American Family Physician

U.S. PREVENTIVE SERVICES TASK FORCE (HTTPS://WWW.AAFP.ORG/GLOBAL-SEARCH.AFP.HTML#&T=PUBLICATION&F:@SECTION=[U.S. PREVENTIVE SERVICES TASK FORCE]&F:@SUBPUBLICATIONS=[AFP%20JOURNAL])

Screening for Lipid Disorders in Adults: Recommendations and Rationale

Am Fam Physician. 2002;65(2):273-277

This statement summarizes the current U.S. Preventive Services Task Force (USPSTF) recommendations for screening for lipid disorders and the supporting scientific evidence, and it updates the 1995 recommendations contained in the *Guide to Clinical Preventive Services*, second edition.[1] Explanations of the ratings and the strength of overall evidence are provided in *Tables 1* and *2*, respectively. This is an abridged version of the original Recommendations and Rationale Statement, which appeared in the April 2001 Supplement of the *American Journal of Preventive Medicine*[2] and is available on the Agency for Healthcare Research and Quality (AHRQ) Web site. The complete information on which this statement is based, including evidence tables and references, is available in the article, "Screening and Treating Adults for Lipid Disorders,"[3] and in the Systematic Evidence Review[4] on this topic, which can be obtained through the USPSTF Web site (http://www.ahrq.gov/clinic/uspstfix.htm (http://www.ahrq.gov/clinic/uspstfix.htm)), through the National Guideline Clearinghouse (http://www.guideline.gov (http://www.guideline.gov)), or in print through the AHRQ Publications Clearinghouse (800-358-9295). Screening for lipid disorders in children and adolescents will be addressed in a separate statement.

Reprints of the original Recommendations and Rationale Statement are available on the AHRQ Web site athttp://www.ahrq.gov/clinic/uspstfix.htm (http://www.ahrq.gov/clinic/uspstfix.htm), through the National Guideline Clearinghouse (http://www.guideline.gov (http://www.guideline.gov)), or in print through the AHRQ Publications Clearinghouse (800-358-9295).

Summary of Recommendations

- The USPSTF strongly recommends that clinicians routinely screen men 35 years and older and women 45 years and older for lipid disorders and treat abnormal lipid levels in persons who are at increased risk of coronary heart disease **(A recommendation)**.

TABLE 1

USPSTF Recommendations and Ratings

The USPSTF grades its recommendations according to one of five classifications (A, B, C, D, or I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms).

A.	The USPSTF strongly recommends that clinicians provide [the service] to eligible patients. *The USPSTF found good evidence that [the service] improves important health outcomes and concludes that benefits substantially outweigh harms*.
B.	The USPSTF recommends that clinicians provide [the service] to eligible patients. *The USPSTF found at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms*.
C.	The USPSTF makes no recommendation for or against routine provision of [the service]. *The USPSTF found at least fair evidence that [the service] can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation*.
D.	The USPSTF recommends against routinely providing [the service] to asymptomatic patients. *The USPSTF found at least fair evidence that [the service] is ineffective or that harms outweigh benefits*.
I.	The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing [the service]. *Evidence that [the service] is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined*.

USPSTF = U.S. Preventive Services Task Force.

The USPSTF has found good evidence that lipid measurement can identify asymptomatic middle-aged persons at increased risk of coronary heart disease and that lipid-lowering drug therapy substantially decreases the incidence of coronary heart disease in such persons with abnormal lipid levels and causes few major harms. The USPSTF concludes that the benefits of screening for and treating lipid disorders in persons who are middle aged and

older substantially outweigh the harms.

TABLE 2

USPSTF Strength of Overall Evidence

The USPSTF grades the quality of the overall evidence for a service on a three-point scale (good, fair, or poor).

Good:	Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.
Fair:	Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies; generalizability to routine practice; or indirect nature of the evidence on health outcomes.
Poor:	Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

USPSTF = U.S. Preventive Services Task Force.

- The USPSTF recommends that clinicians routinely screen younger adults (men 20 to 35 years of age and women 20 to 45 years of age) for lipid disorders if they have other risk factors for coronary heart disease **(B recommendation)**. (See "Clinical Considerations" for a discussion of risk factors.)

The USPSTF found good evidence that lipid measurement can identify younger persons at increased risk for coronary heart disease, that risk is highest in those with other risk factors, and that the absolute benefits of lipid-lowering treatment depend on a person's underlying risk of coronary heart disease. The USPSTF concludes that the benefits of screening and treating high-risk young adults outweigh the harms.

- The USPSTF makes no recommendation for or against routine screening for lipid disorders in younger adults (men 20 to 35 years of age or women 20 to 45 years of age) in the absence of known risk factors for coronary heart disease **(C recommendation)**.

