Performance Measures

2016 Clinical 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

Writing Committee Members

Paul A. Heidenreich, MD, MS, FACC, FAHA, Chair
N. A. Mark Estes MD, FACC, FAHA
Joseph E. Marine, MD, FACC‡
Gregg C. Fonarow, MD, FACC, FAHA§
David D. McManus, MD, MS, FACC, FAHA, FHRS
Corrine Y. Jurgens PhD, RN, ANP-BC, FAHA
Robert L. McNamara, MD, MHS, FACC
Penelope Solis, JD

ACC/AHA Task Force on Performance Measures

Paul A. Heidenreich, MD, MS, FACC, FAHA, Chair
Nancy M. Albert, PhD, CCNS, CCRN, FAHA†
P. Michael Ho, MD, PhD, FACC, FAHA*
Paul S. Chan, MD, MSc, FACC*
Sean O’Brien, PhD†
Lesley H. Curtis, PhD*
Corrine Y. Jurgens PhD, RN, ANP-BC, FAHA*
T. Bruce Ferguson, Jr., MD, FACC†
Andrea M. Russo, MD, FACC, FHRS*
Gregg C. Fonarow, MD, FACC, FAHA*§
Randal J. Thomas, MD, FACC, FAHA†
Michelle Gurvitz, MD, FACC†
Paul D. Varosy, MD, FACC†

*American Heart Association Representative.
†American College of Cardiology Representative.
‡Heart Rhythm Society Representative.
§ACC/AHA Task Force on Performance Measures Liaison.

This document underwent a 14-day peer review between 10/5/2015 and 10/19/2015 and a 30 day public comment period between 10/22/2015 and 11/21/2015.

This document was approved by the American College of Cardiology Board of Trustees on 10/22/2015 and the Executive Committee on 10/29/2015; by the American Heart Association Science Advisory and Coordinating Committee on 10/29/2015 and the Executive Committee on 10/29/2015; and by the Heart Rhythm Society on 10/30/2015.

The American College of Cardiology requests that this document be cited as follows:

J Am Coll Cardiol. 2016;[volume]:[year];[issue].

This article has been co-published in Circulation.

Copies: This document is available on the World Wide Web sites of the American College of Cardiology (www.acc.org) and the American Heart Association (http://my.americanheart.org). For copies of this document, please contact Elsevier Inc. Reprint Department via fax (212-633-3820) or email (reprints@elsevier.com).

Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American College of Cardiology. Please contact Elsevier’s permission department at healthpermissions@elsevier.com.

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
Table of Contents

1 PREAMBLE .................................................................................................................................5

2 1. INTRODUCTION ..................................................................................................................6
   1.1. Scope of the Problem ........................................................................................................11
   1.2. Disclosure of Relationships With Industry and Other Entities ....................................12

2. METHODOLOGY ..................................................................................................................13
   2.1. Literature Review .............................................................................................................13
   2.2. Definition and Selection of Measures..............................................................................13

3. ACC/AHA ATRIAL FIBRILLATION/ATRIAL FLUTTER MEASURE SET
   3.1 Discussion of 2016 Atrial Fibrillation/Atrial Flutter Measure Set ....................................16
      3.1.1. Retired Measures .................................................................................................... 16
      3.1.2. Revised Measures .................................................................................................. 16
      3.1.3. New Measures ....................................................................................................... 19

4. AREAS FOR FURTHER RESEARCH .................................................................................26

APPENDIX A. ATRIAL FIBRILLATION MEASURE SET .......................................................28

Performance Measure for Use with Inpatient and Outpatient Atrial Fibrillation or Atrial Flutter Patients .................................................................28

Inpatient Measures ....................................................................................................................28
   PM-1: CHA₂DS₂–VASc Risk Score Documented Prior to Discharge ................................. 28
   PM-2: Anticoagulation Prescribed Prior to Discharge .......................................................... 30
   PM-3: Prothrombin time (PT)/ International Normalized Ratio (INR) Planned Follow-Up
       Documented Prior to Discharge ..................................................................................... 33

Outpatient Measures .................................................................................................................34
   PM-4: CHA₂DS₂–VASc Score Risk Score Documented ....................................................... 34
   PM-5: Anticoagulation Prescribed ....................................................................................... 36
   PM-6: Monthly INR ............................................................................................................. 38

Quality Improvement Measures For Inpatient or Outpatient Atrial Fibrillation or Atrial Flutter Patients .................................................................40

Inpatient Measures ....................................................................................................................40
   QM-1: Beta Blocker Prescribed Prior to Discharge ............................................................... 40
   QM-2: ACE inhibitor (ACEI) or Angiotensin-Receptor Blocker (ARB) Prescribed Prior to
       Discharge ....................................................................................................................... 42
   QM-3: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial
       Fibrillation ....................................................................................................................... 44
   QM-4: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs ..................... 45
   QM-5: Inappropriate Prescription of Dofetilide or Sotalol Prior to Discharge ....................... 47

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
QM-6: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor Prior to Discharge ................................................................. 48

QM-7: Inappropriate Prescription of a Direct Thrombin and Factor Xa inhibitor (Rivaroxaban or Edoxaban) Prior to Discharge ........................................................................................................ 49

QM-8: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy Prior to Discharge .................................................................................................................................. 50

QM-9: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge .................................................................................................................................. 51

QM-10: Patients Who Underwent Atrial Fibrillation Catheter Ablation Who Were Not Treated with Anticoagulation Therapy During or After a Procedure .......................................................... 52

QM-11: Shared Decision Making Regarding Anticoagulation Prescription Prior to Discharge ................................................................................................................................................... 53

Outpatient Measures .......................................................................................................................................................................................... 55

QM-12: Beta Blocker Prescribed ........................................................................................................................................ 55

QM-13: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation........................................................................................................................................ 57

QM-14: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs ............................................................................................................................................... 58

QM-15: Inappropriate Prescription of Dofetilide or Sotalol ........................................................................................................................................ 60

QM-16: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor (Rivaroxaban or Edoxaban) ........................................................................................................................................ 61

QM-17: Inappropriate Prescription of a Direct Thrombin and Factor Xa Inhibitor (Rivaroxaban or Edoxaban) ........................................................................................................................................ 62

QM-18: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy ............................................................................................................................................... 63

QM-19: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist .... 64

QM-20: Shared Decision Making in Anticoagulation Prescription .............................................................................................. 65

APPENDIX B. AUTHOR LISTING OF RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—2016 ACC/AHA ATRIAL FIBRILLATION ...................... 68

APPENDIX C. PEER REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES—ACC/AHA 2016 ATRIAL FIBRILLATION ......................................................... 71
Preamble

The American College of Cardiology (ACC)/American Heart Association (AHA) performance measure sets serve as vehicles to accelerate translation of scientific 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) and to ensure that the measures developed are aligned with ACC/AHA clinical 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/or 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 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
1. Introduction

In the summer of 2015, the ACC/AHA convened the writing committee to begin the process of revising the existing atrial fibrillation (AF) and atrial flutter measure set that was released in 2008 (2) and for which implementation notes had been issued in 2011 (3). The writing committee also was charged with the task of developing new measures to benchmark and improve the quality of care for atrial fibrillation or atrial flutter patients. Throughout the report the term atrial fibrillation will include atrial flutter unless specifically stated.

All the measures included in the measure set are briefly summarized in Table 1 which provides information on the measure number, measure title, and care setting. The detailed measure specifications (available in Appendix A) provide not only the information included in Table 1 but also provide more detailed information including the measure description, numerator, denominator (including denominator exclusions and exceptions), rationale for the measure, guideline that support the measure, measurement period, source of data, attribution.

This atrial fibrillation measure set is notable for several reasons. First, the writing committee considered whether measures should be developed for the inpatient setting, expanding the scope of the original measure set. Specifically, the writing committee decided to broaden the care setting from solely outpatient to the inpatient setting in order to further improve the
continuity of care for these patients by addressing the multiple settings where patients receive care.

Second, new measures were developed for care domains that were not previously addressed including patient safety, effective clinical care, communication and care coordination. Many measure concepts were considered but were ultimately not included in this set after committee discussion. It is the hope of this writing committee that this measure set be reassessed as new science is developed and as electronic health record data standards are more broadly implemented across settings.

The writing committee has developed a comprehensive atrial fibrillation measure that includes 26 total measures, including 6 performance measures (3 inpatient measures and 3 outpatient measures), and 20 quality measures (11 inpatient measures and 9 outpatient measures), as reflected in Table 1 and Appendix A. The writing committee believes that implementation of this measure set by providers, physician practices, and hospital systems will help to enhance the quality of care provided to atrial fibrillation patients in both the inpatient and outpatient setting.
Table 1. 2016 ACC/AHA Atrial Fibrillation Measure Set Update

<table>
<thead>
<tr>
<th>#</th>
<th>MEASURE TITLE</th>
<th>CARE SETTING</th>
<th>Measure Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>PERFORMANCE MEASURES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM-1</td>
<td>CHA₂DS₂–VASc Risk Score Documented Prior to Discharge</td>
<td>Inpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>PM-2</td>
<td>Anticoagulation Prescribed Prior to Discharge</td>
<td>Inpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>PM-3</td>
<td>Prothrombin time (PT)/ International Normalized Ratio (INR) Planned</td>
<td>Inpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td></td>
<td>Follow-Up Documented Prior to Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM-4</td>
<td>CHA₂DS₂–VASc Risk Score Documented</td>
<td>Outpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>PM-5</td>
<td>Anticoagulation Prescribed</td>
<td>Outpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>PM-6</td>
<td>Monthly INR</td>
<td>Outpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td></td>
<td><strong>QUALITY MEASURES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-1</td>
<td>Beta Blocker Prescribed Prior to Discharge</td>
<td>Inpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>QM-2</td>
<td>ACE inhibitor (ACEI) or Angiotensin-Receptor Blocker (ARB)</td>
<td>Inpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td></td>
<td>Prescribed Prior to Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-3</td>
<td>Inappropriate Prescription of Antiarrhythmic Drugs Prior to Discharge</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td></td>
<td>to Patients with Permanent Atrial Fibrillation for Rhythm Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-4</td>
<td>Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td></td>
<td>Prior to Discharge in Atrial Fibrillation Patients With Coronary Artery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease and/or Heart Failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-5</td>
<td>Inappropriate Prescription of Dofetilide or Sotalol Prior to Discharge</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td></td>
<td>in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(CKD) or on Dialysis Prior to Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-6</td>
<td>Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td></td>
<td>Prior to Discharge in Atrial Fibrillation Patients with a Mechanical Heart</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
<table>
<thead>
<tr>
<th>#</th>
<th>MEASURE TITLE</th>
<th>CARE SETTING</th>
<th>Measure Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>QM-7</td>
<td>Inappropriate Prescription of a Direct Thrombin and Factor Xa Inhibitor Rivaroxaban or Edoxaban Prior to Discharge in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-8</td>
<td>Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy Prior to Discharge for Patients Who Do Not have Coronary Artery Disease and/or Vascular Disease</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-9</td>
<td>Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge in Patients with Reduced Ejection Fraction or Decompensated Heart Failure</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-10</td>
<td>Patients Who Underwent Atrial Fibrillation Catheter Ablation Who Were Not Treated with Anticoagulation Therapy During or After a Procedure</td>
<td>Inpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-11</td>
<td>Shared Decision Making Between Physician and Patient in Anticoagulation Prescription Prior to Discharge</td>
<td>Inpatient</td>
<td>Communication and Care Coordination</td>
</tr>
<tr>
<td>QM-12</td>
<td>Beta Blocker Prescribed</td>
<td>Outpatient</td>
<td>Effective Clinical Care</td>
</tr>
<tr>
<td>QM-13</td>
<td>Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation for Rhythm Control</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-14</td>
<td>Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs in Atrial Fibrillation Patients With Coronary Artery Disease and/or Heart Failure</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-15</td>
<td>Inappropriate Prescription of Dofetilide or Sotalol in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-16</td>
<td>Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor in Atrial Fibrillation Patients With Mechanical Heart Valve</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-17</td>
<td>Inappropriate Prescription of a Direct Thrombin and Factor Xa Inhibitor (Rivaroxaban or Edoxaban) in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-18</td>
<td>Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy for Patients Who Do Not Have Coronary Artery Disease and/or Vascular Disease</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>#</td>
<td>MEASURE TITLE</td>
<td>CARE SETTING</td>
<td>Measure Domain</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>QM-19</td>
<td>Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist in Patients with Reduce Ejection Fraction or Decompensated Heart Failure</td>
<td>Outpatient</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>QM-20</td>
<td>Shared Decision Making Between Physician and Patient in Anticoagulation Prescription</td>
<td>Outpatient</td>
<td>Communication and Care Coordination</td>
</tr>
</tbody>
</table>
1.1. Scope of the Problem

Atrial fibrillation is recognized as the most common cardiac arrhythmia in the United States and is associated with increased mortality for individuals who have other cardiovascular conditions and procedures, such as heart failure (4-6), myocardial infarction (7,8), coronary artery bypass graft (9,10) and stroke (11). Furthermore, atrial fibrillation is associated with a four to five-fold increased risk for stroke (12).

