Abnormal Lipid Levels, Diagnosed High Cholesterol, and Lipid-lowering Treatment Among Adults: Los Angeles County and the United States, 1999–2014

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The National Health and Nutrition Examination Survey (NHANES), conducted by the National Center for Health Statistics, is a multistage probability sample of the civilian noninstitutionalized population of the United States. A household interview and a physical examination are conducted for each survey participant. Because of the size and population density of Los Angeles (LA) County and the large Mexican-American and Hispanic populations, a primary sampling unit in LA County was chosen with certainty in each 2-year NHANES cycle (1). By aggregating NHANES data between 1999–2006 and 2007–2014 to increase the sample size and improve the reliability of LA County estimates, the prevalence of many health conditions for the LA County and U.S. populations can be estimated and compared.

This Health E-Stat presents the percentage of adults aged 20 and over with high total cholesterol (greater than or equal to 240 mg/dL), low high-density lipoprotein cholesterol (HDL-C) (less than 40 mg/dL), high non-HDL-C (total cholesterol minus HDL-C, greater than or equal to 190 mg/dL), high low-density lipoprotein cholesterol (LDL-C) (greater than or equal to 160 mg/dL), and high triglycerides (greater than or equal to 175 mg/dL). The percentage of adults diagnosed with high cholesterol and, among those with diagnosed high cholesterol, those taking lipid-lowering medications and statins among adults in LA County and the United States during 1999–2006 and 2007–2014 are also presented.

Table 1 shows crude and age-adjusted percentages of adults aged 20 and over with high total cholesterol, low HDL-C, high non-HDL-C, high LDL-C, diagnosed high cholesterol, the percentage taking a lipid-lowering medication among adults diagnosed with high cholesterol, and percentage taking a statin among adults diagnosed with high cholesterol in LA County and the United States for 1999–2006 and 2007–2014 (low HDL-C and high non-HDL-C is shown for 2007–2014 only due to changes in laboratories and methods).

The age-adjusted prevalence of high total cholesterol in LA County was 14.2% in 1999–2006 and 13.8% in 2007–2014, while the prevalence in the United States was 16.8% and 12.8%, respectively. Among adults diagnosed with high cholesterol in LA County, 39.5% took a lipid-lowering medication in 1999–2006 and 38.0% did in 2007–2014 (age-adjusted), while among U.S. adults, 37.3% took a lipid-lowering medication in 1999–2006 and 45.1% did in 2007–2014 (age-adjusted).

Table 2 shows age-adjusted percentages of adults aged 20 and over with high total cholesterol, low HDL-C, high non-HDL-C, high LDL-C, diagnosed high cholesterol, the percentage taking a lipid-lowering medication among adults diagnosed with high cholesterol, and the percentage taking a statin among adults diagnosed with high cholesterol in LA County and the United States by age, sex, and race and Hispanic origin during 2007–2014.

Data source and methods

During the physical examination, venous blood samples were collected from NHANES participants and processed using a standardized protocol. Confidence intervals were constructed using the method of Korn and Graubard and the reliability of estimates was assessed using the NCHS data presentation standards for proportions (2). Despite aggregating NHANES data between 1999–2006 and 2007–2014 to increase the sample size and improve the reliability of LA County estimates, reduced power limited the ability to calculate reliable estimates for health conditions with a low prevalence, especially among subgroups. See the publication "National Health and Nutrition Examination Survey: California and LA County, Estimation Methods and Analytic Considerations" (1) for additional information on methods related to the LA County sample.

References

1. Parker JD, Kruszon-Moran D, Mohadjer LK, Dohrmann SM, Van de Kerckhove W, Clark J, et al. National Health and Nutrition Examination Survey: California and Los Angeles County, estimation methods and analytic considerations, 1999–2006 and 2007–2014. National Center for Health Statistics. Vital Health Stat 2(173). 2017.

