

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 CHA₂DS₂-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 arrhythmia² 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 capacity⁶ 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 studies¹² 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 context²²

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

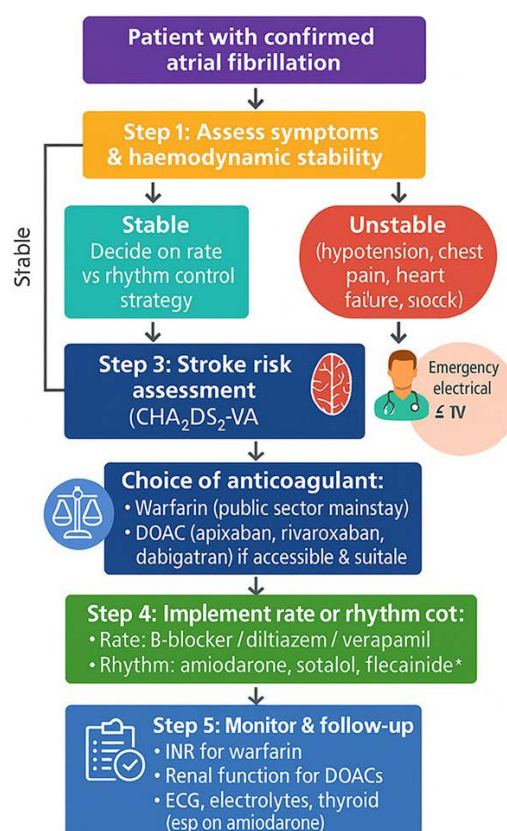
The overall goal of treatment is to improve survival, reduce incidence of stroke, restore atrial functions, reverse ultrastructural remodelling and improve symptoms.¹⁷ The gold standard integrated care strategy is the Atrial Fibrillation Better Care (ABC) for AF management. AF should be confirmed and 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 therapy²¹

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 CHA₂DS₂-VA score. DOAC is recommended for CHA₂DS₂-VA ≥ 2 and should be considered for CHA₂DS₂-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 Africa²⁰

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 perspective³⁰

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 CHA₂DS₂-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 CHA₂DS₂-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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References

