

Prevalence of Low High-density Lipoprotein Cholesterol Among Adults, by Physical Activity: United States, 2011–2014

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Key findings

Data from the National Health and Nutrition Examination Survey

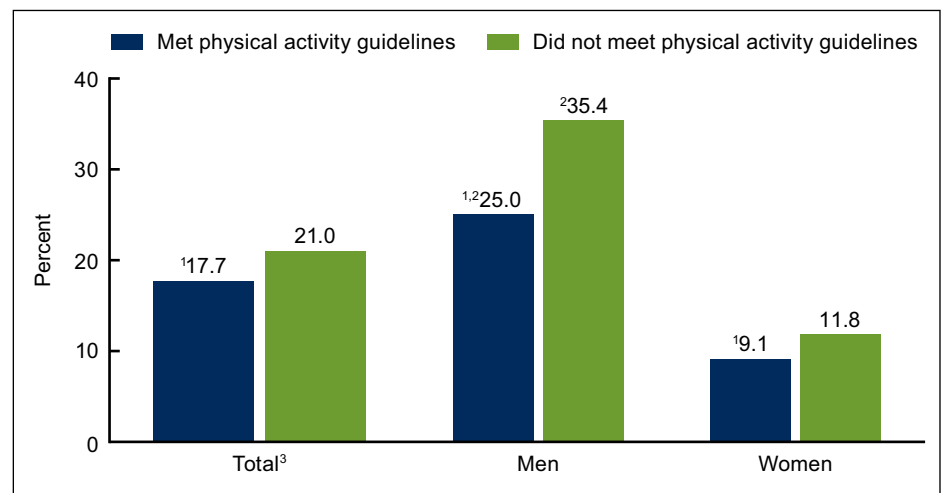
- The prevalence of low high-density lipoprotein (HDL) cholesterol was significantly higher among adults who did not meet recommended physical activity guidelines (21.0%) than adults who met the guidelines (17.7%).
- Low HDL cholesterol prevalence differed significantly for both men and women by adherence to physical activity guidelines.
- Prevalence of low HDL cholesterol declined as age increased for both those who did and did not meet the physical activity guidelines.
- Non-Hispanic white and non-Hispanic black adults who did not meet the physical activity guidelines had a higher prevalence than those who met the guidelines.
- Low HDL cholesterol prevalence declined with increasing education level regardless of adherence to physical activity guidelines.

Regular physical activity can improve cholesterol levels among adults, including increasing high-density lipoprotein (HDL) cholesterol (1). HDL cholesterol is known as “good” cholesterol because high levels can reduce cardiovascular disease risk (2). The 2008 Physical Activity Guidelines for Americans recommend that adults engage in 150 minutes or more of moderate-intensity aerobic activity per week, 75 minutes of vigorous-intensity aerobic activity per week, or an equivalent combination (3). Adherence to these guidelines is expected to decrease the prevalence of low HDL cholesterol levels (4–8). This report presents national data for 2011–2014 on low HDL cholesterol prevalence among U.S. adults aged 20 and over, by whether they met these guidelines.

Keywords: HDL cholesterol • physical activity • NHANES

Prevalence of low HDL cholesterol was higher among adults who did not meet the physical activity guidelines compared with those who met the guidelines.

Figure 1. Age-adjusted prevalence of low HDL cholesterol among adults aged 20 and over, by physical activity and sex: 2011–2014



¹Significantly different from subgroup that did not meet physical activity guidelines.

²Significantly different from women in the same group.

³Overall total of low HDL prevalence was 19.0%.

NOTES: HDL is high-density lipoprotein. Low HDL cholesterol is less than 40 mg/dL based on laboratory measurement. Data are age-adjusted by the direct method to the 2000 U.S. Census population, using age groups 20–39, 40–59, and 60 and over. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db276_table.pdf#1.

SOURCE: NCHS, National Health and Nutrition Examination Survey, 2011–2014.