It is estimated that atrial fibrillation impacts between 2.7 million and 6.1 million American adults and this number is expected to double by 2050 (13,14). Among Medicare patients who are 65 years and older that were diagnosed from 1993 to 2007, the prevalence of atrial fibrillation increased 5% per year, from approximately 41.1 per 1000 beneficiaries to 85.5 per 1000 beneficiaries (15).

Hospitalizations with atrial fibrillation listed as the primary diagnosis increased by 34% from 1996 to 2001 (16). Just of over half of patients admitted for atrial fibrillation were men (50.8%) (17). The costs of care for patients with atrial fibrillation are substantial; with estimates ranging from $6 to $26 billion a year, of which $6 billion was attributed directly to atrial fibrillation, $9.9 billion to other cardiovascular expenses, and $10.1 billion to non-cardiovascular expenses (18). Based on this information, identifying performance and quality measures that can be implemented by provider or healthcare systems may aid not only in improving patient care, but also in reducing costs by reducing adverse outcomes of atrial fibrillation (e.g., fewer strokes).

Accordingly, updating the existing atrial fibrillation measure set was a priority for the ACC and AHA. Particular attention was given to those assessment, therapies, and interventions that could improve the quality of life for atrial fibrillation patients. This document serves to
reflect those measures that were developed by the writing committee after comprehensive
internal discussion, peer review, and public comment.

1.2. Disclosure of Relationships With Industry and Other Entities
The ACC/AHA Task Force on Performance Measures makes every effort to avoid actual,
potential, or perceived conflicts of interest that could arise as a result of relationships with
industry or other entities (RWI). Detailed information on the ACC/AHA policy on RWI can be
found at [http://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy](http://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy). 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 co-chairs 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 which are relevant to the document are included in the appendices: Please see
Appendix B for relevant writing committee RWI and Appendix C for relevant 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 at [insert link to Comprehensive RWI here once paper finalized] Disclosure
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 Heart Rhythm Society (HRS) who served as a collaborator on this project.

2. Methodology

2.1. Literature Review

In developing the updated atrial fibrillation measure set, the writing committee reviewed evidence based guidelines and statements that would potentially impact the construct of the measures. The practice guidelines and statements that provided the basis for these measures can be seen in Table 2.

Table 2 Associated Guidelines and Other Clinical Guidance Documents

<table>
<thead>
<tr>
<th>GUIDELINES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 2014 AHA/ACC/HRS Guidelines for the Management of Patients with Atrial Fibrillation (19)</td>
<td></td>
</tr>
<tr>
<td>2. 2013 ACCF/AHA Guideline for Management of Heart Failure (20)</td>
<td></td>
</tr>
<tr>
<td>STATEMENTS</td>
<td></td>
</tr>
<tr>
<td>1. 2013 Treatment of Atrial Fibrillation (21,22)</td>
<td></td>
</tr>
</tbody>
</table>

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; AHA, American Heart Association; ASA, American Stroke Association; EHRA European Heart Rhythm Association; ECAS, the European Cardiac Arrhythmia Society; HRS, Heart Rhythm Society.

2.2. Definition and Selection of Measures

The writing committee reviewed both recent guidelines and other clinical guidance documents referenced in Table 2. The writing committee also examined available information on gaps in
care to address which new measures might be appropriate as performance measures or quality measures for this measure set update.

All measures were designed to assess quality of care experienced by individuals who have atrial fibrillation or atrial flutter in the inpatient and outpatient setting. The measures also were designed to limit performance measurement to patients without a valid reason for exclusion from the measure. Measure exclusions are those reasons that remove a patient automatically from the denominator. For example, all measures excluded patients who were under 18 years of age or on comfort care. In contrast to exclusions, denominator exceptions are those conditions that remove a patient from the denominator only if the numerator criteria are not met.

Denominator exceptions are used in select cases to allow for a fairer measurement of quality for those providers with higher risk populations. Exceptions are also used to defer to the clinical judgement of the provider. Several of the measures include exceptions.

During the course of developing the measure set, the writing committee evaluated the potential measures against the ACC/AHA attributes of performance measures (Table 3) to reach consensus on which measures should be advanced for inclusion in the final measure set. After the peer review and public comment period, the writing committee reviewed and discussed the comments received, and further refined the measure set.
### Table 3. ACC/AHA Task Force on Performance Measures: Attributes for Performance Measures

#### 1. Evidence Based

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence Based</td>
<td>High-impact area that is useful in improving patient outcomes</td>
</tr>
<tr>
<td>a) Structural measures</td>
<td>The structure should be closely linked to a meaningful process of care that in turn is linked to a meaningful patient outcome.</td>
</tr>
<tr>
<td>b) Process measures</td>
<td>The scientific basis for the measure should be well established, and the process should be closely linked to a meaningful patient outcome.</td>
</tr>
<tr>
<td>c) Outcome measures</td>
<td>The outcome should be clinically meaningful. If appropriate, performance measures based on outcomes should adjust for relevant clinical characteristics through the use of appropriate methodology and high-quality data sources.</td>
</tr>
</tbody>
</table>

#### 2. Measure Selection

- **Measure definition**: a) The patient group to whom the measure applies (denominator) and the patient group for whom conformance is achieved (numerator) are clearly defined and clinically meaningful.
- **Measure exceptions and exclusions**: b) Exceptions and exclusions are supported by evidence.
- **Reliability**: c) The measure is reproducible across organizations and delivery settings.
- **Face validity**: d) The measure appears to assess what it is intended to.
- **Content validity**: e) The measure captures most meaningful aspects of care.
- **Construct validity**: f) The measure correlates well with other measures of the same aspect of care.

#### 3. Measure Feasibility

- **Reasonable effort and cost**
  a) The data required for the measure can be obtained with reasonable effort and cost.
- **Reasonable time period**
  b) The data required for the measure can be obtained within the period allowed for data collection.

#### 4. Accountability

- **Actionable**
  a) Those held accountable can affect the care process or outcome.
- **Unintended consequences avoided**
  b) The likelihood of negative unintended consequences with the measure is low.

---

ACC indicates American College of Cardiology; AHA, American Heart Association.

3. ACC/AHA Atrial Fibrillation/Atrial Flutter Measure Set

Performance Measures

3.1 Discussion of 2016 Atrial Fibrillation/Atrial Flutter Measure Set

After reviewing the existing guidelines, and the 2008 measure set (2) and 2011 implementation notes (3), the writing committee discussed which measures needed to be revised in order to reflect the updated science, and worked to identify which guideline recommendations could serve as the basis for new performance or quality measures. The writing committee also reviewed existing measure sets that were publicly available.

The following subsections serve as a synopsis of the revisions that were made to previous measures, and a description of why the new measures were created for both the inpatient and outpatient setting.

3.1.1. Retired Measures

The writing committee decided not to retire any of the three measures that were previously included in the 2008 measure set. Although the writing committee did note that the data needed for the monthly INR measure have proved difficult to collect for some institutions, it was noted that some healthcare systems such as the Veteran Affairs may be able to collect this information. The writing committee hopes that by maintaining this as a performance measure, health systems will be encouraged sites to improve data collection. The writing committee also anticipates that increased interoperability of health care data in general, and across inpatient and outpatient records in particular, will facilitate the ability to report this measure.

3.1.2. Revised Measures

The writing committee did make a number of changes to the three measures which are summarized in the Table 4. The majority of the changes were made to reflect the updated
guideline recommendations, while other changes were made to strengthen the measure construct.

Table 4 provides information including the measure care setting, title, and a brief rationale as to the revisions made to the measure.
Table 4: Revised Atrial Fibrillation Measures

<table>
<thead>
<tr>
<th>#</th>
<th>Care Setting</th>
<th>Measure Title</th>
<th>Rationale for Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM-4</td>
<td>Outpatient</td>
<td>CHA2DS2–VASc Risk Score Documented</td>
<td>This measure was revised to reflect the update in the 2014 guidelines that recommends the use of the CHA2DS2–VASc score instead of the CHA2DS2. Additionally, this measure was revised to allow for a patient reason exception that reflects those instances where a patient may choose to have an atrial appendage device placed or to clearly account for those medical instances in which a patient already has such a device is already in place.</td>
</tr>
<tr>
<td>PM-5</td>
<td>Outpatient</td>
<td>Anticoagulation Prescribed</td>
<td>This measure had the same changes made as noted in the CHA2DS2–VASc Risk Score Documented “Rationale for Revisions.” This measure was also revised to require the healthcare provider document if the patient has a CHA2DS2–VASc Risk Score of 2 or greater as a reason for why anticoagulation was prescribed. This was accomplished by modifying the denominator to include in this measure all patients with nonvalvular atrial fibrillation or atrial flutter who do not have a score of 0 or 1 documented in the medical record.</td>
</tr>
<tr>
<td>PM-6</td>
<td>Outpatient</td>
<td>Monthly International Normalized Ration (INR)</td>
<td>This measure was maintained as previously specified in the 2008 measure set. However, the attribution was changed to facility or provider level instead of being limited to physician level. The writing committee acknowledged that this measure has been difficult to implement in registries, however, the sentiment was that this measure does lead to improved patient care and can be implemented in certain instances such as the Veteran Affairs or integrated healthcare systems. It is the hope of the writing committee that with increased interoperability and common data standards, this measure may be more readily adopted in the future by more systems.</td>
</tr>
</tbody>
</table>
3.1.3. New Measures

The writing committee has worked to create a comprehensive list of measures that can be utilized for atrial fibrillation patients. This set included 23 new measures, of which 3 are inpatient performance measures, and 20 are quality measures (11 inpatient, 9 outpatient). Table 5 includes a list of the measures with information on the care setting, and a brief rationale.

Six of the quality measures are structured in a typical format in which the goal is seek a higher performance score nearing 100%. However, a number of these new measures of patient harm (safety measures, 14 in total) where the optimal score is 0%.

For more detailed information on the measure construct, please refer to the detailed measure specifications for each measure in Appendix A.
Table 5: New Atrial Fibrillation Measures

<table>
<thead>
<tr>
<th>#</th>
<th>Care Setting</th>
<th>Measure Title</th>
<th>Rationale for Creating New Measure</th>
<th>Rationale for Designating as a Quality Measure as Opposed to a Performance Measure (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM-1</td>
<td>Inpatient</td>
<td>CHA$_2$DS$_2$–VASc Risk Score Documented Prior to Discharge</td>
<td>The writing committee determined that it should create inpatient measures. This measure seeks to implement a Class I Level of Evidence A recommendation that patients have a CHA$_2$DS$_2$–VASc risk score assessment performed prior to discharge which will aid in the treatment eligible patients in the outpatient setting with anticoagulation medications.</td>
<td>Not Applicable.</td>
</tr>
<tr>
<td>PM-2</td>
<td>Inpatient</td>
<td>Anticoagulation Prescribed Prior to Discharge</td>
<td>The writing committee developed this measure because members felt that prior to discharge the provider should ensure that the patient was prescribed anticoagulation medication in accordance with the guideline recommendations. As in the outpatient measure the CHA$_2$DS$_2$–VASc risk score must be documented to receive credit for this measure.</td>
<td>Not Applicable.</td>
</tr>
<tr>
<td>Measure</td>
<td>Setting</td>
<td>Description</td>
<td>Considerations</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>-------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>PM-3</td>
<td>Inpatient</td>
<td>PT/INR Planned Follow-Up Documented Prior to Discharge</td>
<td>The writing committee did discuss whether or not to expand this measure from just documentation of scheduled follow-up to be a measure that examined did the patient have a follow up performed. However, the writing committee felt that the burden of documentation of a referral was sufficiently burdensome for the inpatient setting. Furthermore, because most systems are not integrated and there are limits in terms of electronic data sharing between the inpatient and the outpatient setting extending this measure to require documentation of actual PT/INR completed post discharge would provide to be a significant burden on hospitals and physicians.</td>
<td></td>
</tr>
<tr>
<td>QM-1</td>
<td>Inpatient</td>
<td>Beta Blocker Prescribed Prior to Discharge</td>
<td>Patients with atrial fibrillation and atrial flutter can benefit from having beta blockers prescribed in the inpatient and in the outpatient setting. The guideline recommends that use of beta blockers to control ventricular rate in patients with paroxysmal, persistent, or permanent atrial fibrillation. Given this recommendation the writing committee felt that it would be valuable to measure whether or not beta blockers were prescribed to atrial fibrillation/flutter patients.</td>
<td></td>
</tr>
<tr>
<td>QM-12</td>
<td>Outpatient</td>
<td>Beta Blocker Prescribed</td>
<td>While the recommendation support beta blocker use in controlling atrial fibrillation is a Class 1 Level of Evidence B recommendation the writing committee felt that it would be appropriate to designate this as quality measure only.</td>
<td></td>
</tr>
</tbody>
</table>

*Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.*
<p>| QM-2 | Inpatient | ACE inhibitor (ACEI) or Angiotensin-Receptor Blocker (ARB) Prescribed Prior to Discharge | Patients with atrial fibrillation can benefit from having ACEI/ARBs prior to discharge who are also diagnosed with having heart failure and a left ventricular ejection fraction (LVEF) (\leq 40). Given this, the writing committee determined it would be valuable to develop a measure that would evaluate if ACEI/ARBs were prescribed. | There is a strong linkage between patients who have atrial fibrillation and heart failure. Given this, the writing committee felt that there would be some benefit in developing an inpatient and outpatient quality measure that examined whether or not patients were placed on ACEI/ARBs, but did not feel at this time that there was sufficient evidence to validate this becoming a performance measure. |
| QM-3 | Inpatient | Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation Prior to Discharge for Rhythm Control | The 2014 atrial fibrillation guideline recommends that antiarrhythmic drugs for rhythm control not be continued when atrial fibrillation becomes permanent. In accordance with this recommendation, the writing committee sought to develop measure that would attempt to track how often patients with permanent atrial fibrillation are prescribed an antiarrhythmic drug. | The writing committee felt that there would be value in developing an inpatient and an outpatient quality measure for inappropriate prescription of antiarrhythmic drugs for rhythm control in accordance with the guideline. However, the writing committee did note that it may be possible that some patients may be inappropriately classified as permanent atrial fibrillation. After discussion, it was determined that this measure would be best designated as a quality measure. |
| QM-13 | Outpatient | Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation for Rhythm Control | | |</p>
<table>
<thead>
<tr>
<th>Measure</th>
<th>Setting</th>
<th>Description</th>
<th>Reasoning</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>QM-4</td>
<td>Inpatient</td>
<td>Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs Prior to Discharge in Atrial Fibrillation Patients With Coronary Artery Disease and/or Heart Failure</td>
<td>Patients with atrial fibrillation and coronary artery disease should not be prescribed flecainide and propafenone and patients with atrial fibrillation and heart failure should not be prescribed flecainide, propafenone, sotalol, and dronedarone. Therefore, the writing committee felt that there would be some value in generating a measure that examined whether patients received any of these inappropriate prescriptions based on the patient also having a diagnosis of coronary artery disease and/or heart failure.</td>
<td>The writing committee felt that this measure may prove to be quite valuable. However, at this time the writing committee felt that additional data was needed before this measure could be promoted to a performance measure.</td>
</tr>
<tr>
<td>QM-14</td>
<td>Outpatient</td>
<td>Inappropriate Prescription of A Specific Type of Antiarrhythmic Drugs in Atrial Fibrillation Patients With Coronary Artery Disease and/or Heart Failure</td>
<td>Patients with atrial fibrillation and chronic kidney disease or on dialysis should not have sotalol and dofetilide prescribed. The writing committee did discuss whether patients with chronic kidney disease and dialysis should be included in QM-4 or QM-14 but decided that it would be more appropriate to create a separate measure.</td>
<td>At this time the writing committee felt that additional data was needed before this measure could be promoted to a performance measure.</td>
</tr>
<tr>
<td>QM-5</td>
<td>Inpatient</td>
<td>Inappropriate Prescription of Dofetilide or Sotalol Prior to Discharge in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</td>
<td>According to the 2014 atrial fibrillation patients with atrial fibrillation and a mechanical heart valve should not be prescribed direct thrombin inhibitor dabigatran. When creating these measures, the writing committee determined that the science and guidelines justified expanding the measure to include Factor Xa inhibitors.</td>
<td>Additional data is required prior to making this measure a performance measure.</td>
</tr>
<tr>
<td>QM-15</td>
<td>Outpatient</td>
<td>Inappropriate Prescription of Dofetilide or Sotalol in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-6</td>
<td>Inpatient</td>
<td>Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor Discharge in Atrial Fibrillation Patients with a Mechanical Heart Valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QM-16</td>
<td>Outpatient</td>
<td>Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor in Atrial Fibrillation Patients With Mechanical Heart Valve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
<p>| QM-7  | Inpatient | Inappropriate Prescription of a Direct Thrombin and Factor Xa inhibitor Rivaroxaban or Edoxaban in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis | The 2014 atrial fibrillation guidelines recommend that patients with atrial fibrillation and end-stage chronic kidney disease or on dialysis not be prescribed direct thrombin inhibitor dabigatran and the factor Xa inhibitor rivaroxaban because of the lack of evidence from clinical trials regarding the balance of risks and benefits. The writing committee in developing this measure expanded it to include edoxaban since it was approved for use in atrial fibrillation patients after the guidelines had been released. | Additional data is required prior to making this measure a performance measure. |
| QM-17 | Outpatient | Inappropriate Prescription of a Direct Thrombin and Factor Xa inhibitor (Rivaroxaban or Edoxaban) in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis |  |  |
| QM-8  | Inpatient | Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy Prior to Discharge for Patients who do not have Coronary Artery Disease and/or Vascular Disease | Combining of oral anticoagulants and antiplatelet therapy is associated with a high annual risk of fatal and nonfatal bleedings. | Additional data is required prior to making this measure a performance measure. |
| QM-18 | Outpatient | Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge in Patients with Reduced Ejection Fraction or Decompensated Heart Failure | The 2014 guidelines state that nondihydropyridine calcium channel antagonists should not be used in patients with decompensated heart failure (HF) as these may lead to further hemodynamic compromise. | Additional data is required prior to making this measure a performance measure. |
| QM-9  | Inpatient | Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge in Patients with Reduce Ejection Fraction or Decompensated Heart Failure |  |  |
| QM-19 | Outpatient | Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist in Patients with Reduce Ejection Fraction or Decompensated Heart Failure |  |  |</p>
<table>
<thead>
<tr>
<th>QM-10</th>
<th>Inpatient</th>
<th>Patients Who Underwent Atrial Fibrillation Catheter Ablation Who Were Not Treated with Anticoagulation Therapy During or After a Procedure</th>
<th>Atrial fibrillation catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and after the procedure. Given this the writing committee felt that it would be important to develop a measure for the occurrence of this “never event.”</th>
<th>Additional data is required prior to making this measure a performance measure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>QM-11</td>
<td>Inpatient</td>
<td>Shared Decision Making Between Physician and Patient in Anticoagulation Prescription Prior to Discharge</td>
<td>The writing committee believed that there would be value in developing a measure to capture shared decision making between physicians and the patient on the type of anticoagulation medication prescribed. The writing committee did acknowledged that this measure may create some administrative burden in documentation for hospitals, practices, or practitioners but believed that this measure is critical for patient engagement and empowerment in the medication regimen that they are prescribed.</td>
<td>The writing committee felt that while these measures are important they are associated with a high level of administrative burden. Therefore, it was felt that at this time, without any data, it would be more appropriate to designate these constructs as quality measures.</td>
</tr>
<tr>
<td>QM-20</td>
<td>Outpatient</td>
<td>Shared Decision Making Between Physician and Patient in Anticoagulation Prescription</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Areas for Further Research

The writing committee felt that documentation of a bleeding score may be beneficial but that more data are needed before recommending that calculation of a bleeding score be advanced to the level of a performance or quality measure. While the 2014 ACC/AHA Atrial Fibrillation guideline does reference the HAS-BLED score, it does not include specific guideline recommendations with regards to bleeding risk assessment. Although other guidelines, like the 2014 National Institute For Health Care And Excellence for Atrial Fibrillation (25), do include recommendations for the use of HAS-BLED score to assess the risk of bleeding, the writing committee felt that additional evidence was needed before creating a performance or quality measure.

The writing committee also discussed whether any outcome measures should be developed specific to atrial fibrillation. The committee felt there is insufficient evidence to support the use of an outcome measure (e.g. stroke rate per capita) as a measure of quality of atrial fibrillation care. It is not clear that patient outcomes will be improved by having patients select providers based on outcome metrics when measures of process of care are equivalent.

Staff

American College of Cardiology
Kim A. Williams, MD, FACC, President
Shalom Jacobovitz, Chief Executive Officer
William J. Oetgen, MD, MBA, FACC, Executive Vice President, Science, Education, Quality and Publications
Lara Slattery, MHS, Senior Director, ACC Scientific Reporting
Jensen S. Chiu, MHA, Team Lead, Quality Measurement
Penelope Solis, JD, Associate, Quality Measurement
Amelia Scholtz, PhD, Publications Manager, Clinical Policy and Pathways

American College of Cardiology/American Heart Association
Sana Gokak, MPH, Associate, Quality Measurement

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
Appendix A. Atrial Fibrillation Measure Set

Performance Measure for Use with Inpatient and Outpatient Atrial Fibrillation or Atrial Flutter Patients

Inpatient Measures

<table>
<thead>
<tr>
<th>Short Title: PM-1: CHA$_2$DS$_2$–VASc Risk Score Documented Prior to Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PM-1: Atrial Fibrillation/Atrial Flutter: CHA$_2$DS$_2$–VASc Risk Score Documented Prior to Discharge</strong></td>
</tr>
<tr>
<td><strong>Measure Description:</strong> Percent of patients, age 18 and older, with nonvalvular atrial fibrillation or atrial flutter for whom a CHA$_2$DS$_2$–VASc risk score has been documented in the medical record.</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
</tr>
<tr>
<td>Patients with nonvalvular atrial fibrillation or atrial flutter for whom a CHA$_2$DS$_2$–VASc risk score were documented prior to discharge.</td>
</tr>
<tr>
<td>For patients with nonvalvular atrial fibrillation or atrial flutter, assessment of thromboembolic risk should include:</td>
</tr>
<tr>
<td><strong>CHA$_2$DS$_2$–VASc</strong></td>
</tr>
<tr>
<td>Congestive HF</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Age&gt;= 75Y</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>Stroke/Transient Ischemic Attack (TIA)/ Thromboembolism [TE]</td>
</tr>
<tr>
<td>Vascular disease (prior myocardial infarction [MI], peripheral artery disease [PAD], or aortic plaque)</td>
</tr>
<tr>
<td>Age 64-74 years</td>
</tr>
<tr>
<td>Sex category (i.e.; female)</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
</tr>
<tr>
<td>All patients with nonvalvular atrial fibrillation or atrial flutter.</td>
</tr>
<tr>
<td><strong>Denominator Exclusions</strong></td>
</tr>
<tr>
<td>Patients less than 18 years of age</td>
</tr>
<tr>
<td>Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)</td>
</tr>
<tr>
<td>Patients who leave against medical advice</td>
</tr>
<tr>
<td>Patients who die during hospitalization</td>
</tr>
</tbody>
</table>

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
Patients who are on comfort care measures only
Patients who are transferred to another acute care hospital

Denominator Exceptions
Medical reason(s) documented for not assessing risk factors and documenting the CHA\textsubscript{2}DS\textsubscript{2}-VASc score, including atrial appendage device in place.
Patient choice of having atrial appendage device placed.

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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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 (11). Silent AF is also associated with ischemic stroke (26-29). The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHA\textsubscript{2}DS\textsubscript{2} (Congestive heart failure, Hypertension, Age \(\geq 75\) years, Diabetes mellitus, Prior Stroke or transient ischemic attack or Thromboembolism [doubled]), or CHA\textsubscript{2}DS\textsubscript{2}-VASc (Congestive heart failure, Hypertension, Age \(\geq 75\) years [doubled], Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHA\textsubscript{2}DS\textsubscript{2} score (32), the CHA\textsubscript{2}DS\textsubscript{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 to 74 years of age, and vascular disease) (33,34).

The selection of an antithrombotic 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)
2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of
whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA\textsuperscript{2}-DS\textsubscript{2}-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)

4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, TIA, or a CHA\textsuperscript{2}-DS\textsubscript{2}-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).

6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)

### Short Title: PM-2: Anticoagulation Prescribed Prior to Discharge

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

**Measure Description:** Percent of patients, age 18 and older, with nonvalvular atrial fibrillation or atrial flutter who were discharged on warfarin or another Food and Drug Administration (FDA) approved anticoagulant drug for the prevention of thromboembolism.

**Numerator**
- Patients with nonvalvular atrial fibrillation or atrial flutter for whom warfarin or another FDA approved anticoagulant was prescribed* prior to discharge.

  *Prescribed-Also satisfied by documentation in current medication list.

