension recommended by the Third Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, or JNC III: a systolic blood pressure greater than or equal to 140 mm Hg or diastolic blood pressure greater than or equal to 90 mm Hg or currently taking medication to lower high blood pressure.

The Los Angeles County Department of Public Health has been monitoring the prevalence of hypertension, as well as other health conditions, using the Los Angeles County Health Survey (LACHS). This survey is a population-based telephone survey that provides information concerning the health of Los Angeles County adults. The prevalence of age-adjusted diagnosed hypertension for adults aged 18 and over was 21.2% during the 1999–2000 cycles and 21.6% during the 2002–2003 cycles (14). The present report found the age-adjusted prevalence of hypertension among Los Angeles County adults aged 20 and over during a comparable time period to be 24.8%. Because coronary heart disease was the leading cause of disability-adjusted life years in Los Angeles County (15), an accurate assessment of hypertension prevalence in the county is important for prevention efforts.

Data from LACHS also show the prevalence of obesity to be lower than the rates based on health examination data. The prevalence of obesity for adults aged 18 and over was 16.7% during the 1999–2000 cycles and 19.3% during the 2002–2003 cycles of LACHS (16). The prevalence of obesity among Los Angeles County adults based on NHANES was 23.6%. Validation studies have shown that when responding to health surveys, men tend to overreport their height and women tend to underreport their weight (17). Thus, estimates of obesity for a community are best made using direct physical measures from a population-based sample.

The prevalence of obesity among adults was found to be lower in Los Angeles County compared with adults in the United States. The lower prevalence may be due to the much lower prevalence among white persons in Los Angeles County compared with the subgroup nationally. The white population in Los Angeles County is more affluent and better educated than the white population nationally.

The age-adjusted prevalence of diagnosed diabetes in Los Angeles County from NHANES (6.8%) is similar to the estimates found in the 1999–2000 (7.5%) and 2002–2003 (7.6%) LACHS. However, the true burden of diabetes in Los Angeles County is reflected in the total diabetes estimates from NHANES that incorporate a fasting glucose measurement to account for undiagnosed diabetes. This report found the total diabetes prevalence to be 9.9%. Trend data from successive waves of LACHS show diabetes to be an increasing problem among adults in Los Angeles. NHANES data shed light on the fact that the burden of diabetes is actually greater in the Los Angeles County population than inferred from self-reported survey data.

This report is subject to several limitations. NHANES was designed to produce nationally representative health estimates. Therefore, the weights created for the national sample are not designed to produce estimates for Los Angeles.

The effort to reweight the Los Angeles County sample from NHANES was an attempt to not only adjust for the differential probability of selection and response rates within Los Angeles, but also poststratify the sample to match the known population totals for Los Angeles. In addition, despite aggregating 6 years of NHANES data, the Los Angeles County sample size is small. This limits the reliability of some of the estimates produced. However, since these are based on direct physical measures and are not available elsewhere, we have presented estimates with RSEs greater than 30% but less than 40% because they represent a "ballpark" of the estimate and can be useful for sample size calculations for statistical power for future studies.

The Los Angeles County sample is predominately Mexican American, and the sample sizes of other racial and ethnic groups such as non-Hispanic black is inadequate to produce stable estimates, particularly for diabetes. Lastly, comparisons of health estimates were made between Los Angeles County and the United States based on statistical testing assuming independent samples. Los Angeles County participants are clearly part of the U.S. sample, and a more correct comparison would have been between Los Angeles County and the United States excluding Los Angeles County. It was not possible to create such a U.S. sample minus Los Angeles County because new weights would have had to be calculated.

Given the cost of conducting a community health examination survey, creating local area estimates from national health examination surveys using known statistical techniques is a viable, lower-cost alternative. Partnerships among federal, state, and local public health agencies are important for the success in using national survey systems to inform county public health agencies in their mission to improve the health of their community.

