The Purpose of the Atrial Fibrillation Model Practice

The 2018 PACE® Atrial Fibrillation (AF) Model Practice provides relevant management recommendations to PACE® primary care providers. The Model Practice was adapted specifically for PACE® participants from evidence-based, published guidelines for older adults using the collective review of experienced PACE® medical directors and primary care physicians and is offered with the belief that shared decision making between individual primary care providers and participants / caregivers is optimal. This Model Practice is not intended to replace the clinical judgment of the individual provider or establish a standard of care.

PACE® participants are a heterogeneous group, with differing health profiles, prognoses, preferences, and goals of care. Life expectancy and quality of life issues require an individualized context within which to apply practice guidelines that may have been developed from and for a population of non-frail adults. We recommend that whether a PCP follows any of the summary recommendations for an individual participant will depend upon factors specific to that participant, including the participant’s preferences, prognosis and life expectancy, co-morbid conditions, functional status, and goals of care. PACE® enrollment starts at age 55, as does this guideline.

This Model Practice assumes that the goals of care for PACE® participants can be divided into three broad categories: promoting longevity, optimizing function, and palliative care. Accordingly, the Model Practice suggests different approaches depending on whether the goal is life-extension, function, or palliation. The PCP will need to determine which recommendations are appropriate for each individual participant, considering the participant’s preferences, life expectancy, and the expected benefit versus burdens of specific interventions.

Goals of Care:

**Longevity** – Participant expresses a preference for life-prolonging treatment. A participant with a goal of longevity typically desires unrestricted use of medically-indicated treatments, including CPR, invasive procedures and life-sustaining treatments (ACLS, surgery, ventilator support, dialysis, IV fluids and tube feedings).

**Functional** – Participant’s main goal is to maintain function. Participant makes individualized choices to limit some invasive procedures that are not consistent with that goal. Limited procedures may include CPR, mechanical ventilation, dialysis, and surgery.

**Palliative** – Participant desires treatments aimed at providing comfort only. Treatment choices focus on relieving pain and other symptoms and limiting invasive, life-sustaining treatments such as CPR, mechanical ventilation, dialysis and surgery.

Note: This NPA Model Practice focuses on the common clinical considerations and risk assessments that a provider must address when determining

a) whether to treat with stroke prevention therapy for AF;

b) the evolving treatment choices and issues related to monitoring;

c) considerations for rate and rhythm control; and

d) considerations for the frail participant prone to falls.
The workgroup's core recommendations are largely drawn from the following consensus publication:


The workgroup chose to adapt its core recommendations from this particular consensus document as it is the most current, and reflects the opinion of the American Heart Association, the American College of Cardiology, and the Heart Rhythm Society. Notable in the document is that it strongly recommends use of CHADS2VA$c$ (relative to CHADS2) as the risk tool for stroke risk, and it considers warfarin and DOACs as equivalent choices. However, the workgroup wishes to note that DOACs are becoming increasingly preferable as first line therapy for the frail when no other contraindications or considerations exist.

Several other published articles were referenced to supplement this document with respect to individual subtopics, and those references are included in the appendices.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>STANDARDS</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Diagnosis--General considerations</strong></td>
<td>1) AF should be verified on ECG 2) Assess for contributing factors to the onset of AF onset or to refractory rate control (hyperthyroidism, volume depletion or overload, infection, sleep apnea, alcohol, drug use, prescribed medications)</td>
<td>Provider</td>
<td>Prior to proceeding</td>
</tr>
<tr>
<td><strong>II. Risk Assessment--General Considerations</strong></td>
<td>1) Use a validated tool for quantitative assessment of benefit (stroke risk); the Workgroup recommends CHADS2Vasc, as noted above 2) Use a validated tool for quantitative assessment of risk of treatment (e.g., HAS-BLED)</td>
<td>Provider</td>
<td>Prior to proceeding</td>
</tr>
<tr>
<td><strong>III. Treatment Decisions--General considerations</strong></td>
<td>1) AC therapy is indicated, in accordance with stroke risk, for any AF pattern (paroxysmal, permanent, or persistent, or atrial flutter) 2) Repeat assessment of risk-and benefit at intervals 3) Elicit participant/caregiver values and preferences in reaching a shared decision 4) Consider use of a prognostic tool to aid in risk-benefit considerations</td>
<td>Provider</td>
<td>Prior to proceeding</td>
</tr>
</tbody>
</table>
### IV. Rate and Rhythm Control--Pharmacologic Therapy