**Denominator**
- All patients with nonvalvular atrial fibrillation or atrial flutter who do not have a CHA\textsuperscript{2}-DS\textsubscript{2}-VASc risk score of 0 or 1
Denominator Exclusions

- Patients less than 18 years of age
- Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)
- Patients who leave against medical advice
- Patients who die during hospitalization
- Patients who are on comfort care measures only
- Patients who are transferred to another acute care hospital

Denominator Exceptions

- Documentation of a medical reason for not prescribing warfarin or another FDA approved anticoagulant to a patient with a CHA\(2\)DS\(2\)-VASc score of 2 or greater, including atrial appendage device in place.
- Documentation of a patient reason for not prescribing warfarin or another oral anticoagulant drug that is FDA approved for the prevention of thromboembolism, including patient choice of having atrial appendage device placed.
- Patient currently enrolled in a clinical trial related to atrial fibrillation/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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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 (11). Silent AF is also associated with ischemic stroke (26-29). The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHA\(2\)DS\(2\) (Congestive heart failure, Hypertension, Age \(\geq\) 75 years, Diabetes mellitus, Prior Stroke or TIA or Thromboembolism [doubled]), or CHA\(2\)DS\(2\)-VASc (Congestive heart failure, Hypertension, Age \(\geq\) 75 years [doubled] (31), Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHA\(2\)DS\(2\) score (32), the CHA\(2\)DS\(2\)-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65 to 74 years of
The selection of an antithrombotic 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.

<table>
<thead>
<tr>
<th>Clinical Recommendation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation</strong> (19)</td>
</tr>
<tr>
<td>1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>3. In patients with nonvalvular AF, the CHA$_2$DS$_2$-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>5. For patients with nonvalvular AF with prior stroke, TIA, or a CHA$_2$DS$_2$-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).</td>
</tr>
<tr>
<td>6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)</td>
</tr>
<tr>
<td>7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)</td>
</tr>
</tbody>
</table>
Short Title: PM-3: Prothrombin time (PT)/ international normalized ratio (INR) Planned Follow-Up Documented Prior to Discharge

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

Percentage of patients, age 18 and older, with nonvalvular atrial fibrillation or atrial flutter who are prescribed warfarin who have a PT/INR follow-up scheduled prior to hospital discharge.

**Numerator**
- Patients with nonvalvular atrial fibrillation or atrial flutter for whom warfarin was prescribed prior to discharge and for whom a PT/INR follow-up* is scheduled.

*Follow up is scheduled within 2 weeks for those patients who were newly prescribed warfarin, or scheduled within 30 days for those patients that 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 nonvalvular atrial fibrillation or atrial flutter who were prescribed warfarin.

**Denominator Exclusions**
- Patients less than 18 years of age
- Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)
- Patients who leave against medical advice
- Patients who die during hospitalization
- Patients who are on comfort care measures only
- 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)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA\textsubscript{2}DS\textsubscript{2}-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)

4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA\textsubscript{2}DS\textsubscript{2}-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).

6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)

### Outpatient Measures

**Short Title: PM-4: CHA2DS2–VASc Score Risk Score Documented**

**PM-4: Atrial Fibrillation/Atrial Flutter: CHA\textsubscript{2}DS\textsubscript{2}–VASc Score Risk Score Documented**

**Measure Description:** Percent of patients, age 18 and older, with nonvalvular atrial fibrillation or atrial flutter for whom a CHA\textsubscript{2}DS\textsubscript{2}-VASc risk score is documented.

**Numerator**
- Patients with nonvalvular atrial fibrillation or atrial flutter for whom a CHA\textsubscript{2}DS\textsubscript{2}-VASc risk score is documented.

**Denominator**
- All patients with nonvalvular atrial fibrillation or atrial flutter.

*Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.*
### Denominator Exclusions

- Patients less than 18 years of age
- Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)
- Patients who are on comfort care measures only

### Denominator Exceptions

- Documentation of a medical reason for not prescribing warfarin or another FDA approved anticoagulant to a patient with a CHA₂DS₂-VASc score of 2 or greater, including atrial appendage device in place.
- Patient choice of having atrial appendage device placed.

### 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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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 (11). Silent AF is also associated with ischemic stroke (26-29). The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHA₂DS₂ (Congestive heart failure, Hypertension, Age ≥75 years, Diabetes mellitus, Prior Stroke or TIA or Thromboembolism [doubled]), or CHA₂DS₂-VASc (Congestive heart failure, Hypertension, Age ≥75 years [doubled], Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHA₂DS₂ score (32), the CHA₂DS₂-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65 to 74 years of age, and vascular disease) (33,34).

The selection of an antithrombotic 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)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making
after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA<sub>2</sub>DS<sub>2</sub>-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)

4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).

6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)

---

**Short Title: PM-5: Anticoagulation Prescribed**

**PM-5: Atrial Fibrillation/Atrial Flutter: Anticoagulation Prescribed**

**Measure Description:** Percent of patients, age 18 and older, who were prescribed warfarin or another FDA approved anticoagulant drug for the prevention of thromboembolism during the measurement period.

**Numerator**

- Patients with nonvalvular atrial fibrillation or atrial flutter for whom warfarin or another FDA approved anticoagulant was prescribed.*

*Prescribed—Also satisfied by documentation in current medication list.
Denominator

- All patients with nonvalvular atrial fibrillation or atrial flutter who do not have a CHA<sub>2</sub>DS<sub>2</sub>-VASc risk score of 0 or 1 documented.

Denominator Exclusions

- Patients less than 18 years of age
- Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)
- Patients who are on comfort care measures only

Denominator Exceptions

- Documentation of a medical reason for not prescribing warfarin or another FDA approved anticoagulant to a patient with a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of 2 or greater, including atrial appendage device in place.
- Documentation of a patient reason for not prescribing warfarin or another oral anticoagulant drug that is FDA approved for the prevention of thromboembolism, including patient choice of having atrial appendage device placed.
- Patient currently enrolled in a clinical trial related to atrial fibrillation/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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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 (11). Silent AF is also associated with ischemic stroke (26-29). The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHA<sub>2</sub>DS<sub>2</sub> (Congestive heart failure, Hypertension, Age ≥75 years, Diabetes mellitus, Prior Stroke or TIA or Thromboembolism [doubled]), or CHA<sub>2</sub>DS<sub>2</sub>-VASc (Congestive heart failure, Hypertension, Age ≥75 years [doubled] (31), Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHA<sub>2</sub>DS<sub>2</sub> score (32), the CHA<sub>2</sub>DS<sub>2</sub>-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65 to 74 years of age, and vascular disease) (33,34).
The selection of an antithrombotic 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)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA$_2$DS$_2$-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)

4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA$_2$DS$_2$-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).

6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)

---

Short Title: PM-6: Monthly INR

PM-6: Atrial Fibrillation/Atrial Flutter: Monthly INR

Percentage of patients, age 18 and older, with nonvalvular atrial fibrillation or atrial flutter who have documented in the medical record an assessment of INR at least once a month if receiving anticoagulation.
therapy with warfarin.

<table>
<thead>
<tr>
<th>Numerator</th>
<th>The number of calendar months in which at least 1 INR measurement was made.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominator</td>
<td>The number of calendar months in which the patient with nonvalvular atrial fibrillation or flutter was receiving warfarin therapy during the reporting year.</td>
</tr>
</tbody>
</table>
| Denominator Exclusions | Patients less than 18 years of age  
Patients who are on comfort care measures only |
| Denominator Exceptions | Documentation of a patient reason for no INR measurement.  
Documentation of system reason(s) for no INR measurement. |
| 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

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)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA₂DS₂-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)

4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA₂DS2-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).
6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)

Quality Improvement Measures For Inpatient or Outpatient Atrial Fibrillation or Atrial Flutter Patients

Inpatient Measures

**Short Title: QM-1: Beta Blocker Prescribed Prior to Discharge**

**QM-1: Atrial Fibrillation/Atrial Flutter: Beta Blocker Prescribed Prior to Discharge**

**Measure Description:** Percent of patients, age 18 and older, with a diagnosis of atrial fibrillation or atrial flutter and with an LVEF ≤ 40, who were prescribed a beta blocker prior to discharge.

**Numerator**

- Patients with a diagnosis of atrial fibrillation or atrial flutter and with an LVEF ≤ 40 for whom a beta blocker was prescribed* during the measurement period.

  *Prescribed-Also satisfied by documentation in current medication list.

**Denominator**

- All patients with atrial fibrillation or atrial flutter with an LVEF ≤ 40.

**Denominator Exclusions**

- Patients less than 18 years of age
- Patients with transient or reversible causes of AF (e.g., pneumonia, hyperthyroidism, pregnancy, cardiac surgery)
- Patients who leave against medical advice
- Patients who die during hospitalization
- Patients who are on comfort care measures only
• Patients who are transferred to another acute care hospital

**Denominator Exceptions**

• Documentation of a medical reason for not prescribing a beta blocker.
• Documentation of a patient reason for not prescribing a beta blocker.
• Patient currently enrolled in a clinical trial related to atrial fibrillation/atrial flutter treatment.

**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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times over that of patients in sinus rhythm.

Rate control in AF is an important strategy. It impacts quality of life, reduces morbidity, and decreases the potential for developing tachycardia-induced cardiomyopathy. Multiple agents, including beta blockers and nondihydropyridine calcium channel blockers, certain antiarrhythmic drugs, including amiodarone and sotalol, have been evaluated with regard to efficacy in attaining rate control. When considering which agent(s) to use, clinicians must consider the patient’s degree of symptoms, hemodynamic status, presence or absence of HF, and potential precipitants of AF.

In general, beta blockers are the most common agents used for rate control, followed by nondihydropyridine calcium channel blockers, digoxin, and amiodarone. Patient comorbidities must be understood to avoid medications that may precipitate adverse events such as decompensation of HF, exacerbation of chronic obstructive pulmonary disease, or acceleration of conduction in patients with pre-excitation.

**Clinical Recommendation(s)**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. Control of the ventricular rate using a beta blocker or nondihydropyridine calcium channel antagonist is recommended for patients with paroxysmal, persistent, or permanent AF (51-53). (Class I, Level of Evidence: B)

2. Intravenous administration of a beta blocker or nondihydropyridine calcium channel blocker is recommended to slow the ventricular heart rate in the acute setting in patients without pre-excitation. In hemodynamically unstable patients, electrical cardioversion is indicated (54-57). (Class I, Level of Evidence: B)
**Short Title:** QM-2: ACE inhibitor (ACEI) or Angiotensin-Receptor Blocker (ARB) Prescribed Prior to Discharge

### Measure Description:
Percent of patients with a diagnosis of atrial fibrillation or atrial flutter, with heart failure and an LVEF ≤ 40, who were prescribed an ACEI or ARB prior to discharge.

#### Numerator
- Patients with a diagnosis of atrial fibrillation or atrial flutter, with heart failure and a LVEF ≤ 40 for whom an ACEI or ARB† was prescribed* during the measurement period.

  * Prescribed-Also satisfied by documentation in current medication list.
  † This measure includes fixed dose combination medications that contain an ARB.

#### Denominator
- All patients with atrial flutter or atrial flutter with heart failure and an LVEF ≤ 40 who are not currently on an ACEI or ARB.

#### Denominator Exclusions
- Patients less than 18 years of age
- Patients who leave against medical advice
- Patients who die during hospitalization
- Patients who are on comfort care measures only
- Patients who are transferred to another acute care hospital

#### Denominator Exceptions
- Documentation of a medical reason for not prescribing an ACEI or ARB.
- Documentation of a patient reason for not prescribing an ACEI or ARB.
- Patient currently enrolled in a clinical trial related to atrial fibrillation/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
2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
Patients with HF are more likely than the general population to develop AF (5). There is a direct relationship between the New York Heart Association (NYHA) Class and prevalence of AF in patients with HF progressing from 4% in those who are NYHA Class I to 40% in those who are NYHA Class IV (58). AF is also a strong independent risk factor for subsequent development of HF. In addition to those...
with heart failure with reduced ejection fraction (HFrEF), patients with heart failure with a preserved EF (HFpEF) are also at greater risk for AF than the general age matched population (59). HF and AF can interact to promote their perpetuation and worsening through mechanisms such as rate-dependent worsening of cardiac function, fibrosis, and activation of neurohumoral vasoconstrictors. AF can worsen symptoms in patients with HF, and, conversely, worsened HF can promote a rapid ventricular response in AF.

ACE inhibitors can reduce the risk of death and reduce hospitalization in HFrEF. The benefits of ACE inhibition were seen in patients with mild, moderate, or severe symptoms of HF and in patients with or without coronary artery disease (CAD). ACE inhibitors should be prescribed to all patients with HFrEF. Unless there is a contraindication, ACE inhibitors are used together with a beta blocker. Patients should not be given an ACE inhibitor if they have experienced life-threatening adverse reactions (i.e., angioedema) during previous medication exposure or if they are pregnant or plan to become pregnant. Clinicians should prescribe an ACE inhibitor with caution if the patient has very low systemic blood pressures (systolic blood pressure <80 mm Hg), markedly increased serum levels of creatinine (>3 mg/dL), bilateral renal artery stenosis, or elevated levels of serum potassium (>5.0 mEq/L).