The USPSTF found good evidence that lipid measurement in low-risk young adults can detect some persons at increased long-term risk of heart disease, but the absolute risk reduction as a result of treating dyslipidemia in most persons is small before middle age. Fair evidence suggests that a substantial proportion of the treatment benefits may be realized within five years of initiating therapy. The USPSTF concludes that the net benefits of screening for lipid disorders in low-risk young persons are not sufficient to make a general recommendation.

- The USPSTF recommends that screening for lipid disorders include measurement of total cholesterol and high-density lipoprotein cholesterol (HDL) levels **(B recommendation)**.

The USPSTF found good evidence that measurement of HDL along with total cholesterol improves the identification of persons at increased risk of cardiovascular disease. Good evidence from randomized trials demonstrates that persons with low HDL without high total cholesterol benefit from treatment.

- The USPSTF concludes that the evidence is insufficient to recommend for or against triglyceride measurement as a part of routine screening for lipid disorders **(I recommendation)**.

Evidence that an elevated triglyceride level is an independent risk factor for heart disease is conflicting, and prospective data are lacking to determine whether including triglyceride measurement is more effective for screening than simply measuring total cholesterol and HDL.

Clinical Considerations

- Total cholesterol and HDL levels can be measured on nonfasting or fasting samples.

Abnormal results should be confirmed by a repeated sample on a separate occasion, and the average of both results should be used for risk assessment. Although measurement of total cholesterol and HDL is more sensitive and specific for assessing the risk of coronary heart disease, total cholesterol alone is an acceptable screening test if available laboratory services cannot provide reliable measurements of HDL. In conjunction with HDL, low-density lipoprotein cholesterol (LDL) and total cholesterol provide comparable information, but measuring LDL requires a fasting sample and is more expensive. In patients with elevated

risk on screening results, lipoprotein analysis, including fasting triglyceride levels, may provide information that is useful in choosing optimal treatments.

- Screening is recommended for men 20 to 35 years of age and women 20 to 45 years of age in the presence of any of the following conditions: diabetes; a family history of cardiovascular disease before age 50 years in male relatives or age 60 years in female relatives; a family history suggestive of familial hyperlipidemia; and multiple risk factors for coronary heart disease (e.g., tobacco use, hypertension).

- The optimal screening interval is uncertain.

On the basis of other guidelines and expert opinion, reasonable options for optimal screening intervals include every five years, shorter intervals for persons who have lipid levels close to those warranting therapy, and longer intervals for low-risk persons who have had low or repeatedly normal lipid level measurements.

- An age at which screening should stop has not been established.

Screening may be appropriate in older persons who have never been screened, but repeated screening is less important in older persons because lipid levels are less likely to increase after age 65 years.

- Treatment decisions should take into account overall risk of heart disease rather than lipid levels alone.

Overall risk assessment should include the presence and severity of the following risk factors: age, gender, diabetes, elevated blood pressure, family history (in younger adults), and smoking. Tools that incorporate specific information on multiple risk factors provide more accurate estimation of cardiovascular risk than categorizations based on counting the numbers of risk factors.[5,6]

- Treatment choices should take into account costs and patient preferences.

Drug therapy is usually more effective than diet alone, but choice of treatment should consider overall risk, costs of treatment, and patient preferences. Guidelines for treating high cholesterol are available from the National Cholesterol Education Program of the National Institutes of Health.[7] Although diet therapy is an appropriate initial treatment for most patients, a minority achieve substantial reductions in lipid levels from diet alone. Drugs are frequently needed to achieve therapeutic goals, especially in high-risk patients. Lipid-lowering treatments should be accompanied by interventions that address all modifiable risk

factors for heart disease, including smoking cessation, treatment of blood pressure, diabetes, and obesity, as well as promotion of a healthy diet and regular physical activity. Long-term adherence to therapies should be emphasized.

- All patients, regardless of lipid levels, should be offered counseling about the benefits of a diet low in saturated fat and high in fruits and vegetables, regular physical activity, avoiding tobacco use, and maintaining a healthy weight.

Scientific Evidence

EPIDEMIOLOGY AND CLINICAL CONSEQUENCES

Consistent evidence from long-term, prospective studies indicates that high levels of total cholesterol and LDL and low levels of HDL are important risk factors for coronary heart disease, the leading cause of morbidity and mortality in the United States. The risk for coronary heart disease increases with increasing levels of total cholesterol and LDL, and declining levels of HDL, in a continuous and graded fashion with no clear threshold of risk. According to National Center for Health Statistics data from 1988 to 1994, 17.5 percent of men and 20 percent of women 20 to 74 years of age had high levels of total cholesterol (240 mg per dL [6.20 mmol per L] or higher).

ACCURACY AND RELIABILITY OF SCREENING TEST

Total cholesterol, LDL, and HDL are independent predictors of coronary heart disease risk, but considering other risk factors (age, diabetes, smoking, blood pressure) in addition to lipid levels markedly improves the estimation of risk. The ratios of total cholesterol to HDL (total cholesterol/HDL) or LDL to HDL (LDL/HDL) classify risk better than total cholesterol alone.