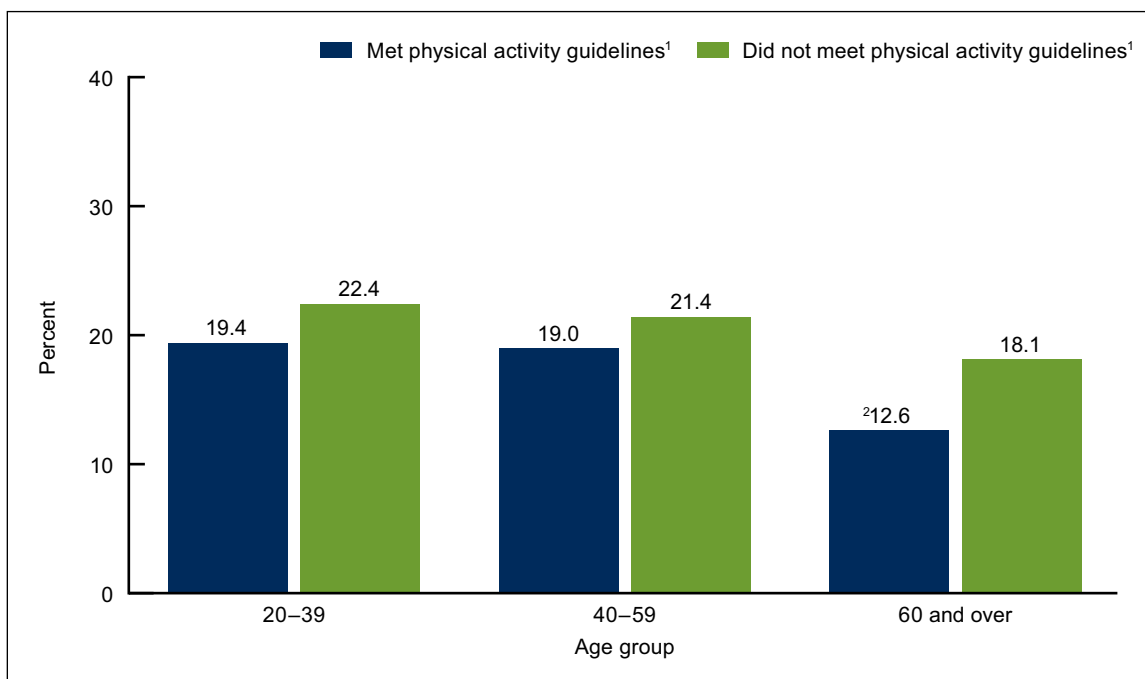


- During 2011–2014, the prevalence of low HDL cholesterol was 19.0% among all adults. Prevalence was higher among adults who did not meet the physical activity guidelines (21.0%) compared with adults who met the guidelines (17.7%) (Figure 1).
- For men, prevalence of low HDL cholesterol was higher among those who did not meet the physical activity guidelines (35.4%) compared with those who met the guidelines (25.0%). Prevalence was also higher among women who did not meet the guidelines (11.8%) compared with women who met the guidelines (9.1%).
- Among adults who met the physical activity guidelines, the prevalence of low HDL cholesterol was higher among men (25.0%) compared with women (9.1%).
- For adults who did not meet the physical activity guidelines, prevalence of low HDL cholesterol was higher among men (35.4%) compared with women (11.8%).

The prevalence of low HDL cholesterol declined as age increased, regardless of physical activity status.

- For adults aged 60 and over, those who did not meet the physical activity guidelines had a higher prevalence of low HDL cholesterol than those who met the guidelines (18.1% compared with 12.6%) (Figure 2). There were no significant differences in the prevalence of low HDL cholesterol by physical activity status among adults aged 20–39 and 40–59.

Figure 2. Prevalence of low HDL cholesterol among adults aged 20 and over, by physical activity and age: 2011–2014



¹Significant decreasing linear trend.

²Significantly different from subgroup that did not meet physical activity guidelines.

NOTES: HDL is high-density lipoprotein. Low HDL cholesterol is less than 40 mg/dL based on laboratory measurement. Data are age-adjusted by the direct method to the 2000 U.S. Census population, using age groups 20–39, 40–59, and 60 and over. Access data table for Figure 2 at:

https://www.cdc.gov/nchs/data/databriefs/db276_table.pdf#2.

