

## **Screening for Lipid Disorders in Adults: Recommendations and Rationale**

### **United States Preventive Services Task Force**

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This statement summarizes the third 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.<sup>1</sup> Explanations of the ratings and of the strength of overall evidence are given in Appendix A and Appendix B, respectively. 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<sup>2</sup> and in the Systematic Evidence Review<sup>3</sup> on this topic, which can be obtained through the USPSTF Web site ([www.ahrq.gov/clinic/uspstfix.htm](http://www.ahrq.gov/clinic/uspstfix.htm)), through the National Guideline Clearinghouse ([www.guideline.gov](http://www.guideline.gov)), or in print through the AHRQ Clearinghouse (1-800-358-9295). Screening for lipid disorders in children and adolescents will be addressed in a separate statement.

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## SUMMARY OF RECOMMENDATIONS

- The U.S. Preventive Services Task Force (USPSTF) strongly recommends that clinicians routinely screen men aged 35 years and older and women aged 45 years and older for lipid disorders and treat abnormal lipids in people who are at increased risk of coronary heart disease. **A recommendation.**

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

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

*The USPSTF found good evidence that lipid measurement can identify younger people 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 benefits of screening for and treating high-risk young adults outweigh harms.*

- The USPSTF makes no recommendation for or against routine screening for lipid disorders in younger adults (men aged 20 to 35 or women aged 20 to 45) 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 individuals at increased long-term risk of heart disease, but the absolute reduction in risk as a result of treating dyslipidemia in most people is small before middle age. Fair evidence suggests that a substantial proportion of the benefits of treatment may be realized within 5 years of initiating therapy. The USPSTF concludes the net benefits of screening for lipid disorders in low-risk young people are not sufficient to make a general recommendation.*

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

*The USPSTF found good evidence that measurement of HDL-C along with TC improves the identification of people at increased risk of cardiovascular disease. Good evidence from randomized trials demonstrates that people with low HDL-C without high TC 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 elevated triglyceride level is an independent risk factor for heart disease is conflicting, and prospective data are lacking to determine whether including triglyceride is more effective for screening than simply measuring TC and HDL-C.*

## **CLINICAL CONSIDERATIONS**

- TC and HDL-C can be measured on non-fasting 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 measuring TC and HDL-C is more sensitive and specific for assessing coronary heart disease risk, TC alone is an acceptable screening test if available laboratory services cannot provide reliable measurements of HDL. In conjunction with HDL-C, low-density lipoprotein cholesterol (LDL) and TC provide comparable information, but measuring LDL-C requires a fasting sample and is more expensive. In patients with elevated risk on screening results, lipoprotein analysis, including fasting triglycerides, may provide information that is useful in choosing optimal treatments.
- Screening is recommended for men aged 20 to 35 and women aged 20 to 45 in the presence of any of the following:
  - 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
  - Multiple coronary heart disease risk factors (e.g., tobacco use, hypertension)
- The optimal interval for screening is uncertain.

On the basis of other guidelines and expert opinion, reasonable options include every 5 years, shorter intervals for people who have lipid levels close to those warranting therapy, and longer intervals for low-risk people who have had low or repeatedly normal lipid levels.

- An age to stop screening is not established.

Screening may be appropriate in older people who have never been screened, but repeated screening is less important in older people 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.<sup>4,5</sup>

- 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.<sup>6</sup> Although diet therapy is an appropriate initial therapy for most patients, a minority achieve substantial reductions in lipid levels from diet alone; drugs are frequently needed to achieve therapeutic goals, especially for high-risk people. Lipid-lowering treatments should be accompanied by interventions addressing 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 TC and LDL-C and low levels of HDL-C are important risk factors for coronary heart disease, the leading cause of mortality and morbidity in the United States. The risk for coronary heart disease increases with increasing levels of TC and LDL-C, and declining levels of HDL-C, 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% of men and 20% of women aged 20 to 74 years had high levels of TC (240 mg/dL or greater).

### **Accuracy and Reliability of Screening Test**

TC, LDL-C and HDL-C 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 TC to HDL-C (TC/HDL-C) or LDL-C to HDL-C (LDL-C/HDL-C) classifies risk better than TC alone.

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

### **Effectiveness of Early Intervention**

In four large primary prevention trials, cholesterol-lowering drug treatment for 5 to 7 years decreased risk of coronary heart disease events approximately 30% in people with high TC or average cholesterol and low HDL-C. In the one trial that included women, treatment appeared to be as effective in postmenopausal women as in men. The average benefit of treating abnormal lipids 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 people younger than age 45 years or older than age 65 years, the USPSTF concluded that the benefits of treatment could be generalized to older and younger people whose underlying risk of coronary heart disease is

comparable to or greater than that of subjects in the existing trials (annual incidence of coronary heart disease 0.6% to 1.5% 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 TC and LDL-C as much as 10% to 20% in some individuals, but the average effect of diet interventions in outpatients is relatively modest (2% to 6% reduction in TC). 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 psychological effects (i.e. labeling) in patients identified with abnormal lipids. Screening could subject some low-risk people to the inconvenience and expense of treatments that may offer only minimal benefits.

