ECONOMIST IMPACT

Atrial Fibrillation

Improving care pathways to meet the rising burden across the Asia-Pacific region

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About this Report

Atrial Fibrillation—Improving care pathways to meet the rising burden across the Asia-Pacific region is an Economist Impact report, sponsored by Johnson & Johnson MedTech in Asia Pacific. The report provides an independent analysis of Atrial Fibrillation's (AFib) growing burden in the Asia-Pacific region. The report evaluates the state of AFib care in five countries in the region (China, India, Japan, South Korea and Australia), discusses the gaps and challenges in patient care, and identifies opportunities for healthcare stakeholders to improve health outcomes for AFib patients and mitigate the impact on healthcare systems. The insights in this report are based on an extensive literature review and desk research, expert panel discussions, and in-depth interviews with relevant clinical experts, scientific leaders, policy stakeholders and patient advocates. The editorial team at Economist Impact would like to thank the following individuals (listed alphabetically) for generously contributing their time and insights, which have been critical to the creation of this report:

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Executive summary

Atrial fibrillation (AFib) is the most common cardiac arrhythmia (heart rhythm disorder) among adults. The condition can be diagnosed during routine cardiac screening because of new-onset symptoms or as an incidental finding in asymptomatic individuals.

The prevalence of AFib in the Asia-Pacific region has increased in recent decades and this trend looks set to continue. By 2050, it is estimated that 49 million men and 23 million women in the region will carry a diagnosis of AFib.[1] There are multiple factors contributing to the rising prevalence of AFib in the region, which include: an ageing population; a rise in the incidence of risk factors for AFib, such as obesity, hypertension, metabolic syndrome and diabetes; enhanced detection; and increased survival with chronic diseases, including greater survival among patients with AFib.

This report provides a snapshot of the status of and challenges along the care pathway for patients with AFib in five Asia-Pacific countries (Australia, China, India, Japan and South Korea). Despite the differences in diagnostic methods and clinical settings, the countries were chosen to generate a representative sample across parameters such as per capita income, population size, AFib prevalence, and structural features of health systems.

Through rigorous desk research and in-depth discussions with relevant clinical and policy stakeholders, as well as patient advocates, Economist Impact identified checkpoints for intervention in the AFib care pathway that could help improve patient outcomes and lower healthcare costs.

Key insights from our research include:

AFib's silent nature has lethal consequences. One of the most significant challenges in addressing the AFib burden is that the condition occurs in a silent or asymptomatic form in about 30% of the patients.[2] As a result, AFib is often only diagnosed after a clinical consequence such as stroke or heart failure. People with AFib have a five-fold increase in their risk of stroke and heart failure, emphasising the need to identify patients with AFib early so they can manage their condition appropriately and prevent such events from occurring.

The health and economic burden is growing, but solutions exist to mitigate it. While the health and economic burden of AFib varies between countries due to various factors (such as AFib epidemiology, the relative ageing of the population, and structural features of their public health systems etc), the overall trend is clear—the burden is increasing across

the five countries of study. In Australia, AFib-related hospitalisations increased 295% between 1993 and 2013, with AFib hospitalisation costs rising from US$37m in 1997 to US$286m in 2013.[3] A similar trend was observed in Korea where AFib-related hospitalisations increased by 420% between 2006 and 2015.[4] These increases are indicative of the pitfalls in AFib care. These include a lack of early intervention, suboptimal treatment as a result of inconsistent or variation in treatment strategies, poor disease management, and unsuccessful primary prevention efforts.

Once diagnosed, various cost-effective treatment options are available to help address the hospitalisation burden highlighted above. Treatment strategies include controlling the heart rate, restoring the heart's natural rhythm through medical, surgical, or minimally invasive procedures, using anticoagulants to reduce the risk of thromboembolic events including stroke, and addressing underlying risk factors such as hypertension, diabetes, and obesity. The choice of treatment depends on a range of factors, including the patient's age, the type of AFib, presence of reversible causes, and patient preference. The various treatment strategies have been shown to improve patients' quality of life, increase survival rates and reduce the societal burden of AFib.

In the aftermath of the covid-19 pandemic, there is a heightened level of scrutiny on the cost of care, particularly as patients resume regular medical check-ups after prolonged periods of irregular check-ups due to covid-19 lockdowns. Substantial integrated efforts in the Asia-Pacific region are needed to ensure patients are diagnosed earlier and have access to timely and effective treatment for AFib to attenuate the subsequent individual and social costs.

There is a lack of awareness of AFib.
There is a general lack of awareness of AFib and its consequences amongst the public, frontline healthcare professionals, and policymakers. Despite improved diagnosis and treatment options for AFib, patients diagnosed with AFib often decline therapy or have poor adherence to treatment, putting them at increased risk of complications. In addition, experts from China noted that some primary care physicians (PCPs) are reluctant to prescribe anticoagulants due to perceived bleeding risk.

Significant variability exists in how policymakers have prioritised AFib in their countries. While there is an increasing focus on non-communicable diseases (NCDs) among policymakers, attention to AFib is still lagging in countries such as India, Australia and Japan, possibly due to the lower prevalence rates compared to other NCDs and budgetary constraints. On the other hand, in 2019, China began establishing dedicated AFib care centres in an effort to streamline the diagnosis and management of the disease.

There is inadequate emphasis on primary prevention.
Several modifiable risk factors such as obesity, excessive alcohol use, hypertension, diabetes, and obstructive sleep apnoea increase the risk of AFib. However, there is inadequate emphasis on preventing and controlling these risk factors through lifestyle modification and pharmacological means. Targeting risk factors through primary prevention is paramount to AFib care, especially in resource-poor or remote settings where screening can be a challenge.

A lack of consensus means screening protocols and practice varies across the region.
There is no universal consensus on the optimal screening mechanism for AFib, as evidenced by the diverse international recommendations on AFib screening. While AFib guidelines in Australia and South Korea recommend single-lead ECG for screening for people aged ≥65 years, this is not implemented consistently in clinical practice

due to lack of awareness and logistical, time and budgetary constraints for PCPs. In Japan, an ECG exam is included in the government and employers' annual health checks, but the elderly do not consistently avail of this option. There is no standard protocol for AFib screening in China and India. However, the covid-19 pandemic increased self-monitoring and self-referrals of heart rhythm abnormalities, especially in the private sector. With the Asia Pacific Heart Rhythm Society's (APHRS) recent publication of a three-tiered AFib screening recommendation structure, which takes into account different country characteristics, there is now a better framework for developing screening protocols in individual countries.

Care pathways in AFib management need to integrate primary care better.
The need for better integration of PCPs into AFib care pathways to improve rates of anticoagulant use and optimise health outcomes emerged as a common thread across all countries studied. This was of particular significance in China, India and Australia, where large rural populations experience difficulties accessing specialists. Empowerment of PCPs in the management of AFib could be enhanced by:

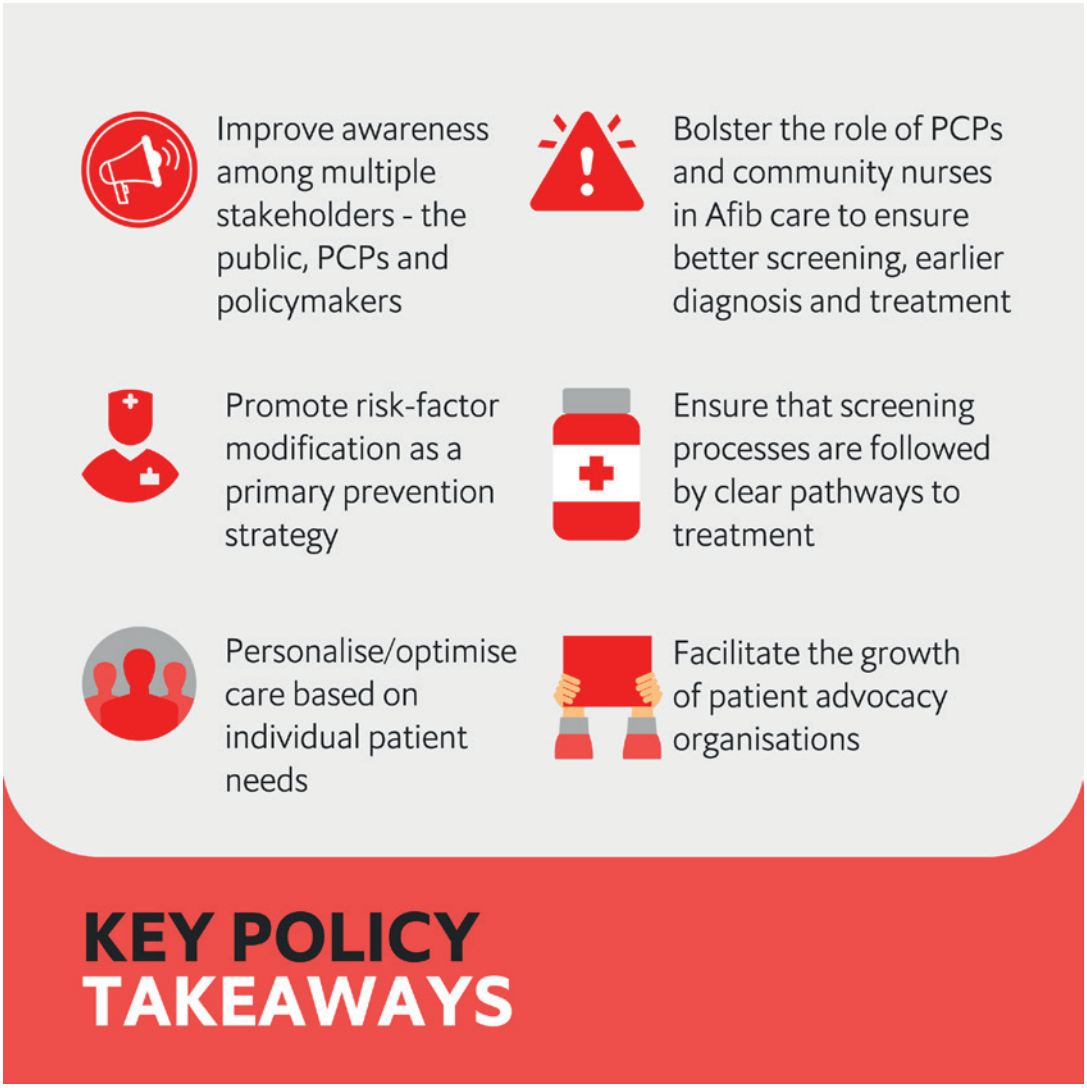
- Development of concise guidelines targeted at PCPs
- Improving access to continuing education activities regarding AFib including through e-learning platforms
- Developing electronic decision-making tools for AFib management
- Doctor-to-doctor telehealth support from specialists for PCPs managing complex AFib scenarios

