

Screening for Atrial Fibrillation With Electrocardiography

US Preventive Services Task Force

Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Atrial fibrillation is the most common type of cardiac arrhythmia (irregular heartbeat), and its prevalence increases with age, affecting about 3% of men and 2% of women aged 65 to 69 years and about 10% of adults 85 years and older. Atrial fibrillation is a major risk factor for ischemic stroke, increasing risk of stroke by as much as 5-fold. Approximately 20% of patients who have a stroke associated with atrial fibrillation are first diagnosed with atrial fibrillation at the time of stroke or shortly thereafter.

OBJECTIVE To issue a new US Preventive Services Task Force (USPSTF) recommendation on screening for atrial fibrillation with electrocardiography (ECG).

EVIDENCE REVIEW The USPSTF reviewed the evidence on the benefits and harms of screening for atrial fibrillation with ECG in adults 65 years and older, the effectiveness of screening with ECG for detecting previously undiagnosed atrial fibrillation compared with usual care, and the benefits and harms of anticoagulant or antiplatelet therapy for the treatment of screen-detected atrial fibrillation in older adults.

FINDINGS Most older adults with previously undiagnosed atrial fibrillation have a stroke risk above the threshold for anticoagulant therapy and would be eligible for treatment. Anticoagulant therapy is effective for stroke prevention in symptomatic persons with atrial fibrillation and high stroke risk. However, the USPSTF found inadequate evidence to determine whether screening with ECG and subsequent treatment in asymptomatic adults is more effective than usual care. At the same time, the harms of diagnostic follow-up and treatment prompted by abnormal ECG results are well established and include misdiagnosis and invasive testing. Given these uncertainties, it is not possible to determine the net benefit of screening with ECG.

CONCLUSIONS AND RECOMMENDATION The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for atrial fibrillation with ECG. (I statement)

JAMA. 2018;320(5):478-484. doi:10.1001/jama.2018.10321

← Editorial page 447

+ Author Audio Interview

← Related article page 485 and JAMA Patient Page page 516

+ CME Quiz at jamanetwork.com/learning

+ Related articles at jamacardiology.com and jamainternalmedicine.com

Author/Group Information: The US Preventive Services Task Force (USPSTF) members are listed at the end of this article.

Corresponding Author: Susan J. Curry, PhD, University of Iowa, 111 Jessup Hall, Iowa City, IA 52242 (chair@uspstf.net).

The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

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 atrial fibrillation with electrocardiography (ECG) (I statement) (Figure 1).

Rationale

Importance

Atrial fibrillation is the most common type of cardiac arrhythmia (ie, irregular heartbeat), and its prevalence increases with age, affecting about 3% of men and 2% of women aged 65 to 69 years and

Figure 1. USPSTF Grades and Levels of Evidence

What the USPSTF Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the Clinical Considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies. inconsistency of findings across individual studies. limited generalizability of findings to routine primary care practice. lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of the limited number or size of studies. important flaws in study design or methods. inconsistency of findings across individual studies. gaps in the chain of evidence. findings not generalizable to routine primary care practice. lack of information on important health outcomes. More information may allow estimation of effects on health outcomes.
The USPSTF defines certainty as “likelihood that the USPSTF assessment of the net benefit of a preventive service is correct.” The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.	

USPSTF indicates US Preventive Services Task Force.

about 10% of adults 85 years and older. Atrial fibrillation is a major risk factor for ischemic stroke, increasing risk of stroke by as much as 5-fold. Approximately 20% of patients who have a stroke associated with atrial fibrillation are first diagnosed with atrial fibrillation at the time of stroke or shortly thereafter.

Detection

The USPSTF found inadequate evidence to assess whether screening with ECG identifies adults 65 years and older with previously undiagnosed atrial fibrillation more effectively than usual care.

Benefits of Early Detection and Intervention and Treatment

The USPSTF found inadequate evidence directly assessing the benefit of screening for atrial fibrillation with ECG on clinical outcomes. The USPSTF found adequate evidence that treatment with anticoagulant therapy reduces the incidence of stroke in patients with symptomatic atrial fibrillation. Given the inadequate evidence on screening with ECG for the detection of atrial fibrillation in asymptomatic adults, there is inadequate evidence to determine the magnitude of benefit of screening with ECG followed by treatment.