Total cholesterol and HDL can be measured accurately on nonfasting venous or capillary blood samples, but LDL requires fasting samples for accurate measurement. At least two measurements are necessary to ensure that true values are within 10 percent of the mean of the measurements.

EFFECTIVENESS OF EARLY INTERVENTION

In four large primary prevention trials, cholesterol-lowering drug treatment for five to seven years decreased the risk of coronary heart disease events by approximately 30 percent in persons with high total cholesterol or average cholesterol and low HDL levels. In the one trial that included women, treatment appeared to be as effective in post-menopausal women as in men. The average benefit of treating abnormal lipid levels in women, however, may be smaller than in men of similar ages because of their lower rates of heart disease. Although trials have enrolled few patients younger than 45 years or older than 65 years, the USPSTF concluded that the benefits of treatment could be generalized to older and younger persons whose underlying risk of coronary heart disease is comparable to or greater than that of patients in the existing trials (annual incidence of coronary heart disease: 0.6 to 1.5 percent per year).

The only trials examining diet with coronary heart disease outcomes have modified diet in conjunction with interventions on other risk factors, in patients with heart disease, or using atypical institutional diets. Reducing dietary saturated fat and weight loss can lower total cholesterol and LDL levels by as much as 10 to 20 percent in some persons, but the average effect of diet interventions in outpatients is relatively modest (2 to 6 percent reduction in total cholesterol). Lipid screening does not clearly improve the effectiveness of routine diet interventions.

POTENTIAL ADVERSE EFFECTS OF SCREENING

Studies of adverse effects of screening are limited but have not found adverse psychologic effects (i.e., labeling) in patients identified with abnormal lipid levels. Screening could subject some low-risk persons to the inconvenience and expense of treatments that may offer only minimal benefits.

Discussion

The clearest benefit of lipid screening is the identification of persons whose near-term risk of coronary heart disease is sufficiently high to justify drug therapy or other intensive lifestyle interventions to lower cholesterol levels. Screening men older than 35 years and women older than 45 years will identify nearly all persons whose risk of coronary heart disease is as

high as that of the patients in the existing primary prevention trials. In a population with a 1 percent risk of coronary heart disease per year, drug treatment of 67 persons for five years is required to prevent one coronary heart disease event. Most younger persons have a substantially lower risk, unless they have other important risk factors for coronary heart disease or familial hyperlipidemia.

The primary goal of screening younger persons is to promote lifestyle changes that may provide long-term benefits. The average effect of diet interventions is small, however, and screening is not necessary to advise young adults about the benefits of a healthy diet and regular exercise. Although universal screening may detect familial hyperlipidemia earlier than selective screening in some patients, whether this will lead to important reductions in coronary events is not known.

Author Information

The USPSTF recommendations are independent of the U.S. government. They do not represent the views of the Agency for Healthcare Research and Quality (AHRQ), the U.S. Department of Health and Human Services, or the U.S. Public Health Service.

Address correspondence to Alfred O. Berg, M.D., M.P.H., c/o David Atkins, M.D., M.P.H., U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, Center for Practice and Technology Assessment, 6010 Executive Blvd., Suite 300, Rockville, MD 20852 (e-mail:datkins@ahrq.gov (mailto:datkins@ahrq.gov)).

Reference(s)

1. U.S. Preventive Services Task Force. Guide to clinical preventive services. 2d ed. Washington, D.C.: Office of Disease Prevention and Health Promotion, U.S. Government Printing Office, 1996.

2. Berg AO. Screening adults for lipid disorders. Recommendations and rationale. *Am J Prev Med.* 2001;20(3 suppl):73-6.

3. Pignone MP, Phillips CJ, Atkins D, Teutsch SM, Mulrow CD, Lohr KN. Screening and treating adults for lipid disorders. *Am J Prev Med.* 2001;20(3 suppl):77-89.

4. Pignone MP, Phillips CJ, Lannon CM, Mulrow CD, Teutsch SM, Lohr KN, et al. Screening adults for lipid disorders. Systematic Evidence Review Number 4. Rockville, Md.: Agency for Healthcare Research and Quality, April 2001; AHRQ publication no. 01-S004.

5. Wilson PW, D'Agostino RB, Levy D, Belanger AM, Silbershatz H, Kannel WB. Prediction of coronary heart disease using risk factor categories. *Circulation.* 1998;97:1837-47.

6. Jackson R. Updated New Zealand cardiovascular disease risk-benefit prediction guide. BMJ 2000;320:709–10. Retrieved December 2001, from: http://www.bmj.com/cgi/content/full/320/7236/709.

7. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III), May 2001. Retrieved December 2001, from: http://nhlbi.nih.gov/guidelines/cholesterol/atp3xsum.pdf.

This series is coordinated by Joanna Drowos, DO, contributing editor.