These strategies may also facilitate individualised and patient-centric care.

Lack of integration of e-health modalities impairs AFib management.
Empowering patients in the self-management of their chronic conditions has been associated with several benefits, including increased patient satisfaction with care, improved patient adherence to treatment and better clinical outcomes. This is particularly relevant given the proliferation of wearables and other e-health modalities that could complement physician-led care across the continuum from diagnosis to lifestyle modifications and disease management.

The application of digital health technologies is rapidly growing across a vast range of chronic NCDs. The use of mobile phones and other wearable sensors has increasing implications for screening and diagnosis of AFib in real-world situations. The use of mobile health technologies in patient education and ongoing follow-up will facilitate better health outcomes. However, challenges remain in the form of data security concerns, medico-legal and billing issues, integration with electronic medical records, and digital divides across demographics. Still, the untapped potential of e-health technologies shows promise for improving AFib care. In addition to such technological aids, patient advocacy organisations can be nurtured and supported better in the five countries of study to promote patient engagement and awareness of AFib.

Given these insights, our research of AFib care pathways in five countries in the Asia-Pacific region has revealed six key policy takeaways:



Chapter 1: A Brief Epidemiology of AFib

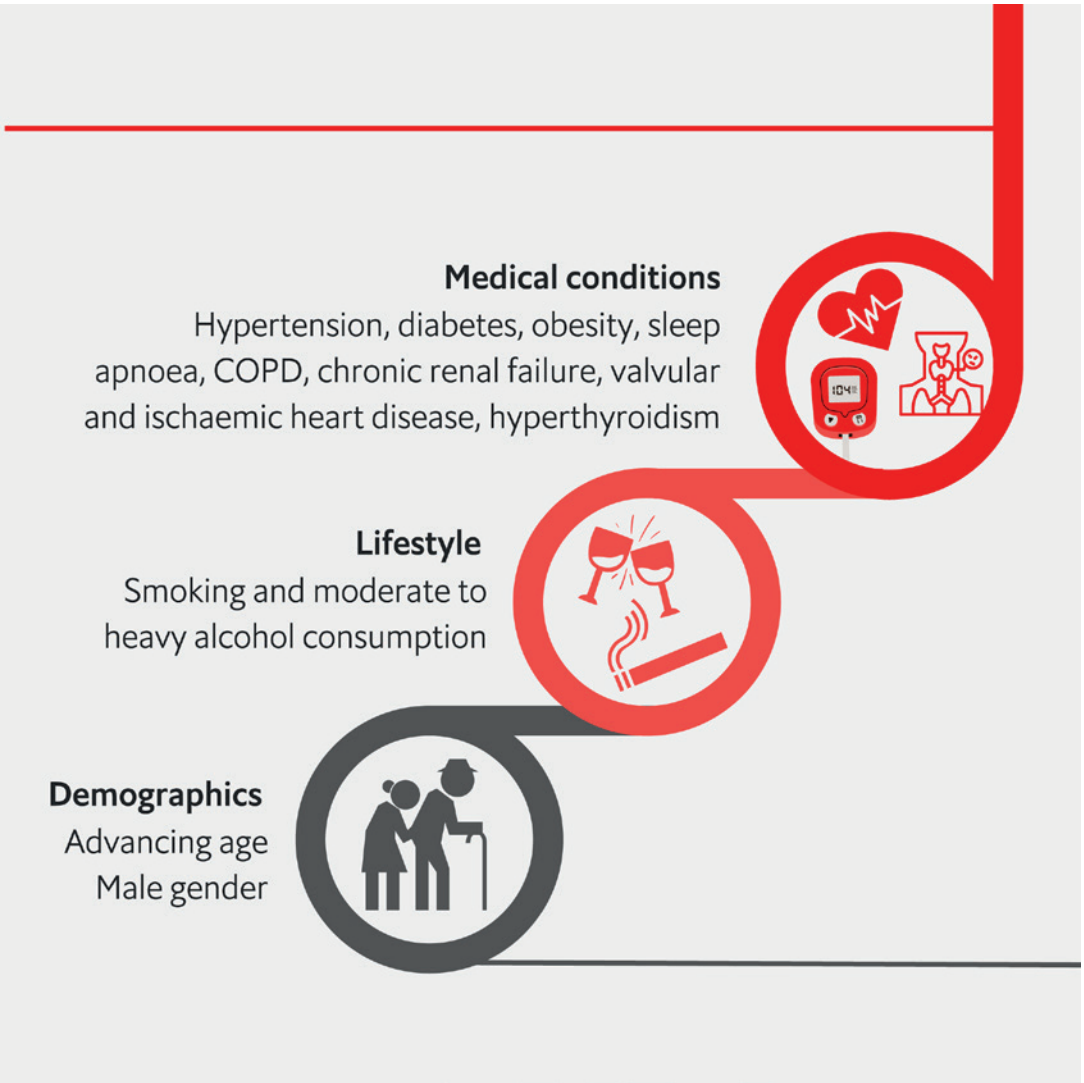
Atrial Fibrillation, also known as AFib, is the most common heart arrhythmia (irregular and often rapid heartbeat) in adults and a significant risk factor for ischaemic stroke, heart failure, and cognitive decline.[6] The diagnosis of AFib involves recording a consistently irregular rhythm of the atria (upper chambers of the heart) using an electrocardiogram (ECG). Based on the persistence of arrhythmia, AFib is usually classified as follows[7]:

- **Paroxysmal AFib:** episodes that terminate spontaneously within 7 days, with or without intervention
- **Persistent AFib:** episodes that last longer than 7 days, including those that have been terminated by medications or electrical cardioversion (electricity is used to return the heart to its normal rhythm)
- **Long-standing persistent AFib:** AFib that has lasted for at least 12 months despite the use of rhythm control strategies
- **Permanent AFib:** chronic AFib, where no further attempts to restore or maintain normal heart rhythm are to be made

AFib is a progressive disease, with one-quarter of patients with paroxysmal AFib developing sustained (persistent or permanent) AFib within five years.[8,9] As AFib progresses, so do the risks and complications for downstream cardiovascular events, highlighting the importance of early intervention to help prevent disease progression and improve the quality of life and health outcomes for people with AFib.