Figure 2. Clinical Summary: Screening for Atrial Fibrillation With Electrocardiography

Population	Older adults
Recommendation	No recommendation. Grade: I (insufficient evidence)
Risk Assessment	Atrial fibrillation is strongly associated with older age and obesity. Other risk factors include high blood pressure, diabetes, heart failure, prior cardiothoracic surgery, current smoking, prior stroke, sleep apnea, alcohol and drug use, and hyperthyroidism.
Screening Tests	The USPSTF found inadequate evidence to assess whether screening with electrocardiography identifies older adults with previously undiagnosed atrial fibrillation more effectively than usual care.
Treatments and Interventions	Treatment of atrial fibrillation has 2 components: managing arrhythmia and preventing stroke. In general, these treatment goals are independent of each other. Arrhythmia can be managed by controlling the heart rate to minimize symptoms (usually through medication) or by restoring a normal rhythm. Treatment with anticoagulant therapy reduces the incidence of stroke in patients with symptomatic atrial fibrillation and high stroke risk.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on many factors related to stroke prevention, including screening for high blood pressure, use of statins, counseling on smoking cessation, counseling to promote healthful diet and physical activity, and use of low-dose aspirin for certain persons at increased risk of cardiovascular disease.

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



USPSTF indicates US Preventive Services Task Force.

Harms of Early Detection and Intervention and Treatment

The USPSTF found adequate evidence that screening for atrial fibrillation with ECG is associated with small to moderate harms, such as misdiagnosis, additional testing and invasive procedures, and over-treatment. The USPSTF also found adequate evidence that treatment of atrial fibrillation with anticoagulant therapy is associated with a small to moderate harm of increased risk of major bleeding.

USPSTF Assessment

The USPSTF concludes that there is insufficient evidence to determine the balance of benefits and harms of screening for atrial fibrillation with ECG in asymptomatic adults. Evidence is lacking, and the balance of benefits and harms cannot be determined.

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to older adults (65 years and older) without symptoms of atrial fibrillation (Figure 2).

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

Atrial fibrillation is the most common type of cardiac arrhythmia, affecting more than 2.7 million individuals in the United States.¹ Atrial fibrillation is strongly associated with older age (eg, prevalence increases from 0.2% among adults <55 years to 10% among those ≥85 years) and obesity, both of which are increasing in the United States.² Other risk factors include high blood pressure, diabetes, heart fail-

ure, prior cardiothoracic surgery, current smoking, prior stroke, sleep apnea, alcohol and drug use, and hyperthyroidism.

Electrocardiography, the intervention considered for this recommendation, records the electrical activity of the heart using electrodes (or leads) placed on the skin. It can be measured with 12 leads, fewer than 12 leads, or a single handheld lead. One systematic review reported a 93% sensitivity and 97% specificity for 12-lead ECG; individual studies in the review reported sensitivity ranging from 68% to 100% and specificity ranging from 76% to 100%.³ In addition, several medical devices (eg, automatic blood pressure cuffs and pulse oximeters) are being designed to detect an irregular heartbeat, and an increasing number of consumer devices (eg, wearable monitors and smartphones) have the capability to assess heart rhythm.⁴

Pulse palpation and heart auscultation can also detect atrial fibrillation. In the systematic review discussed above, pulse palpation was reported to have relatively good sensitivity (point estimate, 0.87-1.00) but lower specificity than ECG (point estimate, 0.77-0.84) for detecting atrial fibrillation.³ However, to address this lower specificity, confirmatory ECG can be readily performed in practice in response to an irregular pulse.

Without treatment with anticoagulant therapy, patients with atrial fibrillation have an approximately 5-fold increased risk of stroke, and strokes associated with atrial fibrillation tend to be more severe than strokes attributed to other causes.⁵ Approximately one-third of patients with atrial fibrillation who have a stroke die within the year, and up to 30% of survivors have some type of permanent disability.⁶ Atrial fibrillation does not always cause noticeable symptoms, and some persons may not be aware

that they have it. For approximately 20% of patients who have a stroke associated with atrial fibrillation, stroke is the first sign that they have the condition.⁷ If persons with undiagnosed atrial fibrillation could be detected earlier and start preventive therapy earlier, some of these strokes might be avoided.