- Hindricks G, Potpara T, Dagres N, et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS) The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. *European Heart Journal*. 2021;42:373-498. <https://doi.org/10.1093/eurheartj/ehaa612>.
- Lippi G, Sanchis-Gomar F, Cervellin G. Global epidemiology of atrial fibrillation: an increasing epidemic and public health challenge. *International Journal of Stroke*. 2021;16:217-21. <https://doi.org/10.1177/1747493019897870>.
- Keates AK, Mocumbi AO, Ntseke M, Sliwa K, Stewart S. Cardiovascular disease in Africa: epidemiological profile and challenges. *Nature Reviews Cardiology*. 2017;14:273-93. <https://doi.org/10.1038/nrcardio.2017.19>.
- Cheng S, He J, Han Y, et al. Global burden of atrial fibrillation/flutter and its attributable risk factors from 1990 to 2021. *Europace*. 2024;26:euae195. <https://doi.org/10.1093/europace/euae195>.
- Roth GA, Mensah GA, Johnson CO, et al. Global burden of cardiovascular diseases and risk factors, 1990-2019: update from the GBD 2019 study. *Journal of the American College of Cardiology*. 2020;76:2982-3021. <https://doi.org/10.1016/j.jacc.2020.11.010>.
- Jacobs MS, van Hulst M, Adeoye AM, Tieleman RG, Postma MJ, Owolabi MO. Atrial fibrillation in Africa-an under-reported and unrecognized risk factor for stroke: a systematic review. *Global Heart*. 2019;14:269-79. <https://doi.org/10.1016/j.gheart.2019.04.003>.
- Minja NW, Nakagaayi D, Aliku T, et al. Cardiovascular diseases in Africa in the twenty-first century: gaps and priorities going forward. *Frontiers in Cardiovascular Medicine*. 2022;9:1008335. <https://doi.org/10.3389/fcvm.2022.1008335>.
- Olowoyo P, Okekunle AP, Asowata OJ, et al. Prevalence of hypertension in Africa in the last two decades: Systematic review and meta-analysis. *Cardiovascular Research*. 2025;cvaf125. <https://doi.org/10.1093/cvr/cvaf125>.
- Chandiwana N, Venter WF, Manne-Goeher JM, et al. Obesity is South Africa's new HIV epidemic. Health and Medical Publishing Group (HMPG). 2024:1-4.
- Agbor VN, Aminde LN, Tianyi F-L, et al. Atrial fibrillation among adults with heart failure in sub-Saharan Africa-prevalence, incidence and all-cause mortality: a systematic review and meta-analysis protocol. *BMJ Open*. 2019;9:e022320. <https://doi.org/10.1136/bmjopen-2018-022320>.
- Zühlke L, Watkins D, Engel ME. Incidence, prevalence and outcomes of rheumatic heart disease in South Africa: a systematic review protocol. *BMJ Open*. 2014;4:e004844. <https://doi.org/10.1136/bmjopen-2014-004844>.
- Noubiap JJ, Nyaga UF. A review of the epidemiology of atrial fibrillation in sub-Saharan Africa. *Journal of Cardiovascular Electrophysiology*. 2019;30:3006-16. <https://doi.org/10.1111/jce.14222>.
- Wang T-F. To anticoagulate, or not to anticoagulate, that is the question in patients with fall risks. *Research and Practice in Thrombosis and Haemostasis*. 2025;102963. <https://doi.org/10.1016/j.rpth.2025.102963>.
- Verdecchia P, Angeli F, Reboldi G. Hypertension and atrial fibrillation: doubts and certainties from basic and clinical studies. *Circulation Research*. 2018;122:352-68. <https://doi.org/10.1161/CIRCRESAHA.117.311402>.
- Sliwa K, Carrington MJ, Klug E, et al. Predisposing factors and incidence of newly diagnosed atrial fibrillation in an urban African community: insights from the Heart of Soweto Study. *Heart*. 2010;96:1878-82. <https://doi.org/10.1136/hrt.2010.206938>.
- Nweke M, Mshunqane N. Characterization and stratification of risk factors of stroke in people living with HIV: A theory-informed systematic review. *BMC Cardiovascular Disorders*. 2025;25:405. <https://doi.org/10.1186/s12872-025-04833-2>.
- Kingma J, Simard C, Drolet B. Overview of cardiac arrhythmias and treatment strategies. *Pharmaceuticals*. 2023;16:844. <https://doi.org/10.3390/ph16060844>.
- Ritchie LA, Penson PE, Akpan A, Lip GY, Lane DA. Integrated care for atrial fibrillation management: the role of the pharmacist. *The American Journal of Medicine*. 2022;135:1410-26. <https://doi.org/10.1016/j.amjmed.2022.07.014>.
- Bonny A, Ngantcha M, Scholtz W, et al. Cardiac arrhythmias in Africa: epidemiology, management challenges, and perspectives. *Journal of the American College of Cardiology*. 2019;73:100-9. <https://doi.org/10.1016/j.jacc.2018.09.084>.
- Mouton JP, Blockman M, Sekaggya-Wiltshire C, et al. Improving anticoagulation in sub-Saharan Africa: What are the challenges and how can we overcome them? *British Journal of Clinical Pharmacology*. 2021;87:3056-68. <https://doi.org/10.1111/bcp.14768>.
- Van Gelder IC, Rienstra M, Bunting KV, et al. 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS) Developed by the task force for the management of atrial fibrillation of the European Society of Cardiology (ESC), with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Endorsed by the European Stroke Organisation (ESO). *European Heart Journal*. 2024;ehae176.
- Jardine R, Fine J, Obel I. A survey on the treatment of atrial fibrillation in South Africa. *South African Medical Journal*. 2014;104:623-7. <https://doi.org/10.7196/SAMJ.8111>.
- Veale EL. Pharmacy-led management of atrial fibrillation: improving treatment adherence and patient outcomes. *Integrated Pharmacy Research and Practice* 2024;101-14. <https://doi.org/10.2147/IPRPS397844>.
- DoH. South African Medicine Price Registry (MPR): Single Exit Price (SEP) database [online]. Available at: <https://medicineprices.org.za/>. Accessed 15 October.
- DRP. Government Employees Medical Scheme (GEMS). Drug Reference Price List: October 2025 [online]. Available at: <https://gems.gov.za/en/Healthcare-Providers/Formularies-List/2025-Formularies-Files?year=2025>. Accessed 15 October 2025.
- Kefale B, Peterson GM, Mirkazemi C, Bezabhe WM. The effect of pharmacist-led interventions on the appropriateness and clinical outcomes of anticoagulant therapy: a systematic review and meta-analysis. *European Heart Journal-Quality of Care and Clinical Outcomes*. 2024;10:488-506. <https://doi.org/10.1093/ehjqcco/qcae045>.
- Wiggins BS, Dixon DL, Neyens RR, Page RL, Gluckman TJ. Select drug-drug interactions with direct oral anticoagulants: JACC review topic of the week. *Journal of the American College of Cardiology*. 2020;75:1341-50. <https://doi.org/10.1016/j.jacc.2019.12.068>.
- Steffel J, Collins R, Antz M, et al. 2021 European Heart Rhythm Association practical guide on the use of non-vitamin K antagonist oral anticoagulants in patients with atrial fibrillation. *Ep Europace*. 2021;23:1612-76. <https://doi.org/10.1093/europace/euab065>.
- Sharma R, Hasan SS, Gilkar IA, Hussain WF, Conway BR, Ghori MU. Pharmacist-led interventions in optimising the use of oral anticoagulants in patients with atrial fibrillation in general practice in England: A retrospective observational study. *BJGP Open*. 2024;8. <https://doi.org/10.3399/BJGPO.2023.0113>.
- Joglar JA, Chung MK, Armbruster AL, et al. 2023 ACC/AHA/ACCP/HRS guideline for the diagnosis and management of atrial fibrillation: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*. 2024;83:109-279. <https://doi.org/10.1016/j.jacc.2023.08.017>.
- Guideline For Adverse Drug Reactions (ADRs) Reporting for Healthcare Professionals. SAH-PGL-CEM-PV-06: SAHPRA, 2022.