



A review of atrial fibrillation (AF) and AF-related stroke public health policies

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Introduction

For many, a stroke will be the first sign of atrial fibrillation (AF), the most common heart arrhythmia worldwide affecting nearly 33.5 million individuals. However, this number is likely underestimated due to asymptomatic individuals remaining undiagnosed and unaware that their symptoms are a sign of AF.^{1,2} Individuals ≥ 65 years of age are disproportionately affected, and for people, ≥ 75 AF is the leading cause of stroke, a consequence of cardiovascular aging and age-related increases in comorbidities.^{3,4,5} Estimates suggest the undetected AF individual is five times more likely to suffer an AF-related stroke, a stroke with increased morbidity, mortality, and severe neurological deficits when compared to non-AF-related strokes.^{6,7} Moreover, with the aging global population, AF occurrence is predicted to more than double by 2030.⁸ Because AF patients present an elevated risk of having an AF-related stroke, improvements to screening, awareness, and prevention become essential to limiting the consequences of AF-related stroke and the associated healthcare costs.

While the physical burden is significant, AF and AF-related stroke also present enormous economic burden in both direct and indirect costs.^{9,10,11} Across Europe, the reported annual healthcare costs of AF range from €660–3,286 million (France: €1,942 million, Germany: €660 million, Italy: €3,286, and the UK: £1,307), accounting for 0.28–2.60% (France: 2.60%, Germany: 0.28%, Italy: 2.49, and the UK: 0.90–2.4%) of total healthcare spending.¹² This high cost of AF is largely attributable to hospitalizations and complications such as stroke.^{10,13} In Europe, the cost of AF-related stroke is 7–60% higher than the cost of stroke in patients without AF.¹²

Though medication to reduce the risk of AF-related strokes are now available and have reduced hospitalizations, there remains uncertainty around cost estimates and savings, despite positive incremental net benefits.¹⁴ Additionally, AF-related heart failure, hypertension, metabolic, and coronary disease are also associated with higher costs. A review of three US databases determined the total annual care costs of AF care were estimated at US\$6.65 billion, including US\$2.93 billion (44%) for AF hospitalizations, US\$1.95 billion (29%) for incremental inpatient costs of AF as a comorbid diagnosis, US\$1.53 billion (23%) for outpatient AF treatment, and US\$235 million (4%) for prescription drugs.¹⁵ Furthermore, economies suffer from indirect costs, loss of productivity associated with disability, long-term care requirements, and death. Consequently, these figures may significantly misrepresent the overall financial impacts as they fail to include other costs sustained in the community.

Understanding that the overall disease burden, costs, and AF-related stroke mortality is increasing globally, many countries have developed clinical practice guidelines outlining the management, and use of, anticoagulation medication for AF once the incident of AF-related stroke has occurred. Still, there remains limited emphasis on AF screening and awareness and AF-related stroke prevention, particularly prior to an AF-related stroke. Thus, highlighting the need for comprehensive government-supported policies and approaches that encourages increased screening and awareness of AF, and the prevention of AF-related stroke while also supporting the therapy/medication of AF patients to reduce their risk of AF-related stroke.

To better understand where public health policy deficits exist within the AF and AF-related stroke screening, awareness, and prevention landscape and how to best develop a health policy response, a qualitative literature review was conducted in ten countries with known AF clinical and public health interventions; respectively, Australia (AU), Belgium (BE), Canada (CA), France (FR), Germany (DE), Italy (IT), Spain (ES), Sweden (SE), United Kingdom (UK), and the United States (US).



This review focused on the following questions:

1. What are the barriers and challenges to developing comprehensive awareness and prevention policies for AF and AF-related stroke?
2. What are the characteristic features of countries that successfully implement awareness and prevention initiatives and policies, and can they be replicated in other countries?
3. What component(s) of a healthcare system plays the greatest role in policy development and adoption, e.g., research, advocacy, infrastructure, costs, other?

Methods

This qualitative analysis offers a review of AF and AF-related stroke screening, awareness, and prevention policies in ten countries: (AU, BE, CA, FR, DE, IT, ES, SE, UK, and US) with active AF and AF-related initiatives being conducted in the public domain. The search of policies was conducted per country, using a framework of four domains, “disease awareness,” “disease management,” “financial barriers,” and “health systems,” each with associated indicators, as illustrated in Figure 1.