Potential Harms

The performance of ECG itself is not associated with significant harm, although abnormal results may cause anxiety. Misinterpretation of ECG results may lead to misdiagnosis and unnecessary treatment. Treatment of atrial fibrillation includes anticoagulant therapy for stroke prevention, which is associated with a risk of bleeding, and pharmacologic, surgical, endovascular (eg, ablation), or combined treatments to control heart rhythm or heart rate. In addition, ECG may detect other abnormalities (either true- or false-positive results) that can lead to invasive confirmatory testing and treatments that have the potential for serious harm. For example, angiography and revascularization are associated with risks, including bleeding, contrast-induced nephropathy, and allergic reactions to the contrast agent.

Current Practice

Few data are available on the current prevalence of screening for atrial fibrillation with ECG or the frequency with which pulse palpation or heart auscultation are performed in the United States.

Treatment and Interventions

Treatment of atrial fibrillation has 2 components—managing arrhythmia and preventing stroke. In general, these treatment goals are independent of each other, because even restoring sinus rhythm does not necessarily reduce stroke risk enough to change how anticoagulant therapy is managed, given the potential for subsequent recurrence of atrial fibrillation. Arrhythmia can be managed by controlling the heart rate to minimize symptoms (usually through medication) or by restoring a normal rhythm. Methods for restoring normal rhythm include electrical or pharmacologic cardioversion and surgical or catheter ablation. Some evidence suggests that selected patients may be able to reverse atrial fibrillation through lifestyle changes that address the underlying causes of atrial fibrillation.⁸ Stroke risk for persons with nonvalvular atrial fibrillation can be estimated with tools such as CHADS₂ (congestive heart failure, hypertension, age \geq 75 years, diabetes mellitus, prior stroke or transient ischemic attack or thromboembolism [doubled]) (developed by Gage and colleagues, Washington University School of Medicine) or its updated version, CHA₂DS₂-VASc (congestive heart failure, hypertension, age \geq 75 years [doubled], diabetes, stroke/transient ischemic attack/thromboembolism [doubled], vascular disease [prior myocardial infarction, peripheral artery disease, or aortic plaque], age 65-74 years, sex category [female]) (Lip and colleagues, University of Birmingham Centre for Cardiovascular Sciences). These tools use somewhat different combinations of patient characteristics and presence or absence of comorbid conditions, as outlined above, to estimate annual risk of stroke and guide decisions about anticoagulation therapy. For patients with atrial fibrillation and high stroke risk (defined as a CHA₂DS₂-VASc score of \geq 2), this risk can be reduced with anticoagulant therapy—either vitamin K antagonists (eg, warfarin) or, more recently, non-vitamin K antagonist oral anticoagulants.

A device that blocks off the atrial appendage to prevent blood clots has also been recently approved by the US Food and Drug Administration as a nonpharmacologic alternative to anticoagulant therapy for selected patients.

Additional Approaches to Prevention

The Million Hearts campaign provides tools and protocols to support the prevention of ischemic heart disease, one of the major causes of atrial fibrillation.⁹ The Centers for Disease Control and Prevention also provides information about programs and resources for the prevention of heart disease.¹⁰

Useful Resources

The USPSTF has made recommendations on many factors related to stroke prevention, including screening for high blood pressure,¹¹ use of statins,¹² counseling on smoking cessation,¹³ and counseling to promote healthful diet and physical activity.¹⁴ In addition, the USPSTF recommends use of low-dose aspirin for certain persons at increased risk of cardiovascular disease.¹⁵

Other Considerations

Research Needs and Gaps

The connection between atrial fibrillation and stroke is well established, as is the existence of undiagnosed atrial fibrillation, especially among older adults. Randomized trials enrolling asymptomatic persons that directly compare screening with usual care and that assess both health outcomes and harms are needed to understand the balance of benefits and harms of screening for atrial fibrillation. Other research needs include understanding how to best optimize the accuracy of ECG interpretation. Although the evidence review for this recommendation statement focused on screening with ECG, the effectiveness of newer technologies capable of assessing pulse and heart rhythm as potential screening strategies should be evaluated. In addition, as ECG and other technologies (eg, AliveCOR Kardia system [AliveCor Inc], discussed in the context of the REHEARSE-AF trial below) are used to record heart activity for longer periods and thus are able to detect shorter episodes of arrhythmia, understanding the stroke risk associated with brief episodes of subclinical atrial fibrillation, and the potential benefit of anticoagulation therapy if risk is significant, is another important research need.

