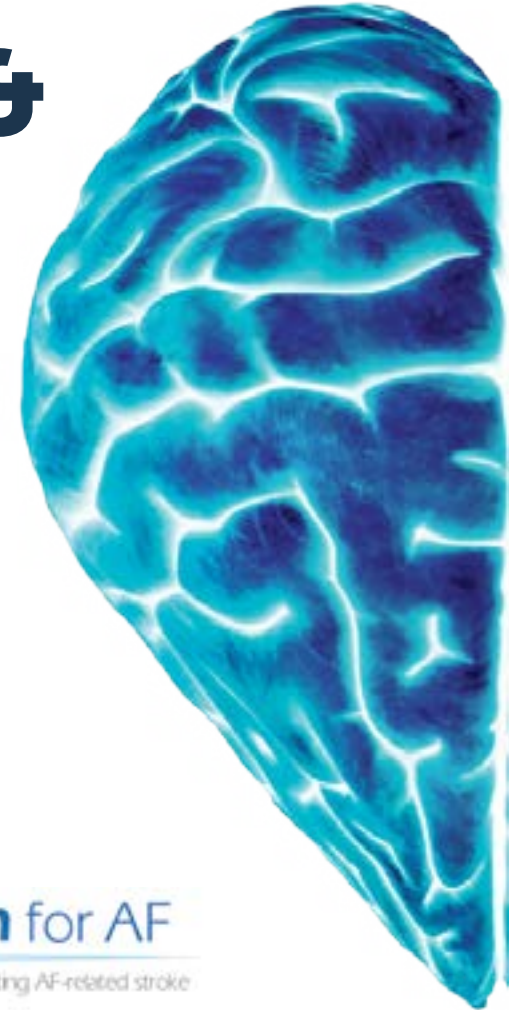




The Route Map for Change & the European Atlas on the Prevention of AF-Related Stroke



Professor John Camm
Professor of Clinical Cardiology,
St. George's University of
London, United Kingdom

Trudie Lobban MBE FRCP
Atrial Fibrillation Association
and Arrhythmia Alliance

Eve Knight
AntiCoagulation Europe



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KEY CONTRIBUTORS

We are grateful to the following individuals for their important contributions to the development of the report:



Professor Michael Brainin,
European Stroke Organisation




Chris Macey,
Irish Heart Association
Ireland



Prof. G.A. Dan,
University of Medicine
Bucharest
President International
Society of Cardiovascular
Pharmacotherapy
Director FACTS Program
Romania

Dr. Anca Dan,
Colentina University Hospital
Director Arrhythmia Patient
Association,
Romania



Erdem Diker, MD, FHRS,
Professor of Medicine
Director of Cardiology
and Electrophysiology
Department, Mediana
International Ankara Hospital,
Ankara, Turkey.
President of Atrial Fibrillation
Association,
Turkey



**Dr Jeroen Hendriks, RN,
PhD, NFESC,**
Post-doctoral researcher,
Department of Cardiology,
Maastricht University
Medical Centre
and Dutch Society for
Cardiovascular Nursing
The Netherlands



Mary Baker,
European Brain Council




Paolo Binelli,
ALICE, Italy



Joe Korner,
Stroke Association, UK



Hellenic Cardiology Society,
Greece



**Associate Professor Axel
Brandes, MD, FESC,**
Department of Cardiology,
Odense University Hospital,
and President of Atrial
Fibrillation Association
Denmark



Noreen Siba,
International Longevity
Centre-UK, UK

Lena Marie Izzat,
Prince Phillip Hospital,
Llanelli, Wales,

Dr Matthew Fay, GP
Executive Member Bradford
Districts CCG Westcliffe
Medical Centre,
AF Association Medical
Advisory Committee Member
& Arrhythmia Alliance
Executive Committee
Member,
UK



Philippe Thebault,
Alliance du Cœur, France



Dr Thomas Fåhraeus,
Chairman of Arrhythmia
Alliance, Sweden



Professor Paulus Kirchhof,
University of Birmingham,
Founding member of AFNET
Germany



Jo Jerome,
Atrial Fibrillation Association
and Arrhythmia Alliance, UK



II: A NOTE FROM THE STEERING COMMITTEE

AF (atrial fibrillation) is a common condition, yet few people have heard of it. What is also often not known is that AF is the second most important risk factor for stroke after blood pressure and causes at least one in every five strokes² – **close to 360,000 cases per year in the EU.**

The good news is that effective therapies are available that help reduce the risk of stroke in people with AF. But many patients at significant risk of stroke – up to 40% in many countries – are not offered these treatments – despite a strong evidence base and consistent international guidelines recommending their use.

The challenge, as ever, is one of implementation. But successful implementation requires up-to-date, reliable data to help understand what the most important unmet needs are in each country, and where efforts should be targeted to achieve the greatest returns.

Two years ago, we set out, with financial support from the Pfizer/BMS Alliance, to develop a **European Policy Atlas on the prevention of AF-related stroke**, bringing together, for the first time, reliable evidence of what different countries are doing across Europe to help achieve

effective prevention of AF-related stroke. We are grateful to the many patient organisations and clinical experts from around Europe who have contributed their thoughts and examples of best practice to help inform this document - allowing the comparison and contrast of unmet needs and the available local evidence. We have also been able to find out what has been done to tackle this important public health problem across the countries of Europe.

But data are not enough – they need to translate into action. Accompanying the Atlas is the **Route Map for Change**, which draws on the findings of the Atlas to propose priority actions for policymakers to take forward in their respective countries.

These documents have been created with their use in mind, and we urge you and your colleagues to draw from these documents to help impress upon policymakers the public health urgency posed by AF-related stroke. We have the means to prevent these catastrophic events, averting countless personal tragedies as a result. We hope that this document may serve as a valuable resource to bring us one step closer to achieving this goal.

Professor John Camm
St Georges Medical Centre,
UK

Trudie Lobban MBE FRCP
Atrial Fibrillation Association
and Arrhythmia Alliance

Eve Knight
AntiCoagulation Europe

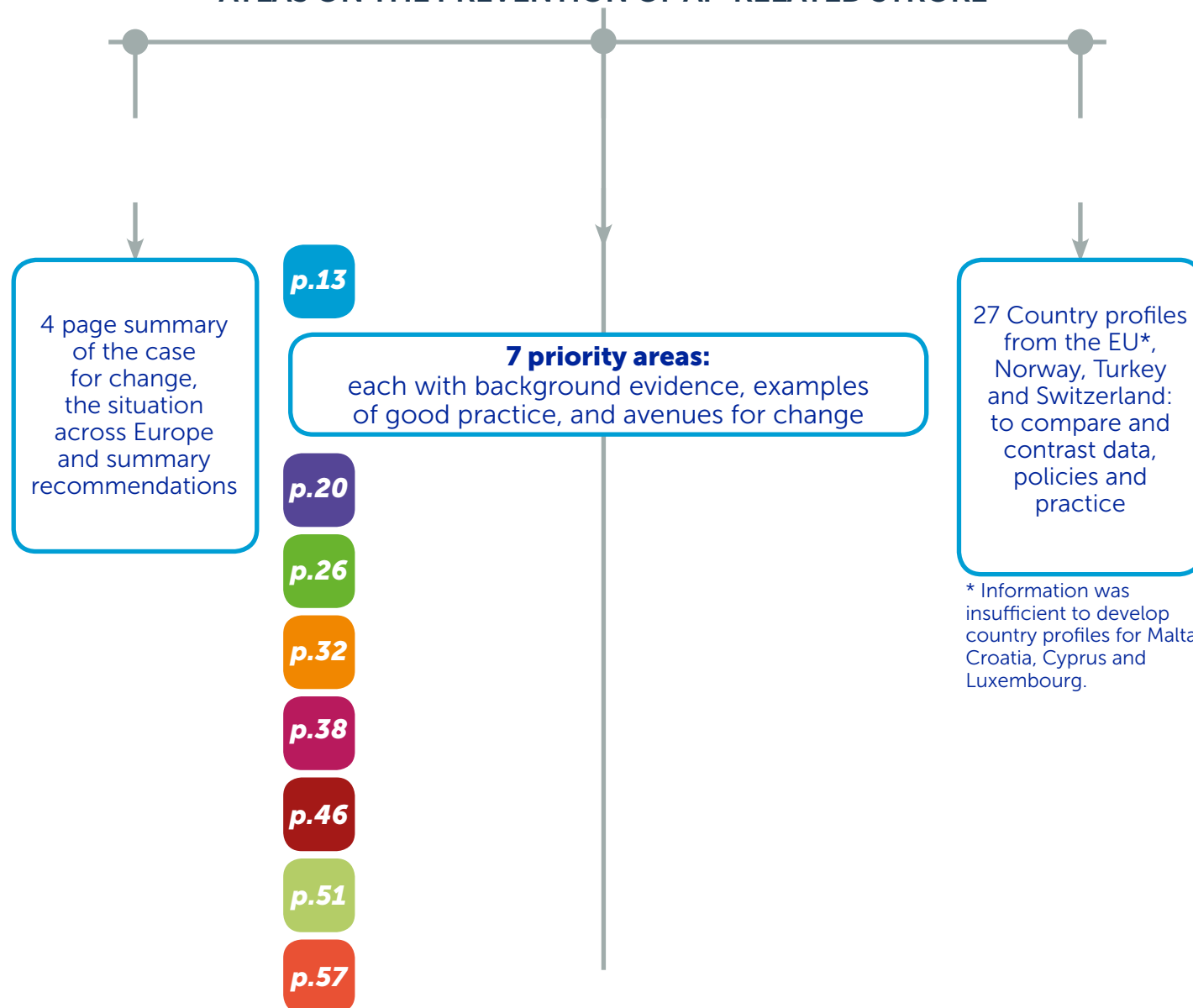




III: ABOUT THIS DOCUMENT

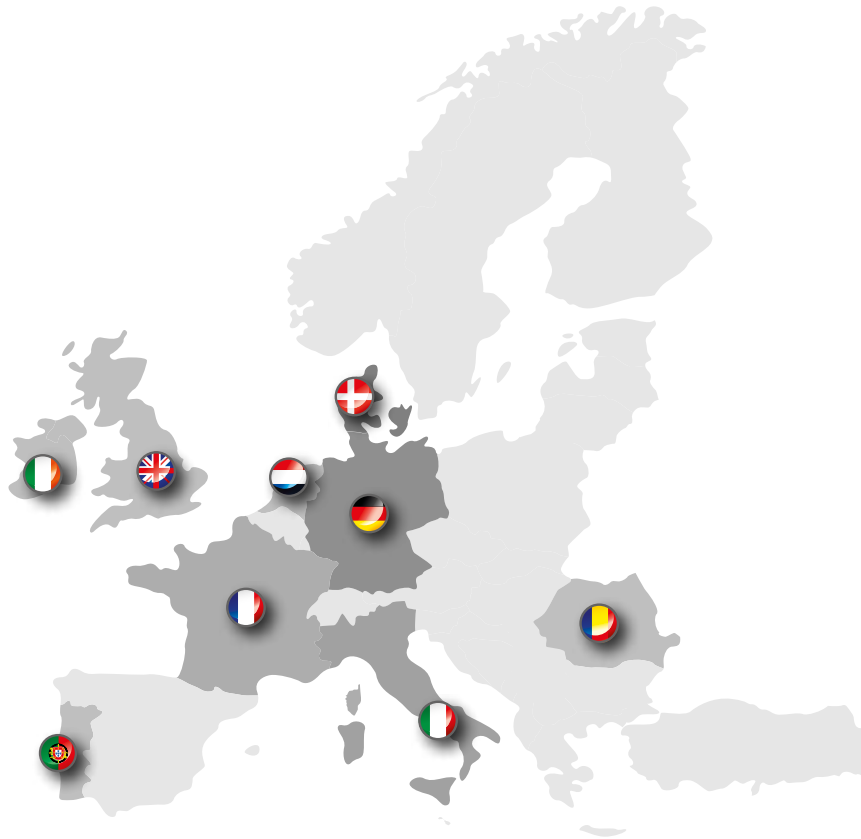
This document was developed to raise awareness of the need to focus attention, policies and resources towards the prevention of AF-related stroke in Europe. It presents key data documenting the burden posed by AF-related strokes across Europe, highlights key issues and challenges in implementing best practice to help prevent these strokes and provides examples of successful initiatives that have made a difference across Europe.

THE ROUTE MAP FOR CHANGE AND THE EUROPEAN ATLAS ON THE PREVENTION OF AF-RELATED STROKE





Case Studies:



Priority 1: Targeted policies and resources to enable the effective prevention of AF-related stroke

p.24



p.25



Priority 2: Greater public awareness and understanding of AF and the increased risk of stroke with AF

p.29



p.30



p.31



Priority 3: Improved detection of AF and integration of pulse checks into clinical practice

p.36



p.37



Priority 4: Appropriate anticoagulation therapy for every AF patient at risk of stroke



p.43



p.44



p.45

Priority 5: Patient-centred care and clear information to patients



p.49



p.50

Priority 6: A whole-system approach to the prevention of AF-related stroke



p.55



p.56

Priority 7: Better data to guide policy and clinical management



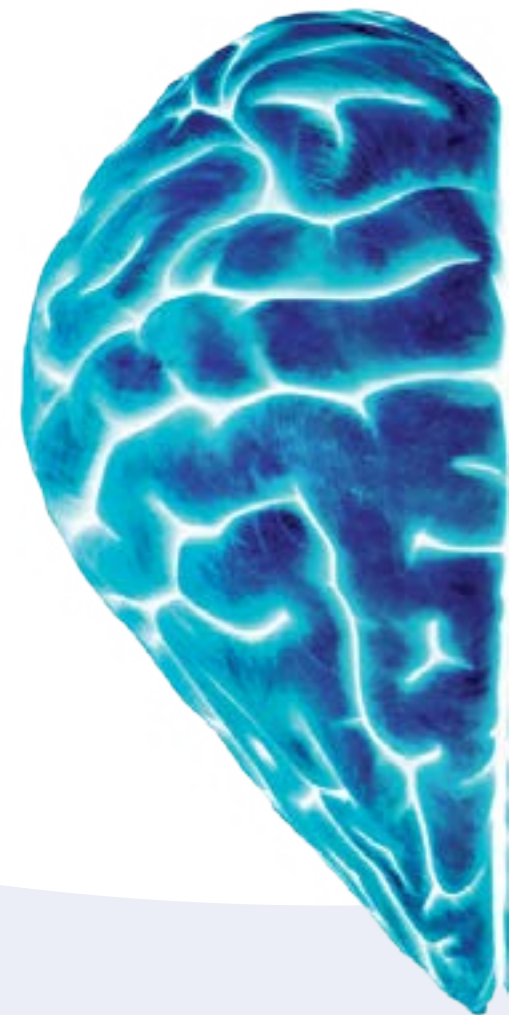
p.65



p.66



Executive Summary



1: The prevention of AF-related stroke: The Case for Change

Every year in the EU, **1.8 million new cases of stroke** occur¹, each a personal tragedy, and together a huge societal burden of death, disability, and healthcare costs. One in five of these strokes² – close to **360,000 cases per year** – are **due to AF** (atrial fibrillation).

Many AF-related strokes can be prevented through effective treatment. However, available treatments are all too often not offered to patients – leaving **millions of patients with AF at risk of suffering a debilitating and potentially fatal stroke**.

- There are **624,000 deaths due to stroke** every year in the EU.¹
- Stroke presents **a tremendous burden on people living with stroke, their families, healthcare systems, and society**.³⁻⁸ The EU spends €38 billion per year on treating strokes, and the indirect costs (loss of productivity, informal care demands) are enormous.⁵ In some countries, stroke patients occupy up to 20% of all acute hospital beds and 25% of long-term beds.⁹
- **AF is the most common heart rhythm abnormality** and affects close to 2% of the general population.^{2,10} The incidence rises with age.¹¹
- The lifetime risk of developing AF is **one in four** after the age of 40.¹²
- AF causes **one in five strokes** – one in three after the age of 80.^{13,14}
- AF is the **second most important risk factor for stroke** after blood pressure and a greater risk factor than smoking, diabetes or lack of physical activity.¹⁵
- AF-related strokes are **the most deadly and debilitating strokes**,^{16,17} lead to more permanent disability^{18,19} and cost 1.5 times more than strokes not due to AF.²
- Today, **millions of people in Europe may be unaware they are living with AF**, and therefore are at much higher risk of stroke whilst they remain untreated. AF can often be a 'silent' condition²⁰ and is only diagnosed once a stroke or another serious complication strikes.²¹
- **AF is on the rise** with the ageing of the population. The numbers of people affected by AF are predicted to double by 2050,^{2,22} which means the number of AF-related strokes is also likely to grow in years to come.
- Effective therapy, in the form of **oral anticoagulation therapy (OAC)**, exists to help prevent the risk of stroke in patients with AF.²⁰
- The decision to use any given OAC therapy requires **a careful balance** between the potential benefits (stroke prevention) and risks (increased risk of major bleeding) of therapy for each patient – as well as the patient's preferences and values.^{23,24}
- There are two kinds of OAC therapy: vitamin K antagonists (**VKAs**), which have been the standard of care for many years, and non-VKA (or novel) anticoagulation therapy (often called **NOACs**), which have been made available to patients in the past few years.
- The **2012 European Society of Cardiology (ESC) guidelines** recommend that, in many patients, NOACs are broadly preferable to VKAs.²⁰
- Yet in practice, **a large proportion of people with AF (up to 40-50%) do not even receive OAC therapy**^{25,26} – instead, they either receive antiplatelet therapy (usually aspirin), which is ineffective at reducing the risk of AF-related stroke²⁷, or no treatment at all.
- This **treatment deficit** occurs for a number of reasons, including physicians' fear of bleeding caused by OAC therapy,²⁸ practical difficulties in using VKAs in the past,²⁹⁻³³ and insufficient understanding by physicians and patients of the purpose of OAC therapy.^{34,35}
- **With up-to-date guidelines and new treatment options available for the first time in 60 years, we have an unprecedented opportunity to prevent AF-related stroke.** Policy makers must lead urgent efforts to improve public awareness of AF, address system deficiencies, including poor information to patients and under-detection of AF, improve physician adherence to guidelines and encourage appropriate use of OAC therapy in all AF patients at increased risk of stroke.

Unsatisfactory leadership by governments

- Only two countries (Ireland and the UK) have **dedicated national strategies** on the prevention of AF-related stroke, and only eleven countries (Bulgaria, Czech Republic, Estonia, France, Hungary, Ireland, Poland, Portugal, Slovakia, Spain and the UK) have national stroke plans.
- **Funding** for stroke research pales in comparison to other conditions.³⁶
- Important **gaps in acute stroke care** persist, particularly in Eastern Europe and Baltic countries, where the burden from stroke is greatest.³⁷

Poor public awareness and understanding

- AF is a common condition, yet few people are aware of it.^{38,41}
- Most people do not know that AF is an important risk factor for stroke.^{38,41-45}

Detection gap of up to one third

- AF is likely to be **more prevalent than previously reported**, according to country-level data.^{18;31;33;42;46-64}
- **Between 10-45% of cases of AF may be undetected**, depending on the setting.^{31;33;51;62;65;66}
- **Simple screening tools such as pulse checks** have yet to be integrated into general health checks. However, community screening initiatives are gaining ground in many countries.^{65;67}

A treatment gap of up to 40% in many countries, with significant variation between countries and across local settings

- Across Europe, a large proportion of AF patients do not receive OAC therapy despite guideline recommendations:
 - **Up to 40% of AF patients do not receive OAC therapy** in 13 out of 20 countries where data are available.^{31;52;62-64;68-90}
 - **Up to 40% of high risk patients do not receive OAC therapy** in 8 out of 15 countries where data are available.^{52;57;63;72;77;82;91-98}
- There is general **over-reliance on aspirin**, despite evidence that it is ineffective at preventing AF-related stroke.²⁷
- There is **under-treatment** of patients at greatest risk of stroke^{52;70;91;92} as well as and **over-treatment** of patients who are not at increased risk of stroke.^{52;69;70;76;98;99}
- **Older patients, particularly older women**, are most likely to be under-treated, despite being at greater risk of stroke.^{75;76;92;100;101}

Better information is needed for patients, along with a patient-centred, coordinated approach to care

- Many AF patients have a **poor understanding of their condition**, their increased risk of stroke and the purpose of OAC therapy.^{35;102-104} Physicians have suggested that the information available to AF patients is poor compared to other conditions.²³
- **Health professionals other than cardiologists** (GPs^{105,83}, nurses, geriatricians¹⁰⁶, and pharmacists¹⁰⁷) are likely to play a growing role in the management of AF patients in years to come.
- **Some countries are looking at nurse-led AF care** to offer patient-centred care to AF patients, with specialist nurses playing a coordinating and supportive role to patients throughout their care.¹⁰⁸
- **Integrated, multidisciplinary approaches to care** have been implemented successfully in a number of countries¹⁰⁸ and shown to improve coordination between primary and secondary care physicians and help break down professional silos.
- In several countries, guidelines on the management of AF have been drafted by primary care professionals and **joint guidelines** between geriatricians and cardiologists exist in France.¹⁰⁶

A poor evidence base and the need for more reliable epidemiological and economic data

- There is a general **lack of reliable data** on AF and AF-related stroke across Europe.
- Only three countries (Germany, Latvia and Estonia) have invested in dedicated registries for AF.
- Very few countries have reliable estimates of the proportion of strokes due to AF.^{17;47;109-117}
- The prevalence of **AF-related stroke is increasing** due to the ageing of the population.³²
- Stroke poses a considerable burden on our societies^{3;9;118-132}, but estimates of the costs of AF-related strokes are lacking in most countries, including Eastern Europe and the Baltic region, where the public health burden of stroke is greatest.
- What data do exist suggest that AF-related strokes are the most debilitating, fatal and expensive strokes.^{123;124;130;133-138}

1

Targeted policies and resources to enable the prevention of AF-related stroke

- **Global, regional and national policy leaders** should consistently **recognise AF as a major risk factor for stroke** alongside other 'conventional' risk factors such as smoking, high blood pressure, poor diet and physical inactivity.
- **Governments** should create **national programmes focused on AF** (as exist for myocardial infarction, diabetes, and oncology).
- **Policymakers** should also accord AF and AF-related stroke **due priority in all relevant policy frameworks** – e.g. on chronic diseases, cardiovascular disease prevention and healthy ageing.

2

Greater public awareness and understanding of AF and the increased risk of stroke with AF

- **Patient organisations and professional societies** should be encouraged to lead **targeted, hard-hitting awareness campaigns** to improve public understanding that AF is a major risk factor for stroke and that all patients with AF at risk of stroke should receive appropriate OAC therapy to help reduce their risk.

3

Improved detection of AF and integration of pulse checks into clinical practice

- **Primary care physicians and specialists** should **screen** all their patients over the age of 65 opportunistically for AF.
- **Governments and health insurance bodies** should integrate **manual pulse checks** into national health checks.

4

Appropriate anticoagulation therapy for every AF patient at increased risk of stroke

- **Patient organisations and professional societies should work with health professionals** to develop **educational tools and resources** to help physicians implement guidelines in practice, in terms of assessing all AF patients for their risk of stroke and offering all patients except those at very low risk of stroke the most effective OAC therapy. Tools targeting primary care physicians are particularly needed.
- **Health care system leaders** should develop **local quality improvement frameworks and centralised standards of care** to be implemented at a local level, and particularly in primary care, to reduce heterogeneity in the provision of OAC therapy to AF patients and ensure that best practice becomes embedded into local practice.

5

Patient-centred care and clear information to patients

- **All health professionals** should foster a **patient-centred approach to care**, encourage greater **patient engagement and patient education**.

6

A whole-system approach to the prevention of AF-related stroke

- **Health professionals** should work together and learn from other chronic diseases to identify successful models of **multidisciplinary, integrated care** that may help break down professional silos.

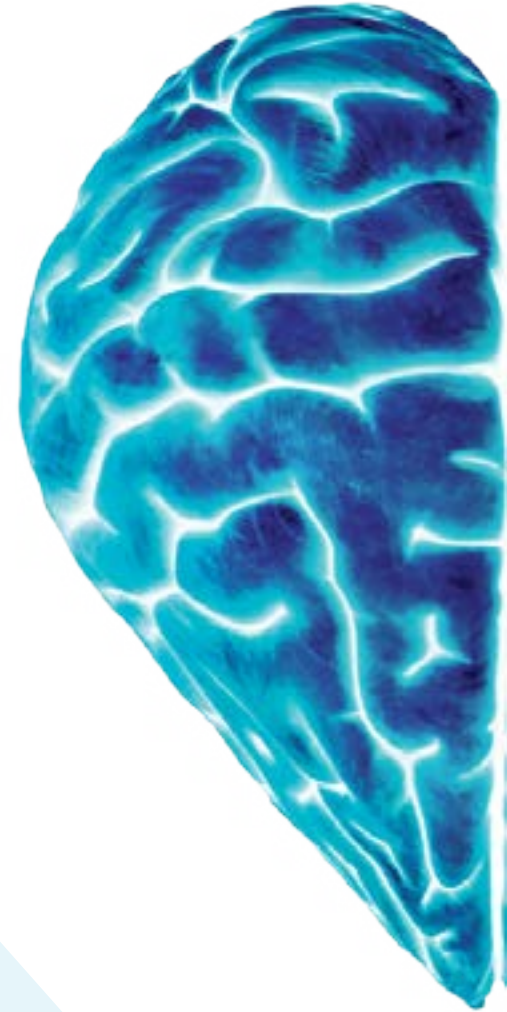
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Better data to guide policy

- **Governments, research institutes and professional societies** should invest in the **systematic collection of epidemiological, economic and administrative data** on AF and AF-related stroke. This will ensure that policymakers are equipped with the most reliable and up-to-date data possible to guide policies and target resources appropriately.



The Route Map for Change on the Prevention of AF-Related Stroke





The Routemap for Change is composed of 8 sections, a Case for Change followed by 7 priority areas for action:

The Case for Change

This section provides a brief overview of AF, how it may lead to stroke, its burden on society, the current best practice recommendations and what barriers exist to implementing these in practice. It is intended to be a useful overview and supporting brief to all of the 7 priorities for action.



The **Priorities for Action** present key avenues for change for policy makers, drawing from key findings from across Europe contained in the European Atlas, and supported by Case studies of what has worked well in different countries.



The Case for Change:

This section provides:

- A brief overview of:
 - AF
 - How it may lead to stroke
 - Its burden on society
- Current best practice recommendations
- What barriers exist to implementing recommendations in practice.



i. What is atrial fibrillation (AF)?

Atrial fibrillation (AF) is a condition in which the heart beats irregularly. It is the most common heart rhythm disorder affecting close to 2% of the general population.^{2:10}

The risk of developing AF is one in four after the age of 40.¹² Some 70% of cases of AF occur in individuals aged 65-85 years and the risk of AF increases with age.¹¹

AF

- Close to 10 million people in Europe
- Affects 2% of the population^{2:10}
- Prevalence set to at least double by 2050^{2:22}

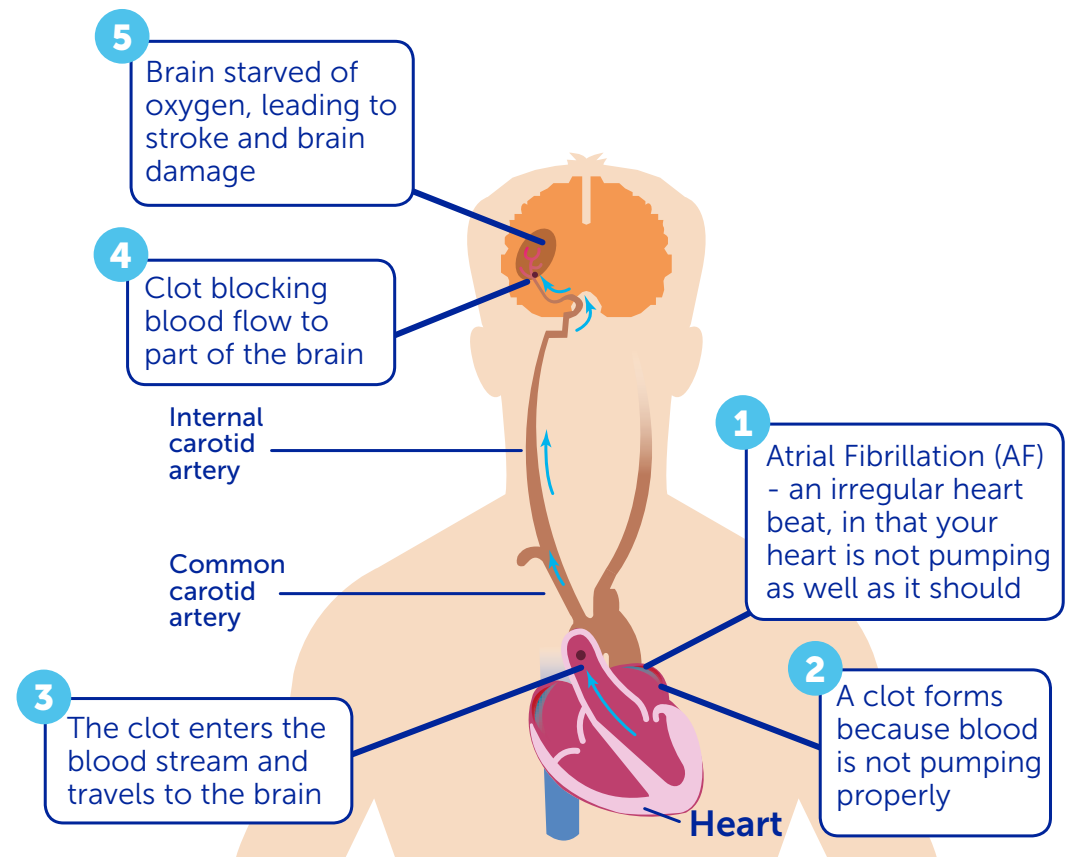
STROKE

- 1.8 million new cases per year in the EU¹
- 624,000 deaths per year in the EU.
- 8% of deaths in men, 10% of deaths in women in the EU¹⁴⁰
- A leading cause of adult disability¹⁴¹
- Cost of €38 billion per year in the EU⁵

AF-RELATED STROKE

- Close to 360,000 new cases per year in the EU^{1:2}
- 1 in 5 strokes is due to AF²
- AF-related strokes are the most debilitating and expensive strokes^{2:142}

Figure 1: How AF can lead to stroke



1 in 5 strokes is due to AF, and AF-related strokes are the most debilitating strokes

Adapted from Camm 2012¹³⁹

ii. How is AF linked to stroke?

AF is the second most important risk factor for stroke after high blood pressure.¹⁵

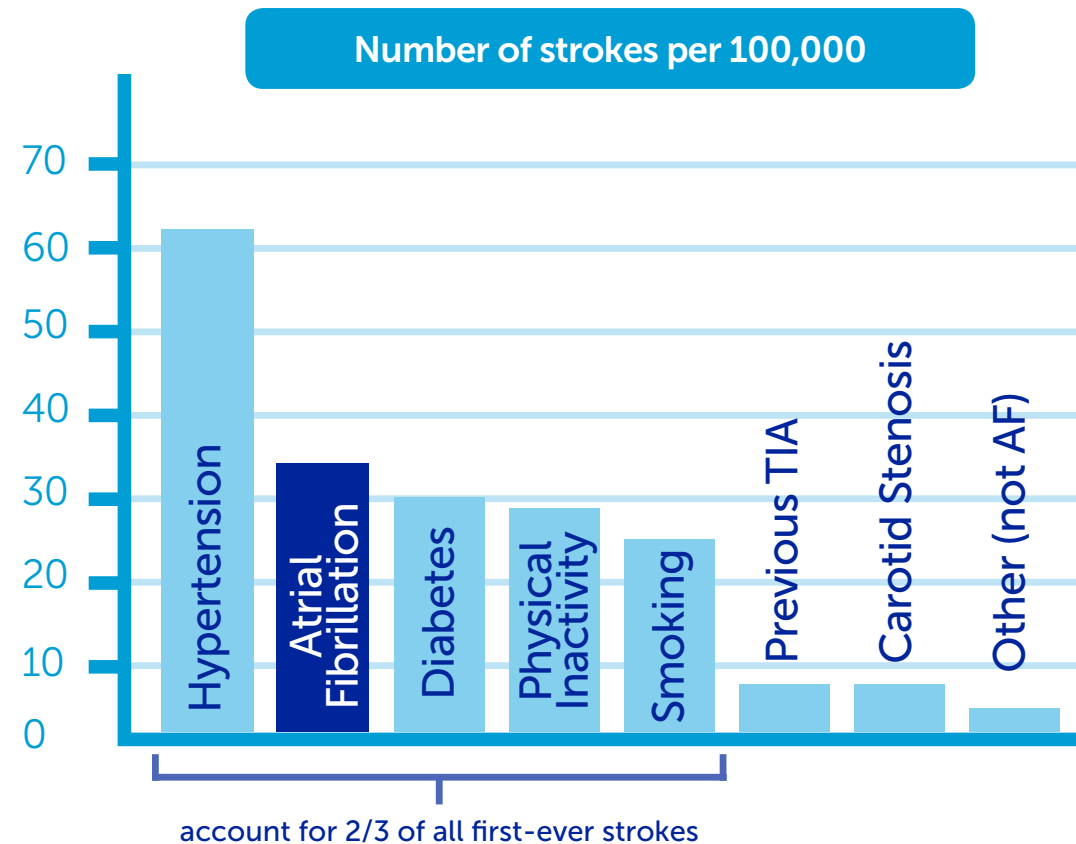
Because the heart beats irregularly in AF, blood does not flow as easily through the heart's chambers, and as a result blood clots may form there, eventually travelling through the arteries to lodge in the blood vessels of the brain. In a stroke, the blood clot deprives parts of the brain of oxygen, severely damaging any affected tissue.

One in every five strokes is due to AF² – and this figure rises to one in three after the age of 80.^{13,14}

AF increases the risk of stroke by a factor of five – more than any other cardiovascular condition.¹³

Adapted from Apslund 2003¹⁵

Figure 2: AF is one of the “big five” risk factors for stroke, along with high blood pressure, diabetes, physical inactivity and smoking:



Adapted from Apslund 2003¹⁵

iii. Why should AF-related stroke be a priority for policy makers?

The clinical and economic burden posed by AF-related strokes is staggering. Stroke poses a considerable burden on people affected and their families in terms of disability, lost productivity and impact on quality of life.^{3-7;143} It also imposes a huge cost to Europe's health and social care systems and to society at large, estimated as **€38 billion** in the EU⁵ and **€64 billion** every year in Europe as a whole.³

AF-related strokes are the most deadly, debilitating and expensive strokes: they have twice the mortality rate,^{16;17} have a higher chance of recurrence¹⁶, lead to more permanent disability^{118;19} and cost 1.5 times more than strokes not due to AF.²

AF and stroke are on the rise. The prevalence of AF is expected to at least double by 2050 due to the ageing of the population and improved survival from other heart conditions.^{22;2} Also, despite falling stroke mortality in many countries, the total number of people affected by stroke (i.e. stroke survivors) will increase in years to come.¹

As a result, the number and burden of AF-related strokes will continue to increase unless effective prevention measures are implemented across Europe.

iv. How can we prevent AF-related strokes?

The most highly regarded, up-to-date European guidelines on the management of AF are the European Society of Cardiology (ESC) 2012 guidelines.²⁰ Key recommendations pertaining to the prevention of AF-related stroke are:

- 1. All patients over the age of 65 should be screened opportunistically** (e.g. when presenting to their doctor for care) for AF by pulse checking, with confirmation by ECG as needed.²⁰
- 2. All patients with AF should be assessed for their risk of stroke,** using a validated stroke risk stratification system.²⁰
- 3. All AF patients should be offered effective oral anticoagulation (OAC) therapy** to help reduce their risk of stroke, except those at a truly low risk of stroke.²⁰
- 4. The decision to prescribe any OAC therapy requires a careful balance** between the potential benefits (stroke prevention) and risks (increased risk of major bleeding) of therapy for each patient - as well as the patient's preferences and values.^{23;24}
- 5. In many patients, non-VKA (or novel) anticoagulation therapy (NOACs) should be considered as broadly preferable to vitamin K antagonists (VKAs),** which have been the standard of care for OAC therapy for 60 years, as a choice of OAC therapy for patients.²⁰

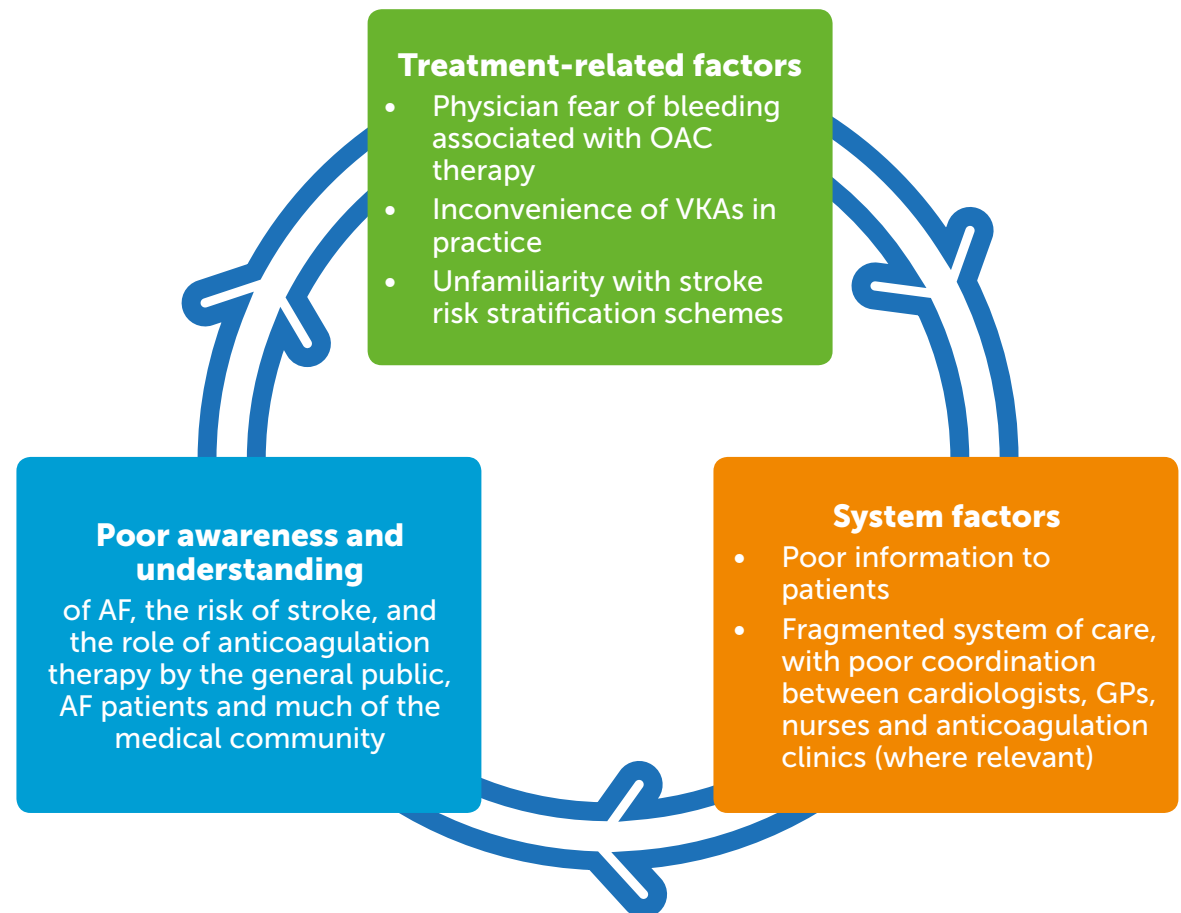
These recommendations are described in more detail in the Special Briefing section (p18-19).

v. What happens in practice?

Unfortunately, there is **widespread evidence that existing guidelines are poorly implemented in practice**: AF is under-detected, AF patients are often not assessed for their risk of stroke and only about 50-60% of AF patients receive OAC therapy in accordance with clinical guidelines.^{25;26}

It is important to recognise that **a number of factors contribute to the inadequate prevention of AF-related strokes**. Physicians may be reluctant to administer OAC therapy to patients due to their fear of major bleeding, or for other treatment-related factors based on their experience with VKAs.³⁰⁻³³ In addition, poor awareness and understanding of AF, of the risk of stroke or the role of OAC therapy by many AF patients³⁵ and physicians,³⁴ and system-related factors such as poor coordination of care, and lack of a patient-centred approach²¹ also play a role.

Figure 3: Factors that contribute towards inadequate prevention of AF-related stroke



vi. *Special briefing: The ESC 2012 guideline recommendations on the prevention of AF-related stroke:*

a. *Assessing the risk of stroke in AF patients:*

There are two main well validated risk stratification schemes for stroke: CHADS₂¹⁴⁴ and CHA₂DS₂-VASc.¹⁴⁵ Both of these are scoring systems that use data that are readily available in all patients, such as age and medical history, and have been designed to be easy to use in all clinical settings.

The major international guidelines from the European Society of Cardiology and the American Heart Association/American College of Cardiology/HRS¹⁴⁶ recommend the use of the CHA₂DS₂-VASc system.¹⁴⁵ However, its predecessor the CHADS₂ system is also still commonly used in clinical practice.

b. *The role of OAC therapy in the prevention of AF-related stroke*

There have, traditionally, been several approaches available to prevent AF-related stroke. The 2012 ESC guidelines recommend that **oral anticoagulation therapy (OAC therapy) be given to all AF patients except those at very low risk of stroke, in whom no therapy is recommended.**²⁰

These recommendations differ from previous guidelines in several important respects:

- **They advocate a more inclusive approach to anticoagulation therapy**, whereas previous guidelines limited its use to patients at high risk of stroke.
- **They recommend that, in many patients NOACs are 'broadly preferable' to VKAs** if they are used as in published clinical trials.
- **They recommend limiting the use of aspirin and other anti-platelet drugs** to patients who refuse any OAC therapy, whereas previous guidelines included it as an option for lower-risk patients.

vi. *Special briefing: The ESC 2012 guideline recommendations on the prevention of AF-related stroke: (cont'd)*

Available approaches for the prevention of AF-related stroke:

1. Oral anticoagulation (OAC) therapy, which include:

- **Vitamin K antagonists (VKAs)**, such as warfarin, which has demonstrated a reduction of stroke of up to 64% in clinical trials.¹⁴⁷ VKAs have been the standard of care for many years. However, they have a number of limitations:^{10;35;148} they are only effective within a very narrow therapeutic window, outside of which patients are either at increased risk of stroke or of bleeding, and require routine monitoring and frequent dosing adjustments. These limitations have contributed to their under-use in clinical practice.^{25;26;149}
- **Non-VKAs, commonly referred to as novel oral anticoagulants (NOACs):**¹ NOACs have demonstrated promising results in terms of stroke prevention and bleeding risk compared to warfarin in clinical trials,¹⁵⁰⁻¹⁵³ they offer fixed dosing and have a wide therapeutic window, precluding the need for routine monitoring.¹⁵⁴⁻¹⁵⁶ However, these agents have only received a license for use in clinical practice in the last few years and physicians need to familiarise themselves with their use in specific clinical situations.¹⁵⁷

2. Antiplatelet drugs:

The most common antiplatelet is acetylsalicylic acid (or aspirin). Aspirin is less effective than VKAs at reducing stroke and has a similar risk of bleeding,¹⁴⁷ therefore it is no longer considered a suitable option for preventing AF-related stroke.²⁰ Another commonly used antiplatelet agent is clopidogrel.¹⁵⁸ The combination of aspirin and clopidogrel is more effective than aspirin alone for the prevention of AF-related stroke, however it does present an increased risk of bleeding.¹⁵⁹

3. Surgical or catheter-based removal or occlusion of the source of the blood clot (e.g. left atrial appendage removal or closure)¹⁶⁰: These approaches tend to be used in a limited number of patients at high risk of thromboembolism and stroke, but for whom OAC therapy is contraindicated.

¹At the time of writing this report, only apixaban, dabigatran etexilate and rivaroxaban are licensed for use in patients for the prevention of AF-related stroke in Europe.

Priority 1:

Targeted policies and resources to enable the effective prevention of AF-related stroke

Case studies for Priority 1

The full integration of AF and AF-related stroke across health policy: the Irish example



The first National Heart Day: a political call to action on heart disease from the Alliance du Coeur - France



What we know:

AF has often been overlooked as a risk factor for stroke by policymakers. For example, the WHO 2011 Global Atlas on Heart Disease and Stroke fails to include AF in its list of risk factors for stroke¹⁶¹ and focuses instead on 'conventional' risk factors such as high blood pressure, smoking, physical inactivity and poor diet. This is worrying, as AF increases the risk of death from stroke more than each of these other factors.¹⁶

Why is this important?



National and regional governments have the authority to drive the strategic, system-wide approaches needed to prevent AF-related stroke and may provide a powerful steer to healthcare systems to implement these approaches in practice.

Key findings from the European Atlas:

- Only 2 countries in the EU (Ireland and the UK) have a **national plan targeting the prevention of AF-related stroke**. Only 11 (Bulgaria, Czech Republic, Estonia, France, Hungary, Ireland, Poland, Portugal, Slovakia, Spain, UK) have a national stroke strategy.
- **AF and AF-related stroke rarely feature in other policy frameworks**, such as chronic disease prevention or healthy ageing, despite their growing prevalence, particularly in the older population.
- **Funding** for stroke research is poor compared to other conditions.³⁶
- **Important gaps in acute stroke care** remain, particularly in Eastern Europe and Baltic countries, which suffer from the greatest stroke burden in Europe.³⁷

Avenues for change:

- Global policy reports should take the lead and **recognise AF as a major risk factor for stroke** alongside other 'conventional' risk factors such as smoking, high blood pressure, poor diet and physical inactivity.
- National governments should develop **targeted action plans** on the prevention of AF-related stroke. (see **Case study 1: The full integration of AF and AF-related stroke across health policy: the Irish example**)
- Greater prominence should be given to AF and AF-related stroke in **relevant health policy frameworks** (eg. on chronic disease, cardiovascular health, and healthy ageing) (see **Case study 2: The first National Heart Day: a political call to action on heart disease by the Alliance du Coeur - France**).
- **Targeted funds** for more research and care for stroke are needed to reflect the burden it poses on society.

"AF is a major risk factor for stroke, but it is simply not on the political agenda. We are focusing increasingly on prevention, chronic conditions, and healthy ageing – and yet AF is conspicuously absent from these policy frameworks and it has yet to enter into the prevention dialogue."

(Glyn Davies, Member of the All Party Political Group on AF (APPG-AF), UK)

Summary findings in more depth:

Very few countries have national policies targeting AF-related stroke

Only two countries in Europe (the UK and Ireland) have a national plan targeted at the prevention of AF-related stroke. Ten countries (Bulgaria, Czech Republic, Estonia, France, Hungary, Ireland, Poland, Portugal, Spain, UK) have national stroke strategies, which in some cases include specific sections on AF-related stroke.

AF and AF-related stroke rarely feature in national health plans and policy frameworks

Given its growing prevalence with the ageing of the population, one would expect AF to feature as a priority health topic within policies on healthy ageing and chronic disease prevention. **Yet very few countries appear to consider AF, or AF-related stroke in their national policies.** One notable exception is Ireland. (see [Case study 1](#)) France also provides an interesting case study of how the prevention of AF-related stroke has been integrated into a White paper on heart disease and a political call to action on heart disease in general. (see [Case study 2](#))

Table 1: Overview of existing policies on stroke and AF-related stroke (EU27 + Norway, Switzerland and Turkey)

Have a national stroke strategy or plan	Have a national plan on the prevention of AF-related stroke
Bulgaria, Czech Republic, Estonia, France, Hungary, Ireland, Poland, Portugal, Spain, UK	Ireland, UK

Summary findings in more depth:

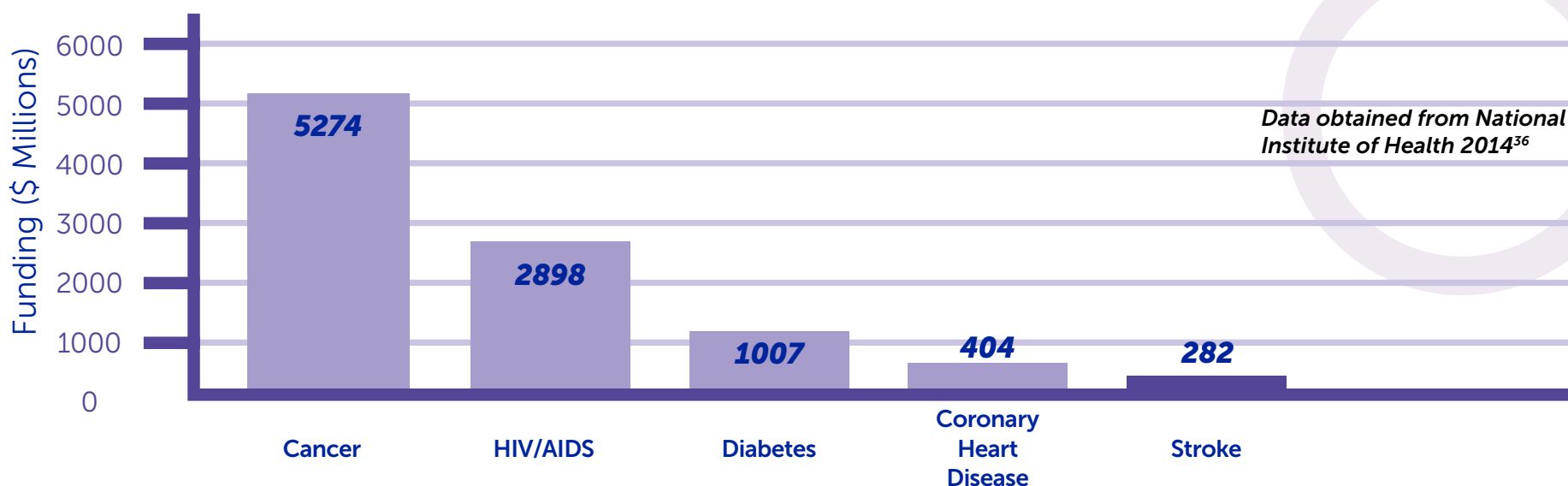
Investment in stroke research is poor compared to other conditions

Funding for research on stroke is low compared to other common conditions. For example, data from the United States suggests that research funding for stroke is about one tenth of funding for other chronic conditions (**Figure 4**).³⁶ Similarly, in the UK £71 of total government and charity research goes towards stroke research for every £1 million of health and social care costs attributable to it – as compared to £129,269 for cancer and £73,153 for coronary heart disease.¹⁶³

Important gaps in the provision of acute stroke care remain

Persistent gaps in the provision of acute stroke services still exist in many countries, despite important improvements in recent years. This is particularly the case in Baltic and Eastern European countries, where the burden of stroke is greatest.^{37;56;162} For example, only 30-40% of ischaemic stroke patients in Estonia arrive at the hospital within 3 hours, and only 5% receive intravenous thrombolysis.⁵⁶

Figure 4: Relevant research funding for stroke as compared to other conditions in the United States³⁶



CASE STUDY 1: IRELAND

THE FULL INTEGRATION OF AF AND AF-RELATED STROKE ACROSS HEALTH POLICY



Overview

The Irish Government has provided for AF-related stroke prevention as a core component of its national strategy for cardiovascular health and related improvement programmes, much of which is being developed in close collaboration with the national Stroke Council led by the Irish Heart Foundation.

Timescales

- National Cardiovascular Health Policy: 2010-19¹⁶⁴
- National Stroke Clinical Care Programme: ongoing
- 'Model of Care' position paper: 2012¹⁶⁵



Approach

AF and AF-related stroke prevention feature prominently in several layers of Irish health policy, from national strategy to delivery and implementation.

The overarching government strategy 'Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019' incorporates both stroke and the prevention, detection and management of AF. In particular, it outlines the need for more effective anti-coagulation therapy in AF in the primary care setting.¹⁶⁴ This is coupled with specific recommendations calling for the formalisation of clinical leadership and new joint care standards in anti-coagulation between GPs and hospital staff, a national screening programme for AF, and new integrated anticoagulation services spanning primary care, secondary care and community services, including new AF nurse specialists, new information systems and the collaboration with pharmacies amongst other measures.

Ireland has a National Stroke Programme led by the Irish Health Service Executive (HSE).¹⁶⁵ This includes a National Stroke Clinical Care Programme which aims to implement many of the stroke goals contained in the national cardiovascular health strategy, developed in close collaboration with the Irish Heart Foundation's influential Stroke Council.