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>Goal: Longevity</th>
<th>Goal: Functional</th>
<th>Goal: Comfort Care</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agents for rate control</td>
<td>See Appendix A for details of options and dosing considerations</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Provider and consultant</td>
</tr>
<tr>
<td>Agents for rhythm control</td>
<td>See Appendix B for details of options and dosing considerations</td>
<td>Y</td>
<td>Consider</td>
<td>N</td>
<td>Provider and consultant</td>
</tr>
</tbody>
</table>

### V. Non-Pharmacologic Rate and Rhythm Control--Ablation

**NOTE:** General guidelines advise that a patient considered for ablation must be: (1) symptomatic due to uncontrolled atrial fibrillation including palpitations, chest pain, congestive heart failure/flash pulmonary edema and dyspnea and (2) have failed at least one antiarrhythmic drug therapy (e.g., the pro-arrhythmic medications such as amiodarone, propafenone, sotalol, etc.) (Does not include first line anti-arrhythmic such as calcium channel blockers, beta blocker, digoxin, etc.). The same considerations of risk/benefit for continued anticoagulant therapy apply even after AF has been successfully resolved by ablation. Thus, if not a candidate for anticoagulant therapy, then no ablation.

<table>
<thead>
<tr>
<th>Comment</th>
<th>Goal: Longevity</th>
<th>Goal: Functional</th>
<th>Goal: Comfort Care</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ablation should be considered IF indications present as noted above</td>
<td>Y</td>
<td>Consider</td>
<td>Consider only for symptom management</td>
<td>Provider</td>
<td>Dictated by clinical history and scenario</td>
</tr>
</tbody>
</table>

### VI. Risk Benefit Assessment Scores for Treatment with Anticoagulants--Recommendations by Goal Pathway

#### CHA2DS2Vasc Score (see Appendix C for details of scoring)

<table>
<thead>
<tr>
<th>Comment</th>
<th>Goal: Longevity</th>
<th>Goal: Functional</th>
<th>Goal: Comfort Care</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Aspirin is recommended</td>
<td>Y</td>
<td>Y</td>
<td>Consider</td>
<td>Provider</td>
</tr>
<tr>
<td>&gt;1</td>
<td>Oral AC with VKA or DOAC recommended</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Provider</td>
</tr>
</tbody>
</table>

#### HAS-BLED Score (see Appendix D for details of scoring)

| Score 0-1 | Oral AC with VKA or DOAC recommended | Y | Y | N | Provider | Initial, semi-annual, annual, during pertinent clinical events |
| Score 2   | Oral AC with VKA or DOAC recommended | Y | Y | N | Provider | Initial, semi-annual, annual, during pertinent clinical events |
### VII. Clinical events impacting decision to initiate or continue treatment

#### Falls

<table>
<thead>
<tr>
<th>Comment</th>
<th>Goal: Longevity</th>
<th>Goal: Functional</th>
<th>Goal: Comfort Care</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior history of falls</td>
<td>Oral AC with VKA or DOAC recommended</td>
<td>Y</td>
<td>Consider</td>
<td>N</td>
<td>Provider</td>
</tr>
<tr>
<td>At risk of falls</td>
<td>Oral AC with VKA or DOAC recommended</td>
<td>Y</td>
<td>Consider</td>
<td>Consider</td>
<td>Provider</td>
</tr>
</tbody>
</table>