2. Parker JD, Talih M, Malec DJ, Beresovsky V, Carroll M, Gonzalez Jr JF. National Center for Health Statistics data presentation standards for proportions. National Center for Health Statistics. Vital Health Stat 2(175). 2017.

Suggested citation

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Table 1. Crude and age-adjusted percentage of adults aged 20 and over with abnormal lipids, diagnosed high cholesterol, and taking lipid-lowering medications: Los Angeles County and the United States, 1999–2006 and 2007–2014

Measurement	Los Angeles County				United States			
	1999–2006		2007–2014		1999–2006		2007–2014	
	N	Percent (95% CI)	N	Percent (95% CI)	N	Percent (95% CI)	N	Percent (95% CI)
Crude percentage								
High total cholesterol (greater than or equal to 240 mg/dL)	850	13.7 (9.9, 18.4)	972	13.7 (10.2, 17.9)	17,766	16.8 (16.0, 17.7)	21,283	13.1 (12.4, 13.8)
Low HDL-C (less than 40 mg/dL)	…	…	972	17.9 (14.4, 21.7)	…	…	21,283	20.0 (19.0, 21.1)
High non-HDL-C (greater than or equal to 190 mg/dL)	…	…	972	11.6 (8.9, 14.9)	…	…	21,283	12.1 (11.5, 12.7)
High LDL-C (greater than or equal to 160 mg/dL)	341	12.7 (7.7, 19.4)	446	11.5 (7.8, 16.1)	7,674	12.5 (11.4, 13.7)	9,422	10.0 (9.3, 10.7)
High triglycerides (greater than or equal to 175 mg/dL)	364	31.9 (22.3, 42.7)	454	15.8 (12.1, 20.1)	7,893	24.3 (23.0, 25.6)	9,593	17.8 (16.7, 19.0)
Diagnosed high cholesterol	623	39.4 (35.1, 43.8)	909	33.9 (28.8, 39.2)	13,535	38.7 (37.4, 40.0)	19,764	37.1 (36.0, 38.1)
Percent taking a lipid-lowering medication among adults diagnosed with high cholesterol	275	38.6 (30.6, 47.1)	353	44.2 (36.2, 52.4)	5,383	41.0 (39.0, 43.1)	7,592	51.3 (49.5, 53.0)
Percent taking a statin among adults diagnosed with high cholesterol	276	23.5 (15.9, 32.7)	354	31.6 (22.6, 41.7)	5,398	32.3 (30.5, 34.1)	7,616	42.7 (41.0, 44.4)
Age-adjusted percentage[1]								
High total cholesterol (greater than or equal to 240 mg/dL)	850	14.2 (10.3, 19.0)	972	13.8 (10.4, 17.8)	17,766	16.8 (16.0, 17.6)	21,283	12.8 (12.2, 13.6)
Low HDL-C (less than 40 mg/dL)	…	…	972	17.8 (14.5, 21.5)	…	…	21,283	20.2 (19.1, 21.3)
High non-HDL-C (greater than or equal to 190 mg/dL)	…	…	972	11.6 (9.0, 14.7)	…	…	21,283	12.0 (11.4, 12.6)
High LDL-C (greater than or equal to 160 mg/dL)	341	12.8 (7.9, 19.1)	446	11.8 (7.9, 16.6)	7,674	12.5 (11.4, 13.6)	9,422	9.9 (9.2, 10.6)
High triglycerides (greater than or equal to 175 mg/dL)	364	32.5 (23.5, 42.7)	454	15.8 (12.2, 20.0)	7,893	24.3 (23.0, 25.6)	9,593	17.6 (16.5, 18.8)
Diagnosed high cholesterol	623	38.2 (33.7, 42.9)	909	32.7 (28.6, 37.0)	13,535	35.7 (34.6, 36.8)	19,764	34.2 (33.4, 35.1)
Percent taking a lipid-lowering medication among adults diagnosed with high cholesterol	275	39.5 (32.5, 46.8)	353	38.0 (31.8, 44.5)	5,383	37.3 (35.7, 38.9)	7,592	45.1 (43.4, 46.9)
Percent taking a statin among adults diagnosed with high cholesterol	276	23.2 (16.1, 31.6)	354	26.9 (19.1, 35.9)	5,398	29.0 (27.5, 30.6)	7,616	37.3 (35.7, 39.0)

…Category not applicable. Percentages prior to 2007–2008 are not presented due to changes in laboratories and methods.
[1]Age-adjusted by the direct method to the projected 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over.