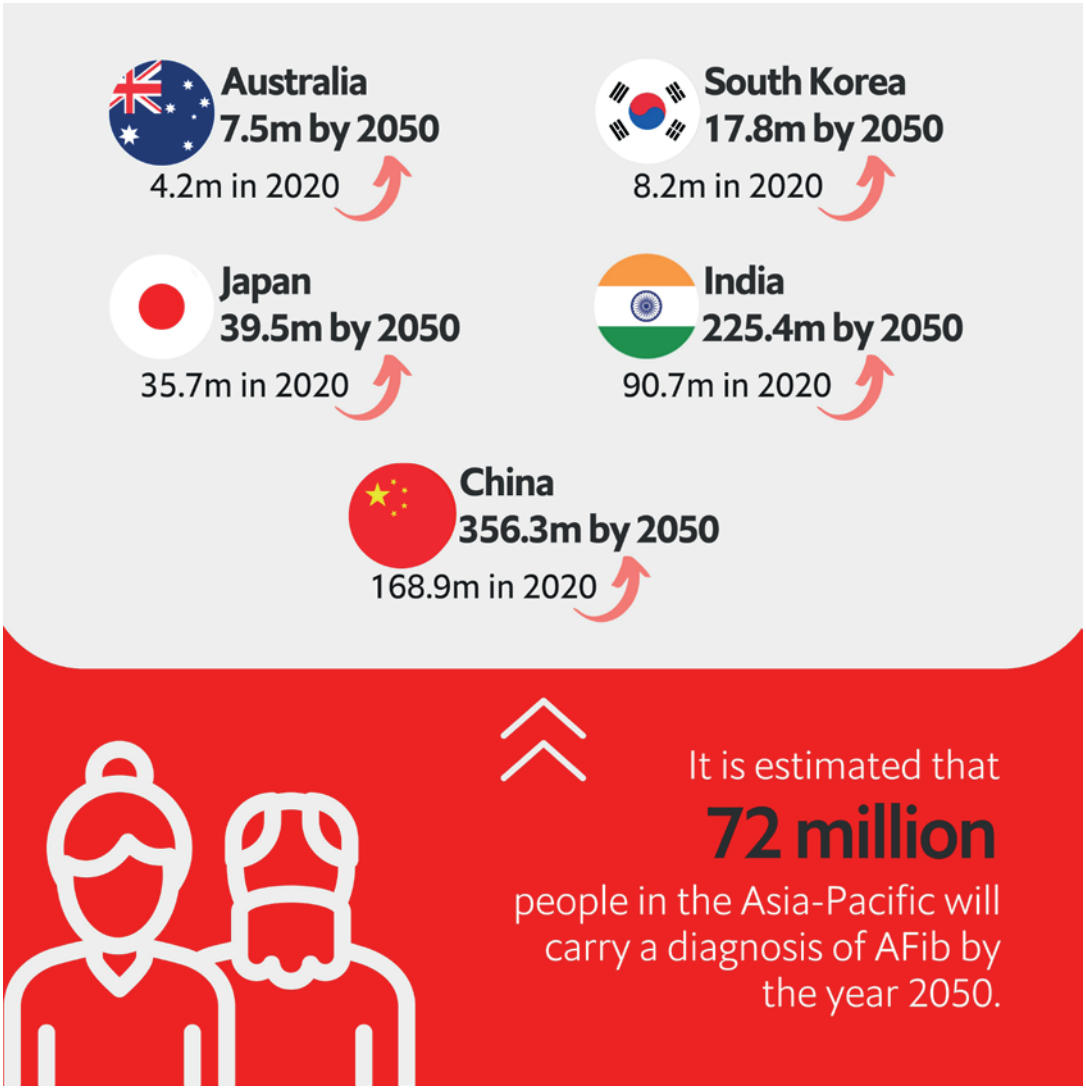
The exact underlying causes of AFib are unknown. However, several lifestyle, demographic and clinical risk factors have been identified including: advancing age, high blood pressure, diabetes, obesity, obstructive sleep apnoea, hyperthyroidism, ischaemic or valvular heart disease, moderate to high alcohol use, and smoking (Figure 1).[10]

Figure 1: Risk factors for AFib



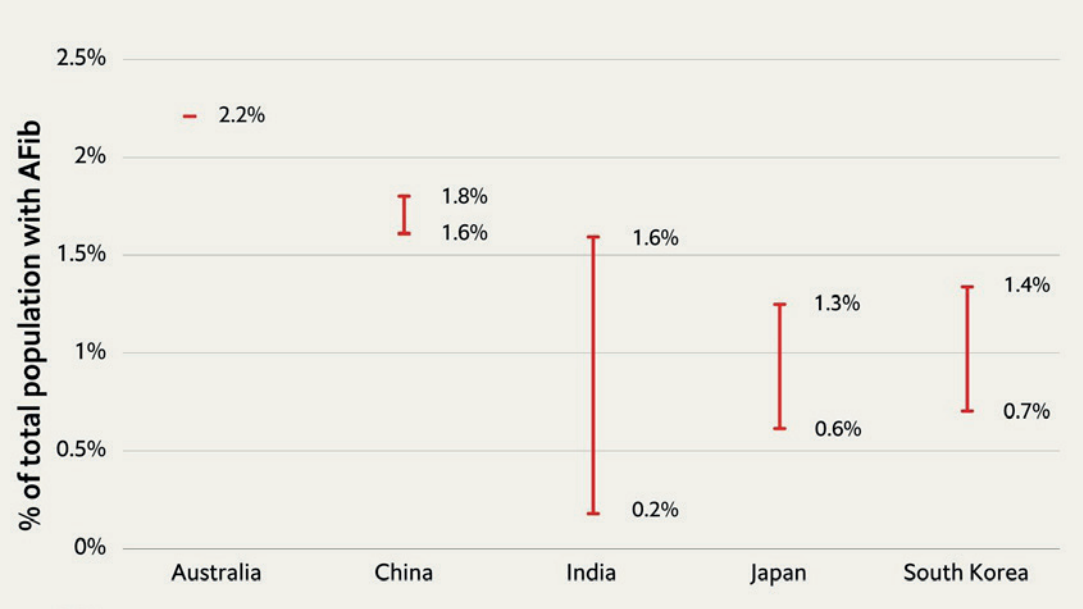
The prevalence of AFib has increased more than two-fold in the last two decades, and is predicted to rise by over 60% by the year 2050. In the Asia-Pacific region alone, it is estimated that about 72 million people will have AFib by the year 2050, primarily due to an increase in the ageing population. Between 2020 and 2050, the population aged 65 years and above is projected to grow by 148% in India, 117% in South Korea, 110% in China, 79% in Australia, and 10% in Japan (Figure 2).[11] A concomitant rise in risk factors such as obesity, hypertension, and diabetes, as well as higher detection rates due to improved awareness and screening are expected to further contribute to the rise in AFib prevalence.[12]

Figure 2: Estimated increase in the over-65 population, between 2020 and 2050



The estimates of the prevalence of AFib in our countries of analysis range from 0.2% to 5.4%. Australia has one of the highest prevalence rates of AFib worldwide—an estimated 2.2% of adults and 5.4% of adults aged 55 years and over in Australia suffer from AFib.[1, 13, 14]

Figure 3: Prevalence rates of AFib in countries of study[14-23]



Note: Figure is created based on publicly available data. Different age groups and catchment populations (rural versus urban) were used in the studies estimating prevalence from the different countries.

Between 1993 and 2013, AFib-related hospitalisations in Australia increased by 295%.[3] About 25% of ischaemic strokes in Australia have an underlying diagnosis of AFib, and patients with AFib-related strokes have a significantly higher mortality rate than patients without AFib.[24]

In China, the estimated prevalence of AFib is 1.6 to 1.8%.[15, 16] Prevalence of AFib has increased 20-fold and AFib-related stroke 13-fold between 2001 and 2012 in Southwest China.[5]

Studies from South Korea demonstrate an overall prevalence of AFib between 0.7% and 1.4%. Remarkably, hospitalisations for AFib increased by 420% between 2006 and 2015.[4, 21, 25]

Estimates of the prevalence of AFib in India range between 0.2% and 1.6% across different studies.[17-19] The average age of AFib diagnosis in India is 55 years, a decade lower than the global average, likely due to a high prevalence of rheumatic heart disease-related AFib.[26]

The overall prevalence of AFib in Japan is estimated to be between 0.6% and 1.3% of the population.[22, 23] However, the prevalence increases with age and approaches 3 to 4.7% in those over 80 years old.[22, 27] With the rising ageing population and increasing risk factors for AFib, especially obesity among males, the prevalence of AFib in Japan is expected to further increase in the next couple of decades.[28]

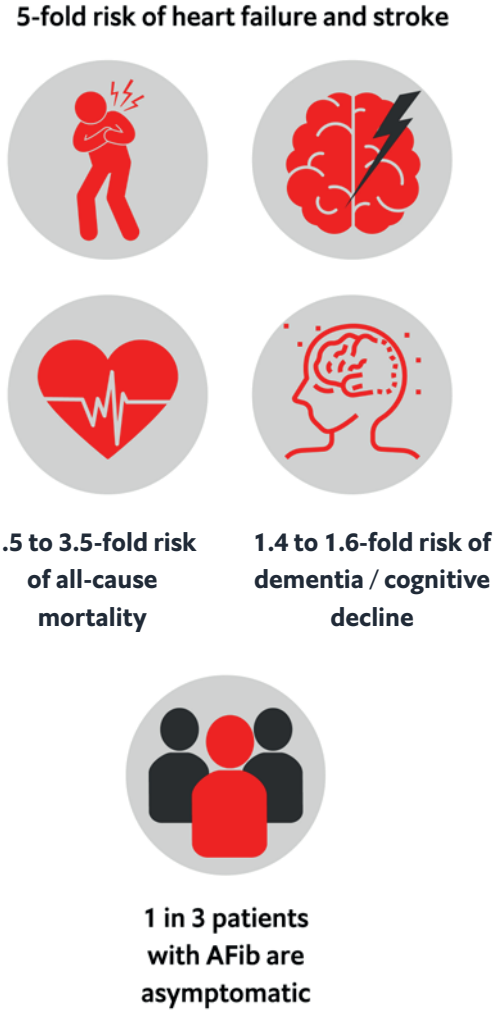
Once diagnosed, treatment strategies for AFib include controlling the heart rate, restoring the heart's natural rhythm through medical, surgical, or minimally invasive procedures, using anticoagulants to reduce the risk of thromboembolic events including stroke, and addressing underlying risk factors such as hypertension, diabetes and obesity. The choice of treatment depends on the patient's age, the type of AFib (paroxysmal versus persistent), presence of reversible causes and patient preference.[29]

Chapter 2: Why Should We Care about AFib?