ARBs are used in patients with HFrEF who are ACE inhibitor intolerant; an ACE-inhibition intolerance primarily related to cough is the most common indication. In addition, an ARB may be used as an alternative to an ACE inhibitor in patients who are already taking an ARB for another reason, such as hypertension, and who subsequently develop HF. Angioedema occurs in <1% of patients who take an ACE inhibitor, but it occurs more frequently in blacks. Because its occurrence may be life-threatening, clinical suspicion of this reaction justifies the subsequent avoidance of all ACE inhibitors for the lifetime of the patient. ACE inhibitors should not be initiated in any patient with a history of angioedema. Although ARBs may be considered as alternative therapy for patients who have developed angioedema while taking an ACE inhibitor, there are some patients who have also developed angioedema with ARBs, and caution is advised when substituting an ARB in a patient who has had angioedema associated with use of an ACE inhibitor (60-63).

### Clinical Recommendation(s)

<table>
<thead>
<tr>
<th>2013 ACCF/AHA Guideline for Management of Heart Failure (20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACE inhibitors are recommended in patients with HFrEF and current or prior symptoms, unless contraindicated, to reduce morbidity and mortality (64-67). (Class I, Level of Evidence: A)</td>
</tr>
<tr>
<td>2. In all patients with a recent or remote history of myocardial infarction or acute coronary syndrome (ACS) and reduced EF, ACE inhibitors should be used to prevent symptomatic HF and reduce mortality (64,68,69). In patients intolerant of ACE inhibitors, ARBs are appropriate unless contraindicated (68,70). (Class I, Level of Evidence: A)</td>
</tr>
<tr>
<td>3. ARBs are recommended in patients with HFrEF with current or prior symptoms who are ACE inhibitor intolerant, unless contraindicated, to reduce morbidity and mortality (68,71-73). (Class I, Level of Evidence: A)</td>
</tr>
<tr>
<td>4. ARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors as first-line therapy for patients with HFrEF, especially for patients already taking ARBs for other indications, unless contraindicated (74-79). (Class IIa, Level of Evidence: A)</td>
</tr>
<tr>
<td>5. Addition of an ARB may be considered in persistently symptomatic patients with HFrEF who are already being treated with an ACE inhibitor and a beta blocker in whom an aldosterone antagonist is not</td>
</tr>
</tbody>
</table>

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
Short Title: QM-3: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation

**QM-3: Atrial Fibrillation: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation Prior to Discharge for Rhythm Control**

**Measure Description:** Percentage of patients, age 18 and older, with permanent atrial fibrillation who were prescribed an antiarrhythmic medication prior to discharge for rhythm control.

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Patients with a diagnosis of atrial fibrillation who were inappropriately prescribed an antiarrhythmic medication for rhythm control.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For purposes of this measure antiarrhythmic drugs includes the medications provided in the below table.</td>
</tr>
</tbody>
</table>
|           | **Vaughan Williams Class IA**  
|           | Disopyramide  
|           | Quinidine  
|           | **Vaughan Williams Class IC**  
|           | Flecaïnide  
|           | Propafenone  
|           | **Vaughan Williams Class III**  
|           | Dofetilide  
|           | Dronedarone  
|           | Sotalol |

| Denominator | All patients with permanent atrial fibrillation. |

| Denominator Exclusions | Patients less than 18 years of age  
|                       | Patients prescribed amiodarone for rate control |

| 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**  

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

---

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
In selecting a strategy of rhythm control with an antiarrhythmic drug, providing for adequate rate control in the event of AF recurrence should also be considered. Once antiarrhythmic drug therapy is initiated, patient symptoms may improve without complete AF suppression. The transition from frequent AF to infrequent, well-tolerated recurrence of AF is a reasonable outcome and does not necessarily indicate that the therapy should be discontinued. However, if attempts at rhythm control are abandoned (e.g., after AF has been declared permanent), the antiarrhythmic drug should be discontinued.

Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
Antiarrhythmic drugs for rhythm control should not be continued when AF becomes permanent (Class III, Level of Evidence: C) including dronedarone (82). (Class III Level of Evidence: B)

Short Title: QM-4: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs

QM-4: Atrial Fibrillation: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs Prior to Discharge in Atrial Fibrillation Patients With Coronary Artery Disease and/or an NYHA Class III or Class IV Heart Failure

Measure Description: Percentage of patients, age 18 and older, with atrial fibrillation that also have coronary artery disease and/or an NYHA Class III or Class IV heart failure who were inappropriately prescribed antiarrhythmic medications prior to discharge.

Numerator

- Patients with a diagnosis of atrial fibrillation with coronary artery disease and/or an NYHA Class III or Class IV heart failure who were prescribed* a specific type of antiarrhythmic medication prior to discharge.

*Patients with coronary artery disease should not be prescribed flecainide and propafenone and patients with heart failure should not be prescribed flecainide, propafenone, sotalol, and dronedarone.

Denominator

- All patients with atrial fibrillation with coronary artery disease and/or an NYHA Class III or Class IV heart failure.

Denominator Exclusions

- Patients less than 18 years of age

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.
<table>
<thead>
<tr>
<th>Care Setting</th>
<th>Inpatient</th>
</tr>
</thead>
</table>

**Rationale**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Flecainide and Propafenone are Vaughan Williams Class IC drugs that may be considered for rhythm control in patients with AF without structural heart disease. Flecainide, along with other potent sodium channel–blocking drugs, increased mortality in patients with prior myocardial infarction (MI) and therefore should be avoided in patients with ischemic heart disease (83). In addition, both drugs are negative inotropes and should be avoided in patients with left ventricular (LV) dysfunction.

Sotalol is renally cleared and should be used with caution or avoided in patients with CKD or unstable renal function. Sotalol causes drug-induced QT interval prolongation, so it should be administered with caution or avoided when administered with other drugs known to prolong the QT interval. Table 13 in the 2014 ACC/AHA/HRS Guidelines for Management for Patients with Atrial Fibrillation provides more guidance in types of patients who should be excluded. Trends toward increased mortality for sotalol (OR: 3.44; 95% CI: 1.02 to 11.59) were observed in a comparison study (84), and it is likely that proarrhythmia is a contributing mechanism.

Dronedarone increases mortality in patients with recently decompensated HF and depressed left ventricular function (85) and is contraindicated in patients with NYHA Class III or IV HF and in patients who have had an episode of decompensated HF in the past 4 weeks, especially if they have depressed LV function. In patients with permanent AF, dronedarone increases the combined endpoint of stroke, cardiovascular death, and hospitalization (82). Therefore, dronedarone is contraindicated in patients whose sinus rhythm is not restored.

**Clinical Recommendation(s)**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. The following antiarrhythmic drugs are recommended in patients with AF to maintain sinus rhythm, depending on underlying heart disease and comorbidities (Class I, Level of Evidence: A):
   - a. Amiodarone (86-89)
   - b. Dofetilide (90,91)
   - c. Dronedarone (92-94)
   - d. Flecainide (87,95)
   - e. Propafenone (88,96-99)
   - f. Sotalol (87,97,100)

2. The risks of the antiarrhythmic drug, including proarrhythmia, should be considered before initiating therapy with each drug. (Class I, Level of Evidence: C)

3. Dronedarone should not be used for treatment of AF in patients with New York Heart Association Class III and IV HF or patients who have had an episode of decompensated HF in the past 4 weeks (85). (Class III, Level of Evidence: B)
**Short Title:** QM-5: Inappropriate Prescription of Dofetilide or Sotalol Prior to Discharge

**QM-5: Atrial Fibrillation: Inappropriate Prescription of Dofetilide or Sotalol Prior to Discharge in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease (CKD) or on Dialysis**

**Measure Description:** Percentage of patients, age 18 and older, with atrial fibrillation that also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis, who were prescribed dofetilide or sotalol prior to discharge.

**Numerator**
- Patients with a diagnosis of atrial fibrillation that also have end stage chronic kidney disease or are on dialysis who were prescribed dofetilide or sotalol prior to discharge.

**Denominator**
- All patients with atrial fibrillation who also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis.

**Denominator Exclusions**
- Patients less than 18 years of age

**Denominator Exceptions**
- Patients less than 18 years of age.

**Measurement Period**
- Encounter

**Sources of Data**
- Medical record or other database (e.g., administrative, clinical, registry).

**Attribution**
- Measure reportable at the facility or provider level.

**Care Setting**
- Inpatient

**Rationale**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Sotalol and Dofetilide are predominantly renally cleared and should be used with caution or avoided in patients with end-stage CKD or on dialysis. Table 11 in the 2014 ACC/AHA/HRS Guidelines for Management for Patients with Atrial Fibrillation provides more guidance in types of patients who should be excluded. Manufacturer/FDA recommendations suggest that both drugs are contraindicated due increased risk for toxicity (including potentially life-threatening pro-arrhythmic effects) in patients with severely reduced renal function.

**Clinical Recommendation(s)**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. The following antiarrhythmic drugs are recommended in patients with AF to maintain sinus rhythm, depending on underlying heart disease and comorbidities (Class I, Level of Evidence: A):
   - a. Amiodarone (86-89)
   - b. Dofetilide (90,91)
   - c. Dronedarone (92-94)
   - d. Flecainide (87,95)
   - e. Propafenone (88,96-99)
   - f. Sotalol (87,97,100)
2. The risks of the antiarrhythmic drug, including proarrhythmia, should be considered before initiating therapy with each drug. (Class I, Level of Evidence: C)

<table>
<thead>
<tr>
<th>Short Title: QM-6: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor Prior to Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QM-6: Atrial Fibrillation: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor Prior to Discharge in Atrial Fibrillation Patients with a Mechanical Heart Valve</strong></td>
</tr>
<tr>
<td><strong>Measure Description:</strong> Percentage of patients, age 18 and older, with a mechanical heart valve and with a diagnosis of atrial fibrillation that were inappropriately prescribed a direct thrombin or factor Xa inhibitor prior to discharge.</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
</tr>
<tr>
<td><strong>Denominator Exclusions</strong></td>
</tr>
<tr>
<td><strong>Denominator Exceptions</strong></td>
</tr>
<tr>
<td><strong>Measurement Period</strong></td>
</tr>
<tr>
<td><strong>Sources of Data</strong></td>
</tr>
<tr>
<td><strong>Attribution</strong></td>
</tr>
<tr>
<td><strong>Care Setting</strong></td>
</tr>
</tbody>
</table>

**Rationale**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Patients with atrial fibrillation and a mechanical heart valve should not be prescribed dabigatran.

Patients with mechanical heart valves or hemodynamically significant mitral stenosis were excluded from all 3 major trials (RE-LY [Randomized Evaluation of Long-Term Anticoagulation Therapy], ROCKET AF [Rivaroxaban-once daily, oral, direct factor Xa inhibition compared with vitamin K antagonism for prevention of stroke and Embolism], and ARISTOTLE [Apixaban for Reduction in Stroke and Other Thromboembolic Events in Atrial Fibrillation]) (101-103) therefore, these patients should be managed with warfarin. Patients with aortic stenosis or aortic insufficiency who, in the estimation of the local RCT principal investigator, would not need a surgical procedure before the conclusion of the trial were included. The RE-ALIGN (Randomized, Phase II Study to Evaluate the Safety and Pharmacokinetics of Oral Dabigatran Etxililate in Patients After Heart Valve Replacement) trial, a phase 2 dose-range study of...
the use of dabigatran compared with warfarin in patients with mechanical heart valves, was stopped because dabigatran users were more likely to experience strokes, MI, and thrombus forming on the mechanical heart valves than were warfarin users (104-106). There was also more bleeding after valve surgery in the dabigatran users than in the warfarin users; thus, dabigatran is contraindicated for use in patients with mechanical heart valves. Similar drug safety and efficacy information is lacking for rivaroxaban and apixaban and mechanical heart valves. Bioprosthetic heart valves have not been studied with any of the new anticoagulants. None of the 3 major trials included pregnant or lactating women, children, patients with reversible causes of AF, or patients with severe hypertension (systolic blood pressure >180 mmHg or diastolic blood pressure >100 mmHg). Patients with a recent stroke (within 7 to 14 days), patients with significant liver disease, and complex patients with multiple chronic conditions were excluded from all trials.

**Clinical Recommendation(s)**

| 2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19) | The direct thrombin inhibitor dabigatran should not be used in patients with AF and a mechanical heart valve (104). (Class III, Level of Evidence: B) |

| Short Title: QM-7: Inappropriate Prescription of a Direct Thrombin and Factor Xa inhibitor (Rivaroxaban or Edoxaban) Prior to Discharge |

| QM-7: Atrial Fibrillation: Inappropriate Prescription of a Direct Thrombin and Factor Xa inhibitor (Rivaroxaban or Edoxaban) Prior to Discharge in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis |

| Measure Description: Percentage of patients, age 18 and older, with atrial fibrillation that also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis, who were prescribed a direct thrombin or factor Xa inhibitor (rivaroxaban or edoxaban) prior to discharge. |

| Numerator | • Patients with a diagnosis of atrial fibrillation that also have end stage chronic kidney disease or are on dialysis who were prescribed a direct thrombin or factor Xa inhibitor (rivaroxaban or edoxaban) prior to discharge. |

| Denominator | • All patients with atrial fibrillation who also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis. |

| Denominator Exclusions | • Patients less than 18 years of age |

| 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

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
For patients with CKD, dose modifications of the new agents are available (Table 8); however, for those with severe or end-stage CKD, warfarin remains the anticoagulant of choice, as there are no or very limited data for these patients. Among patients on hemodialysis, warfarin has been used with acceptable risks of hemorrhage (104).

