

## Screening for High Blood Pressure in Adults: Recommendation Statement

As published by the U.S. Preventive Services Task Force.

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 <http://www.uspreventiveservicestaskforce.org/>.

This series is coordinated by Sumi Sexton, MD, Associate Deputy Editor.

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

### Summary of Recommendation and Evidence

The USPSTF recommends screening for high blood pressure in adults aged 18 years or older (*Table 1*). **A recommendation.**

The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment (see the Clinical Considerations).

### Rationale

#### IMPORTANCE

High blood pressure is a prevalent condition, affecting approximately 30% of the adult population.<sup>1</sup> It is the most commonly diagnosed condition at outpatient office visits. High blood pressure is a major contributing risk factor for heart failure, heart attack, stroke, and chronic kidney disease. In 2010, it was the primary or contributing cause of death for more than 362,000 Americans.<sup>1</sup>

### DETECTION

The evidence on the benefits of screening for high blood pressure is well established. In 2007, the USPSTF reaffirmed its 2003 recommendation to screen for hypertension in adults aged 18 years or older (A recommendation). Previous evidence reviews commissioned by the USPSTF found good-quality evidence that screening for hypertension has few major harms and provides substantial benefits.<sup>2,3</sup> However, these reviews did not address the diagnostic accuracy of different blood pressure measurement protocols or identify a reference standard for measurement confirmation. For the current recommendation, the USPSTF examined the diagnostic accuracy of office blood pressure measurement, ambulatory blood pressure monitoring (ABPM), and home blood pressure monitoring (HBPM). The USPSTF also assessed the accuracy of these

blood pressure measurements and methods in confirming the diagnosis of hypertension. In addition, the USPSTF reviewed data on optimal screening intervals for diagnosing hypertension in adults.

### BENEFITS OF EARLY DETECTION AND TREATMENT

The USPSTF found good evidence that screening for and treatment of high blood pressure in adults substantially reduces the incidence of cardiovascular events.

### HARMS OF EARLY DETECTION AND TREATMENT

The USPSTF found good evidence that screening for and treatment of high blood pressure has few major harms.

### USPSTF ASSESSMENT

The USPSTF concludes with high certainty that the net benefit of screening for high blood pressure in adults is substantial.

### Clinical Considerations

#### PATIENT POPULATION UNDER CONSIDERATION

This recommendation applies to adults aged 18 years or older without known hypertension.

#### SCREENING TESTS

*Office Blood Pressure Measurement.* Office measurement of blood pressure is most commonly done with a manual or automated sphygmomanometer. Little research has been done on the best approach to measuring blood pressure in the office setting. Most clinical trials of hypertension treatment, at a minimum, used the mean of 2 measurements taken while the patient was seated (some used the mean of the second and third measurements), allowed for at least

**Table 1. Screening for High Blood Pressure in Adults: Clinical Summary of the USPSTF Recommendation**

Population	Adults aged $\geq 18$ years without known hypertension
Recommendation	Screen for high blood pressure; obtain measurements outside of the clinical setting for diagnostic confirmation. Grade: A
Risk assessment	Persons at increased risk for high blood pressure are those who have high-normal blood pressure (130-139/85-89 mm Hg), those who are overweight or obese, and African Americans.
Screening tests	Office measurement of blood pressure is done with a manual or automated sphygmomanometer. Proper protocol is to use the mean of 2 measurements taken while the patient is seated, allow for $\geq 5$ minutes between entry into the office and blood pressure measurement, use an appropriately sized arm cuff, and place the patient's arm at the level of the right atrium. Multiple measurements over time have better positive predictive value than a single measurement. Ambulatory and home blood pressure monitoring can be used to confirm a diagnosis of hypertension after initial screening.
Screening interval	Adults aged $\geq 40$ years and persons at increased risk for high blood pressure should be screened annually. Adults aged 18 to 39 years with normal blood pressure ( $< 130/85$ mm Hg) who do not have other risk factors should be rescreened every 3 to 5 years.
Treatment and interventions	For nonblack patients, initial treatment consists of a thiazide diuretic, calcium-channel blocker, angiotensin-converting enzyme inhibitor, or angiotensin-receptor blocker. For black patients, initial treatment is thiazide or a calcium-channel blocker. Initial or add-on treatment for patients with chronic kidney disease consists of either an angiotensin-converting enzyme inhibitor or an angiotensin-receptor blocker (not both).
Balance of benefits and harms	The net benefit of screening for high blood pressure in adults is substantial.

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

USPSTF = U.S. Preventive Services Task Force.