TARGETED POLICIES AND RESOURCES

What has been achieved?

- The Programme published a comprehensive '**Model of Care**' position paper in 2012,¹⁶⁵ setting out how stroke outcomes will be improved through the development of prevention, treatment and rehabilitation services, including anticoagulation in AF-related stroke.⁷¹
- Several improvement initiatives are laid out, including launching a **national 'gap analysis' of anti-coagulation in AF**, and the development of new standards of care in anti-coagulation, and efforts to promote patient-centred care, early detection of AF and patient and professional education.¹⁶⁵
- Delivery and implementation efforts are supported by the creation of a **new AF Working group** spanning representatives from Primary Care, Cardiology, Haematology, Pharmacy, Drugs and Therapeutics, Neurology, Geriatric Medicine, and Public Health.
- Ireland is implementing a stroke register in each hospital admitting acute stroke patients.¹⁶⁵



CASE STUDY 2: FRANCE

THE FIRST NATIONAL HEART DAY: A POLITICAL CALL TO ACTION ON HEART DISEASE FROM *THE ALLIANCE DU COEUR*



“Cardiovascular disease is a major public health problem. In France, AF causes a stroke every 20 minutes – and this is the message that we must build into all public awareness campaigns on the prevention of heart disease to ensure that everyone is aware of the risks linked to AF and that we all take the necessary measure to reduce these risks.”
(Philippe Thébault, President, Alliance du Coeur)

Overview

A national day devoted to heart disease, organised by the Alliance du Coeur on Valentine’s Day, to call for the publication of a White Paper on heart disease (*le Plan Coeur*) advocating prevention of cardiovascular disease in all of its forms and supported by an ongoing awareness campaign.

Timescales

The awareness campaign will take place over several years, namely during National Heart Day (*Journée du Coeur*) which will take place again in 2015. The national plan (*Plan Coeur*) should be submitted to the government at the end of 2014.



Approach

L’Alliance du Coeur, a national alliance consisting of 16 charities and one patient organisation, has led a campaign for the past 20 years calling for better prevention and greater support for people suffering from heart disease and stroke. They had led an active campaign on prevention of AF-related stroke for several years, the key message being that a stroke due to AF occurs every 20 minutes in France.

In 2012, the Alliance partnered with the French cardiology federation (*Fédération Française de Cardiologie*), to propose a national cardiovascular disease strategy (*le Plan Coeur*), with the aim to develop a White Paper on heart disease that will be submitted to policymakers at the end of 2014. In 2014, the Alliance organised the first National Heart Day (*Journée Nationale pour le Coeur*) on Valentine’s Day. This was an interactive event in which all stakeholders involved in heart disease -- patients, health professionals, policymakers – were linked via live streaming across three cities: Paris, Bordeaux and Strasbourg. The aim of the event was to raise awareness of the wealth of ongoing local initiatives on heart disease and to demonstrate the commitment of local member organisations towards the creation of a national strategy on cardiovascular disease (*Plan Coeur*).



What has been achieved?

- Improved awareness of cardiovascular disease, including AF and AF-related stroke
- Integration of AF and AF-related stroke into a broader cardiovascular policy document
- A concerted call for greater political engagement on cardiovascular disease (including AF and AF-related stroke) as part of a broader commitment towards public health, prevention and chronic diseases.



Links/References

<http://www.alliancecoeur.fr/>
<http://lajourneeducoeur.org/>
<http://www.fedecardio.org/plateforme-plancoeur/>



Contact:

contact@alliancecoeur.fr



Priority 2:

Greater public awareness and understanding of AF and the increased risk of stroke with AF

Case studies for Priority 2

**Bate Bate Coração Association
- Portugal**



**The Irish Heart Foundation
Awareness Campaign - Ireland**



**The Act F.A.S.T Campaign -
UK and International**



What we know:

AF is a common condition, **and the lifetime risk of developing AF is one in four over the age of 40.**¹² Yet very few people have heard of AF, and poor awareness and understanding of AF and the risk of stroke with AF is a major hurdle to overcome across Europe.^{29;30}

Why is this important?

AF often does not present with any symptoms – so many people may have AF without knowing it, meaning they will miss out on treatment and unnecessarily run a much higher risk of having a stroke.



Key findings from the European Atlas:



- There is **poor awareness and understanding of AF** in the general population,^{38;41} especially among older people.⁴⁰
- Most people **do not know that AF is an important risk factor for stroke.**^{38;41-45}
- People are **more aware of other risk factors for stroke** than AF.⁴⁵

Avenues for change:

- Development of **patient organisations** and professional societies as a key player in providing information (see **Case study 3: Bate Bate Coração-Portugal**).
- **Targeted, hard-hitting awareness campaigns** are needed to educate the general public about AF, encourage them to regularly check their pulse, and communicate clearly the fact that AF is a major risk factor for stroke and that appropriate OAC therapy may help reduce their risk of AF-related stroke (see **Case study 4: the Irish Heart Foundation awareness campaign**).
- Similarly, hard-hitting campaigns to **enable people to recognise the signs of stroke** and encourage them to seek immediate treatment are needed, particularly in countries where awareness may be poorer and the burden of stroke is greatest (see **Case study 5: the F.A.S.T campaign**).

“People understand high blood pressure. They understand cholesterol. They don’t understand heart rate or pulse.”

(Mary Baker, European Brain Council)

Summary findings in more depth:



There is poor general awareness and understanding of AF and its role as a major risk factor for stroke

Evidence from a number of countries confirms that there is very **poor general awareness of AF**,³⁸⁻⁴¹ especially among older people.⁴⁰

There is also **poor understanding that AF is a major risk factor for stroke**^{38;41-45} – as compared, for example, to knowledge of the role played by high blood pressure.⁴⁵



Table 2: Evidence of poor general awareness and understanding of AF and of the increased risk of stroke with AF

Country	Study Design/Setting	Findings
Belgium	General population survey run by Ligue Cardiologique Belge (2012) ⁴¹	40% of the population had never heard of AF Only 11% could describe AF accurately Over half of respondents knew that stroke was the most common complication of AF.
Bulgaria	Surveys carried out amongst residents aged 45-74 in North East Bulgaria (2000-3) ⁴⁴	Knowledge of AF as a stroke risk was zero in rural and urban populations.
Estonia	Two surveys of the general population in Tartu and Tallin (2012) ⁴⁵	Just over 50% of respondents knew that cardiac arrhythmia was a risk factor for stroke, whereas 95% were aware that high blood pressure was a risk factor. ⁴⁵
France	Population survey	At least 25% of the population are poorly informed about stroke and what causes stroke. ¹⁶⁶
Germany	General population survey conducted in adults aged 40 and over in 3 large German cities under the auspices of AFNET (2011) ³⁸	Over a quarter of the population over 40 had never heard of AF. Only half of the population were aware of the increased risk of stroke with AF.
Ireland	Survey conducted before the launch of an awareness campaign in 2013 ⁴⁰	38% of the population were unaware of AF, and this figure reached 64% in 65-70 year olds.
Italy	Survey conducted in Northern Italy ¹⁶⁷	50% of people did not know much about stroke or about available anticoagulation therapy.
Portugal	Survey conducted by local patient organisation ³⁹	40% of Portuguese are unaware of the symptoms associated with cardiac arrhythmias. 89% of Portuguese does not identify arrhythmias as a possible cause of death.
Switzerland	Survey conducted by the Swiss Heart Foundation ⁴²	40% of people did not know that AF could lead to stroke and only one third could identify the signs of someone having a stroke.
UK	AF Association, AF week survey (2013) ⁴³	One in three adults is unaware of the high stroke risk caused by AF (AF).

CASE STUDY 3: PORTUGAL

BATE BATE CORAÇÃO ASSOCIATION



Overview

A range of public educational events and pulse testing in everyday settings, including major events supported by football clubs. Strong engagement of government and civil service in public debate on policy and provision for AF.

Timescales

The association was formed in 2011, following the Bata Bate Coração campaign in 2010, and has been active since.¹⁶⁸



Approach

The Bate Bate Coração Association has developed several key programmes to deliver on its mission of raising awareness and knowledge of cardiac arrhythmia. As part of the 'Sinta *deu* pulso' (Know Your Pulse) campaign, volunteer doctors, nurses and technicians regularly teach members of the public to check their pulse in everyday settings such as shopping malls, lunch breaks in workplaces, universities, and musical events. Public seminars are also held where healthcare professionals talk about AF prevalence, co-morbidities and treatment options.

Bate Bate Coração has kept a high profile in public affairs and national policy, communicating frequently with politicians and the Health Commission in the Portuguese National Parliament. Bate Bate Coração's work has been recognised by leading healthcare commentators, receiving a first prize honour by the not-for-profit group 'Hospital do Futuro' in 2011.³³⁹



Links/References

<http://www.batebatecoracao.pt/>



GREATER PUBLIC AWARENESS

What has been achieved?

- Regular public outreach on pulse checks (see 'Approach')
- Major event held in 2010 at a key football match in the Estadio da Luz in partnership with SL Benfica.¹⁶⁸
- Specialist activities for children and families provided through the 'Coração Tic Tac' project.¹⁶⁸
- Website with in-depth and regularly updated information on cardiac arrhythmias and public discussion forums. Presence on Facebook.
- 'Coversas con Ritmo' (Rhythm talks) public interactive debate launched in 2012, involving the secretary of state for health and other major public figures
- Petition launched to have November the 12th recognised as National Sudden Death Prevention Day.¹⁶⁸
- Plenary session organised in national parliament in 2013 on arrhythmia



Resource implications

The 'Sinta o seu pulso' campaign relies in part on volunteer healthcare professionals. Bate Bate Coração Association is supported by the Portuguese Association of Arrhythmology, and the Portuguese Institute and Heart Rhythm Association of Patients with pacemakers and implantable defibrillators (ICDs)³⁹



CASE STUDY 4: IRELAND

THE IRISH HEART FOUNDATION AWARENESS CAMPAIGN



“It’s our job to make people aware of the dangers of undiagnosed AF. Any impactful campaign is bound to create some public fear, because the facts are truly frightening.”
(Chris Macey, Head of Advocacy, Irish Heart Foundation)

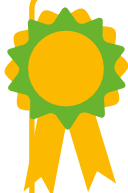


Overview

A hard-hitting national awareness campaign alerting the public of the magnified risk of stroke associated with AF with a call to action to have regular pulse checks.

Timescales

The campaign was launched in November 2013 – a follow-up campaign is planned for 2014.



What has been achieved?

- Call to action to people over 50 to have regular pulse checks
- Improved awareness in people who have AF of the links between AF and stroke
- Sensitisation of the GP community to the frequency of undetected AF

A full evaluation of the impact of the campaign is forthcoming.

Resource implications

The campaign was funded by Pfizer and Bristol-Myers Squibb.



Links/References

http://www.irisheart.ie/iopen24/atrial-fibrillation-awareness-campaign-2013-t-38_1339.html

Approach

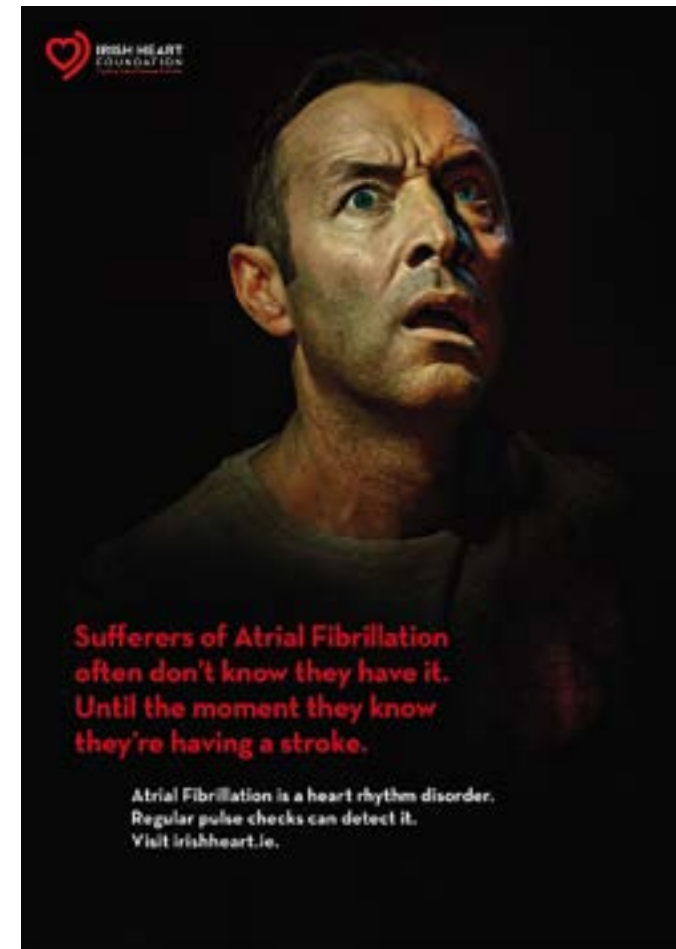
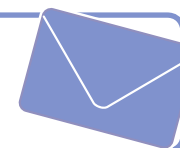
The Irish Heart Foundation has run a variety of successful stroke-related awareness campaigns in recent years, including F.A.S.T., which trebled knowledge of stroke warning signs among the Irish population.

The need for an AF awareness campaign was established through the North Dublin Stroke Registry. This suggested that 1 in 3 strokes in Ireland was due to AF, a much higher proportion than the 15-20% reported in the European Society of Cardiology guidelines. Surveys also suggested that 74% of the general population were unaware of AF, and that, amongst people who had ECG-documented AF, 38% were unaware that they had an irregular heart rhythm – and this rate was 64% in those aged 65-70.⁴⁰ This led the development of the current AF campaign by the Irish Heart Foundation, whose key message was that ‘sufferers of AF often don’t know they have it, until the moment they know they’re having a stroke.’

The campaign urged over 50s to undergo regular pulse checks. The campaign involved an audio advertisement which was broadcast on national and regional radio over four weeks, and hard-hitting posters, flyers, and information booklets were distributed widely to GP practices, hospitals, and health centres. The next phase of the campaign will be focused on the implementation of widespread screening for AF.

Contact:

Chris Macey, Irish Heart Foundation
cmacey@irisheart.ie



CASE STUDY 5: UK & OTHER

THE ACT F.A.S.T CAMPAIGN



"We found that by raising awareness of stroke within the general public, this helped put pressure on the system to improve stroke services in general."

(Joe Korner, External Affairs Director, Stroke Association)

Overview

The Act F.A.S.T campaign seeks to raise awareness of stroke warning signs amongst the general public and encourage rapid access to acute care in order to reduce the long-term impact of stroke.

Timescales

The campaign was launched in 2009 by the Department of Health in England and has been running annually since, in focused bursts of activity managed by the Department of Health, as well as independent supporting activity from organisations such as the Stroke Association and primary/secondary care organisations.



Approach

The Department of Health (now Public Health England), a public agency promoting information on health, social care and healthy living, launched a campaign in collaboration with the Stroke Association promoting the Act F.A.S.T, 'speech', and 'time' (to call 999 and access emergency care) – a memorable 4-point action list proving clear direction for any member of the public in the event of a suspected stroke.

Act F.A.S.T. is supported by a website managed by Public Health England and NHS Choices, with further information, such as patient stories, and an invitation to get involved. It is intended as a 'viral' media campaign, providing public domain resources such as posters, adverts, and video clips for other websites and media sources to feature in support of the campaign.

In 2014, the campaign was delivered primarily through the television advertisement, with supporting campaign activity from external organisations. Further resources were available to download centrally via a public resource centre.



GREATER PUBLIC AWARENESS

What has been achieved?

- The first year of the campaign saw an uplift of 54% in stroke in stroke related calls to 999, meaning that almost 24,000 people reached hospital within 3 hours of the onset of stroke symptoms
- Awareness of stroke symptoms is currently at 73% in England
- Stroke Association also see an annual uplift in enquiries to their Stroke Information Helpline and F.A.S.T campaign pages on their website



Contact:

<http://www.nhs.uk/actfast/Pages/contact-information.aspx>
or stroke.org.uk
or stroke@dh.gsi.gov.uk

For further information on the Stroke Association's involvement with the Act F.A.S.T campaign, please contact Laura Harris, Senior Prevention Marketing Officer: laura.harris@stroke.org.uk



Resource implications

In 2004, Professor Gary Ford's team at Newcastle University showed that ambulance paramedics can use the Face Arm Speech Time (F.A.S.T) test to recognise when someone is having a stroke. The study, funded by the Stroke Association, found that paramedics using the F.A.S.T test could identify a stroke just as accurately as specially trained doctors.

This research formed the basis of the national Act F.A.S.T campaign to inform emergency paramedics and the public how to identify the signs of stroke and to treat it as a medical emergency.



Links/References

<http://www.nhs.uk/actfast/Pages/stroke.aspx>



Priority 3:

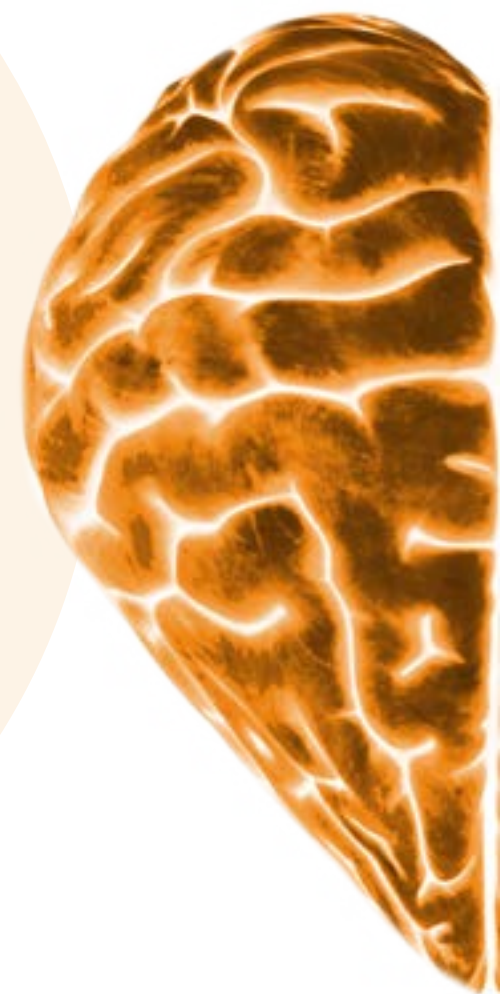
Improved detection of AF and integration of pulse checks into clinical practice

Case studies for Priority 3

**Pulse checks in pharmacies
- Italy**



**'Know Your Pulse' campaign
– UK, China, India, Australia,
USA, Uruguay**



What we know:

AF often does not present with any obvious symptoms,¹⁰ therefore many cases of AF are thought to only get diagnosed once a person presents to their doctor with a serious complication such as a stroke.²¹ In addition, symptoms of AF can come and go, making it sometimes difficult to diagnose. To counter this detection gap, ESC guidelines recommend that all people over the age of 65 should be screened opportunistically for AF,²⁰ based on clinical trial evidence.

Why is this important?

Adequate detection of AF is a first step in the prevention of AF-related strokes.



Key findings from the European Atlas:

- Country-level data on the prevalence of AF are derived from a number of sources^{18;31;33;42;46-64} and are likely to vary in reliability; however, **estimates from many countries suggest that the prevalence of AF may be higher than previously estimated.**^{18;31;47;48;51;52;54-56;59;61-63;57}
- There is evidence of **a detection gap of approximately 10-45%** in terms of the number of people who have AF but in whom it is undetected.^{31;33;51;62;65;66}
- **Community screening** presents an important avenue for improving the detection of AF, and interesting pilot programmes have been led in many countries.^{65;67}
- Yet overall **simple screening tools are being overlooked.** For example pulse checks have yet to be integrated as part of general health checks, despite the fact that AF generally meets WHO criteria for conditions in which screenign is warranted.¹⁶⁹

Avenues for change:

- **All patients aged 65 and above should be screened opportunistically** for AF in accordance with ESC guidelines. In particular, people who already present with a long-term medical condition may be good candidates for screening given the higher prevalence of AF in people with other co-morbid conditions.³⁰
- **Manual pulse checks should be integrated into national health checks** sponsored by national health organisations or health insurance bodies (see **Case study 7: the 'Know Your Pulse' campaign**)
- **Opportunities for community screening should be explored** within each local context – for example in shopping centres, community centres, pharmacies, flu clinics (see **Case study 6: screening in pharmacies in Italy**).
- **Incentives to encourage proactive detection of AF** by primary care physicians should be embedded into local framework agreements and remuneration schemes where available in different countries, and supported by targeted professional education to help improve understanding of AF across the entire medical community.

“The more you look, the more you find”

(Professor John Camm, lead author of the ESC guidelines on the management of AF)

Summary findings in more depth:



Country-level estimates of the prevalence of AF suggest that greater numbers of people are affected by AF than previously estimated

The international literature has traditionally suggested that the prevalence of AF is between 0.5-1% of the population.²⁰ However, **many national estimates of AF prevalence suggest that it may be higher.**^{18;31;47;48;51;52;54-56;59;61-63}

(see all available country-level estimates of AF prevalence in **Priority 7**).

Pulse checks have not yet been integrated into clinical practice

In order to improve the detection of AF, patient organisations and professional societies in a number of countries (eg. Germany, Denmark and UK) have lobbied governments to **include manual pulse checks in the general health checks** offered to patients over a given age. Unfortunately, decisions by governments thus far have been not to include them, despite the fact that AF generally meets the WHO established criteria for screening.¹⁶⁹

A large proportion of AF cases are undetected – between 10-45% depending on the country

Existing prevalence data are likely to be underestimated as they do not include cases of AF that remain undetected. Exact figures for the number of undetected cases are difficult to obtain, however some estimates have been provided in different countries – these reveal a detection gap of between 10-45% depending on the study.^{31;33;51;62;65;66} (see **Table 3**)

Table 3: Country-level estimates of the detection gap in the prevalence of AF

Country	Detection Gap (%)
Czech Republic	40% ⁶⁶
Norway	11% ⁶²
Portugal	36% ³¹
Spain	10% ³³
Sweden	45% (in 75-76 year olds), 30% of all AF cases ⁶⁵
UK	18% ⁵¹

Summary findings in more depth:

Community screening programmes for AF may help uncover undetected AF

Community screening programmes may be helpful to improve detection of AF.¹⁷⁰ For example in Sweden, a pilot screening study of 75-76 year olds (the STOPSTROKE study) found that **45% of AF cases were undetected.**⁶⁵ Extrapolating these findings to population-based figures, the authors suggested that the estimated prevalence rate of 3% in Sweden may be as high as 4-5%.^{32;65}

Opportunities for community screening should also be explored within each local context. For example, **screening of people over the age of 65 years during seasonal flu vaccination** has been an effective and economical way of detecting AF in parts of the UK¹⁷¹, and screening for AF at the same time as high blood pressure in pharmacies has done in pharmacies in Italy and France. (see [Case study 6](#))

Technological advances in the form of hand-held ECG devices and iPhone apps (Figure 5) are likely to facilitate community screening in future, and have been shown to be very effective at detecting AF in primary care settings.⁶⁷ However, further research is needed into their feasibility and cost-effectiveness if implemented at scale.¹⁷⁰

Figure 5: an example of AliveECG, a portable ECG that allows to check one's heart rhythm.



CASE STUDY 6: ITALY

PULSE CHECKS IN PHARMACIES



“The general public is still so poorly aware that atrial fibrillation is a major risk factor for stroke. This initiative helps convey the message that people should get their pulse checked and check their blood pressure in efforts to prevent stroke.”
(Paolo Binelli, President, A.L.I.Ce. Italia)

Overview

Pulse checks are offered alongside blood pressure monitoring for free to the general public in 3,000 pharmacies across Italy during the week of World Stroke Day.

Timescales

Every year during the week of World Stroke Day (October 29th) – run since 2011.



Approach

Since 2011, Colpharma has sponsored a screening initiative across 3,000 pharmacies in Italy, being the distributor in Italy of MicroLife, which provides the monitoring instruments to pharmacies. The initiative is run under the auspices of A.L.I.Ce. Italia. Individuals are encouraged to check their blood pressure as well as their pulse in order to detect possible problems of high pressure as well as whether they have AF. They are then referred, when necessary, to their family physicians.

Thousands of people participated in the initiatives since 2011, and 5-6% of people assessed were suspected to have AF. In general more than 50% of people identified with AF do not know that this a major cause of stroke.



What has been achieved?

- 3,000 pharmacies participated
- Thousands of people over a 1-week period had their pulse checked, and more than 5% of new cases of AF were referred to physicians.
- Increased awareness of AF as an important risk factor for stroke, alongside high blood pressure, has been achieved
- Initiative also replicated in France, in a collaboration with France-AVC (the national stroke patient organisation)

Resource implications

Funding for the initiative from Colpharma. Provision of blood pressure and pulse check monitoring instruments by MicroLife. Promotion and dissemination of the initiative by A.L.I.Ce. Italia with support.

Links/References

www.aliceitalia.org

A.L.I.Ce. Italia Onlus
Associazione per la Lotta all'Ictus Cerebrale
www.aliceitalia.org

Contact:

Paolo Binelli, Associazione per la Lotta all'Ictus Cerebrale (A.L.I.Ce. Italia)
paolo.binelli@aliceitalia.org



"We all know to check our weight, blood pressure, cholesterol, any lumps in case of cancer – yet few of us think to check our pulse. A simple pulse check can identify an irregular heart rhythm – the first signs of diagnosing potential AF. Having a record of your pulse will help your doctor determine whether or not you have AF and put you on effective therapy to help reduce your risk of an AF-related stroke."

(Trudie Lobban, MBE, Atrial Fibrillation Association)

Overview

A broad campaign to encourage people to check their pulse and to promote the inclusion of routine manual pulse checks in clinical practice.



Timescales

Launched in 2009, still running today.

Resource implications

The campaign has been run by the Atrial Fibrillation Association in the UK and other AF associations in different countries. The campaign has benefited from educational grants from Bayer Healthcare and other private companies.



What has been achieved?

- Improved awareness and understanding amongst the general public of the importance of taking one's pulse as a first step to detecting AF
- Campaign endorsed by the Department of Health in the UK and by leading cardiology societies in other countries
- A powerful political campaign focused on AF, with public events hosted in national parliaments, schools, and other public arena in participating countries

Approach

The Know Your Pulse (KYP) campaign was first launched jointly by the AF Association and Arrhythmia Alliance during Heart Rhythm Week in 2009. Its aim is to raise public and medical awareness of the pulse as one of the most effective ways of identifying potential cardiac arrhythmias. Founded in UK, it now is an ongoing campaign in the UK, Australia, USA, Uruguay, China and India, promoting the need for us all to be aware of our pulse, and encouraging governments to include routine manual pulse checks in clinical practice.

The campaign has involved thousands of events and social media. The campaign website features a dedicated app, 'Know Your Heart Rhythm' and tools (eg. letters to MPs) for individuals to lobby their local politicians to introduce pulse checks to screen for AF in the general health checks and flu vaccination clinics.

Links/References

<http://pulse.knowyourpulse.org/>
www.atrialfibrillation.org.uk



Contact:

trudie@heartrhythmalliance.org



✓ IMPROVED DETECTION OF AF



Priority 4:

Appropriate anticoagulation therapy for every AF patient at increased risk of stroke

Case studies for Priority 4

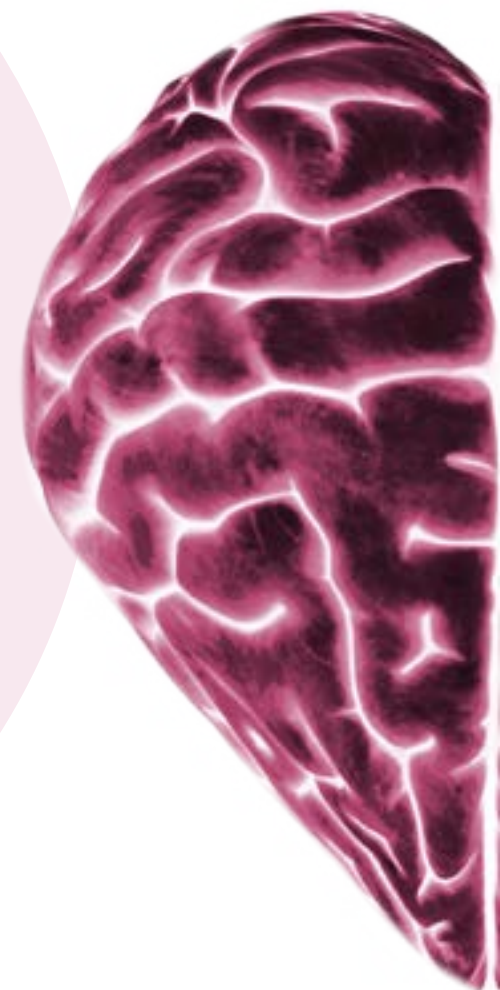
Heart of AF programme



EHRA practical guide to the use of new anticoagulants



Primary care leadership driving best practice in Bradford - UK



What we know:

The decision to prescribe any given OAC therapy requires a **careful balance** between the potential benefits (stroke prevention) and risks (increased risk of major bleeding) of therapy for each patient - as well as the patient's preferences and values.^{23;24}

Evidence suggests that **physicians often overestimate the risk of bleeding** but underestimate the risk of stroke with OAC therapy,²⁸ and therefore do not offer appropriate OAC therapy to their AF patients.

Why is this important?

The ESC guidelines recommend that **all AF patients except those at very low risk of stroke** be offered the most appropriate anticoagulation medicine to meet their individual needs.²⁰



Key findings from across Europe:

- Country-level estimates of OAC therapy use suggest that a large proportion of AF patients do not receive OAC therapy in accordance with clinical guidelines and that the treatment gap is larger than reported in recent international registry studies:
 - **Up to 40% of AF patients do not receive OAC therapy** in 13 out of 20 countries where data are available.^{31;52;62-64;68-90;97}
 - **Up to 40% of high risk patients do not receive OAC therapy** in 8 out of 15 countries where data are available.^{52;57;63;72;77;82;91-98}
 - **Generally, physicians still over-rely on aspirin**, despite evidence that it is ineffective at preventing AF-related stroke.²⁷
- There is considerable variation in the use of OAC between local settings even in countries where national guidelines recommend its use - pointing to the need for localised quality improvement schemes.
- There are also important deficiencies in practice, including:
 - **under-treatment** of patients at greatest risk of stroke^{52;70;91;92}, and **over-treatment** of patients who are not at risk of stroke.^{52;69;76;98;99;70}
 - **under-treatment of older patients**, particularly older women, who are at greater risk of stroke.^{75;76;92;100;101}

Avenues for change:

- **Local quality improvement frameworks** should be developed to ensure that inequalities in access are redressed between local settings and that good practice is embedded in local care pathways. (see **Case study 10: Primary care leadership driving best practice in Bradford**)
- **Where possible, these should be supported by financial incentives for GPs** to encourage them to adhere to existing guidelines.
- **Physician education tools and resources** are also needed on the importance of assessing all AF patients for their risk of stroke, and of offering each patient the most appropriate OAC therapy to meet their individual needs, particularly in primary care. (see **Case study 8: The Heart of AF**).
- **Information on all OAC therapy alternatives** should be provided to physicians and patients to ensure that these medicines are used appropriately and safely and that an individualised approach to therapy is offered to patients.^{157;172} (see **Case study 9: the EHRA practical guide to the use of new anticoagulants**)

"There are approximately 360,000 new cases of AF-related stroke every year in the EU¹ – and many of these can be prevented through appropriate anticoagulation therapy, thereby avoiding considerable morbidity, death and costs to society."

(Eve Knight, Chief Executive of AntiCoagulation Europe)

Priority 4: Appropriate anticoagulation therapy for every AF patient at increased risk of stroke

Summary findings in more depth:

In many countries, a significant proportion of patients are not treated with OAC therapy, and are offered aspirin instead, despite its use not being supported by recent clinical evidence or ESC guidelines.

Data on OAC therapy use were available for 22 countries, and are shown in **Table 4**. **These rates are often much lower** than those found in recent publications of international registries¹⁷³⁻¹⁷⁵ – probably reflecting the fact that most of these national studies have more recruitment of patients from non-specialist centres, including primary care – where under-use of OAC therapy is known to be more common.¹⁷⁶ Key findings are:

- **Up to 40% of AF patients do not receive OAC therapy** in 13 out of 20 countries where data are available.^{31;52;62-64;68-90;97}
- **Up to 40% of high risk patients do not receive OAC therapy** in 8 out of 15 countries where data are available.^{52;57;63;72;77;82;91-98}
- **In most countries, there is still over-reliance on aspirin**, although it is no longer recommended by ESC guidelines on the basis that it is less effective at preventing stroke and does not carry a lower risk of bleeding compared to OAC therapy.^{20;27}

Table 4: Use of OAC therapy in different countries (data restricted to studies > 2006)

Country	% of all AF patients receiving OAC therapy	% high risk patients receiving OAC therapy
Czech Republic	75% ⁷³	
Denmark	32-66% ^{72;79}	69% ⁷²
Estonia	66% ⁸⁸	
Finland	52% ⁸²	50% ⁸²
France	51% ⁸⁹	
Germany	60-83% ^{63;71;84}	70% ⁶³
Greece	39% ⁸⁵	33% ⁵⁹
Hungary	50-60% ^{78;68}	
Ireland	53%* ⁵²	59% ⁵²
Italy	46-68% ^{64;76;98}	67-73% ⁹⁸
Lithuania		39.4%*** ⁹⁷
Netherlands	69% ⁷⁰	87% ⁷⁰
Norway	94% ⁶²	
Poland	50% ⁸⁶	15% ⁵⁷
Portugal	34-41% ^{31;80;87}	
Romania		71%** ⁹⁶
Slovakia	67% ⁷⁷	58%** ⁷⁷
Spain	52-84% ^{74;83;94}	57%-59% ^{91;94}
Sweden	42 ¹⁷⁷ -64% ⁶⁹	50% ⁹²
Switzerland	51% ⁹⁰	80%****
Turkey	44% ⁸¹	
UK	56% ⁷⁵	51% ^{95;93}



* Percentage of patients eligible for OAC therapy who are receiving it.

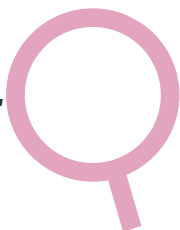
** Defined as patients with a previous TIA or stroke.

*** Defined as OAC rates in patients discharged from hospital for stroke.

**** Expert opinion, unpublished data.

No data are available for: Austria, Belgium, Bulgaria, Latvia, or Slovenia.

Summary findings in more depth:



Even in countries where national guidelines recommend broad use of OAC therapy, there is large variation in local practice.

Decentralisation of health care across many European countries has resulted in **significant heterogeneity in practices** surrounding the prevention of AF-related stroke – and this heterogeneity often exists despite national standards or guidelines.

For example in Sweden, the National Board of Health and Welfare (NBHW) has recently introduced as one of its KPIs for reducing the disease burden that at least 80% of all AF-patients with one additional risk factor for stroke should receive anticoagulant therapy. In theory, these KPIs are meant to lead focus and investment at a local level. However in practice to date: none of Sweden's 21 county councils reaches that target.

Local quality improvement initiatives, particularly in primary care, may help reduce discrepancies between localities and encourage the local implementation of guidelines. However, very few countries reported such initiatives taking place. (see **Case study 10**)

Summary findings in more depth:



Under-treatment as well as over-treatment are common

Findings from several countries also suggest that physicians do not necessarily base their decisions to prescribe OAC therapy on stroke risk and that their understanding and use of stroke risk classification schemes is limited. These findings confirm those of previous reports.³⁵ Specifically:

- **Under-treatment:** i.e. patients at the highest risk of stroke are often not offered OAC therapy,^{52;70;91;92} and
- **Over-treatment:** patients with no known risk factors for stroke are being offered OAC therapy.^{52;69;70;76;98;99}
- Under-treatment is a particular problem in non-specialist settings – which may be reflective of the tendency of **multi-morbid patients** to present to internal medicine departments compared to cardiology, for example.⁷⁶

Older people, particularly older women, are at greatest risk of under-treatment despite being at greatest risk of stroke

In many countries, under-use of OAC therapy is greatest in older people even if they are otherwise healthy.^{75;76;92;100;101}

This is a worrying trend, as older people are at greatest risk of AF and of stroke.¹³ Older women in particular are at greatest risk of under-treatment^{81;178}, despite evidence that OAC therapy may be of greatest benefit in this population of patients.¹⁷⁹ Unfortunately, this finding mirrors a number of reports that women with heart disease tend to be under-treated compared to men.¹⁸⁰

CASE STUDY 8: ONLINE TOOL

HEART OF AF PROGRAMME



“Although initially designed to provide physicians with information, we found that non-specialists in AF welcomed the website as a forum in which they can exchange good practice with their peers.”

(Jo Jerrome, Atrial Fibrillation Association)

Overview

A web-based resource which provides healthcare professionals with state the art resources to better equip them with the skills and knowledge to better diagnose, treat and manage AF patients.

Timescales

The site was launched in June 2013 and has run continuously since



Approach

The site functions as an online information platform and is targeted at all health professionals who may be involved in the care of a person with AF. The site is used by a wide range of health professionals working in different settings (e.g., GPs, emergency physicians, commissioners and medical students) and materials are appropriate for a wide range of professionals.

Resources provided include: guidelines, information on AF as a condition, treatment options, information on commissioning, real life examples, and training resources, including signposting to relevant courses. Users also use it as a network and forum for exchange on good practice.

THE
HEART
OF AF

AFA
AF Association
www.afa-international.org



APPROPRIATE ANTICOAGULATION
THERAPY

What has been achieved?

- 1293 new health care professionals joining, and 4973 visits to the website in its first 12 months, with the number of visits continuing to increase month on month
- Increasing number of centres approaching AF Association to share information on the site, as well as good feedback from others who have gone to the site to look for information
- Contributes towards better information of non-specialists about AF and its management
- Forum for exchange of information and sharing of best practice among non-specialist physicians on all aspects of AF management



Resource implications

Resource created and managed entirely by Atrial Fibrillation Association (patient organisation) with financial support from various private and commercial sources



Links/References

<http://www.heartofaf.org/>



Contact:

Jo Jerrome, Atrial Fibrillation Association
jo@afa.org.uk



CASE STUDY 9: EUROPE

EHRA PRACTICAL GUIDE TO THE USE OF NEW ANTICOAGULANTS



“We have brought together information on all the NOACs in one document so it’s clear for physicians what the similarities and differences are. We worked closely with the drug companies to make sure that all of the information in the SmPCs [patient information leaflets] is also in our document.”
(Professor Hein Heidbuchel – lead author)¹⁸¹

Overview

A practical guide, meant as a complement to the ESC 2012 guidelines, to help physicians in their use of the different NOACs with their patients.

Timescales

Published in 2013,¹⁵⁷ due to be updated



Resource implications

The EHRA Practical Guide and all supporting educational material was produced solely by the European Heart Rhythm Association, and was funded through unrestricted and educational grants from Boehringer Ingelheim, Bayer, Daiichi-Sankyo and Pfizer and Bristol-Myers Squibb.

Approach

The ESC 2012 guidelines recommend NOACs as an alternative to VKAs for the prevention of AF-related stroke; given their novelty, patients and physicians will need to learn how to use NOACs safely and effectively. Thus the European Heart Rhythm Association (EHRA) developed a single comprehensive guide to support clinicians in the practical use of NOACs, which may serve as a complement to the ESC guidelines. The guide summarises existing evidence of best practice, and gives practical directions for 15 concrete clinical scenarios. They cover practical start up and follow up schemes for patients on NOACs, how to measure the anti-coagulation benefits of NOACs, drug-drug interactions and pharmacokinetics of NOACs, switching between anticoagulant regimes, the management of co-morbidities and complications, and various other important ‘what if’ scenarios.

The guide comes with various embedded resources to assist clinical practice, including a proposed patient information card on NOACs, a card to record all planned or unplanned visits and a template to list any concomitant medication. In recognition of the rapid development of new information and evidence, EHRA has provided a supporting website www.NOACforAF.eu and a pocket sized booklet with key messages.

The EHRA practical guide was co-authored by leading cardiologists from 5 different countries across Europe.

Links/References

Heidbuchel H, et al. European Heart Rhythm Association Practical Guide on the use of new oral anticoagulants in patients with non-valvular atrial fibrillation. *Europace* 2013; 15(5):625-651.¹⁵⁷
www.NOACforAF.eu



✓ APPROPRIATE ANTICOAGULATION THERAPY



What has been achieved?

- Practical information to physicians to help them implement ESC guidelines in different clinical situations
- Helpful information to physicians on the characteristics, risks and benefits of individual NOACs
- Useful, adaptable patient information cards that may keep track of patients’ medication, educate them about how to optimise therapy (e.g., by listing concomitant medications, in the hope of minimising drug-drug interactions,) and ensure continuity of care across different providers.



Contact:

ESC Press Office
press@escardio.org

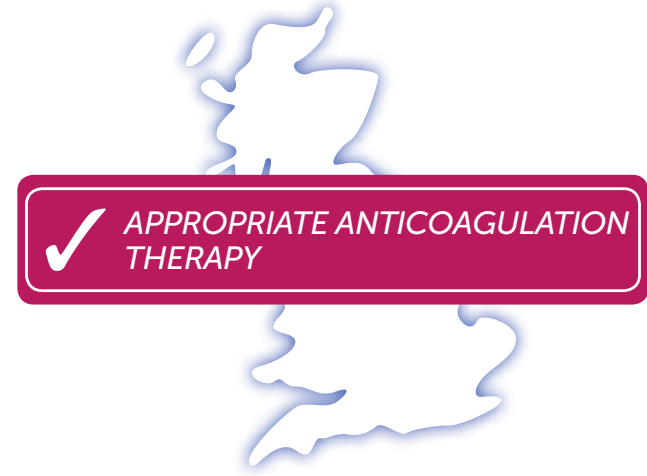


CASE STUDY 10: UK

THE AF QUALITY IMPROVEMENT PROJECT (AFQIP) - PRIMARY CARE LEADERSHIP IN BRADFORD



“Guidelines are important, but to really make things change, you have to have clinical leaders within each local health care setting who can drive best practice amongst their peers and reinforce existing policy levers.”
(Dr Matthew Fay, GP Executive Member, AF Association Medical Advisory Committee Member & Arrhythmia Alliance Executive Committee Member, Bradford Districts Clinical Commissioning Group, Westcliffe Medical Centre)



Overview

A quality improvement project, led in a collaborative approach between local commissioning bodies and GPs, which aimed to improve anticoagulation rates in AF patients.

Timescales

The initial initiative was run in 2012 with a follow up of 18 months, but the quality improvement model has since become embedded within participating practices.



Approach

A quality improvement initiative was established as a complement to the national incentive framework for GPs (the Quality Outcomes Framework) to improve the use and quality of anticoagulation therapy in AF patients in Bradford. Sixty-four out of 80 local practices participated. Participating practices were offered 10 simple, evidence-based strategies to encourage improvement. The programme achieved a significant increase in the number of AF patients receiving OAC therapy, with the greatest improvement of practice in patients at highest stroke risk. Success factors included:

- Clear measurable indicators that were evaluated across all participating practices and fed back to encourage improvement
- Leadership from local GPs, working in collaboration with local commissioners, public health, and local hospitals
- A clear approach to peer facilitation, recognising that practices have as much to learn from each other as ‘experts’ had to teach them
- Constant availability of advice and support in the form of Q&A, expert events, training, practice visits and IT support tools.

What has been achieved?

- 31% relative increase in patients put on OAC therapy vs. 4% increase in non-participating practices over 18 months
- Stroke reduction rate of 10% in one year
- 25 strokes and 17 deaths estimated to have been prevented.



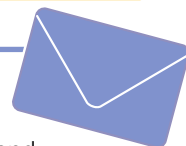
Resource implications

The programme was funded using existing resources and volunteer GP time. A preliminary economic analysis suggested that the overall cost of implementation was offset considerably by the reduced costs associated with the prevention of AF-related stroke.



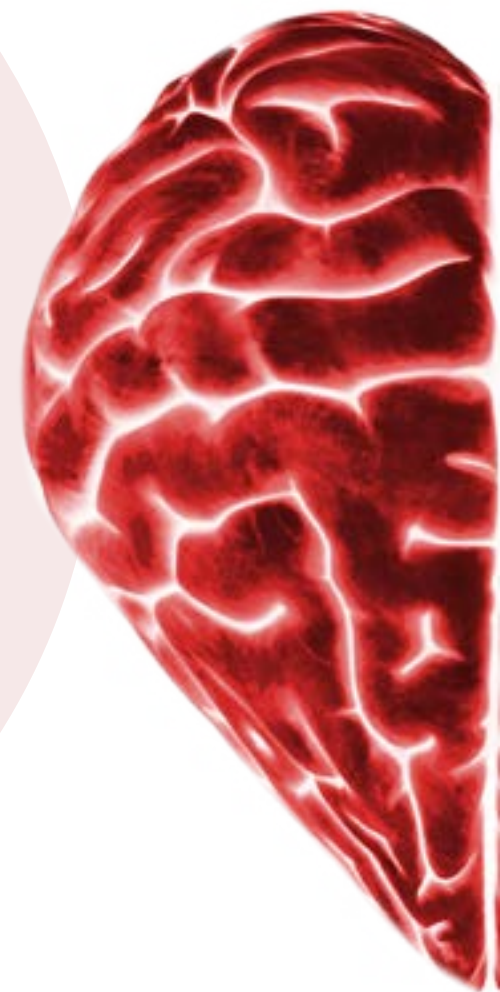
Contact:

Dr Matthew Fay
GP Principal, Westcliffe Medical Practice and GP Executive Member Bradford Districts CCG
Westcliffe Medical Centre
AF Association Medical Advisory Committee Member & Arrhythmia Alliance Executive Committee Member
matthew.fay@bradford.nhs.uk



Priority 5:

Patient-centred care and clear information to patients



Case studies for Priority 5

The AF risk stroke calculator



Nurse-led integrated
chronic care model for AF
management - Netherlands



What we know:

Physicians and patients are known to differ in how they view the **relative risks and benefits of OAC therapy**: physicians tend to overestimate the risk of bleeding and underestimate the risk of stroke compared to their patients,²⁸ whereas patients tend to place more value on reducing the risk of stroke.^{24;182}

Why is this important?

Persistence with OAC therapy is low,¹⁸³ with **up to 60% of AF patients on OAC therapy discontinuing medication** within the first year.¹⁸⁴



Key findings from the European Atlas:

- AF patients often have a poor understanding of their condition, their increased risk of stroke and the purpose of OAC therapy.^{35;102-104}
- According to physicians, the amount and quality of information available for AF patients is poor compared to other cardiac conditions.²³
- Some countries are beginning to look at nurse-led AF care as an approach offering patient-centred care to AF patients, with specialist nurses playing a coordinating and supportive role to patients throughout their care.¹⁰⁸

Avenues for change:

- **Easy-to-access information** about AF, the risk of AF-related stroke and the importance of OAC therapy is urgently needed to help improve patients' understanding of the purpose of OAC treatment and encourage greater adherence to therapy.
- **Resources to support the development of patient organisations** are critical to provide AF patients and their families with a local community of support as well as the information, coping skills and support they need to learn to live with their condition, make the right treatment choices and find ways to improve their quality of life.
- **The development of tools to help patient-physician communication and shared decision-making approaches** between the patient and his/her physician should also be encouraged. (see **Case study 11: The AF stroke risk calculator**).
- **Health care systems should explore the feasibility of nurse-led AF clinics as a model of care** and should invest in the development of specialist nurses who may offer AF patients continuous case management, support and information in community and hospital settings. (see **Case study 12: A nurse-led, integrated chronic model for AF care in Maastricht**).

"All too often patients do not understand or are not told why they have been prescribed oral anticoagulation. Symptoms of AF do not go away by taking anticoagulation drugs so often patients stop taking them as they feel no difference. If you were given paracetamol and your headache did not go away, you would stop taking it. If we want to achieve good adherence to OAC therapy, we must improve the information we provide to patients about the purpose of treatment and stress the critical importance of adhering to the treatment prescribed"

(Trudie Lobban MBE, Arrhythmia Alliance and AF Association)

Summary findings in more depth:

AF patients often have a poor understanding of their condition, their increased risk of stroke, and the purpose of OAC therapy

Findings from a number of countries suggest that **many AF patients are poorly informed** about their condition, the risk of AF and the role of OAC therapy. For example:

- An international patient survey found that up to 25% of AF patients were unable to explain their condition to someone else.¹⁰²
- In a UK study, 56% of patients with AF did not know AF could lead to stroke.¹⁰³
- Many patients do not know why they are on OAC therapy to begin with.³⁵
- Even stroke survivors more widely have been found to have a poor understanding of risk factors for stroke – particularly older patients and those with excellent recovery.¹⁰⁴

There is a general lack of high-quality information and support available to AF patients, leading to poor engagement in their care

Patient organisations focused on AF, anticoagulation and stroke exist in many European countries. However, important gaps in information and support still exist, particularly in Eastern European and Baltic countries.

In a survey of patients and physicians from five EU countries, physicians suggested that **the amount and availability of patient information on AF compares poorly** to that available for other cardiac conditions and AF patients stated that poor engagement in clinical decisions and lack of support were an important concern.²³ In the same study, on average only 14% of AF patients reported having been informed of the potential side-effects of their medication (range across five countries: 9-30%).²³

Similarly, an Italian study found that fewer than 20% of AF patients received information on the side-effects of OAC therapy and only 24% received information about interactions with other drugs.⁹⁸

Nurse-led models of care should be explored as a means to offer a truly patient-centred approach to patients

Physicians often lack the time to provide information to their AF patients.¹⁰² Lessons can be learnt from other chronic conditions such as diabetes or cardiac failure, where the role of **specialist nurses** has been developed to provide patients with the information, support and continuity of care they need throughout the course of their condition and disease management programmes have been implemented successfully.¹⁸⁵

Some countries are beginning to invest in specialist arrhythmia nurses, and successful **models of integrated, nurse-led chronic care** for AF have been implemented and have led to greater patient satisfaction and patient outcomes.^{108;186;187} (see **Case study 12**).

CASE STUDY 11: ONLINE TOOL

AF STROKE RISK CALCULATOR



“This user-friendly tool not only enables physicians in any setting of care to assess their patients for their risk of stroke according to guidelines, it also gives AF patients at risk of stroke a record of this assessment, which they can then take with them to any other health provider they may be seeing, therefore avoiding that any critical information gets lost along the care pathway.”
(Jo Jerrome, Atrial Fibrillation Association)



Overview

An online tool that provides AF patients with an individual assessment of their risk of stroke using the CHA₂DS₂-VASc risk scoring system.

Timescales

The risk calculator was launched in 2012 and is available online.



Approach

This is an easy-to-use online tool that is aimed at AF patients to improve their awareness of their risk of stroke, but is also professional-looking so that it is viewed as credible by GPs and other physicians.

It can be used both in primary or secondary care settings. The tool runs through a series of questions that mimic the sequence of questions in the CHA₂DS₂-VASc score, and ensures that no step is skipped so that the patient receives a comprehensive assessment of their risk of stroke. The tool provides each patient with printable information which can serve as a record of results – this can also be emailed to the patient and his or her doctor.

The risk calculator also provides information on anticoagulant treatment options based on the most recent guidelines.

What has been achieved?

- User friendly, simple tool which appeals to patients as well as physicians
- Improved understanding by AF patients of their risk of stroke
- Helps ensure each patient receives a thorough assessment of their stroke risk in accordance with clinical guidelines
- Starting point for discussion between patient and all treating physicians about AF and risks of stroke with AF, helping improve continuity of care throughout the care pathway
- Positive feedback received to date from physicians and AF patients



Resource implications

The risk calculator was developed by Atrial Fibrillation Association (AFA) and AntiCoagulation Europe. Funding for the project is provided by Bayer Healthcare.



Links/References

<http://www.preventaf-strokecrisis.org/calculator>

Contact:

Jo Jerrome, Atrial Fibrillation Association
jo@afa.org.uk



CASE STUDY 12: NETHERLANDS

A NURSE-LED INTEGRATED CHRONIC CARE MODEL FOR AF MANAGEMENT IN MAASTRICHT



"We were able to convey to patients that responsibility comes hand-in-hand with involvement – and to convince cardiologists that if patients were involved in their care, they would achieve better outcomes."