Several ongoing trials may help to fill these evidence gaps. The STROKESTOP study (ClinicalTrials.gov identifier [NCT01593553](#)) randomized 28 768 Swedish adults aged 75 to 76 years to be invited or not invited for screening, first with 12-lead ECG and then intermittently with a single handheld lead over 2 weeks. The primary outcome is stroke incidence. The SCREEN-AF study (ClinicalTrials.gov identifier [NCT02392754](#)) randomized more than 800 participants to a 2-week ambulatory ECG patch monitor or usual care. The primary outcome is new diagnosis of ECG-confirmed atrial fibrillation or flutter, but clinical events are included as secondary outcomes. The IDEAL-MD study (ClinicalTrials.gov identifier [NCT02270151](#)) randomized 16 000 adults older than 65 years to screening with a single-lead ECG device or usual care. The primary outcome is new diagnosis of atrial fibrillation over 1 year; secondary outcomes include major

cardiovascular events and all-cause mortality. Last, the Detecting and Diagnosing Atrial Fibrillation (D₂AF) study (Netherlands Trial Register No. NTR4914) is a cluster randomized trial that compares different approaches to case-finding among adults 65 years and older. The primary outcome is the difference in detection rate of new atrial fibrillation cases over 1 year compared with usual care; however, the study does not include clinical outcomes.

Discussion

Burden of Disease

Atrial fibrillation affects more than 2.7 million individuals in the United States.¹ The prevalence of atrial fibrillation increases with age, from less than 0.2% among adults younger than 55 years to 10% among those older than 85 years.² Although the age-adjusted hospitalization rate for atrial fibrillation among adults older than 65 years has stabilized since 2006, it has steadily increased for younger adults.¹⁶ A meta-analysis of 19 studies found that about 1% of the adult population may have undiagnosed atrial fibrillation, although the prevalence varies among different populations.⁷ Atrial fibrillation may progress over time, causing worsening symptoms and exacerbating heart failure. Atrial fibrillation is also an important cause of stroke, accounting for 14% to 24% of all cases of ischemic stroke.⁷ Persons with persistent and permanent atrial fibrillation have the highest stroke risk, but even paroxysmal (intermittent) atrial fibrillation, which accounts for 25% of all cases, increases the incidence of stroke.¹⁷

Scope of Review

The USPSTF commissioned a systematic review^{7,18} to evaluate the evidence on the benefits and harms of screening for atrial fibrillation with ECG in older adults, the effectiveness of screening with ECG for detecting previously undiagnosed atrial fibrillation compared with usual care (including prompted pulse palpation), and the benefits and harms of anticoagulant or antiplatelet therapy for the treatment of screen-detected atrial fibrillation in older adults.

Detection of Previously Undiagnosed Atrial Fibrillation

Three fair-quality randomized clinical trials in the United Kingdom assessed screening for atrial fibrillation with ECG. The first study randomized 3001 patients (mean age, 75 years) to prompted pulse palpation (clinicians and nurses were encouraged to record the patient's pulse and follow up an irregular pulse with 12-lead ECG; this strategy was termed "opportunistic screening" in this study and in the SAFE study, below) or systematic screening (invitation to attend nurse-led screening with pulse palpation and single-lead ECG).¹⁹ The study found no statistically significant difference between systematic screening with ECG and prompted pulse palpation (risk difference, 0.003 [95% CI, -0.002 to 0.009]), although there were few cases of atrial fibrillation and the confidence interval was wide.

