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PERFORMANCE MEASURES

# 2020 Update to the 2016 ACC/AHA Clinical Performance and Quality Measures for Adults With Atrial Fibrillation or Atrial Flutter

A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures

*Developed in Collaboration With the Heart Rhythm Society*

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## TOP 5 TAKE-HOME MESSAGES FOR UPDATE OF ADULTS WITH ATRIAL FIBRILLATION OR ATRIAL FLUTTER

1. This document describes updates to the atrial fibrillation performance measures that are appropriate for public reporting or pay-for-performance programs.
2. The performance measures are taken from the 2019 American College of Cardiology/American Heart Association/Heart Rhythm Society atrial fibrillation guideline update and are selected from the strongest recommendations (Class 1 or 3).
3. Quality measures are provided that are not yet ready for public reporting or pay-for-performance programs but might be useful for clinicians and healthcare organizations for quality improvement.
4. The recent guideline change regarding the definition of valvular atrial fibrillation is now incorporated into the performance measures. This includes patients with moderate or severe mitral stenosis and those with a mechanical prosthetic heart valve.
5. The recent guideline changes regarding different $CHA_2DS_2$-VASc risk score treatment thresholds for men (>1) and women (>2) are now incorporated into the performance measures.

## PREAMBLE

The American College of Cardiology (ACC)/American Heart Association (AHA) performance measurement sets serve as vehicles to accelerate translation of scientific



This document underwent a 14-day peer review between April 16, 2020, and May 1, 2020.

This document was approved by the American College of Cardiology Clinical Policy Approval Committee on June 29, 2020; by the American Heart Association Science Advisory and Coordinating Committee on July 16, 2020; the American Heart Association Executive Committee on August 10, 2020; and by the Heart Rhythm Society on August 6, 2020.

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evidence into clinical practice. Measure sets developed by the ACC/AHA are intended to provide practitioners and institutions that deliver cardiovascular services with tools to measure the quality of care provided and identify opportunities for improvement.

Writing committees are instructed to consider the methodology of performance measure development (1,2) and to ensure that the measures developed are aligned with ACC/AHA clinical practice guidelines. The writing committees also are charged with constructing measures that maximally capture important aspects of care quality, including timeliness, safety, effectiveness, efficiency, equity, and patient-centeredness, while minimizing, when possible, the reporting burden imposed on hospitals, practices, and practitioners.

Potential challenges from measure implementation may lead to unintended consequences. The manner in which challenges are addressed is dependent on several factors, including the measure design, data collection method, performance attribution, baseline performance rates, reporting methods, and incentives linked to these reports.

The ACC/AHA Task Force on Performance Measures (Task Force) distinguishes quality measures from performance measures. Quality measures are those metrics that *may* be useful for local quality improvement but are not yet appropriate for public reporting or pay for performance programs (uses of performance measures). New measures are initially evaluated for potential inclusion as performance measures. In some cases, a measure is insufficiently supported by the guidelines. In other instances, when the guidelines support a measure, the writing committee may feel it is necessary to have the measure tested to identify the consequences of measure implementation. Quality measures may then be promoted to the status of performance measures as supporting evidence becomes available.

*P. Michael Ho, MD, PhD, FACC, FAHA*
*Chair, ACC/AHA Task Force on Performance Measures*

## 1. DECISION TO UPDATE THE ATRIAL FIBRILLATION MEASURE ON ANTICOAGULATION

### 1.1. Background

In 2020, the Task Force convened the writing committee to begin the process of updating the atrial fibrillation measure on chronic anticoagulation therapy from the 2016 atrial fibrillation measure set (3). The writing committee was also charged with the task of identifying any additional measures in need of updating to be in accordance with the 2019 AHA/ACC/Heart Rhythm Society (HRS) atrial fibrillation guideline update (4).

## 2. ACC/AHA UPDATED ATRIAL FIBRILLATION MEASURE ON ANTICOAGULATION AND UPDATED PERFORMANCE MEASURES

### 2.1. Discussion of Changes to the Atrial Fibrillation Measure on Anticoagulation

There were 2 changes to the performance measures, both prompted by recent changes to the 2019 AHA/ACC/HRS atrial fibrillation guideline update (4). The first, which impacts all the performance measures (see Appendix A, for the changes and measure specifications), is the clarification that valvular atrial fibrillation is atrial fibrillation with either moderate or severe mitral stenosis or a mechanical heart valve. The second change is the separation of a male and female threshold for the $CHA_2DS_2$-VASc score. This only applies to PM-5: Atrial Fibrillation/Atrial Flutter: Anticoagulation Prescribed.