NOTES: CI is confidence interval. HDL-C is high-density lipoprotein cholesterol. LDL-C is low-density lipoprotein cholesterol. Diagnosed high cholesterol is based on an affirmative response to the question, "Have you ever been told by a doctor or other health professional that your blood cholesterol level was high?" Taking a lipid-lowering medication is based on an affirmative response to the question, "Are you currently taking lipid-lowering medication?" asked of adults diagnosed with high cholesterol. Taking a statin is based on a comprehensive enumeration of prescription medications that the participant reported taking in the past 30 days.

SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, 1999–2014.

Table 2. Age-adjusted percentage of adults aged 20 and older with abnormal lipids, diagnosed high cholesterol, and percentage taking lipid-lowering medications by age, sex, and race and Hispanic origin: Los Angeles County and United States, 2007–2014

	Los Angeles County		United States	
Measurement	N	Percent (95% CI)	N	Percent (95% CI)
High total cholesterol (greater than or equal to 240 mg/dL)				
Age group:				
20–39	314	9.9 (5.5, 15.9)	7,157	7.9 (7.0, 8.9)
40–59	335	17.6 (12.8, 23.4)	7,102	17.2 (16.1, 18.4)
60 and over	323	14.4 (9.5, 20.6)	7,024	14.3 (13.2, 15.4)
Sex:				
Men	458	14.7 (10.9, 19.1)	10,357	11.6 (10.8, 12.5)
Women	514	12.7 (8.7, 17.6)	10,926	13.8 (12.9, 14.7)
Race and Hispanic origin:				
Non-Hispanic white	155	*12.3 (5.5, 22.5)	9,495	13.2 (12.3, 14.2)
Non-Hispanic black	104	9.5 (4.6, 16.9)	4,292	9.9 (8.9, 11.0)
Hispanic[1]	507	14.4 (11.5, 17.8)	5,366	13.8 (12.6, 15.1)
Mexican American	357	12.4 (9.2, 16.3)	3,204	12.9 (11.5, 14.4)
Low HDL-C (less than 40 mg/dL)				
Age group:				
20–39	314	17.4 (12.0, 23.9)	7,157	22.0 (20.4, 23.7)
40–59	335	20.3 (15.3, 26.1)	7,102	20.6 (19.1, 22.1)
60 and over	323	14.5 (9.5, 20.8)	7,024	16.3 (14.8, 17.9)
Sex:				
Men	458	26.5 (21.6, 31.9)	10,357	29.8 (28.4, 31.3)
Women	514	9.4 (6.5, 12.9)	10,926	11.1 (10.1, 12.2)
Race and Hispanic origin:				
Non-Hispanic white	155	13.1 (7.8, 20.1)	9,495	20.8 (19.4, 22.2)
Non-Hispanic black	104	*9.1 (2.6, 21.5)	4,292	14.1 (13.0, 15.2)
Hispanic[1]	507	24.8 (19.7, 30.5)	5,366	22.7 (21.2, 24.2)
Mexican American	357	25.7 (20.1, 32.0)	3,204	23.2 (21.4, 25.2)
High non-HDL-C (greater than or equal to 190 mg/dL)				
Age group:				
20–39	314	8.8 (5.1, 13.8)	7,157	8.2 (7.4, 9.0)
40–59	335	15.2 (11.1, 20.1)	7,102	16.6 (15.5, 17.8)
60 and over	323	10.7 (6.6, 16.3)	7,024	11.1 (10.3, 11.9)
Sex:				
Men	458	15.0 (11.2, 19.4)	10,357	13.5 (12.7, 14.4)
Women	514	8.2 (6.0, 10.9)	10,926	10.4 (9.7, 11.1)
Race and Hispanic origin:				
Non-Hispanic white	155	*8.6 (3.4, 17.1)	9,495	12.2 (11.5, 13.0)
Non-Hispanic black	104	*6.6 (2.6, 13.2)	4,292	8.5 (7.5, 9.5)
Hispanic[1]	507	14.9 (11.8, 18.4)	5,366	13.9 (12.7, 15.2)
Mexican American	357	14.0 (10.4, 18.2)	3,204	13.6 (12.0, 15.2)
High LDL-C (greater than or equal to 160 mg/dL)				
Age group:				
20–39	146	*5.5 (2.0, 11.9)	3,109	7.0 (6.0, 8.1)
40–59	159	14.3 (8.3, 22.4)	3,186	13.1 (11.6, 14.6)
60 and over	141	*18.4 (7.5, 34.9)	3,127	9.8 (8.6, 11.0)
Sex:				
Men	210	11.6 (7.0, 17.9)	4,497	9.8 (8.8, 10.9)
Women	236	11.8 (6.3, 19.8)	4,925	9.8 (9.0, 10.7)
Race and Hispanic origin:				
Non-Hispanic white	64	*,†12.4 (3.4, 29.0)	4,205	9.7 (8.7, 10.8)
Non-Hispanic black	43	*,†16.7 (2.6, 45.7)	1,809	10.3 (8.8, 11.9)
Hispanic[1]	255	8.6 (5.5, 12.8)	2,455	10.6 (9.1, 12.4)
Mexican American	184	8.3 (4.7, 13.3)	1,444	10.0 (8.0, 12.4)

