

# U.S. Preventive Services Task Force

## Screening for Peripheral Artery Disease and Cardiovascular Disease Risk Assessment with the Ankle-Brachial Index: Recommendation Statement

### Summary of Recommendation and Evidence

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for peripheral artery disease (PAD) and cardiovascular disease (CVD) risk with the ankle-brachial index (ABI) in asymptomatic adults (*Table 1*). **I statement.**

See the Clinical Considerations section for suggestions for practice regarding the I statement.

### Rationale

#### IMPORTANCE

PAD is a manifestation of atherosclerosis in the lower limbs. It can impair walking and, in severe cases, can lead to tissue loss, infection, and amputation. In addition to morbidity directly caused by PAD, patients with PAD are at increased risk for CVD events because atherosclerosis is a systemic disease that also causes coronary and cerebrovascular events. The most recent data from the National Health and Nutrition Examination Survey (1999-2004) show that 5.9% of the U.S. population 40 years or older has a low ABI ( $\leq 0.9$ ), which indicates the presence of PAD. The true prevalence of PAD is difficult to establish because more than half of persons with a low ABI are asymptomatic or have

atypical symptoms and because population screening studies that use a gold standard diagnostic test are lacking.

#### DETECTION

The USPSTF found inadequate evidence on the accuracy of the ABI for identifying asymptomatic persons with PAD who can benefit from treatment.

#### BENEFITS OF EARLY DETECTION AND INTERVENTION OR TREATMENT

The USPSTF found inadequate evidence to assess whether screening for and treatment of PAD in asymptomatic patients leads to clinically important benefits in either preventing the progression of PAD or preventing CVD events.

#### HARMS OF EARLY DETECTION AND INTERVENTION OR TREATMENT

The USPSTF found adequate evidence that the direct harms of screening, beyond the time needed for testing, are minimal. Other harms may include false-positive test results, exposure to gadolinium or contrast dye if magnetic resonance angiography (MRA) or computed tomography angiography is used to confirm a diagnosis of PAD, anxiety, labeling, and opportunity costs. If a low ABI finding prompts further evaluation for CVD, harms could include those attributable to stress testing and angiography. The harms of preventive treatment for PAD or CVD include bleeding (with aspirin use) and possibly diabetes mellitus (with statin use).

#### USPSTF ASSESSMENT

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for PAD and CVD risk with the ABI in asymptomatic adults.

### Clinical Considerations

#### PATIENT POPULATION UNDER CONSIDERATION

This recommendation applies to asymptomatic adults without a known diagnosis of PAD, CVD, or severe chronic kidney disease.

**See related** Putting Prevention into Practice on page 754.

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**This summary** is one in a series excerpted from the Recommendation Statements released by the USPSTF. These statements address preventive health services for use in primary care clinical settings, including screening tests, counseling, and preventive medications.

**The complete** version of this statement, including supporting scientific evidence, evidence tables, grading system, members of the USPSTF at the time this recommendation was finalized, and references, is available on the USPSTF website at <https://www.uspreventiveservicestaskforce.org/>.

**This series** is coordinated by Kenny Lin, MD, MPH, Deputy Editor.

**A collection** of USPSTF recommendation statements published in *AFP* is available at <https://www.aafp.org/afp/uspstf>.

TABLE 1

### Screening for Peripheral Artery Disease and Cardiovascular Disease Risk Assessment with the Ankle-Brachial Index: Clinical Summary of the USPSTF Recommendation

<b>Population</b>	Adults
<b>Recommendation</b>	No recommendation Grade: I (insufficient evidence)
<b>Risk assessment</b>	Major risk factors for PAD include older age, diabetes mellitus, current smoking, high blood pressure, high cholesterol level, obesity, and physical inactivity.
<b>Screening tests</b>	Resting ABI is most commonly used to detect PAD in clinical settings. ABI is calculated as the systolic blood pressure obtained at the ankle divided by the systolic blood pressure obtained at the brachial artery while the patient is lying down. A ratio of less than 1 (typically defined as $\leq 0.9$ ) is considered abnormal and is commonly used to define PAD.
<b>Treatment and interventions</b>	Treatment of PAD has 2 potential targets: reducing morbidity and mortality from lower limb ischemia and preventing CVD events due to systemic atherosclerosis. PAD treatment focuses on improving outcomes in symptomatic patients; interventions to prevent CVD events include smoking cessation, lowering cholesterol levels, managing high blood pressure, and antiplatelet therapy.
<b>Other relevant USPSTF recommendations</b>	The USPSTF has made recommendations on many factors related to CVD prevention, including screening for high blood pressure, statin use, counseling on smoking cessation, counseling on healthful diet and physical activity, CVD risk assessment with nontraditional risk factors, and low-dose aspirin use in certain persons at increased risk for CVD.

**Note:** For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, go to <https://www.uspreventiveservicestaskforce.org/>.

ABI = ankle-brachial index; CVD = cardiovascular disease; PAD = peripheral artery disease; USPSTF = U.S. Preventive Services Task Force.

### SUGGESTIONS FOR PRACTICE REGARDING THE I STATEMENT

In deciding whether to screen for PAD with the ABI in asymptomatic adults, clinicians should consider the following factors.