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**KEY WORDS** ACC/AHA Performance Measures, atrial fibrillation, atrial flutter, performance measures, quality measures, quality indicators

## APPENDIX A. UPDATED ATRIAL FIBRILLATION MEASURES

### SHORT TITLE: PM-1 $CHA_2DS_2$-VASc Risk Score Documented Prior to Discharge

**PM-1: Atrial Fibrillation or Atrial Flutter: $CHA_2DS_2$-VASc Risk Score Documented Prior to Discharge**

**Measure Description: Percentage of patients, age ≥18 y, with AF or atrial flutter for whom a $CHA_2DS_2$-VASc risk score has been documented in the medical record.**

| | |
|---|---|
| **Numerator** | ■ Patients with AF or atrial flutter for whom a $CHA_2DS_2$-VASc risk score was documented prior to discharge<br>**For patients with AF or atrial flutter, assessment of thromboembolic risk should include:** |

| **$CHA_2DS_2$-VASc** | **Score** |
|---|---|
| Congestive HF | 1 |
| Hypertension | 1 |
| Age 65-74 y | 1 |
| Age ≥75 y | 2 |
| Diabetes mellitus | 1 |
| Stroke, TIA, or thromboembolism | 2 |
| Vascular disease (prior myocardial infarction, peripheral artery disease, or aortic plaque) | 1 |
| Sex category (i.e., female) | 1 |

| | |
|---|---|
| **Denominator** | All patients with AF or atrial flutter |
| **Denominator Exclusions** | ■ Patients age <18 y<br>■ Patients with moderate or severe mitral stenosis<br>■ Patients with a mechanical prosthetic heart valve<br>■ Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)<br>■ Patients who leave against medical advice<br>■ Patients who die during hospitalization<br>■ Patients who are on comfort care measures only<br>■ Patients who are transferred to another acute care hospital<br>■ Patients with another indication for anticoagulation |
| **Denominator Exceptions** | ■ Documentation of a medical reason for not assessing risk factors and documenting the $CHA_2DS_2$-VASc score, including present or planned left atrial appendage occlusion or ligation, hypertrophic cardiomyopathy, or other reasons<br>■ Documentation of patient preference for not receiving anticoagulation |
| **Measurement Period** | Encounter |
| **Sources of Data** | Medical record or other database (e.g., administrative, clinical, registry) |
| **Attribution** | Measure reportable at the facility or physician level |
| **Care Setting** | Inpatient |

**Rationale**

AF, whether paroxysmal, persistent, or permanent, and whether symptomatic or silent, significantly increases the risk of thromboembolic ischemic stroke. AF increases the risk of stroke 5-fold, and AF in the setting of mitral stenosis increases the risk of stroke 20-fold over that of patients in sinus rhythm. Atrial flutter also increases the risk of stroke, and this risk increases with certain risk factors.

Thromboembolism occurring with AF is associated with a greater risk of recurrent stroke, more severe disability, and mortality (5). Silent AF is also associated with ischemic stroke (6–9). The appropriate use of anticoagulant therapy and the control of other risk factors, including hypertension and hypercholesterolemia, substantially reduce stroke risk.

One meta-analysis has stratified ischemic stroke risk among patients with AF using the following point scoring system (10): AF Investigators; $CHA_2DS_2$ (congestive heart failure, hypertension, age ≥75 y, diabetes mellitus, prior stroke or transient ischemic attack or thromboembolism [doubled]), or $CHA_2DS_2$-VASc (congestive heart failure, hypertension, age ≥75 y [doubled] (11), diabetes mellitus, prior stroke or TIA or thromboembolism [doubled], vascular disease, age 65–74 y, sex category).

Compared with the $CHA_2DS_2$ score (12), the $CHA_2DS_2$-VASc score for AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65–74 y of age, and vascular disease) (13,14).

The selection of an anticoagulant agent should be based on shared decision-making that takes into account risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the INR therapeutic range if the patient has been on warfarin, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent.

**Clinical Recommendation(s)**

**2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation** (4)

1. For patients with AF and an elevated $CHA_2DS_2$-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended. Options include:
   - Warfarin (Class 1, Level of Evidence: A) (15–17)
   - Dabigatran (Class 1, Level of Evidence: B) (18)
   - Rivaroxaban (Class 1, Level of Evidence: B) (19)
   - Apixaban (Class 1, Level of Evidence: B) (20), or Edoxaban (Class 1, Level of Evidence: B-R) (21)
   - MODIFIED: This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of $CHA_2DS_2$-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system (Section 4.1. in the 2019 AF Guideline (4)). The original text can be found in Section 4.1 of the 2014 AF guideline (22). Additional information about the comparative effectiveness and bleeding risk of DOACs can be found in Section 4.2.2.2.

*Continued on the next page*

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-1** **Continued**

| Clinical Recommendation(s) |
|---|
| 2. DOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) are recommended over warfarin in DOAC-eligible patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve) (18–21). (Class 1, Level of Evidence: A)<br>NEW: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve. When the DOAC trials are considered as a group, the direct thrombin inhibitor and factor Xa inhibitors were at least noninferior and, in some trials, superior to warfarin for preventing stroke and systemic embolism and were associated with lower risks of serious bleeding. |
| 3. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of anticoagulant therapy and at least monthly when anticoagulation (INR in range) is stable (23–25). (Class 1, Level of Evidence: A)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 4. In patients with AF (except with moderate or moderate or severe mitral stenosis or a mechanical heart valve), the $CHA_2DS_2$-VASc score is recommended for assessment of stroke risk (15–17). (Class 1, Level of Evidence: B)<br>MODIFIED: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve. |
| 5. For patients with AF who have mechanical heart valves, warfarin is recommended (26–30). (Class 1, Level of Evidence: B) |
| 6. Selection of anticoagulant therapy should be based on the risk of thromboembolism, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (31–34). (Class 1, Level of Evidence: B)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 7. In patients with AF, anticoagulant therapy should be individualized on the basis of shared decision-making after discussion of the absolute risks and relative risks of stroke and bleeding, as well as the patient's values and preferences. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 8. For patients with atrial flutter, anticoagulant therapy is recommended according to the same risk profile used for AF. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 9. Reevaluation of the need for and choice of anticoagulant therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |

All patients with exclusions are removed from the denominator. Patients with exceptions are removed from the denominator only if the numerator is not met.