(Dr Jeroen Hendriks, Maastricht University Medical Centre and Dutch Society for Cardiovascular Nursing)

Overview

A multidisciplinary, nurse-led AF clinic offering integrated, long-term support and care to AF patients.¹⁰⁸

Timescales

The nurse-led clinic model was evaluated in a clinical trial in 2007-8¹⁰⁸ and has been established in the outpatient setting ever since.



Approach

In 2007, Maastricht University Medical Centre set out a randomised clinical trial to compare nurse-led integrated chronic care for AF patients versus usual care by a cardiologist. The integrated care model was based on the Chronic Care Model¹⁸⁸, and involved nurse-led outpatient care steered by decision-support software based on the ESC guidelines and supervised by a cardiologist.¹⁰⁸ Usual care consisted of care provided by cardiologists in the regular outpatient setting.

The clinic model was based on a shared decision-making approach: patients are provided with information about their disease, care and treatment options from the onset and are encouraged to remain engaged in decisions throughout their care. They are also encouraged to undertake self-management activities and to contact the nurse in between visits should they require additional support or information.

The model is based on a multidisciplinary approach in which nurses provide the mainstay of care, guided by a cardiologist who has medical oversight. The use of a common electronic record and decision-making tool requires specialist nurses and cardiologists to justify reciprocally any deviations from clinical guidelines, thereby improving adherence to guidelines. Finally, the use of electronic medical records ensures better information transfer between treating clinicians.¹⁰⁸

Resource implications

The initial trial comparing nurse-led care to usual care was supported by the University Hospital Maastricht as well as by unrestricted educational grants from Boehringer Ingelheim and Medtronic Bakken Research Centre. The clinic is now funded through the general University Medical Centre budget.

Links/References

Hendriks JML. Nurse-led vs. usual care for patients with AF: results of a randomized trial of integrated chronic care vs. routine clinical care in ambulatory patients with AF. *Eur Heart J* 2012; 33: 2692-6.¹⁰⁸



PATIENT-CENTRED CARE

What has been achieved?

As compared to usual care, nurse-led care led to:

- Greater adherence to stroke prevention guidelines (99% vs. 83%)
- Overall, prevention of incomplete diagnostics and therapeutics
- Lower rate of cardiovascular death (1.1% vs. 3.9%)
- Better information of patients about AF and their treatment, as measured by a validated scale (the AF Knowledge Scale)¹⁸⁶
- 35% relative risk reduction of cardiovascular hospitalization or death¹⁰⁸
- Lower overall costs compare with usual care and more life-years gained, therefore a highly cost-effective (dominant) option from an economic point of view.



Contact:

Dr. Jeroen Hendriks, RN, PhD, NFESC
University of Maastricht Medical Centre
Jeroen.Hendriks@maastrichtuniversity.nl



Priority 6:

A whole-system approach to the prevention of AF-related stroke



Case studies for Priority 6

A 'one stop shop' AF clinic - UK



Collaboration between
neurologists and cardiologists
in Odense - Denmark



What we know:

Poor coordination of care is a key concern for AF patients²³, who often find themselves caught between numerous physicians - cardiologists, general practitioners, neurologists, and other professionals – who do not systematically share information about their patients. Thus any strategy to improve the prevention of AF-related stroke must look at system changes and tools that may foster greater communication between physicians and encourage more efficient use to resources and better quality of care for patients.^{102,185}

Why is this important?

Lack of coordination of care is one of the main concerns of AF patients, and may lead to important **information about the patients getting lost** between treating physicians.²³



Key findings from the European Atlas:

- **Health care professionals other than cardiologists** (particularly general practitioners, nurses, geriatricians¹⁰⁶ and pharmacists¹⁰⁷) are likely to play a growing role in the management of AF in years to come.
- In many countries, **primary care clinicians** have called for greater involvement in anticoagulation decisions for AF patients.^{105,83}
- **Integrated, multidisciplinary approaches** to care may encourage greater coordination between physicians and help break down professional silos
- **Harmonised standards of care** for anticoagulation practice may help reduce heterogeneity across care settings.

Avenues for change:

- **Policymakers should learn from other conditions** and explore the development and implementation of multidisciplinary models of care to improve coordination of care for AF patients and improve collaboration between all relevant professionals.
- **Ways to achieve greater collaboration** between cardiologists, neurologists, and other health professionals (including GPs, nurses, pharmacists and geriatricians) should be explored within the context of each particular health care setting. (see **Case study 13: A 'one stop shop' clinic in Llanelli** and **Case study 14: Coordination between cardiologists and neurologists in Odense**).
- **Cardiology professional societies should work with other disciplines** (geriatrics, neurology, primary care) to develop joint guidance that may help practising physicians place the requirements for prevention of AF-related stroke within the broader context of each patient's individual health needs.

“Achieving better prevention of AF-related stroke is not just the responsibility of cardiologists. With the rising prevalence of AF and the ageing of the population, it will be critical that all involved professionals raise awareness among their patients of the risks of AF-related stroke and work together to make best use of available resources to offer patients the highest standard of care across the whole health care system.”

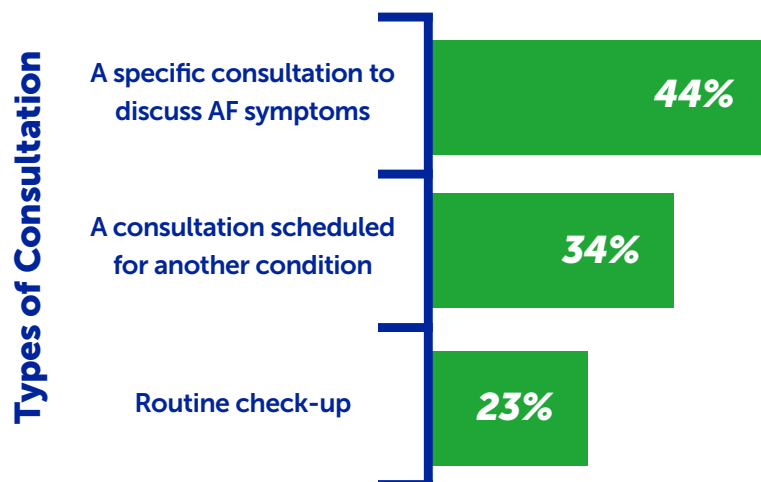
(Dr Thomas Fåhraeus, Chairman of Arrhythmia Alliance, Sweden)

Summary findings in more depth:

The growing prevalence of AF is likely to mean that GPs and other primary care physicians will play a growing role in the management of AF in years to come.

Increasing numbers of AF patients are likely to put unsustainable pressures on hospital-based cardiology clinics, and a gradual shift of care into primary care settings is likely to occur. In addition, the fact that most diagnoses of AF are made 'by accident' (see Figure 6 below) underscores the need for all primary care clinicians to have a good understanding of clinical guidelines and OAC therapy in order to guide their patients towards appropriate care.^{34,102}

Figure 6: Type of consultation at which AF diagnosis was made



Adapted from Aliot et al 2010¹⁰²

In many countries, general practitioners, pharmacists and family physicians have called for greater recognition of their critical role in OAC management decisions.

There are a number of examples across Europe of professionals working in primary care having a growing role – or calling for a greater role – in the management of AF patients. For example:

- In Austria, the national professional society of general practice and family medicine has drafted its own **guidelines** on the prevention of AF-related stroke, in collaboration with the cardiology professional societies.¹⁸⁹
- In Spain, primary care physicians have called for **greater involvement in the management of AF patients** and better coordination between primary and secondary care.¹⁰⁵
- In Spain and Italy, primary care physicians have asked to receive **appropriate training on NOACs** and to have the right to prescribe NOACs to their patients (currently prescription is only allowed by specialists).⁸³
- In France, the main Sickness Fund granted **pharmacists specific remuneration**, as of 2013, for their role in providing follow up to patients on OAC therapy.¹⁰⁷

Joint guidelines between cardiology and geriatrics may offer useful guidance for the care of older patients with AF

Seventy percent of AF patients are over the age of 65¹¹, and patients with AF often present with significant co-morbidities, each of which requires a particular care pathway. Yet surprisingly, **the only example of joint guidelines between national geriatrics and cardiology societies was found in France**.¹⁰⁶ The authors provide useful guidance on how to place the requirements for OAC therapy within the broader context of older patients' competing health needs, and highlight the need to perform a comprehensive geriatric assessment in all patients. It should be mentioned, however, that joint guidelines between different specialties including internal medicine, haematology and others also do exist, for example in Switzerland.¹⁹⁰

Summary findings in more depth:



Integrated, multidisciplinary approaches to care may encourage greater coordination and help break down professional silos

Multidisciplinary, integrated models of care have been applied successfully to other conditions such as cardiac failure¹⁹¹ and may offer a promising model of care for the organisation of AF management as well.¹⁰⁸ (see [Case study 12](#))

Key components of such integrated models of care include:

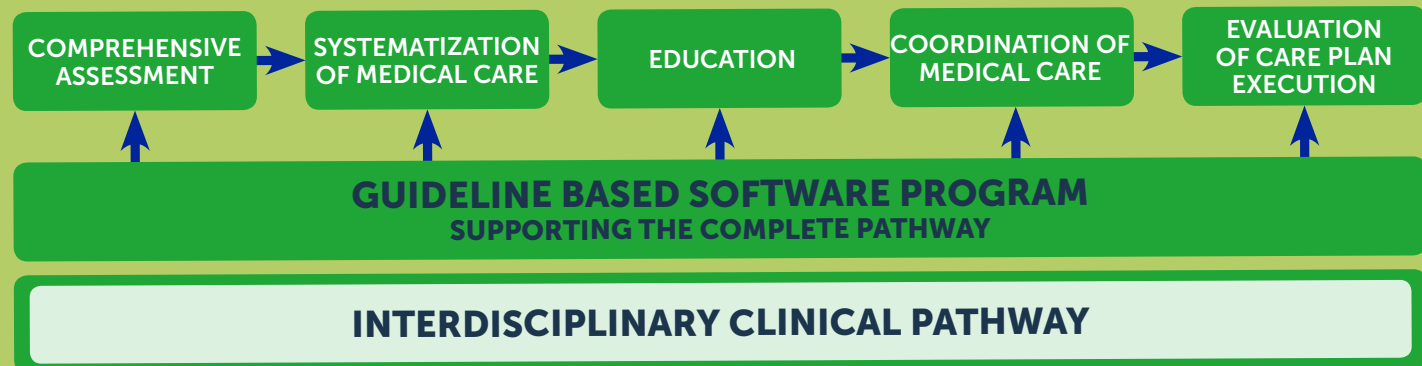
- A **multidisciplinary approach to care**, with clear delineation of roles between professionals
- The **use of decision-supporting software**, which prompts a dialogue between clinicians to explain their therapeutic decisions, and helps engage patients in therapeutic decisions¹⁰⁸
- **Centralised records of information** on patients, facilitating dialogue between GPs and cardiologists¹⁸⁵ (see [Case study 13](#) and [Case study 14](#)).

Harmonised standards of care for anticoagulation practice may help reduce heterogeneity across care settings

Harmonised standards of care that work across primary and secondary care may also play an important role in improving overall standards of care.

For example in Tuscany, a regional law was passed to ensure that all AF patients on OAC therapy receive the same level of information and follow-up care, regardless of whether they were treated in a primary care or hospital setting. A specific training programme was developed for all professionals, with the underlying slogan **'written is better'** to ensure that a continuous and complete record of information was maintained and communicated across the entire chain of care for each patient.¹⁹²

Figure 7:
Cornerstones of a multidisciplinary approach to AF care



Adapted from Berti et al 2013¹⁸⁵

CASE STUDY 13: UK

A 'ONE STOP SHOP' CLINIC IN WALES



"AF is often the entry point into a host of other cardiac problems – for example today I saw a patient who was coming to see me for his AF, but I also found that he had ischemic heart disease. Because we are all under one roof, I was able to refer him immediately for bypass surgery."

(Dr Lena Marie Izzat, Prince Philip Hospital, Wales)

Overview

A multidisciplinary "one stop shop" AF clinic was established within the local hospital to offer patients with AF a comprehensive, integrated service and achieve greater stroke prevention in the area.

Timescales

Commenced in January 2009, currently running 2-3 clinics per week.



Resource Implications

The service is entirely self-funded. Additional funding was received recently from a private company to fund a third session.



Links/References

<http://www.atrialfibrillation.org.uk/files/file/Events/120501-1-1125%20Carmarthen%20Audit%20Report%20on%20AF.pdf>

Approach

The centre is located in Carmarthenshire, a rural part of Wales prone to high rates of AF (population: 200,000).

The centre accepts all referrals from GPs or other providers (emergency department, other hospital clinicians,...), but not self-referrals. Referring clinicians are asked to assess all AF patients for their risk of stroke using CHA₂DS₂-VASc and provide a clear treatment plan.

Patients are then seen at the clinic first by a cardiovascular nurse who begins/confirms OAC treatment according to ESC 2012 guidelines, and then by the cardiologist consultant who does a thorough cardiac assessment of the patient and recommends future management.

Patients have access to everything under one roof – all patients can have an ECG, receive their anticoagulation therapy and echocardiography on the same day and receive cardioversion or other specialist interventions very promptly. The clinic has close links with the stroke unit and tertiary centre in Swansea, helping to reduce waiting times for procedures.



A WHOLE-SYSTEM APPROACH

What has been achieved?

- More local GPs are checking for AF
- General reduction in disabling stroke incidence in the region
- Decreased waiting times for general cardiology
- Identification of other cardiac problems that would have gone unnoticed in AF patients



Contact:

Dr Lena Marie Izzat, Prince Philip Hospital
lena.izzat@carmarthen.wales.nhs.uk



CASE STUDY 14: DENMARK

COLLABORATION BETWEEN NEUROLOGISTS AND CARDIOLOGISTS IN ODENSE



“A key success factor in our region has been that many neurologists have championed the need for greater collaboration between all those who treat AF patients in order to ensure more effective stroke prevention in this patient population.”
(Dr Axel Brandes, Odense University Hospital and President of the Atrial Fibrillation Association, Denmark)



Overview

A collaborative approach between neurology and cardiology departments ensures that all patients admitted for a TIA or stroke are monitored for AF, especially if they are in sinus rhythm. If AF is detected during the hospital stay, this data is included in the national stroke registry. In addition, a standardised web based tool is applied across all primary care centres where AF patients may receive OAC therapy.

Timescales

Currently ongoing.



Resource implications

No resource implications.



Links/References

Brandes A, Overgarrd, M, Plauborg L, et al. Guideline adherence of antithrombotic treatment initiated by general practitioners in patients with nonvalvular atrial fibrillation: a Danish study. Clin Cardiol 2013; 36: 427-432.⁷²



Approach

Cardiology and neurology departments work together in Odense to ensure that all patients admitted for suspected TIA or stroke to the neurology department are monitored for AF, and referred for OAC therapy as appropriate. It is aimed that the results of this prolonged monitoring will also be included in the standardised dataset for the stroke registry in the future.

In an effort to harmonise practices across all physicians, a practical guide is also being developed as part of the National Cardiology Treatment Guidelines by the Danish Society of Cardiology to ensure that all patients follow the same pathway from detection of AF to stroke risk assessment to OAC treatment, regardless of where they are seen.

In addition, it is intended that all hospitals or GPs must report their INR results centrally in the future, and any patient whose results are not within the TTR at least 70% of the time is referred to a specialist department for treatment.

What has been achieved?

- Routine monitoring for AF is now done for all stroke and TIA patients
- Standardisation of the quality of care in OAC therapy across the whole treatment pathway
- High adherence to clinical guidelines for OAC therapy across primary care (>75%)⁷²



Contact:

Associate Professor Axel Brandes, MD, FESC
Department of Cardiology, Odense University Hospital, and President of Atrial Fibrillation Association
Denmark
Axel.brandes@syd.dk



Priority 7:

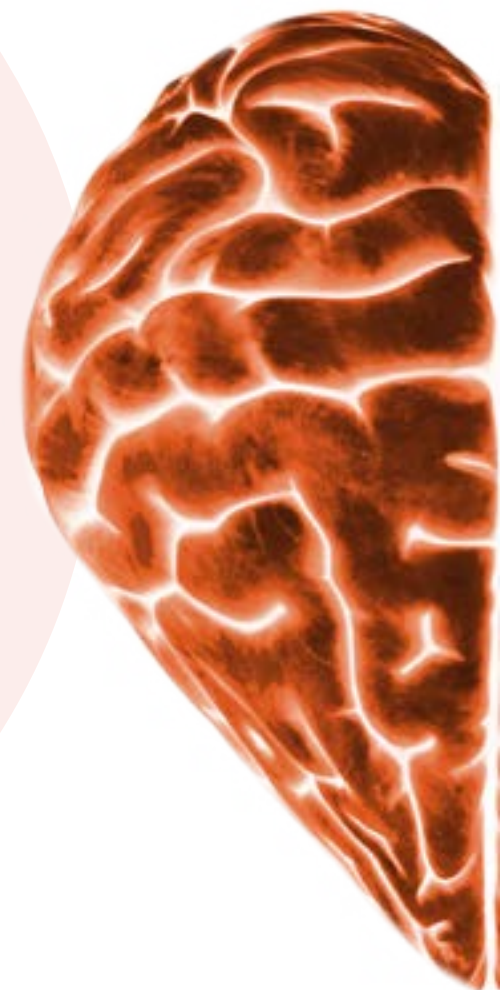
Better data to guide policy and inform clinical management

Case studies for Priority 7

**The German Competence
Network on Atrial Fibrillation
(AFNET) - Germany**



**The FACTS spot registry -
Romania**



What we know:

In 2010, the World Health Organisation included AF for the first time as one of the conditions it investigated in its influential **Global Burden of Disease study**, recognising its growing prevalence worldwide.¹⁹³ This was a welcome milestone, as several expert reports have commented on the poor level of evidence available and the need for greater research on AF as well as AF-related stroke.^{29;194}

The purpose of the **European Atlas** developed as part of this report, was to uncover what data and evidence exists within each country of the EU, as well as in Norway, Switzerland and Turkey. We have summarised key findings below.

Why is this important?

Policymakers need **accurate estimates** of the number of people affected by AF-related stroke to ensure that health care systems are resourced appropriately to meet patient needs.



Key findings from the European Atlas:

- Country-level data on the prevalence of AF suggest that **the true prevalence of AF may be higher than previously estimated.**^{18;31;33;42;46-64}
- Very few countries have dedicated AF **registries.**
- Estimates of the proportion of strokes due to AF are rare but suggest that **at least 20% of strokes are due to AF** and that this proportion is increasing with the ageing of the population.^{17;47;109-117}
- Available economic data confirm the **high burden posed by stroke,**^{3;9;118-132} but estimates are lacking in most Eastern European and Baltic countries, even though the burden posed by stroke is greatest in these countries.
- Data on the economic burden of AF-related stroke are rare, however existing figures support previous reports that **AF-related strokes are the most debilitating and costly strokes.**^{123;124;130;133-138}

Avenues for change:

- Governments should invest in the **systematic collection of epidemiological and economic data** on AF, stroke and AF-related stroke, to ensure that policies are guided by the best possible evidence.
- **Professional societies** have an important role to play in strengthening this evidence base and to communicating these data to policymakers.
- **Investment in stroke registries,** and inclusion of 'AF diagnosis' within existing stroke registries is needed to be able to quantify with accuracy the percentage of strokes due to AF.
- **EU-level funds** should be devolved to research that may provide reliable figures on the burden of stroke and AF-related stroke in countries where prevalence is greatest – Eastern European and the Baltic region in particular.

"There are different ways to obtain reliable information on AF and AF-related stroke – and different sources (registries, observational studies, large claims databases) should be explored based on what is most feasible in each country. Obtaining this data is essential if we are to understand existing differences in practice and find ways to remedy them, with the ultimate goal of improving patient outcomes across all settings of care."

(Professor Paulus Kirchhof, founding member and current board member, AFNET)

Summary findings in more depth:

Table 5: Most recent* country-level estimates of AF prevalence

Estimates of the prevalence of AF come from a variety of sources and suggest that the prevalence of AF is greater than previously estimated

Available country-level estimates of the prevalence of AF are presented in **Table 5**. Data are derived from a number of sources and it is likely that some data are more reliable than others, therefore any comparisons should be made with caution.

No recent (>2005) prevalence data were found in Austria, Bulgaria, Czech Republic, Finland, Latvia, Lithuania, or Slovakia.

Country	Estimated prevalence (%)	Age group	Study Design
Belgium ⁴⁸	2.2%	>40	Voluntary screening programme
Denmark ¹⁸	2%	all	Copenhagen Stroke Study
Estonia ⁵⁶	2%	all	
France ⁵³	1-2%	all	Official government figure (estimate)
Germany ⁶³	2.1%	all	Claims database of 2 large statutory insurance funds
Greece ⁵⁹	3.9%	all	Community screening study
Hungary ⁶¹	2.9%	all	Analysis of National Health Insurance Fund database
Ireland ⁵²	3%	>50	The Irish Longitudinal Study on Ageing (TILDA)
Italy ⁶⁴	1.85%	all	ISAF (Italian Survey of AF Management Study)
Latvia ⁵⁵	3.0 – 3.5%		Riga Stradins University pilot project
Netherlands ⁵⁴	5.5%	>55	Rotterdam Study
Norway ⁶²	10%	Age 75	Population-based study in 2 municipalities
Poland ⁵⁷	18%	>65	Self-reported survey
Portugal ³¹	2.5%	>40	FAMA study, a cross-sectional observational study
Romania ⁴⁹	2-3%	All	Expert opinion
Slovenia ⁵⁸	1-2%	All	Expert opinion
Spain ³³	4.4%	>40	OFRECE cross-sectional, population-based study
Sweden ⁴⁷	3.2%	>20	Population-based study
Switzerland ⁴²	1.25%	all	Swiss Heart Foundation estimate
Turkey ^{60 50}	0.8-1.25%	all	TRAF hospital database on AF; TEKHARF (Cardiac Disease and Risk Factors in Adults in Turkey), cross-sectional prospective study
UK ⁴⁶	1.4%	all	GARFIELD registry (UK arm)
UK ⁵¹	6.9-7.9%	>65	SAFE study

* In order to have a current estimate of prevalence, we limited figures to those obtained after 2005.

Summary findings in more depth:

Very few countries have established registries for AF or stroke

Across Europe, Germany is the only country with established AF registry (see [Case study 15](#)), although AF registries are in development in Estonia and Latvia. Registries are also being considered in a number of other countries. Denmark and Sweden have national patient registries which cover all conditions and from which data on AF may be extracted and Norway has a national prescription database which similarly collects information on AF.¹⁹⁵ Romania has a spot registry on AF (see [Case study 16](#)). Both the German and Romanian registries have been incorporated into the European-wide EORP-AF registry, with Germany providing an extended contribution.¹⁷⁵ Many other countries have conducted longitudinal cohort studies on AF, which are not registries as such – for example Turkey has a hospital-based database called TRAF which is focused on AF.⁶⁰

Stroke registries are available in a few more countries.

NO AF REGISTRY



NO STROKE REGISTRY



COUNTRY	AF REGISTRY	STROKE REGISTRY
Austria	X	√ Austrian stroke registry
Czech Republic	X	√ IKTA – National Stroke Registry
Denmark	No, but Danish National Patient Register collects data on AF	√ Danish Stroke Registry
Estonia	X	√ In preparation
Germany	√ The AF-NET registry	X
Ireland	X	√ National Stroke Registry
Latvia	√ Latvian AF Registry in development	√ Latvian National Stroke Registry
Norway	No, but Norwegian Prescription Database (NorPD) collects data on AF	√ Norwegian Stroke Registry
Poland	X	√ Polish National Stroke Prevention and Treatment Registry
Romania	√ FACTS spot registry, (recruitment has stopped)	X
Slovakia	X	√ As part of CVD registry
Slovenia	X	√ Slovenian Stroke Registry*
Spain	No, but FANTASIIA registry of AF patients on OAC therapy run by Spanish Society of Cardiology	X
Sweden	√ Swedish Population Register records diagnosis of AF, AuriculA is the national quality registry of patients with AF	√ The Riks-Stroke registry
Turkey	X	X
UK	X	No, but Sentinel Stroke National Audit Programme

* although commentators suggest it is not updated or comprehensive.¹⁹⁶

Summary findings in more depth:



Table 6: Ongoing European and global registries* on AF

There are several ongoing European and global registries (which include EU countries) on AF

Several European-wide and international registries on AF have been developed in recent years, although they tend to recruit patients predominantly from hospital cardiology departments. (see **Table 6**)

EORP-AF¹⁷⁵ Hospital + outpatient	GARFIELD¹⁷³ Hospital-based cardiologists	PREFER in AF¹⁷⁴ 53% hospital-based, 42% office-based, 70% enrolled by cardiologists	Realise-AF¹⁹⁷ 83% cardiologists, 17% internists, hospital- and office-based
BEL 	AUS 	AUS 	BEL
DEN 	DEN 	FRA 	BUL
GER 	FIN 	GER 	CZR
GRE 	FRA 	ITA 	HUN
ITA 	GER 	SPA 	IRE
NET 	ITA 	SWZ 	LIT
NOR 	NET 	UK 	POR
POL 	NOR 		SVK
ROM 	POL 		SPA
UK 	SPA 		SWE
	SWE 		TUR
	UK 		

*which include European countries

Summary findings in more depth:

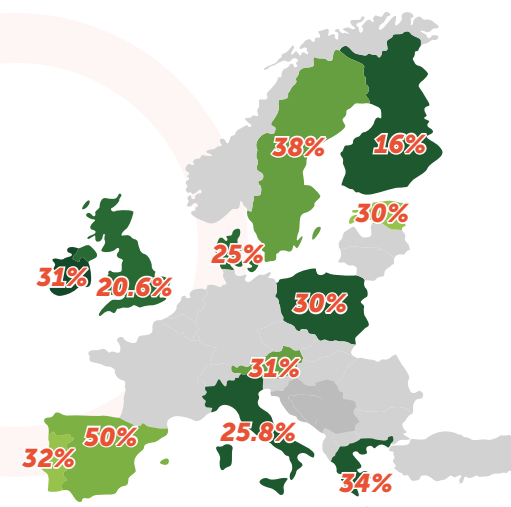


There is very little information available which allows to understand the full clinical and economic burden of AF-related stroke in individual countries

A striking finding across Europe is the **lack of accurate data on the number of AF-related strokes** in many countries.

For example, the ESC guidelines suggest that 1 in 5 strokes is due to AF. Yet **precise estimates of the proportion of strokes due to AF are rare across Europe**. Expert opinion¹⁹⁸ as well as data from several countries suggest that this proportion may in fact be higher than 20%. This may be explained in part by the ageing of the population and the increased risk of AF in older people. (see **Table 7**) These findings have important implications for policymakers and reinforce the importance of recognising the key role of AF as a major risk factor for stroke in existing policy platforms (see **Priority 1**).

Table 7: Country-level estimates of the proportion of strokes due to AF



Country	% strokes due to AF	Study details/source
Austria	31	Austrian Stroke registry ¹⁷
Denmark	25	The Danish Heart Foundation and Danish Society of Cardiology estimates ^{109;113}
Estonia	30	Expert report ⁵⁶
Finland	16	National hospital discharge register (1999-2006) ¹¹⁴
Greece	34	Arcadia Stroke Registry ¹⁷
Ireland	31	The North Dublin Population Stroke Study ¹¹²
Italy	25.8	Prospective study of consecutive stroke patients admitted to a comprehensive stroke unit ¹¹¹
Poland	30	Polish National Stroke Prevention and Treatment Registry ¹¹⁵
Portugal	32	Retrospective study of stroke patients admitted to one hospital ¹¹⁶
Spain	50 (of cardioembolic strokes)	Diaz Guzman 2013 ¹¹⁰
Sweden	38	Population-based study in one Swedish region ⁴⁷
UK	20.6	National stroke audit ¹⁹⁹

Summary findings in more depth:



Country-level estimates of the cost of stroke confirm the high burden posed by stroke, however estimates are lacking in Eastern Europe and the Baltic region, where the burden posed by stroke is greatest.

No country-level estimates of the cost of stroke were available for: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Greece, Latvia, Lithuania, Portugal, Romania.

Table 8: Country-level estimates of the cost of stroke

Country	Direct Medical Costs	Indirect Costs	Data
Finland	✓		Average lifetime healthcare costs after a stroke are 86,300 Euros per patient, for a total of €1.1 billion per year, or 7% of total healthcare costs. ^{127;137}
France	✓	✓	Total direct costs of €5.3 billion per year; nursing home costs: €2.4 billion; lost productivity for those under 65: €255.9 million per year. ¹²¹
Germany	✓	✓	Direct medical costs of a first-occurring stroke are €18,517 in the first year, and €5,479 for each of the four years following stroke. ¹²⁵
Hungary			€38.8m (12.1 billion HUF) incremental cost due to stroke (direct healthcare costs) ¹²⁴
Ireland	✓	✓	Total costs of stroke were estimated at €489 million (2007 data), which comprises €345-557 million in direct healthcare costs and 143-248 million in indirect costs. ¹³¹
Italy	✓		Between €20,000 ²⁰⁰ and €30,000 ¹²⁹ per person
Netherlands	✓		Total direct healthcare cost of €1.5bn (2005 data) ¹¹⁹
Norway	✓	✓	Total costs per year of €874 million (direct + indirect costs) ³
Poland	✓		704 million PLN (€168 million), of which 159 million PLN are for rehabilitation and 545 million PLN for acute stroke care. ¹²⁰
Slovakia			Annual cost of stroke per patient: €13,600 ²⁰¹
Slovenia	✓	✓	€87.4 million direct costs, €24.7 million indirect costs ¹³²
Spain	✓	✓	Total direct costs of cerebrovascular disease are €6 billion per year, of which hospital costs account for €1.5 billion. ¹²⁶ Informal care for stroke costs €6.5-10.8 billion per year, or €27,314 Euros per stroke survivor. ¹³⁰
Sweden	✓		Stroke hospitalisations in the first year cost around €10,000. ¹²³
Switzerland	✓	✓	Healthcare and social costs of 21,203-43,821 CHF per stroke depending on severity ¹¹⁸
Turkey	✓		Direct healthcare cost of stroke in the first year was TL 5,719 of which TL 2,432 were within the first month and TL 3,257 within the next 11 months. ¹²²
United Kingdom	✓	✓	Annual direct healthcare cost of stroke in UK between £2.8 ⁹ -3.0 billion ¹²⁸ , indirect societal costs £4.2 ⁹ -5.0 billion ¹²⁸

Summary findings in more depth:



Data on the economic burden of AF-related stroke are still too rare

There are very limited estimates of the costs associated with AF-related stroke, however those available confirm that **AF-related strokes are more debilitating and costly than strokes not due to AF.**

No recent country-level estimates of the cost of AF-related stroke were available for: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Germany, Greece, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Switzerland, or Turkey.

Table 9: Country-level estimates of the costs of AF-related stroke

Country	Data
Finland	AF-related strokes cost approximately €23,500 in direct healthcare costs in the first year, as compared to an average cost for all patients with first-ever ischemic stroke of €21,900. ¹³⁷
France	Mean direct medical costs of AF-related strokes range from €4,848 (mild) - €29,700 (severe case) over 2 years. ¹³⁴
Hungary	\$8 million (2.5 billion HUF) incremental cost due to AF-related stroke (direct healthcare costs). ¹²⁴
Ireland	Two-year median costs of AF-related stroke are €25,150 – compared to an average of €12,751 for strokes not due to AF. ¹³⁵
Spain	AF-related strokes have a longer length of stay in hospital than strokes not due to AF, and are less likely to be discharged home than non-AF related strokes (38% vs. 63%). ¹³⁸ Patients hospitalised for AF-related strokes are also older, require more intravenous treatments, have more intense neurological deficits and more systemic complications compared to stroke patients without AF, although costs of care are similar. ^{130;133}
Sweden	In-patient costs for patients amounted to €9,300 for AF-related stroke and €8,900 for strokes not due to AF. The presence of AF in stroke patients under 65 increased costs by 46% compared to stroke patients without AF. ¹²³
United Kingdom	Average costs of stroke amongst patients with AF were £10,413. ¹³⁶ The 10% of stroke patients who survived acute stroke phase incurred annual long-term care costs of €6880 annually. ¹³⁶

CASE STUDY 15: GERMANY

THE GERMAN COMPETENCE NETWORK REGISTRY (AFNET)



“The creation of the registry allowed to bring together physicians of all disciplines and care settings and the data collected provided a starting point for engaging with policymakers, the media and patient groups as well as providing a starting point to plan clinical trials. We are delighted to be able to report long-term follow-up data of the AFNET registry patients soon.”
(Professor Paulus Kirchhof, founding member and current board member, AFNET)

Overview

AFNET is an interdisciplinary translational collaborative research organisation that started off with 200 German centres and now conducts international clinical studies in AF. Part of AFNET is a national patient registry intended to help improve the treatment of atrial fibrillation (AF).

Timescales

AFNET was established in 2003 and is still operating today with a focus on the conduct of observational and investigator-initiated interventional multi-centre studies in Germany and Europe.



Resource implications

AFNET was funded by the German Federal Ministry of Research and Education for 10 years. Today, AFNET is an independent association and is expected to become an associated partner of the newly-created German research centre on cardiovascular disease as of 2015.

Links/References

<http://www.kompetenznetz-vorhofflimmern.de/en/>

Nabauer et al. 2009⁹⁹; Kirchhof, et al. 2011¹⁷²



Approach

AFNET was established as one of 17 competence networks funded by the German government. From its onset, it has had three aims: i) establish a registry to provide information on AF and its management in Germany; ii) provide a platform for investigator-initiated trials, and iii) help improve understanding of the mechanisms and pathology of AF.

The Basis-AF registry is a prospective, nationwide registry that enrolled a total of 9,577 patients from 2004 to 2006 from 191 German centres drawn from primary care, office- and hospital-based cardiologists, and internal medicine. The registry included data on patient characteristics, medical history, presence of co-morbidities, risk factors and treatments. Patients were followed up for an average of 5.1 years after enrolment, and an updated publication on follow-up data is currently being prepared. In 2012, AFNET was nominated as the official German partner of the EURObservational Research Programme AF General Registry (EORP-AF Registry) and provides an extended contribution of 3,500 patients (EORP-AF Registry Germany).

Today, AFNET is recognised as a unique centre of excellence on AF, particularly on the development of investigator-led trials. It runs a series of consensus conferences in partnership with the European Heart Rhythm Association (EHRA), the latest one focused on individualised management of AF.¹⁷²



What has been achieved?

- Around 20 clinical trials, registries, and basic research projects completed to date, including three large completed multicentre clinical trials
- Setup of a platform for the planning, conduct, and analysis of investigator-initiated trials in Europe, where AFNET functions as an academic research organisation
- Significant contribution to improving knowledge about AF through a strong media presence, multiple publications and broad, interdisciplinary membership
- A powerful platform for engagement with the media, the German Parliament, patient groups and other stakeholders about new ways to combat AF



Contact:

Dr Gerlinde Benninger, Managing Director
info@kompetenznetz-vorhofflimmern.de
Prof. Paulus Kirchhof, Founding member and Board Member
p.kirchhof@bham.ac.uk





"We need to convince GPs to move away from passive to active recognition of AF. Having a national registry for AF was an important first step in raising awareness of AF and the risk of stroke among the medical community."

(Prof. Gheorghe Andrei Dan, University Clinical Hospital 'Colentina', Bucharest)

Overview

A spot registry, run as part of a broader programme aimed at improving awareness of AF and AF-related stroke in Romania.

Timescales

The FACTS (AF-Awareness, Consciousness and Therapeutic Strategy) programme began in 2010. 3800 patients were screened and 3,644 were included in the registry between 2011-2012, with a follow up of 1 year. Full results to be published in 2014.



Resource implications

The FACTS programme is an academic initiative funded through an unrestricted grant for the registry from Sanofi Aventis. The APA 1 Euro 1 Patient project was sponsored by Boehringer Ingelheim through the "1 Mission 1 Million" project.

Links/References

Popescu R, Dan, GA, Buzea A. Secondary prevention in patients with atrial fibrillation and stroke or transient ischemic attack – an insight from the FACTS programme. Romanian J Neurology 2013; 12: 130-135. http://www.medica.ro/reviste_med/download/neurologie/2013.3/Neuro_Nr-3_2013_Art-5.pdf



Approach

The FACTS spot registry included patients with AF or atrial flutter identified in 27 cardiology units located throughout Romania between 2011 and 2012. It was initiated as part of the FACTS programme, which aimed to raise awareness of AF in an effort to improve adherence to guidelines on the prevention of AF-related stroke. The FACTS programme had an important educational component, and one of the central aims was to raise awareness and understanding of AF and AF-related stroke amongst GPs, as the country has relatively few cardiologists and GPs will invariably need to play a greater role in detecting AF in the future.

Collecting data through the registry has helped quantify the problem of AF and AF-related stroke and raise awareness of treatment gaps in particular groups of patients, for example those with a prior stroke or other thrombotic event. A major challenge in the future will be to improve detection of AF in general practice and convince doctors to move away from antiplatelet therapy and provide appropriate anticoagulation therapy.

The registry was created before the creation of the ESC-supported EORP pilot registry on AF (results published in 2013, 2014), and participating centres are now part of the EORP long term registry.



What has been achieved?

- Greater awareness of AF and what is happening at the local level in terms of prevention of AF-related stroke
- National data now available to help gain political support for greater resources to be spent on AF and stroke
- Greater knowledge of treatment patterns in given subgroups of patients (eg. those with prior stroke or TIA), with further analyses planned
- Arrhythmia Patients' Association (APA) was founded based on FACTS programme



Contact:

Prof. G.A. Dan,
University of Medicine Bucharest
President International Society of
Cardiovascular Pharmacotherapy
Director FACTS Program

andrei.dan@gadan.ro

Dr. Anca Dan,
Colentina University Hospital
Director Arrhythmia Patient Association,



AF-related strokes are the most deadly, debilitating and expensive strokes and are likely to increase in years to come, leading to significant morbidity and mortality across Europe. With recent guidelines and the advent of new therapeutic options offering effective stroke prevention to AF patients, there is **an unprecedented opportunity to prevent the most debilitating of strokes and save thousands of lives in Europe.**

The key to achieving this is **greater implementation of clinical guidelines**, but this will not happen without greater public, patient and professional understanding of AF and the increased risk of stroke with AF; more integrated, patient-centred; effective care pathways which foster greater coordination and a multidisciplinary approach to care; and the investment in reliable data to drive policies and target resources towards the effective prevention of AF-related stroke.

Finally, the fact that **AF is one of the major risk factors for stroke** must be communicated loud and clear to policymakers and all decision-makers, to ensure that better detection of AF and provision of effective anticoagulation therapy be considered as integral parts of the prevention of AF-related stroke and cardiovascular prevention strategies more generally.

In summary, we make the following key recommendations to improve the prevention of AF-related stroke in Europe:

1

Targeted policies and resources to enable the effective prevention of AF-related stroke

- **Global, regional and national policy leaders should consistently recognise AF as a major risk factor for stroke** alongside other 'conventional' risk factors such as smoking, high blood pressure, poor diet and physical inactivity.
- **Policymakers should also accord AF and AF-related stroke due priority in all relevant policy frameworks** – e.g. on chronic diseases, cardiovascular disease prevention and healthy ageing.
- **Governments should create national programmes** focused on AF (as exist for myocardial infarction, diabetes, and oncology).

2

Greater public awareness and understanding of AF and the increased risk of stroke with AF

- **Patient organisations and professional societies should be encouraged to lead targeted, hard-hitting awareness campaigns** to improve public understanding that AF is a major risk factor for stroke and that all patients with AF at risk of stroke should receive appropriate OAC therapy to help reduce their risk.

3

Improved detection of AF and integration of pulse checks into clinical practice

- **Primary care physicians and specialists should screen** all their patients over the age of 65 opportunistically for AF.
- **Governments and health insurance bodies should integrate manual pulse checks** into national health checks.

4

Appropriate anticoagulation therapy for every AF patient at increased risk of stroke

- **Patient organisations and professional societies should work with health professionals** to develop **educational tools and resources** that may help physicians implement guidelines in practice, in terms of assessing all AF patients for their risk of stroke and offering all patients except those at very low risk of stroke the most effective OAC therapy. Tools targeting primary care physicians are particularly needed.
- **Health care system leaders** should develop **local quality improvement frameworks and centralised standards of care** to be implemented at a local level, and particularly in primary care, to reduce heterogeneity in the provision of OAC therapy to AF patients and ensure that best practice becomes embedded into local practice.

5

Patient-centred care and clear information to patients

- **All health professionals should foster a patient-centred approach to care, encourage greater patient engagement and patient education.**

6

A whole-system approach to the prevention of AF-related stroke

- **Health professionals should work together** and learn from other chronic diseases to identify successful models of multidisciplinary, integrated care that may help break down professional silos.

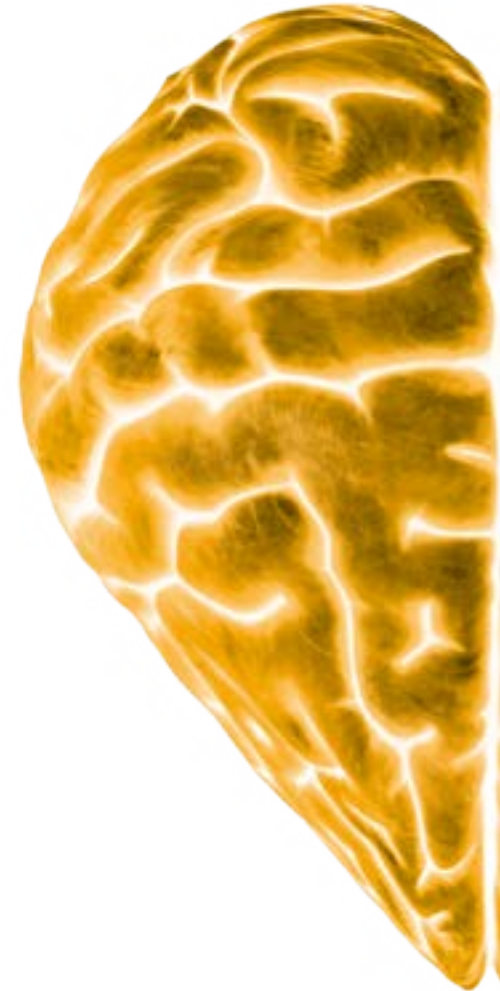
7

Better data to guide policy and clinical management

- **Governments, research institutes and professional societies** should invest in the **systematic collection of epidemiological, economic and administrative data** on AF and AF-related stroke. This will ensure that policymakers are equipped with the most reliable and up-to-date data possible to guide policies and target resources appropriately.

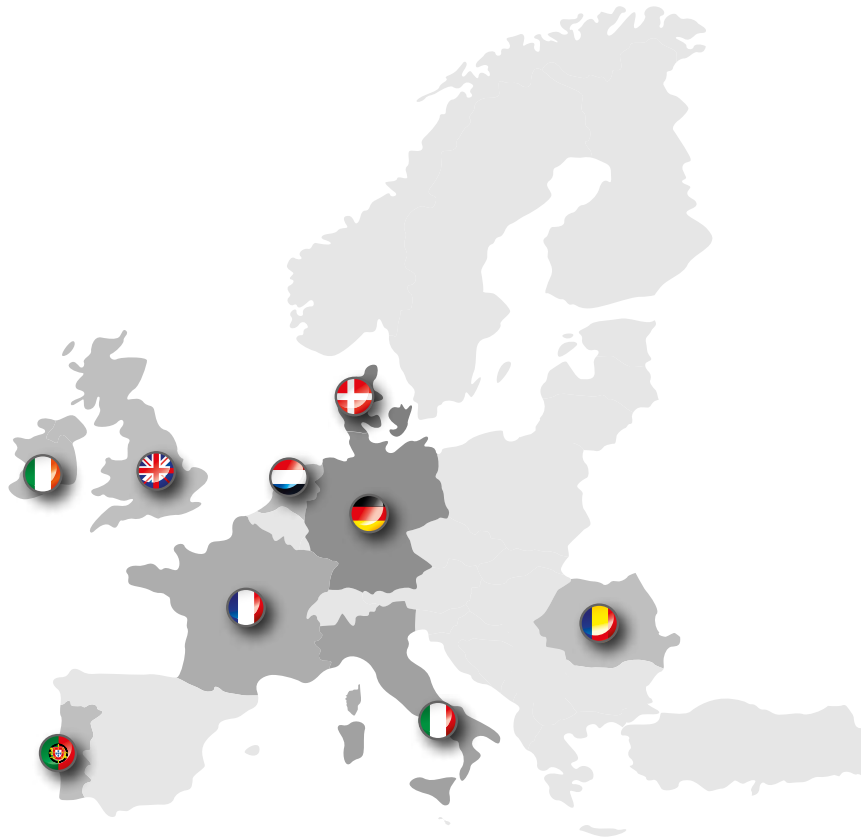


Case Studies for the Route Map for Change





Case Studies:



Priority 1: Targeted policies and resources to enable the effective prevention of AF-related stroke

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p.25



Priority 2: Greater public awareness and understanding of AF and the increased risk of stroke with AF

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Priority 3: Improved detection of AF and integration of pulse checks into clinical practice

p.36



p.37



Priority 4: Appropriate anticoagulation therapy for every AF patient at risk of stroke



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Priority 5: Patient-centred care and clear information to patients



p.49



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Priority 6: A whole-system approach to the prevention of AF-related stroke



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Priority 7: Better data to guide policy and clinical management



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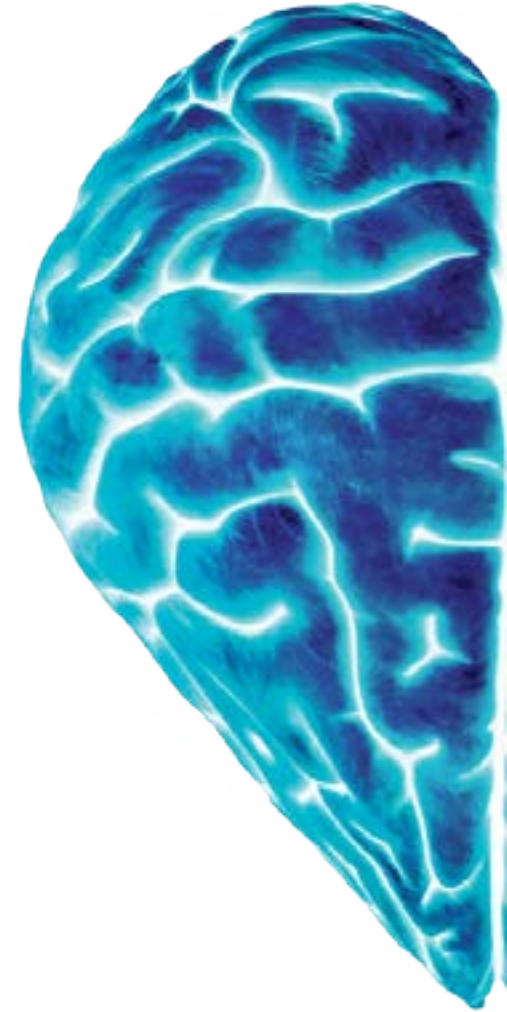
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The European Policy Atlas on the Prevention of AF-Related Stroke





Click on the country you are interested in to view your desired country profile



*Please note that there was insufficient information to develop country profiles for Cyprus, Croatia, Malta or Luxembourg.



AF-Related Stroke:

Stroke is a **leading** cause of death

35,000
strokes
per year¹

5,000
deaths
per year¹

1st
cause
of adult
disability²

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴

1 in 3 strokes is due to AF⁵

AF-related strokes are the most debilitating strokes

1.5x
higher
cost⁶

AF-related strokes compared to strokes not due to AF

2x
the risk of
death⁷

Policy Landscape:

X No national stroke strategy

X No national plan on the prevention of AF-related stroke

✓ National stroke registry

X No national registry for AF

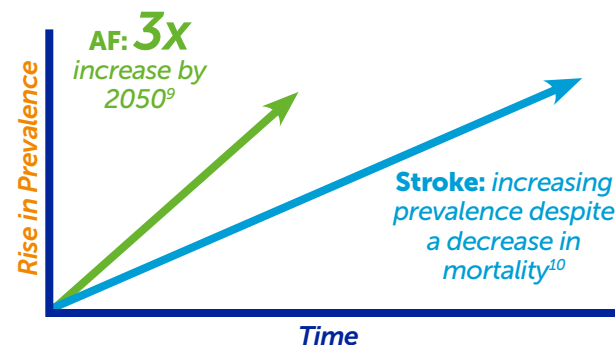
A Growing Economic Burden:

Total direct healthcare costs of cardiovascular disease per year:	€444 million⁸
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Total indirect costs of cerebrovascular disease per year:	€334 million⁸
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Annual cost of AF-related stroke:	No data available
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A growing number of AF-related strokes risk going un-prevented



Detection Gap:

200,000
AF cases
detected¹²

At least **1/3** of all cases undetected¹³⁻¹⁵

Treatment Gap:

54% of AF patients receive OAC therapy,¹⁶ although more are likely to be eligible according to current guidelines.¹⁷

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	No data available
Number of people with AF (prevalence):	130,000 ¹¹ – 200,000 ¹²
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	25,000 ¹⁸ – 35,000 ¹
Number of deaths due to stroke per year:	Approx. 5,000 (2006) ¹
% of total deaths due to stroke:	10% ¹²

AF-Related Stroke

% of strokes associated with AF:	31% ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	Approximately 26,000 ⁹

Future Projections

AF:	Triple from current prevalence by 2050 ⁹
Stroke:	No data available

THE COSTS

Total direct healthcare costs of cerebrovascular disease per year:	€444 million ⁸
Total indirect costs of cerebrovascular disease per year:	€334 million ⁸
Total cost of AF-related stroke per year:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁷
Most relevant to primary care:	ÖGAM 2013

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	54.3% ¹⁶
% high risk AF patients currently treated with OAC therapy:	No data available



2: A VIEW FROM THE GROUND

“The Austrian country profile is a valid description of our current state of knowledge regarding epidemiology of AF and its consequences such as stroke and economic burden. Data about stroke rates, stroke fatality and percentage of AF-related strokes are quite accurate due to the high quality of and the nation-wide adherence to the Austrian Stroke Registry. As there is no single source collection of health data in Austria (such as in Scandinavian countries), incidence and prevalence of AF will be estimates from other countries or focused registries. Obtaining reliable estimates of the economic burden of AF-related stroke is critical for physicians and policymakers.

The lack of a national plan for AF detection, rate of adherence to guidelines and AF-related stroke is well recognised by the Austrian Society of Cardiology and the Austrian Ministry of Health. A nation-wide campaign focusing on awareness of AF is under way. Due to the specifics of the Austrian health system, a complete patient pathway for all Austrian AF patients is not realistic. However, participation in European registries and national AF registries focussing on treatment modalities will fill some gaps in our knowledge of AF patients in the near future.”

Dr. Franz X. Roithinger (Secretary, Austrian Society of Cardiology)

3: EPIDEMIOLOGY

AF

Number of people with AF:	Approximately 130,000 – 200,000. ^{11,12,19}
Prevalence rate:	No data available

Undetected AF

No data available

Future Projections

AF prevalence expected to treble by 2050.⁹

STROKE

Total number of people living with stroke (prevalence):	No data available
Total numbers of new cases of stroke per year (incidence):	25,000 ¹⁸ to 35,000 ¹
Deaths due to stroke per year:	Approx. 5,000 ¹

National data is not available for stroke prevalence.