The second study (Screening for Atrial Fibrillation in the Elderly [SAFE]) randomized 50 primary care practices (N = 14 802; mean age, 75 years) to usual care or intervention; patients in the intervention practices were randomized to prompted pulse palpation (clinicians and nurses were encouraged to check the patient's pulse and follow up an irregular pulse with 12-lead ECG) or systematic screening with ECG (invitation to attend nurse-led screening

with pulse palpation and 12-lead ECG).²⁰⁻²⁴ The SAFE study found that both prompted pulse palpation and systematic screening increased detection of atrial fibrillation by 0.6% over baseline prevalence but found no difference between prompted pulse palpation and systematic screening in the detection of new cases.²⁰ The study reported that 29% of cases detected with prompted pulse palpation and 43% of cases detected with systematic screening had a CHADS₂ score of 2 or greater and thus would be eligible for anticoagulant therapy for stroke prevention.²¹ The SAFE study also reported subgroup analyses by age and sex. Age had no effect on detection rates; however, while both prompted pulse palpation and systematic screening significantly increased the odds of detecting atrial fibrillation among men (odds ratio, 2.33 [95% CI, 1.30-4.15] and odds ratio, 2.68 [95% CI, 1.52-4.73], respectively), neither screening approach improved detection rates among women.⁷

The SAFE study also assessed the accuracy of diagnosis by comparing ECG interpretation at primary care clinics with a reference standard consisting of 2 cardiologists assigned to interpret the same results (with a third cardiologist as arbitrator of any disagreements). The primary care clinics, which had general practitioners reading 12-lead ECG results, had relatively low sensitivity (79.8% [95% CI, 70.5-87.2]) and specificity (91.6% [95% CI, 90.1-93.1]); sinus rhythm was misinterpreted as atrial fibrillation in 114 of 1355 cases.²³ Adding a computer algorithm improved the sensitivity of primary care clinic readings from 80% to 92% but did not affect specificity.²²

The third study, Assessment of Remote Heart Rhythm Sampling Using the AliveCor Heart Monitor to Screen for Atrial Fibrillation (REHEARSE-AF), randomized 1001 participants (mean age, 73 years) with a CHA₂DS₂-VASc score of 2 or greater to systematic, twice-weekly ECG screening using a single handheld lead for 30 seconds (plus additional recordings if symptoms occurred) over 12 months vs no screening.²⁵ It was not clear if the study excluded persons with symptoms suggestive of atrial fibrillation at baseline. The study found that more new cases of atrial fibrillation were detected in the screening group than in the no screening group (19 vs 5 cases; hazard ratio, 3.9 [95% CI 1.4-10.4]). All new diagnoses of atrial fibrillation were confirmed by a study cardiologist.

Eight of the 19 diagnoses of atrial fibrillation in the screening group were among asymptomatic persons, while 11 diagnoses in the screening group and all 5 diagnoses in the control group were among persons who noted symptoms (palpitations or "other symptoms"). Most cases (12/19) detected in the screening group were paroxysmal atrial fibrillation; no cases of paroxysmal atrial fibrillation were diagnosed in the control group.

Effectiveness of Early Detection and Treatment

The USPSTF found 1 randomized clinical trial that reported clinical outcomes from a screening program to detect atrial fibrillation using ECG. In the REHEARSE-AF study, there was a similar number of strokes or transient ischemic attacks in the ECG screening and control groups (6 vs 10 cases; *P* = .34); however, this study was not powered to detect differences in clinical outcomes.²⁵

Four cohort studies suggested that persons with asymptomatic atrial fibrillation have an increased stroke risk similar to that of persons with symptomatic atrial fibrillation, although the risk of selection bias, ascertainment bias (for determining symptom status),

and confounding were high.⁷ Six RCTs and 7 systematic reviews (>100 000 persons with atrial fibrillation) concluded that anticoagulant therapy reduces all-cause mortality by about one-third and ischemic stroke by about two-thirds over 2 years among persons with atrial fibrillation and high stroke risk (usually determined by CHADS₂ or CHA₂DS₂-VASc score). However, most participants in these trials had established persistent nonvalvular atrial fibrillation, and the prevalence of symptoms was generally not reported.⁷

Potential Harms of Screening and Treatment

Only 1 included study directly examined the harms of screening. The SAFE study reported anxiety, but only for the intervention group, thus precluding comparative assessment.²³ One potential source of harms from screening with ECG is additional testing that leads to harms (eg, complications from unnecessary stress testing or angiography performed on the basis of false-positive results suggesting ischemic heart disease). Based on large population-based registries that include symptomatic persons, angiography is associated with a serious harm rate of 1.7%, including arrhythmia (0.40%), death (0.10%), stroke (0.07%), and myocardial infarction (0.05%).²⁶ Treatment with anticoagulant therapy for stroke prevention also increases the risk of serious bleeding.