References

1. U.S. Department of Health and Human Services. Healthy people 2010. 2nd ed. With Understanding and improving health and objectives for improving health, 2 vols. Washington, DC: U.S. Government Printing Office. 2000.
2. Thorpe LE, Gwynn RC, Mandel-Ricci J, Roberts S, Tsoi B, Berman L, et al. Study design and participation rates of the New York City Health and Nutrition Examination Survey, 2004. Prev Chronic Dis 3(3):A94. 2006. Available from: http://www.cdc.gov/pcd/issues/2006/jul/05_0177.htm.
3. U.S. Census Bureau. State & county quickfacts: Los Angeles County, California. Available from: http://quickfacts.census.gov/qfd/states/06/06037.html [Accessed 12/14/2010].
4. Los Angeles County Department of Health Services and UCLA Center for Health Policy Research. The burden of disease in Los Angeles County: A study of the patterns of morbidity and mortality in the county population. 2000.
5. National Center for Health Statistics. National Health and Nutrition Examination Survey, 1999–2000 examination files. Available from: http://www.cdc.gov/nchs/nhanes/nhanes1999-2000/nhanes99_00.htm.
6. National Center for Health Statistics. National Health and Nutrition Examination Survey, 2001–2002 examination files. Available from: http://www.cdc.gov/nchs/nhanes/nhanes2001-2002/nhanes01_02.htm.
7. National Center for Health Statistics. National Health and Nutrition Examination Survey, 2003–2004 examination files. Available from: http://www.cdc.gov/nchs/nhanes/nhanes2003-2004/nhanes03_04.htm.
8. National Center for Health Statistics. National Health and Nutrition Examination Survey, limited access data, Los Angeles demographic (1999–2004). Available from: http://www.cdc.gov/nchs/nhanes/nhanes2003-2004/non_public_03-04.htm.
9. Klein RJ, Schoenborn CA. Age adjustment using the 2000 projected U.S. population. Healthy People Statistical Notes, no. 20. Hyattsville, MD: National Center for Health Statistics. 2001.
10. Wolter KM. Introduction to variance estimation. New York, NY: Springer-Verlag. 1985.
11. U.S. Department of Health and Human Services. NHANES 1999–2000 addendum to the NHANES III analytic guidelines. 2002. Available from: http://www.cdc.gov/nchs/data/nhanes/nhanes_general_guidelines_june_04.pdf.
12. Nieto FJ, Peppard PE, Engelman CD, McElroy JA, Galvao LW, Friedman EM, et al. The Survey of the Health of Wisconsin (SHOW), a novel infrastructure for population health research: Rationale and methods. BMC public health 10:785. 2010. Available from: http://www.biomedcentral.com/1471-2458/10/785.
13. Vargas CM, Burt VL, Gillum RF, Pamuk ER. Validity of self-reported hypertension in the National Health and Nutrition Examination Survey III, 1988–1991. Prev Med 26(5 Pt1): 678–85. 1997.
14. Los Angeles County Department of Public Health. The silent killer: Hypertension in Los Angeles County adults. LA Health. 2007.
15. Kominski GF, Simon PA, Ho A, Luck J, Lim YW, Fielding JE. Assessing the burden of disease and injury in Los Angeles County using disability-adjusted life years. Public Health Rep 117(2):185–91. 2002.
16. Office of Health Assessment and Epidemiology, Los Angeles County Department of Public Health. The obesity epidemic in Los Angeles County adults. LA Health Trends. 2006.
17. Merrill RM, Richardson JS. Validity of self-reported height, weight, and body mass index: Findings from the National Health and Nutrition Examination Survey, 2001–2006. Prev Chronic Dis 6(4):A121. 2009.
18. National Institutes of Health. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report. Obes Res 6 (Suppl 2):51S–209S. Erratum in: Obes Res 6:464. 1998.
19. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 20(7):1183–97. 1997.