See footnotes at end of table.

Table 2. Age-adjusted percentage of adults aged 20 and older with abnormal lipids, diagnosed high cholesterol, and taking lipid-lowering medications by age, sex, and race and Hispanic origin: Los Angeles County and United States, 2007–2014—Con.

Measurement	Los Angeles County		United States	
	N	Percent (95% CI)	N	Percent (95% CI)
High triglycerides (greater than or equal to 175 mg/dL)				
Age group:				
20–39	148	15.0 (8.1, 24.5)	3,158	13.3 (11.8, 15.1)
40–59	164	15.9 (10.7, 22.5)	3,268	20.9 (19.1, 22.7)
60 and over	142	17.1 (8.6, 28.9)	3,167	19.8 (17.6, 22.2)
Sex:				
Men	215	18.2 (11.8, 26.3)	4,618	21.2 (19.6, 22.9)
Women	239	13.4 (9.1, 18.7)	4,975	14.1 (12.7, 15.6)
Race and Hispanic origin:				
Non-Hispanic white	65	*,†8.8 (3.2, 18.5)	4,296	18.2 (16.8, 19.7)
Non-Hispanic black	43	*,†11.7 (1.2, 38.3)	1,823	7.9 (6.4, 9.7)
Hispanic[1]	261	22.8 (16.6, 30.1)	2,509	22.2 (20.4, 24.1)
Mexican American	190	26.1 (17.4, 36.4)	1,481	22.9 (20.6, 25.4)
Diagnosed high cholesterol				
Age group:				
20–39	262	10.7 (7.2, 15.1)	5,734	14.7 (13.7, 15.7)
40–59	311	42.5 (35.2, 50.1)	6,710	41.2 (39.7, 42.8)
60 and over	336	54.5 (46.6, 62.2)	7,320	56.5 (54.7, 58.3)
Sex:				
Men	412	33.6 (28.0, 39.5)	9,408	35.9 (34.5, 37.3)
Women	497	31.7 (26.8, 36.9)	10,356	32.7 (31.5, 33.9)
Race and Hispanic origin:				
Non-Hispanic white	148	28.1 (19.6, 37.9)	8,845	34.9 (33.8, 36.0)
Non-Hispanic black	105	38.0 (28.7, 48.0)	4,299	32.2 (30.6, 33.9)
Hispanic[1]	437	34.5 (29.2, 40.0)	4,450	33.3 (31.9, 34.7)
Mexican American	306	33.7 (27.6, 40.3)	2,507	32.2 (30.2, 34.2)
Percent taking a lipid-lowering medication among adults diagnosed with high cholesterol				
Age group:				
20–39	‡	‡	849	15.1 (12.2, 18.3)
40–59	133	38.1 (27.1, 50.2)	2,719	42.9 (40.0, 45.8)
60 and over	192	64.2 (55.4, 72.4)	4,024	70.6 (68.9, 72.3)
Sex:				
Men	162	36.3 (26.3, 47.1)	3,733	47.3 (45.0, 49.6)
Women	191	38.9 (31.4, 46.9)	3,859	43.1 (40.9, 45.4)
Race and Hispanic origin:				
Non-Hispanic white	49	†4.3 (21.3, 49.2)	3,617	46.1 (44.0, 48.2)
Non-Hispanic black	48	*,†33.1 (18.9, 49.9)	1,569	47.5 (44.8, 50.3)
Hispanic[1]	171	37.3 (30.1, 45.0)	1,718	39.2 (36.1, 42.4)
Mexican American	113	36.7 (26.9, 47.4)	930	41.9 (37.4, 46.5)