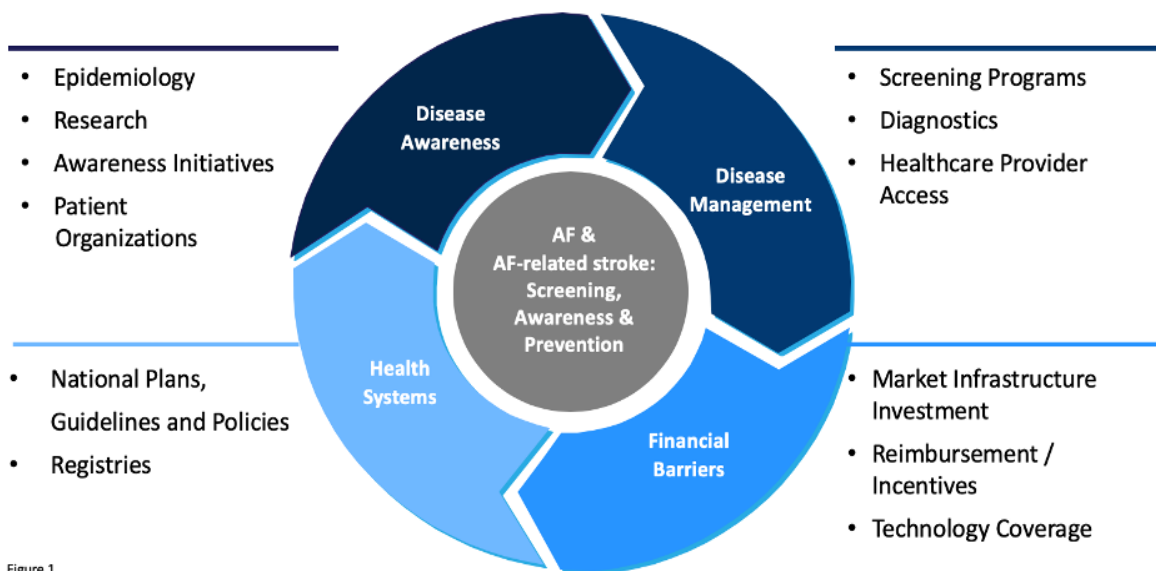


Figure 1.

The search of data combined different sources of information: (1) scientific literature; (2) governmental reports and national/regional documents, policies/guidelines; and (3) website data and databases of different national and international medical and advocacy organizations. Government reports and national/regional working documents and policies were collected in each country’s native language. In addition, websites and databases of varying national and international medical societies and advocacy organizations provided additional background to country-specific data and policies. The research also included qualitative regional and clustered country studies for assessing epidemiology, technology, and registry trends for the European countries.

After collecting per-country data, relevant findings were prioritized based on five criteria: (1) met the policy topics framework definition(s), (2) represented the most recent data, (3) strength and trustworthiness of sources, (4) findings based on the analysis of primary or secondary data including at least one of the countries of interest, and (5) addressed at least one research question. We used the technique of interpretive synthesis, reading and rereading the primary sources, and using narratives to



summarize key findings. The most trustworthy sources of information considered were official medical organizations and journal publications.¹⁶

In the last phase of the research, professionals were asked to assess whether the data in the country report represented accurate and correct data. Experts were chosen based on their background in AF and AF-related stroke at both the national and global levels.

Results

The results offer a collection of data focused on the policies of AF and AF-related stroke and the healthcare landscape that contributes to supporting policy development.