The rising prevalence of AFib has both human and economic costs. For patients, untreated AFib has several health consequences. In addition to suffering symptoms such as palpitations, shortness of breath and chest pain, which impact their quality of life, patients with AFib have a five-fold increase in their risk of ischaemic stroke due to blood clots. A quarter of ischaemic strokes are associated with underlying AFib.[30] Furthermore, stroke is more debilitating in patients with AFib as an underlying condition. In Asia, 1 in 5 heart failure patients has concomitant AFib; it is estimated that AFib leads to a five-fold increase in the risk of heart failure. Patients with AFib have a 1.5- to 3.5-fold increase in mortality compared to the general population mainly due to increased risk of stroke and heart failure.

AFib is a risk factor for more than just cardiovascular conditions such as stroke and heart failure—there is growing evidence that it is also a risk for cognitive decline and dementia. AFib is associated with a 2.4-fold and 1.4-fold increase in the risk of dementia in patients with or without a history of stroke, respectively.[31]

AFib occurrence may be reduced by primary prevention strategies targeting cardiovascular risk factors. In addition, effective treatment can mitigate the progression of AFib to complications. Stroke risk, for example, can be decreased by about 65% if AFib is detected early and managed according



to guidelines.[32] However, a significant challenge is that AFib occurs in a silent or asymptomatic form in about 30% of patients and is often only diagnosed after a clinical consequence occurs.[2]

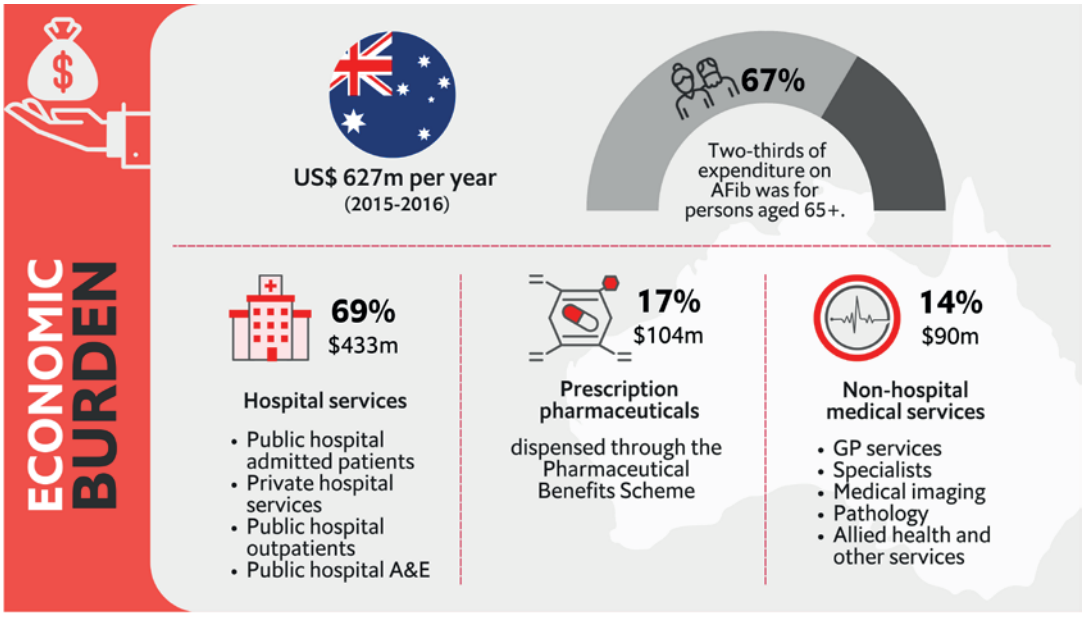
A costly problem

In addition to the impact AFib has on individuals' health, it imposes tremendous costs on national healthcare systems, including direct costs (hospitalisations, outpatient visits, laboratory tests, prescription medications and long-term care) and indirect costs (work productivity losses of patients and caregivers). These costs vary based on several factors such as the relative ageing of the populations, the prevalence of the condition and its downstream complications, as well as structural features of the healthcare system.

The Australian Burden of Disease Study 2015 quantified the national expenditure due to AFib and classified this into various categories (Figure 4). Hospital expenses accounted for almost 70% of the costs, 17% went towards prescription medications, and 14% was spent on primary care, specialist services, allied health, imaging and pathology services.[33] Public hospital inpatient costs alone accounted for about 37% of the expenditure, suggesting that AFib-related complications may have contributed significantly to the overall expense. With the ageing population and rising overall contribution of AFib to the cardiovascular disease burden (3.7% in 2003 to 6.9% in 2015), the economic impact of the disease is expected to increase further in the future. These data included in Figure 4 are estimates of direct costs. In Japan, Prof Kamae's team estimated the direct medical costs for AFib to be US$1-1.4bn per year.[34] Superimposed on these estimates are indirect costs due to productivity losses of patients and caregivers.

Indeed, the complications of AFib come with a substantial health and economic cost for multiple stakeholders – patients and their loved ones, health systems and wider society. Figure 5 highlights estimates of the economic burden of AFib-related stroke in China and India, though it should be noted that the costs reported in the Indian study were based on a sample of private sector hospitals.[35, 36] The financial burden of stroke on health systems and societies is enormous. Recent, large-scale studies in China estimate the annual medical cost of stroke to be US$1,655—2,819 per patient.[37, 38] Patients with AFib experience more severe stroke, and with it, they incur a greater economic burden

Figure 4: Estimated spend on diagnosis and treatment of AFib in Australia[33]