Future Projections

No data available



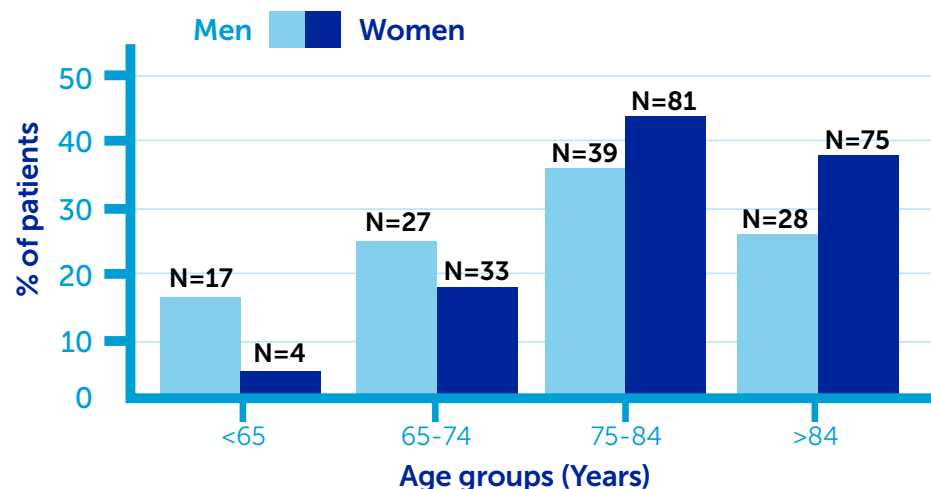
3: EPIDEMIOLOGY (CONT'D)

AF-RELATED STROKE

AF is major driver of strokes in Austria; for example data gathered from 57 medical departments on hospital inpatient data as part of the Austrian Stroke Registry reported that as many as one third (31%) of all people suffering repeat strokes had AF at admission.⁵

Significant gender differences have been demonstrated amongst AF-related stroke patients. Female stroke patients have been shown to be more likely to have a history of AF (31.1% vs. 20.8%) and suffered more often from cardioembolic strokes (19.9% vs. 15.5%) than males. Women stroke patients were also shown to be significantly older than men, had a more severe neurologic deficit at admission and at discharge and were more severely handicapped at 3-month follow-up.²⁰

Prevalence of AF related to age groups and gender in 992 patients with acute stroke⁵



4: ECONOMIC BURDEN

STROKE

Direct healthcare costs of cerebrovascular disease:	€444 million ⁸
Indirect costs* of cerebrovascular disease:	€334 million ⁸

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for Austria. However, leading international studies have provided estimates for cerebrovascular disease (see above).

Stroke is known to have a major indirect burden on stroke sufferers and their families. Every other stroke survivor and every fifth informal carer had to give up their professional life because of the stroke. Financial burden, reduction of vacations and social activities was found for both groups.²¹

AF-RELATED STROKE

The Austrian Stroke Registry has proved a seminal European research initiative on the impact of AF on strokes. It demonstrated that in-hospital mortality amongst AF-related strokes was almost double that of non-AF related strokes (27% vs 14% mortality over 16 months) that stroke patients with AF had more cerebrovascular risk factors and more severe strokes, and their neurological outcome was worse than in patients without AF⁵. During hospital stay AF patients developed more medical complications like pneumonia and heart failure.⁵

An Austrian study showed that the healthcare costs of AF patients without OAC therapy are over double those of AF patients in optimal INR (€1,496 vs €679 per year.)¹¹



5: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There is no national plan or strategy for AF and AF-related stroke, nor are AF and AF-related stroke visible in other relevant government policies or improvement initiatives.

Advocacy and awareness:

No information was available on public awareness of AF or AF-related stroke in Austria.

6: CLINICAL REGISTRIES

National stroke registry
Austrian Stroke Registry

National AF registry

The Austrian Stroke Registry has been an international leader on AF-related stroke since 1999, and since 2003 has been administered by Gesundheit Österreich GmbH. A total of 35 out of the 36 existing Stroke Units in Austria take part in the project, financed by the Federal Ministry of Health and accompanied by a steering group.² The main objective of the Registry is quality assurance and quality improvement of stroke-treatment in stroke units. The participating stroke units document their cases using a web-based database. The data are discussed in the steering group and the stroke units get feedback in terms of benchmarking-graphs. The data set follows a modular approach and contains information about stroke, transport, admission to the hospital, stroke unit discharge and the 3-month follow-up. To date, almost 100,000 patients have featured in the Registry.²³

7: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	ÖGAM 2013
Guidelines followed by cardiologists:	ESC 2012 ¹⁷
Local translation and/or adaptation of ESC guidelines?:	No
Other guidelines:	Yes, ÖGSF 2009 position paper – publication of revised 2014 guidelines anticipated for July/ August 2014. ²⁴



8: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke. However, two older studies reflect practices in 1999-2000 and are based on the Austrian Stroke Registry and the Vienna Stroke Study Group.^{5,25} They found that between 16-50% of patients with AF were offered OAC therapy at discharge from hospital for stroke. Similar figures were found in a 5-country study that included 35 Austrian patients with AF (54%).¹⁶

9: KEY LINKS

- Austrian Heart Foundation:
<http://www.herzfonds.at/>
- Austrian Society of Cardiology:
<http://www.atcardio.at/en/>

10: REFERENCES

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AF-Related Stroke:

Stroke is the **3rd** leading cause of death



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke,³ bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 5 strokes is due to **AF**⁴

AF-related strokes are the most debilitating strokes

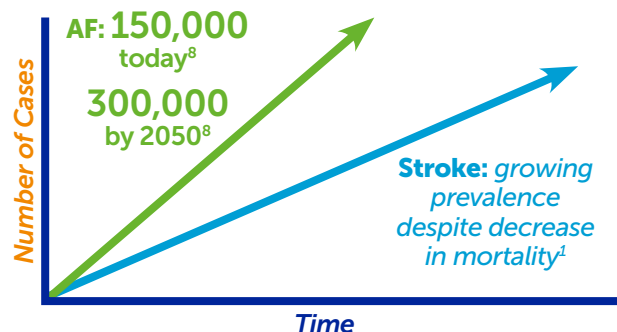


Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national AF registry
- X** No national stroke registry

A Growing Economic Burden:

Total direct cost of stroke	€642 million⁷
Total indirect cost of stroke	€455 million⁷



Awareness Gap:



40% of Belgians have never heard of AF and over **50%** do not know that AF is a major risk factor for stroke⁹... even if the risk of developing **AF is 1 in 4** after the age of 40.¹⁰

Detection Gap:



Treatment Gap:

There is no national data on adherence to guidelines for the prevention of AF-related stroke.

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2.2% ¹⁴
Number of people with AF (prevalence):	150,000 ⁸
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	32,504 ¹
Number of deaths due to stroke per year:	10,578 ¹

AF-Related Stroke

% of strokes due to AF:	20% ⁴
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	300,000 cases by 2050 ⁸
Stroke:	No data available

THE COSTS

Total direct costs of stroke:	€642 million ⁷
Total indirect costs of stroke:	€455 million ⁷
Cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁵
Most relevant to primary care:	ESC 2012 ¹⁵

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% high risk AF patients currently treated with OAC therapy:	No data available
Overall Treatment Gap:	No data available



2: EPIDEMIOLOGY

AF

Number of people with AF:	150,000 ⁸
Prevalence rate (%):	2.2% ¹⁴ for people over 40 years

Atrial fibrillation (AF) affects approximately 150,000 people in Belgium.⁸

The prevalence of AF has been estimated at 2.2% in people over the age of 40 based on a nation-wide, non-selective screening programme, with figures of 3.1% in people aged 65-74 and 6.2% in patients over the age of 75.¹⁴ Previous estimates have been slightly lower at 1.4%¹⁶ but reach 3% after the age of 65.¹⁷

Undetected AF

No data available

Future Projections

The number of AF cases is expected to double by 2050.¹⁸ (estimate: 300,000 cases per year).

STROKE

Total numbers of people living with stroke (prevalence):	124,344 ¹
Total numbers of people suffering a new stroke every year (incidence):	32,504 ¹
Deaths due to stroke every year:	10,578 ¹

There are very few recent estimates of the prevalence or incidence of stroke in Belgium. However, international sources suggest that there are 124,344 prevalent cases and 32,504 incident cases of stroke per year in Belgium.¹ These data are considerably higher than national estimates, however the latter are at least 10 years old.^{16;19}

Stroke causes close to 10,600 deaths per year.¹ The outcomes of those who survive a stroke are poor: 47% of people die within 1 year after first symptoms,¹⁶ approximately 30% of patients (6000 patients every year)²⁰ suffer permanent disability requiring external help and 25-50% of patients will experience depression.²⁰

AF-RELATED STROKE

Approximately **1 in 5** strokes is due to AF.⁴ There are no national estimates of the exact number of strokes due to AF.



1 in 5 strokes is due to **AF**⁴



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€642 million ⁷
Total indirect costs of cerebrovascular disease per year:	€455 million ⁷
Cost of AF-related stroke:	No data available

In 2007, there were 32,970 hospital admissions due to stroke, accounting for 2% of all hospital admissions and 2.9% of total hospital admission costs in Belgium that year.¹⁹

There are no national data on the total costs of stroke, but international studies estimate that cerebrovascular disease costs the Belgian healthcare system €642 million, and a further €455 million is spent in indirect costs every year.⁷

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE

**National
stroke
plan**

**National
plan for
AF-related
stroke**

Government policy and strategy

There is no national plan or strategy on AF-related stroke or on stroke.

Neither AF nor AF-related stroke are visible in other relevant government policies or improvement initiatives.

Advocacy and awareness:

Awareness of AF and stroke is low in the general population. A survey run by the Belgian Cardiology Society (Ligue Cardiologique Belge) in 2012 found that 40% of the population had never heard of AF and that only 11% could describe it accurately. Over half of respondents did not know that stroke was the most common complication of AF.⁹

The Ligue Cardiologique Belge as well as the Belgian Stroke Council are very active on atrial fibrillation. The Belgium Heart Rhythm Association (BeHRA) organises the Belgian Heart Rhythm Week, and the Ligue Cardiologique Belge organises the Week of the Heart (www.fa-avc.be) which includes screening of AF in clinics.



5: CLINICAL REGISTRIES

National AF registry

National stroke registry

There are no national registries for stroke or AF in Belgium, however there is discussion of creating a national stroke registry.

6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

National guidelines on AF-related stroke:	None (earlier guidelines now outdated)
Most relevant to cardiologists:	ESC 2012 ¹⁵ ; EHRA practical guidelines on NOACs ²¹
Most relevant to primary care:	ESC 2012 ¹⁵ ; EHRA practical guideline on NOACs ²¹

Cardiologists and GPs tend to follow ESC 2012 guidelines¹⁵ as well as the EHRA practical guidelines on NOACs.²¹ Two general practice medical societies, Domus Medica, the Flemish GP organisation, the *Soci t  Scientifique de M decine G n rale* (SSMG) (the French-speaking organisation) issued guidelines on the management of AF-related stroke, however both are now outdated.

7: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke.

A number of national studies have, however, suggested that the quality of anticoagulation therapy is often suboptimal, with patients who receive VKAs only spending about half of their time within the target therapeutic range, thus exposing them to a higher risk of stroke and/or bleeding.^{22,23}



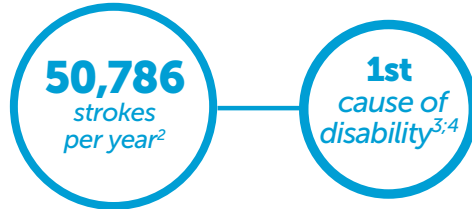
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AF-Related Stroke:

Bulgaria has one of the **highest rates of stroke** yet reported for European populations^{1,2}



AF is the **second** most important risk factor for stroke⁵

AF > smoking
diabetes
physical inactivity

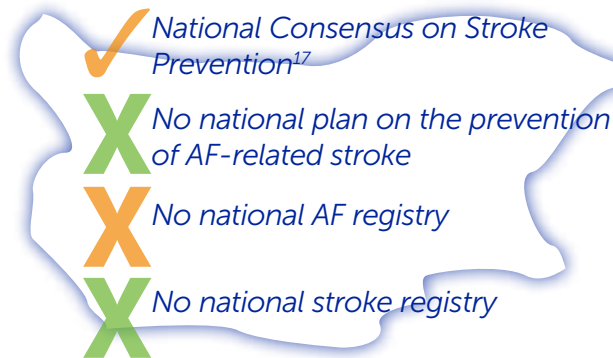
AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁵

1 in 5 strokes is due to AF⁶

AF-related strokes are the most debilitating strokes

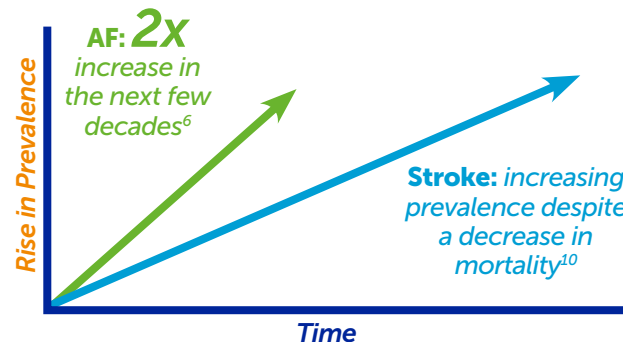
1.5x higher cost⁶ **AF-related strokes** compared to strokes not due to AF **2x** the risk of death^{7,8}

Policy Landscape:



A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year:	€45 million⁹
Total indirect costs of cerebrovascular disease per year:	€96 million⁹
Annual cost of AF-related stroke:	No data available



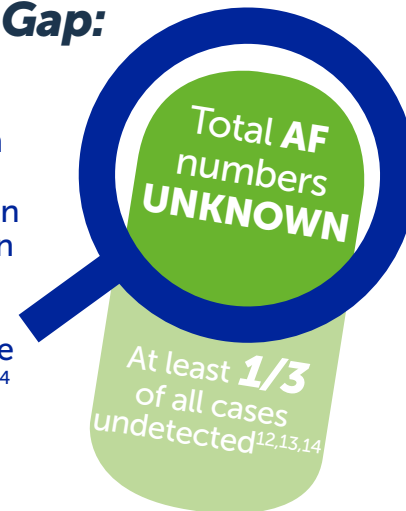
Awareness Gap:



Public knowledge of AF as a stroke risk was **zero** in studies carried out 2002-2003 in North East Bulgaria.¹¹

Detection Gap:

There are no national data on prevalence or detection rates in AF, but European studies suggest at least one third of cases are undetected^{12,13,14}



Treatment Gap:

There is no national data on adherence to guidelines for the prevention of AF-related stroke.

Based on international data, it is thought that up to **50%** of AF patients may not be treated according to clinical guidelines.^{15;16}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	No data available
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	50,678 ¹⁰
Number of deaths due to cerebrovascular disease per year:	27,608 ¹⁰

AF-Related Stroke

% of strokes due to AF:	20% ⁶
Number of new cases of AF-related stroke per year:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare cost of cerebrovascular disease per year:	€45 million ⁹
Total indirect cost of cerebrovascular disease per year:	€96 million ⁹
Cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes - National Consensus on Stroke Prevention 2013 ¹⁷

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes - National Consensus on Stroke Prevention 2013 ¹⁷
Most relevant to cardiologists:	No data available
Most relevant to primary care:	No data available

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	No data available
% high risk AF patients currently treated with OAC therapy:	No data available



2: VIEW FROM THE GROUND

Bulgaria is among the EU countries with the highest incidence and mortality from stroke in general, and reducing the burden posed by stroke is thus a clear priority.¹⁸

3: EPIDEMIOLOGY

AF

Formal data on the prevalence of AF is sparse. However a leading commentator Professor Gocheva, Head of the Department of Cardiology and Department of Emergency Cardiology at the National Heart Hospital and a national consultant in cardiology, commented in the national media that AF is the most common arrhythmia in Bulgaria, and warned that the incidence of AF is considerable and will increase in future.¹⁹

Undetected AF

No data available

STROKE

Total numbers of new cases of strokes per year (incidence):	50,678 ²
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Stroke incidence is consistently high in Bulgaria, with one key study in North-Eastern Bulgaria reporting one of the highest rates of stroke yet reported for European populations,¹ almost three times that of equivalent benchmark population studies elsewhere in Europe.^{11,20} According to the Bulgarian Health Information Centre, 50,678 patients suffered a stroke in 2009.² The cases with acute ischemic stroke predominated – 85.6% (43,578 cases), 51.2% of them being among women.

Stroke incidence and mortality are higher in rural than in urban areas, while the rate of hospitalization is higher among the urban population.¹

No national data were available for total prevalence or mortality from stroke, however useful estimates have been provided by leading international studies on cerebrovascular disease (see below). Stroke morbidity and mortality in Bulgaria show trends associated with population ageing, including a 9.8% increase in deaths from cerebrovascular disease between 2004-2008.²

Total number of people living with cerebrovascular disease (prevalence):	40,734 ¹⁰
Deaths due to cerebrovascular disease per year:	27,608 ¹⁰

AF-RELATED STROKE

No data available



4: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€45 million ⁹
Total indirect costs* of cerebrovascular disease per year:	€96 million ⁹

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for Bulgaria. However, leading international studies have provided estimates for cerebrovascular disease (see above).

Stroke is a major driver of disability and use of care services. According to the Bulgarian Health Information Centre, 95.8% (48,551) of the 50,678 patients who suffered a stroke in 2009 were hospitalized.² Morbidity and mortality from stroke were significantly higher among the rural population.²

AF-RELATED STROKE

No data available

5: POLICY LANDSCAPE

National stroke plan¹⁷

Bulgarian National Consensus on stroke prevention (2013)¹⁷

National plan for AF-related stroke

Government policy and strategy

No national plans or strategies for AF-related stroke could be found.

A 'Bulgarian National Consensus on Stroke Prevention' was recently revised in 2013¹⁷ (see Guidelines).

In the opinion of one commentator, current trends in incidence and mortality of stroke over the last few decades show a lack of rigorous population-based interventions to address the issue.²¹

Representatives of state and non-governmental organizations have been working to implement cardiovascular disease prevention following Bulgaria's official signing of the European Heart Health Charter in 2009.²²

Leading commentators have stated that stroke care in Bulgaria is suboptimal, with enduring barriers to timely identification and effective treatment across the in prevention, treatment, and rehabilitation of stroke. Very few patients have access to high quality, integrated care in the community setting. In particular, the management of discharge and post-discharge services.²¹

Awareness and advocacy

Public knowledge of stroke risk is very low in Bulgaria in the general population. Knowledge of AF as a stroke risk was zero in studies carried out in 2000 and 2003 amongst mixed urban and rural populations in North East Bulgaria, aged 45-74.¹¹

This coupling of the high rate of stroke in Bulgaria with very low awareness of risk factors has prompted at least one leading commentator to demand health education on the established causes of stroke as an urgent priority.¹¹

In civil society, at least one organisation, Association "Heart", provides basic information online about AF.²³



6: CLINICAL REGISTRIES

**National
AF
registry**

**National
stroke
registry**

There is no national stroke registry in Bulgaria,¹⁸ nor is there a national registry for AF.

7: CLINICAL GUIDELINES

National guidelines

National consensus on stroke prevention 2013¹⁷

A new National consensus on stroke prevention was issued at the end of 2013.¹⁷ The recommendation for secondary stroke prevention with NOACs in patients with AF and previous ischaemic stroke is included in this new version of the Consensus.

8: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke.

9: KEY ORGANISATIONS

- Association "Heart": <http://sarce.bg>
- Bulgarian Cardiovascular Society: <http://www.cardiobg.com/>



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AF-Related Stroke:

STROKE is the **2nd** largest cause of death in the Czech Republic¹



AF is the **second** most important risk factor for stroke⁵

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁵

1 in 5 strokes is due to **AF**⁶

AF-related strokes are the most debilitating strokes

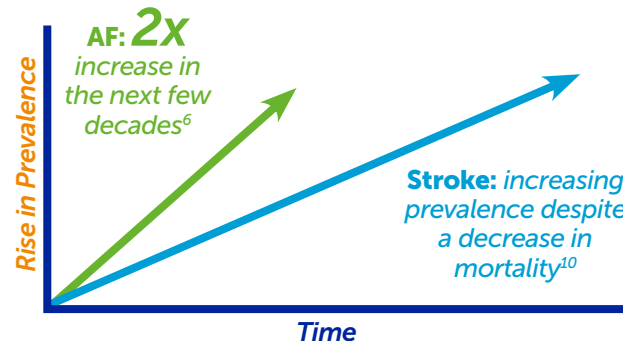


Policy Landscape:

- Ministry of Health policy report on the 'Care of patients with cerebrovascular diseases in the Czech Republic' (2010)
- No national plan on the prevention of AF-related stroke
- No national AF registry
- National stroke registry

A Growing Economic Burden:

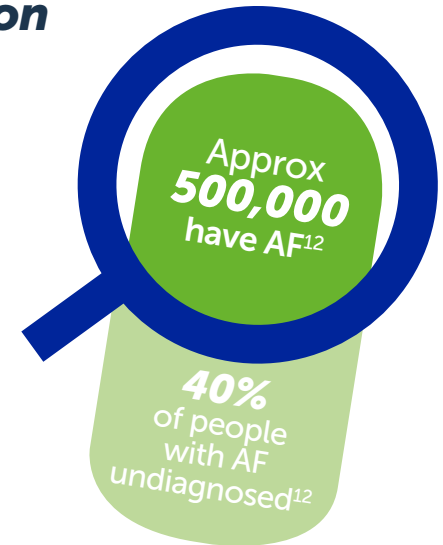
Total direct healthcare costs of cerebrovascular disease per year:	€351 million⁹
Total indirect costs of cerebrovascular disease per year:	€191 million⁹
Annual cost of AF-related stroke:	No data available



Awareness Gap:

Many people are not aware of AF or that AF is a major risk factor for stroke... even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:

As many as **75%** of AF patients receive OAC therapy,¹³ although others may be eligible according to current guidelines.¹⁴

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	No data available
Number of people with AF (prevalence):	500,000 (of which 300,000 undiagnosed) ¹²
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	Approx. 300,000 ¹²
Detection gap:	As high as 40% ¹²

Stroke

Number of new cases of stroke per year:	41,668 ²
Number of deaths due to stroke per year:	10,668 ¹

AF-Related Stroke

% of strokes due to AF:	20% ⁶
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare cost of cerebrovascular disease per year:	€351 million ⁹
Total indirect cost of cerebrovascular disease per year:	€191 million ⁹
Cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes – based on ESC 2012 ¹⁴
Most relevant to cardiologists:	ESC 2012 ¹⁴
Most relevant to primary care:	ESC 2012 ¹⁴

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	75% ¹³
% high risk AF patients currently treated with OAC therapy:	No data available



2: EPIDEMIOLOGY

AF

There is little data on AF in the Czech Republic, however according to national experts, more than 200,000 people in the Czech Republic have been diagnosed with AF.¹² Estimates of prevalence in a 1999 paper were around 1% of the population.¹⁵

Prevalence varies from 0.1% in persons under 55 years of age, to 3.8% in those aged over 80.¹⁶

Undetected AF

Further to the above, commentators have stated that an additional 300,000 people may have undetected AF, bringing the total number to around 500,000 people.¹²

Future Projections

No data available

STROKE

Total number of people living with stroke (prevalence):	No data available
Total numbers of new cases of stroke per year (incidence):	41,646 ²
Deaths due to stroke per year:	10,668 ¹

No national data was available for total prevalence of stroke, however useful estimates are available for incidence of stroke and deaths due to stroke.

Future Projections

No data available

AF-RELATED STROKE

No data available

3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€351million ⁹
Total indirect costs* of cerebrovascular disease per year:	€191million ⁹

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for the Czech Republic. However, leading international studies have provided estimates for cerebrovascular disease (see above).

AF-RELATED STROKE

Very little data is available. However, one study of 306 patients with AF seen in outpatient cardiology clinics showed that 8% of all patients with AF were admitted to hospital for a cardio-embolic event over the study duration of two years.¹³



4: POLICY LANDSCAPE



Government policy and strategy

There is no national plan specific to AF or AF-related stroke.

However, there are national health plans for stroke and cerebrovascular diseases including a strategy for the development of acute stroke units by the Ministry of Health.

The Ministry of Health issued a policy report on the 'Care of patients with cerebrovascular diseases in Czech Republic' in 2010. The report specifies models of care for acute stroke care, covering specialist stroke units and other cerebrovascular care. It also addresses for the first time the importance of providing multidisciplinary rehabilitation care within centres, however the report does not specify how this care is to be delivered.¹⁷

Advocacy and awareness:

There is no data available on public awareness of AF, or AF as risk factor for stroke.

AF and stroke feature quite often as topics on Czech websites and lifestyle media. A number of patient organisations focused on stroke play an active role, for example ICTUS (www.ictus.cz) runs a specialist information website for patients (www.protimrtvici.cz).

NGOs play an important role in policy advocacy, raising public awareness and promoting stroke prevention. There is National Cerebrovascular Plan (2004) issued by the Czech Neurological Society.

The Czech Society of Cardiology's PS KVFT (Working group on Cardiovascular Pharmacotherapy) has played a key role in the issue of access to medicines and treatments at various levels, including government, insurers, and professional bodies. It is unclear, however, if this has involved AF-related stroke.

The Coalition for Rehabilitation Of Persons After Stroke: <http://sdruzenicmp.cz/cz/sdruzeni-cmp/> is also active and is a member of The Stroke Alliance for Europe.

5: CLINICAL REGISTRIES



IKTA.
(www.ikta.registry.cz)





6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	Not applicable (patients are referred to cardiologists)
Guidelines followed by cardiologists:	ESC 2012 ¹⁴ – including local translations ¹⁵
Other guidelines:	No data available

7: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke. An earlier study from 2008 reported that 75% of patients in out-patient settings received OAC therapy; however the data are possibly outdated.¹³

8: KEY LINKS

- Czech Neurological Society: <http://www.czech-neuro.cz>
- Czech Society of Cardiology: <http://www.kardio-cz.cz/>
- ICTUS: www.ictus.cz and www.protimrtvici.cz.
- Coalition for Rehabilitation Of Persons After Stroke: <http://sdruzenicmp.cz/cz/sdruzeni-cmp/>

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AF-Related Stroke:

Stroke is a leading cause of death and disability

12,000 strokes per year^{1,2}

3,445 deaths per year³

4th leading cause of death³

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, along with high blood pressure, diabetes, physical inactivity and smoking.⁴

There are approximately **20,000** new cases of AF per year. AF is the most commonly diagnosed CVD in Denmark^{2,5}

As many as **1 in 4** strokes in Denmark (**25%**) are due to AF^{6,7}

AF-related strokes are the most debilitating strokes

1.5x higher cost⁸

AF-related strokes compared to strokes not due to AF

2x the risk of death^{9,10}

Policy Landscape:

X National stroke strategy

X National plan on the prevention of AF-related stroke

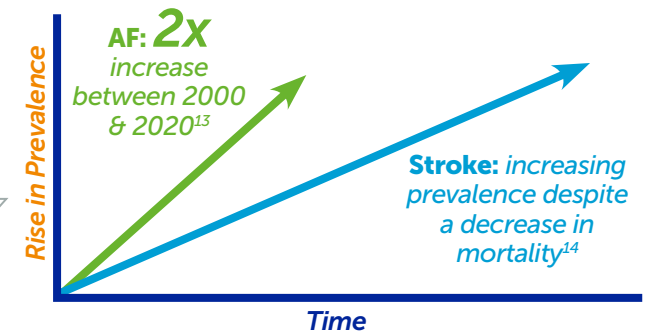
✓ National stroke registry¹¹

X National AF registry

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year: **€235 million**¹²

Total indirect healthcare costs of cerebrovascular disease per year: **€318 million**¹²



Detection Gap:

No specific national data on AF detection rates, but European studies indicate that **30-50%** of AF cases may be undetected.^{15,16,17}

No national data

30-50% of all cases undetected^{15,16,17}

Treatment Gap:

25% of AF patients do not receive the correct treatment in accordance with their stroke risk.¹⁸ In general, anticoagulation therapy of AF patients is well performed in primary care in Denmark,¹⁸ although data vary between studies.¹⁹

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2% ²⁰
Number of people with AF (prevalence):	93,000 (2011) ²
Number of new cases of AF per year (incidence):	20,000 ²
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	12,000 ^{1,2}
Number of deaths due to stroke per year:	3,445 ³
% of total deaths due to stroke:	6.6% ³

AF-Related Stroke

% of strokes due to AF:	25% ^{6,7}
Number of new cases of AF-related stroke per year:	3,000 (estimate)
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	108,000 in 2020 ²¹
Stroke:	110,500 in 2020 ²¹

THE COSTS

Total direct healthcare costs of cerebrovascular disease per year:	€235 million ¹²
Total indirect costs of cerebrovascular disease per year:	€318 million ¹²

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes
Most relevant to cardiologists:	ESC 2012, ²² National Cardio Treatment Guideline (NBV) ²³ , DCS Guideline ⁷ and RADS ²⁴
Most relevant to primary care:	National Cardio Treatment Guideline (NBV) ²³ and RADS. ²⁴

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	31-66% ^{18,19}
% high risk (CHA ₂ DS ₂ -VASc >1) patients currently treated with OAC therapy:	69% ¹⁸
Treatment gap*:	24.5%* (22.7% undertreated, 1.8% over-treated) ¹⁸

* Defined as the % patients with either over-treatment or under-treatment according to guidelines (CHA₂DS₂-VASc scores)



2: EPIDEMIOLOGY

AF

Number of people with AF:	93,000 (2011) ²
Prevalence rate (%):	2% ²⁰

An observational analysis based on the Copenhagen City Heart Study estimated total AF-prevalence among the Danish population to be 2%.²⁰

In May 2014 the Danish National Institute of Public Health documented in a report on CVD based on national health registries that the prevalence of AF in 2011 was about 93,000 persons, and the annual incidence rate about 20,000.² This report was commissioned by the Danish Heart Foundation.² In January 2013, an expert advisory group (RADS) appointed by the Danish Regions (an organization of the 5 regional payers that provide public hospital services and pays for GP services in Denmark) estimated that the prevalence of AF is 75,000-100,000 persons, and the annual incidence rate is 10,000-15,000 new patients with AF and that about 40,000 patients are being treated with OAC therapy.²⁴ Historically, 146,251 patients were recorded through the Danish National Patient Register as being discharged with non-valvular AF between 1997-2008.²⁵

More than 10 % of those aged 75 years or more suffer from AF.^{2:5}

Undetected AF

There are no data available on the proportion of AF cases that go undetected.

Future Projections

Dr Axel Brandes, a National arrhythmia expert at the University Hospital in Odense, projected in 2008 that due to the expected demographic changes there would be 150,000 AF patients by 2050.²⁶

This pattern is consistent with another report issued by the National Institute of Public Health and the Danish Heart Foundation in 2011, which estimated that the prevalence of AF would increase from approximately 64,000 in 2009 to approximately 87,000 by 2015 and to 108,000 by 2020.²¹

STROKE

Total number of people living with stroke (prevalence):	87,000 (2011) ²
Total numbers of new cases of stroke per year (incidence):	12,000 ^{1:2}
Deaths due to stroke per year(mortality):	3,445 ³

There are approximately 12,000 new cases of stroke per year in Denmark.^{1:2} This can be compared to similar figures from previous years.²⁷ Of the 87,000 people living with stroke, 30,000-40,000 of them live with complications from stroke.¹

Future Projections

The Danish National Institute of Public Health have estimated that the prevalence of stroke will increase to 110,500 patients by 2020.²¹

AF-RELATED STROKE

The Danish Heart Foundation (Hjerteforeningen) and the Danish Society of Cardiology estimate that 25% of all strokes are due to AF.^{6:7} Previous estimates from the Danish National Stroke Registry had estimated that this figure was 16.5%, however the publication dates back to 2007.²⁸

Future Projections

No data available



3: ECONOMIC BURDEN

STROKE

Data on the direct and indirect costs of stroke are not available for Denmark. However, leading international studies have provided estimates for cerebrovascular disease (see below).

Total direct healthcare costs of cerebrovascular disease per year:	€235 million ¹²
Total indirect costs* of cerebrovascular disease per year:	€318 million ¹²

*Defined as productivity losses due to morbidity, mortality and informal care

According to a study based on the Danish National Stroke Registry, a total of 55,551 patients were admitted to hospital with acute ischemic stroke between 2003-2011.²⁹

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

Denmark does not have a national plan or strategy for AF-related stroke. Nor is there a national stroke plan.

However, cardiovascular disease has been prioritized by the national government and regional payers over recent decades as 1 of 8 key disease areas, including efforts to reduce stroke through improved prevention, treatment and rehabilitation. In 1993, the national government and regional payers agreed on expanding the diagnostic and surgical capacity related to ischaemic heart disease. Subsequently The National Board of Health (now the DHMA) established a national heart monitoring group (“Hjertefølgegruppen”) including key health administrators, medical societies and The Danish Heart Federation which since have advised the DHMA and policymakers on CVD.

In 2010 Danish hospitals started to implement 4 national pathways for patients with heart disease, heart failure, stable heart cramps and unstable heart cramps/blood clots. A pathway includes the full patient journey from suspected heart disease to examination, diagnosis, treatment and rehabilitation.⁵ The national heart monitoring group has advised on the development and implementation which has been managed at a national level by a DHMA-led task force on pathways for cancer and CVD.

There is no national pathway for AF patients, but a “5th Arrhythmia Pathway” has been developed and implemented in Southern Denmark. The Ministry of Health informed the Parliament in August 2013 that more than 3,000 AF patients who were not covered by the 4 pathways had waited more than 4 weeks to get the necessary ultrasound examination for a diagnosis. This bottle neck may be reduced by a new examination guarantee that was implemented by the 5 regions’ hospitals on Sept 1, 2013. This new initiative should ensure that patients can be diagnosed within 30 days after visiting a hospital.⁵

The Danish Health and Medicines Agency has issued several reports with recommendations on patient involvement in anticoagulation treatment, i.e. self-monitoring of INR values.³⁰ All 5 health regions in Denmark have established anticoagulation/thrombosis clinics focused on anticoagulation therapy.³¹



4: POLICY LANDSCAPE (CONT'D)

Awareness and advocacy

No data was available on public awareness of AF or AF-related stroke in Denmark. However, several organisations are active in the field of stroke and stroke prevention more widely.

5: CLINICAL REGISTRIES



Yes, Dansk Apopleksiregister (DAP)¹¹

Denmark does not have an AF national registry.

It does have a national stroke registry, Dansk Apopleksiregister (DAP), that was established in 2003 and now includes more than 100,000 patient cases. DAP is a cross-functional database designed to improve the quality of treatment of stroke patients in Denmark through monitoring of the use of key recommendations from the national clinical guidelines. An annual report is published each year.¹¹



6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	National Cardio Treatment Guideline (NBV) ²³ and RADS ²⁴
Guidelines followed by cardiologists:	ESC 2012, ²² National Cardio Treatment Guideline (NBV) ²³ , DCS Guideline ⁷ and RADS ²⁴
Other guidelines:	National reference programme for treatment of stroke and transitory cerebral ischaemia issued by Danish Stroke Society ¹

The new treatment guidelines for AF issued by RADS in early 2013 have led to local development and implementation of initiatives in the five regions to improve the quality of treatment with OACs and to improve cross-sector cooperation about AF patients.²⁴ These efforts have been supplemented by initiatives at the regionally funded DAK-E unit (Danish Quality Unit of General Practice) to capture data from GP clinics to monitor and increase the quality of AF and anti-coagulation treatment.

The medical societies (DCS and DSFA) play an official role in the authorship of national clinical guidelines. Both have updated their respective guidelines for anti-thrombotic treatment and treatment of patients with stroke several times, and as recently as 2012 and 2013.^{23,1}



7: ADHERENCE TO GUIDELINES

Most recently published data on the use of stroke prevention therapy in AF patients in Denmark

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Brandes <i>et al.</i> 2013 ¹⁸	Cross-sectional study	2011	1,743	Primary care (64 GP practices)	all	66.3%	18.7%	15%
Jespersen <i>et al.</i> 2013 ²⁹	Danish Stroke Registry	2003-2011	9,482	Hospital	all	91.9% of patients without any contraindications in 2011 received OAC therapy		
Johnsen <i>et al.</i> 2014 ¹⁹	Study of AF-related stroke admissions to hospital	2003-2009	11,356	hospital	>18	31.6 % of patients were on OAC therapy prior to hospital admission		

OAC: oral anticoagulation therapy

One of the most recent studies from Denmark involves a cross-sectional survey of 64 general medicine practices across Denmark and includes 1,743 patients with AF.¹⁸ Findings suggest that antithrombotic treatment of AF is relatively well performed by Danish primary care physicians: 66.3% of patients were treated with OAC therapy, 18.7% with antiplatelet drugs only, and 15% received no antithrombotic therapy. Based on the CHADS₂ score, 75.7% of patients were treated in accordance to 2010 ESC guidelines,¹³ 16% were undertreated and 8.4% were over-treated.

Rates of OAC use varied however by CHA₂Ds₂VASc risk score and are depicted on the right.

Antithrombotic therapy by stroke risk category in general practices in Denmark (adapted from Brandes *et al.* 2013)¹⁸

CHA ₂ Ds ₂ -VASc score	Treatment received		
	OAC	Antiplatelet	None
≥1	68.9%	18.4%	12.7%
1	58.0%	21.0%	21.0%
0	27.5%	18.9%	53.6%

Similar levels of OAC use were reported by Jespersen *et al.*, in their analysis of 9,482 patients with AF-related stroke registered in the Danish Stroke Registry in 2003-2011. The authors found that, in 2011, 91.9 % of patients without any contraindication had received OAC therapy.²⁹

Interestingly, the relatively high rates of OAC use found in the studies above contrast with a recent study by Johnsen *et al.*, which found that of over 11,000 patients admitted to hospital with AF-related stroke between 2003-9, only 32% of patients with confirmed AF had received OAC therapy prior to admission.¹⁹



8: KEY LINKS

Patient advocacy groups:

- Hjerteforeningen (The Danish Heart Foundation): www.hjerteforeningen.dk
- Blodprop og AK Patientforeningen ("The Danish Blood Clot and AC Patient Society"): www.akpatient.dk
- Hjernesagen ("The Danish Stroke Association"): www.hjernesagen.dk
- Ældresagen (The DaneAge Association, a society for elderly citizens): www.aeldresagen.dk

Professional societies:

- Dansk Cardiologisk Selskab (Danish Society of Cardiology): www.cardio.dk
- Dansk Selskab for Apopleksi ("Danish Stroke Society"): www.dsfa.dk

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COUNTRY PROFILE: ESTONIA*



AF-Related Stroke:

Stroke accounts for close to **7%** of total deaths in Estonia¹



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke,⁴ bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 5 strokes is due to **AF**⁵

AF-related strokes are the most debilitating strokes



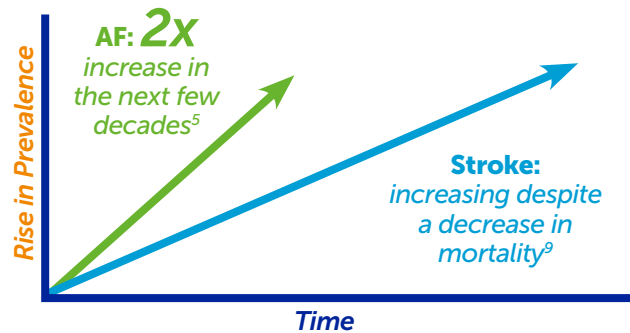
Policy Landscape:

- ✓ Estonian Stroke Initiative
- X No national plan on the prevention of AF-related stroke
- X No national AF registry
- ✓ National stroke registry in development

A Growing Economic Burden:

Total direct costs of cerebrovascular disease per year:	€38 million⁸
Total indirect costs of cerebrovascular disease per year:*	€49 million⁸

*Defined as productivity losses due to morbidity, mortality and informal care.



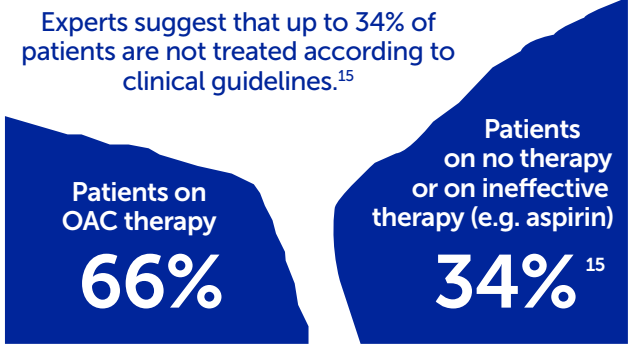
Awareness Gap:

! Most people have not heard of AF and many do not know that it is a major risk factor for stroke¹⁰... even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:



*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2% ²
Number of people with AF (prevalence):	26,000 ¹⁵
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	4,500 ²
Number of deaths due to stroke per year:	1,048 ¹
% of total deaths due to stroke:	6.8% ¹

AF-Related Stroke

% of strokes due to AF:	30% ²
Number of new cases of AF-related stroke per year:	1260 cases ^{2;15}
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare costs of cerebrovascular disease per year:	€38 million ⁸
Total indirect costs of cerebrovascular disease per year:	€49 million ⁸
Cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes (Estonian Stroke Initiative) ¹⁶

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Estonian Stroke Guidelines 2005 ¹⁷
Most relevant to cardiologists:	ESC 2012 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁸

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% high risk AF patients currently treated with OAC therapy:	No data available
Overall treatment gap:*	34% ¹⁵

*Defined as the percentage of AF patients not treated according to clinical guidelines (based on expert opinion)



2: EPIDEMIOLOGY

AF

According to local experts, the prevalence of AF is estimated at 2%, representing approximately 26,000 patients.¹⁵

Undetected AF

No data available

STROKE

Total number of people living with stroke (prevalence):	6,553 ²
Total numbers of new cases of stroke per year (incidence):	4,500 ²
Deaths due to stroke per year:	1,048 ¹

The Tartu population-based registry estimated the incidence and mortality from stroke up to 2003. Approximately 4500 strokes are diagnosed every year in Estonia.² The first-ever incidence of stroke is 223 per 100,000 (2001-2003 data). After adjustment to the European standard population, the first-ever incidence of stroke is 188 per 100,000, a rate comparable to other EU figures.² When calculating first-ever and recurrent strokes combined, the best estimate for incidence is 336 cases per 100,000.

The death rate from stroke (age-standardised to the EU population) has decreased 3-fold since 1994 – showing a decline greater than the EU average.² It is estimated that there are approximately 1,048 deaths from stroke per year, accounting for 6.8% of all deaths in Estonia.¹

However, stroke outcomes and survival are worse in Estonia according to data from the Tartu registry compared to other countries, and rates of mortality from cardiovascular disease in general are three times those seen in Western European countries.² At 1 year, only 20% of stroke survivors are functionally dependent and 56% are alive.¹⁹ The short-term mortality from stroke remains high (26%) compared to other EU countries.²

AF-RELATED STROKE

AF is prevalent in 30% of ischaemic strokes in Estonia (2001-2003 Stroke Registry data).²

Future Projections

No data available

3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€38 million ⁸
Total indirect costs of cerebrovascular disease per year:*	€49 million ⁸
Annual cost of AF-related stroke:	No data available

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for Estonia, however, leading international studies have suggested that direct and indirect costs of cerebrovascular disease represent €38 million and €49 million per year, respectively.⁸

AF-RELATED STROKE

No data available



4: POLICY LANDSCAPE

National stroke plan

(Estonian Stroke Initiative)¹⁶

National plan for AF-related stroke

Government policy and strategy

There is no national plan or strategy for AF and AF-related stroke.

Premature mortality and morbidity from CVD is a top priority area for improvement in Estonia. There is a National Estonian health strategy ongoing, which aims to achieve a permanent decrease in premature cardiovascular morbidity and mortality among the Estonian population. The goals were to:¹⁶

- reduce the risk of 30-60 year old Estonians who are already in a high risk group
- reduce the mortality of CVD among 30-65 year olds by 5% by 2010, compared with 2004
- screen at least 90% of high CVD risk people by 2008
- reduce the overall CVD risk by 10%.

The Estonian Stroke Initiative was founded in 2008, with the objectives to improve stroke care, promote regional networks and increase stroke awareness amongst the general population and health professionals.² The Ministry of Social Affairs has been involved in several awareness campaigns aimed at the general public, and a number of congresses have been held locally as well with participation from international stroke experts to advance knowledge about stroke.²

However, local experts believe there is room for improvement, including a national stroke strategy that links together hospitals of different capabilities to create acute stroke networks.²

Advocacy and awareness:

According to two surveys of the general population carried out in Tartu and Tallinn in 2012, just over 50% of respondents knew that AF was a risk factor for stroke, whereas 95% were aware that high blood pressure was a risk factor.¹⁰

5: CLINICAL REGISTRIES

National stroke registry in preparation

National AF registry

A National Stroke Registry is in preparation, which would monitor trends of stroke and provide information about the quality of stroke care.²

6: CLINICAL GUIDELINES

Guidelines followed by GPs	ESC 2012 ¹⁸
Guidelines followed by cardiologists	ESC 2012 ¹⁸
Other guidelines	Estonian Stroke Guidelines ¹⁷



7: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke, however local experts and the second and third stroke audits in Estonia (2010 and 2013) have stated that oral anticoagulation use is insufficient in Estonia.²⁰ An early study of 451 stroke patients included in the Tartu registry between 2001-2003 found that not a single patient of those who had AF had received anticoagulation therapy prior to their stroke, but 20% received other antithrombotic medication.¹⁹

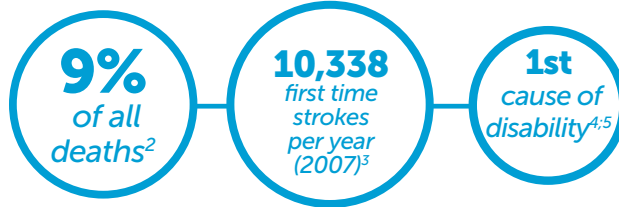
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AF-Related Stroke:

Stroke is a **leading** cause of death.¹



AF is the **second** most important risk factor for stroke⁶

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁶

1 in 5 strokes is due to AF^{7;8}

AF-related strokes are the most debilitating strokes



Policy Landscape:

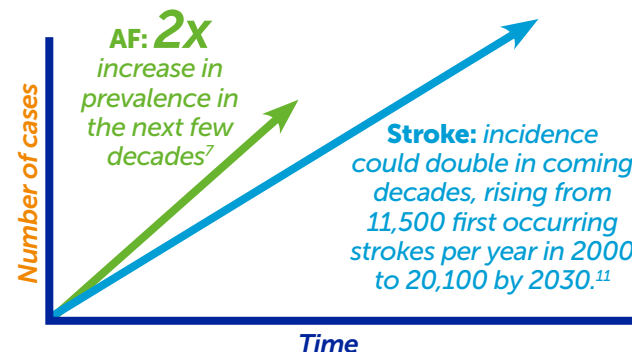
- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- ✓** National Cardiovascular Disease Register includes stroke
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year: **€1.1 billion²**

Total indirect costs of stroke per year: **No data available**

Annual cost of AF-related stroke: **Approximately €24,500 per patient in first year after stroke³**



Awareness Gap:



Public knowledge of AF as a risk factor for stroke is moderate to low...¹² even if the risk of developing AF is **1 in 4** after the age of 40.¹³

Detection Gap:

There are no national estimates of the prevalence of AF, but European studies suggest at least one third of all cases are undetected.^{15;16;17}



Treatment Gap:

Between **52-60%** of all AF patients are thought to receive OAC therapy^{14;18}

52% of high risk patients with AF (CHA₂DS₂-VASc ≥1) receive OAC therapy,¹⁸ suggesting an under-usage of OAC therapy compared to current ESC guidelines¹⁹

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	No national data available
Number of people with AF (prevalence):	Approximately 100,000 ¹⁴
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	10,338 first occurring strokes admitted to hospital (2007 data) ³
Number of deaths due to cerebrovascular disease per year:	No data available

AF-Related Stroke

% of strokes due to AF	16% ⁸
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available
Project number of cases of AF in 2050:	No data available

THE COSTS

Total annual direct healthcare cost of stroke	€1.1 billion ²
Indirect costs of stroke	No data available
Annual direct healthcare cost of AF-related stroke	Approximately €24,500 (\$33,723) per patient in first year after stroke ³

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes – <i>Eteisvärinä. Käypä hoito – suositus. Julkaistu: 14.02.2014</i> ²⁰
Most relevant to cardiologists:	National guidelines (as above) ²⁰
Most relevant to primary care:	National guidelines (as above) ²⁰

ADHERENCE TO CLINICAL GUIDELINES

% of all AF patients currently treated with OAC therapy	52 ¹⁸ -60% ¹⁴
% high risk* AF patients currently treated with OAC therapy	50% ¹⁸

* High risk defined as CHA₂DS₂-VASc ≥ 1



2: EPIDEMIOLOGY

AF

There are no national prevalence estimates for AF in Finland, however Lehto *et al*, estimated that approximately 100,000 people had AF, which would represent a prevalence figure of approximately 1.8%.¹⁴ A large regional population-based study found a prevalence figure of 3.7%.¹⁸ The same study also estimated that prevalence runs as high as 8.3% in men and 3.4% in women aged 60-69 years and 20.6% in men and 11.3% in women aged 70-79 years.¹⁸ However, it is unclear whether these data can be generalised to the whole population.

STROKE

Total number of people living with stroke (prevalence):	Approx. 80,000 ²
Total numbers of new cases of stroke per year (incidence):	10,338 ³ (2007 data)

There were 10,338 first occurring strokes admitted to hospital in 2007, according to the Finnish National Hospital Discharge Register.³ Alternatively, the regional stroke registry FINSTROKE 1993-1997 indicated that there were approximately 11,500 first occurring strokes per year in that period.¹¹

Overall, 1.5% of the Finnish population has had a stroke, or approximately 80,000 people.² Between 1999 to 2006 there were 93,514 ischemic stroke cases treated in Finnish hospitals of which 27,250 had an earlier stroke.⁸

Since the 1970's, stroke mortality has been reduced by half, but still one fifth of the patients succumb within 3 months of their stroke.²

Future Projections

Two estimates of stroke incidence up to 2030 are available, one in which the rates of stroke incidence in the year 2000 are maintained, and another in which stroke declines. In the former scenario, annual stroke incidence in Finland would be 20,100 in the year 2030 (almost double the figure in 2000) and in the latter, 12,100.¹¹

AF-RELATED STROKE

AF was previously diagnosed in 16% of all first occurring strokes, according to data from the National Hospital Discharge Register 1999-2006.⁸

3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of stroke per year	€1.1 billion ²
Total indirect costs* of stroke per year	No data available
Annual direct healthcare cost of AF-related stroke	Approximately €24,500 (\$33,723) in the first year after stroke ³

Calculations based on the Finnish national stroke register estimate that €1.1 billion (\$1.6 billion dollars) is spent annually on the care of Finnish patients with stroke, the equivalent of 7% of the national healthcare budget and 0.6% of Finnish GDP.^{2,3}

On the individual patient level, the mean 1-year costs after an ischemic stroke were approximately €22,000 (\$29,576) in 2008.³ However only part of these costs are directly attributable to stroke as there were annual costs prior to stroke also included. This figure was also calculated for patients with AF after a stroke, see below.

The average lifetime healthcare costs after a stroke are €86,300 per patient in Finland.³ Of this, two thirds are directly due to the actual stroke and one third due to other diseases.

Data on the indirect costs of stroke are not available for Finland.

AF-RELATED STROKE

The direct healthcare costs of AF-related stroke are approximately €24,500 (\$31,723) in the first year after first-ever Ischemic stroke, slightly higher than the average for all patients with first-ever Ischemic stroke (see above).³ There is no data on the total costs of AF-related stroke.



4: POLICY LANDSCAPE

**National
stroke
plan**

**National
plan for
AF-related
stroke**

Government policy and strategy

There are currently no national plans or strategies for AF-related stroke, nor is AF and AF-related stroke visible in other relevant government policies.

Advocacy and awareness:

A 2003 study which followed up patients with AF after a visit to the emergency room revealed only moderate knowledge about AF, and particular gaps included anticoagulation, detection of symptoms and when to seek treatment.¹² This knowledge showed only limited improvement 3 months after the visit.¹²

The 'Know your Pulse' campaign has been run in Finland to encourage greater AF detection and awareness in the community. (see **Case study 7:** in Route Map for Change).

5: CLINICAL REGISTRIES

Finland has excellent national registries, such as the National Hospital Discharge Register, which has been underway since 1999.⁸ National data has been used to study stroke prevention in AF, for example the PERFECT Stroke study (Performance, Effectiveness, and Costs of Treatment episodes in Stroke) linked the national data on hospital discharge, causes of death, and drug use registries, covering of all patients with incident stroke treated in Finnish hospitals and institutions.⁸ The PERFECT study found that 32% of stroke patients were treated in comprehensive stroke centres (CSCs), 17% in primary stroke centres (PSCs) and 50% in general hospitals (GHs).⁸

An earlier regional stroke registry, FINSTROKE, operated between 1993 and 1997 in two regions, the Kuopio area and in Turku.¹¹

Also, Finland has a national cardiovascular disease register, which includes stroke.