Health Systems

There is an established global community of AF experts that participate in developing clinical guidelines and policies outlining screening approaches to AF. However not all agree on the role of opportunistic (pulse palpation-based diagnosis) or systematic AF screening for people aged ≥ 65 years. Organizations supporting opportunistic screening include the European Society of Cardiology (ESC), the European Heart Rhythm Association, the Royal College of Physicians of Edinburgh, AF-SCREEN International Collaboration, the Canadian Cardiology Society (CCS), and, recently, the Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand.¹⁷ Yet, these organizations do not recommend implementing systematic population-level screening in asymptomatic patients, citing the cost implications, based largely on the findings of the SAFE study, and a lack of evidence that it is more effective than usual care.^{18,19}

While in the US, the American College of Cardiology (ACC), American Heart Association (AHA), and Heart Rhythm Society (HRS) make no recommendation about opportunistic screening for AF, but jointly with the American Stroke Association (ASA) recommend active screening with pulse palpation (followed by ECG as appropriate) in adults ≥ 65 years. Thus, indicating that most countries have adopted some form of clinical guidelines to support screening and medication determinations.^{20,21,22,23} However, even with endorsed guidelines, screening in the ten countries is not fully implemented, with reasons including lack of information, lack of in-hospital and in-clinic medical professional training, and time requirements to screen.²⁴ These findings were further supported when surveyed physicians responded that roughly only 13-18% of their patients ≥ 65 , not already monitored for AF, were routinely screened for AF by either pulse palpation or ECG.²⁵

At present there are a series of dedicated clinical guidelines that exist and address the diagnosis and management of AF, i.e., 2020 ESC Guidelines for AF, 2018 CCS focused update on the management of AF, the Cardiac Society of Australia and New Zealand AF clinical guidelines and the 2019 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation.^{26,27,28,29} In addition to the clinical guidelines, countries also utilize regional or countrywide stroke action plans, adopt national strategies, or noncommunicable disease and cardiovascular disease national plans that include AF screening and AF-related stroke prevention approaches to promote awareness further.^{30,31,32}

For an effective plan, recommendations should include continued research for AF, AF-related stroke prevention, therapeutics, and monitoring. Of all plans, the Action Plan for Stroke in Europe 2018-2030 (authored by the European Stroke Organization in collaboration with the Stroke Alliance for Europe), is the most comprehensive that addresses the aforementioned. It includes seven domains: primary prevention, organization of stroke services, management of acute stroke, secondary prevention, rehabilitation, evaluation of stroke outcome and quality assessment, and life after stroke.³³ It provides a road map and sets targets for the implementation of evidence-based preventive actions and stroke services until 2030 that includes AF and AF-



related stroke.

Six countries have AF/stroke national patient registries in place (AU, CA, DE, SE, UK, US); all ten participate in global AF registries, e.g., EORP-AF, GARFIELD-AF, and GLORIA-AF.³⁴ These population-based registries are available for the monitoring of patients affected by AF and stroke. Still, because AF remains undetected in a vast majority of individuals, registries have historically only captured newly diagnosed AF patients who suffer an associated health event.

Monitoring and surveillance data are crucial for understanding the scale of AF burden in each country, and to highlight potential gaps and inform policy development and national strategies around patient care. Therefore, if these countries and others seek to improve AF and AF-related stroke awareness, health information systems require strengthening to improve data collection.

Disease Awareness

Even with significant AF data, disease awareness among the public and general practitioners remains low. In the US, low health literacy is correlated with low AF awareness.³⁵ Studies indicate that individuals also fail to understand the associated risk of stroke with an AF diagnosis, and some who knowingly have AF, lack knowledge of AF management options.³⁶ This has broad implications for patients and providers. Creating effective health literacy improvement strategies for both patient and provider may prove effective for increasing awareness of AF, its potential complications, and available therapeutic options.³⁷ As a general trend, all countries understand the need for continued AF research; however, government and private funding streams, are highly competitive, limiting the amount of available resources granted for this research.

Lastly, while many countries (AU, BE, SE, UK, US) have well-coordinated patient organizations and execute AF national campaigns, patient literacy remains low with insufficient comprehension of the risks of AF and how it contributes to AF-related strokes. On a global scale there are dedicated months and days each year where AF is highlighted or is a focal point, this includes World Heart, World Stroke, and World Thrombosis Days; Stroke Awareness Month (US, May), AF Awareness Month (US, September), and Global AF Awareness Week (GAFAW, mid-November). However, even with extensive campaigns and initiatives, attempts to improve AF literacy remain challenging.