Estimate of Magnitude of Net Benefit

Most older adults with previously undiagnosed atrial fibrillation have a stroke risk above the threshold for anticoagulant therapy and would be eligible for treatment. Anticoagulant therapy is effective for stroke prevention in symptomatic persons with atrial fibrillation. However, the USPSTF found inadequate evidence to determine whether screening with ECG and subsequent treatment in asymptomatic adults is more effective than usual care. At the same time, the harms of diagnostic follow-up and treatment prompted by abnormal ECG

results are well established. Given these uncertainties, it is not possible to determine the net benefit of screening with ECG.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from December 19, 2017, to January 22, 2018. In response to comments, the USPSTF clarified the intervention (screening with ECG) and comparison groups (usual care, including prompted pulse palpation) considered for this recommendation. The USPSTF also added the REHEARSE-AF study to the "Discussion" section and added the need to understand the stroke risk associated with brief episodes of atrial fibrillation to the "Research Needs and Gaps" section. In response to requests that the USPSTF not exclude studies of persons with heart failure or with implantable cardiac devices, the USPSTF notes that it is charged with evaluating the benefits and harms of screening and clinical preventive services in generally healthy, asymptomatic persons. Last, the USPSTF added the guidelines of the European Society of Cardiology to the "Recommendations of Others" section.

Recommendations of Others

In 2014, the American Heart Association and the American Stroke Association stated that active screening for atrial fibrillation in the primary care setting among persons older than 65 years using pulse assessment followed by ECG, as indicated, can be useful.²⁷ The European Society of Cardiology recommends opportunistic screening by pulse palpation or an ECG rhythm strip in persons older than 65 years and recommends considering systematic screening to detect atrial fibrillation in persons older than 75 years or those at high risk of stroke.²⁸

ARTICLE INFORMATION

Accepted for Publication: June 27, 2018.

The US Preventive Services Task Force (USPSTF)

members: Susan J. Curry, PhD; Alex H. Krist, MD, MPH; Douglas K. Owens, MD, MS; Michael J. Barry, MD; Aaron B. Caughey, MD, PhD; Karina W. Davidson, PhD, MASC; Chyke A. Doubeni, MD, MPH; John W. Epling Jr, MD, MSED; Alex R. Kemper, MD, MPH, MS; Martha Kubik, PhD, RN; C. Seth Landefeld, MD; Carol M. Mangione, MD, MSPH; Michael Silverstein, MD, MPH; Melissa A. Simon, MD, MPH; Chien-Wen Tseng, MD, MPH, MSEE; John B. Wong, MD.

Affiliations of The US Preventive Services Task Force (USPSTF) members:

University of Iowa, Iowa City (Curry); Fairfax Family Practice Residency, Fairfax, Virginia (Krist); Virginia Commonwealth University, Richmond (Krist); Veterans Affairs Palo Alto Health Care System, Palo Alto, California (Owens); Stanford University, Stanford, California (Owens); Harvard Medical School, Boston, Massachusetts (Barry); Oregon Health & Science University, Portland (Caughey); Columbia University, New York, New York (Davidson); University of Pennsylvania, Philadelphia (Doubeni); Virginia Tech Carilion School of Medicine, Roanoke (Epling); Nationwide Children's Hospital, Columbus, Ohio (Kemper); Temple University, Philadelphia, Pennsylvania (Kubik); University of Alabama at Birmingham (Landefeld); University of California,

Los Angeles (Mangione); Boston University, Boston, Massachusetts (Silverstein); Northwestern University, Evanston, Illinois (Simon); University of Hawaii, Honolulu (Tseng); Pacific Health Research and Education Institute, Honolulu, Hawaii (Tseng); Tufts University, Medford, Massachusetts (Wong).

Author Contributions: Dr Curry had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. The USPSTF members contributed equally to the recommendation statement.

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. All members of the USPSTF receive travel reimbursement and an honorarium for participating in USPSTF meetings. No other disclosures were reported.

Funding/Support: The USPSTF is an independent, voluntary body. The US Congress mandates that the Agency for Healthcare Research and Quality (AHRQ) support the operations of the USPSTF.