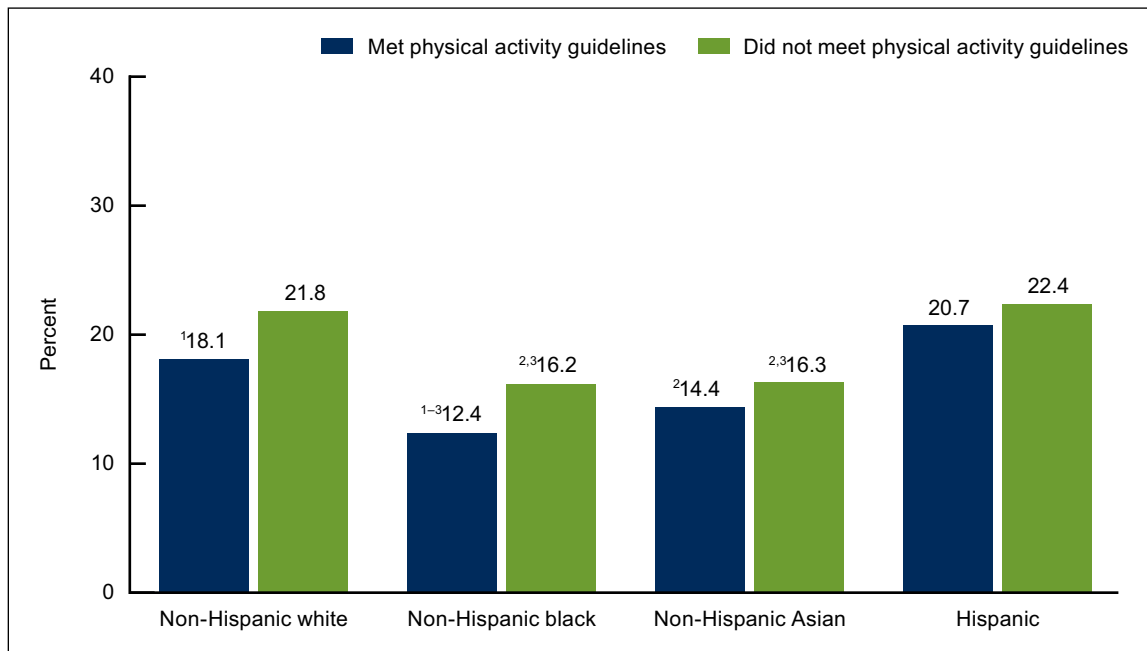
SOURCE: NCHS, National Health and Nutrition Examination Survey, 2011–2014.

- The prevalence of low HDL cholesterol decreased with increasing age among adults who met the physical activity guidelines: 19.4% for adults aged 20–39, 19.0% for those aged 40–59, and 12.6% for those aged 60 and over. A similar pattern was found among adults who did not meet the physical activity guidelines (22.4% for those aged 20–39, 21.4% for those aged 40–59, and 18.1% for those aged 60 and over).

For non-Hispanic white and non-Hispanic black adults, low HDL cholesterol prevalence was higher among those who did not meet the physical activity guidelines compared with those who met the guidelines.

- Among non-Hispanic white and non-Hispanic black adults, the prevalence of low HDL cholesterol was higher among those who did not meet the physical activity guidelines than among those who met the guidelines (21.8% compared with 18.1%, and 16.2% compared with 12.4%, respectively) (Figure 3). There were no significant differences in the prevalence of low HDL cholesterol by physical activity status among non-Hispanic Asian and Hispanic adults.
- For adults who met the physical activity guidelines, prevalence of low HDL cholesterol was higher among Hispanic adults (20.7%) compared with non-Hispanic black (12.4%) and non-Hispanic Asian (14.4%) adults. Non-Hispanic white adults who met the guidelines had higher prevalence than non-Hispanic black adults (18.1% compared with 12.4%).

