# Atrial fibrillation in South Africa: anti-arrhythmic and anticoagulation therapy – clinical considerations for pharmacists

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## Abstract

**Background:** Atrial fibrillation (AF) represents the most prevalent persistent cardiac rhythm disorder encountered in routine clinical care and is a leading contributor to stroke, systemic embolic events, and heart failure. In South Africa, the occurrence of AF is currently lower than anticipated, though it is showing an upward trend, driven in part by the substantial prevalence of hypertension, obesity, and valvular heart disease, frequently linked to rheumatic heart disease (RHD). Furthermore, the risk for arrhythmias is increased with structural heart disease due to fibrotic scar formation caused by myocardial infarction. Pharmacological and non-pharmacological treatments are used to limit the effect of arrhythmias on morbidity and potential mortality. The therapeutic approach to AF typically includes strategies for rhythm or rate regulation using anti-arrhythmic agents, in combination with anticoagulation agents to reduce the risk of thromboembolic events. In the public healthcare sector, warfarin continues to be the predominant anticoagulant, whereas direct oral anticoagulants (DOACs) are being adopted with increasing frequency in private healthcare settings.

**Objectives:** This review summarises current epidemiology of AF in South Africa, outlines anti-arrhythmic and anticoagulation strategies, and highlights key considerations for pharmacists, including drug interactions, adverse effects, and patient counselling.

**Results:** While beta-blockers, calcium channel blockers, amiodarone, and sotalol remain mainstays for rate/rhythm control, newer agents have improved tolerability profiles. Anticoagulation decisions should be guided by the $CHA_2DS_2$-VA and HAS-BLED scores, in line with the 2024 ESC guideline, balancing stroke prevention with bleeding risk. DOACs offer practical advantages but cost, accessibility, and reversal agent availability remain limiting factors in public healthcare.

**Conclusion:** Pharmacists play a critical role in AF management through patient education, adherence support, adverse effect monitoring, and optimisation of therapy in line with national and international guidelines.

**Keywords:** atrial fibrillation, anti-arrhythmic drugs, anticoagulation, direct oral anticoagulants, South Africa, pharmacist role



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## Introduction

Atrial fibrillation (AF) is a supraventricular tachyarrhythmia characterised by uncoordinated atrial activation and ineffective atrial contraction.[1] This leads to irregular and rapid beats of the atria, out of coordination with the ventricles.

AF is the most common sustained arrhythmia[2] encountered in clinical practice and is a significant public health issue due to its association with a five-fold increased risk of stroke, three-fold risk of heart failure, and doubled mortality rate.[1] Stroke risk in AF is particularly concerning in South Africa, where healthcare access is uneven, and late presentation is common.[3]

Global estimates suggest AF affects over 59.7 million people,[4] and its prevalence is rising due to population ageing and improved survival from other cardiovascular diseases.[5]

In South Africa, AF incidence is lower than expected due to limited screening and diagnostic capacity[6] albeit rising,[7] partly due to a high burden of hypertension,[8] obesity,[9] ageing,[10] and valvular heart disease associated with rheumatic heart disease (RHD).[11] A systematic review of 72 studies[12] reports that AF prevalence in sub-Saharan Africa is 4.3% of adults aged ≥ 40 years and 0.7% of those aged ≥ 70 years.

## Epidemiology and risk factors in South Africa

AF prevalence increases with age, with 10–17% of individuals above 80 years affected.[13]

In South Africa, the most important risk factors include:

- Hypertension is present in approximately 60–80% of patients with established AF.[14]
- The Soweto Cardiovascular Cohort highlighted that South African AF patients are, on average, a decade younger than those in high-income countries, likely due to a higher burden of rheumatic and structural heart disease.[15]
- Obesity (especially in women).[15]
- Coronary artery disease and heart failure.[15]
- AF remains a significant predictor of CVD in people living with HIV.[16]

**Table I:** Treatment algorithm for atrial fibrillation – South African clinical context[22]

| Class | Drug/Class | Key Clinical Use | Adverse Effects |
|---|---|---|---|
| Rate Control | Beta-blockers (atenolol, bisoprolol, metoprolol) | First-line response in many patients by slowing atrioventricular (AV) node conduction | Bradycardia, fatigue, bronchospasm |
| | Non-dihydropyridine calcium channel blockers (e.g. verapamil, diltiazem) | Effective in rate control; avoided in heart failure with reduced ejection fraction. | Hypotension, constipation, bradycardia. |
| | Digoxin | Particularly in sedentary or heart failure patients; less effective during exertion. | Toxicity risk increased in renal impairment; interactions with verapamil, amiodarone. |
| Rhythm | Amiodarone | Effective in maintaining sinus rhythm. Long-term use limited by extracardiac toxicity. | Thyroid dysfunction, pulmonary fibrosis, liver toxicity, corneal deposits, skin. |
| | Sotalol | Beta-blocking and Class III properties | Risk of QT prolongation and torsades de pointes. |
| | Flecainide and propafenone | Class IC agents, limited public sector availability. | |