Role of the Funder/Sponsor: AHRQ staff assisted in the following: development and review of the research plan, commission of the systematic evidence review from an Evidence-based Practice Center, coordination of expert review and public comment of the draft evidence report and draft recommendation statement, and the writing and

preparation of the final recommendation statement and its submission for publication. AHRQ staff had no role in the approval of the final recommendation statement or the decision to submit for publication.

Disclaimer: Recommendations made by the USPSTF are independent of the US government. They should not be construed as an official position of AHRQ or the US Department of Health and Human Services.

Additional Contributions: We thank Howard Tracer, MD (AHRQ), who contributed to the writing of the manuscript, and Lisa Nicolella, MA (AHRQ), who assisted with coordination and editing.

REFERENCES

- Centers for Disease Control and Prevention (CDC). Atrial fibrillation fact sheet. CDC website. https://www.cdc.gov/dhdsdp/data_statistics/fact_sheets/fs_atrial_fibrillation.htm. Updated August 22, 2017. Accessed June 21, 2018.
- Go AS, Hylek EM, Phillips KA, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the Anticoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. *JAMA*. 2001;285(18):2370-2375. doi:10.1001/jama.285.18.2370
- Welton NJ, McAleenan A, Thom HH, et al. Screening strategies for atrial fibrillation: a systematic review and cost-effectiveness analysis.