#### History of bleeding

<table>
<thead>
<tr>
<th>Comment</th>
<th>Goal: Longevity</th>
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<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracranial Hemorrhage</td>
<td>After risk/benefit assessment, DOACs are preferable if anticoagulation pursued (see Appendix)</td>
<td>Y</td>
<td>Consider</td>
<td>N</td>
<td>Provider</td>
</tr>
<tr>
<td>History of GI hemorrhage</td>
<td>After risk/benefit assessment, DOACs are preferable if anticoagulation pursued (see Appendix)</td>
<td>Y</td>
<td>Consider</td>
<td>N</td>
<td>Provider</td>
</tr>
</tbody>
</table>

#### Clinical Frailty Score (see appendix F)

<table>
<thead>
<tr>
<th>Comment</th>
<th>Goal: Longevity</th>
<th>Goal: Functional</th>
<th>Goal: Comfort Care</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 1-4</td>
<td>Oral AC with VKA or DOAC recommended</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Provider</td>
</tr>
<tr>
<td>Score 5-8 with risk factors (High Risk) a) High bleeding risk, b) CrCl &lt;40 ml/min, c) High fall risk, d) Liver dysfunction</td>
<td>VKA is recommended therapy if anticoagulant therapy pursued</td>
<td>Consider</td>
<td>Consider</td>
<td>N</td>
<td>Provider</td>
</tr>
<tr>
<td>Score 5-8 with no risk factors as noted above (Low Risk)</td>
<td>DOACs are recommended if anticoagulant therapy is pursued</td>
<td>Consider</td>
<td>Consider</td>
<td>Consider</td>
<td>Provider</td>
</tr>
<tr>
<td>Score 9</td>
<td>Anticoagulation not recommended</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Provider</td>
</tr>
</tbody>
</table>

### VIII. Anticoagulants--Choice of Therapy--General considerations
### Valvular Heart Disease

**Bridging therapy**

AC therapy for valvular heart disease should be implemented with VKA. If participant prefers otherwise (other than bleeding concerns), then combination ASA-clopidogrel therapy is recommended.

- **A)** Bridging therapy during necessary oral anticoagulant interruptions should be implemented for those with mechanical heart valves.
- **B)** Whether to implement bridging therapy for those with non-valvular AF requires consideration of risk of stroke, risk of bleeding given specific procedure to be performed, and length of time that participant will not be anticoagulated.

**Warfarin (VKA)**

See Appendix E for dosing, monitoring frequencies, targets for nonvalvular AF, prosthetic valves by type and location, and geriatric considerations.

**Direct Oral Anticoagulants (DOAC)**

See Appendix E re: dosing, clinical considerations, geriatric considerations for the direct inhibitors (e.g., apixaban, rivaroxaban, dabigatran, edoxaban).

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### VIII. PARTICIPANT/CAREGIVER

- **A.** Participants should receive education regarding nature of atrial fibrillation, lifestyle modification.
- **B.** Attention should be given to impact on quality of life, as chronic AF impacts this significantly.

### IX. MONITORING

- **A.** Though in contemporary management, centralized AC clinics often used for implementation of VKA therapy, no clear benefit from use relative to primary care implemented therapy.
- **B.** Monitoring for adherence to all anticoagulants (warfarin or DOACs) in a systematic fashion by the PACE team is highly recommended.

### X. DIET

- **A.** Recent reviews suggest that restriction of Vitamin K in diet not necessary, that a stable chronic diet of vitamin K containing foods more appropriate, so diet advice and counseling useful.
- **B.** Evidence suggests that supplementation with low dose Vitamin K is not of benefit to INR stability, and is not recommended.
References