Clinical Recommendation(s)

1. The direct thrombin inhibitor dabigatran and the factor Xa inhibitor rivaroxaban are not recommended in patients with AF and end-stage CKD or on dialysis because of the lack of evidence from clinical trials regarding the balance of risks and benefits (45-47,107-109). (Class III, Level of Evidence: C)

Short Title: QM-8: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy Prior to Discharge

QM-8: Atrial Fibrillation: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy Prior to Discharge for Patients Who Do Not Have Coronary Artery Disease and/or Vascular Disease

Measure Description: Percentage of patients, age 18 and older, with atrial fibrillation who do not currently have coronary artery disease and/or vascular disease that where inappropriately prescribed both aspirin and an oral anticoagulant prior to discharge.

Numerator • Patients with a diagnosis of atrial fibrillation who do not currently have coronary artery disease and/or vascular disease that were prescribed both aspirin and an anticoagulant prior to discharge.

Denominator • All patients with atrial fibrillation who do not currently have coronary artery disease and/or vascular disease.

Denominator Exclusions • Patients less than 18 years of age

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

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

The combination of oral anticoagulants and antiplatelet therapy (“triple therapy”) is associated with a high annual risk of fatal and nonfatal bleeding episodes (110-113). Therefore, dual therapy should only be considered in patients with who also have vascular disease.

### Clinical Recommendation(s)

Other guidelines or supporting recommendations:

---

### Short Title: QM-9: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge

#### QM-9: Atrial Fibrillation: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist Prior to Discharge in Patients with Reduced Ejection Fraction or Decompensated Heart Failure

**Measure Description:** Percentage of patients, age 18 and older, with reduced ejection fraction (≤40) or decompensated heart failure and a diagnosis of atrial fibrillation that were inappropriate prescribed nondihydropyridine calcium channel antagonist prior to discharge.

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with a diagnosis of atrial fibrillation and reduced ejection fraction (≤40) or decompensated heart failure who were prescribed a nondihydropyridine calcium channel antagonist prior to discharge.</td>
<td>All patients with atrial fibrillation and reduced ejection fraction (≤40) or decompensated heart failure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator Exclusions</th>
<th>Denominator Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients less than 18 years of age</td>
<td>None</td>
</tr>
</tbody>
</table>

**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

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

In general, beta blockers are the most common agents used for rate control, followed by nondihydropyridine calcium channel blockers, digoxin, and amiodarone. Patient comorbidities must be understood to avoid medications that may precipitate adverse events such as decompensation of HF, exacerbation of chronic obstructive pulmonary disease, or acceleration of conduction in patients with pre-excitation.
Nondihydropyridine calcium channel blockers should not be used in patients with LV systolic dysfunction and decompensated HF because of their negative inotropic effects, but they may be used in patients with HF with preserved LV systolic function. In addition, these agents should not be used in patients with pre-excitation and AF due to the potential for shortening bypass tract refractoriness, which may accelerate the ventricular rate to precipitate hypotension or ventricular fibrillation.

Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Nondihydropyridine calcium channel antagonists should not be used in patients with decompensated HF as these may lead to further hemodynamic compromise. (Class III, Level of Evidence: C)

<table>
<thead>
<tr>
<th>Short Title: QM-10: Patients Who Underwent Atrial Fibrillation Catheter Ablation Who Were Not Treated with Anticoagulation Therapy During or After a Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QM-10: Atrial Fibrillation: Patients Who Underwent Atrial Fibrillation Catheter Ablation Who Were Not Treated with Anticoagulation Therapy During or After a Procedure</strong></td>
</tr>
<tr>
<td><strong>Measure Description:</strong> Percentage of patients, age 18 and older, who underwent atrial fibrillation ablation that were not treated with anticoagulation therapy both during and after a procedure.</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
</tr>
<tr>
<td>• Patients who were not treated with anticoagulation both during and after a procedure.</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
</tr>
<tr>
<td>• All patients with atrial fibrillation who underwent catheter ablation.</td>
</tr>
<tr>
<td><strong>Denominator Exclusions</strong></td>
</tr>
<tr>
<td>• Patients less than 18 years of age</td>
</tr>
<tr>
<td>• Patients who leave against medical advice</td>
</tr>
<tr>
<td>• Patients who die during hospitalization</td>
</tr>
<tr>
<td>• Patients who are on comfort care measures only</td>
</tr>
<tr>
<td>• Patients who are transferred to another acute care hospital</td>
</tr>
<tr>
<td><strong>Denominator Exceptions</strong></td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Measurement Period</strong></td>
</tr>
<tr>
<td>Encounter</td>
</tr>
<tr>
<td><strong>Sources of Data</strong></td>
</tr>
<tr>
<td>Medical record or other database (e.g., administrative, clinical, registry).</td>
</tr>
<tr>
<td><strong>Attribution</strong></td>
</tr>
<tr>
<td>Measure reportable at the facility or physician level.</td>
</tr>
<tr>
<td><strong>Care Setting</strong></td>
</tr>
<tr>
<td>Inpatient</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
</tr>
<tr>
<td>2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)</td>
</tr>
</tbody>
</table>
Because of the well-established risk of periprocedure stroke or transient ischemic attack (TIA) associated with AF catheter ablation, there is consensus that anticoagulation is indicated to prevent thromboembolism around the time of radiofrequency catheter ablation regardless of the patient’s baseline thromboembolic risk. Detailed consensus recommendations have been published about the approach to anticoagulation before, during, and after catheter ablation (24). Both intraprocedural heparin and oral anticoagulation are recommended for ≥2 months post-procedure. AF catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and after the procedure.

<table>
<thead>
<tr>
<th>Clinical Recommendation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)</td>
</tr>
<tr>
<td>1. AF catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and after the procedure. (Class III, Level of Evidence: C)</td>
</tr>
</tbody>
</table>

**Short Title:** QM-11: Shared Decision Making Regarding Anticoagulation Prescription Prior to Discharge

**QM-11: Atrial Fibrillation/Atrial Flutter: Shared Decision Making Between Physician and Patient in Anticoagulation Prescription Prior to Discharge**

**Measure Description:** Percent of patients, age 18 and older, with atrial fibrillation or atrial flutter who were educated on the benefits and risk of anticoagulation and for the specific type of anticoagulation therapy recommended by the physician and were consulted in the decision making process of whether to prescribe and which anticoagulant was prescribed prior to discharge.

<table>
<thead>
<tr>
<th>Numerator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with atrial fibrillation or atrial flutter with documentation of engagement in the decision making process regarding the benefits and risk of anticoagulation and for the specific type of anticoagulation therapy for atrial fibrillation or atrial flutter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients with atrial fibrillation or atrial flutter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients less than 18 years of age</td>
</tr>
<tr>
<td>Patients who leave against medical advice</td>
</tr>
<tr>
<td>Patients who die during hospitalization</td>
</tr>
<tr>
<td>Patients who are on comfort care measures only</td>
</tr>
<tr>
<td>Patients who are transferred to another acute care hospital</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation of a medical reason for not prescribing warfarin or another FDA approved anticoagulant to a patient with a CHA2DS2-VASc score of 2 or greater.</td>
</tr>
<tr>
<td>Patient currently enrolled in a clinical trial related to atrial fibrillation/atrial flutter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encounter</td>
</tr>
</tbody>
</table>
**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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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. Silent AF is also associated with ischemic stroke. The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHADS2 (Congestive heart failure, Hypertension, Age ≥75 years, Diabetes mellitus, Prior Stroke or TIA or Thromboembolism [doubled]), or CHA2DS2-VASc (Congestive heart failure, Hypertension, Age ≥75 years [doubled] (31), Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHADS2 score (32), the CHA2DS2-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65 to 74 years of age, and vascular disease) (33,34).

The selection of an antithrombotic 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.

Selection of agents for antithrombotic therapy depends on a large number of variables, including clinical factors, clinician and patient preference, and, in some circumstances, cost. The new agents are currently considerably more expensive than warfarin. However, dietary limitations and the need for repeated INR testing are eliminated with the new agents. If patients are stable, their condition is easily controlled, and they are satisfied with warfarin therapy, it is not necessary to change to a new agent. However, it is important to discuss this option with patients who are candidates for the new agents.

All 3 new oral anticoagulants [dabigatran, rivaroxaban, apixaban] represent important advances over warfarin because they have more predictable pharmacological profiles, fewer drug–drug interactions, an absence of major dietary effects, and less risk of intracranial bleeding than warfarin. They have rapid onset and offset of action so that bridging with parenteral anticoagulant therapy is not needed during initiation, and bridging may not be needed in patients on chronic therapy requiring brief interruption of anticoagulation for invasive procedures. However, strict compliance with these new oral anticoagulants is critical. Missing even 1 dose could result in a period without protection from thromboembolism. As a result, the FDA issued black box warnings that discontinuation of these new agents can increase the risk of thromboembolism and that coverage with another anticoagulant may be needed. In addition, reversal agents, while in development, are not available, although the short half-lives lessen the need for an antidote. Although dose adjustments may be warranted for those with CKD or body weight extremes,
these new agents do not require regular monitoring of INR or activated partial thromboplastin time.

**Clinical Recommendation(s)**

<table>
<thead>
<tr>
<th>2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>3. In patients with nonvalvular AF, the CHA²DS²-VASc score is recommended for assessment of stroke risk (39-41). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)</td>
</tr>
<tr>
<td>5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA²DS²-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).</td>
</tr>
<tr>
<td>6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)</td>
</tr>
<tr>
<td>7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)</td>
</tr>
<tr>
<td>9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)</td>
</tr>
</tbody>
</table>

**Outpatient Measures**

**Short Title: QM-12: Beta Blocker Prescribed**

**QM-12: Atrial Fibrillation/Atrial Flutter: Beta Blocker Prescribed**

**Measure Description:** Percent of patients, age 18 and older, with a diagnosis of atrial fibrillation or atrial
flutter and with an LVEF $\leq 40$, who were prescribed a beta blocker during the measurement period.

<table>
<thead>
<tr>
<th>Numerator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Patients with a diagnosis of atrial fibrillation or atrial flutter and</td>
</tr>
<tr>
<td>with an LVEF $\leq 40$ for whom a beta blocker was prescribed* during the</td>
</tr>
<tr>
<td>measurement period.</td>
</tr>
<tr>
<td>*Prescribed—Also satisfied by documentation in current medication list.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All patients with atrial fibrillation or atrial flutter and with an</td>
</tr>
<tr>
<td>LVEF $\leq 40$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Patients less than 18 years of age</td>
</tr>
<tr>
<td>• Patients who are on comfort care measures only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Documentation of a medical reason for not prescribing a beta blocker.</td>
</tr>
<tr>
<td>• Documentation of a patient reason for not prescribing a beta blocker.</td>
</tr>
<tr>
<td>• Patient currently enrolled in a clinical trial related to atrial</td>
</tr>
<tr>
<td>fibrillation/atrial flutter treatment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical record or other database (e.g., administrative, clinical, registry)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure reportable at the facility or provider level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Care Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF, whether paroxysmal, persistent, or permanent and whether symptomatic</td>
</tr>
<tr>
<td>or silent, significantly increases the risk of thromboembolic ischemic</td>
</tr>
<tr>
<td>stroke. Nonvalvular atrial fibrillation increases the risk of stroke 5</td>
</tr>
<tr>
<td>times, and AF in the setting of mitral stenosis increases the risk of</td>
</tr>
<tr>
<td>stroke 20 times over that of patients in sinus rhythm.</td>
</tr>
<tr>
<td>Rate control in AF is an important strategy. It impacts quality of life,</td>
</tr>
<tr>
<td>reduces morbidity, and decreases the potential for developing</td>
</tr>
<tr>
<td>tachycardia-induced cardiomyopathy. Multiple agents, including beta</td>
</tr>
<tr>
<td>blockers and nondihydropyridine calcium channel blockers, certain</td>
</tr>
<tr>
<td>antiarrhythmic drugs, including amiodarone and sotalol, have been</td>
</tr>
<tr>
<td>evaluated with regard to efficacy in attaining rate control. When</td>
</tr>
<tr>
<td>considering which agent(s) to use, clinicians must consider the patient’</td>
</tr>
<tr>
<td>s degree of symptoms, hemodynamic status, presence or absence of HF, and</td>
</tr>
<tr>
<td>potential precipitants of AF.</td>
</tr>
<tr>
<td>In general, beta blockers are the most common agents used for rate</td>
</tr>
<tr>
<td>control, followed by nondihydropyridine calcium channel blockers,</td>
</tr>
<tr>
<td>digoxin, and amiodarone. Patient comorbidities must be understood to</td>
</tr>
<tr>
<td>avoid medications that may precipitate adverse events such as</td>
</tr>
<tr>
<td>decompensation of HF, exacerbation of chronic obstructive pulmonary</td>
</tr>
<tr>
<td>disease, or acceleration of conduction in patients with</td>
</tr>
<tr>
<td>pre-excitation.</td>
</tr>
</tbody>
</table>
Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
1. Control of the ventricular rate using a beta blocker or nondihydropyridine calcium channel antagonist is recommended for patients with paroxysmal, persistent, or permanent AF (51-53). (Class I, Level of Evidence: B)

Short Title: QM-13: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation

QM-13: Atrial Fibrillation: Inappropriate Prescription of Antiarrhythmic Drugs to Patients with Permanent Atrial Fibrillation for Rhythm Control

Measure Description: Percentage of patients, age 18 and older, with permanent atrial fibrillation who were inappropriately prescribed antiarrhythmic medications for rhythm control.