ACC indicates American College of Cardiology; AF, atrial fibrillation; AHA, American Heart Association; DOAC, direct-acting oral anticoagulant; HF, heart failure; HRS, Heart Rhythm Society; INR, international normalized ratio; LOE, level of evidence; PM, performance measure; and TIA, transient ischemic attack.

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-2** **Anticoagulation Prescribed Prior to Discharge**

**PM-2: Atrial Fibrillation or Atrial Flutter: Anticoagulation Prescribed Prior to Discharge**

**Measure Description: Percentage of patients, age ≥18 y, with AF or atrial flutter who were discharged on an FDA-approved anticoagulant drug for the prevention of thromboembolism.**

| | |
|---|---|
| **Numerator** | Patients with AF or atrial flutter for whom an FDA-approved anticoagulant was prescribed* prior to discharge<br>*Prescribed—also satisfied by documentation in current medication list |
| **Denominator** | Patients with AF or atrial flutter who do not have a documented $CHA_2DS_2$-VASc risk score of 0 or 1, if male, and 0-2, if female. |
| **Denominator Exclusions** | ■ Patients age <18 y<br>■ Patients with moderate or severe mitral stenosis<br>■ Patients with a mechanical prosthetic heart valve<br>■ Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)<br>■ Patients who leave against medical advice<br>■ Patients who die during hospitalization<br>■ Patients who are on comfort care measures only<br>■ Patients who are transferred to another acute care hospital |
| **Denominator Exceptions** | ■ Documentation of a medical reason for not prescribing an FDA-approved anticoagulant to a patient with a $CHA_2DS_2$-VASc score of ≥2 for men and ≥3 for women, including present or planned left atrial appendage occlusion or ligation<br>■ Documentation of a patient reason for not prescribing an FDA-approved anticoagulant drug for the prevention of thromboembolism, including patient preference for not receiving anticoagulation<br>■ Documentation of a patient being enrolled in a clinical trial related to AF or atrial flutter |
| **Measurement Period** | Encounter |
| **Sources of Data** | Medical record or other database (e.g., administrative, clinical, registry) |
| **Attribution** | Measure reportable at the facility or physician level |
| **Care Setting** | Inpatient |

**Rationale**

AF, whether paroxysmal, persistent, or permanent and whether symptomatic or silent, significantly increases the risk of thromboembolic ischemic stroke. AF increases the risk of stroke 5-fold, and AF in the setting of mitral stenosis increases the risk of stroke 20-fold over that of patients in sinus rhythm.

Thromboembolism occurring with AF is associated with a greater risk of recurrent stroke, more severe disability, and mortality (5). Silent AF is also associated with ischemic stroke (6–9). The appropriate use of anticoagulant therapy and the control of other risk factors, including hypertension and hypercholesterolemia, substantially reduce stroke risk.

One meta-analysis has stratified ischemic stroke risk among patients with AF using the following point scoring system (10): AF Investigators; $CHA_2DS_2$ (congestive heart failure, hypertension, age ≥75 y, diabetes mellitus, prior stroke or TIA or thromboembolism [doubled]), or $CHA_2DS_2$-VASc (congestive heart failure, hypertension, age ≥75 y [doubled] (11), diabetes mellitus, prior stroke or TIA or thromboembolism [doubled], vascular disease, age 65–74 y, sex category).

Compared with the $CHA_2DS_2$ score (12), the $CHA_2DS_2$-VASc score for AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65–74 y of age, and vascular disease) (13,14).

The selection of an anticoagulant agent should be based on shared decision-making that takes into account risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the INR therapeutic range if the patient has been on warfarin, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent.

**Clinical Recommendation(s)**

**2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation** (4)

1. For patients with AF and an elevated $CHA_2DS_2$-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended. Options include:
   Warfarin (Class 1, Level of Evidence: A) (15–17)
   Dabigatran (Class 1, Level of Evidence: B) (18)
   Rivaroxaban (Class 1, Level of Evidence: B) (19)
   Apixaban (Class 1, Level of Evidence: B) (20), or Edoxaban (Class 1, Level of Evidence: B-R) (21)
   MODIFIED: This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of $CHA_2DS_2$-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system (Section 4.1. in the 2019 AF Guideline (4)). The original text can be found in Section 4.1 of the 2014 AF guideline (22). Additional information about the comparative effectiveness and bleeding risk of DOACs can be found in Section 4.2.2.2.
2. DOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) are recommended over warfarin in DOAC-eligible patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve) (18–21). (Class 1, Level of Evidence: A)
   NEW: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve. When the DOAC trials are considered as a group, the direct thrombin inhibitor and factor Xa inhibitors were at least noninferior and, in some trials, superior to warfarin for preventing stroke and systemic embolism and were associated with lower risks of serious bleeding.
3. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of anticoagulant therapy and at least monthly when anticoagulation (INR in range) is stable (23–25). (Class 1, Level of Evidence: A)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
4. In patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve), the $CHA_2DS_2$-VASc score is recommended for assessment of stroke risk (15–17). (Class 1, Level of Evidence: B)
   MODIFIED: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve.