Table 1. Sociodemographic characteristics of interviewed adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States				Los Angeles County			
	n	*N*	Percent distribution	Standard error	*n*	*N*	Percent distribution	Standard error
Total	15,332	200,708,000	100.0	. . .	712	6,718,000	100.0	. . .
Age								
20–39 years[1]	5,362	79,335,000	39.5	0.7	268	3,096,000	46.1	3.7
40–59 years	4,363	76,202,000	38.0	0.6	210	2,532,000	37.7	3.7
60 years and over[1]	5,607	45,171,000	22.5	0.5	234	1,090,000	16.2	2.1
Race and ethnicity								
Mexican American[1]	3,380	14,647,000	7.3	0.9	434	1,831,000	27.3	3.7
Other Hispanic[1]	699	11,512,000	5.7	1.2	53	912,000	13.6	2.9
Non-Hispanic white[1]	7,761	143,176,000	71.3	1.7	96	2,442,000	36.4	5.9
Non-Hispanic black	2,916	21,875,000	10.9	1.0	83	598,000	8.9	1.8
Other[1]	576	9,497,000	4.7	0.4	46	935,000	13.9	2.5
Sex								
Male	7,223	95,990.00	47.8	0.4	328	3,262,000	48.6	1.9
Female	8,109	104,718,000	52.2	0.4	384	3,456,000	51.4	1.9
Poverty income ratio (PIR)[2]								
PIR less than 1.30[1]	5,397	39,568,000	19.7	1.0	249	2,089,000	31.1	4.7
1.30 less than or equal to PIR less than 3.5	3,983	66,952,000	33.4	0.8	248	2,222,000	33.1	3.9
PIR greater than or equal to 3.5[1]	4,452	77,276,000	38.5	1.2	127	1,714,000	25.5	6.3
Education								
Less than high school[1]	5,050	41,750,000	20.8	0.7	347	2,060,000	30.7	3.5
High school diploma[1]	3,631	52,113,000	26.0	0.7	97	924,000	13.7	2.2
More than high school	6,592	106,276,000	53.0	1.0	267	3,733,000	55.6	3.6

. . . Category not applicable.

[1] *t* statistic $p < 0.05$.

[2] Poverty status levels are based on PIR: the ratio of income to the family's appropriate poverty threshold (U.S. Census Bureau).

NOTES: "*n*" is the sample size in the NHANES data, and "*N*" is the inflated population size. Numbers may not add to totals because of rounding.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 2. Sociodemographic characteristics of interviewed-and-examined adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States				Los Angeles County			
	n	*N*	Percent distribution	Standard error	*n*	*N*	Percent distribution	Standard error
Total	14,213	200,708,000	100.0	. . .	667	6,718,000	100.0	. . .
Age								
20–39 years[1]	5,068	79,335,000	39.5	0.6	252	3,075,000	45.8	3.8
40–59 years	4,161	76,202,000	38.0	0.9	202	2,554,000	38.0	3.8
60 years and over[1]	4,984	45,171,000	22.5	0.6	213	1,090,000	16.2	2.3
Race and ethnicity								
Mexican American[1]	3,207	14,647,000	7.3	0.9	407	1,831,000	27.3	3.7
Other Hispanic[1]	641	11,512,000	5.7	1.2	50	912,000	13.6	2.9
Non-Hispanic white[1]	7,101	143,176,000	71.3	1.7	90	2,442,000	36.4	5.9
Non-Hispanic black	2,747	21,875,000	10.9	1.0	76	598,000	8.9	1.8
Other[1]	517	9,497,000	4.7	0.4	44	935,000	13.9	2.5
Sex								
Male	6,735	95,990,000	47.8	0.4	312	3,262,000	48.6	2.0
Female	7,478	104,718,000	52.2	0.4	355	3,456,000	51.4	2.0
Poverty income ratio (PIR)[2]								
PIR less than 1.30[1]	3,738	40,162,000	20.0	1.1	235	2,177,000	32.4	4.9
1.30 less than or equal to PIR less than 3.5	5,055	67,686,000	33.7	0.8	236	2,244,000	33.4	4.1
PIR greater than or equal to 3.5[1]	4,160	77,408,000	38.6	1.2	115	1,665,000	24.8	6.1
Education								
Less than high school[1]	4,650	41,624,000	20.7	0.7	322	2,070,000	30.8	3.6
High school diploma[1]	3,371	52,352,000	26.1	0.7	91	972,000	14.5	2.4
More than high school	6,160	106,409,000	53.0	1.0	253	3,676,000	54.7	3.6

. . . Category not applicable.

[1] *t* statistic $p < 0.05$.

[2] Poverty status levels are based on PIR: the ratio of income to the family's appropriate poverty threshold (U.S. Census Bureau).