6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs	National guidelines (<i>Eteisvärinä. Käypä hoito –suositus. Julkaistu: 14.02.2014</i>) ²⁰
Guidelines followed by cardiologists	National guidelines (<i>Eteisvärinä. Käypä hoito –suositus. Julkaistu: 14.02.2014</i>) ²⁰
Other guidelines	National guidelines on stroke (<i>Aivoinfakti. Käypä hoito –suositus. Päivitetty 11.1.2011</i>) ²¹

Finland has national guidelines for stroke prevention in AF (*Eteisvärinä. Käypä hoito –suositus. Julkaistu: 14.02.2014*).²⁰ According to local commentators these are the leading guidelines for both GPs and cardiologists. Stroke guidelines were also published in 2011, and include a section on the prevention of AF-related stroke.²¹



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Finland

Source	Study design	Year of data	N with AF	Setting	Age	% on OAC therapy	% of high-risk (CHADS ₂ ≥ 2) patients on OAC therapy
Lehto <i>et al.</i> 2011 ¹⁴ ('Finfib study')	Cross-sectional survey over a 2-week period	<2011	708	Hospital (40 acute care units in Southern Finland)	All	60% (VKAs, i.e. warfarin)	71% (CHADS ₂ ≥ 2)
Hallinen <i>et al.</i> 2014. ¹⁸ (Joensuu study)	Non-interventional retrospective database	2010-2012	2746	Municipality of Joensuu in Eastern Finland	All	51.8% (VKAs, i.e. warfarin)	50.3%

OAC: oral anticoagulation therapy

The most recent data on OAC therapy use come from two key studies, the Joensuu population study 2010-2012,¹⁸ and the Finfib study 2011, a survey of all AF patients admitted to forty acute care units in Finland over a two-week period.¹⁴

The authors of both studies concluded that there was significant underuse of OAC therapy (VKAs). For the Joensuu study, OAC therapy was received by approximately half of patients with AF, even among those patient groups at a greater risk of stroke (CHA₂DS₂-VASC₂ ≥ 1).¹⁸ Alternatively, the Finfib study showed slightly improved uptake in the acute setting, with 60% of all patients on OAC and 71% of those at greatest risk of stroke (defined as CHADS₂ ≥ 1) on VKAs.¹⁴

8: KEY LINKS

- The Finnish Cardiac Society: <http://www.fincardio.fi/>
- The Finnish Neurological Society: <http://www oulu.fi/neurosurgery/fns/>
- The Finnish Heart Association: www.sydanliitto.fi/
- National Institute of Health and Welfare: www.thl.fi



9: REFERENCES

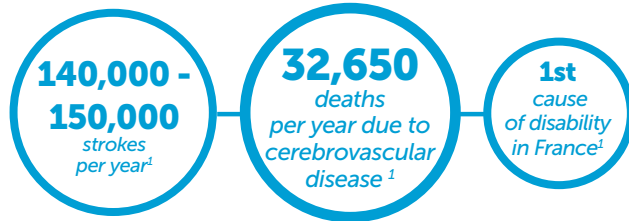
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COUNTRY PROFILE: FRANCE*



AF-Related Stroke:

Stroke is the 3rd leading cause of death.¹



AF is the **second** most important risk factor for stroke²

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke², bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 5 strokes is due to AF³

AF-related strokes are the most debilitating strokes

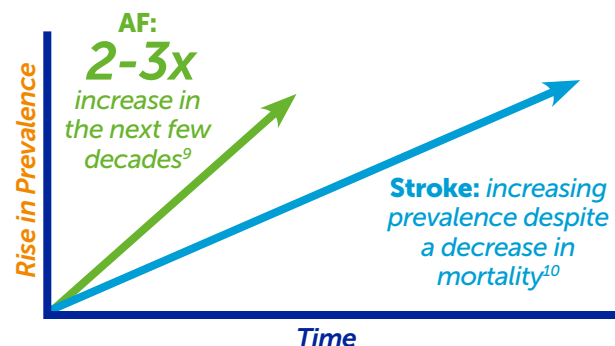


Policy Landscape:

- ✓ Plan AVC (national stroke strategy)⁶
- X No national plan on the prevention of AF-related stroke
- X No national AF registry
- X No national stroke registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year:	€5.3 billion⁷
Total nursing home costs per year:	€2.4 billion⁷
Total costs of lost productivity per year:	€255.9 million⁷
Annual cost per AF-related stroke:	Mild - €4,848 Severe - €29,701⁸



Awareness Gap:



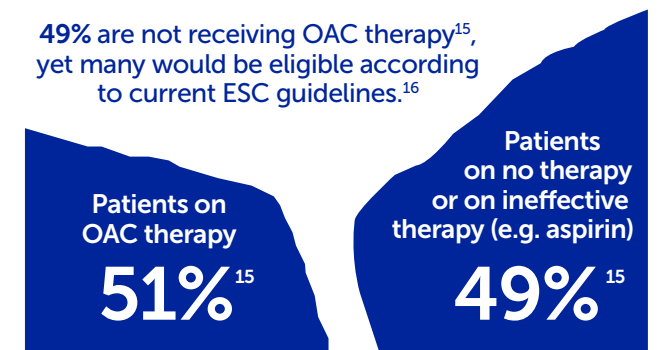
Most people have never heard of AF and many are not aware that AF is one of the major risk factors for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:

49% are not receiving OAC therapy¹⁵, yet many would be eligible according to current ESC guidelines.¹⁶



*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	Between 1-2% ¹⁷ , reaches 8% in people over the age of 80. ¹⁸
Number of people with AF (prevalence):	600,000-1 million ⁹
Number of new cases of AF per year (incidence):	200,000 ⁹
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	140,000-150,000 ¹
Number of deaths due to cerebrovascular disease per year:	32,650 ¹

AF-Related Stroke

% of strokes due to AF:	20% ³
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	1.1-2 million in 2050 ¹⁹
Stroke:	No data available

THE COSTS

Total direct healthcare costs of stroke per year:	€5.3 billion ⁷
Total indirect costs of stroke per year*:	€2.66 billion ⁷
Cost per AF-related stroke:	€4,848 (mild stroke) - €29,701 (severe stroke) over 2 years ⁸

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes ⁶

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	In progress
Most relevant to cardiologists:	ESC 2012 guidelines ¹⁶ ; Haute Autorité de Santé 2013 ²⁰
Most relevant to primary care:	ESC 2012 guidelines ¹⁶ ; Haute Autorité de Santé 2013 ²⁰

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% high risk AF patients currently treated with OAC therapy:	No data available
% AF patients currently treated with OAC therapy:	51% ¹⁵

*Includes nursing home costs and lost productivity due to stroke.



2: EPIDEMIOLOGY

AF

Number of people with AF (prevalence):	600,000-1 million ⁹
Prevalence rate (%):	Between 1-2% ¹⁷ , and 8% in people over the age of 80. ¹⁸

Between 600,000 and 1 million people have AF in France, and there are approximately 200,000 new cases diagnosed every year.⁹ Other studies estimate between 110,000 and 230,000 new cases per year.¹⁹

Prevalence of AF is estimated to be between 1-2%¹⁷ based on international data and reaches 8% in people over the age of 80.¹⁸

Undetected AF

No data available

Future Predictions

By 2050, there will be 1.1-2 million people living with AF in France.¹⁹ Prevalence is expected to double or triple over the next few decades.⁹

STROKE

Total number of people living with stroke (prevalence):	771,000 ²¹
Total number of people suffering new strokes every year (incidence):	140,000-150,000 ¹
Deaths due to cerebrovascular disease every year:	32,650 ¹

Stroke is the third most common cause of death, the 2nd leading cause of dementia and the leading cause of disability in France.¹

There are between 140,000 and 150,000 new strokes per year in France,¹ and an international study estimated that there are 771,000 prevalent cases of stroke.²¹

Stroke carries a high toll in mortality and morbidity in France. Cerebrovascular disease causes 32,650 deaths per year.¹ Approximately 0.8% of the French population (500,000 individuals) were disabled by a stroke (2008 figure)²¹, of whom 225,000 were categorised as having a disabling stroke (ALD 01) by Social Security.²² These estimates may be on the low side, as a population-based survey in France found that 1-2% of the population had had a previous stroke, affecting 771,000 people of whom 505,000 had sequelae.²¹

AF-RELATED STROKE

Alliance du Coeur estimates that one person has an AF-related stroke every 20 minutes in France.²³ ESC guidelines suggest that 1 in 5 strokes is due to AF.³



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of stroke per year:	€5.3 billion ⁷
Total nursing home costs per year:	€2.4 billion ⁷
Total costs of lost productivity per year:	€255.9 million ⁷

A recent study estimated that stroke cost the healthcare system €5.3 billion per year, that nursing home costs amounted to €2.4 billion and lost productivity for those under 65 cost €255.9 million per year.⁷ Stroke costs were also found to account for 3% of total health expenditure.⁷ An earlier study estimated the annual total cost of stroke at €8.4 billion Euros (2007 figures).²⁴

AF-RELATED STROKE

The mean costs of ischaemic strokes in AF patients are €4,848, €10,909 and €29,065 for mild, moderate and severe strokes, respectively; for haemorrhagic strokes due to AF, costs rise to €7,183, €14,298 and €29,701 for mild, moderate and severe cases, respectively.⁸ Costs of rehabilitation represent 75% of the total cost of stroke care in severe cases. These figures cover the first two year costs of stroke and do not include costs of long-term care or any indirect costs.⁸

Hospitalisations due to AF increased by 32% between 2002 and 2008¹⁹ (66% over the past 20 years¹⁸) and this trend is continuing.

4: POLICY LANDSCAPE



Plan d'actions national accidents vasculaires cérébraux 2010-2014⁶



Loi Relative à la Politique de Santé Publique

The national public health act (*Rapport d'Objectifs Annexe à la Loi Relative à la Politique de Santé Publique, août 2004*) had a specific objective related to stroke, namely to reduce the frequency and severity of functional sequelae linked to stroke. A new national public health act is expected in 2015.

Plan d'actions national AVC

France has a national stroke plan (*Plan d'actions national 'accidents vasculaires cérébraux 2010-2014*) which describes a series of prevention, care and rehabilitation strategies to help reduce the frequency and severity of complications linked to stroke. It proposes the introduction of a national programme to prevent stroke in patients with known vascular risk factors and other conditions such as AF, however no detail is given as to how this is to be achieved.⁶

Le Plan Coeur

In 2012, *L'Alliance du Coeur*, an alliance of 14 patient organisations, and the French cardiology society (*Fédération Française de Cardiologie*) proposed a national cardiovascular disease strategy (*le Plan Coeur*), which is intended to lead to the development of a White Paper on heart disease and be submitted to the government at the end of 2014. AF and the prevention of AF-related stroke are integral themes of the White Paper. It is the hope of the Alliance du Coeur that the White Paper may then be integrated into the 2015 public health plan currently in development. (see **Case study 2: The first National Heart Day: a political call to action on heart disease by the Alliance du Coeur – France**)



4: POLICY LANDSCAPE (CONT'D)

Focus on OAC therapy by l'Assurance Maladie

Social Security (*l'Assurance Maladie*) has devoted a lot of attention to the incidence of bleeding linked to VKA therapy over the past 10 years.^{25,26} A recent report by the national medicines agency (ANSM) noted that OAC therapy was the major cause of serious adverse events (representing approximately 31% of serious adverse events linked to medicines in 2009) and that VKAs were the leading cause of hospitalisations due to adverse events in France, accounting for 12% of such hospitalisations (2007 data).²⁶ There is also an ongoing study looking at the incidence of adverse events with VKA therapy being led by the *Centre de Référence et d'Education des AntiThrombotiques d'Ile de France*.²⁷

In 2013, pharmacists received official recognition for their role in the follow up of patients on VKAs and now receive a specific compensation for this role, as part of the *Convention des Pharmaciens* (national contract with pharmacists).²⁸

Advocacy and awareness:

The Alliance du Coeur have run campaigns for the past 20 years aiming for better information and support for those suffering from heart disease and stroke. This has included an active campaign on the prevention of AF-related stroke for several years, with their central message being that AF causes a stroke every 20 minutes in France.

Results of surveys conducted by *France AVC* suggest that at least a quarter of the population is poorly informed about stroke and what causes stroke and fewer than half of respondents would recognise the signs of someone having a stroke.²⁹

5: CLINICAL REGISTRIES

National stroke registry

National AF registry

There are no national registries for AF or stroke at present.

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	ESC 2012 ¹⁶ ; Haute Autorité de Santé 2013 ^{20,30}
Guidelines followed by cardiologists:	ESC 2012 ¹⁶ ; French guidelines under development by national cardiology society; Haute Autorité de Santé 2013 ²⁰
Other guidelines:	Joint guidelines by French society of Geriatrics and Gerontology and the French Society of Cardiology (2013) on AF management (including stroke prevention in AF) ⁹

The most followed clinical guidelines are the ESC 2012 guidelines, however guidance from the *Haute Autorité de Santé* is also followed that VKAs should still be considered the standard of care, with NOACs considered as an alternative.^{20,30} The ESC guidelines recommend that NOACs should be considered as 'broadly preferable' to VKAs.¹⁶

France is also one of the only countries in Europe where joint guidelines on AF have been drafted between the national society of geriatrics and gerontology and the national society of cardiology. This guidance, published in 2013, highlights the importance of doing a comprehensive geriatric assessment (CGA) in all AF patients and factoring in frailty and cognition, amongst other factors, when making choices for anticoagulation therapy.⁹ This marks an important contribution to clinical practice, given that most AF patients are over the age of 65 and present with multiple co-morbidities.



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF patients in France

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Sabouret <i>et al.</i> 2013 ¹⁵	Cross-sectional database of patients treated by GPs	2012	15,623	Primary care (GPs)	>18	51%	24%	25%
Becquemont <i>et al.</i> 2013 ³¹	SAG.ES study, non-interventional prospective study amongst GPs	2010 ongoing until 2015	1,072	Primary care (GPs)	>65	77%	17%	n/a
Cohen <i>et al.</i> 2010 ³²	EPHA study (national, cross-sectional, descriptive study using retrospective data analysis)	2009	1,331	Hospital- and private practice cardiologists	all	83%	22%	5.6%

OAC: oral anticoagulation therapy

Published studies suggest that OAC use varies significantly by setting of care. Becquemont *et al.*, suggest that 77% of patients over the age of 65 treated in primary care receive OAC therapy³¹, and Sabouret *et al.* found that this figure was 51% for all adult patients with AF.¹⁵ This latter figure is consistent with the figures used by government authorities – namely that 50% of AF patients are not treated according to clinical guidelines.¹⁷ Reported OAC use rates are higher (83%) in patients treated by hospital- or private practice-based cardiologists.³¹ All studies suggest over-reliance on aspirin, which is used in approximately 20% of patients regardless of the setting of care.

Several studies have also suggested that the quality of OAC therapy is suboptimal: AF patients receiving VKAs are only within the TTR for at best 65% of the time, with particularly poor control amongst very old patients.^{33,34}



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AF-Related Stroke:

Stroke is one of the leading causes of death in Germany.¹

262,000
strokes per year¹

59,000
deaths per year²

6.7%
of total deaths²

AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke³, bigger than smoking, bigger than diabetes, bigger than physical inactivity

15% of strokes are due to AF⁴

AF-related strokes are the most debilitating strokes

Greater lengths of stay and overall costs⁵

AF-related strokes compared to strokes not due to AF

2x the risk of death^{6;7}

Policy Landscape:

- X** No national stroke plan
- X** No national plan on the prevention of AF-related stroke
- ✓** National AF registry (AFNET)
- X** No national stroke registry (but local registries exist)

A Growing Economic Burden:

Total direct costs of cerebrovascular disease per year:	€5.96 billion⁸
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Total indirect costs of cerebrovascular disease per year:	€5.94 billion⁸
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A growing number of AF-related strokes risk going un-prevented

AF: 1.8 million cases today, increase to 2.13 million cases by 2020 (prevalence of 2.66%)⁹

Stroke: 3.4 million new cases of ischaemic stroke between 2006 and 2025.¹⁰

Awareness Gap:



One quarter of people are not aware of AF and up to 50% do not know that AF is a major risk factor for stroke¹¹...even if the risk of developing AF is **1 in 4** after the age of 40.¹²

Detection Gap:



Treatment Gap:

Between 17-40% of patients are not receiving OAC therapy, yet many would be eligible according to current ESC guidelines.¹⁹

Patients on OAC therapy
60% - 83%^{16;17;18}

Patients on no therapy or on ineffective therapy (e.g. aspirin)
20%^{16;17;18}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2.1% ⁹
Number of people with AF (prevalence):	1.8 million (2009) ⁹
Number of new cases of AF per year (incidence):	362,970 (2009) ⁹
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	262,000 ¹ (of which 200,000 are first-occurring) ¹
Number of deaths due to stroke per year:	58,925 ²
% of total deaths due to stroke:	6.7% ²

AF Related Stroke

% of strokes due to AF:	15% ⁴
Number of new cases of AF-related stroke per year:	Approximately 40,000 ⁴
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	Increase to 2.13 million cases in 2020 (prevalence of 2.66%) ⁹
Stroke:	3.4 million new cases of ischaemic stroke expected between 2006 and 2025 ¹⁰

THE COSTS

Total direct costs of cerebrovascular disease per year:	€5.96 billion ⁸
Total indirect costs of cerebrovascular disease per year:	€5.94 billion ⁸
Annual cost of AF-related stroke:	No data available*

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes
Most relevant to cardiologists:	ESC 2012 ¹⁹ ; German guidelines (DGK 2012) ²⁰
Most relevant to primary care:	Local guidelines (DGK 2012 ²⁰ ; Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin 2012; Deutsche Gesellschaft Neurologie ²¹)

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients receiving OAC therapy:	60-83% ^{16;17;18}
% high risk (CHA ₂ DS ₂ -VASc scores ≥2) AF patients currently treated with OAC therapy:	70% ¹⁸

* Estimates exist, however they date back to 2000-1.

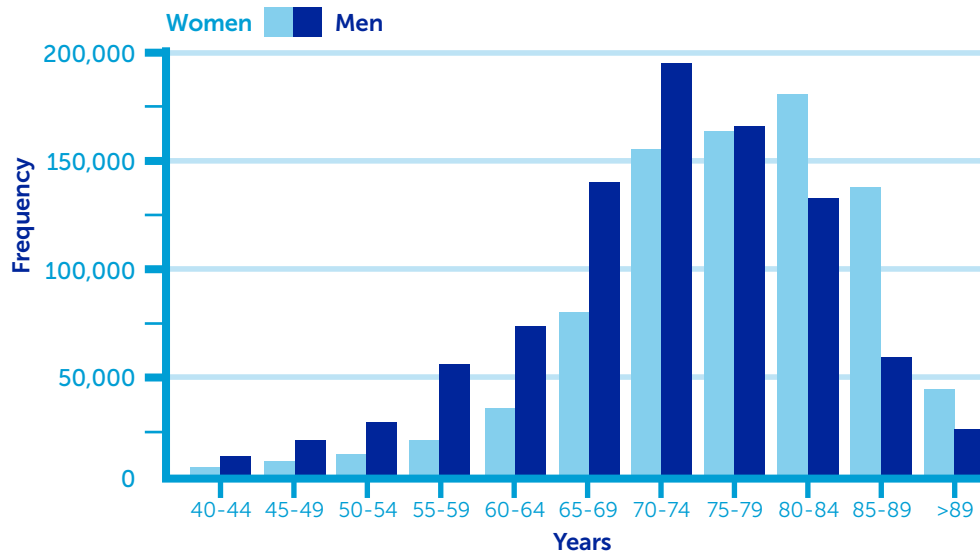


2: EPIDEMIOLOGY

AF

Number of people with AF (prevalence):	1.8 million (2009) ⁹
Prevalence of AF (%):	2.1% ⁹

Prevalence of AF in Germany



Adapted from Wilke et al., 2013⁹

A large claims database study of close to 8.3 million members of two large German statutory insurance funds found a prevalence rate of 2.13% overall, with an incidence rate of close to 4.4 cases per 1000 person-years in men, and 3.9 cases per 1000 person-years in women.⁹ This amounts to almost 1.8 million (1,793,277) cases of AF in 2009. This figure is likely to be underestimated as it excludes cases of suspected and undiagnosed AF.⁹

Undetected AF

No data available

STROKE

Total numbers of people suffering new strokes every year (incidence):	262,000 ¹
Deaths due to stroke every year:	58,925 ²

Stroke is one of the main causes of death in Germany, and accounts for 6.7% of all deaths.² Based on data from the Arbeitsgemeinschaft Deutscher Schlaganfall-Register (ADSR-German Stroke Registries Study Group), in 2008 there were close to 262,000 new strokes in Germany. Two hundred thousand of these strokes were first-occurring strokes and 66,000 were recurrent cases.¹ Cases of stroke were recorded using ICD-10 codes 160-169. Data from 2012 suggests there are close to 59,000 deaths due to stroke in Germany per year.² National data on the prevalence of stroke are not available.

AF-RELATED STROKE

As 15% of strokes are due to AF, there are an estimated 40,000 AF-related strokes per year in Germany.⁴

Future Projections

The number of people with AF is expected to increase from 1.8 million in 2009 to 2.13 million cases in 2020 (to reach a prevalence rate of 2.7%).⁹



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€5,96 billion ⁸
Total indirect costs of cerebrovascular disease per year*:	€5.94 billion ⁸

*Defined as productivity losses due to morbidity, mortality and informal care.

Data on the total direct and indirect costs of stroke are not available for Germany. However, leading international studies have estimated that cerebrovascular disease costs the German healthcare system €5.96 billion per year, and lost productivity due to mortality, morbidity and caregiver time (indirect costs) amounts to €5.94 billion per year.⁸

A widely cited study estimated that the direct medical costs of a first-occurring stroke are €18,517 in the first year, and €5,479 for each of the four years following stroke.¹⁰ Rehabilitation accounts for the largest share of these costs (37%).¹⁰ The lifetime treatment costs of newly diagnosed first strokes occurring between 2006 and 2025 were estimated at €108.9 billion overall.¹⁰

AF-RELATED STROKE

AF-related strokes are associated with greater lengths of stay, higher hospitalisation costs and higher overall costs than strokes not due to AF.⁵ Cost estimates, however, date back to the year 2000.⁵

4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There are no national plans or strategies for AF-related stroke in Germany, nor are AF or AF-related stroke visible in other relevant government policies or improvement initiatives.

There is also no national stroke policy as such. The Federal Joint Committee (G-BA) has proposed to focus attention on improving the quality of care in five key indications, including stroke.²²

Advocacy and awareness

AFNET, the German Competence Network on AF, plays an important role in disseminating information about AF to the public and government in Germany. They conducted a survey in 2012 of 1000 people over the age of 40 living in Cologne, Frankfurt and Nuremberg and found that 25% had never heard of AF and only 50% knew that AF increased the risk of stroke.¹¹

Other awareness-raising activities occur mostly at the local level e.g. initiatives by a local hospital or the Foundation of German Stroke Help (such as informational talks, screening activities, expert panels).



5: CLINICAL REGISTRIES

**National
stroke
registry**
(but local registries exist)

**National
AF
registry**

Germany has one of the few national registries on AF in Europe, the AFNET registry, which was established as part of the AFNET German Competence Network on AF in 2003.²³ The registry is a prospective, nationwide registry that enrolled a total of 9,577 patients from 2004 to 2006 from 191 German centres drawn from primary care, office- and hospital-based cardiologists, and internal medicine, and has recently renewed enrolment as part of the European-wide EORP registry. (see **Case study 15:** The German Competence Network on AF (AFNET))

There is no national stroke registry, however local registries exist across the country.

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	Local guidelines (DGK 2012 ²⁰ ; Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin 2012; Deutsche Gesellschaft Neurologie ²¹)
Guidelines followed by cardiologists:	ESC 2012 ¹⁹ ; German guidelines (DGK 2012 ²⁰)
Other guidelines:	No

The ESC 2012 guidelines are followed by cardiologists and have been translated into German by the German Society of Cardiology (*Deutsche Gesellschaft Kardiologie*).²⁰ In addition, national guidelines have been developed by the Society for Primary Care and Family Medicine (*Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin, or DGK*) and the German neurology society (*Deutsche Gesellschaft Neurologie*).²¹



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF patients in France

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Wilke <i>et al</i> 2012 ¹⁶	Claims database of 2 large sickness funds (1.8 million population)	2008	183,448	All	> 18	Rates of under-use of OAC therapy range from 26-48% depending on the definition used, but average 40%.		
Bonnemeir <i>et al</i> 2011 ¹⁷	MOVE (MORbidaetsdaten von Vorhofflimmer-Patienten)	2009	3354	638 physicians across Germany, 78% office- and 22% hospital-based, 80% cardiologists	>18	75%	40%	20%
Meinertz <i>et al.</i> 2011 ¹⁸	ATRIUM (Outpatient Registry Upon Morbidity of AF) registry	2009	3667	primary care	all	83%	27%	7%

OAC: oral anticoagulation therapy

There are a number of recently published national studies showing OAC usage rates in Germany, which show a wide range of findings regarding adherence to clinical guidelines. A large claims database analysis found significant under-use of OAC of approximately 40%, even among patients at highest risk of stroke (CHADS₂ score greater than 5).¹⁶ The authors attribute their low rates of OAC use to the fact that their patient population is older and may present with more comorbidities than in other published registry or observational studies.¹⁶

Data from other recent studies report higher OAC usage rates: Meinertz *et al.* found that 70% of patients with highest risk of stroke (as defined by CHA₂DS₂-VASc scores ≥ 2) received OAC therapy, as compared to 66% with a CHA₂DS₂-VASc score of 1. Nabauer *et al.* found similar levels of treatment.²⁴ Meinertz and Nabauer both found evidence of significant over-treatment of patients who were not at risk of stroke.^{18;24} Bonnemeir found that 75% of patients overall were on OAC therapy, however 20% were not receiving any medicines to lower their risk of stroke.¹⁷

A further study by Schnabel *et al.* reported much lower rates of OAC use (37%), however data were self-reported by patients, therefore they may be less reliable.²⁴

8: KEY LINKS

Patient associations:

- Kompetenznetz Vorhofflimmern e.V. (Competence Network on AF): <http://www.kompetenznetz-vorhofflimmern.de/english/index.php>
- Kompetenznetz Schlaganfall (Competence Network Stroke): <http://www.kompetenznetz-schlaganfall.de/89.0.html>
- Deutsche Gesellschaft für Kardiologie- Herz- und Kreislaufforschung (German society for cardiology, heart and circulation research): <http://dggk.org/>
- Deutsche Schlaganfallgesellschaft (German Stroke Society): <http://www.dsg-info.de/>
- Deutsche Gesellschaft für Neurologie (DGN) (German Neurology Society): <http://www.dgn.org/>
- Deutsche Stiftung Neurologie (Germany society of neurology): <http://www.deutsche-stiftung-neurologie.de/>

Other organisations:

- Stiftung Deutsche Schlaganfallhilfe (Foundation of German Stroke Help): <http://www.schlaganfall-hilfe.de/home>
- Deutsche Herzstiftung (German heart foundation): <http://www.herzstiftung.de/>



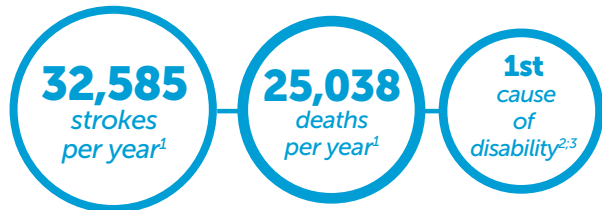
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AF-Related Stroke:

Stroke is a leading cause of death



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴



More than **1 in 3** ischaemic strokes is due to AF^{5,6}

AF-related strokes are the most debilitating strokes

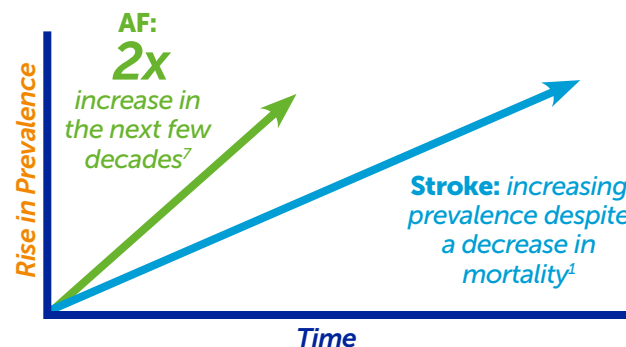


Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year:	€562 million (2010) ¹⁰
Total indirect costs of cerebrovascular disease per year:	€1004 million (2010) ¹⁰
Annual cost of AF-related stroke:	No data available



Awareness Gap:



Many people are not aware of AF or that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40¹¹

Detection Gap:

There are no national estimates of detection rates in AF, but European studies suggest at least one third of all cases are undetected.^{12,13,14}



Treatment Gap:

Between **59% to 67%** of those who could benefit from anticoagulation (i.e. CHADS₂ <1) do not receive treatment with OAC therapy^{15,16}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1.3% (age >20) ¹⁷ 5% (age > 65) ¹⁶ Up to 3.9% in rural population ¹⁵
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	32,585 ¹
Number of deaths due to cerebrovascular disease per year:	25,038 ¹

AF-Related Stroke

% of strokes due to AF:	34% ⁵ possibly as high as 60% ⁶
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct costs of cerebrovascular disease per year:	€563 million ¹⁰
Total indirect costs of cerebrovascular disease per year:	€1,004 million ¹⁰
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Some local guidelines
Most relevant to cardiologists:	ESC 2012 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁸

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	38.8% (2002-2004) ¹⁶
% high risk (CHADS ₂ > 1) AF patients currently treated with OAC therapy:	33.4% (2002-3 data) ¹⁵ 40.6% (2002-4 data) ¹⁶
Treatment gap:	55.5%* (2002-3 data) ¹⁵ 59.4%** (2002-4 data) ¹⁶

*Defined as % of all AF patients not receiving appropriate anti-thrombotic therapy.

**Defined as the percentage of high risk patients (CHADS₂ >1) eligible for OAC therapy and without contraindications who did not receive OAC therapy.



2: EPIDEMIOLOGY

AF

Data regarding specific population characteristics and risk factors for AF in Greek patients are sparse.¹⁹

The most commonly referred-to figure for prevalence of AF in Greece dates back to 1999.¹⁷ Of the 116,594 residents aged >20 years in the study area (Ioannina prefecture), the overall prevalence of AF was 1.3% in the population aged >20 years, and in the population aged above 40 and 60 years it was 2% and 3.6% respectively. In the population over 80 years the prevalence was estimated to be 6.8%.

Other estimates come from rural areas in Greece: a 2002-3 cross-sectional study in 5 villages in Arcadia, found a prevalence of AF of 3.9% in 1,155 individuals.¹⁵ A study of people aged in 4 villages in Northern Greece found a much higher prevalence of permanent AF of 5% in the those aged over 65, (6.6% among men, and 3.6% among women).¹⁶

Undetected AF

No data available

Future Projections

No data available

STROKE

Total number of people living with cerebrovascular disease (prevalence):	94,202 ¹
Total number of new cases of cerebrovascular disease per year (incidence):	32,585 ¹
Deaths due to cerebrovascular disease per year:	25,038 ¹

No national data were available for total prevalence, incidence or mortality of stroke, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

Future Projections

No data available

AF-RELATED STROKE

In the Athens Stroke Registry for patients with a first-ever stroke a high prevalence of AF was noted (33.2%, with an additional 15.8% previously unknown AF), as well as a high prevalence of other risk factors, such as hypertension.⁶ Similar findings were found in the Arcadia Stroke Registry where AF was present in 34.1% of stroke cases.⁵

A study of all ages in a rural village setting in Northern Greece found that the prevalence of cerebrovascular disease amongst people with AF was approximately 4-5 times that of people without AF.¹⁵

Future Projections

No immediate data is available. However, leading commenters have observed that Greece has a relatively high prevalence of cardio-embolic stroke compared to other countries, and an increasing incidence and prevalence of AF and associated cardiovascular risk factors, due in part to the rapid ageing of the population.^{19,20} This and demographic changes pose the significant possibility of a substantial increase of AF cases in the next few decades.¹⁹



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€563 million ¹⁰
Total indirect costs* of cerebrovascular disease per year:	€1,004 million ¹⁰

*Defined as productivity losses due to morbidity, mortality and informal care.

Data on the total direct and indirect costs of stroke are not available for Greece. However, leading international studies have provided estimates for cerebrovascular disease (see above).

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There are no national plans or strategies for AF-related stroke, nor do AF and AF-related stroke feature in other relevant government policies or improvement initiatives. No national stroke plan exists.

Leading national commentators have made regular and urgent calls to improve the care for AF and AF-related stroke in Greece.^{15,19,21} These include better education and adherence of primary care clinicians to guidelines, and efforts to increase public awareness of AF and patient compliance with anticoagulation.¹⁵ For example, many physicians avoid placing their older AF patients on anticoagulation, fearing the haemorrhagic complications or the complications of regular monitoring.^{16,19} Overall, the promotion of 'deep knowledge' of evidence-based therapeutic approaches amongst professionals, as well as the development of individualized therapeutic strategies are considered hopeful strategies to substantially improve the effective management of AF patients.¹⁵

National experts have highlighted various structural problems in the prevention of AF-related stroke, including a lack of special outpatient clinics for anticoagulation therapy or well-organized primary care of patients, delays in laboratory results, variability of results between different laboratories, lack of specialized nurses or trained health personnel, and inadequate social support.¹⁹ Other key issues include errors in detection and management of the underlying conditions that promote and perpetuate the arrhythmia, and in the selection and monitoring of antithrombotic treatment.²¹

Advocacy and awareness

No data was available on levels of public awareness of AF or AF related stroke. However, low awareness of the stroke risk for patients with AF is also cited by experts as likely factor in undertreatment.¹⁶

Very little information was available on advocacy or awareness raising initiatives for AF or AF-related stroke in Greece.



5: CLINICAL REGISTRIES

National stroke registry

National AF registry

Leading national commentators have highlighted that the epidemiology of AF is not well studied in Greece, including a lack of specific data on population characteristics and risk factors for AF.¹⁹

6: CLINICAL GUIDELINES

The guidelines most commonly followed in Greece are presented below.

Guidelines followed by GPs:	ESC 2012 ¹⁸
Guidelines followed by cardiologists:	ESC 2012 ¹⁸
Other guidelines:	Some local therapeutic protocols were developed recently but yet to be implemented.

7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Greece

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Ntaios 2012 ¹⁵	Cross sectional population study (1,115 people)	2002-3	15 (CHADS ₂ <1)	5 rural villages in Arcadia	All	33.4%	n/a	n/a
Ninios 2010 ¹⁶	Population screening for permanent AF (720 residents)	2002-4	36	4 villages in Northern Greece	>65	38.8	33.3	27.7
Farmakis 2013 ²²	Country-wide prospective observational study (1,127 patients enrolled in the RAFTING registry)	2010-2011	1,127	6 major regions of Greece	All (mean 70.9±11.8)	44.1	40.8	25.2

OAC: oral anticoagulation therapy



7: ADHERENCE TO GUIDELINES (CONT'D)

Although the use of OAC therapy has increased over time in Greece, it is still underutilized, especially by primary care/ community physicians.²¹ Two studies provide evidence of significant treatment gaps in Greece. A screening study of 4 villages in individuals aged 65 and over in Northern Greece found that only 38.8% of AF patients without contraindications who could benefit from OAC therapy were prescribed it, and 27.7% of individuals did not receive any antithrombotic therapy at all (2002-4 data).¹⁶

The Arcadia study, a cross-sectional population study in 5 villages in Greece conducted in 2003-4, found that only 45% of AF patients received OAC therapy.¹⁵ In particular, 55.5% of AF patients with a medium CHADS₂ score of 1 did not receive any antithrombotic therapy (OAC or aspirin) and almost 66.6% of the high-risk group (CHADS₂>1) did not receive any OAC therapy, a considerable treatment gap as in theory as many would be eligible according to current guidelines.¹⁸

8: KEY LINKS

- Hellenic Cardiological Society: www.hcs.gr
- Hellenic Cardiovascular Research Society: www.cardioresearch.net



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COUNTRY PROFILE: HUNGARY*



AF-Related Stroke:

Stroke is a leading cause of death

40,000
(ischaemic) strokes per year¹

13,081
cerebrovascular deaths per year²

1st
cause of adult disability^{3,4}

AF is the **second** most important risk factor for stroke⁵

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke bigger than smoking, bigger than diabetes, bigger than physical inactivity⁵

1 in 5 strokes is due to AF⁶

AF-related strokes are the most debilitating strokes

1.5x
higher cost⁶

AF-related strokes compared to strokes not due to AF

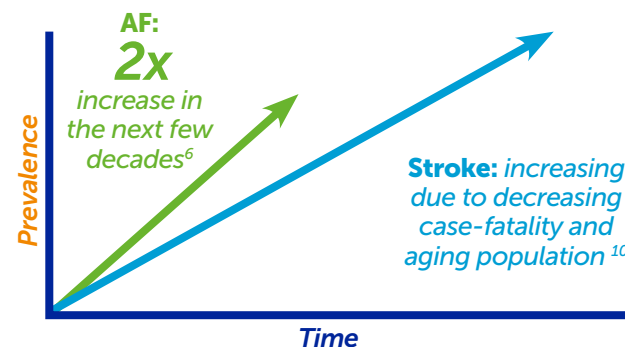
2x
the risk of death^{7,8}

Policy Landscape:

- ✓ National Cardiovascular Programme (since 2006)
- X No national plan on the prevention of AF-related stroke
- X No national stroke registry
- X No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year:	HUF 12.1 billion (€38.8 million) incremental cost due to stroke. ⁹
Total indirect costs of stroke per year:	No data available



Awareness Gap:



Many people are not aware of AF or that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:

Only **50-60%** of eligible patients with AF receive OAC^{13,14}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2.95% (2007-9) ¹²
Number of people with AF (prevalence):	296,493 (2007-9) ¹²
Number of new cases of AF per year (incidence):	31,944 (2007-9) ¹²
Number of undetected AF cases:	No data available
Detection gap:	19% ¹³

Stroke

Number of new cases of stroke per year:	Approx. 40,000 (Ischaemic stroke) ¹
Number of deaths due to stroke per year:	13,081 deaths due to cerebrovascular causes in 2012. ²
% of total deaths due to stroke:	Approx. 10% ¹

AF-Related Stroke

% of strokes due to AF:	Approx. 20% ¹⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total cost of stroke per year:	HUF 12.1 billion (€38.8 million) incremental cost due to stroke. ⁹
Total indirect costs of stroke per year:	No data available
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	National Cardiovascular Program, including the Vascular Neurology National Program (previously National Stroke Program)

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes - Ministry of Health Professional Protocol (since 2006).
Most relevant to cardiologists:	ESC 2012, ¹⁶ EHRA 2013 Practical Guidelines ¹⁷
Most relevant to primary care:	Expert reviews published in GP-targeted journals.

HOW MANY AF PATIENTS ARE BEING TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	50-60% ^{13,14}
% high risk AF patients currently treated with OAC therapy:	No data available
Treatment gap*:	40-50% ^{13,14}

*Defined as % of AF patients not receiving proper anticoagulation despite being eligible



2: EPIDEMIOLOGY

AF

Number of people with AF:	296,493 (2007-9) ¹²
Prevalence (%):	2.95% (2007-9) ¹²

The prevalence of AF in Hungary was estimated at 2.95% in 2009, based on National Health Insurance Fund records over 5 to 7 years.¹²

Undetected AF

No data available

Future Projections

No data available

STROKE

Total numbers of people living with stroke (prevalence):	200,000-250,000 ¹⁸
Total numbers of people suffering new strokes every year (incidence):	40,000 ¹
Deaths due to cerebrovascular diseases every year:	13,081 (2012) ²

Future Projections

No data available

AF-RELATED STROKE

In a survey covering 648 hospitalizations due to acute ischemic stroke during October 2013 at 8 high-volume stroke centres (out of the 37 accredited centres in Hungary), 21% of the cases were associated with AF.¹⁵

Future Projections

No data available

3: ECONOMIC BURDEN

STROKE

Direct healthcare costs of stroke per year:	HUF 12.1 billion (€38.8 million)* ⁹
Indirect costs of stroke per year:	No data available

* incremental cost due to stroke per year (see below)

The direct healthcare costs of stroke in Hungary have been estimated by studies using data from the National Health Insurance Fund to extrapolate health insurance claims data from 3,535 hospitalizations due to stroke in May 2003 among patients over 25 years of age, which estimated a HUF 12.1 billion (€38.8 million) incremental cost due to stroke (i.e., total costs during the first 12 months after stroke minus total costs during the 12 months before stroke).⁹ A further incremental cost of HUF 2.0 billion (€6.5 million) was incurred between 13-24 months after the stroke.

Data on the indirect costs of stroke (e.g. lost productivity and informal care) are not available for Hungary.

AF-RELATED STROKE

Derived from the above data, based on the estimated 21% proportion of AF etiology among stroke hospitalizations, the annual incremental cost of AF-related stroke is estimated at HUF 2.5 billion (€8 million) (No assumption is made about the potential differences between costs of AF-related vs. non-AF-related stroke cases).⁹



4: POLICY LANDSCAPE

National stroke plan

National Stroke Programme (since 1992)

National plan for AF-related stroke

Government policy and strategy

Hungary does not have a national plan or strategy for AF-related stroke.

However stroke features in several key Government plans. A dedicated stroke program has existed since 1992,¹⁹ currently called the Vascular Neurology National Programme under the National Cardiovascular Programme launched in 2006.²⁰ The programme's main goal is to improve access to acute stroke services such intravenous thrombolysis and multidisciplinary rehabilitation in specialist stroke centres.

The current Healthy Nation Public Health Programme features stroke in terms of a reduction of behavioural risk and lifestyle determinants, and the importance of the programme has been highlighted by the Hungarian Stroke Society. This reflects a legacy of various national public health initiatives over the last decade and beyond, all of which have included cardiovascular disease as a leading cause of death in Hungary.

Advocacy and awareness

No data was available on levels of public awareness for AF, stroke, or AF-related stroke.

Several organisations are known to be active in the field of stroke, with some active on AF-related stroke. The Hungarian Stroke Society has called for stronger civil society organization in the prevention of stroke and in raising social awareness.¹⁸ The association has also run an educational campaign "Stroke - don't waste time!" for the last four years, aiming to educate the public on stroke symptoms, and emphasizing the time factor and the importance of prevention. The strategic plan of the Hungarian Stroke Society includes the goal of increasing the percentage of appropriate OAC therapy in patients with AF (see link below).

One of the most active organisations is the National Stroke League, which announced a strategic plan of stroke prevention and management.

5: CLINICAL REGISTRIES

There is no national stroke registry, nor a national registry for AF.



6: CLINICAL GUIDELINES

Guidelines followed by GPs:	Expert reviews published in GP-targeted journals.
Guidelines followed by cardiologists:	ESC 2012, ¹⁶ and translation of the 2010 version. ²¹ EHRA 2013 Practical Guidelines ¹⁷
Other guidelines:	Professional Protocol of the Ministry of Health on Cerebrovascular Diseases (since 2008). Professional Protocol of the Ministry of Health on the Treatment of Atrial Fibrillation and Atrial Flutter (since 2006).

The guidelines most commonly followed for stroke prevention in AF patients are described on the left.

There is no single guideline of the management of AF and AF-related stroke, but Class 1 recommendations on OAC therapy for the prevention of AF-related stroke are provided in two broader guidelines; the Professional Protocol of the Ministry of Health on Cerebrovascular Diseases¹⁴ (since 2008), authored and updated by the Hungarian Stroke Society and endorsed by the College of Neurology, and the Professional Protocol of the Ministry of Health on the Treatment of Atrial Fibrillation and Atrial Flutter²² (since 2006) authored by the College of Cardiology.

7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Hungary

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Hofgart 2012 ¹³	Observational study	2009	118	Hospital patients admitted for stroke, neurology department of one teaching hospital	All	n/a	n/a	50% not treated appropriately according to current guidelines

OAC: oral anticoagulation therapy

A study of approximately 416 patients admitted for stroke to the neurology department at Debrecen hospital in 2009 found that approximately 50% of patients were receiving antithrombotic therapy on presentation. Treatment with OAC was suboptimal, with only 9% of patients on VKAs having INR readings within the target therapeutic range.¹³

The Professional Protocol of the Ministry of Health on Cerebrovascular Diseases 2010 states that only 50-60% of eligible patients receive OAC therapy.¹⁴

Similar data was reported in earlier studies, for example data from 2004 on 116 patients with AF admitted to one hospital found that only 30% were on antithrombotic therapy prior to admission and only 28% of patients had INR

readings within the target range.²³ Another study found higher rates of OAC therapy at discharge (77%), however again these data were for limited to one cardiology department.²

Several barriers to treatment have been stated in relevant literature in the last decade. For example patient engagement with health professionals is known to be low; every year roughly half of the patients with previously detected AF receive medical care.¹²

Historically, under usage of treatment has been a general problem, for example one commentator observed that anticoagulant treatment in non-valvular AF in the Hungarian pre-hospital practice is underused and inefficient.²³



8: KEY LINKS

- Hungarian Stroke Society (www.stroketars.hu). The society runs a website for patients: <http://www.szelutes.hu/>
- Hungarian Stroke League: <http://strokeliga.blogspot.hu/>
- ESzMe (Egyesület a Stroke Megelőzéséért - Association for Stroke Prevention) - the Hungarian representative of the Stroke Alliance for Europe: <http://www.eszme.hu/>

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AF**-Related Stroke:

Stroke is the 2nd leading cause of death^{2,3}



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke,⁴ bigger than smoking, bigger than diabetes, bigger than physical inactivity

Close to **1 in 3** ischaemic strokes is due to AF⁵

AF-related strokes are the most debilitating strokes⁸



Policy Landscape:

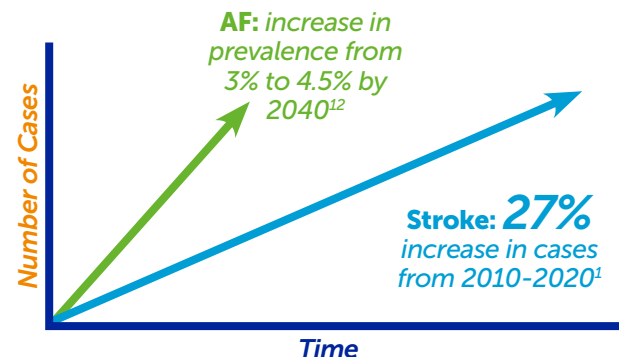
- ✓ National Stroke Manifesto⁹
- ✓ AF-related stroke included in Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019¹⁰
- ✗ No national AF registry
- ✓ National Stroke Register

A Growing Economic Burden:

Total direct cost of stroke per year **€345 - €557 million¹¹**

Total indirect cost of stroke per year **€143 - €248 million¹¹**

Cost of AF-related stroke **€25,150 over 2 years compared to €12,750 for non-AF stroke patients⁵**

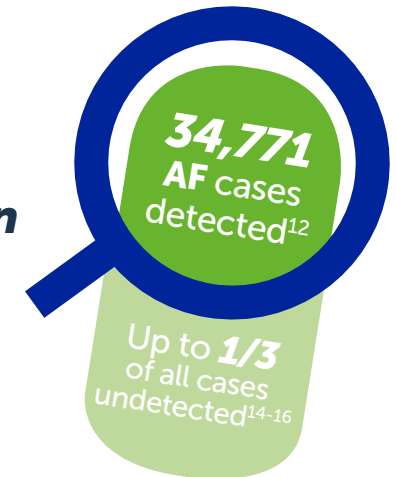


Awareness Gap:



38% of the population and **64%** of people aged 65-70 years old are unaware of AF...even if the risk of developing AF is 1 in 4 after the age of 40.^{12,13}

Detection Gap:



Treatment Gap:

Up to **47%** of AF patients eligible for anticoagulation therapy are not receiving it.¹²

*This infographic is based on national data where possible. Where national data are not available, international data have been used.

** AF: atrial fibrillation.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	3% of people aged 50 and over ¹²
Number of people with AF (prevalence):	34,771 ¹²
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	23,000 adults >18 years (2012) ¹
Number of deaths due to stroke per year:	2,499 (2010) ²
% of total deaths due to stroke:	7.4% ¹⁰

AF Related Stroke

% of strokes due to AF:	31% of ischaemic strokes ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	Prevalence will increase from 3% to 4.5% by 2040 with a corresponding 3-fold increase in patient numbers to 107,000 ¹²
Stroke:	27% increase in prevalence expected by 2020, to reach 29,000 people clinically diagnosed with stroke. ¹

THE COSTS

Total direct costs of stroke:	€345-€557million (2007) ¹¹
Total indirect costs of stroke:	€143 - €248million (2007) ¹¹
Cost of AF-related stroke:	2 year median cost of €25,150 compared to median cost of €12,750 for non-AF stroke patients ⁶

THE POLICY LANDSCAPE

National plan for AF-related stroke:	Changing Cardiovascular Health (2010-2019) ¹⁰ The Stroke Manifesto (2009) ⁹
National stroke plan:	The National Stroke Clinical Care Programme (2012)

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁷ National Institute of Clinical Excellence (NICE) CG 68 on stroke and TIA ¹⁸ Royal College of Physicians: National clinical guideline for stroke (2012) ¹⁹
Most relevant to primary care:	ESC 2012 ¹⁷ National Clinical Guidelines for the Care of People with Stroke and TIA (2010) ²⁰

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% of all AF patients treated with OAC therapy:	No data available
% high risk AF patients currently treated with OAC therapy (CHA ₂ DS ₂ -VASc ≥2):	59% ¹²
Treatment gap*:	47% ¹²

*Defined as the % of AF patients eligible for OAC treatment who are not receiving it.¹²

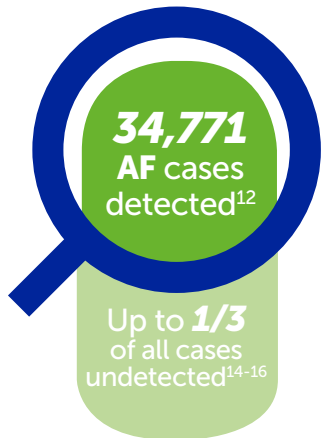


2: EPIDEMIOLOGY

AF

Number of people with AF:	34,771 ¹²
Prevalence rate (%):	3% of people aged 50 and over ¹²

AF prevalence among people over 50 in Ireland is estimated to be 3%, however there is a marked difference between the sexes with a prevalence rate of 4.8% among men over 50 and 1.4% among women over 50.¹² Prevalence among people over the age of 80 is even higher, around 19.3% for men and 5.9% for women.¹²



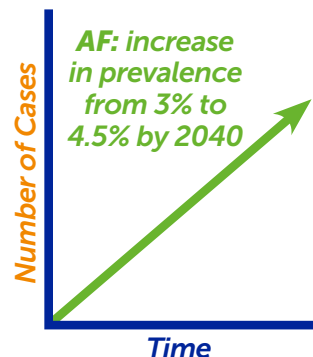
Undetected AF

National estimates of the number of undetected cases of AF are not available, however European figures suggest that up to one third of AF cases may be undetected.¹⁴⁻¹⁶

Data from the North Dublin Stroke Registry suggests that only 54% of patients with an ischaemic stroke had a diagnosis of AF prior to their admission to hospital, with the remaining 46% having AF first diagnosed during the first stroke.⁵

Future Projections

Based on data from the Irish national census, prevalence will increase from 3 to 4.5% over the next 3 decades, with 107,000 people having AF in 2040, due mainly to age related demographic changes.¹²



STROKE

Total numbers of new cases of stroke per year (incidence):	23,000 ¹
Deaths due to cerebrovascular disease per year:	2,499 ²

In 2010, it was estimated that 23,000 adults over the age of 18 had had a stroke diagnosed by a doctor in the previous 12 months.¹ Incidence increases with age: it is 0.2% among 18-44 year olds, 0.3% among 45-54 year olds, 1.7% among 55-64 year olds, 1.4% among 65-74 year olds and 2.8% among those aged 75 and over.¹

Future Projections

By 2020, the number of adults clinically diagnosed with stroke is expected to rise to almost 29,000, at a prevalence rate of 0.8%, representing a 27% increase over ten years.¹

According to international studies, there are close to 2,500 deaths from cerebrovascular disease in Ireland every year.²

AF-RELATED STROKE

Data from the North Dublin Stroke Registry found that AF was present in 31% of all new strokes and 28.7% of first-ever strokes.⁵ The authors estimated that the crude incidence of all AF-related strokes was between 60 and 69 cases per 100,000 person-years.⁵

The proportion of strokes due to AF increases progressively with increasing age. AF-related stroke accounts for 13.9% of ischaemic stroke cases under the age of 65 years, compared with 41.7% of those aged 75 years or older, and 46.2% of those aged 85 or older.⁵



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of stroke per year:	€345-557 million (2007) ¹¹
Total indirect* costs of stroke per year:	€143-248 million (2007) ¹¹

*Defined as productivity losses due to morbidity and mortality

National cost data shows that stroke imposes a huge cost on society: Total costs of stroke were estimated at €489 million (2007 data), which comprises €345-557 million in direct healthcare costs and €143-248 million in indirect costs. Nursing home care and indirect costs together account for the largest proportions of the combined stroke costs in this analysis.¹¹

Direct cost due to stroke have been estimated to account for 2-4% of total health expenditure.¹¹ In 2009 over 7,500 people were admitted to hospital with a stroke²¹

AF-RELATED STROKE

Data from the North Dublin Population Stroke Study revealed that the two year median cost of AF-related stroke was €25,150 – compared to an average of €12,751 for strokes not due to AF.⁶

4: POLICY LANDSCAPE



Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019

Ireland has afforded considerable recognition to AF and AF-related stroke, which feature prominently in several layers of health policy and strategy. The overarching government strategy '**Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019**' incorporates both stroke and the prevention, detection and management of AF. The policy outlines the need for more effective anti-coagulation therapy in the primary care setting in order to reduce the risk of stroke.¹⁰ This is coupled with a specific recommendation calling for the formalisation of anticoagulation service management in AF which covers the clinical leadership of integrated anticoagulation services, structured anticoagulation services and a screening programme for AF.¹⁰ The development of structured clinical care for the prevention of cardiovascular disease more widely is also included.