Disease Management

Though large-scale systematic AF screening has been conducted in the community setting within some countries and with promising findings, challenges persist due to the requirements and costs associated with such programs. One such example, SE's STROKESTOP study, which used a single-lead ECG, found 0.5 % of new AF cases in its screened population on first ECG, and 3 % of new AF cases when repeated ECGs were performed twice daily for two weeks and on palpitations.³⁸ Though the results were promising when tested in those aged ≥ 75 , broader screening initiatives have not been implemented as the data is still too limited to justify the potential associated financial implications.

Subclinical AF is a common and a known growing health problem, there are a range of potential approaches to screening, including non-invasive tests with a high degree of acceptance among patients. We know that AF is an important stroke risk factor and there are effective treatments that can reduce the risk of cardiac events. Failure to identify and treat AF leaves patients at a considerably higher risk of stroke, disability, and death.³⁹ At present, however, the evidence does not show that screen-detected AF patients have the same cardiovascular risks or benefits from available treatment. Nor is it certain whether screening improves health outcomes in terms of stroke-related morbidity and mortality or all-cause mortality.⁴⁰

Specific to AF, an ECG confirmatory diagnosis by a physician is required, and though many individuals can presently access care,



this will become an issue in the future if new methodologies for diagnosis are not adopted. Different tools, smartphone-based watches, and wearable devices, some with the FDA's ECG approval (e.g., Kardia Mobile, Apple Watch), are making the possibility of community AF screening feasible. Innovations in technology are likely to mean the public becomes increasingly aware of its own health data and allow people to self-diagnose AF through smart technology.⁴¹ The potential use of these new tools may aid in addressing HCP access issues as well, as globally and across studied countries, a gradual decline in the number of available GPs and specialists, due to the growing aging worldwide population is expected. While formal diagnoses may remain in the hands of physicians, for now, these new devices could help eliminate false positives and alert a patient that medical consultation should be considered. These tools, however, will also require new legal and scientific rules. Studies are needed to guide implementation of these technology into healthcare. Doctors and patients will require training for the appropriate use and application of these devices to avoid potentially dangerous misuse and to be able to understand correctly the clinical meaning of what each device is able to do.⁴²

Additional screening solutions could also include expanding a pharmacist partnership program, with Arrhythmia Alliance that teaches and screens globally, and the inclusion of nurses to identify arrhythmia, via pulse palpation or ECG confirmation.⁴³

Financial Barriers

Though costly, nine out of the ten countries reviewed (except ES) have increased investments for medical infrastructure, including technology improvements to further expand access and delivery of care. Telehealth/telemedicine has begun to play a more significant role in connecting rural and, at times, at-risk populations with needed medical experts across the disease spectrum. The role of this treatment modality has become even more significant during the COVID-19 pandemic, but its expansion of use, due to the coronavirus for AF screening and detection has not yet been explored.

Financial challenges have typically applied to the reimbursement of services and the coverage for new technologies. Data is not yet available to support coverage for the use of new AF diagnostic technologies, and presently there are no methodologies in place for reimbursement.

Reimbursement information for screening procedures, performed by HCPs, was also limited. Many countries operate with a budget for care, not with payment of services, which eliminates the possibility of reimbursement. Few governing bodies have revisited or evaluated their payment schedules to accommodate these screening and wellness assessments performed by HCPs, due in part that screening is a procedure performed on an individual who is not complaining of symptoms related to, or suggestive of, the medical condition being screened. However, the literature does suggest that many countries outside the aforementioned European countries are exploring the benefits of value-based medicine, where rewards for the quality of care provided would be recognized and therefore incentives to reimburse screening would be made available.⁴⁴

Findings

This paper is the first to review the available policy and landscape data for AF management/policy across 10 countries (AU, BE, CA, FR, DE, IT, ES, SE, UK, US). Findings indicate that there are clinical guidelines and AF and AF-related stroke prevention policies embedded in larger stroke action plans, recently developed. Contributing factors that may be influencing the development of these policies include; (1) recognition of the growing burden of AF on healthcare budgets, (2) results from randomized controlled trials that have identified the silent threat of AF and need for screening (STROKESTOP(S) and SAFER studies),²⁸ (3) an awareness that an AF global narrative needs to be formed to shrink the health literacy gap, and (4) the lack of shared best practices amongst countries that actively promote and highlight results on how initiatives are improving and elevating the AF conversation. These



factors are not exhaustive but highlight the main observations.