NOTES: "*n*" is the sample size in the NHANES data and "*N*" is the inflated population size. Numbers may not add to totals because of rounding.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 3. Prevalence of hypertension among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total	12,613	30.0	0.8	580	25.8	3.2
Sex						
Men	6,386	28.2	1.0	289	26.0	3.6
Women	6,227	31.7	0.9	291	25.6	4.3
Race and ethnicity						
Mexican American	2,817	17.7	1.5	345	19.2	2.4
Non-Hispanic white	6,373	30.6	1.0	82	29.7	6.8
Non-Hispanic black	2,432	37.7	1.2	70	34.2	5.7
Age						
20–39 years	4,059	7.5	0.6	201	*5.5	1.7
40–59 years	3,939	30.9	1.2	184	32.9	6.6
60 years and over	4,615	66.7	1.0	195	66.1	4.9
			Age adjusted			
Total	12,613	25.2	0.6	580	24.8	2.8
Sex						
Men	6,386	25.4	0.9	289	26.5	3.1
Women	6,227	24.7	0.5	291	22.6	3.3
Race and ethnicity						
Mexican American	2,817	22.4	1.0	345	23.7	2.0
Non-Hispanic white	6,373	24.0	0.7	82	20.9	4.4
Non-Hispanic black	2,432	35.2	0.9	70	36.5	5.0
			Age-race adjusted			
Total	12,613	29.7	0.7	580	28.5	4.4
Sex						
Men	6,386	29.3	1.0	289	27.9	4.1
Women	6,227	29.6	0.7	291	27.2	5.6

* Figure does not meet standards of reliability or precision; relative standard error is greater than 30%.

NOTES: "*n*" is the sample size in the NHANES data. Hypertension is defined as having a systolic blood pressure greater than or equal to 140 mm Hg, diastolic blood pressure greater than or equal to 90 mm Hg, or currently taking medication to lower high blood pressure.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 4. Prevalence of high cholesterol among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total	12,927	26.7	0.5	609	23.5	3.9
Sex						
Men	6,150	26.9	0.6	287	22.6	3.3
Women	6,777	26.5	0.8	322	24.3	5.4
Race and ethnicity						
Mexican American	2,932	17.0	0.7	372	19.4	2.3
Non-Hispanic white	6,552	28.9	0.7	83	*29.2	9.7
Non-Hispanic black	2,388	20.7	0.9	65	16.5	4.2
Age						
20–39 years	4,554	11.9	0.6	225	13.4	3.1
40–59 years	3,848	30.7	0.9	188	28.6	6.5
60 years and over	4,525	45.4	0.7	196	38.2	5.5
			Age adjusted			
Total	12,927	26.5	0.4	609	22.5	3.6
Sex						
Men	6,150	27.0	0.6	287	21.4	3.1
Women	6,777	25.7	0.7	322	23.3	5.2
Race and ethnicity						
Mexican American	2,932	16.9	0.7	372	21.6	2.4
Non-Hispanic white	6,552	28.7	0.5	83	*24.4	9.8
Non-Hispanic black	2,388	20.7	0.9	65	16.8	4.1
			Age-race adjusted			
Total	12,927	26.5	0.4	609	25.7	7.1
Sex						
Men	6150	27.0	0.6	287	21.0	4.6
Women	6777	25.7	0.7	322	*28.9	9.2

* Figure does not meet standards of reliability or precision; relative standard error is greater than 30%.

NOTES: "*n*" is the sample size in the NHANES data. High cholesterol is defined as having measured serum total cholesterol greater than or equal to 240 mg/dL or reporting taking cholesterol-lowering medications.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 5. Prevalence of overweight and obese among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total	12,961	65.7	0.7	611	62.6	3.0
Sex						
Men	6,499	69.3	0.7	303	67.3	4.6
Women	6,462	62.1	1.0	308	57.8	3.2
Race and ethnicity						
Mexican American	2,908	71.4	1.7	363	73.3	3.5
Non-Hispanic white	6,491	64.4	0.9	86	58.7	7.8
Non-Hispanic black	2,542	72.1	0.9	74	80.5	4.9
Age						
20–39 years	4,210	57.4	1.0	212	51.7	5.4
40–59 years	4,053	70.9	1.1	194	75.8	3.9
60 years and over	4,698	70.9	0.9	205	61.9	5.9
			Age adjusted			
Total	12,961	65.4	0.7	611	63.0	2.6
Sex						
Men	6,499	69.3	0.7	303	68.8	3.7
Women	6,462	61.2	1.1	308	57.6	3.1
Race and ethnicity						
Mexican American	2,908	71.2	1.6	363	76.3	2.9
Non-Hispanic white	6,491	64.3	0.9	86	55.2	7.4
Non-Hispanic black	2,542	71.9	0.9	74	80.5	5.1
			Age-race adjusted			
Total	12,961	65.4	0.7	611	60.0	5.1
Sex						
Men	6,499	69.3	0.7	303	65.8	4.4
Women	6,462	61.2	1.1	308	53.3	7.7