The Stroke Manifesto

In 2009 The Stroke Manifesto was launched by the Irish Heart Foundation. The manifesto called on government to implement 16 recommendations in an effort to reduce or even eliminate avoidable death and disability from stroke in Ireland. The manifesto was sponsored by the IHF Stroke Council which draws in experts from the healthcare and social community involved in stroke prevention and care. The Stroke Council still exists at time of writing.⁹



4: POLICY LANDSCAPE (CONT'D)

The National Stroke Clinical Care Programme

Ireland has a National Stroke Clinical Care Programme which aims to deliver better care and service efficiency, including the design and delivery of standardised models of integrated clinical care. The Programme has recently provided a comprehensive 'Model of Care' position paper, setting out how stroke outcomes will be improved through the development of prevention, treatment and rehabilitation services.²¹ AF features as a specific topic in the Model of Care under prevention, where a range of key developments are detailed for gap analysis of AF (i.e. incidence and prevalence of AF in Ireland vs current anticoagulation rates), standards of care (including anti-coagulation), patient-centred care, detection of AF and patient and professional education.²¹

Advocacy and awareness

In November 2013, the Irish Heart Foundation, in collaboration with Pfizer/BMS, launched a hard-hitting awareness campaign alerting the public of the magnified risk of stroke associated with AF with a call to action to have regular pulse checks (see *Case study 4*). The campaign involved an audio advert which was to be broadcast on national and regional radio over four weeks. The primary targets were men/women over 50 years of age. In addition, posters, flyers, wallet cards and information booklets were distributed by Pfizer/BMS to GP practices, hospitals departments, out-patients departments, health centres and other care services for the duration of the campaign.

5: CLINICAL REGISTRIES



There is no national AF registry at present.

The National Stroke Register is a national clinical quality register that collects data on patients who have had a stroke or TIA and who are admitted to participating hospitals. There are 28 hospitals that admit acute stroke patients currently participating.²¹

6: CLINICAL GUIDELINES

The guidelines most commonly followed in Ireland are presented below.

Guidelines followed by GPs:	ESC 2012 ¹⁷
Guidelines followed by cardiologists:	ESC 2012 ¹⁷ National Institute of Clinical Excellence (NICE) CG 68. Stroke Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA) ¹⁸ Royal College of Physicians: National clinical guideline for stroke, 4th edition (2012) ¹⁹
Other guidelines:	IHF National Clinical Guidelines and Recommendations For The Care Of People With Stroke and TIA ²⁰



7: ADHERENCE TO GUIDELINES

Up to 47% of AF patients in Ireland are not treated according to clinical guidelines.¹²

Using population data from the Irish national census, Frewen *et al.* estimated that of 34,771 people with AF in Ireland, 16,502 (47.5%) eligible for treatment are not receiving it.¹² Treatment rates by CHA₂DS₂-VASC (stroke risk score) are illustrated below, and point to both under-treatment amongst AF patients at high risk of stroke (CHA₂DS₂-VASC score ≥2) and over-treatment of patients at lowest risk of stroke (CHA₂DS₂-VASC = 0).¹²

Treatment rates of AF patients by CHA₂DS₂-VASC score:¹²

CHA ₂ DS ₂ -VASC score	Treatment received		
	OAC	Antiplatelet	None
≥ 2	40.7%	34.6%	24.7%
1	23%	38.5%	38.5%
0	36%	36%	28%

OAC: oral anticoagulation therapy

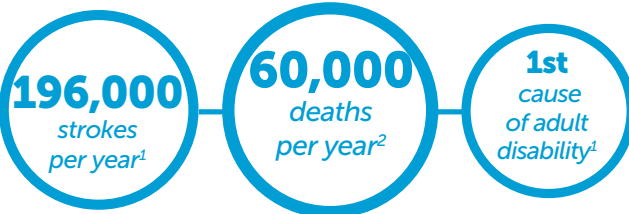
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AF-Related Stroke:

Stroke is the 3rd leading cause of death¹



10-12% of all deaths¹

AF is the second most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke,³ bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 4 strokes due to AF⁴

AF-related strokes are the most debilitating strokes⁵



More disabling and more likely to lead to admission to nursing home⁴

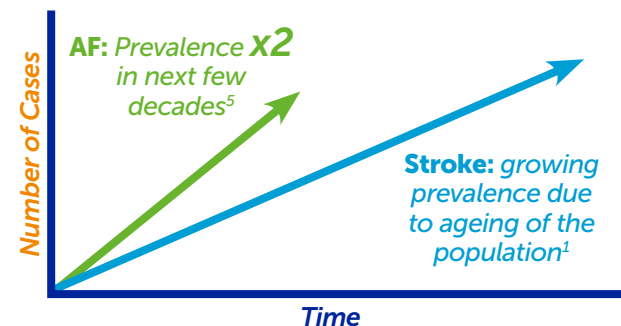
Policy Landscape:

- X No national stroke strategy, (available only in some Italian regions)
- X No national plan on the prevention of AF-related stroke
- X No national AF registry
- X No national stroke registry

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year: **€2.7 billion⁸**

Total indirect costs of cerebrovascular disease per year*: **€1.99 million⁸**



Awareness Gap:



Most people have never heard of AF and up to 50% do not know very much about stroke⁹...even if the risk of developing AF is 1 in 4 at the age of 40.¹⁰

Detection Gap:



Treatment Gap:

Patients on OAC therapy: **46-68%** depending on the setting^{11;15;16}

Approximately **one third** of AF patients at risk of stroke (CHA₂DS₂-VASc ≥ 2) are not offered OAC therapy¹⁶ yet many of these would be eligible according to current ESC guidelines.¹⁷

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1.85% ¹¹
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	196,000 ¹
Number of deaths due to stroke per year:	60,000 ²
% of total deaths due to stroke:	10-12% ¹

AF Related Stroke

% strokes due to AF:	25.8% ⁴
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	Growing prevalence, no estimates available ¹

THE COSTS

Total direct healthcare costs of cerebrovascular disease per year:	€2.7 billion ⁸
Total indirect costs of cerebrovascular disease per year:	€1.99 billion ⁸
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No, but some regional plans exist

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes (AIAC* 2013) ¹⁸
Most relevant to cardiologists:	ESC 2012 ¹⁷ , AIAC 2013 ¹⁸
Other guidelines:	Local/regional FCSA** guidelines ¹⁹

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	46-68% depending on the setting ^{11;15;16}
% AF patients at increased risk of stroke (CHA ₂ DS ₂ -VASc ≥ 2) currently treated with OAC therapy:	67-73% (depending on risk of bleeding) ¹⁶

* AIAC: Associazione Italiana Aritmologia e Cardiostimolazione

** FCSA: Federazione Centri per la Diagnosi della Trombosi et la Sorveglianza delle Terapie Antitrombotiche



2: EPIDEMIOLOGY

AF

Number of people with AF (prevalence):	No data available
Prevalence of AF (%):	1.85% ¹¹

The most recent estimate of prevalence in Italy is from the ISAF (Italian Survey of Atrial Fibrillation Management Study) study of 295,906 patients seen by 233 GPs across Italy. Authors found AF in close to 2% of the population, with rates decreasing slightly from North to South.¹¹ Extrapolated to the Italian population, the prevalence of AF is estimated at 1.85%.¹¹ Other previous studies report similar findings, although many of the estimates are regional.²⁰

Undetected AF

No data available

STROKE

Total numbers of people living with stroke (prevalence):	913,000 ¹ – 950,000 ²
Total number of new cases of stroke per year (incidence):	196,000 ¹
Deaths due to stroke every year:	60,000 ²

Stroke is the 3rd leading cause of death in Italy and represents 10–12% of total deaths.¹ It is also the leading cause of adult disability.¹ There are approximately 196,000 new strokes every year in Italy, of which 157,000 are first-ever strokes.¹ Estimates of the number of stroke survivors range from 913,000¹–950,000². Thirty percent of people who suffer a stroke (approximately 60,000 people) die within one year, and a third suffer severe and permanent disability.²

AF-RELATED STROKE

A prospective study of patients admitted for stroke to hospital from 2003–2005 in Italy found that AF was present in 25.8% of patients with stroke, and AF had not been detected prior to stroke in 21.4% of cases.⁴

Future Projections

No data available, however the prevalence of stroke is expected to increase with the ageing of the population.¹

3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€2.7 billion ⁸
Total indirect costs of cerebrovascular disease per year:	€1.99 billion ⁸
Annual cost per AF-related stroke:	No data available

Published data on the total direct and indirect costs of stroke are not available for Italy, however, leading international studies have suggested that direct and indirect costs of cerebrovascular disease represent €2.7 and €1.99 billion per year, respectively.⁸

The total cost per stroke survivor for 12 months following stroke has been estimated to be between €20,000²¹ and €30,000 per person²² depending on the study. Costs of rehabilitation account for 35% of total healthcare costs, and most costs occur in the first 3 months following a stroke.²¹

AF-RELATED STROKE

A number of studies in Italy have shown that AF-related strokes are more severe and lead to greater disability than those not due to AF.⁴ In a prospective hospital-based study, patients without AF were more often able to go home after stroke than those with AF, and AF-related strokes had greater disability and were associated with a two-fold greater probability of unsatisfactory prognosis in multiple regression analysis.⁴

There are no national estimates of the cost of AF-related stroke. Fattore *et al.* found that AF increased the cost of hospitalisation for strokes as compared to strokes not due to AF, however this difference was not statistically significant.²¹



4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There is no national plan or strategy for AF-related stroke, nor are AF or AF-related stroke visible in other relevant government policies or improvement initiatives. However, a draft bill on “Cardiovascular diseases, prevention and cure of atrial fibrillation and stroke” was presented by an Italian MP on 30th May 2013, but it has not yet been examined by the parliament.

Stroke plans exist only in some Italian regions, but there are no national government-led improvement initiatives relating to stroke.

Advocacy and awareness

Awareness of stroke is very poor – as was found in a survey conducted by A.L.I.Ce. Italia, Censis and the university of Florence, which found that more than 50% of people did not know very much about stroke, or about available treatment.⁹ Poor provision of information to patients about how best to manage their OAC therapy is also a concern: in a recent observational study (ISPAF), fewer than 20% of patients received information on side effects of OAC therapy and only 24% received information about interactions with other drugs.¹⁶

A.L.I.Ce. Italia has led an active awareness campaign on AF in the last years, providing free screening for AF along with blood pressure measurement in over 3000 pharmacies across Italy. (see **Case study 6: Pulse checks in pharmacies in Italy**)

5: CLINICAL REGISTRY

National AF registry

National stroke registry

There is no national AF registry for AF in Italy, nor is there an official national stroke registry, although some initiatives exist.

6: CLINICAL GUIDELINES

Guidelines followed by cardiologists:	ESC 2012 ¹⁷ , AIAC 2013 ¹⁸
Other guidelines:	SPREAD 2012 ¹ (followed by neurologists); local/regional FCSA guidelines ¹⁹

Cardiologists tend to follow the ESC 2012 guidelines and the AIAC 2013 guidelines¹⁸, which follow the main recommendations of the 2012 ESC guidelines but focus mostly on aspects of AF management other than anticoagulation.¹⁸

Other guidelines include local or regional guidelines developed by the FCSA¹⁹ (*Federazione Centri per la Diagnosi della Trombosi et la Sorveglianza delle Terapie Antitrombotiche*) as well as the Stroke Prevention and Educational Awareness Diffusion (SPREAD) 2012 guidelines.¹

The initial prescription of OAC therapy in Italy is usually made by a cardiologist, internist or other specialist (e.g. neurologist) with GPs ensuring follow-up and management of co-morbidities in patients on OAC therapy.²⁰



7: ADHERENCE TO GUIDELINES

Recently published data on the use of stroke prevention therapy in AF patients in Italy

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Zoni Berisso <i>et al.</i> 2013 ¹¹	Retrospective observational study (ISAF)	2011	6036	Primary care	>15	46%	37.5%	16.5%
Gussoni <i>et al.</i> 2013 ¹⁵	Observational study (ATA-AF)	2011	7148	360 internal medicine and cardiology centers/clinics	>18	59% (of whom 7.8% on both OAC and antiplatelet)	19% on antiplatelet only	7% (15% received parenteral antithrombotics) ¹⁵
Volterrani <i>et al.</i> 2013 ¹⁶	Prospective observational study (ISPAF)	2011	2046	63 cardiology units across Italy	>18	68%	27-33% of patients with CHA ₂ DS ₂ -VASc ≥ 2 received no OAC therapy. ¹⁶	

OAC: oral anticoagulation therapy

The table above shows recently published data on OAC therapy use in Italy. In the ISAF study based on patients recruited by GPs across Italy, only 46% of all patients received OAC therapy, 27.5% received antiplatelet therapy, and 16.5% received no antithrombotic therapy at all.¹¹ In the same study, 28.4% percent of patients on rhythm control were treated with OAC therapy, as compared to 59.6% with rate control.¹¹ In the ATA-AF study based in cardiology clinics, 59% of patients with CHADS₂ scores other than 0 receive OAC therapy, (7.8% of whom are on both OAC and antiplatelet therapy) and 7.1% of patients are not receiving any antithrombotic therapy at all.¹⁵ Volterrani *et al.* found that the percentage of patients at high risk (CHA₂DS₂-VASc ≥ 2) not receiving OAC therapy was 27% for patients with high bleeding risk, and 33% for those at low bleeding risk.¹⁶

A number of earlier studies suggest low rates of OAC use (22-41%) in AF patients admitted to hospital for stroke.^{4,23}

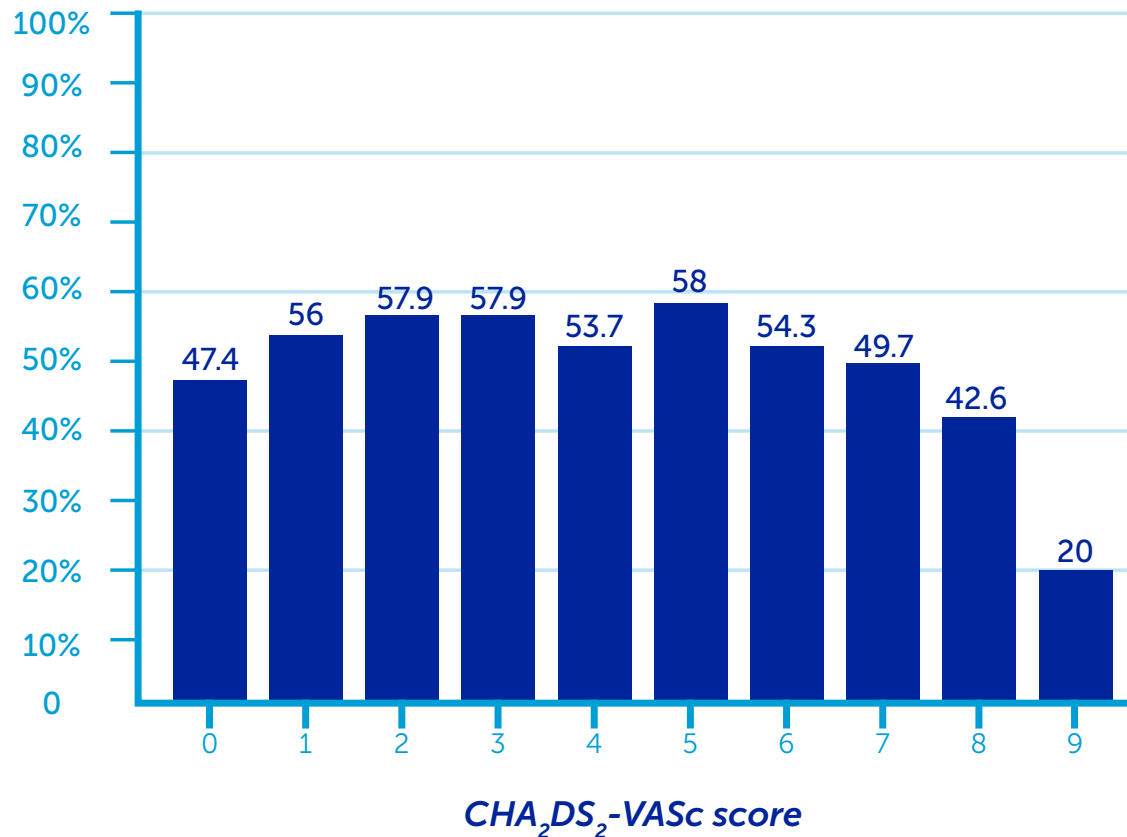
Evidence also suggests that OAC use is not greatly correlated with stroke risk^{24,16}, indicating that stroke risk stratification systems are not yet fully incorporated into clinical practice.²⁵ High risk patients are often under-treated and low-risk patients are often over-treated^{15,16} (see next page). For example in the ATA-AF study, 47% of patients with CHA₂DS₂-VASc risk of 0 were prescribed OAC therapy.¹⁵ Under-treatment is a particular problem in internal/general medicine (MED) settings, possibly reflecting the greater propensity of multi-morbid patients who present to internists, as compared to specialists.^{15,25} Under-treatment also increases with age – for example, age accounted for half of the reasons why OAC therapy was not prescribed in the ATA-AF study.²⁵

Antithrombotic treatment by CHA₂DS₂-VASc score is illustrated below from the ATA-AF study.¹⁵



7: ADHERENCE TO GUIDELINES (CONT'D)

Percentage of use of OAC therapy in non-valvular AF patients, by CHA₂DS₂-VASc score.



Adapted from Gussoni et al. 2013¹⁵

Quality of OAC care:

Low persistence with OAC therapy is also an important concern. Mazzaglia *et al.* (2010) found that persistence rates fell from 42.5% the first year to 24.3% the second year.²⁴ Another study in primary care found that 84% of patients were prescribed OAC therapy, however 64.8% discontinued therapy in favour of antiplatelet therapy within two years.²⁰ Suboptimal treatment in terms of the time spent within the TTR for INR readings is also an issue, with patients only spending approximately 50% of their time within TTR.²⁶

Italy has a wide network of anticoagulation clinics ('TAO centers'). These work in partnership with the patient association Feder AIPA and with the national regulatory agency AIFA. These centres play an important role in providing GP education, patient education, and overall management of patients. Because of capacity, only 30% of AF patients are treated in TAO centers. Discussions are currently ongoing between primary care physicians and TAO centres to try to unify standards of care across all settings of care.



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AF-Related Stroke:

Stroke is a leading cause of death

19,052

new cases of cerebrovascular disease per year⁴

6,105

deaths due to cerebrovascular diseases per year⁴

1st

cause of adult disability^{2,3}

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴



More than **40%** of cardioembolic strokes are due to AF⁵

AF-related strokes are the most debilitating strokes

1.5x
higher cost⁶

AF-related strokes compared to strokes not due to AF

2x
the risk of death^{7,8}

Policy Landscape:



No national stroke strategy



No national plan on the prevention of AF-related stroke



National stroke registry



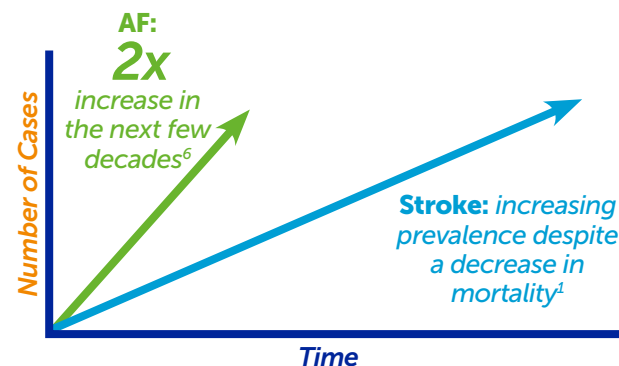
National AF registry in development

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year:	€44 million⁹
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Total indirect costs of cerebrovascular disease per year:	€60 million⁹
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Total cost of AF-related stroke:	No data available
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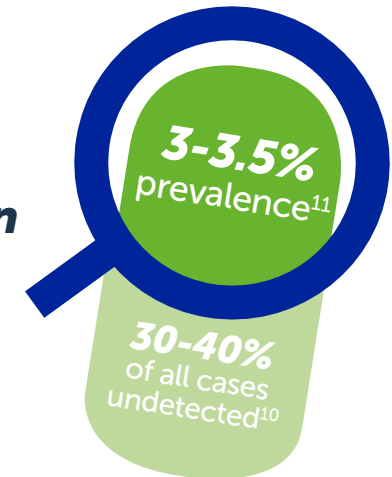


Awareness Gap:



Many people are not aware of AF or that AF is a risk factor for stroke... even if the risk of developing AF is **1 in 4** after the age of 40.¹⁰

Detection Gap:



Treatment Gap:

There is no national data on adherence to guidelines for the prevention of AF-related stroke.

Based on international data, it is thought that up to **50%** of AF patients may not be treated according to clinical guidelines.^{12,13}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	3.0 – 3.5% ¹¹
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	30-40% ¹¹

Stroke

Number of new cases of cerebrovascular disease per year:	19,052 ¹
Number of deaths due to cerebrovascular disease per year:	6,105 ¹

AF-Related Stroke

% of strokes due to AF:	40% of all cardioembolic strokes ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare cost of cerebrovascular disease per year:	€44 million ⁹
Total indirect costs of cerebrovascular disease per year:	€60 million ⁹
Cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No
Recognition of AF related stroke in stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes - National Scientific Statement ⁵
Most relevant to cardiologists:	ESC 2012 ¹⁴
Most relevant to primary care:	ESC 2012 ¹⁴

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	No data available
% high risk AF patients currently treated with OAC therapy:	No data available



2: EPIDEMIOLOGY

AF

The prevalence has of AF has been estimated at between 3.0 - 3.5% .¹¹

Undetected AF

According to leading national commentators, the percentage of undetected AF is around 30-40%.¹¹

Future Projections

No data available

STROKE

Total number of people living with cerebrovascular disease (prevalence):	23,585 ¹
Total numbers of new cases of cerebrovascular disease per year (incidence):	19,052 ¹
Deaths due to cerebrovascular disease per year:	6,105 ¹

No national data was available for total prevalence, incidence or mortality of stroke, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

However, commentators have observed that stroke incidence and prevalence is high in Latvia, a common factor shared with other in Baltic and central European countries, such Bulgaria, Hungary, Lithuania, Romania and the Slovakia.¹⁵

Future Projections

No data available

AF-RELATED STROKE

AF is reported to account for 40% of all cardio-embolic strokes according a scientific statement published by the Latvian Society of Cardiology in collaboration with Latvian Society of Neurologists and the Latvian Association of Internists.⁵

3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€44 million ⁹
Total indirect costs* of cerebrovascular disease per year:	€60 million ⁹

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for Latvia. However, leading international studies have provided estimates for cerebrovascular disease (see above).

AF-RELATED STROKE

No data available



4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There are no national plans or strategies for AF-related stroke, nor for stroke.

Advocacy and awareness

No data is available on public awareness of AF and AF related stroke.

5: CLINICAL REGISTRIES

According to a leading commentators, an AF registry is in development and a Latvian National Stroke Registry exists.

AF registry in development

Latvian National Stroke Registry

6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	ESC 2012 ¹⁴
Guidelines followed by cardiologists:	ESC 2012 ¹⁴
Local translation and/or adaptation of ESC guidelines:	No
Other guidelines:	Yes – National Scientific Statement <i>Antikoagulantu lietošana pacientiem Ar ātriju fibrilāciju kardioemboliskā Insulta novēršana</i> (2013) ⁵

A cardiac arrhythmias guideline is reported to be under development by Latvian Society of Cardiology.

7: ADHERENCE TO GUIDELINES

No data available

8: KEY LINKS

- Latvian Society of Cardiology: www.kardiologija.lv



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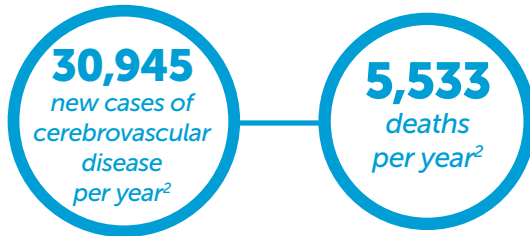
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AF-Related Stroke:

Stroke is a leading cause of death¹



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity³



AF-related strokes are the most debilitating strokes

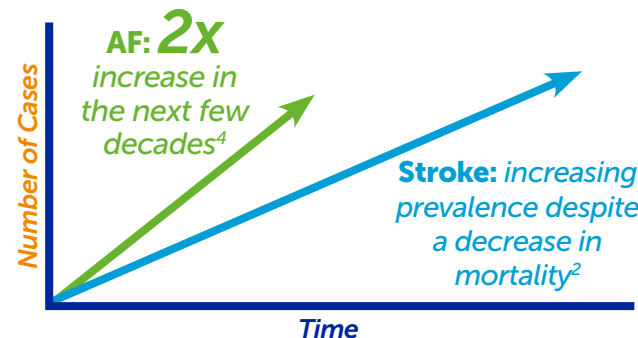


Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year:	€36 million⁷
Total indirect costs of cerebrovascular disease per year:	€75 million⁷
Annual cost of AF-related stroke:	No data available



Awareness Gap:



Many people are not aware of AF or that AF is a risk factor for stroke... even if the risk of developing AF is **1 in 4** after the age of 40.⁸

Detection Gap:

There are no national estimates of detection rates in AF, but European studies suggest at least one third of all cases are undetected.^{9,10,11}



Treatment Gap:

Following a stroke, **35%** of AF patients do not receive OAC therapy on discharge from hospital despite not having any contraindications for OAC therapy.¹²

For those patients on OAC therapy, the quality of and persistence with therapy have been shown to be poor.¹²

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	0.25% ¹² (2002 data)
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	30,945 ²
Number of deaths due to cerebrovascular disease per year:	5,533 ²

AF-Related Stroke

% of strokes due to AF:	20% ⁴
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare costs of cerebrovascular disease per year:	€36 million ⁷
Total indirect costs of cerebrovascular disease per year:	€75 million ⁷
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹³
Most relevant to primary care:	ESC 2012 ¹³

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	No data available
% high risk* AF patients currently treated with OAC therapy:	39.4% (2007) ¹²
Treatment gap**:	35% (2007) ¹²

*Defined as AF patients admitted to hospital following cerebral infarction (i.e. ischaemic stroke)
 ** Defined as % of high risk AF patients not receiving OAC on discharge from hospital following a stroke, yet without contraindication for OAC therapy.



2: EPIDEMIOLOGY

AF

Number of people with AF:	No data available
Prevalence rate:	0.25% ¹² (2002 data)

A study based in the main secondary health care institutions of Kaunas city, Lithuania, found an incidence rate of 0.25% (249.9 per 100,000 inhabitants).¹² The study also found that incidence peaked in the 60-69 age range at 0.95% (955.4 per 100,000).

Incidence of atrial fibrillation and atrial flutter according to the patient's age group and gender in Kaunas City population¹²

Age group (years)	Men		Women		In total	
	Number of cases	Number of cases per 100,000 inhabitants	Number of cases	Number of cases per 100,000 inhabitants	Number of cases	Number of cases per 100,000 inhabitants
20-29	4	13.7	1	3.2	5	8.2
30-39	8	29.1	1	3.3	9	15.5
40-49	29	123.6	4	13.7	33	62.7
50-59	80	429.0	55	214.9	135	305.2
60-69	70	499.0	157	722.5	227	634.8
70-79	76	955.1	153	656.9	229	958.4
80-89	9	494.0	59	1087.8	68	438.5
90-99	2	490.2	2	195.5	4	279.5
In total	278	226.0	432	268.2	710	249.9

Undetected AF
No data available

Future Projections
No data available

STROKE

Total number of people living with cerebrovascular disease (prevalence):	40,327 ²
Total numbers of new cases of cerebrovascular disease per year (incidence):	30,945 ²
Deaths due to cerebrovascular disease per year:	5,533 ²

No national data were available for total prevalence, incidence or mortality of stroke, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

Overall, Lithuania is considered a country with an increased stroke risk,¹ a situation which has mostly been driven by lifestyle behaviours observed over the last decade.¹⁴

Future Projections
No data available

AF-RELATED STROKE

No data available



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€36 million ⁷
Total indirect costs* of cerebrovascular disease per year:	€75 million ⁷

*Defined as productivity losses due to morbidity, mortality and informal care

Data on the total direct and indirect costs of stroke are not available for Lithuania. However, leading international studies have provided estimates for cerebrovascular disease (see above).

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE



Government policy and strategy

There are no national plans or strategies for stroke or AF-related stroke in Lithuania.

Awareness and advocacy

No data were available on levels of public awareness of AF and AF related stroke in Lithuania.

No information was available on advocacy or awareness raising initiatives for AF or AF-related stroke.

5: CLINICAL REGISTRIES



Lithuania does not have an AF register,¹⁵ nor does it have a stroke registry.

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	ESC 2012 ¹³
Guidelines followed by cardiologists:	ESC 2012 ¹³
Other guidelines:	None

Guidelines most commonly followed for AF patients are described above.



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Lithuania

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Ryliškienė 2009 ¹²	Retrospective analysis of patients discharged from hospital for stroke with AF	2007	104	Discharge from hospital after treatment for stroke	all	39.4% (at discharge)	n/a	60.6% (35% without contraindications)

OAC: oral anticoagulation therapy

The only national study available was performed in the Vilnius University Hospital in 2007.¹² Authors looked at OAC therapy use in 104 patients admitted for stroke who also had AF and found that 39% were prescribed OAC therapy at discharge. In 35% of cases where OAC therapy was not prescribed, there were no clear contraindications or explanations found for non-prescription.

Seventeen patients on OAC therapy were followed up by telephone and both persistence with therapy and compliance and INR control were found to be poor.¹²



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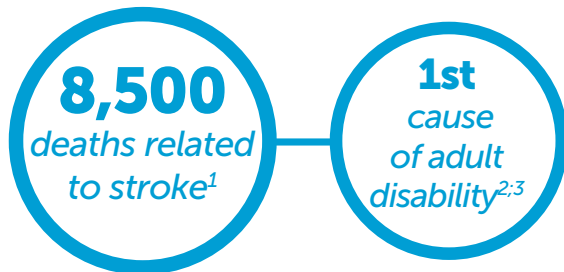
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AF-Related Stroke:

Stroke is a leading cause of death



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴

1 in 5 strokes is due to AF⁵

AF-related strokes are the most debilitating strokes



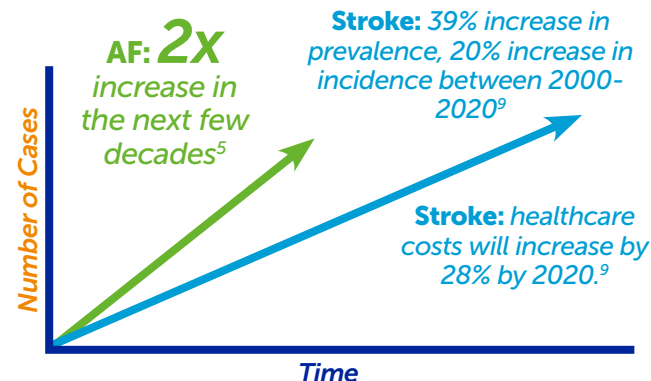
Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year: **€1.5 billion – or 2.2% of all health care costs⁸**

Total indirect costs of stroke per year: **No data available**



Awareness Gap:



Many people are not aware of AF or that AF is a risk factor for stroke... even if the risk of developing AF is **1 in 4** after the age of 40.¹⁰

Detection Gap:



Treatment Gap:

57% of patients with AF have inadequate OAC treatment (i.e. either under-treated or over-treated)¹⁵

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1.5% (all ages) ¹¹ 5.5% > 55 years ¹⁶
Number of people with AF (prevalence):	At least 250,470 ¹¹
Number of new cases of AF per year (incidence):	45,085 ¹¹
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	No data available
Number of deaths due to cerebrovascular disease per year:	8,500 ¹

AF-Related Stroke

% of strokes due to AF:	20% ³
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	39% increase in prevalence, 20% increase in incidence between 2000-2020 ⁹

THE COSTS

Total direct healthcare cost of stroke per year:	€1.5 billion (2005 data) ⁸
Total indirect cost of stroke per year:	No data available
Cost of AF-related stroke per year:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes – GP Society Guidelines
Most relevant to cardiologists:	ESC 2012; ¹⁷ Guidelines endorsed by the Netherlands Society of Cardiology (NVVC) ¹⁸
Most relevant to primary care:	ESC 2012; ¹⁷ Guidelines and Netherlands GP Society Guidelines

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	69% ¹⁵
% high risk AF patients currently treated with OAC therapy:	87% ¹⁵
Treatment gap:	57%* ¹⁵

* Defined as patients judged to be treated inadequately (i.e. undertreated or overtreated with OAC therapy) against relevant guidelines at the time.



2: EPIDEMIOLOGY

AF

Number of people with AF:	At least 250,470 cases ¹¹
Prevalence rate:	1.5% of whole population, ¹¹ 5.5% amongst the over 55s ¹⁶

There are approximately 45,085 new cases of AF detected every year.¹¹ The prevalence of AF in the population over 55 has been estimated at 5.5%.¹⁶ Based on these figures, a further study concluded that the prevalence rate in the entire Dutch population was 1.5% in 2009 (250,470 cases) with the following age break down for the older population:¹¹

Prevalence of AF in the Netherlands by age, 2009¹¹

Age	% with AF	Number of people with AF
55-59:	0.7%	7,558
60-64:	1.7%	17,644
65-69:	4%	29,790
70-74:	6%	35,876
75-79:	9%	43,308
80-84:	13.5%	45,404
85 & older:	17.8%	49,172

These figures are combined for men and women but in each age band, prevalence is higher among men than for women.¹¹ It should be noted that figures are likely to be underestimated as they are based on historical projections.

Undetected AF
No data available

Future Projections
No data available

STROKE

Deaths due to stroke per year:	8,500 ¹
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There were 8,500 deaths due to stroke in 2012.¹

No national data was available for total prevalence, incidence or mortality of stroke, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

Data from 2007 shows that the incidence of primary stroke in the Netherlands was 2.12 per 1,000 men and 2.23 per 1,000 women, and the prevalence of stroke was 11.89 per 1,000 men and 11.48 per 1,000 women.⁸

The average age at which a stroke occurs among the population was 71 years in 2011.¹⁹

Future Projections

The incidence and prevalence of stroke are projected to increase 20 percent and 39 percent, respectively, during the period 2000–20.⁹ Increases in prevalence are expected due to the ageing of the population, continuing unhealthy lifestyles among elderly, and improved care for stroke patients leading to lower mortality.⁸

AF-RELATED STROKE

There are no national estimates of the proportion of strokes due to AF, however ESC guidelines suggest that 1 in 5 strokes is due to AF.⁵



3: ECONOMIC BURDEN

STROKE

Direct healthcare costs of stroke per year:	€1.5 billion ⁸ (2005)
Indirect costs of stroke disease per year:	No data available

For example productivity losses due to morbidity, mortality and informal care

National data shows that stroke was one of the 5 most costly diseases in the Netherlands in 2005, with a total of €1.5 billion per year. This accounts for 2.2% of total health care costs in the Netherlands.⁸

Institutional care is the largest cost component, estimated at 57% of total costs, with a further 28% attributed to inpatient hospital care. Stroke healthcare costs will increase by 28% by 2020.⁹

National data on the total indirect costs of stroke are not available for the Netherlands.

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE



Government policy and strategy

There are no national plans or strategies for AF-related stroke, and AF and AF-related stroke are not mentioned in other relevant government policies or improvement initiatives.

There is no national stroke plan, nor are there government-led improvement initiatives relating to stroke. Such initiatives tend to be run by professional societies, patient organisations or other key stakeholders.

There have been major efforts to promote integrated stroke care in the Netherlands. Many Dutch stroke services are affiliated with a knowledge network ("Kennisnetwerk CVA Nederland") that strives towards implementing the goals of integrated stroke care set by the Helsingborg Declaration.²⁰ There have been some important clinical trials in the Netherlands looking at the value of nurse-led, integrated care clinics for AF patients in the Netherlands.²¹

Awareness and advocacy

Very little data were available on levels of public awareness of AF and AF related stroke in the Netherlands.



5: CLINICAL REGISTRIES



Presently there is no national stroke registry in the Netherlands, nor a national AF registry.

7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in the Netherlands

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Arts <i>et al</i> 2013 ¹⁵	cross-sectional study of electronic records from GPs	2008	981	36 GP practices	>65	69%	13%	18%

OAC: oral anticoagulation therapy

The most recent estimate of OAC therapy use comes from a retrospective, cross-sectional study of electronic health records from 36 Dutch general practitioners in 2008. The authors found that of patients at high risk of stroke (CHADS₂ ≥ 2) 87% were treated adequately, 26% were under-treated and 31% were over-treated according to local GP guidelines at the time (which recommended aspirin for patients at lower risk of stroke).¹⁵ The study also found that patients who had a previous ischaemic stroke were at high risk for under-treatment,

while those with contraindications for OAC were at high risk for overtreatment (8% of patients on OAC had a contraindication that had been overlooked). Based on these findings, the authors recommend that GP awareness should be improved to ensure that guidelines are better adhered to – particularly in terms of contradictions for OACs and the need to treat those at risk.¹⁵

Previous studies suggest that cardiologists are more likely than GPs and internists to prescribe

6: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	Netherlands GP Society Guidelines
Guidelines followed by cardiologists:	ESC Guidelines ¹⁷ and Dutch translation
Local translation and/or adaptation of ESC guidelines:	Yes – Netherlands Society of Cardiology (NVVC) endorsed ESC Guidelines ¹⁸
Other guidelines:	No

OAC therapy correctly. In the 2007 EXAMINE-AF study, of 1,586 patients with AF, 84% were eligible for OAC therapy according to guidelines at the time, but only 64% received it.²²

A further study published in 2010 looked at anticoagulation treatment in a geriatric day clinic in Amsterdam and found that 9.9% of the cohort were inappropriately treated. Increasing age was the only factor associated with non-prescribing of OAC.²³



8: KEY LINKS

Patient advocacy groups:

- De Hart en Vaatgroep:
<http://www.hartenvaatgroep.nl/>
- Netherlands Heart Foundation:
<http://www.hartstichting.nl/>
- The Knowledge Network Foundation CVA NL: <http://www.kennisnetwerkcv.nl/>

Professional societies:

- Netherlands Society of Cardiology:
<https://www.nvvc.nl/>

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AF-Related Stroke:

Stroke is a leading cause of death



AF is the **second** most important risk factor for stroke²

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity²

1 in 5 strokes is due to AF³

AF-related strokes are the most debilitating strokes



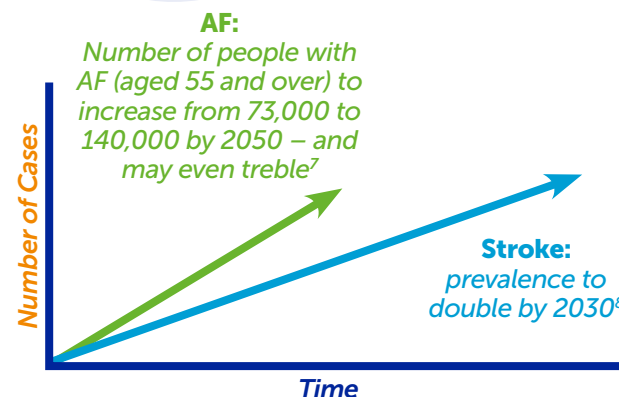
Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total costs of stroke per year (combined direct and indirect):	€874 million⁶
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Annual cost of AF-related stroke:	No data available
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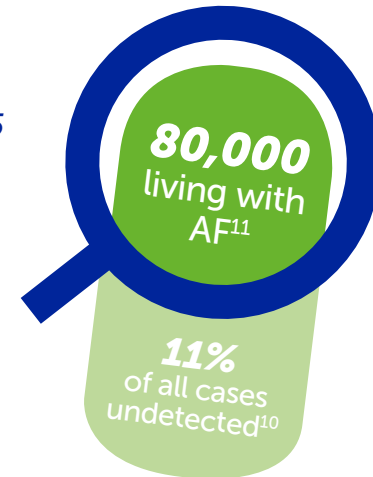
Awareness Gap:



Many people are not aware of AF or that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.⁹

Detection Gap:

- Approximately **80,000** people over the age of 55 estimated to have AF in Norway,⁷
- **10%** of all 75 years olds have AF¹⁰
- **11%** of all AF cases in people with AF aged 75 are undetected¹⁰



Treatment Status:

94% of those diagnosed with AF receive correct antithrombotic therapy¹⁰

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	10% in those aged 75 ¹⁰
Number of people with AF (prevalence):	73,000 - 82,000 ⁷
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	11% in those aged 75 ¹⁰

Stroke

Number of strokes per year:	13,000 ¹
Number of deaths due to stroke per year:	3,116 ¹

AF-Related Stroke

% of strokes due to AF:	20% ³
Number of new caes of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	AF to double amongst over 55s by 2050, and possibly treble ⁷
Stroke:	number of people living with stroke to double to 110,000 by 2030 ⁸

THE COSTS

Total direct healthcare costs of stoke per year:	€874 million, ⁶ or €12,917 per individual following a stroke ⁶
Total indirect cost of stoke per year:	No data available
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Norwegian Society for Thrombosis and Hemostatis 2014 (due to be updated) ¹¹
Most relevant to cardiologists:	ESC 2012 ¹² ; Norwegian Society for Thrombosis and Hemostatis 2014 ¹¹
Most relevant to primary care:	National guidelines, treatment patterns of leading clinicians

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	94% amongst patients aged 75 – (2007 data) ¹⁰
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2: EPIDEMIOLOGY

AF

Number of people with AF (prevalence):	73,500 to 82,250 ⁷
Prevalence of AF (%):	10% in people aged 75 ¹⁰

A population-based study carried out with 916 people aged 75 in the Asker and Baerum municipalities in Norway concluded that AF was present in 92 subjects, a prevalence rate of 10%.¹⁰ The higher prevalence was found in men (15.4%) as compared to women (5.7%).¹⁰

A later study extrapolated prevalence studies for the Netherlands and Iceland to estimate that there are currently between 73,500 and 82,250 people with AF over the age of 55 people in Norway 2011.⁷

A longitudinal study of Norwegian civil servants (with an average age of 50) recruited in 1972 found that 270 men (13%) developed AF over the next 35 years, representing an incidence rate of 5.1 per 1000 person-years. Mean age at first appearance of AF was 71 years.¹³

Undetected AF

The Asker and Baerum population study noted that 10 of the 92 cases of AF in the study population were previously undiagnosed, suggesting a detection gap of 11% amongst those aged 75.¹⁰

Future Projections

Population projections suggest numbers of people with AF in Norway will at least double by 2040, reaching 140,000, and possibly triple by 2050.⁷

STROKE

Total number of people living with stroke (prevalence):	55,000 ¹
Total numbers of strokes per year (incidence):	13,000 ¹
Deaths due to stroke per year:	3,116 ¹

Among 75 year-olds, 10% of men and 8% of the women reported that they had had a stroke in the Asker and Baerum study.¹⁴

Future Projections

Prevalence of stroke is expected to double by 2030 to reach 110,000 people living with stroke.⁸

AF-RELATED STROKE

No data available



3: ECONOMIC BURDEN

STROKE

Total cost of stroke per year (direct healthcare costs and indirect costs combined):

€874 million⁶

Data on the total direct and indirect costs of stroke are not available for Norway, however a useful combined estimate is available from a leading international study (see above).

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There is no national plan or strategy for AF-related stroke specifically. However, in 2010 the Department of Health issued national guidelines for the treatment and rehabilitation of stroke.

One pilot study in Norway looking at heart disease, stroke and COPD concluded that the current disease-based care pathways (i.e. specialist care models) for older patients will be neither feasible nor sustainable in future. A common patient-centred care pathway in the primary care setting that could meet the needs of multi-morbid patients was recommended.¹⁵

Advocacy and awareness

Public awareness initiatives on stroke have included slag.no and the “redd liv” campaign on facebook (<http://www.slag.no/Redd-liv!>).

5: CLINICAL REGISTRIES

Norwegian Cardiovascular Disease Registry

Norwegian Prescription Database (NorPD)

National AF disease registry

The Norwegian Cardiovascular Disease Registry was created by the Norwegian Parliament in March 2010, and is currently run by the Norwegian Institute for Public Health.¹⁶

The Norwegian Prescription Database (NorPD) is a national database that collects data on all conditions, including AF. Data from this database were linked to those of a national health screening programme in a study on AF, however these linkages are not necessarily performed on a regular basis.¹⁷

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	National guidelines, leading clinician’s prescription patterns
Guidelines followed by cardiologists:	ESC 2012; ¹² Norwegian Society for Thrombosis and Hemostatis 2014 ¹¹
Other guidelines:	Norwegian Society for Thrombosis and Hemostasis 2014 ¹¹

Guidelines most commonly followed for AF patients are described above. The Norwegian Society for Thrombosis and Hemostatis published guidelines in 2014.¹¹ A national practical guide is also available from the Department of Health.¹⁸



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in the Norway

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Tveit <i>et al</i> (2008) ¹⁰	Regional population study: 916 people aged 75.	2007	92	Community – all people aged 75 in Asker and Baerum municipality invited to participate	75	Of 82 patients with previously diagnosed AF, 93.9% were receiving antithrombotic therapy compliant with international guidelines.		
Indredavik <i>et al</i> (2005) ¹⁹	Review of patient records for AF-related stroke hospital admissions	1996-2001	394	Acute - University Hospital of Trondheim stroke unit	>60	29%	43% (Aspirin)	28%

OAC: oral anticoagulation therapy

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke. The Tveit *et al* study (2008) noted excellent rates of OAC treatment amongst a regional population study of 916 people aged 75.¹⁰

A much earlier study from 2005 (using data from 1996-2001) suggested poor rates of anticoagulation in AF patients aged over 60. Only 29% of patients with previous AF admitted to hospital for stroke were receiving OAC therapy, and in these, quality of OAC therapy (i.e. proportion of patients within target range for INR readings) was notably poor.¹⁹ The study authors proposed the need for more effective information and education to physicians about the importance of anticoagulation therapy. However these data are nearly 10 years old.¹⁹

8: KEY LINKS

- Norsk Forening For Slagrammede - The Norwegian Association For Stroke Survivors: www.slagrammede.org
- Landsforeningen for Slagrammede: the National Association for Stroke Survivors: www.hjerneslag.org
- Norwegian Institute for Public Health: Norwegian Cardiovascular Disease Registry: http://www.fhi.no/eway/default.aspx?pid=240&trg=Main_6664&Main_6664=6898:0:25,7842:1:0:0::0:0
- Redd-liv campaign: <http://www.slag.no/Redd-liv/>



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AF-Related Stroke:

Stroke is a leading cause of death



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke bigger than smoking, bigger than diabetes, bigger than physical inactivity³

1 in 3 strokes admitted to hospital in Poland are due to AF.^{4:5}

AF-related strokes are the most debilitating strokes

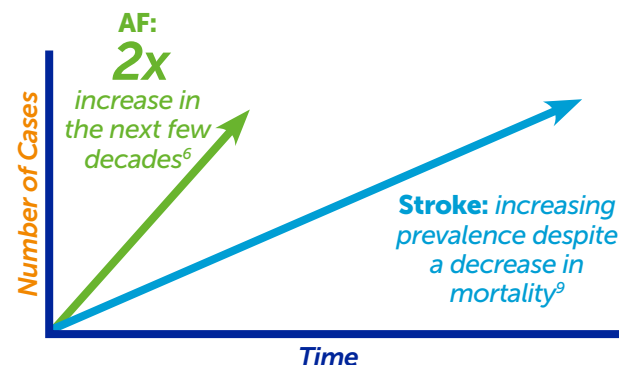


Policy Landscape:

- ✓ Stroke a key target in Polish National Health Strategy 2007-2015
- ✗ No national plan on the prevention of AF-related stroke
- ✓ National stroke registry
- ✗ No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year:	704m PLN (€168 million) ¹
Total indirect costs of stroke per year:	No data available
Total cost of AF-related stroke:	No data available



Awareness Gap:



Many people are not aware of AF or that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹⁰

Detection Gap:



Treatment Gap:

56% of patients with AF are not receiving OAC therapy, yet many would be eligible according to current ESC guidelines¹⁵

OAC treatment rates as low as **10%** amongst patients with AF admitted to hospital after a stroke.⁴

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	18% of over 65s report having AF ¹¹
Number of people with AF (prevalence):	No data available
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	93,232 ¹
Number of deaths due to stroke per year:	32,000 ¹

AF-Related Stroke

% of strokes due to AF:	30% ⁴
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare costs of stroke per year:	704m PLN (€168 million) ¹
Total indirect cost of stroke per year:	No data available
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Polish National Health Strategy 2007-2015 POLKARD (since 2002)

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes ¹⁶
Most relevant to cardiologists:	ESC 2012 ¹⁷
Most relevant to primary care:	ESC 2012 ¹⁷

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	39% ¹⁵ - 50% ¹⁸
% high risk* AF patients currently treated with OAC therapy:	15% ¹¹

* Defined CHADS₂ ≥ 2



2: EPIDEMIOLOGY

AF

The only available data on AF come from a self-reported survey of people aged 65 and over (recruited between 2008-2010 – the PolSenior survey, 4979 people aged 65 and older) which reveal a self-reported diagnosis of AF in 18% amongst older people over 65.¹¹ There was a high proportion of unknown cases as well.

Undetected AF

No data available

Future Projections

No data available

STROKE

Total number of people living with stroke (prevalence):	No data available
Total numbers of new cases of stroke per year (incidence):*	93,232 ¹
Deaths due to stroke per year:	32,000 ¹

*Based on hospitalizations due to stroke per year.

Historically, fatality rates for stroke are known to be higher in Poland than in other countries.² This is partly due to greater stroke severity in the Polish patients, but other factors have also been cited, including poor attention to treatment of cardiovascular disease and lower attention given to the treatment of secondary complications of stroke.²

Future Projections

No data available

AF-RELATED STROKE

The only available data are from the Polish National Stroke Prevention and Treatment Registry, although data date back to 2001-2. A study found that 30% of strokes admitted to hospital were due to AF.⁴

However, national experts have highlighted AF as a likely driver of the extremely high stroke mortality rates in Poland (ischaemic mortality rates are three times higher than the US, for example).²

3: ECONOMIC BURDEN

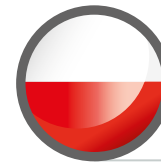
STROKE

Direct healthcare costs of stroke per year: (of which acute costs): (of which rehabilitation after stroke):	704 million PLN (€168 million) ¹ 545 million PLN (€130 million) ¹ 159 million PLN (€38 million) ¹
Indirect costs of stroke (e.g. productivity losses and informal care):	No data available

A recent national study has provided healthcare cost estimates for stroke in Poland as well as other key data (see above).¹ Data on the total indirect costs of stroke are not available.

AF-RELATED STROKE

There is some data to illustrate the costs of AF-related stroke in Poland, particularly with regards to hospital admission. For patients in Poland with persistent or permanent AF, the probability of CVD-related hospitalization was on average 7.52 and 4.19 times higher compared with patients with first-detected AF.¹⁹



4: POLICY LANDSCAPE

**National
stroke
plan**

**National
plan for
AF-related
stroke**

Government policy and strategy

There is no national plan or strategy for AF-related stroke, nor was AF and AF-related stroke visible in other relevant government policies or improvement initiatives.