**Potential Preventable Burden.** The true prevalence of PAD in the general population is not known. Data from the 1999-2004 National Health and Nutrition Examination Survey show that 5.9% of the U.S. population 40 years or older (7.1 million adults) has a low ABI ( $\leq 0.9$ ), which may indicate the presence of PAD.<sup>1</sup> The most recent prevalence data available are from a screening trial of Danish men aged 65 to 74 years, which identified a prevalence of 11% when PAD was defined as an ABI less than 0.9 or greater than 1.4. Two-thirds of identified patients reported no intermittent claudication, which is considered to be the classic symptom of PAD.<sup>2</sup>

A 2016 systematic review<sup>3</sup> found that over 5 years of follow-up, approximately 7% of patients with asymptomatic PAD developed intermittent claudication and approximately 21% of patients with intermittent claudication progressed to critical limb ischemia. In addition to the risk of worsening symptoms in the lower limbs, a low ABI is associated with increased risk of CVD events. Studies suggest that the 5-year cumulative incidence of cardiovascular mortality is 9% (95% confidence interval [CI], 7%-12%) in asymptomatic patients

with a low ABI and 13% (95% CI, 9%-17%) in symptomatic patients with a low ABI; patients with a normal ABI had an average incidence of 5% (95% CI, 4%-6%).<sup>3</sup>

**Potential Harms.** Although minimal harms are associated with the ABI test, subsequent harms are possible. False-positive test results, false-negative test results, anxiety, labeling, and exposure to gadolinium or contrast dye from confirmatory MRA or computed tomography angiography may occur, while further evaluation of CVD risk may involve stress testing or angiography. If the ABI is used to determine the need for pharmacologic treatment to reduce CVD risk, patients could receive additional treatment with resulting adverse effects or be reclassified to a lower risk category and potentially discontinue treatment that may be beneficial.<sup>4</sup>

**Current Practice.** An older study of U.S. primary care practices found that 12% to 13% reported using the ABI for CVD screening weekly or monthly, 6% to 8% reported using it annually, and 68% reported never using it. However, the study was conducted more than a decade ago and may not reflect current practice.<sup>5</sup>

### ASSESSMENT OF RISK

In addition to older age, major risk factors for PAD include diabetes, current smoking, high blood pressure, high

cholesterol levels, obesity, and physical inactivity, with current smoking and diabetes showing the strongest association.<sup>6</sup> Although women have a slightly lower ABI compared with men, the prevalence of low ABI does not appear to vary significantly by sex after adjusting for age.<sup>4</sup> Among healthy U.S. men aged 40 to 75 years without a history of CVD, the risk for PAD over 25 years in the absence of 4 conventional cardiovascular risk factors (current smoking, high blood pressure, high cholesterol levels, or type 2 diabetes) is rare (9 cases per 100,000 men per year). These 4 risk factors account for 75% of all cases of PAD, and at least 1 of these risk factors is present at the time of PAD diagnosis in 96% of men.<sup>7</sup>

### SCREENING TESTS

Resting ABI is the most commonly used measurement for detection of PAD in clinical settings, although variation in measurement protocols may lead to differences in the ABI values obtained. The ABI is calculated as the systolic blood pressure obtained at the ankle divided by the systolic blood pressure obtained at the brachial artery while the patient is lying down. A ratio of less than 1 (typically defined as  $\leq 0.9$ ) is considered abnormal and is commonly used to define PAD. Data on the accuracy of the ABI in asymptomatic populations are limited. One study of men and women older than 70 years reported that an ABI of less than 0.9 had a sensitivity of 15% to 20% and a specificity of 99% compared with whole-body MRA.<sup>8,9</sup> Physical examination has low sensitivity for detecting mild PAD in asymptomatic persons.<sup>4</sup> Although femoral bruit (vascular murmur at the femoral artery), pulse abnormalities, or ischemic skin changes significantly increase the likelihood ratio for low ABI ( $\leq 0.9$ ), these signs indicate moderate to severe obstruction of blood flow or clinical disease.<sup>10</sup> The clinical benefits and harms of screening for PAD with a physical examination have not been well evaluated, although such screening is often performed.<sup>4</sup>

### TREATMENT AND INTERVENTIONS

Because PAD is a manifestation of systemic atherosclerosis in the lower limbs, treatment of PAD has 2 potential targets: reducing morbidity and mortality from lower limb ischemia and preventing CVD events due to systemic atherosclerosis. Treatment of PAD focuses on improving outcomes in symptomatic patients (e.g., increasing walking distance and quality of life by improving symptoms of intermittent claudication and leg function, preventing or reducing limb complications, and preserving limb viability). Interventions to prevent CVD events include smoking cessation, lowering cholesterol levels, managing high blood pressure, and antiplatelet therapy. However, because the major risk factors for PAD are also used to calculate CVD risk, patients with a low ABI may already be recommended for these treatments.

### ADDITIONAL APPROACHES TO PREVENTION

The National Heart, Lung, and Blood Institute provides resources on assessing cardiovascular risk, including a link to an online version of the Pooled Cohort Equations,<sup>11</sup> as well as resources on preventing PAD.<sup>12</sup> Healthy People 2020 provides a database of evidence-based resources for achieving Healthy People 2020 goals, including interventions to prevent CVD.<sup>13</sup>

### USEFUL RESOURCES

The USPSTF has made recommendations on many factors related to CVD prevention, including screening for high blood pressure,<sup>14</sup> statin use,<sup>15</sup> screening for diabetes,<sup>16</sup> counseling on smoking cessation,<sup>17</sup> counseling on healthful diet and physical activity,<sup>18</sup> and CVD risk assessment with nontraditional risk factors.<sup>19</sup> In addition, the USPSTF recommends use of low-dose aspirin by certain adults at increased risk for CVD.<sup>20</sup>

**This recommendation** statement was first published in *JAMA*. 2018;320(2):177-183.

**The "Other Considerations," "Discussion," "Update of Previous USPSTF Recommendation," and "Recommendations of Others"** sections of this recommendation statement are available at <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/peripheral-artery-disease-in-adults-screening-with-the-ankle-brachial-index>.

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

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