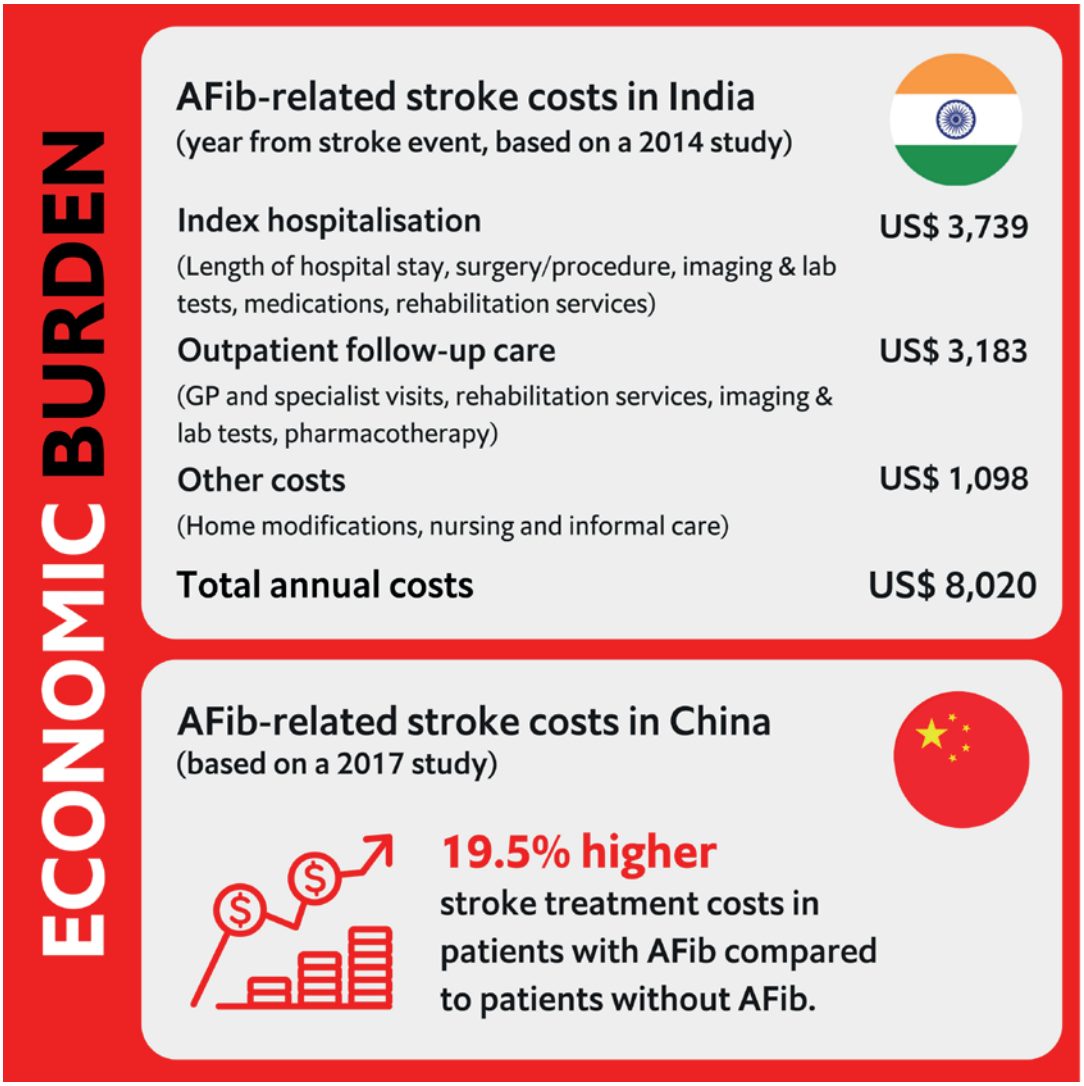


than stroke patients without AFib. In line with international estimates, a study in China highlighted that stroke treatment costs in patients with AFib were almost 20% higher than in those without AFib. Researchers conducted a retrospective study using an insurance claims database examining the economic burden of ischemic stroke in patients with or without AFib. Patients with AFib were found to incur significantly greater inpatient and outpatient costs, have a longer hospital length of stay and more frequent outpatient visits than those without AFib. These data emphasise the need for effective management of AFib and prevention of stroke in this high-risk population.

Policy responses diverge

Despite the significant current and future health and economic burden, there are varying levels of awareness and prioritisation of AFib among policymakers in the five countries studied. In India, for example, according to Dr Anil Saxena, Director of Cardiology at Fortis Escorts Heart Institute, "The focus of policymakers is still very much on communicable diseases. In recent years, more attention has been paid to non-communicable diseases (NCDs), but more can be done in the space of AFib. I believe that

Figure 5: Economic burden of AFib-related stroke in China and India[35, 36]



professional bodies should interact with the government to improve the focus on AFib." A further challenge in India is that awareness and action by policymakers vary widely across states. As Professor Justin Paul Gnanaraj, Head of the Cardiology Unit, Institute of Cardiology at Madras Medical College explains, "In the public sector, the nationwide National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) program includes screening for hypertension and diabetes. School health programs include screening for rheumatic heart disease and AFib. However, there is state-to-state variation in the extent of implementation of these programs and more harmonisation is essential."

A similar neglect of AFib by policymakers is common in Australia, albeit due to a competing focus with other NCDs rather than communicable diseases, according to our expert interviewees. "Heart failure is the most common cause of hospital admissions in the elderly population and costs a lot of money. While AFib is common, it is mostly managed on an outpatient basis so there hasn't been the same imperative to support programmes and generate more awareness of AFib in the general community, despite it being responsible for about 25% of strokes," explains Professor John Amerena, Director at Geelong Cardiology Research Unit in Victoria.

China and South Korea, on the other hand, have been responding to the rising rates of AFib on a national level. Dr Wei Zhang, Shanghai Jiaotong University School of Medicine, informs of recent changes to address AFib, stating that "Before 2019, there were 'chest pain centres' and 'heart failure centres' in China. These are traditional cardiovascular diseases, but with the increasing prevalence of AFib and by accumulating data on the cost of AFib and AFib-related stroke, the government extended its experience with the chest pain centres and heart failure centres to standardise treatment protocols for AFib nationwide. Now, I think there are already three or four hundred AFib centres around the country, and so more and more AFib patients can receive appropriate care."

In South Korea, the government's acknowledgement of and action on AFib can be seen in its move to widen financial coverage to include treatment with Novel Oral Anticoagulants (NOACs) and catheter ablation treatment of AFib. According to Associate Professor Nam Kyun Kim, Department of Thoracic and Cardiovascular Surgery at Yonsei University in Seoul, this is due at least in part to the guidelines published and disseminated by the Korean Heart Rhythm Society (KHRS), driving the message that "AFib is not merely a geriatric disease but also a threat to wider society".

According to Prof Isao Kamae, Professor of Health Policy and Technology Assessment at the Graduate School of Public Policy, University of Tokyo, the lower rates of AFib in Japan do not translate to low levels of awareness. He explains that "There is significant awareness of the health consequences of AFib among policymakers in Japan. However, conversations regarding optimising care pathways are heavily focused on balancing budgetary implications."

The heterogeneity in both the epidemiology and the costs associated with AFib, as well as the diverse attitudes of policymakers and the structural differences of the health systems across the countries analysed for this report, necessarily implies the need for different care management strategies across these jurisdictions. The next section is an overview of the care pathways in place for AFib in the five countries, followed by an investigation of the gaps, and finally an idenfication of some opportunities for improvement.

Chapter 3: Current Care Pathways for AFib and the Barriers to Better Care

The health systems of the five countries analysed in this report are at varying stages of development, making it both challenging and inappropriate to directly compare their care pathways. However, some common patterns, as well as critical differences, in the management of AFib across the care continuum from primary prevention to screening, treatment and specialist care have been identified and are elucidated in this section.

Primary prevention of AFib

There are several modifiable risk factors for AFib, including obesity, sleep apnoea, hypertension, diabetes, excessive alcohol use and smoking. Besides low-cost primary prevention strategies such as weight management, first-line pharmacological therapies for risk factors (including beta-blockers, renin-angiotensin system inhibitors and lipid-lowering agents such as statins) could play a significant role in the primary prevention of AFib.[39]

In India, for example, sleep apnoea and hypertension are common targets for management to head off the development of AFib in patients. Dr Saxena also recommends going farther upstream, explaining, "A lot of other lifestyle measures can be taken to prevent AFib including reducing the consumption of caffeine which almost everyone consumes in India. Obesity is also increasing in the affluent sections of society. Targeted interventions are required based on the population's needs."

Experts from all our countries under study concurred that while primary prevention strategies are employed to combat AFib, they need to be strengthened as key pillars in the management of the condition. Associate Professor Caleb Ferguson, Principal Research Fellow and Associate Head of School (Research) at the University of Wollongong (New South Wales, Australia), suggests that mass media and health promotion campaigns can be very useful in this regard. "We have to draw parallels to the 'FAST' messaging for stroke and do something similar for AFib. Primary prevention messaging around AFib, around the key risk factors, and how you can prevent AFib, would be something that could be quite easy in the community and also quite timely," says A/Prof Ferguson.

Screening for AFib

There is no universal consensus on the optimal screening mechanism for AFib, as evidenced by the diverse international recommendations.[40, 41] This becomes particularly relevant when one considers that AFib is often asymptomatic or non-specific in its presentation, making it difficult to diagnose.

A recent international consensus statement of the European Society of Cardiology recommends opportunistic screening using wearable devices in patients less than 65 years of age with one or more comorbidities or those ≥65 years with no comorbidities. Systematic screening with wearables

is recommended in patients ≥65 years with one or more comorbidities and for those ≥75 years. However, using wearables may be a challenge in resource-poor settings.

The Asia Pacific Heart Rhythm Society (APHRS) 2021 guidelines for AFib screening includes a three-tier recommendation system for different countries in the Asia-Pacific region. Opportunistic screening for all people aged ≥65 years and systematic screening for high-risk people aged ≥75 years using pulse palpation is recommended in all countries. Screening with a modified blood pressure monitor for the same target groups is recommended for most countries; finally, a handheld device with single-lead ECG, smartwatch ECG, or smartwatch photoplethysmography (PPG) is recommended for use in some countries.[22] The APHRS does not prescribe these recommendations for specific countries in the region, but rather tiers them for implementation based on unique clinical epidemiology, demographics, burdens, and resource constraints of individual countries.

Guidelines in Australia and South Korea support opportunistic screening of people over 65 years of age at the point of contact using an ECG.[42, 43] In Australia, the Heart Health Check program covers people aged ≥45 years (≥30 years for Aboriginal and Torres Strait Islanders) without known history of cardiovascular disease. Ms Tanya Hall, founder and CEO of hearts4heart, a patient advocacy organisation in Melbourne, Australia, suggests that explicitly including a pulse check in this program will significantly improve AFib screening rates. She reflects on a pilot screening program launched in Australia using a portable ECG device in pharmacies to record ECGs and transmit them to cardiologists for evaluation. "Achieving alignment between the interests of the pharmacist and general physician would be key to larger implementation and success of this program," says Ms Hall.