- Health Technol Assess.* 2017;21(29):1-236. doi:10.3310/hta21290
4. Taggar JS, Coleman T, Lewis S, Heneghan C, Jones M. Accuracy of methods for detecting an irregular pulse and suspected atrial fibrillation: a systematic review and meta-analysis. *Eur J Prev Cardiol.* 2016;23(12):1330-1338. doi:10.1177/2047487315611347
 5. Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation as an independent risk factor for stroke: the Framingham Study. *Stroke.* 1991;22(8):983-988. doi:10.1161/01.STR.22.8.983
 6. Menke J, Lüthje L, Kastrup A, Larsen J. Thromboembolism in atrial fibrillation. *Am J Cardiol.* 2010;105(4):502-510. doi:10.1016/j.amjcard.2009.10.018
 7. Jonas DE, Kahwati LC, Yun JY, Cook Middleton J, Coker-Schwimmer M, Asher GN. *Screening for Atrial Fibrillation With Electrocardiography: An Evidence Review for the US Preventive Services Task Force: Evidence Synthesis No. 164.* Rockville, MD: Agency for Healthcare Research and Quality; 2018. AHRQ publication 17-05236-EF-1.
 8. Pathak RK, Elliott A, Middeldorp ME, et al. Impact of cardiorespiratory fitness on arrhythmia recurrence in obese individuals with atrial fibrillation: the CARDIO-FIT study. *J Am Coll Cardiol.* 2015;66(9):985-996. doi:10.1016/j.jacc.2015.06.488
 9. Million Hearts. Tools & protocols. Million Hearts website. <https://millionhearts.hhs.gov/tools-protocols/index.html>. Accessed June 21, 2018.
 10. Centers for Disease Control and Prevention (CDC). Educational materials for professionals. CDC website. https://www.cdc.gov/heartdisease/materials_for_professionals.htm. Accessed June 21, 2018.
 11. Siu AL; U.S. Preventive Services Task Force. Screening for high blood pressure in adults: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2015;163(10):778-786. doi:10.7326/M15-2223
 12. Bibbins-Domingo K, Grossman DC, Curry SJ, et al; US Preventive Services Task Force. Statin use for the primary prevention of cardiovascular disease in adults: US Preventive Services Task Force recommendation statement. *JAMA.* 2016;316(19):1997-2007. doi:10.1001/jama.2016.15450
 13. Siu AL; U.S. Preventive Services Task Force. Behavioral and pharmacotherapy interventions for tobacco smoking cessation in adults, including pregnant women: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2015;163(8):622-634. doi:10.7326/M15-2023
 14. LeFevre ML; U.S. Preventive Services Task Force. Behavioral counseling to promote a healthful diet and physical activity for cardiovascular disease prevention in adults with cardiovascular risk factors: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med.* 2014;161(8):587-593. doi:10.7326/M14-1796
 15. Bibbins-Domingo K; U.S. Preventive Services Task Force. Aspirin use for the primary prevention of cardiovascular disease and colorectal cancer: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2016;164(12):836-845. doi:10.7326/M16-0577
 16. Kato E, Ngo-Metzger Q, Fingar KR, McDermott KW, Elixhauser A. Statistical Brief 236: Inpatient Stays Involving Atrial Fibrillation, 1998-2014. Healthcare Cost and Utilization Project website. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb236-Atrial-Fibrillation-Hospital-Stay-Trends.jsp>. Published February 2018. Accessed June 21, 2018.
 17. Link MS, Giugliano RP, Ruff CT, et al; ENGAGE AF-TIMI 48 Investigators. Stroke and mortality risk in patients with various patterns of atrial fibrillation: results from the ENGAGE AF-TIMI 48 Trial (Effective Anticoagulation With Factor Xa Next Generation in Atrial Fibrillation-Thrombolysis in Myocardial Infarction 48). *Circ Arrhythm Electrophysiol.* 2017;10(1):e004267. doi:10.1161/CIRCEP.116.004267
 18. Jonas DE, Kahwati LC, Yun JY, et al. Screening for atrial fibrillation with electrocardiography: evidence report and systematic review for the US Preventive Services Task Force [published August 7, 2018]. *JAMA.* doi:10.1001/jama.2018.4190
 19. Morgan S, Mant D. Randomised trial of two approaches to screening for atrial fibrillation in UK general practice. *Br J Gen Pract.* 2002;52(478):373-374, 377-380. doi:10.1136/bmj.39280.660567.55
 20. Fitzmaurice DA, Hobbs FD, Jowett S, et al. Screening versus routine practice in detection of atrial fibrillation in patients aged 65 or over: cluster randomised controlled trial. *BMJ.* 2007;335(7616):383. doi:10.1136/bmj.39280.660567.55
 21. Fitzmaurice DA, McCahon D, Baker J, et al. Is screening for AF worthwhile? stroke risk in a screened population from the SAFE study. *Fam Pract.* 2014;31(3):298-302. doi:10.1093/fampra/cmu011
 22. Mant J, Fitzmaurice DA, Hobbs FD, et al. Accuracy of diagnosing atrial fibrillation on electrocardiogram by primary care practitioners and interpretative diagnostic software: analysis of data from Screening for Atrial Fibrillation in the Elderly (SAFE) trial. *BMJ.* 2007;335(7616):380. doi:10.1136/bmj.39227.551713.AE
 23. Hobbs FD, Fitzmaurice DA, Mant J, et al. A randomised controlled trial and cost-effectiveness study of systematic screening (targeted and total population screening) versus routine practice for the detection of atrial fibrillation in people aged 65 and over: the SAFE study. *Health Technol Assess.* 2005;9(40):1-74. doi:10.3310/hta9400
 24. Swancutt D, Hobbs R, Fitzmaurice D, et al. A randomised controlled trial and cost effectiveness study of systematic screening (targeted and total population screening) versus routine practice for the detection of atrial fibrillation in the over 65s: (SAFE) [ISRCTN19633732]. *BMC Cardiovasc Disord.* 2004;4:12. doi:10.1186/1471-2261-4-12
 25. Halcox J, Wareham K, Cardew A, et al. Assessment of remote heart rhythm sampling using the AliveCor heart monitor to screen for atrial fibrillation: the REHEARSE-AF study. *Circulation.* 2017;136(19):1784-1794. doi:10.1161/CIRCULATIONAHA.117.030583
 26. Noto TJ Jr, Johnson LW, Krone R, et al. Cardiac catheterization 1990: a report of the Registry of the Society for Cardiac Angiography and Interventions (SCA&I). *Cathet Cardiovasc Diagn.* 1991;24(2):75-83. doi:10.1002/ccd.1810240202
 27. Meschia JF, Bushnell C, Boden-Albala B, et al; American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Functional Genomics and Translational Biology; Council on Hypertension. Guidelines for the primary prevention of stroke: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke.* 2014;45(12):3754-3832. doi:10.1161/STR.0000000000000046
 28. Kirchhof P, Benussi S, Kotecha D, et al; ESC Scientific Document Group. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J.* 2016;37(38):2893-2962. doi:10.1093/eurheartj/ehw210