The differences in the effectiveness of screening, awareness, and prevention initiatives based on the literature and associated country infrastructure determinants suggest that variability remains on available information, how information to individuals is disseminated, and how the condition is medically managed and treated. This implies an unequal delivery of information on AF and AF-related stroke, and management of patients with the condition, despite the existence of clinical recommendations and country guidelines that outline similar approaches to improving awareness, prevention, and ultimately care.

The experts consulted agree work is needed to elevate screening, awareness, to potentially prevent AF and AF-related stroke. The opportunity exists for stakeholders across the AF spectrum (e.g., advocacy groups, industry, key opinion leaders) to come together and partner to promote a shared vision, analogous to the ESO and its development of the 2018-2030 Stroke Action Plan. A collaboration can support initiatives larger than any one group could successfully undertake, i.e., development of best practices for incorporating AF into associated CVD and stroke national plans; identification of registry best practices, showcasing patient outcomes; and partnering with AF and stroke champions to develop universal policy narratives. These initiatives are all actionable and could provide uniform awareness messaging across countries, just not those represented herein.

It is clear, based on these findings, that stakeholders need to understand the multi-factorial determinants that increase screening, awareness, and prevention and ultimately contribute to the development of national action plans, prevention recommendations, and policies. This framework identifies gaps in the data, which provide a roadmap on what is needed to develop future policies for AF and AF-related stroke screening, awareness, and prevention. It shows how health policy analyses can be systematically organized into a framework and applied to a growing public health policy problem, an issue of interest to policymakers and stakeholders worldwide. To address the lack of published work in this area, future research can expand upon this framework and apply a similar analysis to other countries.

This assessment is based on a narrative review and offers a descriptive analysis of available AF data, no statistical analysis or meta-analysis was planned or executed, therefore limiting the applicability of its findings. The data used come from different sources and studies, making direct comparisons between the countries challenging. Furthermore, attention should be given to the fact that although the healthcare problem presented in this paper is the same for all studied countries, the awareness of acting on the AF condition differs per country.

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Conflict of Interest

Trudie Lobban's conflicts of interest include a lecture honorarium from the pharmaceutical industry including Bristol Myers Squibb and Pfizer. Jean-Luc Eiselé's conflicts of interest include a lecture honorarium from the pharmaceutical industry including Bristol Myers Squibb and Pfizer. Valeria Caso's conflicts of interest include serving as a consultant for and receiving honoraria from Boehringer Ingelheim, Bristol Myers Squibb, Pfizer, Bayer, Mindmaze, Daiichi Sankyo, and Ever-NeuroPharma. Mårten Rosenqvist's conflicts of interest include consultancy, research grants, and a lecture honorarium from Abbott, Bayer, Bristol Myers Squibb, Pfizer, Medtronic, and Zenicor; he is also a stockholder and member of the board of HeartRunner Inc.