Our literature review was not able to retrieve local consensus or official recommendations of such screening practices in China, India or Japan. However, discussion with experts has shed some light on the gaps between guidelines and ground realities. In China, Prof Guo informs us that screening guidelines are currently being developed, and hoped they will by finalised and published in the near future. Dr Zhang explains that, "The government supports annual ECG checks in patients over 65 years of age, but there are large differences in screening practices between Tier 1, Tier 2, and Tier 3 hospitals." Dr Yanbo Liu, Cardiology fellow at the Peking Union Medical College Hospital, further reiterates the variability in clinical practice, saying, "Many health checks offered by employers include single-lead ECGs, and we do 12-lead EKG routinely for all check-ups. However, we don't do continuous monitoring for people without any symptoms for AFib screening."

In India, the lack of specific screening for AFib could be due to a number of reasons, including differential access to ECGs within and across the states' health systems, according to Prof Gnanaraj. "There are logistical and cost implications for taking screening devices such as portable ECG machines into remote communities. We have screening programmes for hypertension and diabetes, utilising significant manpower and resources. So, if we implement these programmes well and harvest the rewards, that will be helpful and cost-effective in simultaneously reducing the burden of AFib."

In Japan, the lack of opportunistic or systematic screening for AFib could be because the condition is included in the annual health check-ups available to the whole population, according to Professor Kyoko Soejima, Chair of the Department of Cardiovascular Medicine at Kyorin University, Tokyo, Japan. "There is no uniform method for AFib screening adopted in clinical practice in Japan. However, all employees are entitled to have free annual health checks that include an ECG. Retirees are also covered by government insurance for the same," explains Prof Soejima. Some elderly patients, however, miss their annual health check-ups and fall through the cracks, and are only diagnosed when they experience a clinical consequence such as stroke. There is no move to conduct systematic screening for AFib, possibly because the rates of AFib in Japan are some of the lowest in the world—this makes justifying the costs of population-wide screening harder.

According to Prof Kamae, the cost-effectiveness of screening "depends on the local setting, the population being targeted, and the success in administering treatment following the diagnosis". Prof John Amerena notes that "Since the percentage of patients diagnosed through screening is relatively low and most of those diagnosed are asymptomatic, we are encouraging opportunistic screening by general practitioners (GPs) to check the pulse and follow up with an ECG as this is likely to be a more cost-effective screening method." A/Prof Kim adds that to support the cost-effectiveness of screening, "it is essential to ensure the accuracy of the devices used". Integrating AFib screening into NCD screening and care pathways is an alternate strategy. Whether screening, diagnosing, and treating asymptomatic patients improves their health outcomes meaningfully is a question that remains to be answered.[44]

"Not all patients diagnosed with AFib actually seek specialist care due to various personal and logistical reasons. And for those that do see specialists, considerable time may elapse before the evaluation."

Prof Isao Kamae,
Project Professor, Health Policy and Technology Assessment,
Graduate School of Public Policy, University of Tokyo, Japan

Care pathways for AFib

In Australia, South Korea and Japan, GPs facilitate the initial diagnosis of AFib and then refer patients to specialists for management plans or further care. Prof Amerena describes the system in Australia where once a diagnosis of AFib is made by a GP, community-based physicians or nurses, the patient is referred for a cardiology assessment; GP referrals are required for subsidised specialist care. Management plans devised by the cardiologist are implemented by the GP.

Similar practice is seen in South Korea where patients identified to have AFib by GPs are referred to cardiologists or electrophysiologists for management. More emphasis is typically placed on rhythm control rather than rate control strategies in South Korea, according to Professor Ki-Hong Lee, Department of Cardiovascular Medicine, Chonnam National University Hospital, Guangju, South Korea.

In Japan, patients identified with AFib by the GP or through the annual health check-up are encouraged with a letter of referral to visit a cardiologist and undergo assessment, although it is not free. "Not all patients diagnosed with AFib actually seek specialist care due to various personal and logistical reasons. And for those that do see specialists, considerable time may elapse before the evaluation," notes Prof Kamae.

In India's federal system, there is significant diversity in care pathways between states, as well as great disparity between the public and private sector. In the private setting, patients are diagnosed by GPs or internists and referred to cardiologists or directly to electrophysiologists. Occasionally, patients who have identified a rhythm abnormality, usually with wearables, will self-refer to a cardiologist. In the public setting, AFib referrals come from GPs to cardiologists. "Only about 0.1% of referrals to the public sector cardiology outpatient clinic in the State of Tamil Nadu in India are specifically for a diagnosis of AFib," highlights Prof Gnanaraj.

The situation in China is slightly different; GPs typically make the initial diagnosis of AFib and, if specialist access is limited, may also be the primary providers of AFib care. However, Dr Zhang notes that "GPs in China have limited awareness of the importance of anticoagulation in AFib management and limited access to medications and other equipment for the treatment of AFib." In the AF-CATCH study, which Dr Zhang was part of, 183 patients with AFib were identified out of 4,531 participants screened at community health centres. Of these, 103 patients with AFib were available to follow up at 12 months and only 17 patients attended specialist clinics, with just 4 receiving oral anticoagulants (OACs). Of the 71 patients that

continued to attend community health centres, none were prescribed OACs.[45] According to Dr Liu, "Patients are easily able to make appointments with the specialists of their choice in secondary and tertiary hospitals through a web-based app. However, since these appointment slots are made easily available to the public, often they fill up very quickly." Furthermore, accessing specialists for in-person appointments can be a challenge for patients living in remote parts of China.

Clinical care guidelines are produced and updated routinely based on the best available scientific advice to guide the treatment of a disease and formalise standards of care. Catheter ablation is one area of the AFib care pathway which has seen recommendations evolve in these guidelines in recent years in an effort to keep pace with the latest evidence. In 2021, the European Society of Cardiology published guidelines that recommend catheter ablation as a first-line therapy in AFib patients where tachycardia-induced cardiomyopathy is highly probable. It may also be considered as first-line care in selected patients with heart failure and reduced ejection fraction.[7] Similarly, in 2021, the National Institute for Health and Care Excellence (NICE) updated its guidelines on the management of AFib, adding a recommendation for "radiofrequency point-by-point ablation in patients with symptomatic paroxysmal or persistent AFib where drug treatment was unsuccessful, unsuitable or not tolerated".[46]

However, awareness about this treatment strategy is inadequate in the primary care sector, which means that candidates for this treatment can often be missed. Prof Amerena informs us that referral to electrophysiologists is most often made when young patients present with paroxysmal AFib. Dr Liu

notes that his centre performs ablation for patients with persistent and symptomatic AFib or those at risk for developing heart failure. Prof Soejima opines that awareness of catheter ablation among GPs is low and patients may often be referred only when they have persistent and symptomatic AFib.

The electrophysiologists interviewed considered catheter ablation to be cost-effective when compared to long-term rhythm control and anticoagulation medications. However, in 10-40% of the patients, AFib may recur due to persistent pulmonary vein-triggered AFib and in these patients, the procedure may not be as cost-effective.

Efforts have also been made by different institutions to optimise care during catheter ablation procedures. A/Prof Kim notes that his institution uses a pre- and post-procedure checklist to ensure patient safety and optimal care. At Prof Soejima's institution, monthly programmes are conducted over zoom to connect with physicians that have referred patients for catheter ablation and update them on patient outcomes. Often these meetings are combined with lectures on the role of catheter ablation in AFib management.

Several studies and meta-analyses have found that same-day discharge (SDD) is safe, cost-effective, and does not result in greater readmission rates for AFib patients who undergo catheter ablation.[47, 48] In three of our countries of interest (China, Japan and South Korea), patients are typically hospitalised for three days and two nights for the procedure. This practice appears to tie into logistical considerations, and because the full stay is reimbursed by national insurance. Therefore, there is less incentive for patients to shorten their stay—but it may be a measure to lower costs for the healthcare system as the economic burden of AFib rises.

Patient empowerment using e-health tools

The application of digital health technologies is growing across a vast range of chronic NCDs. The use of mobile phones and other wearable sensors

have increasing implications for screening and diagnosis in real-world situations, and they have growing applicability in self-monitoring as well as educational tools for patients.[49-51]

In the context of AFib, there are various trials with e-health technologies being conducted in the countries analysed for this report—but none reported routine use in clinical practice. Prof Lee informs that, "Various projects are in development in Korea, and government leaders have an e-health strategy to encourage not just large enterprises but also start-ups to enter this sphere." In India, Dr Saxena notes that, "With the advent of the pandemic, increased home monitoring using blood pressure machines and pulse oximeters has made patients more aware of cardiac rhythm abnormalities, and this has resulted in improved identification and care-seeking behaviour for AFib in the private medical sector."

Many of our experts were cautiously optimistic about the untapped potential of wearables and other e-health modalities to improve the diagnosis and monitoring of AFib, but also identified causes for concern, such as data security and ambiguity in medical liability issues and the potential to exacerbate inequities. "The ageing population, who are most vulnerable to AFib, might not have access to a smartphone or be able to afford the data-packs. These are then key issues, which we really need to consider in any recommendations on e-health," says A/Prof Ferguson. This is a particularly key issue in Australia, where internet access is among the most expensive in the world.[52]

Chapter 4: Pulse Check: How Can We Improve AFib Care?