Figure 3. Age-adjusted prevalence of low HDL cholesterol among adults aged 20 and over, by physical activity and race and Hispanic origin: 2011–2014



¹Significantly different from subgroup that did not meet physical activity guidelines.

²Significantly different from Hispanic persons in the same group.

³Significantly different from non-Hispanic white persons in the same group.

NOTES: HDL is high-density lipoprotein. Low HDL cholesterol is less than 40 mg/dL based on laboratory measurement. Data are age-adjusted by the direct method to the 2000 U.S. Census population, using age groups 20–39, 40–59, and 60 and over. Access data table for Figure 3 at:

https://www.cdc.gov/nchs/data/databriefs/db276_table.pdf#3.

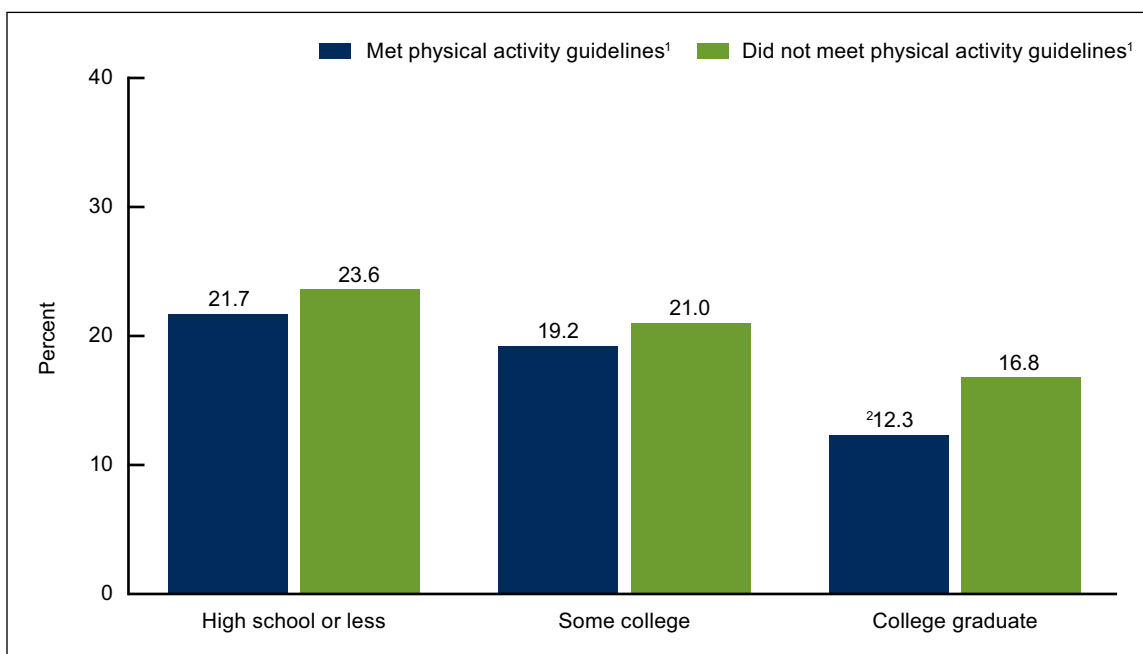
SOURCE: NCHS, National Health and Nutrition Examination Survey, 2011–2014.

- Hispanic adults who did not meet the physical activity guidelines (22.4%) had a higher prevalence of low HDL cholesterol than non-Hispanic black (16.2%) and non-Hispanic Asian (16.3%) adults. Non-Hispanic white adults who did not meet the physical activity guidelines (21.8%) also had significantly higher prevalence than non-Hispanic black and non-Hispanic Asian adults.

Low HDL prevalence declined with increasing education level, regardless of physical activity status.

- College graduates who did not meet the physical activity guidelines had a higher prevalence of low HDL cholesterol (16.8%) than college graduates who met the guidelines (12.3%) (Figure 4). There were no significant differences in low HDL cholesterol prevalence by physical activity status among adults with other education levels.
- Among adults who met the physical activity guidelines, there was a significant decrease in low HDL cholesterol prevalence with increasing education: 21.7% for adults with a high school education or less, 19.2% for adults with some college education, and 12.3% for college graduates. A similar pattern was observed among adults who did not meet the physical activity guidelines (23.6% for adults with a high school education or less, 21.0% for those with some college education, and 16.8% for college graduates).