However, other national plans feature stroke. The first priority (Strategic Objective 1) within the Polish National Health Strategy 2007-2015 is stroke prevention and reduction in early deaths as caused by cardiovascular disease and stroke.

The National Health Strategy is complemented by POLKARD, the National Program for Prevention and Treatment of Cardiovascular Diseases, which has run since 2002.²⁰ Its main objective is to maintain the pace of reduction in mortality diseases of the cardiovascular system in Poland in the years 2003-2012, which includes reducing the number of early deaths from stroke and improving independence following a stroke. POLKARD was predated by an early National Stroke Prevention and Treatment Program launched in 1997, the aim of which was to improve stroke care delivery and to determine the use of evidence-based stroke treatment in Poland.⁴

Commentators report that national stroke prevention programmes have achieved some success. For example, the number of stroke units has increased from three in 1997 to 111 in 2007,²¹ and a national stroke registry was founded (see below). However, unacceptable variations in stroke outcomes persist in Poland, highlighting the need for improvements in general nursing care, patient education, stroke risk factor control, and the better management and reduction of complications overall in decreasing the death rate in Polish stroke patient.⁴

Advocacy and awareness

No data were available on levels of public awareness of AF and AF related stroke in Poland, or on advocacy or awareness raising initiatives for AF or AF-related stroke. However, it is known that awareness raising initiatives on stroke generally have taken place in the past (e.g. as part of POLKARD, see above). The Coalition for Healthy Ageing (comprised by various stakeholders) have placed cardiovascular diseases high up the agenda of the healthy ageing debate in Poland.



5: CLINICAL REGISTRIES

National AF registry

National stroke registry

There is no national AF registry at present. However data on stroke cases now enter the Polish National Stroke Prevention and Treatment Registry which provides reliable information on stroke care.^{21;4}

6: CLINICAL GUIDELINES

The guidelines most commonly followed in Poland are presented below:

Guidelines followed by GPs:	ESC 2012 ¹⁷
Guidelines followed by cardiologists:	ESC 2012 ¹⁷
Other guidelines:	National guidelines (adapted from ESC guidelines)

7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Poland

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Opolski 2013 ¹⁸	RecordAF registry	2007-8	303	Office- and hospital-based cardiologists	>18	50%	53%	7%
Bednarski 2013 ¹⁵	Retrospective analysis of discharge summaries	2006 and 2010	613	Discharged from one district hospital	All ages	39% at discharge from hospital	n/a	
Labuz-Rosak 2012	Population-based study	2012	875	Community settings	65+	15% of high risk patients with AF (CHADS ₂ ≥2)	50%	45%
Niewada 2006	Data from National Stroke Prevention and Treatment Registry	2001-2	2508	Stroke patients admitted to hospital neurological depts.	All ages	10%	n/a	

OAC: oral anticoagulation therapy



7: ADHERENCE TO GUIDELINES (CONT'D)

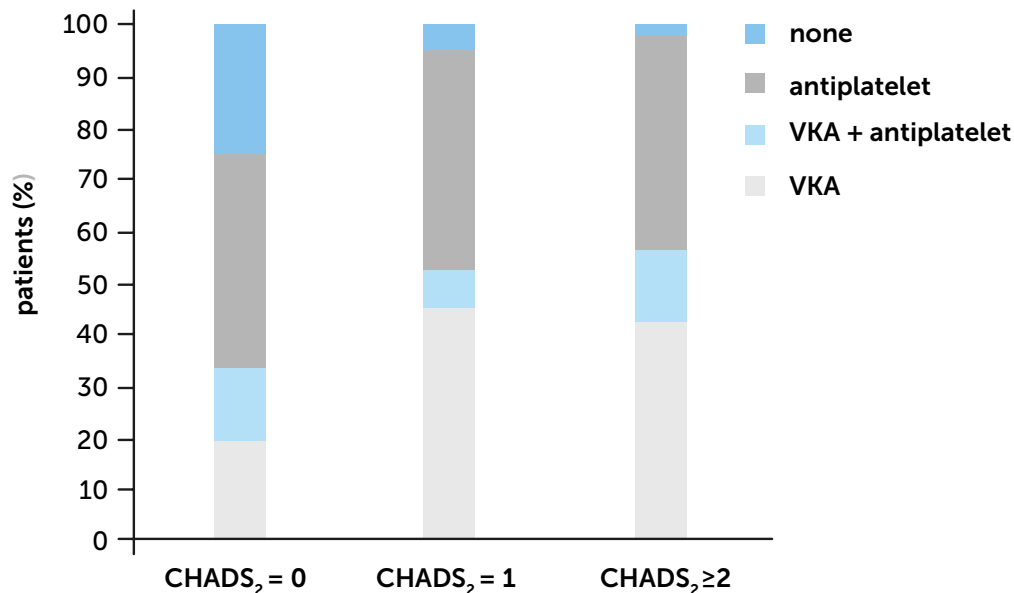
Data from Polish patients included in the international Registry On Cardiac Rhythm Disorders Assessing the Control of AF (RecordAF) registry found that approximately 50% of patients were on OAC therapy, 53% on antiplatelet therapy and 7% overall were not given any antithrombotic therapy.¹⁸ Treatment rates by risk of stroke are presented below, and suggest that choices of antithrombotic therapy are made irrespective of stroke risk, and antiplatelet therapy is overused in patients at higher risk of stroke.¹⁸ The study also found that nearly half of the 137 patients receiving VKAs had INR values within the target range in over 80% of the measurements, and 23% had INR values within the target range in 60% to 80% of the measurements.

Data from other studies suggests lower rates of anticoagulation therapy. A retrospective analysis of patients discharged from one district hospital in 2006 and 2010 found that only 39% were prescribed OAC therapy, against the 95% requiring OAC according to CHA₂DS₂-VASc guidelines – implying a significant treatment gap.¹⁵

A 2012 population study by Labuz-Roszak *et al* of 875 people with AF over the age of 65 found that 15% of individuals received OAC therapy and 50% received antiplatelet therapy, suggesting that approximately 30% received no antithrombotic therapy.¹¹ OAC therapy was used in 10% of individuals with a CHADS₂ score of 1 (antiplatelets were used in 34% of these patients), climbing only to 15% of patients with a CHADS₂ score of ≥ 2 .¹¹ Low use of antithrombotic therapy in older people was confirmed in other studies as well.²²

Another study of patients with AF admitted to hospital after a stroke found OAC treatment rates as low as 10% on presentation.⁴

The same 2012 study mentioned above found that uptake of OAC therapy doubled in educated older people (40% uptake) as compared to less educated people (20% uptake), and reported similar findings for income. In particular, it found that OAC drugs are provided too rarely to older people with atrial fibrillation.¹¹ Poor physician awareness of current pharmacological guidelines has led experts to call for educational programmes among general practitioners concerning current recommendations for pharmacological cardiovascular prevention.¹¹ They also found significant regional differences in the frequency of antithrombotic therapy use.¹¹





8: KEY LINKS

Patient advocacy groups and professional societies:

- Polish Stroke Foundation:
www.fum.info.pl
- Association of Patients after Stroke:
www.udarowcy.com.pl
- Polish Foundation Against Thrombosis:
www.thrombosis.pl
- Polish Cardiac Society:
<http://www.ptkardio.pl/>
- Polish Neurological Society

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AF-Related Stroke:

Stroke is the leading cause of death and **3rd** leading cause of premature mortality in Portugal¹



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

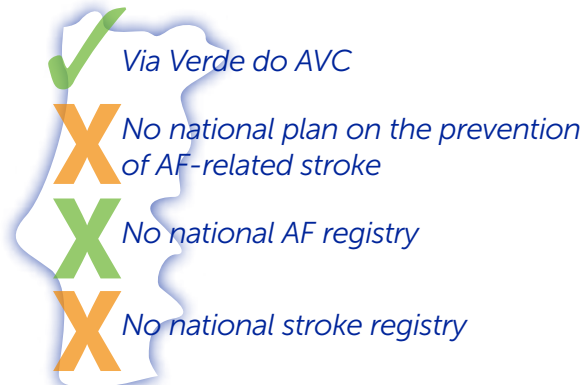
AF is one of the 'big 5' risks for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity.⁴

1 in 3 strokes is due to AF⁵

AF-related strokes are the most debilitating strokes

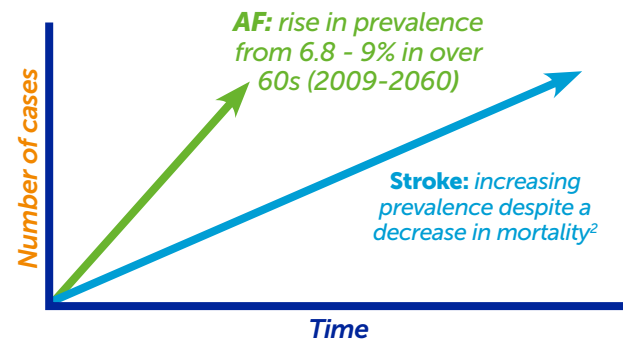


Policy Landscape:



A Growing Economic Burden:

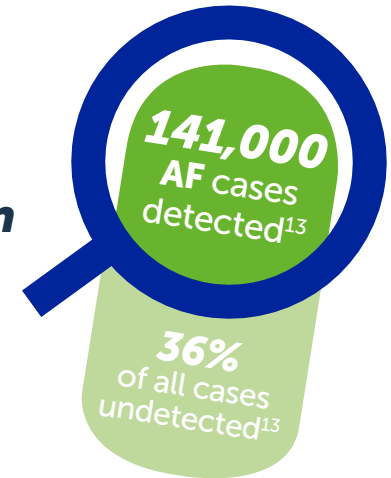
Total direct healthcare costs of cerebrovascular disease per year:	€115 million⁹
Total indirect costs of cerebrovascular disease per year:	€511 million⁹
Total disability-adjusted life years lost to AF per year:	23,000¹⁰



Awareness Gap:

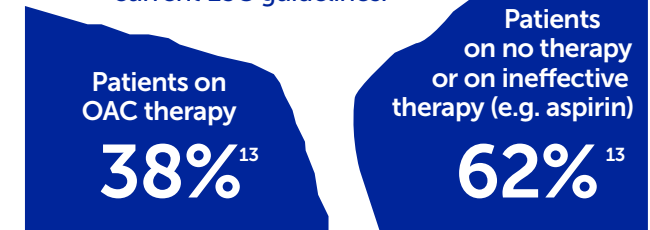
Most people have never heard of AF and many do not know that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹²

Detection Gap:



Treatment Gap:

As many as 62%¹³ of AF patients are not receiving OAC therapy, yet many of these would be eligible according to current ESC guidelines.¹⁴



*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2.5% in > 40 years (2010) ¹³
Number of people with AF (prevalence):	121,825 ¹³ (2010), 141,000 extrapolated to today's population
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	43,857 or 0.9% of > 40 years (2010) ¹³
Detection gap:	36% ¹³

Stroke

Number of new cases of cerebrovascular disease per year:	37,062 ²
Number of deaths due to cerebrovascular disease per year:	12,690 ³
% of total deaths due to cerebrovascular disease:	9% ¹⁰

AF-Related Stroke

% of strokes due to AF:	32% ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	In 2060, 215,146 people over 60 will have AF (prevalence of 9%) as compared to 6.8% in 2009. Prevalence in >45s will rise from 3.8% to 6.12%. ¹¹
Stroke:	No data available

THE COSTS

Total direct costs of cerebrovascular disease:	€155 million ⁹
Total indirect costs of cerebrovascular disease:	€511 million ⁹
Cost of AF-related cerebrovascular disease:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes - Via Verde do AVC

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁴
Most relevant to primary care:	ESC 2012 ¹⁴

HOW MANY PEOPLE ARE RECEIVING ORAL ANTICOAGULATION THERAPY?

% AF patients currently treated with OAC therapy:	34-41% ^{13;15;16}
% high risk AF patients currently treated with OAC therapy:	No data available

"Strokes due to atrial fibrillation lead to serious disability with devastating consequences for patients, caregivers and families. This situation becomes particularly relevant due to the high prevalence of this arrhythmia, resulting in enormous costs for society.

In order to fight this problem more effectively we need patients that are better informed and a society that is more aware, thereby permitting early diagnosis of affected patients and quick access to suitable diagnostic and therapeutic methods. *Associação Bate Bate Coração* has been undertaking such awareness and education work, mobilizing health professionals, patients, legislators and regulators within the health sector and within society in general."

Dr. Carlos Morais, President of Bate Bate Coração

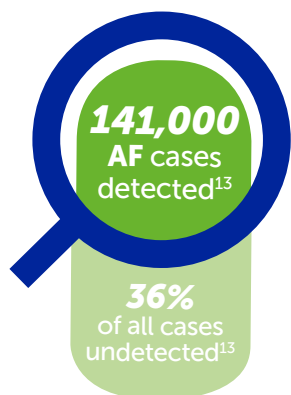


2: EPIDEMIOLOGY

AF

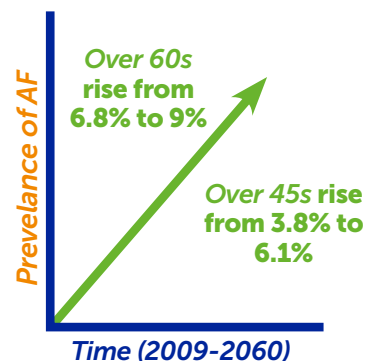
Number of people with AF:	121,825 (2010) ¹³
Prevalence rate (%):	2.5% in > 40 years (2010) ¹³

The best estimate of AF prevalence is 2.5%, based on the FAMA study, a cross-sectional, observational study of 10,000 people over the age of 40.¹³ This translated into 121,825 people with AF in 2010, and would be equivalent to approximately 141,000 people with AF today. Prevalence by age is 4.1% amongst the over 55s, 4.8% in the over 60s, 6.6% in those aged 70-79, and 10.4% in the over 80s.¹³



Undetected AF

The FAMA study found that AF was undetected in 0.9% of people aged 40 or over, against a detection rate of 2.5%, (i.e. a detection gap of 36%).¹³ A further study also found that of patients admitted to hospital with an AF-related stroke, 35% did not have a prior diagnosis of AF.⁴



Future Projections

A review of available data estimated the prevalence of AF in people over the age of 60 was 6.8% in 2009 and would rise to approximately 9% in 2060. In people aged 45 or over, these figures are 3.8% and 6.12%, respectively.¹¹ These projections are based on extrapolations from studies conducted in Scotland and Rotterdam.¹¹

STROKE

Total number of people living with cerebrovascular disease (prevalence):	86,892 ²
Total number of new cases of cerebrovascular disease per year (incidence):	37,062 ²
Deaths due to cerebrovascular disease every year:	12,690 ³

Cerebrovascular diseases are the leading cause of death and 3rd leading cause of premature mortality in Portugal.¹

Portugal has a high incidence of stroke compared to other European countries¹³ and it is one the few European countries where cerebrovascular disease causes more deaths than ischaemic heart disease (12,690 vs. 6,582 deaths per year).^{3,17}

National data on the prevalence and incidence of stroke in Portugal are not available, however leading international studies suggest that there are approximately 86,900 people living with cerebrovascular disease, and over 37,000 new cases of cerebrovascular disease per year.²

Future Projections

No data available

AF-RELATED STROKE

At least 32% of strokes are due to AF, according to a study in 2010 of over 600 patients admitted for stroke in a Portuguese hospital.⁵

A study conducted in 2013 estimated that a total of 4,070 deaths in Portugal in 2010 were attributable to AF, of which 3,257 were AF-related strokes.¹⁰



3: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€155 million ⁹
Total indirect costs of cerebrovascular disease per year:*	€511 million ⁹
Annual cost of AF-related stroke:	No data available

*Defined as productivity losses due to morbidity, mortality and informal care.

Data on the total direct and indirect costs of stroke are not available for Portugal. However, leading international studies have provided estimates for cerebrovascular disease (see above). These data suggest that cerebrovascular disease, including stroke poses a considerable burden on society, in terms of costs to the healthcare system, but also in terms of lost productivity due to mortality, morbidity and informal care (indirect costs). Indirect costs are nearly 4 times greater than direct costs.

AF-RELATED STROKE

A study conducted in 2013 estimated that AF in general accounted for over 23,000 DALYs (disability-adjusted life years) per year, 54% of which were due to disability. Looking just at years of life lost (YLL), AF accounted for 10,521 YLL, of which AF-related stroke accounted for 8,270 YLL.¹⁰

4: POLICY LANDSCAPE



Via Verde do AVC

A national stroke plan (*Via Verde do AVC*) exists, which focuses on improving access to acute stroke care across Portugal. No national plan specific to the prevention of AF-related stroke exists at present.

National priorities

The prevention and control of cardiovascular disease is a top priority in the Portuguese National Health Plan 2012-16. The implementation of the plan is still being finalised by the Portuguese Health Ministry and the office of the Director-General of Health (*Direção Geral de Saúde - DGS*). The plan proposes a range of new measures to promote the prevention, treatment and rehabilitation of cardiovascular disease and stroke, the development of new national indicators, and improved information sharing. It is as of yet unclear whether AF or the prevention of AF-related stroke will feature specifically in the plan. However, continuing education programmes for health professionals do contain specific curriculum on the prevention of AF-related stroke.

Advocacy and awareness:

There is a strong advocacy presence on AF and AF-related stroke in the form of patient organisations and professional societies. (see **Case study 3: Bate Bate Coração**).

Gaps in awareness remain however: A survey conducted by **Bate Bate Coração** found that 40% of people were unaware of the symptoms of AF, and 89% did not identify cardiac arrhythmias as a possible cause of death. Furthermore, in the FAMA study, only 20% of patients who had been diagnosed with AF knew it was permanent.¹³



5: CLINICAL REGISTRIES



There are no national registries on AF or stroke. A national registry for cardiovascular disease exists, however the last update was in 2010.

6: CLINICAL GUIDELINES

Portugal does not currently have national guidelines for the prevention of stroke in AF, and the ESC guidelines are the most influential guidelines in both primary and secondary care.

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁴
Most relevant to primary care:	ESC 2012 ¹⁴

7: ADHERENCE TO GUIDELINES

Most recently published data on the use of stroke prevention therapy in AF patients in Portugal

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Pereira da Silva <i>et al</i> 2013 ¹⁶	Prospective observational study of patients discharged from hospital	2011	103	Discharged from hospital with AF diagnosis	all	41%	57%	9%
Sargento-Freitas <i>et al</i> 2013 ⁴	Retrospective analysis of AF-related stroke admissions	2010	200	Hospital	all	27% upon admission	n/a	n/a
Sa <i>et al</i> 2012 ¹⁸	Observational cross-sectional study	2011	37	Unidade de Saúde Familiar (USF)	>80	45%	55%	10%
Bonhorst <i>et al</i> 2010 ¹³	Cross-sectional population-based study (FAMA study)	2010	261	Population survey	>40	38%	22%	n/a
Jorge <i>et al</i> 2011 ¹⁵	Retrospective analysis of AF patients admitted to hospital	2005-7	161	Single hospital	>65	37%	21%	42%

OAC: oral anticoagulation therapy



7: ADHERENCE TO GUIDELINES (CONT'D)

A number of recent studies from various clinical settings suggest that adherence to clinical guidelines on the prevention of AF-related stroke is poor in Portugal. Uptake of OAC therapy is reported as being between 27–45% depending on the study (see above), suggesting that approximately 60% of AF patients are either not receiving any therapy to reduce their risk of stroke or are treated with aspirin. Many physicians have a 'defensive' over-reliance on antiplatelet therapy, wrongly assuming that they offer an inferior risk of haemorrhage and going against evidence that antiplatelet therapy offers poor protection against stroke in AF patients.¹⁹

In addition, there is evidence of suboptimal treatment with VKAs: in a retrospective analysis of 200 patients admitted for AF-related stroke, Sargento-Freitas found that only 8.5% had INR values within the target therapeutic range.⁴

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COUNTRY PROFILE: ROMANIA*



AF-Related Stroke:

Stroke is a leading cause of death

106,000

cases of cerebrovascular disease per year¹

64,482

deaths per year due to cerebrovascular causes¹

1st

cause of adult disability^{2,3}

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity³

1 in 5 strokes is due to AF⁴

AF-related strokes are the most debilitating strokes

1.5x
higher cost⁴

AF-related strokes compared to strokes not due to AF

2x
the risk of death^{5,6}

Policy Landscape:

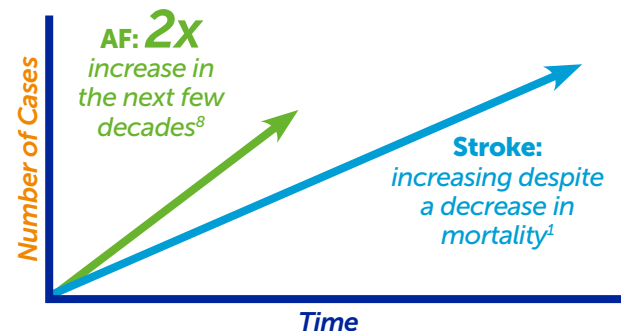
- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of cerebrovascular disease per year: **€118 million (2010)**⁷

Total indirect costs of cerebrovascular disease per year: **€373 million (2010)**⁷

Annual cost of AF-related stroke: **No data available**



Awareness Gap:



Many people are not aware of AF or that AF is a major risk factor for stroke...even if the risk of developing AF is 1 in 4 after the age of 40.⁹

Detection Gap:



Treatment Gap:

As many as **33%** of high risk AF patients are not on OAC therapy,¹⁴ yet many would be eligible according to current ESC guidelines.¹⁵

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	2-3% ¹⁶
Number of people with AF (prevalence):	200,000 ¹⁰
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	106,241 ¹
Number of deaths due to stroke/cerebrovascular disease per year:	64,482 total deaths per year (cerebrovascular disease) ¹ 290 deaths per 100,000 (stroke) ¹⁷
% of total deaths due to stroke:	No data available

AF-Related Stroke

% of strokes due to AF:	20% ⁴
Number of new caes of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct healthcare cost of cerebrovascular disease per year:	€118 million ⁷
Total indirect costs of cerebrovascular disease per year:	€373 million ⁷
Costs of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes
Most relevant to cardiologists:	ESC 2011 ¹⁵
Most relevant to primary care:	ESC 2012 ¹⁵

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	No data available
% high risk* AF patients currently treated with OAC therapy:	67% ¹⁴

*High risk defined as AF patients with previous stroke of TIA



2: A VIEW FROM THE GROUND

'The challenge in Romania is several fold – to convince the political sector to support national programmes for AF, to identify patients with undiagnosed AF before they get a myocardial infarction or a stroke, and to convince doctors to give the correct OAC therapy'

Professor Gheorghe Dan, University of Medicine and Pharmacy 'Carol Davila', and University Clinical Hospital 'Colentina', Bucharest.

3: EPIDEMIOLOGY

AF

Number of people with AF:	200,000 ¹⁰
Prevalence of AF(%):	2-3% ¹⁶

Undetected AF

No data available

Future Projections

No data available

STROKE

Total number of people living with cerebrovascular disease (prevalence):	103,848 ¹
Total numbers of new cases of cerebrovascular disease per year (incidence):	106,241 ¹
Deaths due to cerebrovascular disease per year:	64,482 ¹

No national data were available for stroke prevalence, incidence or mortality, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

Future Projections

No data available

AF-RELATED STROKE

A study of 3,700 patients with AF from both inpatient and outpatient settings across the country over 2011-12 found a prevalence rate of 10% for stroke.¹⁴

4: ECONOMIC BURDEN

STROKE

Total direct healthcare costs of cerebrovascular disease per year:	€118 million ⁷
Total indirect costs* of cerebrovascular disease per year:	€492 million ⁷

*Defined as productivity losses due to morbidity, mortality and informal care.

Data on the total direct and indirect costs of stroke are not available for Romania. However, leading international studies have provided estimates for cerebrovascular disease (see above).

AF-RELATED STROKE

No data available



5: POLICY LANDSCAPE

**National
stroke
plan**

**National
plan for
AF-related
stroke**

There are currently no national plans or strategies for AF-related stroke. No national stroke plan exists.

However, the Atrial Fibrillation-Awareness, Consciousness and Therapeutic Strategy (FACTS) programme was a substantial initiative started in 2010 in order to study the impact of suboptimal AF awareness in Romania on AF management and stroke prevention.¹⁴ The programme is reported to have helped understand local care arrangements, but the challenge of convincing health authorities to be involved in raising awareness of AF-related stroke remains.

Other efforts are underway to improve cardiovascular disease more widely. Romania started the National Program for Health Evaluation in 2007, having as one of its objectives the detection and treatment of principal risk factors for cerebrovascular diseases. A sustained campaign through mass media regarding improvement to a healthy lifestyle began at the same time and it is still in progress.¹⁸

Leading national commentators have noted that stroke care is sub-optimal in Romania. For example, a relative shortage of cardiologists is reported overall and GPs are being encouraged to improve their performance on AF detection and treatment.¹⁶ Acute thrombolysis is available only in Bucharest, the capital, and one other centre,¹⁶ meaning the great majority of the population do not have effective access.¹⁸

Advocacy and awareness

No data is available on public awareness of AF and AF related stroke.

An educational component was included in the FACTS programme as part of the '1 Mission 1 Million' programme,¹⁶ and a 'Stroke Prevention in AF Academy', an EU-wide initiative lead by Boehringer Ingelheim, has undertaken some activities in Romania in terms of case discussions between cardiologists, neurologists, and internal medicine specialists.

6: CLINICAL REGISTRIES

**National
AF
registry**

**National
stroke
registry**

There is no national stroke registry,¹⁸ and no national AF registry at present. However, as noted above several centres participated in the Romanian FACTS spot registry and have continued in a similar role as part of the EORP European registry (See **Case study 16:** the FACTS spot registry).



9: KEY ORGANISATIONS

- Romanian Stroke Prevention Society

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AF-Related Stroke:

Stroke is a leading cause of death

21,883
cases of cerebrovascular disease per year¹

7,116
cerebrovascular deaths per year¹

1st
cause of adult disability^{2,3}

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴

1 in 5 strokes is due to AF⁵

AF-related strokes are the most debilitating strokes

1.5x
higher cost⁵

AF-related strokes compared to strokes not due to AF

2x
the risk of death^{6,7}

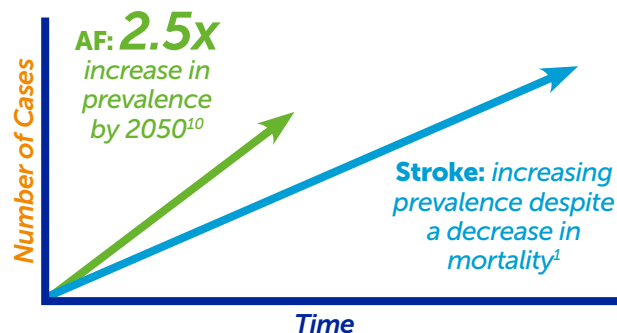
Policy Landscape:

- ✓ National stroke strategy (within national prevention programme for CVD)⁸
- ✗ No national plan on the prevention of AF-related stroke
- ✓ National stroke registry⁹
- ✗ No AF registry with national coverage

A Growing Economic Burden:

Annual cost of stroke per patient: **€13,600⁸**

Annual cost of AF-related stroke: **No data available**



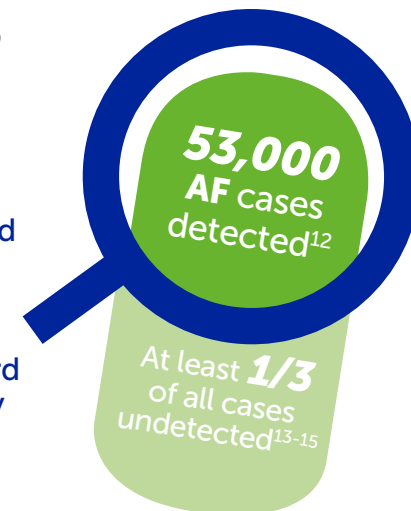
Awareness Gap:



Many people are not aware of AF or that AF is a risk factor for stroke... even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:

It is estimated that there are 53,000 detected cases of AF,¹² but European studies suggest at least one third of all cases may be undetected.¹³⁻¹⁵



Treatment Gap:

42% of high risk AF patients (with previous TIA or stroke) do not receive OAC therapy,¹⁶ yet many would be eligible according to current ESC guidelines¹⁷

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1% ¹²
Number of people with AF (prevalence):	53,000 ¹²
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	21,883 ¹
Number of deaths due to cerebrovascular disease per year:	7,116 ¹

AF-Related Stroke

% of strokes due to AF:	20% ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	2.5-fold increase in prevalence expected by 2050 ¹⁰
Stroke:	No data available

THE COSTS

Annual cost of stroke per patient:	€13,600 ⁸
Costs of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes, within the CVD prevention plan ⁹

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁷ ; EHRA 2013 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁷

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	67% ¹⁹
% high risk* AF patients currently treated with OAC therapy:	58% (of patients with previous TIA or stroke) ^{16,19}

* Defined as % patients with AF not receiving OAC therapy.



2: EPIDEMIOLOGY

AF

It is estimated that approximately 53,000 people have AF, representing a prevalence rate of 1%.¹²

Undetected AF

No data available

Future Projections

The prevalence of AF is expected to increase 2.5-fold by 2050.¹⁰

STROKE

Total number of people living with cerebrovascular disease (prevalence):	32,577 ¹
Total numbers of new cases of cerebrovascular disease per year (incidence):	21,883 ¹
Deaths due to cerebrovascular disease per year:	7,116 ¹

No national data was available for stroke prevalence, incidence or mortality, however useful estimates have been provided by leading international studies on cerebrovascular disease (see above).

Future Projections

No data available

AF-RELATED STROKE

No national data is available. However leading European sources estimate that 20% of strokes are due to AF.⁵

3: ECONOMIC BURDEN

STROKE

Annual cost of stroke per patient	€13,600 ⁸
Annual cost of AF-related stroke	No data available

The annual cost of stroke per patient is estimated at €13,600.⁸ There are no national estimates of the cost of AF-related stroke.

AF-RELATED STROKE

No data available



4: POLICY LANDSCAPE

National stroke plan

within the national plan on the prevention of cardiovascular disease⁸

National plan for AF-related stroke

Government policy and strategy

There are no national plans or strategies for AF-related stroke, nor are AF and AF-related stroke visible in other relevant government policies or improvement initiatives.

There is a national plan on the prevention of cardiovascular disease, which contains a plan for stroke.⁸

Advocacy and awareness

The Slovakian Society of Cardiology and Slovakian Heart Association run an annual awareness campaign called MOST ('The Bridge') focused on prevention of CV risks, which included also education brochure about AF.²⁰

5: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	ESC 2012 ¹⁷
Guidelines followed by cardiologists:	ESC 2012 ¹⁷ ; EHRA 2013 ¹⁸
Other guidelines:	Laboratory monitoring of treatment with NOACs – joint guidelines of professional societies

6: CLINICAL REGISTRIES

AF registry with national coverage

National stroke registry

At present there is no AF registry with national coverage. However, the REALFIB registry is a cross-sectional multicentre study on the management of AF in real-life clinical practice in outpatient internal medicine and cardiology clinics in Slovakia.¹⁶

A national stroke registry was established in 2007.⁹



7: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in Slovakia

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Hatala 2012 ¹⁶	Cross-sectional multicenter prospective study (REALFIB registry)	2012	1,032	Outpatients with AF managed by 51 hospital-based internists and cardiologists in Slovakia	All	67% All patients 58% of patients with previous stroke/TIA)	35%	n/a

OAC: oral anticoagulation therapy

The most recent data on anticoagulation therapy comes from the REALFIB registry, a multicentre, observational study that included 1032 patients with AF managed on an outpatient basis in Slovakia in hospital-based internal medicine and cardiology departments. The study showed that amongst AF patients managed on an outpatient basis, VKAs (warfarin) therapy were used in approximately 60% of patients irrespective of their CHADS₂ score.¹⁶

The study did not find any differences in stroke risk profile for patients on warfarin compared to those not on warfarin, however the proportion of patients with very high stroke risk (CHADS₂ score ≥ 4) was higher in the group not on warfarin than in the group on warfarin (23% and 16.8%, respectively). Warfarin was administered to 58% of the 217 high risk patients with previous history of stroke or TIA,¹⁶ strongly suggesting under treatment according to current ESC guidelines.¹⁷ Conversely, 58% of patients with a low risk CHADS₂ score were on warfarin,¹⁶ suggesting overtreatment.

The management of patients on OAC therapy may be sub-optimal. After 2 years of follow up on 540 patients receiving warfarin, a study found that the observed TTR was achieved 56% of the time. Significant differences in the quality of anticoagulation therapy were observed between internists and cardiologists as well as between individual regions.¹⁹

Reasons for this have been proposed as an unfavourable perception of warfarin, with its perceived risks outweighing its benefits, especially in high-risk patients, and insufficient acceptance of the European (ESC) clinical practice guidelines.¹⁷

8: KEY LINKS

- Slovakian Society of Cardiology
- Slovakian Heart Association
- Slovak League for the Prevention and Treatment of Cardiovascular Diseases: <http://www.hearttoheart.sav.sk/>



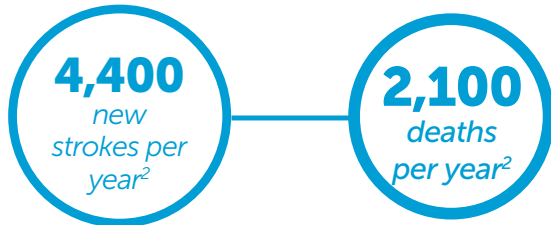
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AF-Related Stroke:

Stroke is a leading cause of life-long handicap and the third most common cause of death among women.¹



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke, along with high blood pressure, diabetes, physical inactivity and smoking³



AF-related strokes are the most debilitating strokes

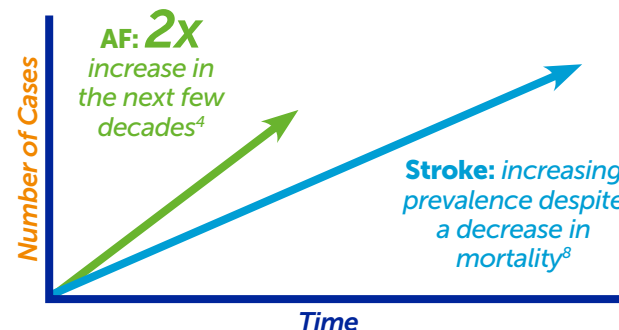


Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- ✓** National stroke registry
- X** No national AF registry

A Growing Economic Burden:

Total direct healthcare costs of stroke per year:	€87.4 million ⁷
Total indirect costs of stroke per year:	€24.7 million ⁷
Annual cost of AF-related stroke:	No data available



Awareness Gap:



According to national experts, public awareness of stroke is low⁹... even though the risk of developing AF is **1 in 4** after the age of 40.¹⁰

Detection Gap:



Treatment Gap:

There is no national data on adherence to guidelines for the prevention of AF-related stroke. Based on international data, it is thought that up to **50%** of AF patients may not be treated according to clinical guidelines^{15,16}

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1-2% ¹⁷
Number of people with AF (prevalence):	15,000 – 20,000 ¹¹
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	4,400 ²
Number of deaths due to stroke per year:	2,100 ²
% of all deaths due to cerebrovascular brain disease:	10.6% (2008) ¹

AF-Related Stroke

% of strokes due to AF:	20% ⁴
Number of new cases of AF-related stroke per year:	800 ²
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct costs of stroke per year:	€87.4 million ⁷
Total indirect costs of stroke per year:	€24.7 million ⁷
Costs of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	<i>Smernice za vodenje antikoagulacijskega zdravljenja</i> [Guidelines for management of anticoagulant treatment] <i>Priročnik za uporabo novih peroralnih antikoagulacijskih zdravil v klinični praksi</i> [Guide to the use of new oral anticoagulants in clinical practice]
Most relevant to cardiologists:	ESC 2012 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁸

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	No data available
% high risk AF patients currently treated with OAC therapy:	No data available



2: EPIDEMIOLOGY

AF

Between 15,000 to 20,000 people have AF in Slovenia.¹⁷ The prevalence rate of AF in the whole population is approximately 1-2%¹¹

Undetected AF

No data available

STROKE

Total number of people living with stroke (prevalence):	Around 40,000 ¹⁹
Total numbers of new cases of stroke per year (incidence):	4,400 ²
Deaths due to stroke per year:	2,100 ²

Slovenia, with 2 million inhabitants, is undergoing economic and demographic changes in recent years resulting in an improvement of lifestyle-related cardiovascular and cerebrovascular diseases.¹ Yet the burden of stroke still remains high – in Slovenia it is a leading cause of life-long disability and the third most common cause of death among women.¹ Stroke mortality in males appears to be significantly higher in Slovenia than in the old EU member countries.¹

In 2008, cerebrovascular disease led to 10.6% of all deaths, 90.2% of which occurred in people over 64 years of age.¹

Future Projections

No data available

AF-RELATED STROKE

According to a recent study, there are 800 AF-related strokes per year.²⁰

Future Projections

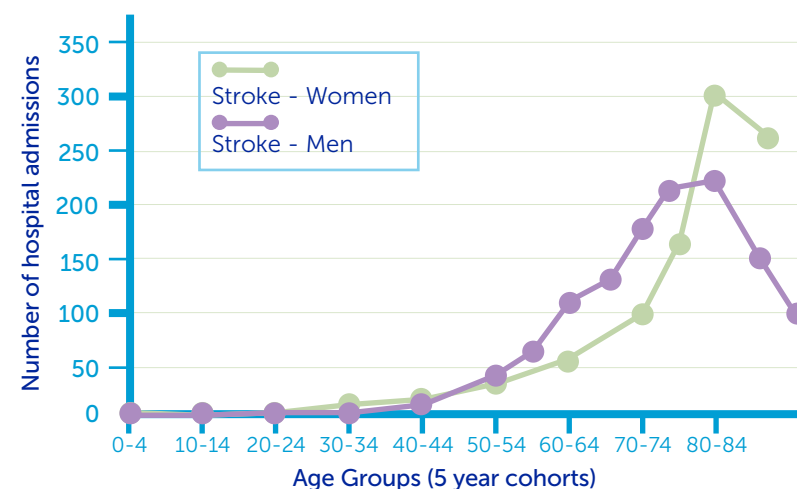
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3: ECONOMIC BURDEN

STROKE

Direct healthcare costs of stroke per year:	€87.4 million ⁷
Indirect cost of stroke per year:	€24.7 million ⁷

The number of hospital admissions for brain bleeding or ischaemic stroke in Slovenia in 2008, comparison by age and gender¹



In the year 2008 stroke occupied 1.1% of visits in a general outpatient clinics for men and 0.7% of the women. Similar data were obtained from specialized outpatient clinics. For each patient taken to the hospital there were 2.4 visits in the primary care and 2.3 visits in the specialist outpatient clinics prior to hospital admission. About 40% stroke patients died at home, while 60 % in the hospitals.¹

AF-RELATED STROKE

No data available



4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There are no specific national plans or strategies for AF-related stroke. However Slovenia has a CVD strategy, a CVD programme, and relevant targets across public health, cardiovascular disease, monitoring reporting and evaluation.²¹ There is little data on strategic preparedness for AF-related strokes, however a commentator reports an insufficient number of neurologists across the country.⁹

Advocacy and awareness

Public awareness of stroke is low.⁹ However, 2006 various initiatives have been put in place to address this, including an annual stroke symposia, a national stroke awareness day and other events in order to educate the public and medical staff. The education and training of neurologists at specialist stroke units has supported by electronic teaching materials (DVDs) and written guidelines in Slovenian.^{22,23}

The Slovenian Heart Foundation has sought to promote AF awareness through the "Catch Your Rhythm!" project, an initiative sponsored by the '1 Mission 1 Mission' programme. This has involved promoting recreational and lifestyle activities with an educational dimension as well as providing free electrocardiogram (ECG) recordings. The project's expert team travelled around Slovenia to give lectures on AF and perform preventative medical examinations, appearing at diverse venues such as university clinics and women's football matches. To date, approximately 50,000 people have participated in activities organised by the "Catch Your Rhythm!" project and an additional 150,000 people have been reached through various media outlets, thanks to the project's communications strategy.²⁴

The Slovenian Society for Cardiovascular Health provides information on stroke and AF on their websites.

5: CLINICAL REGISTRIES

National AF registry

National stroke registry

A Slovenian stroke registry has existed since 2000 (see below).⁹ although commentators report that only a few hospitals use it, and data are not regularly updated.²⁵

6: CLINICAL GUIDELINES

The guidelines most commonly followed in Slovenia are presented below.

Guidelines followed by GPs:	<i>Smernice za vodenje antikoagulacijskega zdravljenja</i> (Guidelines for management of anticoagulant treatment), Ljubljana 2009
Guidelines followed by cardiologists:	<i>Smernice za vodenje antikoagulacijskega zdravljenja</i> [Guidelines for management of anticoagulant treatment], Ljubljana 2009 Priročnik za uporabo novih peroralnih antikoagulacijskih zdravil v klinični praksi [Guide to the use of new oral anticoagulants in clinical practice], Ljubljana 2012.
Local translation and/or adaptation of ESC guidelines:	National guidelines follow ESC guidelines closely.
Other guidelines:	No



7: ADHERENCE TO GUIDELINES

There are no recent national studies that look at adherence to guidelines for the prevention of AF-related stroke.

8: KEY LINKS

- Society for Cardiovascular Health Slovenia: <http://www.sicardio.org/>
- Society of Patients with Cerebrovascular Stroke of Slovenia: <http://www.cvb.si/?menu=society&sub=13>
- Slovenian Heart Foundation: <http://zasrce.si/>

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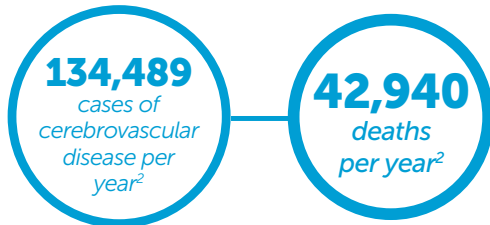
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AF-Related Stroke:

Stroke is a 2nd leading cause death in men and the leading cause of death among women.¹



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is one of the 'big 5' risks for stroke, bigger than diabetes, bigger than smoking, bigger than physical inactivity³

1 in 5 strokes is due to AF⁴

AF-related strokes are the most debilitating strokes

11x risk of early recurrence⁵

AF-related strokes compared to strokes not due to AF

2x the risk of death⁶⁻⁸

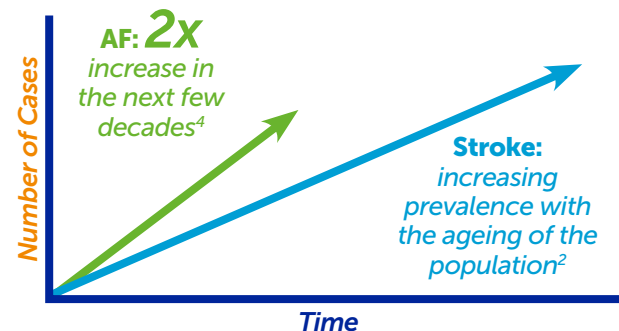
Policy Landscape:

- National stroke strategy⁹
- No national plan on the prevention of AF-related stroke
- No national stroke registry
- No national AF registry (but overall cardiovascular disease registry)

A Growing Economic Burden:

Total direct costs of cerebrovascular disease per year: **€6 billion, of which €1.5 billion are hospital costs¹**

Total costs of informal care for stroke per year: **€6.5-10.8 billion¹⁰**

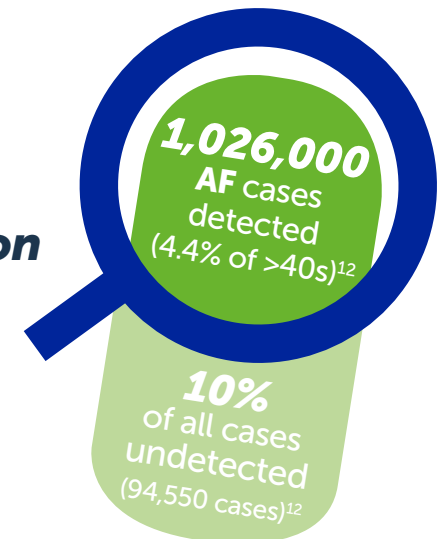


Awareness Gap:



Most people have never heard of AF and many do not know that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:

Patients on OAC therapy: **52-84%**^{13,14,15} depending on the study.

41%¹⁵ of high risk AF patients (CHADS₂ ≥ 2) are not receiving OAC therapy, although many would be eligible according to ESC guideline recommendations.¹⁶

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	4.4% (in >40 years old) ¹²
Number of people with AF (prevalence):	1,025,846 people over the age of 40 ¹²
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	94,546 ¹²
Detection gap:	10% ¹²

Stroke

Number of new cases of cerebrovascular disease per year:	134,489 ²
Number of deaths due to cerebrovascular disease per year:	42,940 ²

AF Related Stroke

% of strokes due to AF:	20% ⁴ ; 50% of cardioembolic strokes ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total direct costs of cerebrovascular disease per year:	€6 billion ¹
Total costs of hospitalisations for cerebrovascular disease per year:	€1.5 billion ¹
Total costs of informal care for stroke per year:	€6.5-10.8 billion ¹⁰
Annual cost of AF-related stroke:	Approximately €9,800 per year ¹⁷

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	Yes, the National Stroke Strategy (2008) ⁹

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁶
Most relevant to primary care:	ESC 2012 ¹⁶

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients receiving OAC therapy:	52-84% ^{13,14,15}
% high risk (CHADS ₂ ≥ 2) AF patients currently treated with OAC therapy:	57% ¹⁸ -59% ¹⁵



2: EPIDEMIOLOGY

AF

Number of people with AF:	1,025,846 (in > 40 years) ¹²
Prevalence rate (%):	4.4% (in > 40 years) ¹²

Data from the OFRECE study, a national, cross-sectional, population-based study of 8000 patients recruited in primary care in 2009 found a prevalence of 4.4% in people over the age of 40, with an increase by age, reaching 9.3% in ages 70-79, and 17.7% in ages 80 or more.¹² A similar prevalence rate (4.8%) was reported from a national registry of cardiovascular disease, the CARDIOTENS registry.¹³

Prevalence varied considerably depending on where patients were treated however: in primary care, prevalence was 2.75%, whereas in specialist cardiology clinics, it was 17.6% across all age groups.¹⁹

Data from the CARDIOTENS registry found that AF accounted for one-third of cases of CVD, a 33% increase between 1999 and 2009.¹³

An earlier randomised, cross-sectional population based study of 7108 patients, the PREV-ICTUS study, found a prevalence of 8.5% in patients over the age of 60 years old (2005 data).²⁰

Extrapolating the OFRECE findings to the Spanish population, it is estimated that 1,025,846 people over the age of 40 have AF (95% CI: 879,077, 1,172,614), of which 94,546 would have gone undiagnosed (10% detection gap).¹²

Undetected AF

Based on estimates of the OFRECE study, the rate of undetected AF is approximately 10%.¹²

STROKE

Total numbers of people living with cerebrovascular disease (prevalence):	473,358 ²
Total numbers of people suffering new cases of cerebrovascular disease every year (incidence):	134,489 ²
Deaths due to cerebrovascular disease every year:	42,940 ²

Stroke is the second most common cause of death and the leading cause of death in women in Spain.¹

The incidence of stroke in Spain is 128 per 100,000 in the general population, with a prevalence of 7% in the urban population older than 65.¹ Previous estimates from the NEDICES study suggest lower prevalence of 4.8% but they date back to the late 1990s.⁵

National estimates of the number of people affected by stroke are not available, however data from international studies are available above.²

AF-RELATED STROKE

One in five strokes is due to AF⁴ and non-valvular AF is thought to account for 50% of cardioembolic stroke in Spain.⁵

The presence of AF has been shown to increase the risk of early stroke recurrence as much as 11-fold.⁵ AF-related strokes are also associated with greater disability and mortality compared to those not due to AF.^{7,10}

Future Projections

No data available



3: ECONOMIC BURDEN

STROKE

Total direct costs of cerebrovascular disease per year:	€6 billion ¹
Total costs of hospitalisations for cerebrovascular disease per year:	€1.5 billion ¹
Total costs of informal care for stroke per year:	€6.5-10.8 billion ¹⁰

The overall costs of cerebrovascular disease have been estimated at close to €6 billion, of which €1.5 billion are hospitalisation costs.¹

A study conducted by the Servicio Canario de Salud estimated that informal care for stroke survivors, if taken up by health and social care services, would amount to €6.5 - €10.8 billion in Spain, equivalent to €27,314 per stroke survivor.¹⁰ Informal care accounts for 40-60% of the total cost of stroke.¹⁰

An earlier (2005) study estimated that stroke had an immediate social and health cost of €4,762 per patient, and then incurred a cost of €10,506 per year, of which rehabilitation accounted for a significant amount.²¹

AF-RELATED STROKE

Studies have suggested that AF-related strokes have an average length of stay in hospital of 2 days longer than strokes not due to AF, and are statistically less likely to be discharged home than non-AF related strokes (38.1% of AF-related strokes vs. 62.6% of strokes not due to AF).²² However, recent data from the CONOCES study found no difference in the costs of strokes due to AF or not. However, they found that patients hospitalised for AF-related strokes are older, require more intravenous treatments, have higher mortality, more intense neurological deficits and more systemic complications compared to stroke patients without AF.^{7,10}

4: POLICY LANDSCAPE

*National
stroke
strategy
(2008)⁹*

*National
plan for
AF-related
stroke*

Government policy and strategy

Spain has a National Stroke Strategy (2008), which includes a section on prevention of AF-related stroke, and recommends that OAC therapy is preferred for high risk patients, antiplatelet therapy for low risk patients.⁹ The strategy has not yet been updated.

AF and AF-related stroke do not feature in other relevant government policies and strategies.

Advocacy and awareness

Awareness campaigns and initiatives on AF and AF-related stroke are mostly run on a local basis. The patient organisation FEASAN has an important voice on AF, and runs the expert patient programme on AF, which is an educational tool for AF patients to encourage responsible self-management for the prevention of AF-related stroke.



5: CLINICAL REGISTRIES



There are no national registries on stroke or AF.

However, the FANTASIA registry is run by the Spanish Society for Cardiology and includes 5000 patients with AF. The registry collects data on their treatment, including use of OAC therapy. There is no publicly available data on the registry at present. 5000 patients will be included over 4 years. The initiative is funded by BMS/Pfizer.

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	ESC 2012 ¹⁶
Guidelines followed by cardiologists:	ESC 2012 ¹⁶
Other guidelines:	Position paper issued by Ministry of Health (on use of NOACs) ²³

7: ADHERENCE TO GUIDELINES

Most recently published data on the use of stroke prevention therapy in AF patients in Spain

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Gomez <i>et al.</i> 2013 ¹²	OFRECE study	2011	369		>40	65%	30%	10%
Cordero <i>et al.</i> 2013 ¹³	CARDIOTENS registry (all patients with CVD)	2009	1563	88% primary care, 12% cardiology clinics		64%	n/a	n/a
Lobos <i>et al.</i> 2013 ¹⁴	FIATE study	2013	3759 patients recruited from 185 family physicians	Primary care	All	84%	n/a	n/a
Barrios <i>et al.</i> 2013 ¹⁸	Val-FAAP study	2013	7260	Primary care	All	57% of patient with CHADS ₂ ≥ 2	19.3% of patients with CHADS ₂ ≥ 2	n/a
Huguet <i>et al.</i> 2012 ¹⁵	Retrospective database analysis	2008-9	2924	Primary care	All	52%	n/a	16%

OAC: oral anticoagulation therapy



7: ADHERENCE TO GUIDELINES (CONT'D)

A number of national studies offer estimates of anticoagulation therapy use in Spain, showing a wide range of estimates of the proportion of patients receiving OAC therapy.