NOTES: "*n*" is the sample size in the NHANES data. "Overweight and obese" is defined as having a body mass index greater than or equal to 25.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 6. Prevalence of obesity among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total[1]	12,961	31.1	0.7	611	23.6	2.6
Sex						
Men[1]	6,499	28.7	0.7	303	20.4	2.7
Women	6,462	33.4	1.0	308	26.8	3.6
Race and ethnicity						
Mexican American	2,908	32.9	1.5	363	36.3	3.3
Non-Hispanic white[1]	6,491	30.3	0.8	86	19.4	5.1
Non-Hispanic black	2,542	41.2	1.1	74	34.4	7.2
Age						
20–39 years	4,210	26.8	0.8	212	20.3	4.0
40–59 years	4,053	34.8	1.2	194	26.9	4.7
60 years and over	4,698	32.2	0.9	205	24.6	6.7
			Age adjusted			
Total[1]	12,961	31.0	0.7	611	23.8	2.7
Sex						
Men[1]	6,499	28.8	0.7	303	20.7	2.7
Women	6,462	33.2	1.0	308	27.0	3.7
Race and ethnicity						
Mexican American	2,908	34.2	1.4	363	37.0	2.8
Non-Hispanic white[1]	6,491	29.8	0.8	86	18.4	4.6
Non-Hispanic black	2,542	41.4	1.1	74	36.5	6.8
			Age-race adjusted			
Total[1]	12,961	31.0	0.7	611	21.4	3.5
Sex						
Men	6,499	28.8	0.7	303	20.8	3.7
Women	6,462	33.0	1.0	308	20.9	5.0

[1] *t* statistic $p < 0.05$.

NOTES: "*n*" is the sample size in the NHANES data. Obesity is defined as having a body mass index greater than or equal to 30.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 7. Prevalence of diagnosed diabetes among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total	15,321	6.9	0.3	711	6.9	1.0
Sex						
Men	7,219	7.0	0.4	328	8.8	1.8
Women	8,102	6.9	0.3	383	5.0	1.2
Race and ethnicity						
Mexican American	3,379	6.8	0.5	433	8.5	1.3
Non-Hispanic white	7,758	6.2	0.3	96	*5.3	1.6
Non-Hispanic black	2,915	10.3	0.6	83	†	†
Age						
20–39 years	5,359	1.6	0.2	267	†	†
40–59 years	4,360	7.3	0.5	210	6.6	1.7
60 years and over	5,602	15.8	0.6	234	19.6	4.1
			Age adjusted			
Total	15,321	7.0	0.3	711	6.8	0.9
Sex						
Men[1]	7,219	7.3	0.4	328	9.1	1.6
Women	8,102	6.7	0.3	383	4.7	1.1
Race and ethnicity						
Mexican American	3,379	11.1	0.4	433	10.1	1.4
Non-Hispanic white	7,758	5.8	0.3	96	4.3	1.3
Non-Hispanic black	2,915	11.6	0.6	83	†	†
			Age-race adjusted			
Total	15,321	6.9	0.3	711	6.2	1.2
Sex						
Men	7,219	7.3	0.4	328	9.8	2.1
Women	8,102	6.6	0.3	383	†	†

* Figure does not meet standards of reliability or precision; relative standard error is greater than 30% and less than or equal to 40%.
† Figure does not meet standards of reliability or precision; relative standard error is greater than 40%.
[1] *t* statistic $p < 0.05$.