Figure 4. Age-adjusted prevalence of low HDL cholesterol among adults aged 20 and over, by physical activity and education: 2011–2014



¹Significant decreasing linear trend.

²Significantly different from subgroup that did not meet physical activity guidelines.

NOTES: HDL is high-density lipoprotein. Low HDL cholesterol is less than 40 mg/dL based on laboratory measurement. Data are age-adjusted by the direct method to the 2000 U.S. Census population, using age groups 20–39, 40–59, and 60 and over. Access data table for Figure 4 at:

https://www.cdc.gov/nchs/data/databriefs/db276_table.pdf#4.

SOURCE: NCHS, National Health and Nutrition Examination Survey, 2011–2014.

Summary

During 2011–2014, adults who did not meet physical activity guidelines had a higher prevalence of low HDL cholesterol compared with adults who met the guidelines. This pattern was consistent across all demographic subgroups, where statistically significant differences were observed among men and women, adults aged 60 and over, non-Hispanic white adults, non-Hispanic black adults, and college graduates. Regardless of physical activity status, the prevalence of low HDL cholesterol was significantly higher among men compared with women, and prevalence decreased with age and education level. Previous reports have demonstrated similar differences in low HDL cholesterol prevalence by sex and age, where men had lower levels of HDL cholesterol than women, and the percentage of adults with low HDL cholesterol declined with age (9–11).

Low HDL cholesterol is a risk factor for cardiovascular disease (4–8). Some factors affecting HDL cholesterol levels and risk for cardiovascular disease cannot be modified, including sex, age, and heredity. However, National Cholesterol Education Program guidelines encourage lifestyle changes that can lower risk, including regular aerobic physical activity as it is associated with increased HDL cholesterol levels (12).

Definitions

Low high-density lipoprotein (HDL) cholesterol: Serum high-density lipoprotein cholesterol less than 40 mg/dL based on laboratory measurement.

Met physical activity guidelines: A summary of reported time spent in the previous week in moderate and vigorous activities from work, transportation, and leisure was categorized as meeting or not meeting the 2008 Physical Activity Guidelines for Americans. These guidelines were issued by the U.S. Department of Health and Human Services (3). Meeting physical activity guidelines is defined as engaging in 150 minutes or more of moderate-intensity aerobic activity per week, 75 minutes of vigorous-intensity aerobic activity per week, or an equivalent combination.

Data source and methods

Data from the 2011–2012 and 2013–2014 National Health and Nutrition Examination Survey (NHANES) were used for these analyses. NHANES is a cross-sectional survey designed to monitor the health and nutritional status of the civilian noninstitutionalized U.S. population (13,14). It is conducted by the National Center for Health Statistics. Survey participants were selected using a complex, multistage probability design. Participants were interviewed in their homes and then underwent standardized physical examinations in a mobile examination center, which included the collection of laboratory specimens. Further details regarding NHANES protocols and procedures, including laboratory methods, are available elsewhere (13,14).

For 2011–2012 and 2013–2014, non-Hispanic black, non-Hispanic Asian, and Hispanic persons were oversampled to obtain reliable estimates for these population subgroups. Specific race and Hispanic-origin estimates reflect persons reporting only one race. Those reporting “other” race and more than one race are included in the analysis but are not reported separately.

Examination sample weights, which account for differential selection probabilities, nonresponse, and noncoverage were used in the estimation of national estimates. The standard errors of the percentages were estimated using Taylor series linearization, a method that incorporates the sample design. Differences between groups were evaluated using a *t* statistic at the $p < 0.05$ significance level. To test for linear trends, the null hypothesis of no linear trend was examined using orthogonal polynomials. Pregnant women were excluded from these analyses. Statistical analyses were conducted using SAS 9.3 software (SAS Institute Inc., Cary, N.C.) and SUDAAN release 11.0 (RTI International, Research Triangle Park, N.C.).

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