Generating awareness of AFib among different stakeholders

Symptoms of AFib such as light-headedness, exercise intolerance and fatigue can sometimes be non-specific, making the condition difficult to diagnose. As highlighted earlier, AFib can be silent or asymptomatic in about a third of the patients and is often only diagnosed after a clinical consequence occurs. The underdiagnosis of this condition is further exacerbated by a lack of awareness among the public as well as important stakeholders in healthcare, such as PCPs and policymakers.

To illustrate this gap in health literacy regarding AFib, 28% of 53,128 respondents surveyed for a study in Japan reported that they had no knowledge of AFib.[53] In China, Prof Yutao Guo, Professor of Internal Medicine, Department of Cardiology, Chinese PLA General Hospital, Beijing highlights that, "While screening can be quite effective, young asymptomatic patients tend to be reluctant to pursue care for their diagnosis despite being educated on the consequences." Dr Zhang notes that such low awareness of AFib and its consequences, especially among the elderly, rural inhabitants, and those of lower socioeconomic status or lower education levels, highlights the importance of educating the public.

The panel of experts convened for this report concurred with this finding of lack of public awareness of the condition and its consequences, and further iterated that there is a similar dearth of knowledge about the burden of AFib among the medical fraternity outside of heart specialists, particularly with regards to the efficacy of anticoagulant therapies. Given that PCPs, community doctors, and nurses are often the first and regular points of contact for patients, bridging this gap in awareness across the care continuum, and actively recruiting these frontline professionals into diagnosing and providing AFib care, could have an outsized impact on health outcomes. Therefore, enhanced education and training of PCPs and community healthcare professionals are of paramount importance.

A/Prof Ferguson's team in Australia has piloted smartphone-based education modules for healthcare providers. A pilot study with nurses reported that a mobile Health (mHealth) intervention improved knowledge of AFib and anticoagulant use by 54% post-intervention, and significantly increased their use of stroke and bleeding risk assessment tools.[54] A/Prof Ferguson informed Economist Impact that more pilots are ongoing with clinicians and that some implementation challenges include time constraints for clinicians, providing appropriate incentives, and scaling such interventions.

The role of professional bodies and patient advocacy organisations in improving awareness among patients, physicians and policymakers cannot be overstated. Ms Mellanie True Hills,

Founder and CEO of StopAfib.org, says that her organisation "works to improve awareness among patients and their loved ones regarding the importance of lifestyle in managing AFib, as well as about AFib treatments and how to consult with specialists to access them".

Ms Hills highlights the crucial role of their online presence and how StopAfib.org has reached AFib communities globally, informing that, "In addition to more than 2,000 pages of content at StopAfib.org (including a Get Started Learning About AFib Guide), we created a discussion forum for patients to support each other, which now has over 88,000 threads (and is a rich archive of information). Our library has more than 100 hours of video content, including patient conference recordings, webinars, and masterclasses. Doctors in the Asia-Pacific region were introduced to this website resource during the APHRS medical conference in 2015 and 2018. The site has been translated into about 108 languages." In Australia, Ms Hall notes that "Efforts have been made by patient advocacy groups to improve awareness of AFib by running AFib awareness week, conducting free screening for AFib and holding events in the parliament to raise awareness among policymakers."

Improving screening for AFib and incorporating e-health modalities

Our research suggests that significant variability exists in the guidelines for screening for AFib. In addition, clinical implementation of screening procedures is not consistent. Experts convened for our analysis agreed that screening mechanisms for AFib ought to be devised and deployed based on their cost-effectiveness in different local settings. They also agreed that risk stratification of the population would be an effective way to screen for the condition regardless of the context.

The recent publication of APHRS's three levels of recommendations for screening for AFib in different countries of the Asia-Pacific region, optimised for the local healthcare system, patient population and cost-effectiveness is a positive step towards harmonising practice. While the underlying principle of AFib screening is that early detection will enable management changes to potentially prevent AFib's progression and complications, there is no evidence yet that greater detection with wearables will necessarily lead to better patient outcomes.

Various studies have also explored artificial intelligence (AI) as a potential means to diagnose AFib or predict AFib occurrence from single-lead or standard 12-lead ECGs to reduce demands on the healthcare system and physicians. More research is needed in this regard to assess the reliability and external validity of this modality.[55, 56]

The untapped potential of wearables

With the expanding use of consumer wearables for screening and their inclusion in the APHRS guidelines, their role in screening needs to be considered. In the Apple Heart Study, 0.5% of the 400,000 participants (aged ≥22 years) were identified to have an abnormal heart rhythm by the smartwatch using a PPG sensor. Of these, 84% were confirmed to have AFib on ECG tracing.[51] In the Chinese mAFA-II program using similar technology with wearable devices, about 180,000 individuals aged over 18 years were studied. An abnormal heart rhythm was noted in 0.23% of participants, of which 87% were confirmed to have AFib.[50]

In another recent mammoth study in China, 2.8 million participants were screened for AFib while 960,000 were concurrently screened for sleep apnoea. Twelve thousand people (0.4%) received a notification for suspected AFib, of which 5,000 followed up with a telehealth appointment which confirmed their diagnosis.[57] The wearables used across each study demonstrated an impressive ability to identify people with AFib successfully. However, how this technology will affect outcomes and whether it will be cost-effective is a crucial question for future research.

Prof Guo, Principal Investigator in the mAFA-II program, is enthusiastic about what wearables can do for AFib care, explaining, "I believe this

technology will contribute to cost-effective primary prevention and maybe we could improve the AFib care pathway before the patient suffers complications such as heart failure or stroke." However, to facilitate the integration of consumer-led screening into AFib care, Prof Soejima and Prof Lee emphasise that efforts must be directed at ensuring the integration of data into electronic health records. In addition, referral pathways and medico-legal considerations with the use of wearables for screening need to be clearly delineated.

Enhancing the role of GPs and nurses in AFib management

Increasing awareness and education of GPs regarding diagnosis and management of AFib is crucial, especially in countries like China, India and Australia with large rural populations that face logistical constraints in accessing specialist care. While guidelines for AFib management have been drafted in all countries, widespread dissemination of these guidelines may be lacking—and an area for improvement. It is also important to ensure that guidelines are developed with the target physician population in mind (GP versus specialist), taking into consideration their time constraints. This is particularly important in targeting GPs who have multiple guidelines across different illnesses to stay updated with. As Prof Amerena explains, "The guideline for management of AFib from the Heart Foundation is targeted towards cardiologists rather than GPs and it is an all-encompassing document. It is a document that most cardiologists are aware of, that is used to get guidance on a specific question or as a reference document, but is less likely to be read completely because of its size."

Continuing medical education programs, especially utilising technology, can be very effective in facilitating quick knowledge updates for GPs. Electronic decision-making tools can be utilised to support GPs in patient management. Additionally,

specialists may further support GPs through doctor-to-doctor telehealth consultations, especially in the management of more complex scenarios.

Nurses could also play a bigger role in the management of AFib, particularly in the community. As Prof Amerena points out, it is a model of care that has proven quite successful in managing hypertension and mitigating heart failure. "One model we used for hypertension was having nurses checking blood pressure in shopping malls and recommending a physician evaluation for abnormal readings." A similar model where a nurse performs a single-lead ECG for AFib could work well, but one needs to consider the legal liabilities that may be inherent to such nurse-led care in different geographies. As A/Prof Kim explains, in Korea, the law severely restricts what nurses can do on their own. "Clinical nurse specialists can manage the emotional and social problems of patients, but they cannot prescribe or dispense medication such as anticoagulants. I think our country needs to be more flexible about the role of clinical nurse specialists," opines A/Prof Kim. Experts noted that nurse specialist-led programs are being piloted in Australia and China to improve coordination of AFib care and maintain communication with patients between follow-ups.

Optimising treatment for AFib

Different, and sometimes contrasting, approaches were suggested by experts to optimise AFib care. One was to integrate AFib care pathways into existing care pathways for other NCDs that garner more attention, such as hypertension and diabetes. Another was to develop specialised clinics for AFib care. The choice between integration versus specialisation would depend on the resource constraints and healthcare system organisation of the country. The integration of AFib care into other chronic NCDs care pathways was suggested by experts for limited-resource settings to reduce duplication of services, improve coordination of care and optimise resource allocation.

"The 'A' and 'B' part of the integrated ABC pathway is good in China, more patients are detected and can receive standardised therapy. However, in practice, the 'C' of risk factor reduction is still limited."