NOTES: "*n*" is the sample size in the NHANES data. Physician-diagnosed diabetes was obtained by self-report and excludes women who reported diabetes only during pregnancy.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Table 8. Prevalence of total diabetes among adults aged 20 and over: United States and Los Angeles County, 1999–2004

Characteristic	United States			Los Angeles County		
	n	Prevalence (percent)	Standard error	*n*	Prevalence (percent)	Standard error
			Crude			
Total	7,087	9.7	0.4	333	9.9	1.8
Sex						
Men	3,377	10.6	0.5	171	12.5	2.4
Women	3,710	8.8	0.4	162	*7.5	2.3
Race and ethnicity						
Mexican American	1,678	8.9	0.9	215	11.8	2.5
Non-Hispanic white	3,522	8.9	0.4	39	*10.6	3.6
Non-Hispanic black	1,337	13.2	0.8	38	†	†
Age						
20–39 years	2,169	2.3	0.4	94	†	†
40–59 years	2,068	10.4	0.6	106	8.9	2.3
60 years and over	2,850	21.5	0.9	133	28.8	6.3
			Age adjusted			
Total	7,087	9.7	0.4	333	11.1	1.6
Sex						
Men	3,377	11.0	0.5	171	14.6	2.4
Women	3,710	8.6	0.4	162	8.0	2.2
Race and ethnicity						
Mexican American	1,678	14.1	0.7	215	15.4	2.2
Non-Hispanic white	3,522	8.3	0.4	39	8.6	2.6
Non-Hispanic black	1,337	14.7	0.8	38	†	†
			Age-race adjusted			
Total	7,087	9.6	0.4	333	9.1	2.1
Sex						
Men	3,377	11.0	0.5	171	14.0	3.3
Women	3,710	8.5	0.4	162	*5.4	2.1

* Figure does not meet standards of reliability or precision; relative standard error is greater than 30% and less than or equal to 40%.

† Figure does not meet standards of reliability or precision; relative standard error is greater than 40%.

NOTES: "*n*" is the sample size in the NHANES data. Total diabetes prevalence is based on the adult having a fasting blood sugar of at least 126 mg/dL or self-reported, physician-diagnosed diabetes.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004.

Technical Notes

Definition of terms

Hypertension—Trained physicians used a mercury sphygmomanometer to measure systolic and diastolic brachial blood pressures following a standard protocol. Appropriate blood pressure cuff sizes were used for participants based on measurement of midarm circumference. The average of up to three readings was used for reported systolic and diastolic blood pressure values. All blood pressure readings were obtained at a single examination visit. Hypertension is defined as a systolic blood pressure greater than or equal to 140 mm Hg or diastolic blood pressure greater than or equal to 90 mm Hg or currently taking medication to lower high blood pressure.

Serum cholesterol—A venous blood sample was collected in the mobile examination center and shipped to the Johns Hopkins University Lipid Laboratory (Baltimore, Md.). This laboratory was certified as having documented traceability to the national reference system for cholesterol. Serum cholesterol was measured enzymatically on a Hitachi 704 Analyzer (Roche Diagnostics, Indianapolis, Ind.) using commercial reagents. High cholesterol is defined as measured serum total cholesterol greater than or equal to 240 mg/dL or reporting taking cholesterol-lowering medications. Respondents were asked, ''Are you now following this advice [from a doctor or health professional] to take prescribed medicine [to lower your cholesterol]?''

Overweight and obese—Trained health technicians measured participants' height and weight in a specially equipped room in the mobile examination center. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared, rounded to one decimal place. For adults aged 20 years and over, overweight is defined as a BMI equal to or greater than 25.0 and less than 30.0. Obesity is defined as a BMI of 30.0 or higher (18).

Diabetes—Participants were asked if, other than during pregnancy for women, a doctor or a health care professional had ever told them they had diabetes. Those who said ''yes'' were classified as having diagnosed diabetes. Total diabetes was estimated by combining the number of persons who reported having diagnosed diabetes with those who had undiagnosed diabetes based on fasting blood glucose levels. For the latter, participants who were randomly assigned to a morning examination session were asked to fast for 9 hours prior to the exam. Plasma glucose values were collected and measured by using a hexokinase enzymatic method with a coefficient of variation of less than 2.5%. Diagnostic criteria of the American Diabetes Association were used to categorize persons without previously diagnosed diabetes if they had fasted 9 hours or more and less than 24 hours, and had a fasting plasma glucose level greater than 126 mg/dL (19).

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