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## APPENDIX A. CONTINUED

**SHORT TITLE: PM-2** **Continued**

| Clinical Recommendation(s) |
|---|
| 5. For patients with AF who have mechanical heart valves, warfarin is recommended (26–30). (Class 1, Level of Evidence: B) |
| 6. Selection of anticoagulant therapy should be based on the risk of thromboembolism, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (31–34). (Class 1, Level of Evidence: B)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 7. In patients with AF, anticoagulant therapy should be individualized on the basis of shared decision-making after discussion of the absolute risks and relative risks of stroke and bleeding, as well as the patient's values and preferences. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 8. For patients with atrial flutter, anticoagulant therapy is recommended according to the same risk profile used for AF. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 9. Reevaluation of the need for and choice of anticoagulant therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |

All patients with exclusions are removed from the denominator. Patients with exceptions are removed from the denominator only if the numerator is not met.

ACC indicates American College of Cardiology; AF, atrial fibrillation; AHA, American Heart Association; DOAC, direct-acting oral anticoagulant; FDA, U.S. Food and Drug Administration; HRS, Heart Rhythm Society; INR, international normalized ratio; LOE, level of evidence; PM, performance measure; and TIA, transient ischemic attack.

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-3** **PT/INR Planned Follow-Up Documented Prior to Discharge for Warfarin Treatment**

**PM-3: Atrial Fibrillation or Atrial Flutter: PT/INR Planned Follow-Up Documented Prior to Discharge for Warfarin Treatment**

**Measure Description: Percentage of patients, age ≥18 y, with AF or atrial flutter who have been prescribed warfarin and who have a PT/INR follow-up scheduled prior to hospital discharge.**

| | |
|---|---|
| **Numerator** | Patients with AF or atrial flutter for whom warfarin was prescribed prior to discharge and for whom a PT/INR follow-up* is scheduled<br>*Follow-up is scheduled within 2 w for patients who were newly prescribed warfarin or scheduled within 30 d for patients who were previously on warfarin. A "yes" or "no" should be documented in the medical record to denote whether follow-up PT/INR was scheduled. |
| **Denominator** | Patients with AF or atrial flutter who were prescribed warfarin |
| **Denominator Exclusions** | ■ Patients age <18 y<br>■ Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)<br>■ Patients who leave against medical advice<br>■ Patients who die during hospitalization<br>■ Patients who are on comfort care measures only<br>■ Patients who are transferred to another acute care hospital |
| **Denominator Exceptions** | None |
| **Measurement Period** | Encounter |
| **Sources of Data** | Medical record or other database (e.g., administrative, clinical, registry) |
| **Attribution** | Measure reportable at the facility or physician level |
| **Care Setting** | Inpatient |

**Rationale**

Frequent monitoring of INR level is essential to guiding warfarin dose adjustment to maintain anticoagulation intensity in the desired target range. More frequent monitoring may be required during initiation of warfarin therapy or when other drugs that interact with warfarin are started or stopped.

**Clinical Recommendation(s)**

**2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation** (4)

1. For patients with AF and an elevated $CHA_2DS_2$-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended. Options include:
   Warfarin (Class 1, Level of Evidence: A) (15–17)
   Dabigatran (Class 1, Level of Evidence: B) (18)
   Rivaroxaban (Class 1, Level of Evidence: B) (19)
   Apixaban (Class 1, Level of Evidence: B) (20), or Edoxaban (Class 1, Level of Evidence: B-R) (21)
   MODIFIED: This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of $CHA_2DS_2$-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system (Section 4.1. in the 2019 AF Guideline (4)). The original text can be found in Section 4.1 of the 2014 AF guideline (22). Additional information about the comparative effectiveness and bleeding risk of DOACs can be found in Section 4.2.2.2.
2. DOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) are recommended over warfarin in DOAC-eligible patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve) (18–21). (Class 1, Level of Evidence: A)
   NEW: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve. When the DOAC trials are considered as a group, the direct thrombin inhibitor and factor Xa inhibitors were at least noninferior and, in some trials, superior to warfarin for preventing stroke and systemic embolism and were associated with lower risks of serious bleeding.
3. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of anticoagulant therapy and at least monthly when anticoagulation (INR in range) is stable (23–25). (Class 1, Level of Evidence: A)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
4. In patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve), the $CHA_2DS_2$-VASc score is recommended for assessment of stroke risk (15–17). (Class 1, Level of Evidence: B)
   MODIFIED: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve.
5. For patients with AF who have mechanical heart valves, warfarin is recommended (26–30). (Class 1, Level of Evidence: B)
6. Selection of anticoagulant therapy should be based on the risk of thromboembolism, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (31–34). (Class 1, Level of Evidence: B)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
7. In patients with AF, anticoagulant therapy should be individualized on the basis of shared decision-making after discussion of the absolute risks and relative risks of stroke and bleeding, as well as the patient's values and preferences. (Class 1, Level of Evidence: C)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
8. For patients with atrial flutter, anticoagulant therapy is recommended according to the same risk profile used for AF. (Class 1, Level of Evidence: C)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
9. Reevaluation of the need for and choice of anticoagulant therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class 1, Level of Evidence: C)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."

All patients with exclusions are removed from the denominator. Patients with exceptions are removed from the denominator only if the numerator is not met.