## Management principles in AF

The overall goal of treatment is to improve survival, reduce incidence of stroke, restore atrial functions, reverse ultrastructural remodelling and improve symptoms.[17] The gold standard integrated care strategy is the Atrial Fibrillation Better Care (ABC) for AF management. AF should be confirmed and characterised prior to implementation of the ABC pathway: "A" – anticoagulation/avoid stroke; "B" – better symptom management and "C" – cardiovascular and other comorbidity optimisation.[18] Management of AF involves rhythm and/or rate control using anti-arrhythmic drugs, alongside anticoagulation to prevent thromboembolic complications.[19] Warfarin remains widely used in the public sector, while direct oral anticoagulants (DOACs) are increasingly prescribed in the private sector.[20] In South Africa, DOAC affordability has improved in the private sector; pharmacists should check current SEPs and plan formularies when discussing options.

## Anti-arrhythmic drug therapy[21]

Anti-arrhythmic drugs are classified according to the Vaughan-Williams classification, although some agents have multi-class properties. In South Africa, commonly used drugs are listed in Table I.

## Pharmacist's role

Pharmacists are a potentially underutilised resource to provide integrated AF care. For hospital patients, pharmacists could perform targeted medication reviews, optimising therapies with cardiology input as needed and providing education especially to patients. In primary care, pharmacists could lead screening programmes, check medication adherence, provide new medicine reviews, monitor for adverse effects, monitor blood pressure, blood glucose, and cholesterol, and reinforce key educational messages.[18] Adverse drug events, drug-drug interactions, especially with high risk drugs like warfarin, digoxin and antiretroviral therapy are important roles for the pharmacists. Recognition of toxicity from narrow therapeutic window drugs like warfarin and digoxin is an important role.[20]

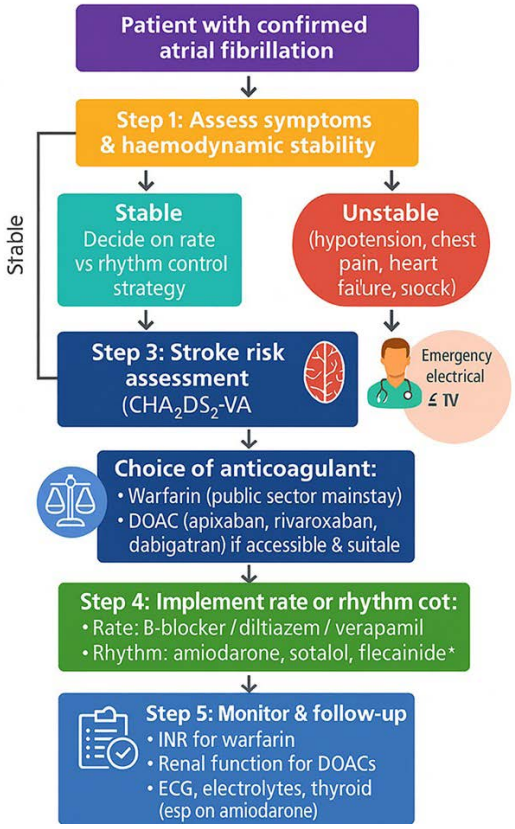


**Figure 1:** Stepwise approach to AF management for pharmacists

With DOAC therapy on the rise for patients diagnosed with AF, and therapy for these patients a life-long commitment, the pharmacist can ensure adherence and persistence, highlighting the benefits of adherence to patients. Physicians often sight a lack of time during patient consultations to counsel patients effectively; thus, pharmacists have a role to play.[23]

## Anticoagulation in AF

Stroke prevention in AF is guided by the $CHA_2DS_2$-VA score. DOAC is recommended for $CHA_2DS_2$-VA ≥ 2 and should be considered for $CHA_2DS_2$-VA = 1, irrespective of sex. The HAS-BLED score is used to estimate bleeding risk. Per the 2024 ESC guideline, bleeding-risk

**Table II:** Summary of anticoagulant options for AF in South Africa[20]

| Agent | Mechanism | Key Advantages | Limitations/Adverse effects |
|---|---|---|---|
| Warfarin | Vitamin K antagonist | Low cost, reversal available | Requires routine internationalised normalized ratio (INR) monitoring, diet & drug interactions, bleeding.* |
| Apixaban | Factor Xa inhibitor | Lower bleeding risk vs. warfarin, no routine monitoring (INR) | Drug interactions (CYP3A4/P-gp); price has decreased in South Africa. Verify current SEP/plan formulary.** |
| Rivaroxaban | Factor Xa inhibitor | Once daily dosing | Needs food with 15/20 mg dose; price has decreased in South Africa. Verify current SEP/plan formulary.** |
| Dabigatran | Direct thrombin inhibitor | Reversal agent available | Dyspepsia, renal clearance, cost |

* In line with ESC 2024, bleeding-risk scores are not to be used to start/stop OAC; they are tools to identify and manage modifiable risks.[21]