Numerator: Patients with a diagnosis of atrial fibrillation who were prescribed antiarrhythmic medications for rhythm control.

For purposes of this measure antiarrhythmic drugs includes the medications provided in the below table.

- Vaughan Williams Class IA
  - Disopyramide
  - Quinidine
- Vaughan Williams Class IC
  - Flecainide
  - Propafenone
- Vaughan Williams Class III
  - Dofetilide
  - Dronedarone
  - Sotalol

Denominator: All patients with permanent atrial fibrillation.

Denominator Exclusions: Patients less than 18 years of age

Denominator Exceptions: None

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.
Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.

### Care Setting
- **Outpatient**

### Rationale

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

In selecting a strategy of rhythm control with an antiarrhythmic drug, providing for adequate rate control in the event of AF recurrence should also be considered. Once antiarrhythmic drug therapy is initiated, patient symptoms may improve without complete AF suppression. The transition from frequent AF to infrequent, well-tolerated recurrence of AF is a reasonable outcome and does not necessarily indicate that the therapy should be discontinued. However, if attempts at rhythm control are abandoned (e.g., after AF has been declared permanent), the antiarrhythmic drug should be discontinued.

### Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Antiarrhythmic drugs for rhythm control should not be continued when AF becomes permanent (Class III, Level of Evidence: C) including dronedarone (82). (Class III Level of Evidence: B)

### Short Title: QM-14: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs

#### QM-14: Atrial Fibrillation/Atrial Flutter: Inappropriate Prescription of a Specific Type of Antiarrhythmic Drugs in Atrial Fibrillation Patients With Coronary Artery Disease and/or an NYHA Class III or Class IV Heart Failure

**Measure Description:** Percentage of patients, age 18 and older, with atrial fibrillation that also have coronary artery disease and/or an NYHA Class III or Class IV heart failure who were inappropriately prescribed antiarrhythmic medications.

**Numerator**
- Patients with a diagnosis of atrial fibrillation who also have coronary artery disease and/or an NYHA Class III or Class IV heart failure that were inappropriately prescribed* a specific type of antiarrhythmic medication.

*Patients with coronary artery disease should not be prescribed flecainide and propafenone and patients with heart failure should not be prescribed flecainide, propafenone, sotalol, and dronedarone.

**Denominator**
- All patients with atrial fibrillation who also have coronary artery disease and/or an NYHA Class III or Class IV heart failure.

**Denominator Exclusions**
- Patients less than 18 years of age

**Denominator Exceptions**
- None

**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
Flecainide and Propafenone are Vaughan Williams Class IC drugs that may be considered for rhythm control in patients with AF without structural heart disease. Flecainide, along with other potent sodium channel–blocking drugs, increased mortality in patients with prior myocardial infarction (MI) and therefore should be avoided in patients with ischemic heart disease (83). In addition, both drugs are negative inotropes and should be avoided in patients with LV dysfunction.

Sotalol is renally cleared and should be used with caution or avoided in patients with CKD or unstable renal function. Sotalol causes drug-induced QT interval prolongation, so it should be administered with caution or avoided when administered with other drugs known to prolong the QT interval. Table 13 in the 2014 ACC/AHA/HRS Guidelines for Management for Patients with Atrial Fibrillation provides more guidance in types of patients who should be excluded. Trends toward increased mortality for sotalol (OR: 3.44; 95% CI: 1.02 to 11.59) were observed in a comparison study (84), and it is likely that proarrhythmia is a contributing mechanism.

Dronedarone increases mortality in patients with recently decompensated HF and depressed LV function (85) and is contraindicated in patients with NYHA Class III or IV HF and in patients who have had an episode of decompensated HF in the past 4 weeks, especially if they have depressed LV function. In patients with permanent AF, dronedarone increases the combined endpoint of stroke, cardiovascular death, and hospitalization (82). Therefore, dronedarone is contraindicated in patients whose sinus rhythm is not restored.

### Clinical Recommendation(s)

**2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation** (19)

1. The following antiarrhythmic drugs are recommended in patients with AF to maintain sinus rhythm, depending on underlying heart disease and comorbidities (Class I, Level of Evidence: A):
   a. Amiodarone (86-89)
   b. Dofetilide (90,91)
   c. Dronedarone (92-94)
   d. Flecainide (87,95)
   e. Propafenone (88,96-99)
   f. Sotalol (87,97,100)

2. The risks of the antiarrhythmic drug, including proarrhythmia, should be considered before initiating therapy with each drug. (Class I, Level of Evidence: C)

3. Dronedarone should not be used for treatment of AF in patients with New York Heart Association Class III and IV HF or patients who have had an episode of decompensated HF in the past 4 weeks (85). (Class III, Level of Evidence: B)
Short Title: QM-15: Inappropriate Prescription of Dofetilide or Sotalol

<table>
<thead>
<tr>
<th>QM-15: Atrial Fibrillation: Inappropriate Prescription of Dofetilide or Sotalol in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis</th>
</tr>
</thead>
</table>

**Measure Description:** Percentage of patients, age 18 and older, with atrial fibrillation that also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis, who were prescribed dofetilide or sotalol.

**Numerator**
Patients with a diagnosis of atrial fibrillation that also have end stage chronic kidney disease or are on dialysis who were prescribed dofetilide or sotalol.

**Denominator**
- All patients with atrial fibrillation who also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis.

**Denominator Exclusions**
- Patients less than 18 years of age

**Denominator Exceptions**
- Patients less than 18 years of age.

**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**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Sotalol and Dofetilide are predominantly renally cleared and should be used with caution or avoided in patients with end-stage CKD or on dialysis. Table 11 in the 2014 ACC/AHA/HRS Guidelines for Management for Patients with Atrial Fibrillation provides more guidance in types of patients who should be excluded. Manufacturer/FDA recommendations suggest that both drugs are contraindicated due increased risk for toxicity (including potentially life-threatening pro-arrhythmic effects) in patients with severely reduced renal function.

**Clinical Recommendation(s)**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. The following antiarrhythmic drugs are recommended in patients with AF to maintain sinus rhythm, depending on underlying heart disease and comorbidities (Class I, Level of Evidence: A):
   - Amiodarone (86-89)
   - Dofetilide (90,91)
   - Dronedarone (92-94)
   - Flecainide (87,95)
   - Propafenone (88,96-99)
   - Sotalol (87,97,100)

2. The risks of the antiarrhythmic drug, including proarrhythmia, should be considered before initiating
therapy with each drug. (Class I, Level of Evidence: C)

<table>
<thead>
<tr>
<th>Short Title: QM-16: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QM-16: Atrial Fibrillation: Inappropriate Prescription of a Direct Thrombin or Factor Xa Inhibitor in Atrial Fibrillation Patients With Mechanical Heart Valve</strong></td>
</tr>
<tr>
<td><strong>Measure Description:</strong> Percentage of patients, age 18 and older, with a mechanical heart valve and with a diagnosis of atrial fibrillation that were inappropriately prescribed a direct thrombin or factor Xa inhibitor.</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
</tr>
<tr>
<td>• Patients with a diagnosis of atrial fibrillation who were prescribed a direct thrombin or factor Xa inhibitor despite having a mechanical heart valve.</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
</tr>
<tr>
<td>• All patients with a diagnosis of atrial fibrillation with a mechanical heart valve.</td>
</tr>
<tr>
<td><strong>Denominator Exclusions</strong></td>
</tr>
<tr>
<td>• Patients less than 18 years of age</td>
</tr>
<tr>
<td><strong>Denominator Exceptions</strong></td>
</tr>
<tr>
<td>• None</td>
</tr>
<tr>
<td><strong>Measurement Period</strong></td>
</tr>
<tr>
<td>Reporting Year</td>
</tr>
<tr>
<td><strong>Sources of Data</strong></td>
</tr>
<tr>
<td>Medical record or other database (e.g., administrative, clinical, registry).</td>
</tr>
<tr>
<td><strong>Attribution</strong></td>
</tr>
<tr>
<td>Measure reportable at the facility or provider level.</td>
</tr>
<tr>
<td><strong>Care Setting</strong></td>
</tr>
<tr>
<td>Outpatient</td>
</tr>
</tbody>
</table>

**Rationale**

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

Patients with atrial fibrillation and a mechanical heart valve should not be prescribed dabigatran. Patients with mechanical heart valves or hemodynamically significant mitral stenosis were excluded from all 3 major trials (RE-LY, ROCKET AF, and ARISTOTLE) (101-103); therefore, these patients should be managed with warfarin. Patients with aortic stenosis or aortic insufficiency who, in the estimation of the local RCT principal investigator, would not need a surgical procedure before the conclusion of the trial were included. The RE-ALIGN (Randomized, Phase II Study to Evaluate the Safety and Pharmacokinetics of Oral Dabigatran Etexilate in Patients After Heart Valve Replacement) trial, a phase 2 dose-range study of the use of dabigatran compared with warfarin in patients with mechanical heart valves, was stopped because dabigatran users were more likely to experience strokes, MI, and thrombus forming on the mechanical heart valves than were warfarin users (104-106). There was also more...
bleeding after valve surgery in the dabigatran users than in the warfarin users; thus, dabigatran is contraindicated for use in patients with mechanical heart valves. Similar drug safety and efficacy information is lacking for rivaroxaban and apixaban and mechanical heart valves. Bioprosthetic heart valves have not been studied with any of the new anticoagulants. None of the 3 major trials included pregnant or lactating women, children, patients with reversible causes of AF, or patients with severe hypertension (systolic blood pressure >180 mmHg or diastolic blood pressure >100 mmHg). Patients with a recent stroke (within 7 to 14 days), patients with significant liver disease, and complex patients with multiple chronic conditions were excluded from all trials.

Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
The direct thrombin inhibitor dabigatran should not be used in patients with AF and a mechanical heart valve (104). (Class III, Level of Evidence: B)

Short Title: QM-17: Inappropriate Prescription of a Direct Thrombin and Factor Xa Inhibitor (Rivaroxaban or Edoxaban)

QM-17: Atrial Fibrillation: Inappropriate Prescription of a Direct Thrombin and Factor Xa Inhibitor (Rivaroxaban or Edoxaban) in Patients with Atrial Fibrillation and End-Stage Chronic Kidney Disease or on Dialysis

Measure Description: Percentage of patients, age 18 and older, with atrial fibrillation that also have end stage chronic kidney disease (CrCl <15 mL/min) or are on dialysis, who were prescribed a direct thrombin or factor Xa inhibitor (rivaroxaban or edoxaban).

Numerator

• Patients with a diagnosis of atrial fibrillation, that also have and end stage chronic kidney disease or are on dialysis, who were prescribed a direct thrombin or factor Xa inhibitor (rivaroxaban or edoxaban).

Denominator

• All patients with atrial fibrillation that also have and end stage chronic kidney disease (CrCl <15 mL/min or are on dialysis).

Denominator Exclusions

• Patients less than 18 years of age

Denominator Exceptions

• None

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

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

For patients with CKD, dose modifications of the new agents are available (Table 8); however, for those with severe or end-stage CKD, warfarin remains the anticoagulant of choice, as there are no or very limited data for these patients. Among patients on hemodialysis, warfarin has been used with acceptable risks of hemorrhage (114).

Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

The direct thrombin inhibitor dabigatran and the factor Xa inhibitor rivaroxaban are not recommended in patients with AF and end-stage CKD or on dialysis because of the lack of evidence from clinical trials regarding the balance of risks and benefits (45-47,107-109). (Class III, Level of Evidence: C)

---

Short Title: QM-18: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy

QM-18: Atrial Fibrillation: Inappropriate Prescription of Aspirin and Oral Anticoagulation Therapy for Patients Who Do Not Have Coronary Artery Disease and/or Vascular Disease

Measure Description: Percentage of patients, age 18 and older, with atrial fibrillation who do not currently have coronary artery disease and/or vascular disease that were inappropriately prescribed both aspirin and an oral anticoagulant.

Numerator

- Patients with a diagnosis of atrial fibrillation who do not have coronary artery disease and/or vascular disease that were inappropriately prescribed both aspirin and an oral anticoagulant.

Denominator

- All patients with atrial fibrillation who do not currently have coronary artery disease and/or vascular disease.