ACC indicates American College of Cardiology; AF, atrial fibrillation; AHA, American Heart Association; DOAC, direct-acting oral anticoagulant; HRS, Heart Rhythm Society; INR, international normalized ratio; LOE, level of evidence; PM, performance measure; PT, prothrombin time; and TIA, transient ischemic attack.

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-4** **$CHA_2DS_2$-VASc Risk Score Documented (Outpatient)**

**PM-4: Atrial Fibrillation or Atrial Flutter: $CHA_2DS_2$-VASc Risk Score Documented (Outpatient)**

**Measure Description: Percentage of patients, age ≥18 y, with AF or atrial flutter for whom a $CHA_2DS_2$-VASc risk score is documented.**

| | |
|---|---|
| **Numerator** | Patients with AF or atrial flutter for whom a $CHA_2DS_2$-VASc risk score is documented |
| **Denominator** | Patients with AF or atrial flutter |
| **Denominator Exclusions** | ■ Patients age <18 y<br>■ Patients with moderate or severe mitral stenosis<br>■ Patients with a mechanical prosthetic heart valve<br>■ Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)<br>■ Patients who are on comfort care measures only<br>■ Patients with another indication for anticoagulation |
| **Denominator Exceptions** | ■ Documentation of a medical reason for not prescribing an FDA-approved anticoagulant to a patient with a $CHA_2DS_2$-VASc score of ≥2 for men and ≥3 for women, including present or planned left atrial appendage occlusion or ligation, hypertrophic cardiomyopathy, or other reasons<br>■ Documentation of patient preference for not receiving anticoagulation |
| **Measurement Period** | Reporting year |
| **Sources of Data** | Medical record or other database (e.g., administrative, clinical, registry) |
| **Attribution** | Measure reportable at the facility or provider level |
| **Care Setting** | Outpatient |

**Rationale**

AF, whether paroxysmal, persistent, or permanent and whether symptomatic or silent, significantly increases the risk of thromboembolic ischemic stroke. AF increases the risk of stroke 5-fold, and AF in the setting of mitral stenosis increases the risk of stroke 20-fold over that of patients in sinus rhythm.

Thromboembolism occurring with AF is associated with a greater risk of recurrent stroke, more severe disability, and mortality (5). Silent AF is also associated with ischemic stroke (6–9). The appropriate use of anticoagulant therapy and the control of other risk factors, including hypertension and hypercholesterolemia, substantially reduce stroke risk.

One meta-analysis has stratified ischemic stroke risk among patients with AF using the following point scoring system (10): AF Investigators; $CHA_2DS_2$ (congestive heart failure, hypertension, age ≥75 y, diabetes mellitus, prior stroke or TIA or thromboembolism [doubled]), or $CHA_2DS_2$-VASc (congestive heart failure, hypertension, age ≥75 y [doubled] (11), diabetes mellitus, prior stroke or TIA or thromboembolism [doubled], vascular disease, age 65–74 y, sex category).

When compared with the $CHA_2DS_2$ score (12), the $CHA_2DS_2$-VASc score for AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65–74 y of age, and vascular disease) (13,14).

The selection of an anticoagulant agent should be based on shared decision-making that takes into account risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the INR therapeutic range if the patient has been on warfarin, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent.

**Clinical Recommendation(s)**

**2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation** (4)

1. For patients with AF and an elevated $CHA_2DS_2$-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended. Options include:
   Warfarin (Class 1, Level of Evidence: A) (15–17)
   Dabigatran (Class 1, Level of Evidence: B) (18)
   Rivaroxaban (Class 1, Level of Evidence: B) (19)
   Apixaban (Class 1, Level of Evidence: B) (20), or Edoxaban (Class 1, Level of Evidence: B-R) (21)
   MODIFIED: This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of $CHA_2DS_2$-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system (Section 4.1. in the 2019 AF Guideline (4)). The original text can be found in Section 4.1 of the 2014 AF guideline (22). Additional information about the comparative effectiveness and bleeding risk of DOACs can be found in Section 4.2.2.2.
2. DOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) are recommended over warfarin in DOAC-eligible patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve) (18–21). (Class 1, Level of Evidence: A)
   NEW: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve. When the DOAC trials are considered as a group, the direct thrombin inhibitor and factor Xa inhibitors were at least noninferior and, in some trials, superior to warfarin for preventing stroke and systemic embolism and were associated with lower risks of serious bleeding.
3. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of anticoagulant therapy and at least monthly when anticoagulation (INR in range) is stable (23–25). (Class 1, Level of Evidence: A)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
4. In patients with AF (except with moderate or severe mitral stenosis or a mechanical heart valve), the $CHA_2DS_2$-VASc score is recommended for assessment of stroke risk (15–17). (Class 1, Level of Evidence: B)
   MODIFIED: Exclusion criteria are now defined as moderate or severe mitral stenosis or a mechanical heart valve.
5. For patients with AF who have mechanical heart valves, warfarin is recommended (26–30). (Class 1, Level of Evidence: B)
6. Selection of anticoagulant therapy should be based on the risk of thromboembolism, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (31–34). (Class 1, Level of Evidence: B)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."
7. In patients with AF, anticoagulant therapy should be individualized on the basis of shared decision-making after discussion of the absolute risks and relative risks of stroke and bleeding, as well as the patient's values and preferences. (Class 1, Level of Evidence: C)
   MODIFIED: "Antithrombotic" was changed to "anticoagulant."