5 minutes between entry into the office and blood pressure measurement, used an appropriately sized arm cuff, and placed the patient's arm at the level of the right atrium during measurement. Multiple measurements over time have better positive predictive value for hypertension than a single measurement. Automated office blood pressure, which is an average of multiple automated measurements taken while the patient is alone in a room, may yield results similar to those of daytime ABPM.<sup>4,5</sup> Blood pressure is affected by various short-term factors, such as emotions, stress, pain, physical activity, and drugs (including caffeine and nicotine). In addition to within-patient temporal variability, isolated clinic hypertension in the medical setting and in the presence of medical personnel (known as "white coat" hypertension) is well documented. Epidemiologic data suggest that 15% to 30% of the population believed to have hypertension may have lower blood pressure outside of the office setting.<sup>1</sup> The disadvantages of diagnosing hypertension solely in the office setting include measurement errors, the limited number of measurements that can be made conveniently, and the confounding risk for isolated clinic hypertension.

**Ambulatory and Home Blood Pressure Monitoring.** In addition to office blood pressure measurement, ABPM

and HBPM may be used to confirm a diagnosis of hypertension after initial screening. Ambulatory blood pressure monitoring devices are small, portable machines that record blood pressure at regular intervals over 12 to 24 hours while patients go about their normal activities and while they are sleeping. Measurements are typically taken at 20- to 30-minute intervals. Home blood pressure measurement devices are fully automated oscillometric devices that record measurements taken from the patient's brachial artery. Many of these devices are available for retail purchase, and some have undergone technical validation according to recommended protocols.

The USPSTF found convincing evidence that ABPM is the best method for diagnosing hypertension. Although the criteria for establishing hypertension varied across studies, there was significant discordance between the office diagnosis of hypertension and 12- and 24-hour average blood pressures using ABPM, with significantly fewer patients requiring treatment based on ABPM (see *Figure 1* at <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/high-blood-pressure-in-adults-screening#fig1>). Elevated ambulatory systolic blood pressure was consistently and significantly associated with increased risk for fatal and

nonfatal stroke and cardiovascular events, independent of office blood pressure (see *Figure 2* at <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/high-blood-pressure-in-adults-screening#fig2>). For these reasons, the USPSTF recommends ABPM as the reference standard for confirming the diagnosis of hypertension.

Good-quality evidence suggests that confirmation of hypertension with HBPM may be acceptable. Several studies showed that elevated home blood pressure was significantly associated with increased risk for cardiovascular events, stroke, and all-cause mortality, independent of office blood pressure (see *Figure 3* at <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/high-blood-pressure-in-adults-screening#fig3>). However, fewer studies have compared HBPM with office blood pressure measurement, so the evidence is not as substantial as it is for ABPM.<sup>1</sup> Therefore, the USPSTF considers ABPM to be the reference standard for confirming the diagnosis of hypertension. However, the USPSTF acknowledges that the use of ABPM may be problematic in some situations. Home blood pressure monitoring using appropriate protocols is an alternative method of confirmation if ABPM is not available. Measurements from the office, HBPM, and ABPM all must be interpreted with care and in the context of the individual patient. Patients with very high blood pressure or signs of end-organ damage may need immediate treatment.

**SCREENING INTERVAL**

The USPSTF recommends annual screening for adults aged 40 years or older and for those who are at increased risk for high blood pressure. Persons at increased risk include those who have high-normal blood pressure (130 to 139/85 to 89 mm Hg), those who are overweight or obese, and African Americans. Adults aged 18 to 39 years with normal blood pressure (< 130/85 mm Hg) who do not have other risk factors should be rescreened every 3 to 5 years. The USPSTF recommends rescreening with properly performed office blood pressure measurement and, if blood pressure is elevated, confirming the diagnosis of hypertension with ABPM.

**TREATMENT**

The benefits of treatment of hypertension in preventing important health outcomes are well documented. Moderate- to high-quality randomized, controlled trials (RCTs) demonstrate the efficacy of treatment of the general population of persons aged 60 years or older to a target blood pressure of 150/90 mm Hg in reducing the incidence of stroke, heart failure, and coronary heart disease events. Similarly, RCTs demonstrate the efficacy of treatment of

younger adults to a target diastolic blood pressure of less than 90 mm Hg in reducing cerebrovascular events, heart failure, and overall mortality.<sup>6</sup> In the absence of sufficient RCT data, expert opinion has been used to establish a target systolic blood pressure of 140 mm Hg in adults younger than 60 years,<sup>6</sup> and some experts believe that this should also be maintained in those aged 60 years or older.<sup>7</sup> However, published results from a recently completed large RCT, the Systolic Blood Pressure Intervention Trial, are not yet available to inform current treatment goals. Clinicians should consult updated blood pressure treatment guidelines informed by this trial as they become available.

For nonblack patients, initial treatment consists of a thiazide diuretic, calcium-channel blocker, angiotensin-converting enzyme inhibitor, or angiotensin-receptor blocker. For black patients, initial treatment is thiazide or a calcium-channel blocker. Initial or add-on treatment for patients with chronic kidney disease consists of either an angiotensin-converting enzyme inhibitor or an angiotensin-receptor blocker (not both).

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The "Other Considerations," "Discussion," "Update of Previous USPSTF Recommendation," and "Recommendations of Others" sections of this recommendation statement are available at <http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/high-blood-pressure-in-adults-screening>.

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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