
MMWR. 2001;50:754-758

2 tables omitted

HIGH BLOOD CHOLESTEROL (HBC) is a major risk factor for heart disease. One of the national health objectives for 2010 is to reduce the percentage of adults aged $\geq 20$ years with total blood cholesterol levels of $\geq 240$ mg/dL (objective 12-14). One strategy for achieving this objective is to increase awareness of HBC. To examine state-specific trends in the proportion of screened adults who reported that they had HBC, CDC analyzed data from the Behavioral Risk Factor Surveillance System (BRFSS) for 1991 through 1999. This report summarizes the results of that analysis and indicates that approximately one fourth of screened survey participants were aware that they had HBC; this proportion increased slightly from 1991 through 1999. Awareness of HBC was consistently higher for successive age groups (from 18.6% among those aged $20-44$ years to 42.7% among those aged $\geq 65$ years for 1999). Reported HBC awareness was higher in 1999 than in 1991 among non-Hispanic whites, non-Hispanic blacks, and Hispanics. Numbers for American Indians/Alaska Natives and Asians/Pacific Islanders were too low for meaningful analysis. Awareness of HBC was higher among women than men until 1999 and increased for both men and women.

For 47 states that participated in BRFSS in all years from 1991 through 1999, the age-standardized prevalence of HBC awareness among persons screened increased from 25.7% in 1991 to 28.6% in 1999. The age-standardized prevalence of HBC awareness among persons screened increased in DC and 38 states and ranged from a 0.1 percentage point increase in Delaware to a 7.3 percentage point increase in Florida. The increase in HBC awareness was significant in Alabama, Arkansas, California, Florida, Georgia, Iowa, Maryland, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, South Dakota, Tennessee, Texas, and West Virginia. For eight states (Alaska, Arizona, Connecticut, Hawaii, Oklahoma, Rhode Island, South Carolina, and Vermont), the prevalence of persons screened who reported HBC decreased from 1991 to 1999 and ranged from a 5.8 percentage point decline in Oklahoma to a 0.7 percentage point decline in Connecticut. The decrease was significant in Oklahoma. In Virginia, the prevalence of reported HBC among persons who ever had their cholesterol tested remained constant at 31.0% during 1991-1999.

From 1991 to 1999, HBC awareness increased among all demographic groups. The percentage of persons who had ever had their cholesterol tested and who reported having been told that they had HBC was consistently higher for successive age groups (from 18.6% among those aged $20-44$ years to 42.7% among those aged $\geq 65$ years for 1999). Reported HBC awareness was higher in 1999 than in 1991 among non-Hispanic whites, non-Hispanic blacks, and Hispanics. Numbers for American Indians/Alaska Natives and Asians/Pacific Islanders were too low for meaningful analysis. Awareness of HBC was higher among women than men until 1999 and increased for both men and women.

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CDC Editorial Note: The findings in this report indicate that among persons who had their cholesterol level screened, the percentage who were told by a health-care provider that they had HBC increased significantly from 1991 to 1999.
BRFSS data on cholesterol screening trends indicated an increase in the proportion of U.S. adults aged ≥20 years who were screened during the preceding 5 years for HBC from 67.3% in 1991 to 70.8% in 1999. Possible reasons for this increase include improved efforts by public health programs to increase awareness of cholesterol levels, increased counseling by health-care providers, or an increase in HBC prevalence. However, data from the National Health and Nutrition Examination Survey (NHANES) suggest that cholesterol levels are declining.

No national data allow state-level estimates of HBC based on actual blood cholesterol measurements. NHANES used directly measured cholesterol and observed decreasing cholesterol levels among adults between the 1971-1974 and 1988-1994 surveys. More recent data from NHANES are not available. The differences in reported HBC across demographic variables (age, sex, and race/ethnicity) in BRFSS are consistent with those measured in NHANES III.

The findings in this report are subject to at least two limitations. First, BRFSS data are self-reported, and some respondents may have over or underestimated their HBC status. Patients may not have been told that they had high cholesterol and may have underestimated their HBC status. However, the actual cut-point used by health-care providers is unknown, and patients with borderline high cholesterol may have been told that their cholesterol was high, which might have resulted in an overestimate of true prevalence. Second, because BRFSS is a telephone-based survey, and persons with lower socioeconomic status are less likely than more affluent persons to have a telephone, persons with lower socioeconomic status may be underrepresented.

Control of HBC requires successful implementation of multiple steps among both patients and health-care providers, including ongoing screening for HBC, knowing one’s cholesterol levels, and treating and managing HBC through lifestyle changes (e.g., reduced dietary intake of saturated fat and cholesterol, increased dietary intake of viscous fiber, increased exercise, and weight control) and medical treatment as appropriate. The National Cholesterol Education Program of the National Heart, Lung, and Blood Institute recommends that all persons aged ≥20 years have their cholesterol checked at least once every 5 years. In May 2001, NCEP released the third Adult Treatment Panel (ATP III) Report, which includes updated clinical guidelines for cholesterol testing and management. The new features of ATP III focus on primary prevention among those with multiple risk factors, including an assessment of the 10-year risk for a heart attack, modifications in lipid and lipoprotein classification levels, and implementation of the treatment recommendations.