*Continued on the next page*

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-4** **Continued**

| Clinical Recommendation(s) |
|---|
| 8. For patients with atrial flutter, anticoagulant therapy is recommended according to the same risk profile used for AF. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |
| 9. Reevaluation of the need for and choice of anticoagulant therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class 1, Level of Evidence: C)<br>MODIFIED: "Antithrombotic" was changed to "anticoagulant." |



ACC indicates American College of Cardiology; AF, atrial fibrillation; AHA, American Heart Association; DOAC, direct-acting oral anticoagulant; FDA, U.S. Food and Drug Administration; HRS, Heart Rhythm Society; INR, international normalized ratio; LOE, level of evidence; PM, performance measure; and TIA, transient ischemic attack.

## APPENDIX A. CONTINUED

**SHORT TITLE: PM-5** **Anticoagulation Prescribed (Outpatient)**

**PM-5: Atrial Fibrillation or Atrial Flutter: Anticoagulation Prescribed (Outpatient)**

**Measure Description: Percentage of patients, age ≥18 y, who were prescribed an FDA-approved anticoagulant drug for the prevention of thromboembolism during the measurement period.**

| | |
|---|---|
| **Numerator** | Patients with AF or atrial flutter for whom an FDA-approved anticoagulant was prescribed*<br>*Prescribed—also satisfied by documentation in current medication list |
| **Denominator** | Patients with AF or atrial flutter who do not have a documented $CHA_2DS_2$-VASc risk score of 0 or 1, if male, and 0-2, if female. |
| **Denominator Exclusions** | ■ Patients age <18 y<br>■ Patients with moderate or severe mitral stenosis<br>■ Patients with a mechanical prosthetic heart valve<br>■ Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)<br>■ Patients who are on comfort care measures only |
| **Denominator Exceptions** | ■ Documentation of a medical reason for not prescribing an FDA-approved anticoagulant drug to a patient with a $CHA_2DS_2$-VASc score of ≥2 for men and ≥3 for women, including present or planned left atrial appendage occlusion or ligation<br>■ Documentation of a patient reason for not prescribing an FDA-approved anticoagulant drug for the prevention of thromboembolism, including patient preference for not receiving anticoagulation<br>■ Documentation of a patient being enrolled in a clinical trial related to AF or atrial flutter treatment |
| **Measurement Period** | Reporting year |
| **Sources of Data** | Medical record or other database (e.g., administrative, clinical, registry) |
| **Attribution** | Measure reportable at the facility or provider level |
| **Care Setting** | Outpatient |

**Rationale**

AF, whether paroxysmal, persistent, or permanent and whether symptomatic or silent, significantly increases the risk of thromboembolic ischemic stroke. AF increases the risk of stroke 5-fold, and AF in the setting of mitral stenosis increases the risk of stroke 20-fold over that of patients in sinus rhythm.

Thromboembolism occurring with AF is associated with a greater risk of recurrent stroke, more severe disability, and mortality (5). Silent AF is also associated with ischemic stroke (6–9). The appropriate use of anticoagulant therapy and the control of other risk factors, including hypertension and hypercholesterolemia, substantially reduce stroke risk.

One meta-analysis has stratified ischemic stroke risk among patients with nonvalvular AF using the following point scoring system (10): AF Investigators; $CHA_2DS_2$ (congestive heart failure, hypertension, age ≥75 y, diabetes mellitus, prior stroke or TIA or thromboembolism [doubled]), or $CHA_2DS_2$-VASc (congestive heart failure, hypertension, age ≥75 y [doubled] (11), diabetes mellitus, prior stroke or TIA or thromboembolism [doubled], vascular disease, age 65–74 y, sex category). Subsequent work demonstrated that the risk differs for men and women (4).

When compared with the $CHA_2DS_2$ score (12), the $CHA_2DS_2$-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65–74 y of age, and vascular disease) (13,14).

The selection of an anticoagulant agent should be based on shared decision-making that takes into account risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the INR therapeutic range if the patient has been on warfarin, irrespective of whether the AF pattern is paroxysmal, persistent, or permanent.

The term "nonvalvular AF" was clarified in the 2019 update and does not imply the absence of valvular heart disease. Instead, as used in the 2019 guideline update, nonvalvular AF is "AF in the absence of moderate or severe mitral stenosis or a mechanical heart valve" (4).

**Clinical Recommendation(s)**

**2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation** (4)

1. For patients with AF and an elevated $CHA_2DS_2$-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended. Options include:
   - Warfarin (Class 1, Level of Evidence: A) (15–17)
   - Dabigatran (Class 1, Level of Evidence: B) (18)
   - Rivaroxaban (Class 1, Level of Evidence: B) (19)
   - Apixaban (Class 1, Level of Evidence: B) (20), or Edoxaban (Class 1, Level of Evidence: B-R) (21)
   - MODIFIED: This recommendation has been updated in response to the approval of edoxaban, a new factor Xa inhibitor. More precision in the use of $CHA_2DS_2$-VASc scores is specified in subsequent recommendations. The LOEs for warfarin, dabigatran, rivaroxaban, and apixaban have not been updated for greater granularity as per the new LOE system (Section 4.1. in the 2019 AF Guideline (4)). The original text can be found in Section 4.1 of the 2014 AF guideline (22). Additional information about the comparative effectiveness and bleeding risk of DOACs can be found in Section 4.2.2.2.