A large study involving 7260 patients with AF treated in primary care (the Val-FAAP study) found that 57% of patients at higher risk of stroke (defined as CHADS₂ ≥ 2) received OAC therapy either alone or in combination with an antiplatelet.¹⁸ The authors found evidence of under-treatment of patients at high risk of stroke and overtreatment of patients at lowest risk of stroke, demonstrating the need for urgent professional training on existing guidelines.¹⁸

A similar study also from primary care suggested that 84% of patients were on OAC therapy, however control was suboptimal, with 66% of patients having INR readings within the recommended range – and this figure dropped to 33% when the last 3 available INR readings were included.¹⁴ A further retrospective analysis of patients treated by GPs in Spain found lower figures, namely that 52% of AF patients received OAC therapy, and 41% of high risk (CHADS₂ ≥ 2) patients did not receive OAC therapy despite being eligible for OAC therapy. VKA persistence was also found to be low: 60% and 38% at 6 and 12 months, respectively.¹⁵

Finally, the OFRECE study (*Observación de FibRilación y Enfermedad Coronaria en España*) held under the auspices of the Spanish Cardiology Society, found in patients over the age of 40 that 65% were on OAC therapy, and 10% were not on any form of antithrombotic therapy.¹² Similar figures were found in the CARDIOTENS registry on cardiovascular diseases in general.¹³

8: KEY LINKS

Patient organisation:

- FEASAN: <http://www.anticoagulados.info/>

Professional societies:

- Sociedad Española de Cardiología: <http://www.secardiologia.es/>
- Sociedad española de medicina de atención primaria (SEMERGEN): <http://www.semergen.es/semergen/>



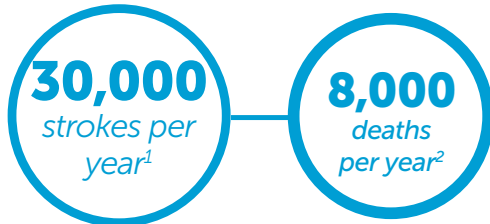
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AF-Related Stroke:

Stroke is a leading cause of death



AF is the **second** most important risk factor for stroke³

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke, along with high blood pressure, diabetes, physical inactivity and smoking.³

300,000 people have AF in Sweden, or **4%** of adults⁴

AF-related strokes are the most debilitating strokes

1.5x higher cost⁵

AF-related strokes compared to strokes not due to AF

2x the risk of death^{6,7}

Policy Landscape:

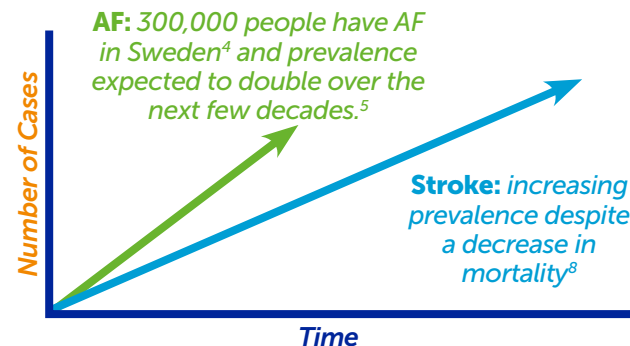
- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- ✓ National stroke registry (Riks-Stroke)
- ✓ National AF registry (Auricula)

A Growing Economic Burden:

Total lifetime societal costs of stroke: **€1.513 billion²**

Total lifetime indirect costs of stroke (lost productivity): **€318 million²**

Annual cost of AF-related stroke: **No data available**



Detection Gap:

- Of 300,000 AF cases, as many as 91,000 may be undetected – approx. 30% of all cases⁴
- 4.2% of 75-76 year olds may have undetected AF⁹

Up to **300,000** people with AF⁴

...of which **91,000** are undetected¹⁰

Treatment Gap:

Approximately half of high risk AF patients ($CHA_2DS_2-VASc \geq 2$) are not receiving OAC therapy,¹⁰ yet many would be eligible according to current ESC guidelines.¹¹

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	3.2% ¹² possibly as high as 4-5%. ^{4,13}
Number of people with AF (prevalence):	140,000 ¹⁴ – 300,000 ⁴
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	91,000 ⁴
Detection gap:	30% of all AF cases undetected – equivalent to an additional 45% of known AF cases within 75-76 year olds ⁹

Stroke

Number of new cases of stroke per year:	30,000 ¹
Number of deaths due to stroke per year:	8,000 ²
% of total deaths due to stroke:	No data available

AF-Related Stroke

% of strokes due to AF:	38% ¹²
Number of new cases of AF-related stroke per year:	11,400 ¹

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Total lifetime societal costs of stroke:	€1.513 billion ²
Total lifetime indirect costs of stroke (lost productivity):	€318 million ²
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	National Board of Health and Welfare guidelines, 2013 ¹⁵ (2014 update underway) ¹⁶ Medical Product Agency (MPA) guideline, due 2014
Most relevant to cardiologists:	National guidelines, ¹⁶ ESC 2012, ⁵ local guidelines by region or in-hospital guidelines
Most relevant to primary care:	Regional payer drug committee guidelines within the 21 different county councils

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients receiving OAC therapy:	42% ⁴ - 64% ¹⁷
% high risk* AF patients currently treated with OAC therapy:	Approximately 50% ¹⁰

*High risk defined as CHADS₂ score ≥2



2: EPIDEMIOLOGY

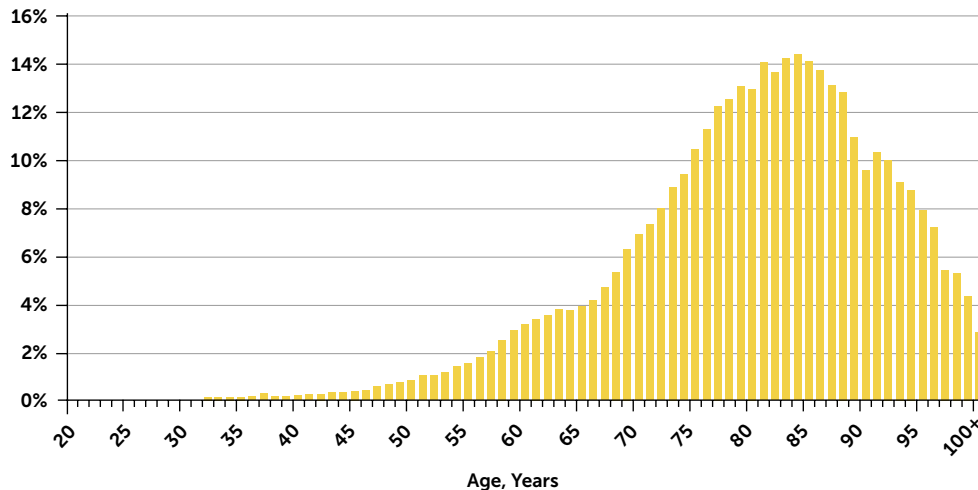
AF

According to a leading national study, approximately 4% of all adults or 300,000 people are estimated to have AF in Sweden.⁴ However other estimates are 3.2%¹³ or even as high as 4-5%.¹⁸

The prevalence of AF varies by age and gender. Data from the Swedish Patient Registry, which has been matched with data from the National Prescribed Drugs Register has given estimates by age to be:¹³

- 60 and under: 0.6%
- 60-69: 4.2%
- 70-79: 9.7%
- 80-89: 13.4%
- 90 and above: 9.0%

Prevalence of diagnosed atrial fibrillation by age, 2010, Sweden¹³



The same study found that prevalence of AF ranged from 2.5% in the Swedish capital Stockholm, where the mean age of the population is 39.0 years, up to 3.5% in the northernmost rural region of Norrbotten, where the mean age of the population was 42.4 years.¹³ Some 3.3% of Swedish men had an AF diagnosis compared with 2.5% of Swedish women,¹³ a finding that is compatible with other studies.¹⁷

Undetected AF

It has recently been estimated that 91,000 people in Sweden have undiagnosed AF.⁴ Against the 209,000 people with diagnosed AF, this equates to a 'detection gap' of 30% of all cases in those aged 20 and over.⁴

The prevalence of undiagnosed AF amongst older people has been shown to be even higher. A pilot study undertaken in an urban and a rural area of Sweden invited all inhabitants aged 75-76 for AF screening, for which there were around 870 participants. The results so far imply the true prevalence of AF in the age group (75 to 76 year olds) to be over 14%, as opposed to the previous baseline of 9.6% in this age group.⁹

Under-estimates in previous studies may be partly explained by data sources, for example the Swedish Patient Registry does not include any primary healthcare data, and it is assumed that up to 50% of patients are treated in primary care.¹⁴ Studies that have included primary care data have returned different results, for example a recent population-based study of adults over the age of 20 found an overall prevalence of 3.2%, increasing to as high as 21% in women and 27% in men aged over 80.¹²



2: EPIDEMIOLOGY (CONT'D)

STROKE

Total number of people living with stroke (prevalence):	No data available
Total numbers of new cases of stroke per year (incidence):	30,000 ¹
Deaths due to stroke per year:	8,000 ²

The Swedish Stroke Risk Register, Riks-Stroke has collected national data on stroke in Sweden since 1994. Approximately 30,000 strokes per year were recorded in the 8 years prior to 2012.¹

A separate study found that amongst stroke patients, women were on average 5 years older (77 years) than men, had a more severe stroke at admission and were more prone to have a diagnosis of AF and hypertension.²

No national data were available for stroke prevalence.

Future Projections

No data available

AF-RELATED STROKE

38% of ischaemic stroke cases had a diagnosis of AF on hospital discharge notes or patient records.¹²

3: ECONOMIC BURDEN

STROKE

Total societal lifetime cost of stroke:	€1.513 billion ²
Indirect costs due to lost productivity year:	€318 million ²

*Defined as productivity losses due to morbidity, mortality and informal care

A study of the cost of incident stroke cases in Sweden in 2009 found that the total societal lifetime cost of stroke was €1.513 billion (€69,000 per person per year), of which 21% (approximately €318 million) were indirect costs due to lost productivity.²

Stroke hospitalisations in the first year have been shown to cost around €10,000 per stroke, while costs for recurrent stroke hospitalisations are lower.² Municipality care, that is, costs for increased need for home assistance and residential housing due to the stroke, constitutes a substantial long-term cost, especially for women.²

AF-RELATED STROKE

In-patient costs for first stroke, recurrent stroke, and other hospitalisations with a secondary diagnosis of stroke amounted to €9,300 and €8,900 for patients with and without AF, respectively, during a 3-year study period.² The case fatality among patients with AF was higher than for those without AF during the first 28 days after the index event. The presence of AF among patients aged under 65 increased costs by 46% compared with those without AF.²



4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

At present there is no national strategy for stroke, nor for AF-related stroke. However substantial efforts are underway to modernise national guidelines for AF, stroke prevention and cardiac care, as described below.

Advocacy and awareness

There is no data on public awareness of AF or AF related stroke.

5: CLINICAL REGISTRIES

National AF registry (Auricula)

National stroke registry (Riks-Stroke)

A national registry exists for stroke (Riks-Stroke), which collects information on stroke patients at the time of stroke onset, during hospitalisation, and at follow up points three months and a year following stroke.

A centralised patient registry covering all conditions, the Swedish Population Register, covers the diagnosis of AF. Auricula is the Swedish national quality registry of patients with AF. The registry includes key patient characteristics, information on treatment, concurrent illnesses, investigations, and complications to AF as quality indicators. Auricula was created in 2006 with the intent to improve anticoagulation practices.¹⁹ However, coverage is not 100% and some regions use different quality registries (e.g. Journalia).

6: CLINICAL GUIDELINES

Guidelines followed by GPs:	Drug committee guidelines within the 21 different county councils
Guidelines followed by cardiologists:	ESC guidelines 2012 ¹¹
National guidelines:	<i>Socialstyrelsen</i> [National Board of Health and Welfare] <i>Uppdaterade rekommendationer om antikoagulationsbehandling vid förmaksflimmer (2013)</i> ¹⁵ Medical Product Agency guideline, MPA (due 2014)
Other guidelines:	In-hospital guidelines can exist in different hospitals.

The National Board of Health and Welfare guidelines issued preliminary guidelines in 2013¹⁵ and revised national recommendation for anticoagulation in AF are expected in 2015.¹⁶ These form part of a comprehensive and ongoing updating of national guidelines for cardiac care expected in 2015.



7: ADHERENCE TO GUIDELINES

Recently published data on the use of stroke prevention therapy in AF patients in Sweden

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Forslund <i>et al</i> 2013 ¹⁰	Cross-sectional registry study	2006-2010	43,353	Hospital, out-patient and primary care	all	47%	42%	21%
Andersson <i>et al</i> 2012 ¹⁷	Prospective study in county of Northern Hälsingland	2008-2010	1616	All people visiting the hospital or GP for any reason were screened for AF and entered into AURICULA registry	all	64% of patients were on OAC therapy whereas 85% of patients were at higher risk of stroke.		
Bjork <i>et al</i> 2013 ¹²	Data from hospital, outpatient, and primary healthcare and drug registries	2009	37,200 Patients with AF	Region with 1.56 million residents	aged ≥ 50 years	46% on OAC therapy		

OAC: oral anticoagulation therapy

Forslund *et al.* undertook a cross-sectional registry study of all 43,353 patients with a diagnosis of non-valvular AF recorded in the Stockholm county during 2006-2010 in inpatient care, specialist ambulatory care and primary care settings.¹⁰ Overall, 47% of patients were prescribed OAC therapy, 42% were prescribed antiplatelet therapy and 21% received no treatment. There was evidence of under-treatment by OAC in highest-risk groups (only 50% of patients with $CHA_2DS_2-VASc \geq 2$ were prescribed OAC therapy in 2010) and over-treatment in low-risk groups (20% of patients with $CHA_2DS_2-VASc = 0$ were on OAC). Over reliance on aspirin was especially present in older patients and those at highest risk of stroke.¹⁰ The study also found that 64% of the entire cohort of patients with AF had their diagnosis made in primary care.¹⁰

Andersson *et al* looked at 1616 AF cases included in the AURICULA national quality registry of patients on anticoagulation therapy for the Northern region of Sweden.¹⁷ They found that VKAs were used by 64% of all AF patients, when 85% of patients were considered at higher risk of stroke ($CHA_2DS_2-VASc \geq 2$) and therefore should be on OAC therapy according to current ESC clinical guidelines.¹⁷ By contrast, 41% of patients with a low stroke risk ($CHA_2DS_2-VASc = 0$) were on OAC therapy, when ESC guidelines do not recommend any anti-thrombotic therapy in this group of patients.¹¹

8: KEY LINKS

- The Swedish Heart and Lung Foundation: <http://www.hjart-lungfonden.se/Om-Hjart-lungfonden/About-HLF/>
- Swedish Society on Thrombosis and Hæmostasis: <http://www.ssth.se/>
- The Swedish Heart and Lung Association: <http://www.hjart-lung.se/>
- Riks-Stroke Registry: <http://www.riks-stroke.org/index.php?content=&lang=eng&text=>
- National Stroke Association: <http://www.strokeforbundet.se/show.asp>
- Socialstyrelsen [National Board of Health and Welfare]: <http://www.socialstyrelsen.se>
- Auricula registry: <http://www.ucr.uu.se/auricula/>



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AF-Related Stroke:

Stroke is the 3rd leading cause of death¹



AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke,⁴ bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 5 strokes is due to AF⁵

AF-related strokes are the most debilitating strokes

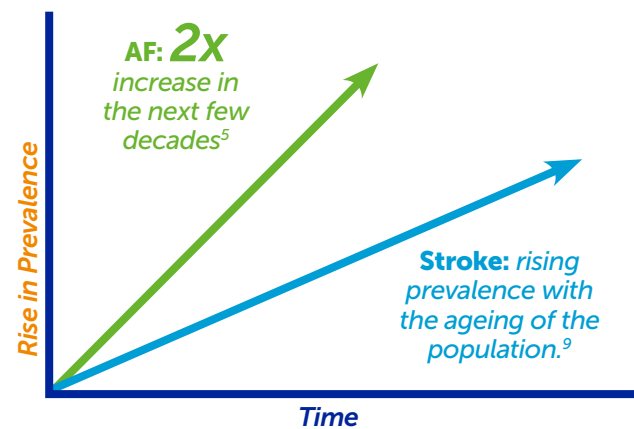
1.5x higher cost⁵ AF-related strokes compared to strokes not due to AF 2x the risk of death^{6,7}

Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- X** No national AF registry
- X** No national stroke registry

A Growing Economic Burden:

Annual cost of stroke (health and social care) in first year: **21,203 - 43,821 CHF** depending on severity⁸



Awareness Gap:

Most people have not heard of AF and 40% do not know that it is a major risk factor for stroke¹⁰... even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:

Experts suggest that up to **20%** of AF patients at high risk of stroke are not treated according to clinical guidelines in Switzerland.

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1.25% ¹⁰
Number of people with AF (prevalence):	Approximately 100,000 ¹⁰
Number of new cases of AF per year (incidence):	No data available
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of stroke per year:	15,733 (2004) ¹
Number of deaths due to cerebrovascular disease per year:	3,634 (2011) ²
% of total deaths due to stroke:	9% (OECD average) ³

AF-Related Stroke

% of strokes due to AF:	20% ⁵
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Annual cost of stroke (health and social care) in first year:	21,203 - 43,821 CHF depending on severity ⁸
Indirect costs of stroke:	No data available
Annual cost of AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	AGLA Pocketguide 'Antithrombotika' 2014 ¹⁵ and SGAR recommendations on use of apixaban ¹⁶
Most relevant to cardiologists:	ESC 2012 ¹⁷ and local hospital-based guidelines
Most relevant to primary care:	Local hospital guidelines based on ESC 2012; AGLA Pocketguide 'Antithrombotika' 2014 ¹⁵

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	51% ¹⁸
% high risk (CHA ₂ DS ₂ -VASc score ≥ 2) AF patients currently treated with OAC therapy:	80%*
Treatment gap*:	20%*

* Data based on local expert opinion (unpublished). Treatment gap defined as the % of high risk AF patients who are not treated with OAC therapy as recommended by clinical guidelines.



2: EPIDEMIOLOGY

AF

It is estimated that there are approximately 100,000 people with AF in Switzerland, representing a prevalence rate of 1.25%.⁸

Undetected AF

No data available

STROKE

Total numbers of people living with stroke (prevalence):	No data available
Total number of new cases of stroke per year (incidence):	15,733 ¹
Deaths due to cerebrovascular disease every year:	3,634 ²

Stroke (cerebrovascular diseases) is the leading cause of disability in adults, the second most common cause of dementia, and the third most common cause of death in Switzerland,¹ accounting for 9% of all deaths per year.³ Approximately 3,634 deaths are due to cerebrovascular disease every year (2011 data).²

Very little epidemiological data exist on the prevalence or incidence of stroke. The most recent estimate dates back to 2004, suggesting that there are 15,733 new cases of stroke every year in Switzerland. This includes first-ever and recurring cases.¹

Future Projections

No data available

AF-RELATED STROKE

There are no national data, however ESC guidelines suggest that 1 in 5 strokes is due to AF.⁵

3: ECONOMIC BURDEN

STROKE

Cost of stroke in the first year:	22,851 CHF - 43,821 CHF depending on severity of the disease ⁸
Indirect costs of stroke:	No data available.

According to official statistics, the healthcare and social care costs associated with stroke in the first year vary by severity of disease from 22,851 to 43,821 CHF.⁸ Other authors have found similar estimates.¹⁹

In Switzerland, 41% of the costs of nursing homes is paid by patients, 23% by health insurance companies, 23% by the state and 9% by the cantons and communities and 4% by other sources.²⁰

There are no data on the indirect costs of stroke (eg. lost productivity or informal care).

AF-RELATED STROKE

No data available



4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

Government policy and strategy

There are no national plans or strategies for AF-related stroke, nor do AF or AF-related stroke feature in other relevant government policies or improvement initiatives.

There is no national stroke plan. However, the government has issued a plan to improve the quality and structure of specialised stroke centres.

Advocacy and awareness

The *Schweizerische Herzstiftung* (Swiss Heart Foundation) and *Sprechzimmer* both run awareness campaigns and provide information on AF and AF-related stroke. In a public survey in 2012, the *Schweizerische Herzstiftung* found that 40% of people did not know that AF could lead to stroke, and only one third of people could identify signs of a stroke. Only 13% of people with AF who were receiving OAC therapy were aware that the purpose of their treatment was to reduce their risk of stroke.¹⁰

5: CLINICAL REGISTRIES

National AF registry

National stroke registry

There is no national AF registry in Switzerland. No government-funded national stroke registry exists at present, however the Swiss Stroke Society *NeuroVasc* (*Schweizer Hirnschlag Gesellschaft*) is currently setting up a registry to which a number of stroke centres are planning to contribute data. In addition, the Swiss Health Observatory monitors data on cases of stroke along with other cardiovascular disease.¹

6: CLINICAL GUIDELINES

Most relevant to cardiologists:	ESC 2012 ¹⁷ and local hospital-based guidelines
Most relevant to primary care:	Local hospital-based guidelines based on ESC 2012; AGLA Pocketguide 'Antithrombotika' 2014 ¹⁵
Other guidelines:	SGAR ¹⁶ recommendations on use of apixaban

The ESC 2012 guidelines¹⁷ are mostly followed by cardiologists, however local hospital-based guidelines are also available, which are usually simpler versions of the ESC 2012. In addition, AGLA, a professional society grouping angiologists, haematologists and internists, have produced the AGLA Pocketguide 'Antithrombotika' 2014¹⁵ and the SGAR, which brings together anaesthesiologists, cardiologists, neurologists and haematologists have drafted expert recommendations on apixaban, one of the NOACs.¹⁶



7: ADHERENCE TO GUIDELINES

There are few recent studies on the adherence to anticoagulation guidelines in AF patients. According to expert opinion, 80% of patients at higher risk of stroke (CHA₂DS₂-VASc score of 2 or more) are thought to be on OAC therapy, with 20% of these being on NOACs.

An earlier study, published in 2006, found that, among 484 patients admitted for AF to a university hospital, 49% were not receiving any OAC therapy despite existing guidelines. This percentage reached 72% in older patients (aged 75+) who did not have an additional risk factor, and 55% in older patients with an additional risk factor.¹⁸ Reasons for not giving OAC therapy were a history of repeated falls (44%), presumed non-adherence (34%) and other factors. There was no apparent reason given in 31% of all patients not on OAC therapy.¹⁸

A survey of physicians conducted in an urban part of Switzerland suggested that hospital-based physicians were more likely to adhere to anticoagulation guidelines, and GPs were less likely to adhere to guidelines (29%) than internists (53%) or cardiologists (90%), particularly in terms of initiation of OAC therapy.²¹ The study suggested that greater adherence to guidelines in hospital-based physicians may be as a result of their treating more severely ill hospitalised patients, in whom avoidance of adverse events is critical.²¹

8: KEY LINKS

Patient advocacy groups:

- Schweizerische Herzstiftung: <http://herzrhythmus.swissheart.ch/>
- Sprechzimmer: <http://www.sprechzimmer.ch/>

Professional societies:

- SGK (Swiss Society of Cardiology): <http://www.swisscardio.ch/>
- SGIM (Swiss Society of Internal Medicine): <http://www.sgim.ch/>
- SGAM (Swiss Society of General Medicine): <http://www.sgam.ch/>
- SHG (NeuroVasc: Swiss Stroke Society): <http://www.swissneuro.ch/Intro/>
- SNG (Swiss Neurological Society): <http://www.swissneuro.ch/Intro/>



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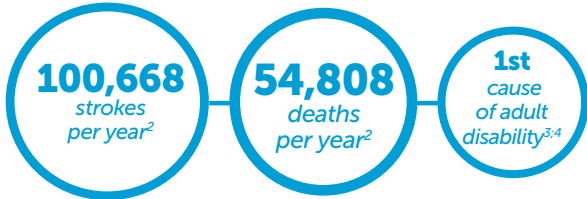
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COUNTRY PROFILE: TURKEY*



AF-Related Stroke:

Stroke accounts for **9.7%** of all deaths in Turkey¹



AF is the **second** most important risk factor for stroke⁵

AF > smoking
diabetes
physical inactivity

AF is the **second** most important risk factor for stroke,⁵ bigger than smoking, bigger than diabetes, bigger than physical inactivity

1 in 4 strokes is due to **AF**⁶

AF-related strokes are the most debilitating strokes

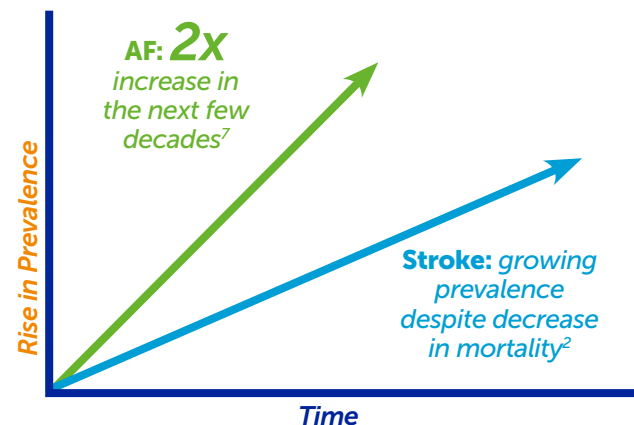


Policy Landscape:

- X** No national stroke strategy
- X** No national plan on the prevention of AF-related stroke
- ✓** No national AF registry, but AF hospital-based registry
- X** No national stroke registry

A Growing Economic Burden:

Direct cost per stroke in first year: **5,719-7,931 TL**¹⁰



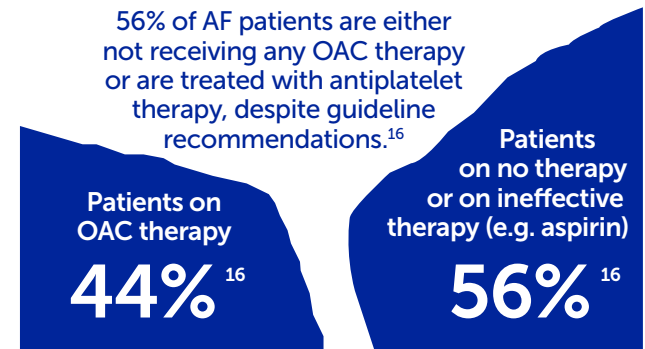
Awareness Gap:

Most people have never heard of AF and do not know that AF is a major risk factor for stroke...even if the risk of developing AF is **1 in 4** after the age of 40.¹¹

Detection Gap:



Treatment Gap:



*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	0.8 ¹⁷ -1.25% ¹²
Number of people with AF (prevalence):	310,000 ¹²
Number of new cases of AF per year (incidence):	35,000 ¹²
Number of undetected AF cases:	No data available
Detection gap:	No data available

Stroke

Number of new cases of cerebrovascular disease per year:	100,668 ²
Number of deaths due to cerebrovascular disease per year:	54,808 ²
% of total deaths due to stroke:	9,7% ¹

AF-Related Stroke

% of strokes due to AF:	20% ^{6,18}
Number of new cases of AF-related stroke per year:	No data available
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	No data available

THE COSTS

Direct healthcare cost per individual stroke:	5,719-7,931 TL in the first year ¹⁰
Total indirect cost of stroke:	No data available
Annual cost per AF-related stroke:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	No
National stroke plan:	No

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	No
Most relevant to cardiologists:	ESC 2012 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁸

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	44% ¹⁶
% high risk AF patients currently treated with OAC therapy:	No data available
% AF patients treated only with antiplatelet therapy:	39% ¹⁶



2: EPIDEMIOLOGY

AF

Number of people with AF:	310,000 ¹²
Prevalence rate (%):	0.8 ¹⁷ -1.25% ¹²

A cross-sectional prospective study of close to 3,500 adults, the Cardiac Diseases and Risk Factors in Adults in Turkey (TEKHARF) study, found a prevalence of AF of 1.25% and an incidence of 1.35 per 1000 person-years.¹² The TRAF hospital database on AF found an even lower prevalence, at 0.8% in persons over the age of 18.¹⁷

In the TEKRHARF study, prevalence and incidence was higher in women,¹² which was confirmed in the recent AFTER registry which found that AF was 1.5 times more prevalent in women than men (all types of AF combined).¹⁹

Prevalence by age is: 0.46% for ages 32-59, 2.09% for ages 60-69, and 2.49% for ages 70 and over.¹² Based on these figures, it is estimated that there are 35,000 new cases of AF per year (22,000 in women) and 310,000 prevalent cases (200,000 in women - 2008 data).¹²

Undetected AF

No data available

Future Projections

No data available

STROKE

Total number of people living with cerebrovascular disease (prevalence):	154,911 ²
Total number of people suffering new cases of cerebrovascular disease every year (incidence):	100,668 ²
Deaths due to cerebrovascular disease every year:	54,808 ²

There are no national data on the incidence or prevalence in Turkey, however international studies suggest that there are close to 155,000 people living with cerebrovascular disease (including stroke) in Turkey and 100,668 new cases of cerebrovascular disease occur every year, leading to 54,808 deaths per year.²

Stroke accounts for 9.7%¹ of all deaths in Turkey.

AF-RELATED STROKE

The average stroke rate in people with AF is 5.8%.¹⁷ There are no figures, however, allowing to estimate the actual number of AF-related strokes per year in Turkey. However ESC guidelines suggest that 20% (1 in 5) of all strokes are due to AF.⁶



3: ECONOMIC BURDEN

STROKE

Direct healthcare costs per individual stroke (in the first year):	5,719-7,931 TL ¹⁰
Indirect costs of stroke:	No data available

There are very few estimates on the cost of stroke. A 2014 expert consensus found that the cost of stroke in the first year was 5,719 TL, of which 2,431 were within the first month and 3,257 within the next 11 months.¹⁰ This cost rose to 7,931 TL per year when calculated based on recommendations from current guidelines. This difference was especially present in the first month following stroke, suggesting that clinical practice deviates from guideline recommendations in this critical phase of treatment. The authors compared this discrepancy between observed practice and guidelines for the treatment of chronic heart failure (CHF) in AF patients and found no such discrepancy, which may point to a greater awareness of CHF and its severity.¹⁰

AF-RELATED STROKE

No data available

4: POLICY LANDSCAPE

National stroke plan

National plan for AF-related stroke

There are no national plans or strategies for AF-related stroke, nor do AF and AF-related stroke feature in other relevant government policies or improvement initiatives.

Advocacy and awareness

No data available

5: CLINICAL REGISTRIES

National AF registry

National stroke registry

There is no epidemiological registry on AF in Turkey, however the Turkish Atrial Fibrillation Database (TRAF) is a hospital-based database which collects information on patients with AF.¹⁷

There is no national stroke registry, although a regional registry (the Ege stroke registry) did collect stroke cases in 1998, but data collection has not continued.¹¹



6: CLINICAL GUIDELINES

National guidelines on AF-related stroke:	Yes, translation of ESC 2012 guidelines ⁶
Most relevant to cardiologists:	ESC 2012 ¹⁸
Most relevant to primary care:	ESC 2012 ¹⁸

The ESC guidelines have been translated into Turkish and are the most commonly followed guidelines by both cardiologists and primary care physicians.^{6,18}

7: ADHERENCE TO GUIDELINES

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Kaya <i>et al</i> 2013 ¹⁶	Prospective multicentre registry study (AFTER registry)	2011	1745	Hospital cardiology departments (out-patient)	>18	44% (24% on VKA only, 20% on VKA+antiplatelet)	59% (of whom 20% also on VKA)	17%

OAC: Oral anticoagulation therapy

Preliminary results of the AFTER registry (Atrial Fibrillation in Turkey: epidemiologic registry), a prospective, multicentre study which assesses the epidemiology of AF in Turkey, found that only 44% of patients with non-valvular AF received OAC therapy. A large proportion of patients (59%, of whom 20% in combination with VKAs) are treated with antiplatelet therapy, which is ineffective at reducing the risk of stroke¹⁶ and is no longer recommended by current international guidelines.¹⁸ The TRAF database revealed even lower rates of OAC use, at 33%.¹⁷

Treatment with VKAs was also found to be suboptimal, with only 39% of patients on VKAs found to be within an effective therapeutic range.¹⁶

Results from the AFTER registry applying to all AF patients (valvular and non-valvular AF) found that only 7% of patients who were not receiving OAC therapy (all patients with AF) had an actual contraindication according to clinical guidelines, which points to an urgent need for physician education.¹⁹ The prescription of OAC therapy was highly associated with risk factors in the CHA₂DS₂-VASc score, with the exception of female gender and vascular disease.¹⁶



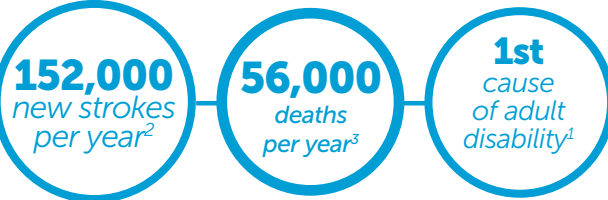
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AF-Related Stroke:

Stroke is one of the top three causes of death in the United Kingdom¹



Stroke patients occupy around 20% of all acute hospital beds and 25% of long-term beds.³

AF is the **second** most important risk factor for stroke⁴

AF > smoking
diabetes
physical inactivity

AF is the second most important risk factor for stroke, bigger than smoking, bigger than diabetes, bigger than physical inactivity⁴

1 in 5 strokes is due to **AF**^{5,6}

AF-related strokes are the most debilitating strokes

1.5x higher cost⁶

AF-related strokes compared to strokes not due to **AF**

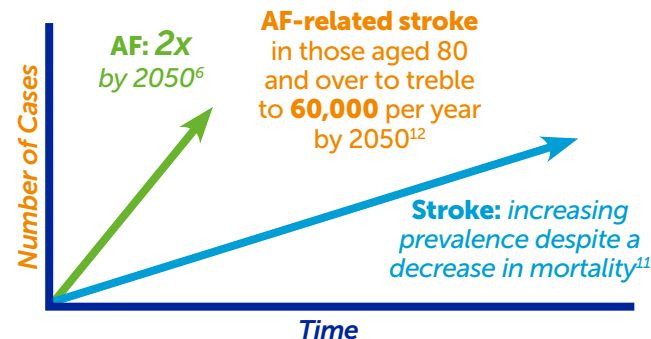
2x the risk of death^{7,8}

Policy Landscape:

- ✓ National Stroke Strategy 2007-17 (England)⁹
- ✓ National plan on the prevention of AF-related stroke
- ✓ National stroke registries: Scottish Stroke Care Audit,¹⁰ registries under development in England, Wales and Northern Ireland.
- X No national AF registries

A Growing Economic Burden:

Total direct healthcare costs of stroke per year:	£2.8 billion³ - £3 billion¹
Total indirect costs of stroke per year:	£4.2 billion³ - £5 billion¹
Annual cost of AF-related stroke:	No data available



Awareness Gap:



1 in 3 adults in the UK is unaware of the high stroke risk caused by AF.¹³

Detection Gap:



Treatment Gap:

34% of non-valvular AF patients at high risk of stroke (CHADS₂ ≥ 2) do not receive OAC therapy, despite the absence of contraindication or treatment refusal¹⁵

Appropriate OAC therapy for all AF patients could prevent 4,500 strokes a year and 3,000 deaths a year.¹

*This infographic is based on national data where possible. Where national data are not available, international data have been used.



1: DATA SUMMARY

THE NUMBERS

AF

Prevalence of AF (%):	1.4% ¹⁶ - 1.8% ¹⁷ 6.9-7.9% among over 65s ^{17,18}
Number of people with AF (prevalence):	800,000 (known cases) ^{19,20}
Number of new cases of AF per year (incidence):	100,000 – 200,000 ¹⁴
Number of undetected AF cases:	700,000 ¹⁴
Detection gap:	18% ¹⁸

Stroke:

Number of new cases of stroke per year:	110,000 ³ (England) - 152,000 ² (UK)
Number of deaths due to stroke per year:	49,366 ² – 56,000 ³
% of total deaths due to stroke:	8.8% ² (2010)

AF-Related Stroke

% of strokes due to AF:	20.6% ⁵
Number of new cases of AF-related stroke per year:	12,500 (England) ²¹
Prevalence of AF-related strokes:	No data available

Future Projections

AF:	No data available
Stroke:	Stroke to increase by 196,000 from 2010 to 2020 ²²
AF-related stroke:	Estimated to treble from 19,012 amongst >80s in 2010 to 60,528 by 2050. ²³

THE COSTS

Total direct healthcare costs of stroke per year:	£2.8 billion ³ - £3 billion ²⁴
Total Indirect costs of stroke per year:	£4.2 billion - £5 billion ²⁴
Total annual cost of AF-related stroke per year:	No data available

THE POLICY LANDSCAPE

National plan for AF-related stroke:	National Stroke Strategy 2007-17 ⁹ (England) Cardiovascular Disease Outcomes Strategy 2013
National stroke plan:	(England) ²⁵

CLINICAL GUIDELINES

National guidelines on AF-related stroke:	NICE Clinical Guideline 180 ²⁶ (England) SIGN 129: Antithrombotics: indications and management ²⁷ (Scotland)
Most relevant to cardiologists:	NICE Clinical Guideline 180 ²⁶ & ESC 2012 ²⁸
Most relevant to primary care:	NICE Clinical Guideline 180 ²⁶ & ESC 2012 ²⁸

HOW MANY AF PATIENTS ARE TREATED ACCORDING TO GUIDELINES?

% AF patients currently treated with OAC therapy:	56% ¹⁵
% high risk AF (CHA ₂ DS ₂ -VASc ≥2) patients currently treated with OAC therapy:	51% ^{29,30}
Treatment gap*:	34% ³¹

*Defined % of high risk AF (CHADS₂ ≥2) patients not receiving OAC therapy, nor recorded as OAC contraindicated or having declined therapy.



2: A VIEW FROM THE GROUND

“There are still major issues in primary and secondary care about ensuring that patients have effective stroke prevention. One fifth of patients [admitted for stroke] are in atrial fibrillation (AF) on admission. Only 36% of patients in AF on admission are taking anticoagulants with 38% taking antiplatelet drugs which are considered ineffective for patients in AF. Over a quarter of patients are recurrent stroke.”

Royal College of Physicians, Clinical Effectiveness and Evaluation Unit on behalf of the Intercollegiate Stroke Working Party. Sentinel Stroke National Audit Programme (SSNAP), September 2013⁵

3: EPIDEMIOLOGY

AF

AF is known to affect approximately 800,000 people in the UK,^{19;20} however other leading commentators have suggested that a true figure may be as high as 1.5 million.¹⁴ Between 100,000 to 200,000 people develop AF each year.¹⁴

The prevalence of AF in England is 1.4%,¹⁶ although an expert consensus statement suggests AF affects at least 1.8% of the UK population.¹⁷

Prevalence by age is also well documented. According to one study the rate of AF is 6.9-7.9% amongst people over 65 and 10% in those aged 80 or over.¹⁸ These findings are consistent with UK expert consensus statements.¹⁷

Undetected AF

A study designed to test the effectiveness of different screening approaches for AF in 50 primary care centres in England detected an additional 149 further adults with AF amongst the over 65s in the intervention arm over the course of a year, in addition to the existing 679 known cases of AF in the study population.¹⁸ This would imply a detection gap of 18%, i.e. that for every 5-6 diagnosed cases of AF, there is one additional undiagnosed case.

Leading commentators from the Atrial Fibrillation Association (AFA) state that as many as a third to one half of AF may be undetected, and that persistent under-diagnosis of AF is exacerbated by the lack of a routine screening for AF.¹⁴

Future projections:

Although no national data is available, a panel of UK experts has predicted that prevalence is expected to double by 2050, citing international studies.³²



3: EPIDEMIOLOGY (CONT'D)

STROKE

Number of people living with stroke (prevalence):	900,000 ³ – 1.2million ²
Numbers of new cases of stroke per year (incidence):	110,000 ³ (England) 152,000 ² (UK)
Deaths due to stroke per year:	49,366 ²

Estimates for the number of strokes per year range from 110,00 in England³ to 152,000 across the UK.² An estimated 1.2 million stroke survivors live in the UK.²

Stroke is fatal in 17% of cases for men and 25% of cases for women.² Stroke is significant cause of death – estimates vary from 8.8% of all deaths in the UK (2010 data)² to 11% in England and Wales (1999 data).³

Future Projections

The number of people living with stroke in England is projected to increase by approximately 196,000 from 2010 to 2020, with the total number rising from 1,058,722 to 1,254,430 people.²²

AF-RELATED STROKE

Data from the English national stroke registry found that AF was present in 20.6% of stroke patients admitted to hospital in January to March 2013⁵.

A 2009 report by NHS Improvement stated that 12,500 strokes each year in England are directly attributable to AF,²¹ however this figure is lower than would be expected given estimates for the incidence of strokes in the UK and proportion of strokes due to AF above.

Future Projections

Based on current rates of AF prevalence and appropriateness of treatment uptake, one study has estimated that by 2050 the number of AF-related ischaemic strokes among those aged 80 and above will treble – rising from 19,012 in 2010 to a predicted 60,528 by 2050.²³

4: ECONOMIC BURDEN

STROKE

Direct healthcare costs of stroke per year:	£2.8 billion ³ - £3 billion ²⁴
Indirect costs of stroke per year*:	£4.2 billion ³ - £5 billion ²⁴

*Defined as costs due to productivity losses, disability and informal care

The National Institute for Health and Clinical Excellence (NICE) acknowledge the figure of £2.8 billion³ in direct costs in England as provided by Mant *et al* 2004.³³ The National Audit Office has provided an alternative estimate for England of £3 billion per year in direct costs and £5 billion per year in indirect costs (such as benefit payments and lost economic productivity).²⁴

Stroke patients occupy around 20% of all acute hospital beds and 25% of long-term beds.³

AF-RELATED STROKE

Average acute care costs of stroke for patients with prior known AF have been stated at £10,413 with costs increasing considerably with event severity.³⁴ Following the acute phase, patients incurred annual health-care costs of £3,370, with these costs also varying significantly by event severity.³⁴ The 10% of patients who survived past the acute stroke phase were newly admitted into long-term care – resulting in annual costs of £6,880 after stroke.³⁴ Alternatively, NHS Improvement states that the cost per stroke due to AF is £11,900 per patient in the first year after a stroke.²¹



5: POLICY LANDSCAPE

National stroke plan

England:
The National Stroke Strategy⁹
Cardiovascular Disease
Outcomes Strategy²⁵

National plan for AF-related stroke

Yes – within The National Stroke Strategy (England)⁹

Government policy and strategy

Health policy in the United Kingdom is devolved across the four nations of England, Scotland, Wales and Northern Ireland. The Department of Health (England) launched a ten year national Stroke Strategy in 2007 which recognised AF as an important risk factor for stroke,⁹ and more recently a broader Cardiovascular Disease Outcomes Strategy²⁵ (2013), which has highlighted the need for improvements in diagnosis and management of AF. The strategy warns that 'despite there being incentives... and often clear evidence based guidelines... people who have atrial fibrillation are not always appropriately anti-coagulated.'²⁵ This assessment is supported by other leading reports that have noted persistent barriers in the treatment of AF and AF-related stroke, disconnect between primary and secondary care, and unacceptable local variation in access to NOACs.^{35,36}

Encouragingly, NICE (a highly influential body responsible for the production and review of national clinical guidelines), has recently issued an updated NICE Guideline 180 - Atrial fibrillation: the management of atrial fibrillation²⁶ (2014), which has further and updated recommendations on both over-treatment and under treatment (see 7. Clinical Guidelines below).

The Quality Outcomes Framework (QOF) Indicators also set national targets and reimbursement incentives in England for the effective treatment of the various conditions in primary care. There are four QOF targets pertaining to AF including one regarding anti-platelet therapy or anti-coagulation therapy,³⁷ although no distinction is made between the two in terms of monitoring.

Given decentralisation of practice in England, a number of CCGs and former PCTs (i.e. local healthcare commissioners) have led initiatives to try to improve the quality of OAC therapy within their participating practices (see for example, **Case study 10**: Primary care leadership driving best practice in Bradford).

The UK Parliament has an All Parliamentary Party Group (APPG) for Atrial Fibrillation. The remit of this group is to scrutinise policy and healthcare delivery for AF patients across the UK, raise the profile of AF in government, and assess new methods that could potentially result in better treatment and diagnosis of the condition.

Advocacy and awareness

According to the Atrial Fibrillation Association (AFA), 1 in 3 adults in the UK is unaware of the high risk of stroke with AF.¹³

Several educational and policy activities are led by patient organisations such as the AFA / The Arrhythmia Alliance, Anti-Coagulation Europe and the Stroke Association (see for example, **Case Study 7**: Know Your Pulse Campaign and **Case study 5**: the Act F.A.S.T. campaign). These organisations have also led the development of a number of professional resources and online tools to help improve practice (see **Case study 8**: The Heart of AF programme and **Case study 11**: The AF Stroke Risk Calculator).

The Association of the British Pharmaceutical Industry (ABPI) collaborated with the AFA and Anti-Coagulation Europe (UK) to form the Stroke in Atrial Fibrillation Initiative (SAFI) in 2012.³⁶ The group has produced a joint report aiming to raise awareness of new treatment options such as NOACs and improve patient access at the local commissioning level, where many reimbursement policies are currently decided.³⁶



6: CLINICAL REGISTRIES

National AF registry

National stroke registry

Scottish Stroke Care Audit

Sentinel Stroke National Audit Programme in England, Wales and Northern Ireland

The Sentinel Stroke National Audit Programme (SSNAP) is a programme of work across England, Wales and Northern Ireland which aims to improve the quality of stroke care by auditing stroke services against evidence based standards.⁵ SSNAP began in December 2012 with the aim of collecting a minimum dataset for every stroke patient, including acute care, rehabilitation, 6-month follow-up, and outcome measures in England, Wales and Northern Ireland.

The Scottish Stroke Care Audit is a national electronic database managed by National Services Scotland. Stroke data are monitored locally and nationally for performance purposes, and reportedly play a strong role in Scottish health policy and research.¹⁰

There is no similar initiative for AF or AF related stroke, however in England a national improvement agency NHS Improving Quality has worked in the past to encourage better stroke risk-stratification and improved management of diagnosed AF patients through promoting the use of the GRASP-AF audit software in primary care. The GRASP-AF tool systematically scans participating GP practices' AF registers and calculates individual CHADS₂ and CHA₂DS₂-VASc scores for each AF patient, which facilitates decision-making regarding anticoagulation therapy. There are some 2,108 GP practices that upload GRASP-AF data onto a national registry, and although the actual GP use of GRASP-AF is thought to be higher, there is still huge potential for further roll-out of the tool on a national level. Considering that there are over 8,000 GP clinics nationwide, further roll-out could contribute substantially to increased stroke prevention among AF patients.³⁸

7: CLINICAL GUIDELINES

The guidelines most commonly followed for stroke prevention in AF patients are described below.

Guidelines followed by GPs:	NICE Clinical Guideline 180 ²⁶ ESC 2012 ²⁸
Guidelines followed by cardiologists:	NICE Clinical Guideline 180 ²⁶ ESC 2012 ²⁸
National guidelines:	NICE Clinical Guideline 180 ²⁶ (2014 - England) SIGN 129: Anti-thrombotics: indications and management ²⁷ (2013 - Scotland)

In England the National Institute for Clinical Excellence has recently issued an updated *NICE Guideline 180 - Atrial fibrillation: the management of atrial fibrillation (2014)*.²⁶ Major changes include new recommendations to tackle under-treatment and over-treatment in anti-coagulation, such as the clarification that aspirin monotherapy is unacceptable where used solely for stroke prevention in AF, and that anti-coagulation is unacceptable for those with a low CHA₂DS₂-VASc score (i.e. 0 for men, or 1 for women.) The new guidelines also require that all patients requiring anti-coagulation should be supported to take part in an informed discussion around the benefits and risks of NOACs versus Vitamin K Antagonists (VKAs - e.g. warfarin), and that final choice should be based on their patient's preferences as well as clinical features.²⁶



8: ADHERENCE TO GUIDELINES

Published data on the use of stroke prevention therapy in AF in the United Kingdom

Source	Study design	Year	N with AF	Setting	Age	% on OAC	% on antiplatelet	% with no antithrombotic therapy
Royal College of Physicians 2013 ⁵	Audit of SSNAP National Stroke Register - 11,939 stroke patients	Jan – March 2013	20.6%	Secondary care – treatment provided to AF patients upon admittance to hospital for stroke	All	36.4%	44.8%	25.6%
Cowan <i>et al</i> (2013) ¹⁵	Analysis of national registry (CHART Online) of GP practices that utilise the GRASP-AF tool	2009-2012	231,833 with a history of AF	Approximately 2100 GP practices across the UK	All	49.3% (of which 6.9% on both OAC and AP therapy)	42.5%	n/a
Mohammed <i>et al.</i> 2013 ³⁰	Electronic record database (THIN)	2010-2011	50,361, (of which 39,491 high risk)	420 GP practices across the UK	All	51% (of high risk)*	37% (of high risk)*	12% (of high risk)*
Holt <i>et al</i> 2012 ²⁹	Longitudinal series of cross-sectional survey in 583 UK practices linked to the Research database	2010	99,351	over 600 UK practices	All	51% (of high risk)*	42% (of high risk)*	13.4% (of high risk)*

* as defined by a CHA₂DS₂-VASc score ≥ 2

OAC: oral anticoagulation therapy

Recently published data on the use of OAC therapy is presented in the table above. Data suggest both under-treatment of AF patients at high risk of stroke (approximately half do not receive OAC therapy)^{15,29,30} and overtreatment of low risk patients (approximately one quarter to a third receive OAC therapy).^{30,38}

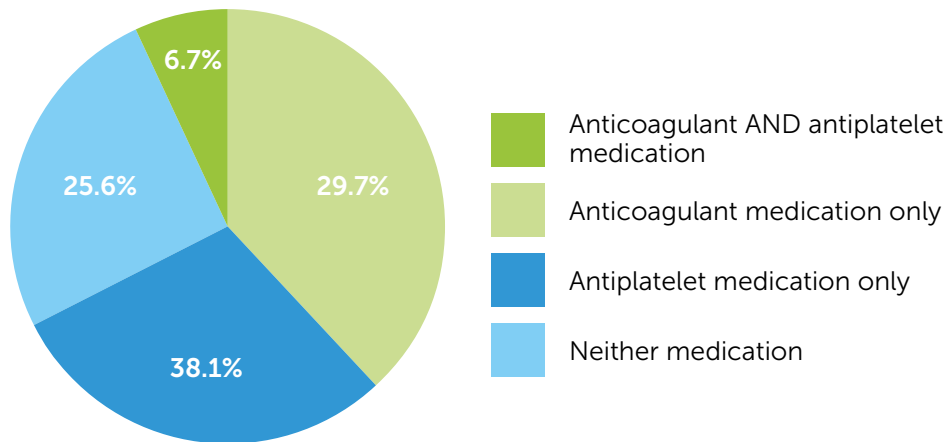
According to the National Audit Office, an English government agency, the appropriate treatment of AF could prevent 4,500 strokes a year and 3,000 deaths a year in the UK.²⁴

A major study based on the SSNAP (Sentinel Stroke National Audit Programme) Stroke Registry has suggested that 64% of patients with AF are still not receiving OAC therapy after admission for stroke, and 25% of these receive no anti-thrombotic treatment at all.⁵



8: ADHERENCE TO GUIDELINES (CONT'D)

Percentage of AF patients on stroke preventative medication by type on admission to hospital with a stroke³



Two other recent studies looked at data entered into the national CHART online database, compiled from GP practices who use the GRASP AF tool to detect AF. Cowan *et al.* found that approximately 55% of high risk AF patients ($CHA_2DS_2 \geq 2$) were receiving OAC therapy, but that a further 34% of patients who did not have any contraindication did not receive OAC therapy.¹⁵ Mohammed *et al.* found similar results, namely that, among patients with high risk of stroke ($CHA_2DS_2-VASc \geq 2$), 51% were on OAC therapy (VKAs).³⁰ However, the study also found that 27% of AF patients with a CHA_2DS_2-VASc score of 0 were receiving OAC therapy. Both studies therefore suggest under-treatment of high-risk patients and over treatment of low risk patients, which contradict recommendations from both national (e.g. NICE)²⁶ and current ESC guidelines.²⁸

Promisingly however, both Cowan *et al.* and Holt *et al.* found that risk stratification is used to determine OAC therapy more often than a decade ago, possibly as a result of national guidance.^{15,29} However, Cowan *et al.* and Mohammed *et al.* found lower prescription rates of OAC and overreliance on antiplatelet therapy in older patients, suggesting other barriers to treatment such as current attitudes to risk amongst physicians.^{29,30}

9: KEY LINKS

- Atrial Fibrillation Association: <http://www.atrialfibrillation.org.uk/>
- Anticoagulation Europe: <http://www.anticoagulationeurope.org/>
- Stroke Association: <http://www.stroke.org.uk/>
- British Heart Foundation: <http://www.bhf.org.uk/>
- All Party Parliamentary Group on Atrial Fibrillation: <http://www.atrialfibrillation.org.uk/parliamentary-focus/westminster.html>



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