Dr Wei Zhang,
Department of Hypertension, Ruijin Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

Specialised AFib care clinics have been piloted in Australia. According to Prof Amerena, the wait-time in the public sector in Australia to see a cardiologist for a newly diagnosed patient with AFib can be up to six months, although early-access clinics are starting to emerge. Some patients opt to see a private cardiologist expeditiously but often incur an out-of-pocket expense for this. The AFib care clinics being piloted, on the other hand, are run by groups of cardiologists interested in AFib management, and patients are offered early appointments with no out-of-pocket cost. Management plans are provided with subsequent GP follow up. "Ensuring an adequate referral base for sustaining the clinic would be an important consideration for success", says Prof Amerena.

The application of e-health modalities to augment specialist access would also be of benefit to patients. Dr Liu notes that in China, following an initial in-person visit, patients can easily access specialist follow-up remotely through telehealth consultations. In India, Dr Saxena mentions that such practice, while it has always been existent in an informal fashion, is gradually becoming more manifest and formalised, especially in the private medical sector.

In 2017, the **A**trial Fibrillation **B**etter **C**are (**ABC**) pathway was proposed as an integrated, structured approach to AFib management, designed around the following elements:

A—**A**void stroke using oral anticoagulation

B—**B**etter symptom management with a patient and symptom-focused approach

C—**C**ardiovascular and comorbidity risk factor reduction and management

The ABC pathway is associated with lower rate of stroke, cardiovascular deaths, and all-cause mortality.[58] The APHRS guidelines recommend the ABC pathway for AFib care. Of the countries studied in this report, only China and South Korea include the ABC pathway in their guidelines.

According to Dr Zhang, the ABC pathway for integrated AFib care in China is greatly aided by the set-up of AFib centres—but notes that there is room for improvement. "I think the 'A' and 'B' part of the integrated ABC pathway is good in China, more patients are detected and can receive standardised therapy. However, in practice, the 'C' of risk factor reduction is still limited," says Dr Zhang.

Enabling patient empowerment for better health outcomes

Empowering patients in the self-management of their chronic conditions has been associated with several benefits, including increased patient satisfaction with care, improved patient adherence to treatment, and better clinical outcomes. In order to achieve this, patient education is of critical importance. Furthermore, such education efforts can be more targeted for the most effective use of resources, and also include caregivers and patients' family members.

This is particularly relevant given the proliferation of wearables and other e-health modalities that could complement physician-led care for AFib. In India, Dr Saxena notes that, "Patient compliance can be improved only by educating the patients. Providing them with some digital tools may also help, but only after they've been educated on how to use them. Digital tools can remind patients, for example, on medication adherence, which is very useful for chronic conditions."

"Patient compliance can be improved only by educating the patients. Providing them with some digital tools may also help, but only after they've been educated on how to use them."

Dr Anil Saxena,
Director of Cardiology, Fortis Escorts Heart Institute, New Delhi, India

In Japan, Prof Kamae mentions the efforts of physicians in the private sector in disseminating information about AFib on educational websites.

mHealth modalities are being piloted by A/Prof Ferguson's group in Australia to improve patient awareness of AFib and its management.

Supporting the growth of patient advocacy organisations can also play an important role in empowering patients for better health outcomes. According to Ms Hills, "Patient advocacy and education organisations focused on AFib, of which there are few in Asia, can play a key role in improving awareness of the condition among the public and patients by providing trustworthy information. This, in turn, can lead to empowering people to recognise the signs of AFib to facilitate early detection and treatment and enabling existing patients to get the right care and treatment."

Chapter 5: Conclusion & Key Policy Takeaways

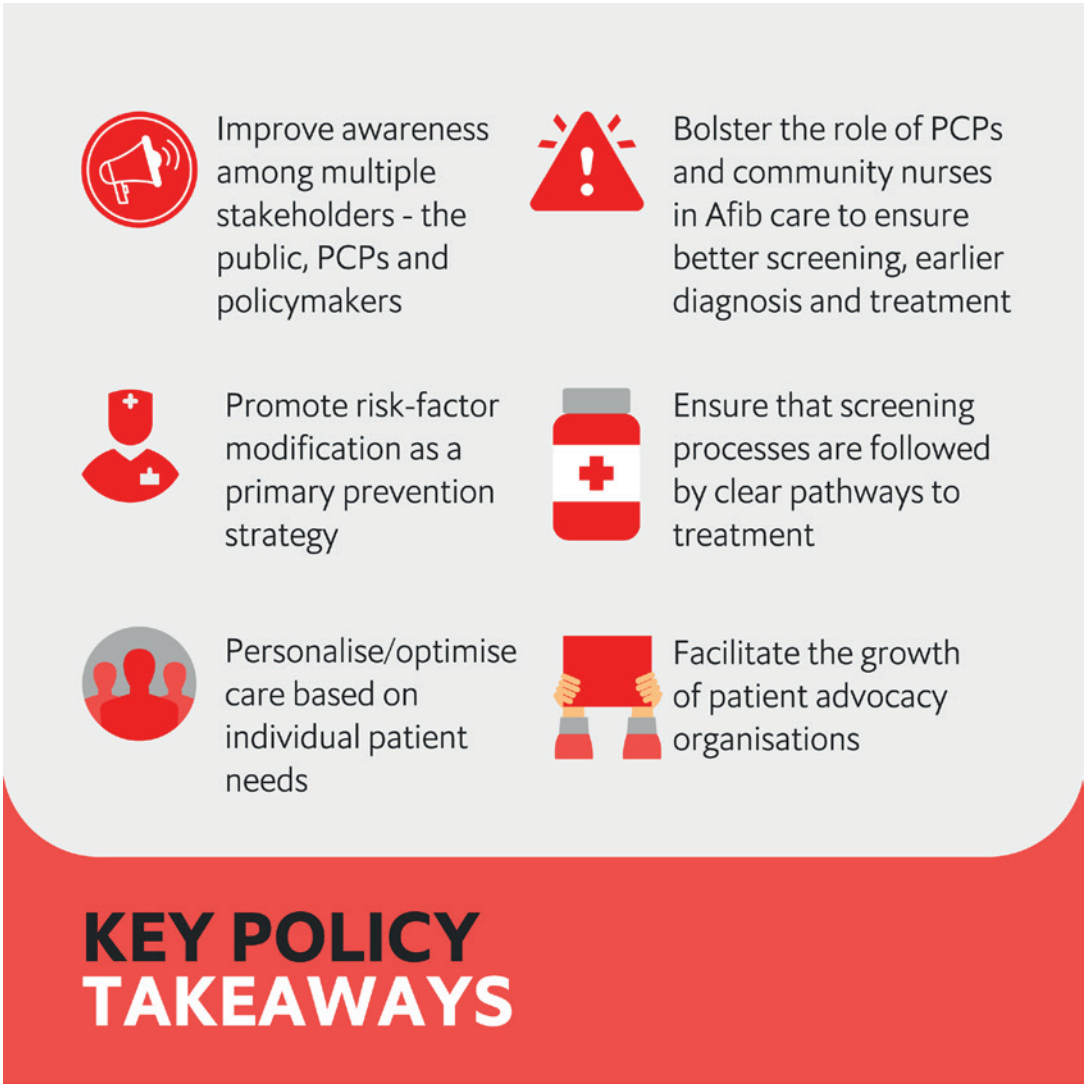
AFib is projected to affect over 72 million people in Asia by 2050.[1] Given that AFib is asymptomatic in a significant proportion of patients and is an important risk factor for stroke, heart failure and dementia, there are huge health and economic costs associated with the disease. In the five countries analysed for this report, we saw that health systems are increasingly recognising and responding to the 'silent' public health threat posed by AFib. However, there remain gaps that need to be addressed.

The first step to addressing a problem is acknowledging it—and the lack of awareness of AFib among multiple stakeholders is an important focus for action. Beyond traditional information campaigns, employing social media and technological advancements can significantly facilitate the generation of awareness among the public, primary care sector, and policymakers. Educating and integrating the primary care sector and nursing teams into AFib management, particularly with regards to the need for anticoagulation to prevent thromboembolic risk and identifying appropriate patients to refer for minimally invasive and/or surgical interventions, would greatly improve care outcomes. This can be achieved through better dissemination of tailored guidelines, continuing education programmes, and access to electronic decision-making tools for management.

Improving access to specialist care, especially in remote or underserved areas, could be achieved by harnessing telehealth modalities. Telehealth can be employed either for doctor-to-doctor consultations between GPs and specialists or for doctor-to-patient consultations during initial evaluation or follow-up. The proliferation of e-health tools and wearable sensors offers a huge opportunity to improve screening for AFib as well as ongoing follow-up, management and patient education. For successful deployment of these modalities, more efforts need to be made in streamlining their integration with electronic health records and clarifying medico-legal and reimbursement issues.

Finally, in resource-constrained contexts, cost-effectiveness becomes a key consideration when devising and implementing care strategies. Boosting awareness, empowering patients (and their caregivers), as well as heavily promoting primary prevention strategies such as risk factor modification, and secondary care led by nurses and PCPs are low-cost interventions that would have an outsized impact on the management of AFib.

Our research of AFib care pathways in five countries in the Asia-Pacific region has thus revealed six key policy takeaways:



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