ACC indicates American College of Cardiology; AF, atrial fibrillation; AHA, American Heart Association; DOAC, direct-acting oral anticoagulant; FDA, U.S. Food and Drug Administration; HRS, Heart Rhythm Society; INR, international normalized ratio; LOE, level of evidence; PM, performance measure; and TIA, transient ischemic attack.

## APPENDIX B. AUTHOR RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—2020 UPDATE TO THE 2016 ACC/AHA CLINICAL PERFORMANCE AND QUALITY MEASURES FOR ADULTS WITH ATRIAL FIBRILLATION OR ATRIAL FLUTTER

The Task Force makes every effort to avoid actual, potential, or perceived conflicts of interest that could arise as a result of RWI. Detailed information on the ACC/AHA policy on RWI can be found online. All members of the writing committee, as well as those selected to serve as peer reviewers of this document, were required to disclose all current relationships and those existing within the 12 months before the initiation of this writing effort. ACC/AHA policy also requires that the writing committee chair and at least 50% of the writing committee have no relevant RWI.

Any writing committee member who develops new RWI during his or her tenure on the writing committee is required to notify staff in writing. These statements are reviewed periodically by the Task Force and by members of the writing committee. Author and peer reviewer RWI that are pertinent to the document are included in the appendixes: Appendix B for relevant writing committee RWI and Appendix C for comprehensive peer reviewer RWI. Additionally, to ensure complete transparency, the writing committee members' comprehensive disclosure information, including RWI not relevant to the present document, is available online. Disclosure information for the Task Force is also available online.

The work of the writing committee was supported exclusively by the ACC and the AHA without commercial support. Members of the writing committee volunteered their time for this effort. Meetings of the writing committee were confidential and attended only by writing committee members and staff from the ACC, AHA, and the HRS, which served as a collaborator on this project.

## APPENDIX B. CONTINUED

| Committee Member | Employment | Consultant | Speakers Bureau | Ownership/ Partnership/ Principal | Personal Research | Institutional, Organizational, or Other Financial Benefit | Expert Witness |
|---|---|---|---|---|---|---|---|
| Paul A. Heidenreich *(Chair)* | Stanford VA Palo Alto Health Care System—Professor of Medicine | None | None | None | None | None | None |
| N. A. Mark Estes III | University of Pittsburgh, Department of Medicine—Professor of Medicine | ■ Boston Scientific*<br>■ Medtronic*<br>■ St. Jude Medical* | None | None | None | ■ Boston Scientific*<br>■ Medtronic*<br>■ St. Jude Medical* | None |
| Gregg C. Fonarow | UCLA Medical Center—Professor of Medicine | ■ Abbott*<br>■ Amgen<br>■ AstraZeneca<br>■ Janssen Pharmaceuticals<br>■ Medtronic<br>■ Merck<br>■ Novartis* | None | None | None | ■ Boston Scientific | None |
| Corrine Y. Jurgens | Boston College, School of Nursing—Associate Professor | None | None | None | None | None | None |
| Michelle M. Kittleson | Smidt Heart Institute, Cedars Sinai—Professor of Medicine | None | None | None | None | None | None |
| Joseph E. Marine | Johns Hopkins University—Associate Professor of Medicine/ Cardiology | None | None | None | None | None | None |
| David D. McManus | University of Massachusetts Medical School—Associate Professor | ■ Bristol Myers Squibb*<br>■ Pfizer* | None | None | ■ Biotronik*<br>■ Pfizer*<br>■ Philips Healthcare* | ■ Bristol Myers Squibb (Steering Committee)† | None |
| Robert L. McNamara | Yale School of Medicine—Associate Professor of Medicine (Cardiology), Cardiovascular Medicine | None | None | None | None | None | None |

This table represents the relationships of committee members with industry and other entities that were determined to be relevant to this document. These relationships were reviewed and updated in conjunction with all meetings and/or conference calls of the writing committee during the document development process. The table does not necessarily reflect relationships with industry at the time of publication. A person is deemed to have a significant interest in a business if the interest represents ownership of ≥5% of the voting stock or share of the business entity, or ownership of ≥$5,000 of the fair market value of the business entity; or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. Relationships that exist with no financial benefit are also included for the purpose of transparency. Relationships in this table are modest unless otherwise noted. According to the ACC/AHA, a person has a relevant relationship IF: a) the relationship or interest relates to the same or similar subject matter, intellectual property or asset, topic, or issue addressed in the document; or b) the company/entity (with whom the relationship exists) makes a drug, drug class, or device addressed in the document or makes a competing drug or device addressed in the document; or c) the person, or a member of the person's household, has a reasonable potential for financial, professional, or other personal gain or loss as a result of the issues/content addressed in the document.

*Significant relationship.

†No financial benefit.

ACC indicates American College of Cardiology; AHA, American Heart Association; HRS, Heart Rhythm Society; RWI, relationships with industry or other entities; UCLA, University of California, Los Angeles; and VA, Veterans Affairs.