References

- ¹Freedman B, et al. Stroke prevention in atrial fibrillation. *Lancet* 2016; 388: 806–17.
- ²Lown M, Yue A, Lewith G, et al. Screening for Atrial Fibrillation using Economical and accurate Technology (SAFETY)—a pilot study. *BMJ Open*. 2017;7(1):e013535. doi:10.1136/bmjopen-2016-013535.
- ³Lau D, et al. Modifiable Risk Factors and Atrial Fibrillation. *Circulation*. 2017;136:583–596.
- ⁴Patel NJ, Atti V, Mitrani RD, et al. Global rising trends of atrial fibrillation: a major public health concern. *Heart Published Online First*: 15 June, 2018. doi: 10.1136/heartjnl-2018-313350.
- ⁵Baturova M, Lindgren A, Carlson J, et al. Predictors of new-onset atrial fibrillation during 10-year follow-up after first-ever ischemic stroke. *Int J Cardiol* 2015;199:248-252.
- ⁶Miyasaka Y, Barnes ME, Gersh BJ et al. Secular trends in incidence of atrial fibrillation in Olmsted County, Minnesota, 1980 to 2000, and implications on the projections for future prevalence. *Circulation* 2006;114:119-257.
- ⁷Chugh S, Havmoeller R, Narayanan K, et al. Worldwide epidemiology of Atrial Fibrillation: A global burden of disease. *Circulation* 2013;129:837–847.
- ⁸Go AS, Hylek EM, Phillips KA et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: The Anticoagulation and Risk Factors in 2001: 285:2370-5.
- ⁹Haim M, Hoshen M, Reges O, et al. Prospective national study of the prevalence, incidence, management, and outcome of a large contemporary cohort of patients with incident non-valvular atrial fibrillation. *J Am Heart Assoc*. 2015;4:e001486.
- ¹⁰Ball J, Carrington MJ, McMurray JJ, Stewart S (2013) Atrial fibrillation: profile and burden of an evolving epidemic in the 21st century. *Int J Cardiol* 167 (5): 1807-1824.
- ¹¹Wolowacz SE, Samuel M, Brennan VK, Jasso-Mosqueda JG, Van Gelder IC The cost of illness of atrial fibrillation: a systematic review of the recent literature. *Europace* 2011;13 (10): 1375-1385.
- ¹²*EMJ Cardiology*. 2019;7[1]:110–118.
- ¹³Stewart S, Murphy NF, Walker A, McGuire A, McMurray JJ Cost of an emerging epidemic: an economic analysis of atrial fibrillation in the UK. *Heart*. 2004; 90 (3): 286-292.
- ¹⁴New Findings Confirm Predictions on Physician Shortage. April 23, 2019. <https://www.aamc.org/news-insights/press-releases/new-findings-confirm-predictions-physician-shortage>.
- ¹⁵Coyne KS, Paramore C, Grandy S, et al., Assessing the direct costs of treating nonvalvular atrial fibrillation in the United States, *Value Health*, 2006;9:348–56.
- ¹⁶Ceornodolea AD, Bal R, Severens JL. Epidemiology and Management of Atrial Fibrillation and Stroke: Review of Data from Four European Countries. *Stroke Res Treat*. 2017; 2017: 8593207.
- ¹⁷Lowres N, Olivier J, Chao TF, et al. Estimated stroke risk, yield, and number needed to screen for atrial fibrillation detected through single time screening: a multicountry patient-level meta-analysis of 141,220 screened individuals. *PLoS Med*. 2019;16(9):e1002903. Published 2019 Sep 25. doi:10.1371/journal.pmed.1002903