Denominator Exclusions

- Patients less than 18 years of age

Denominator Exceptions

- None

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

---
The combination of oral anticoagulants and antiplatelet therapy ("triple therapy") is associated with a high annual risk of fatal and nonfatal bleeding episodes (110-113). Therefore, dual therapy should only be considered in patients with who also have vascular disease.

### Clinical Recommendation(s)

**Other guidelines or supporting recommendations:**

---

### Short Title: QM-19: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist

#### QM-19: Atrial Fibrillation: Inappropriate Prescription of Nondihydropyridine Calcium Channel Antagonist in Patients with Reduce Ejection Fraction or Decompensated Heart Failure

**Measure Description:** Percentage of patients, age 18 and older, with reduced ejection fraction \((\leq 40)\) or decompensated heart failure and a diagnosis of atrial fibrillation that were inappropriate prescribed nondihydropyridine calcium channel antagonist.

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Patients with a diagnosis of atrial fibrillation and reduced ejection fraction ((\leq 40)) or decompensated heart failure who were prescribed nondihydropyridine calcium channel antagonist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominator</td>
<td>All patients with atrial fibrillation and reduced ejection fraction ((\leq 40)) or decompensated heart failure.</td>
</tr>
<tr>
<td>Denominator Exclusions</td>
<td>Patients less than 18 years of age</td>
</tr>
<tr>
<td>Denominator Exceptions</td>
<td>None</td>
</tr>
</tbody>
</table>

**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

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

In general, beta blockers are the most common agents used for rate control, followed by nondihydropyridine calcium channel blockers, digoxin, and amiodarone. Patient comorbidities must be understood to avoid medications that may precipitate adverse events such as decompensation of HF, exacerbation of chronic obstructive pulmonary disease, or acceleration of conduction in patients with pre-excitation.

Nondihydropyridine calcium channel blockers should not be used in patients with left ventricular systolic dysfunction and decompensated HF because of their negative inotropic effects, but they may be used in patients with HF with preserved LV systolic function. In addition, these agents should not be used in...
patients with pre-excitation and AF due to the potential for shortening bypass tract refractoriness, which may accelerate the ventricular rate to precipitate hypotension or ventricular fibrillation.

Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)
Nondihydropyridine calcium channel antagonists should not be used in patients with decompensated HF as these may lead to further hemodynamic compromise. (Class III, Level of Evidence: C)

Short Title: QM-20: Shared Decision Making in Anticoagulation Prescription

QM-20: Atrial Fibrillation/Atrial Flutter: Shared Decision Making Between Physician and Patient in Anticoagulation Prescription

Measure Description: Percent of patients, age 18 and older, with atrial fibrillation or atrial flutter who were educated on the benefits and risk of anticoagulation and for the specific type of anticoagulation therapy recommended by the physician and were consulted in the decision making process of whether to prescribe and which anticoagulant was prescribed during the measurement period.

Numerator

- Patients with atrial fibrillation or atrial flutter with documentation of engagement in the decision making process regarding the benefits and risk of anticoagulation and for the specific type of anticoagulation therapy for atrial fibrillation or atrial flutter.

Denominator

- All patients with atrial fibrillation or atrial flutter.

Denominator Exclusions

- Patients less than 18 years of age
- Patients who are on comfort care measures only

Denominator Exceptions

- Documentation of a medical reason for not prescribing warfarin or another FDA approved anticoagulant to a patient with a CHA2DS2-VASc score of 2 or greater.
- Patient currently enrolled in a clinical trial related to atrial fibrillation/atrial flutter.

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. Nonvalvular atrial fibrillation increases the risk of stroke 5 times, and AF in the setting of mitral stenosis increases the risk of stroke 20 times 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. Silent AF is also associated with ischemic stroke. The appropriate use of antithrombotic 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 systems (30): AF Investigators; CHADS2 (Congestive heart failure, Hypertension, Age \( \geq 75 \) years, Diabetes mellitus, Prior Stroke or TIA or Thromboembolism [doubled]), or CHA2DS2-VASc (Congestive heart failure, Hypertension, Age \( \geq 75 \) years [doubled] (31), Diabetes mellitus, Prior Stroke or TIA or thromboembolism [doubled], Vascular disease, Age 65 to 74 years, Sex category).

When compared with the CHADS2 score (32), the CHA2DS2-VASc score for nonvalvular AF has a broader score range (0 to 9) and includes a larger number of risk factors (female sex, 65 to 74 years of age, and vascular disease) (33,34).

The selection of an antithrombotic 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.

Selection of agents for antithrombotic therapy depends on a large number of variables, including clinical factors, clinician and patient preference, and, in some circumstances, cost. The new agents are currently considerably more expensive than warfarin. However, dietary limitations and the need for repeated INR testing are eliminated with the new agents. If patients are stable, their condition is easily controlled, and they are satisfied with warfarin therapy, it is not necessary to change to a new agent. However, it is important to discuss this option with patients who are candidates for the new agents.

All 3 new oral anticoagulants [dabigatran, rivaroxaban, apixaban] represent important advances over warfarin because they have more predictable pharmacological profiles, fewer drug–drug interactions, an absence of major dietary effects, and less risk of intracranial bleeding than warfarin. They have rapid onset and offset of action so that bridging with parenteral anticoagulant therapy is not needed during initiation, and bridging may not be needed in patients on chronic therapy requiring brief interruption of anticoagulation for invasive procedures. However, strict compliance with these new oral anticoagulants is critical. Missing even 1 dose could result in a period without protection from thromboembolism. As a result, the FDA issued black box warnings that discontinuation of these new agents can increase the risk of thromboembolism and that coverage with another anticoagulant may be needed. In addition, reversal agents, while in development, are not available, although the short half-lives lessen the need for an antidote. Although dose adjustments may be warranted for those with CKD or body weight extremes, these new agents do not require regular monitoring of INR or activated partial thromboplastin time.

### Clinical Recommendation(s)

2014 ACC/AHA/HRS Guidelines for the Management of Patients With Atrial Fibrillation (19)

1. In patients with AF, antithrombotic therapy should be individualized based on shared decision-making after discussion of the absolute and RRs of stroke and bleeding, and the patient’s values and preferences. (Class I, Level of Evidence: C)

2. Selection of antithrombotic therapy should be based on the risk of thromboembolism irrespective of whether the AF pattern is paroxysmal, persistent, or permanent (35-38). (Class I, Level of Evidence: B)

3. In patients with nonvalvular AF, the CHA2DS2-VASc score is recommended for assessment of stroke
4. For patients with AF who have mechanical heart valves, warfarin is recommended and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis (42-44). (Class I, Level of Evidence: B)

5. For patients with nonvalvular AF with prior stroke, transient ischemic attack (TIA), or a CHA2DS2-VASc score of 2 or greater, oral anticoagulants are recommended. Options include: warfarin (INR 2.0 to 3.0) (35-38) (Class I, Level of Evidence: A), dabigatran (45) (Class I, Level of Evidence: B), rivaroxaban (46) (Class I, Level of Evidence: B), or apixaban (47) (Class I, Level of Evidence: B).

6. Among patients treated with warfarin, the INR should be determined at least weekly during initiation of antithrombotic therapy and at least monthly when anticoagulation (INR in range) is stable (48-50). (Class I, Level of Evidence: A)

7. For patients with nonvalvular AF unable to maintain a therapeutic INR level with warfarin, use of a direct thrombin or factor Xa inhibitor (dabigatran, rivaroxaban, or apixaban) is recommended. (Class I, Level of Evidence: C)

8. Re-evaluation of the need for and choice of antithrombotic therapy at periodic intervals is recommended to reassess stroke and bleeding risks. (Class I, Level of Evidence: C)

9. For patients with atrial flutter, antithrombotic therapy is recommended according to the same risk profile used for AF. (Class I, Level of Evidence: C)
### Appendix B. Author Listing of Relationships With Industry and Other Entities (Relevant)—2016

#### ACC/AHA Atrial Fibrillation

<table>
<thead>
<tr>
<th>Committee Member</th>
<th>Employment</th>
<th>Consultant</th>
<th>Speaker</th>
<th>Ownership/Partnership/Principal</th>
<th>Research</th>
<th>Institutional, Organizational, or Other Financial Benefit</th>
<th>Expert Witness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paul Heidenreich, <em>Chair</em></td>
<td>Stanford VA Palo Alto Health Care System — Professor of Medicine</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>David D. McManus</td>
<td>University of Massachusetts Memorial Medical Center — Assistant Professor of Medicine</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td><em>Biotronik - IMPACT study</em>&lt;br&gt;<em>Philip Healthcare – SENTINEL-HF study</em></td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Gregg C. Fonarow</td>
<td>Ahmanson-UCLA Cardiomyopathy Center Division of Cardiology — Director</td>
<td>• Boston Scientific&lt;br&gt;• Medtronic</td>
<td>None</td>
<td>None</td>
<td><em>Medtronic</em></td>
<td><em>Medtronic- IMPROVE HF Steering Committee</em></td>
<td>None</td>
</tr>
</tbody>
</table>

*Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.*
<table>
<thead>
<tr>
<th>Committee Member</th>
<th>Employment</th>
<th>Consultant</th>
<th>Speaker</th>
<th>Ownership/ Partnership/ Principal</th>
<th>Research</th>
<th>Institutional, Organizational, or Other Financial Benefit</th>
<th>Expert Witness</th>
</tr>
</thead>
</table>
| N. A. Mark Estes         | Tufts Medical Center — Professor of Medicine | • Boston Scientific†  
• Medtronic†  
• St. Jude Medical† | None | None | • Boston Scientific | • Medtronic†  
• St. Jude Medical†  
• Boston Scientific† | None |
| Joseph E. Marine         | Johns Hopkins School of Medicine — Associate Professor of Medicine | None | None | None | None | None | None |
| Robert L. McNamara       | Yale University School of Medicine — Section of Cardiology — Associate Professor of Medicine | None | None | None | None | None | None |
| Corrine Y. Jurgens       | Stony Brook University School of Nursing — Associate Professor | None | None | None | None | None | None |
| Penelope Solis           | American College of Cardiology | 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

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
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.

*No financial relationship.
†Significant (greater than $5,000) relationship.

ACC indicates American College of Cardiology; ACCF, American College of Cardiology Foundation; AHA, American Heart Association; GWTG, Get With The Guidelines; IBHRE, International Board of Heart Rhythm Examiners; IMPACT; IMPROVE HF, Improve the Use of Evidence-Based Heart Failure Therapies in the Outpatient Setting; PRT, Pharmacy Round Table; UCLA, University of California, Los Angeles; NIH/NIAID, National Institute Health/The National Institute of Allergy and Infectious Diseases; NHBLI, National Heart, Lung, and Blood Institute; SENTINEL-HF study and VA, Veterans Affairs.

Please note: This draft document should be considered confidential and has been provided for comment purposes only. This document should not be cited or distributed to other individuals.
Appendix C. Peer Reviewer Relationships With Industry and Other Entities—ACC/AHA 2016
Atrial Fibrillation

[This table will be populated post comment period with the peer reviewer relevant RWI]

<table>
<thead>
<tr>
<th>Peer Reviewer</th>
<th>Representation</th>
<th>Consultant</th>
<th>Speaker’s Bureau</th>
<th>Ownership/Partnership/Principal</th>
<th>Personal Research</th>
<th>Institutional, Organizational, or Other Financial Benefit</th>
<th>Expert Witness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table represents the relationships of reviewers with industry and other entities that were disclosed at the time of peer review and determined to be relevant. It 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. A relationship is considered to be modest if it is less than significant under the preceding definition. 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.

*No financial relationship.
†Significant (greater than $5 000) relationship.
ACC indicates American College of Cardiology; AHA, American Heart Association; BOT, Board of Trustees; BOG, Board of Governors; HRS, Heart Rhythm Society; PI, principal investigator; NCDR, National Cardiovascular Data Registry; and GWTG, Get With the Guidelines.
References


24. Calkins H, Kuck KH, Cappato R, et al. 2012 HRS/EHRA/ECAS expert consensus statement on catheter and surgical ablation of atrial fibrillation: recommendations for patient selection, procedural techniques, patient management and follow-up, definitions, endpoints, and research trial design: a report of the Heart Rhythm Society (HRS) Task Force on Catheter and Surgical Ablation of Atrial Fibrillation. Developed in partnership with the European Heart Rhythm Association (EHRA), a registered branch of the European Society of Cardiology (ESC) and the European Cardiac Arrhythmia Society (ECAS); and in collaboration with the American College of Cardiology (ACC), American Heart Association (AHA), the Asia Pacific Heart Rhythm Society (APHRS), and the Society of Thoracic Surgeons (STS). Heart Rhythm. 2012;9:632-96.


34. Lane DA, Lip GY. Use of the CHA(2)DS(2)-VASc and HAS-BLED scores to aid decision making for thromboprophylaxis in nonvalvular atrial fibrillation. Circulation. 2012;126:860-5.