## APPENDIX C. REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (COMPREHENSIVE)—2020 UPDATE TO THE 2016 ACC/AHA CLINICAL PERFORMANCE AND QUALITY MEASURES FOR ADULTS WITH ATRIAL FIBRILLATION OR ATRIAL FLUTTER

| Peer Reviewer | Representation | Employment | Consultant | Speakers Bureau | Ownership/ Partnership/ Principal | Personal Research | Institutional, Organizational, or Other Financial Benefit | Expert Witness |
|---|---|---|---|---|---|---|---|---|
| Boback Ziaeian | Official TFPM Lead Reviewer | UCLA David Geffen School of Medicine—Assistant Professor; VA Greater Los Angeles Healthcare System—Director of Telecardiology | ■ AHA | None | None | ■ AHA*<br>■ NIH* | None | None |
| Matthew Bennett | Official ACC | Vancouver Coastal Health Research Institute— Clinical Assistant Professor | ■ Medtronic of Canada<br>■ St. Jude Medical | None | None | ■ Research Enrollment | ■ Bayliss Medical† | None |
| Anabelle S. Volgman | Official ACC | Rush Heart Center for Women—Professor | None | None | None | None | ■ Apple‡<br>■ Novartis† | None |
| L. Samuel Wann | Official ACC | Columbia St. Mary's Hospital, Ascension Healthcare— Clinical Cardiologist | None | None | None | None | None | None |
| Carolynn Spera Bruno | Official AHA | New York University—Clinical Associate Professor | None | None | None | None | None | None |
| James V. Freeman | Official AHA | Yale University School of Medicine—Associate Professor | ■ ACC NCDR*<br>■ Biosense Webster<br>■ Boston Scientific<br>■ Medtronic | None | None | ■ Janssen Pharmaceuticals<br>■ NHLBI* | ■ Biosense Webster†<br>■ Boston Scientific†<br>■ Sentreheart† | None |
| Pamela J. McCabe | Official AHA | Mayo Clinic Saint Mary's Hospital M-90—Nurse Scientist | None | None | None | None | None | None |
| Jonathan P. Piccini | Official HRS | Duke University School of Medicine—Associate Professor of Medicine, Associate Professor in Population Health Sciences, Member in the Duke Clinical Research Institute | ■ Abbott*<br>■ Allergan<br>■ ARCA biopharma<br>■ Biotronik<br>■ Medtronic*<br>■ Milestone<br>■ MyoKardia*<br>■ Philips*<br>■ Sanofi-Aventis*<br>■ UpToDate* | None | None | ■ Abbott*<br>■ AHA*<br>■ Association for the Advancement of Medical Instrumentation*<br>■ Bayer*<br>■ Boston Scientific*<br>■ Gilead Sciences*<br>■ Philips* | None | None |
| Sana M. Al-Khatib | Content ACC/AHA | Duke University School of Medicine—Professor of Medicine, Member in the Duke Clinical Research Institute | ■ Medtronic<br>■ Milestone Pharmaceuticals | None | None | ■ Abbott<br>■ FDA*<br>■ Medtronic<br>■ NHLBI*<br>■ PCORI* | ■ Abbott<br>■ AHA*<br>■ Bristol Myers Squibb<br>■ Medtronic<br>■ Pfizer | ■ Plaintiff, patient died of VT due to QT-prolonging meds, 2018<br>■ Plaintiff, SCD, 2018<br>■ Plaintiff, SCD Prevention, 2018 |
| Duy T. Nguyen | Content ACC/AHA | Stanford University—Clinical Associate Professor, Medicine -Cardiovascular Medicine; Director, Translational and Experimental EP Research Laboratory; Fellow, Stanford Faculty Biodesign | None | None | ■ EpyNova Medtech‡ | None | ■ CardioNXT‡ | None |

*Continued on the next page*

## APPENDIX C. CONTINUED

| Peer Reviewer | Representation | Employment | Consultant | Speakers Bureau | Ownership/ Partnership/ Principal | Personal Research | Institutional, Organizational, or Other Financial Benefit | Expert Witness |
|---|---|---|---|---|---|---|---|---|
| Paul D. Varosy | Content ACC/ AHA | VA Eastern Colorado Health Care System—Director of Cardiac Electrophysiology | None | None | None | ■ Research Grant Funding: PI Career Development Award, Co-Investigator VA Merit Review Grant* | ■ AHA‡ | None |

This table represents all relationships of reviewers with industry and other entities that were reported at the time of peer review, including those not deemed to be relevant to this document, at the time this document was under review. The table does not necessarily reflect relationships with industry at the time of publication. A person is deemed to have a significant interest in a business if the interest represents ownership of ≥5% of the voting stock or share of the business entity, or ownership of ≥$5,000 of the fair market value of the business entity; or if funds received by the person from the business entity exceed 5% of the person's gross income for the previous year. Relationships that exist with no financial benefit are also included for the purpose of transparency. Relationships in this table are modest unless otherwise noted. Names are listed in alphabetical order within each category of review. Please refer to http://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy for definitions of disclosure categories or additional information about the ACC/AHA Disclosure Policy for Writing Committees.

*Significant relationship.

†This disclosure was entered under the Clinical Trial Enroller category in the ACC's disclosure system.

‡No financial benefit.

ACC indicates American College of Cardiology; AHA, American Heart Association; EP, electrophysiology; FDA, U.S. Food and Drug Administration; HRS, Heart Rhythm Society; NCDR, National Cardiovascular Data Registry; NHLBI, National Heart, Lung, and Blood Institute; NIH, National Institutes of Health; PCORI, Patient-Centered Outcomes Research Institute; PI, principal investigator; SCD, sudden cardiac death; TFPM, Task Force on Performance Measures, UCLA, University of California, Los Angeles; VA, Veterans Affairs; and VT, ventricular tachycardia.