APPENDIX A

Atrial Fibrillation: Pharmacotherapy for Heart Rate Control

Target resting HR of < 110 bpm if asymptomatic

If symptoms present, target resting HR of < 80 bpm

**Beta blockers:**

- Metoprolol tartrate: 25 to 100 mg PO BID
- Metoprolol succinate: 50 to 400 mg PO daily
- Atenolol: 25 – 100 mg PO daily
  - If CrCl < 35, 50 mg max
  - If CrCl < 15, 25 mg max
- Propranolol: 10 – 40 mg PO TID or QID (likely not a good option due to pill burden)
  - No dosing recommendations in renal disease, but accumulation does occur with decreased CrCl
- Nadolol: 10 – 240 mg PO daily
  - If CrCl 31 – 50, use interval of 24 or 36 hours
  - If CrCl 10 – 30, use interval of 24 or 48 hours
  - If CrCl < 10, use interval of 48 hours or greater
- Carvedilol: 3.125 – 25 mg PO BID
- Bisoprolol: 2.5 – 10 mg PO daily
  - If CrCl < 40, doses > 2.5 mg should be used with great caution

**Non-dihydropyridine CCBs:** Verapamil ER: 180 – 480 mg PO daily  OR  Diltiazem ER: 120 – 360 mg PO daily

**Notes for rate control:**

- Beta blockers preferred over CCBs due to fewer adverse effects and safety of beta blockers in heart failure setting
- Of the beta blockers, likely the two recommended most readily would be metoprolol succinate and carvedilol due to:
  - No renal adjustments
  - Good mortality data in heart failure if pt has both
  - Relatively low pill burden
Appendix B

Atrial Fibrillation: Pharmacotherapy for Heart Rhythm Control

Class IA

- Quinidine: 324 – 648 mg PO Q8h
- Disopyramide: Not recommended due to high anticholinergic load (Beers criteria recommendation)

Class IC

- Flecainide: 50 – 200 mg PO Q12h
  - If CrCl < 35, use 100 mg daily or 50 mg BID and use serum concentrations to guide therapy (therapeutic level = 0.2 – 1 mcg/mL)
- Propafenone IR: 150 – 300 mg PO Q8h
- Propafenone ER: 225 – 425 mg PO Q12h

Class III

- Amiodarone: Not recommended as first or second line therapy due to risk of toxicities
  - If needed:
    - 400 – 600 mg/day (divided) for 2-4 weeks
    - 100 – 200 mg/day maintenance
- Dofetilide: 125 – 500 mcg PO Q12h
  - Must be initiated in the hospital
  - Contraindicated if QTc > 440 prior to initiation
  - Renal adjustment:
    - CrCl 40 – 60: 250 mcg PO BID max
    - CrCl 20 – 39: 125 mcg PO BID max
    - CrCl < 20: Contraindicated
- Dronedarone: 400 mg PO Q12h
  - Many contraindications:
    - Permanent AF
    - Symptomatic HF
    - Others
- Sotalol: 40 – 160 mg PO Q12h
Renal adjustment:
- CrCl 40 – 60: administer Q24h
- CrCl < 40: Contraindicated

Notes for rhythm control:
- Considered 2nd line therapy if rate control doesn’t control symptoms of AF
- Antiarrhythmic medications have many more adverse effects than rate control medications, including pro-arrhythmic potential
- Cardiology consultation advised prior to initiation of rhythm control therapy
- The 2014 guidelines do not mention quinidine as an option

Appendix C
CHA2DS2-VASC risk tool for assessing stroke risk from AF without anticoagulant therapy
Can be referenced via this hyperlink: https://www.chadsvasc.org/

Appendix D
HAS-BLED risk tool for assessing risk of bleeding during anticoagulant therapy
Can be referenced via this hyperlink: https://www.chadsvasc.org/

Appendix E
Anticoagulant Therapy for Atrial Fibrillation

Vitamin K Antagonists (warfarin)
- Warfarin: Initiation – 2.5 – 5 mg PO daily
  - No loading dose, especially for elderly
  - Usual dose range 2 – 5 mg/day
  - Titrate to INR of 2 – 3
  - No specific renal adjustment, just use more caution
Direct Thrombin inhibitor (dabigatran)