**Pricing note (South Africa): As of 2025, apixaban and rivaroxaban prices have decreased with broader market availability. Pharmacists should confirm the latest Single Exit Price (SEP) and medical-scheme reference prices (e.g., GEMS/DRP) when counselling patients.[24,25]

**Table III:** Drug options in AF management – South African perspective[30]

| Therapy goal | First-line | Alternative/Second line | Key pharmacist notes |
|---|---|---|---|
| **Rate control** | β-blockers (atenolol, bisoprolol, metoprolol) | Non-DHP CCBs (diltiazem, verapamil) | Avoid verapamil/diltiazem in HFrEF; monitor BP, HR; caution in asthma (β-blockers) |
| | Digoxin (in sedentary/ HF patients) | | Check renal function; toxicity risk with low $K^+$ or drug interactions |
| **Rhythm control** | Amiodarone | Sotalol, flecainide* | Monitor QT, thyroid, liver, lung; avoid sotalol in severe renal impairment; flecainide only in structurally normal heart |
| **Anticoagulation** | Warfarin | DOACs (apixaban, rivaroxaban, dabigatran) | Warfarin: INR target 2–3; DOACs: adjust dose for renal function, avoid strong CYP3A4/P-gp interactions |
| **Emergency AF with haemodynamic compromise** | | Direct electrical cardioversion ± IV amiodarone | Immediate hospital referral |

scores should not be used to decide on starting or withdrawing oral anticoagulation; rather, they help flag and address modifiable bleeding-risk factors.[21]

While anticoagulation decisions in AF should be guided by the $CHA_2DS_2$-VA and HAS-BLED scores, the practical selection of therapy is shaped by the characteristics of each agent, as detailed in Table II, highlighting the trade-offs between efficacy, safety, monitoring requirements, and accessibility in the South African context.

## Adverse effects and monitoring

All anticoagulants carry a risk of bleeding, and pharmacists play a crucial role in educating patients about recognising warning signs such as melena, haematuria, and unexplained bruising. Notably, a recent systematic review and meta-analysis found that pharmacist-led interventions reduced the risk of total bleeding by 25% and significantly lowered hospitalisation or readmission rates compared with usual care.[26] Do not withhold or withdraw DOAC on the basis of a bleeding-risk score alone; instead, optimise modifiable risks (e.g., uncontrolled hypertension, interacting drugs, excess alcohol) as recommended by ESC 2024.

Before initiating direct oral anticoagulants (DOACs), it is essential to assess renal function and to repeat this assessment at least annually.[21]

Drug–drug interactions require careful consideration: warfarin interacts with numerous agents, including antibiotics, antifungals, and antiretrovirals (ARVs), while DOACs should be avoided in combination with strong CYP3A4 or P-glycoprotein (P-gp) inhibitors such as ketoconazole and ritonavir, or with potent inducers like rifampicin and carbamazepine.[27]

In practice, pharmacists must balance adverse effect risks and monitoring requirements with therapy selection; Table III highlights these options, underscoring the importance of pharmacist input in tailoring AF management to patient-specific needs.[26,28,29]

## Pharmacist's role in AF care

Pharmacists play a critical role in the care of patients with AF by providing comprehensive education on the indication, dosing, side-effects, and the importance of adherence to prescribed therapy.[27,29] For patients on warfarin, pharmacists must ensure regular INR monitoring and actively check for potential drug interactions, including those with antiretrovirals (ARVs), tuberculosis (TB) medications, and herbal products such as St John's Wort.[27-29] Counselling should extend to lifestyle modifications, including alcohol moderation, weight management, and blood pressure control.[21]

Additionally, adverse drug reactions, including those related to interactions or complementary therapies, must be reported to the South African Health Products Regulatory Authority (SAHPRA), in accordance with national pharmacovigilance guidelines.[31]

Pharmacists play a pivotal role in anticoagulation management, with evidence from a UK retrospective observational study showing that pharmacist-led care reduced inappropriate DOAC

prescribing from 24.5% to 1.7% and improved bleeding risk profiles, reflected in lower HAS-BLED scores.[29]

In daily practice, pharmacists can use a quick-check framework: confirm anticoagulation need using the $CHA_2DS_2$-VA score; assess bleeding risk via the HAS-BLED score and counsel on bleeding warning signs; review all medicines for interactions, including over-the-counter and herbal products; ensure appropriate monitoring, for example, INR for warfarin, renal function for DOACs, and ECG for patients on anti-arrhythmics; and reinforce patient education on adherence, symptom recognition, and lifestyle measures.[26,29,30]

## Conclusion

AF is a growing health burden in South Africa, with important implications for stroke prevention and healthcare resource allocation. Pharmacists, as accessible healthcare professionals, are essential in optimising anti-arrhythmic and anticoagulant use, improving adherence, minimising risks, and ensuring early detection of complications. Expanding DOAC access, improving public awareness, and integrating AF care into chronic disease management programmes will be key to improving outcomes.

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