### **DISCUSSION**

The clearest benefit of lipid screening is identifying individuals whose near-term risk of coronary heart disease is sufficiently high to justify drug therapy or other intensive lifestyle interventions to lower cholesterol. Screening men older than age 35 years and women older than age 45 years will identify nearly all individuals whose risk of coronary heart disease is as high as that of the subjects in the existing primary prevention trials. In a population with a 1% risk of coronary heart disease per year, drug treatment of 67 persons for 5 years is required to prevent one

coronary heart disease event. Most younger people 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 people is to promote lifestyle changes, which may provide long-term benefits later in life. 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 some patients with familial hyperlipidemia earlier than selective screening, whether this will lead to important reductions in coronary events is not known.

## **RECOMMENDATIONS OF OTHERS**

Routine measurement of non-fasting TC and HDL every 5 years is recommended by the National Cholesterol Education Program's Adult Treatment Panel II (ATP II), sponsored by the National Institutes of Health,<sup>6</sup> and endorsed by the American Heart Association<sup>7</sup> and the American College of Obstetricians and Gynecologists.<sup>8</sup> The American College of Physicians and American Academy of Family Physicians suggest periodic cholesterol measurement in males aged 35 to 65 and females aged 45 to 65.<sup>9-11</sup> In 1994, The Canadian Task Force on Preventive Health Care recommended selective case-finding in men aged 30 to 59 years, rather than routine screening.<sup>12</sup> The ATP II and the Canadian Task Force recommendations are currently being updated.

## References

- <sup>1</sup>U.S. Preventive Services Task Force. Guide to clinical preventive services. 2nd ed. Washington, DC: Office of Disease Prevention and Health Promotion, U.S. Government Printing Office, 1996.
- <sup>2</sup>Pignone MP, Phillips CJ, Atkins D, Teutsch SM, Mulrow CD, Lohr KN. Screening and treating adults for lipid disorders. *Am J Prev Med* 2001;20:77-89.
- <sup>3</sup>Pignone MP, Phillips CJ, Lannon CM, et al. Screening Adults for Lipid Disorders. Systematic Evidence Review. Pub. No. AHRQ01-S004. Rockville, MD: Agency for Healthcare Research and Quality, 2001.
- <sup>4</sup>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.
- <sup>5</sup>Jackson R. Updated New Zealand cardiovascular disease risk-benefit prediction guide. *BMJ* 2000;320:709-10. Also available at: [www.bmj.com/cgi/content/full/320/7236/709](http://www.bmj.com/cgi/content/full/320/7236/709)
- <sup>6</sup>Summary of the second report of the National Cholesterol Education Program (NCEP) Expert Panel on the Detection, Evaluation, and Treatment of High Blood Cholesterol In Adults (Adult Treatment Panel II). *JAMA* 1993;269:3015-23.
- <sup>7</sup>Grundy SM, Balady GJ, Criqui MH, et al. A statement for healthcare professionals from the Task Force on Risk Reduction, Consensus Panel Statement (AHA). *Circulation* 1997; 95:2330.
- <sup>8</sup>American College of Obstetricians and Gynecologists (ACOG), Committee on Primary Care. Primary and Preventive Care: Periodic Assessments. Committee Opinion No. 229. Washington, DC: ACOG; December 1999.

<sup>9</sup> American Academy of Family Physicians. Clinical recommendations: 2000-2001. Leawood, KS: American Academy of Family Physicians; 2001. In press. Also available at [www.aafp.org/exam/](http://www.aafp.org/exam/).

<sup>10</sup> Garber AM, Browner WS, Hulley SB. Clinical guideline, Part II: cholesterol screening in asymptomatic adults, revisited. *Ann Intern Med* 1996;124:518-31.

<sup>11</sup> Garber AM, Browner WS, Hulley SB. Guidelines for using serum cholesterol, high-density lipoprotein cholesterol, and triglyceride levels as screening tests for preventing coronary heart disease in adults. *Ann Intern Med* 1996;124:515-17.

<sup>12</sup> Logan AG. Lowering the blood total cholesterol level to prevent coronary heart disease. In: Canadian Task Force on the Periodic Health Examination. *Canadian Guide to Clinical Preventive Health Care*. Ottawa: Health Canada; 1994:650-69.

U.S. PREVENTIVE SERVICES TASK FORCE  
RECOMMENDATIONS AND RATINGS

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**The Task Force grades its recommendations according to one of 5 classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms):**

- A.** The USPSTF strongly recommends that clinicians routinely 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 routinely provide [this 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.*

U.S. PREVENTIVE SERVICES TASK FORCE  
STRENGTH OF OVERALL EVIDENCE

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**The USPSTF grades the quality of the overall evidence for a service on a 3-point scale**

**(good, fair, 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.