- Dabigatran: 150 mg PO BID
  - Caution with use in older adults
    - Per ISMP, increase in bleeding with increase in age, fatalities observed in older adults.
    - Age > 75, use extreme caution due to risk of bleed
  - Renal adjustment:
    - CrCl 30 – 50: If combined with dronedarone or ketoconazole, use 75 mg PO BID
    - CrCl 15 – 30: Use 75 mg PO BID
- **Controversial**! The RE-LY trial excluded all patients with CrCl < 30, therefore it is not studied in this patient population. The ACC recommends that this is a contraindication for use due to lack of data.

Factor Xa Inhibitors

- Rivaroxaban: 20 mg PO daily with evening meal
  - Renal Adjustment:
    - CrCl 15 – 50: 15 mg PO daily with evening meal
    - CrCl < 15: Avoid use
- Apixaban: 5 mg PO BID
  - Dose adjustment – if the patient has two of the following, reduce dose to 2.5 mg PO BID
    - Age >/= 80
    - Weight </= 60 kg
    - SCr >/= 1.5 mg/dL
- Edoxaban: 60 mg PO once daily
  - Dose adjustment
    - CrCl greater than 95 ml/min, use not recommended
    - CrCl 15 – 50: 30 mg PO once daily
    - CrCl < 15: Use not recommended

General notes for anticoagulants:

- Warfarin still the drug of choice for patients with ESRD or dialysis

Efficacy and Bleeding Considerations:

- Dabigatran (Pradaxa) – RE-LY trial
  - Non-inferior to warfarin for primary outcome (stroke or systemic embolism)
Superior to warfarin for the following secondary outcomes:
  - Stroke (all forms)
  - MI
  - Death from vascular causes
Bleeding risk:
  - MORE GI bleeding vs warfarin
  - LESS overall bleeding vs warfarin
  - LESS intracranial bleeding vs warfarin
Other notes
  - Relatively young patients (Age = 71)
  - More dabigatran patients withdrew from study (10 vs 16%), mostly due to:
    - “Patient’s choice”
    - Gastrointestinal symptoms
Rivaroxaban (Xarelto) – ROCKET AF trial
  - Non-inferior to warfarin for primary outcome (stroke or systemic embolism)
  - Bleeding Risk:
    - MORE transfusions and Hgb drops of 2 g/dL with rivaroxaban
    - LESS fatal bleeding
    - LESS intracranial hemorrhage
Other notes
  - Relatively young patients (Age = 73)
Apixaban (Eliquis) – ARISTOTLE trial
  - SUPERIOR to warfarin for primary outcome (stroke or systemic embolism)
  - Bleeding Risk:
    - LESS major bleeding
    - LESS intracranial bleeding
    - LESS bleeding for all bleeding outcomes except GI (p=0.37)
Other notes
  - Relatively young patients (Age = 70)
  - However, the primary efficacy outcome remained superior to warfarin in the subgroup analysis of patient 75+ (5600+ patients)
Edoxaban (Savaysa) – ENGAGE AF trial
  - SUPERIOR to warfarin for primary endpoint (time to first stroke or systemic embolism) with high dose 60 mg (non-inferior with low dose 30 mg)
  - Bleeding Risk:
    - LESS major and fatal bleeding
    - LESS intracranial bleeding
    - LESS GI bleeding
LESS bleeding in nearly every category

**Appendix F**


**NOTE:** The algorithm proposed by the authors for applying the Clinical Frailty Score tool to assist in the selection of atrial fibrillation pharmacotherapy in frail elders cannot be reproduced here.

However, the full Pub Med entry for the article, Direct oral anticoagulants in frail older adults: a geriatric perspective, which contains the decision tree that is outlined in our Model Practice, can be accessed via this hyperlink: [https://www.ncbi.nlm.nih.gov/pubmed/25973587](https://www.ncbi.nlm.nih.gov/pubmed/25973587)