See footnotes at end of table.

Table 2. Age-adjusted percentage of adults aged 20 and older with abnormal lipids, diagnosed high cholesterol, and taking lipid-lowering medications by age, sex, and race and Hispanic origin: Los Angeles County and United States, 2007–2014—Con.

Measurement	Los Angeles County		United States	
	N	Percent (95% CI)	N	Percent (95% CI)
Percent taking a statin among adults diagnosed with high cholesterol				
Age group:				
20–39	‡	‡	851	11.6 (9.1, 14.5)
40–59	134	25.0 (14.2, 38.7)	2,721	34.6 (31.9, 37.3)
60 and over	192	49.5 (36.6, 62.4)	4,044	60.3 (58.4, 62.1)
Sex:				
Men	163	22.9 (12.2, 36.9)	3,748	39.8 (37.9, 41.8)
Women	191	29.7 (21.7, 38.7)	3,868	35.1 (33.0, 37.2)
Race and Hispanic origin:				
Non-Hispanic white	50	*,†20.3 (5.4, 45.3)	3,630	39.0 (37.2, 41.0)
Non-Hispanic black	48	†31.4 (18.3, 47.0)	1,573	38.5 (35.7, 41.3)
Hispanic[1]	171	22.5 (16.5, 29.6)	1,723	28.2 (26.0, 30.4)
Mexican American	113	20.0 (12.9, 28.9)	931	29.4 (26.4, 32.5)

*Estimate does not meet National Center for Health Statistics standards of reliability.

†Standard error based on less than 8 degrees of freedom.

‡ Estimate suppressed due to small sample size.

[1]Hispanic includes Mexican Americans.

NOTES: CI is confidence interval. HDL-C is high-density lipoprotein cholesterol. LDL-C is low-density lipoprotein cholesterol. Estimates were age-adjusted by the direct method to the projected 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over. Race and Hispanic origin-specific estimates reflect persons reporting only one race; those reporting more than one race are included in the total but are not reported separately. Diagnosed high cholesterol is based on an affirmative response to the question, "Have you ever been told by a doctor or other health professional that your blood cholesterol level was high?" Taking a lipid-lowering medication is based on an affirmative response to the question, "Are you currently taking lipid-lowering medication?" asked of adults dignosed with high cholesterol. Taking a statin is based on a comprehensive enumeration of prescription medications that the participant reported taking in the past 30 days.

SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, 2007–2014.