- ¹⁸ Ibid.
- ¹⁹ Hobbs FD, Fitzmaurice DA, Mant J, Murray E, Jowett S, Bryan S, Raftery J, Davies M, Lip G. A randomised controlled trial and cost-effectiveness study of systematic screening (targeted and total population screening) versus routine practice for the detection of atrial fibrillation in people aged 65 and over. The SAFE study. *Health Technol Assess* 2005;9:iii–iv, ix–x, 1–74.
- ²⁰ Mairesse GH, Moran P, Van Gelder IC, et al. Screening for atrial fibrillation: a European Heart Rhythm Association (EHRA) consensus document endorsed by the Heart Rhythm Society (HRS), Asia Pacific Heart Rhythm Society (APHRS), and Sociedad Latinoamericana de Estimulación Cardíaca y Elec-trofisiología (SOLAECE). *Europace* 2017;19:1589-1623.
- ²¹ US Preventive Services Task Force. Screening for Atrial Fibrillation with Electrocardiography US Preventive Services Task Force Recommendation Statement. *JAMA*. 2018;320(5):478–484. doi:10.1001/jama.2018.10321.
- ²² Gillis AM, Skanes AC. Comparing the 2010 North American and European Atrial Fibrillation Guidelines. *Can J Cardiol*. 2011;27: 7-13.
- ²³ January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *Circulation* 2014;130:e199–e267.
- ²⁴ Morillo CA, Banerjee A, Perel P, Wood D, Jouven X. Atrial fibrillation: the current epidemic. *J Geriatr Cardiol*. 2017;14(3):195–203. doi:10.11909/j.issn.1671-5411.2017.03.011.
- ²⁵ The Economist. Intelligence Unit Perspectives. Preventing Stroke: Uneven Prevention. Sep 21 2017. <https://eiuPerspectives.economist.com/healthcare/policy-approaches-stroke-prevention/white-paper/preventing-stroke-uneven-progress>.
- ²⁶ 2020 ESC Guidelines for the Diagnosis and Management of Atrial Fibrillation Developed in Collaboration With the European Association of 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. *Eur Heart J* 2020;Aug 29:[Epub ahead of print].
- ²⁷ Canadian Cardiovascular Society. 2018 Focused Update of the Canadian Cardiovascular Society Guidelines for the Management of Atrial Fibrillation. DOI:<https://doi.org/10.1016/j.cjca.2018.08.026>
- ²⁸ Heart Foundation. National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand: Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018. DOI:<https://doi.org/10.1016/j.hlc.2018.06.1043>
- ²⁹ AHA/ACC/HRS. 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society in Collaboration With the Society of Thoracic Surgeons. 28 Jan 2019 <https://doi.org/10.1161/CIR.0000000000000665> *Circulation*. 2019;140:e125–e151
- ³⁰ Heart Foundation. <https://strokefoundation.org.au/What-we-do/National-Action-Plan-for-Heart-and-Stroke>.
- ³¹ CDC. A Public Health Action Plan to Prevent Heart Disease and Stroke https://www.cdc.gov/dhdspl/action_plan/index.htm.
- ³² Smith ER. The Canadian heart health strategy and action plan. *The Canadian Journal of Cardiology*. 2009 Aug;25(8):451–452. DOI: 10.1016/s0828-282x(09)70116-3.
- ³³ ESO. Action plan for stroke in Europe 2018-2030. <https://actionplan.eso-stroke.org/>.
- ³⁴ Masaharu A, Beyer-Westendorf J, Goto S, Peterson E, Stroke prevention in atrial fibrillation: evidence from real-life studies, *European Heart Journal Supplements*, Volume 17, Issue suppl_D, July 2015, Pages D42–D52, <https://doi.org/10.1093/eurheartj/suv037>.
- ³⁵ Reading S, Go A, Fang M. Health Literacy and Awareness of Atrial Fibrillation. *Journal of the American Heart Association*. 11 Apr 2017 <https://doi.org/10.1161/JAHA.116.005128> *Journal of the American Heart Association*. 2017;6:e005128.
- ³⁶ Aliot E, Breithardt G, Brugada J, et al. An international survey of physician and patient understanding, perception, and attitudes to atrial fibrillation and its contribution to cardiovascular disease morbidity and mortality. *Europace*. 2010;12(5):626-633. doi:10.1093/europace/euq109.
- ³⁷ Should we screen for atrial fibrillation? *BMJ* 2019; 364 doi: <https://doi.org/10.1136/bmj.l43> (Published 13 February 2019).
- ³⁸ Montori VM, Brito JP, Mural MH. The optimal practice of evidence-based medicine: incorporating patient preferences in practice guidelines. *JAMA*. 2013;310(23):2503-2504.
- ³⁹ Nicholas R Jones, Clare J Taylor, F D Richard Hobbs, Louise Bowman, Barbara Casadei, Screening for atrial fibrillation: a call for evidence, *European Heart Journal*, Volume 41, Issue 10, 7 March 2020, Pages 1075–1085, <https://doi.org/10.1093/eurheartj/ehz834>



⁴⁰ Ibid.

⁴¹ Nicholas R Jones, Clare J Taylor, F D Richard Hobbs, Louise Bowman, Barbara Casadei, Screening for atrial fibrillation: a call for evidence, *European Heart Journal*, Volume 41, Issue 10, 7 March 2020, Pages 1075–1085, <https://doi.org/10.1093/eurheartj/ehz834>

⁴² ESC. ECG portable devices: example of e-Health strength and threats. <https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-18/ecg-portable-devices-example-of-e-health-strength-and-threats>.

⁴³ Lobban TCA, Breakwell NE, Antoniou S, 54 How multinational community pharmacists worked with AF Association and Arrhythmia Alliance pulse rhythm check campaign (Know Your Pulse) to raise awareness of and identify people at risk of AF, *EP Europace*, Volume 19, Issue suppl_1, 1 October 2017, Page i25, <https://doi.org/10.1093/europace/eux283.011>.

⁴⁴ WHO. Europe. Paying for Performance in Health Care. http://www.euro.who.int/_data/assets/pdf_file/0020/271073/Paying-for-Performance-in-Health-Care.Pdf.

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