HBC is a modifiable risk factor for heart disease. The benefits of cholesterol lowering include a decrease in the incidence of coronary heart disease and a decline in mortality among those with or without coronary heart disease. HBc can be prevented or controlled with increased physical activity, adoption of diets low in saturated fats and cholesterol and high in fruits and vegetables, and with the use of drugs that lower cholesterol.

From the Centers for Disease Control and Prevention


Reference

10 available

*All MMWR references are available on the Internet at <http://www.cdc.gov/mmwr>. Use the search function to find specific articles.

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(Reprinted) JAMA, October 10, 2001—Vol 286, No. 14 1707
standardized by age to the projected 2000 U.S. population. Significant differences in the adjusted odds ratios (AORs) for engaging in all four HLCs were identified using a multiple logistic regression model that contained all independent variables.

An estimated 37.9% (95% confidence interval [CI] = 36.3%-39.5%) of Michigan adults had a healthy body weight, 22.8% (95% CI = 21.4%-24.2%) ate the recommended amount of fruits and vegetables, 25.9% (95% CI = 24.4%-27.4%) engaged in regular LTPA, and 72.3% (95% CI = 70.8%-73.8%) did not smoke. Overall, 11.2% (95% CI = 10.1%-12.3%) of adults engaged in none of these practices, 38.6% (95% CI = 37.0%-40.2%) in one, 33.3% (95% CI = 31.7%-34.9%) in two, 13.9% (95% CI = 12.8%-15.0%) in three, and 3.0% (95% CI = 2.5%-3.5%) in all four.

The prevalence of engaging in all four HLCs was significantly different by sex, education, and health status (p < 0.05). The prevalence of engaging in all four HLCs was lower in men (age-adjusted prevalence = 1.6%) than in women (age-adjusted prevalence = 4.5%; AOR = 0.3; 95% CI = 0.2-0.5). The prevalence of engaging in all four HLCs increased with education. The prevalence in college graduates was more than three times higher than in those with a high school education or less (AOR = 3.2; 95% CI = 1.7-6.1). However, the age-adjusted prevalences were still very low in all three education groups. The prevalence of engaging in all four HLCs decreased with decreasing health status. Persons reporting excellent health had a much higher age-adjusted prevalence (7.1% [95% CI = 5.3%-8.9%]) than adults with fair or poor health (1.0% [95% CI = 0.1%-1.9%; AOR = 0.1; 95% CI = 0.04-0.4]). However, the prevalence rates in all four groups were low.

**CDC Editorial Note:** The findings in this report document the low prevalence of healthy lifestyles in Michigan. The prevalence of HLCs in this report is consistent with that in the Nurses Health Study for a similar grouping of five healthy lifestyle behaviors and is identical to that from the overall 2000 BRFSS data. When compared with other states, obesity and smoking in Michigan are higher than the national average. However, the daily consumption of five fruits and vegetables in Michigan is consistent with the national average, and Michigan ranked among the top 10 states for participation in regular and sustained physical activity in 2000.

Disease risk, especially that related to cardiovascular disease, has usually been examined separately. Some studies have measured disease risk more comprehensively by combining factors such as smoking, obesity, hypertension, and high blood cholesterol. This study used a similar approach by assessing the combination of healthy factors that reduce disease risk, which may be a useful adjunct to the more traditional risk factor surveillance method.

The findings in this report are subject to five limitations. First, data were self-reported and some responses may be considered socially undesirable. As a result, respondents may both under-report weight and over-report LTPA or fruit and vegetable consumption. Second, BRFSS collects information about LTPA only and may underestimate total activity. Third, BRFSS estimates of daily fruit and vegetable consumption are similar to estimates based on multiple records but are smaller than estimates based on more extensive food-frequency questionnaires. Fourth, the number of black respondents in this study was too small for meaningful analysis. Finally, noncoverage and non-response biases related to telephone survey data may affect estimates.

Findings from previous epidemiologic studies underscore the need for comprehensive primary prevention activities to reduce the prevalence of common chronic disease risk factors. Primary prevention may be a useful strategy in promoting the adoption and maintenance of HLCs. Primary prevention includes addressing the underlying social determinants that lead to behavioral and physiologic risk factors by mobilizing both health-care providers and the general population to adopt new policies. These policies include regulatory, educational, and environmental changes designed to facilitate the implementation of prevention programs.

In Michigan, two initiatives sponsored by the Michigan Department of Community Health (MDCH) and the Governor's Council on Physical Fitness promote physical activity and healthy weight. First, a voluntary Exemplary Physical Education Curriculum promotes school-aged children with the fitness levels, motor skills, activity-related knowledge, and personal/social skills needed for an active life. Second, environmental changes that make it easier and safer for persons to be physically active are encouraged through the “Promoting Active Communities Award,” which recognizes communities that enact policies to promote physical activity. To promote a healthy diet, MDCH's 5-A-Day program provides technical support, information, and materials to local agencies to assist them in conducting local programs. MDCH also works with grocery stores to provide education materials and grocery rewards to consumers to encourage them to eat fruits and vegetables.

**REFERENCES**

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