



fighting heart disease  
and stroke

european heart network

## **Atrial Fibrillation and Cardiovascular Diseases – a European Heart Network paper**

*September 2015*

### **Introduction**

*The aim* of this paper is to provide information on atrial fibrillation (AF) and to discuss diagnosis and treatment measures for this condition.

Cardiovascular disease (CVD) – the main forms of which are coronary heart disease (CHD) and stroke – is the main cause of death in the EU, accounting for over 1.9 million deaths each year. CVD is also a major cause of disability and a significant economic burden across the EU, estimated to cost the EU economy almost 196 billion euros every year.<sup>1</sup>

Leading risk factors for CVD are tobacco use, high blood pressure, high cholesterol, overweight and obesity, physical inactivity, diabetes, unhealthy diets and harmful use of alcohol.

Some of these risk factors, e.g., high blood pressure, obesity and excessive alcohol consumption, are also risk factors for AF.<sup>2</sup>

### ***About the European Heart Network***

The European Heart Network (EHN) is a Brussels-based alliance of heart foundations and other like-minded non-governmental organisations throughout Europe. EHN has members in 25 countries in Europe. EHN plays a leading role in the prevention and reduction of cardiovascular diseases, in particular heart disease and stroke, through advocacy, networking, capacity-building and patient support, so that they are no longer a major cause of premature death and disability throughout Europe.

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<sup>1</sup> Nichols M, Townsend N, Luengo-Fernandez R, Leal J, Gray A, Scarborough P, Rayner M (2012). European Cardiovascular Disease Statistics 2012. European Heart Network, Brussels, European Society of Cardiology, Sophia Antipolis; <http://www.ehnheart.org/cvd-statistics.html>.

<sup>2</sup> Mayo Clinic, Atrial fibrillation – risk factors <http://www.mayoclinic.org/diseases-conditions/atrial-fibrillation/basics/risk-factors/con-20027014>

## Summary

Atrial fibrillation (AF) is an irregular heartbeat (arrhythmia) that can form blood clots in the chambers of the heart and lead to stroke, heart failure and other cardiovascular complications.

AF confers a 5-fold risk of stroke, and one in five of all strokes is attributed to this arrhythmia. Strokes in association with AF are often fatal and 30% of people who experience AF-related strokes will never leave hospital; another 20% will die within a year.

AF represents a sizeable burden of health. Latest figures estimate that approximately 10 million people live with this condition in the EU. With an ageing population and a higher prevalence of AF in the elderly, the number of AF patients is likely to increase in the future putting further pressure on healthcare systems.

Efficient diagnosis methods exist. Detecting an irregular pulse can indicate a heart rhythm problem. If arrhythmia is suspected, an electrocardiogram (ECG) is necessary to diagnose AF. In high-risk populations (elderly, cardiac patients, and family history), pulse palpation and ECG tests should take place regularly to monitor the risk of occurrence of AF.

Once diagnosed with AF, a patient may be offered different medication options: anticoagulant drugs (blood-thinner pills), and/or antiarrhythmic drugs (heart rhythm control).

In most cases, AF cannot be cured. However, today's treatment methods can help patients live a normal life with some dietary adjustments as well as regular physical activity.

EHN recommends:

- the opportunistic screening of patients older than 65 years of age, with pulse-taking and ECG-monitoring, if suspected AF
- to implement the current guidelines on medication and management
- more studies to ascertain the benefits of promising new treatment procedures
- effective communication between healthcare professionals and the patient.

## What is atrial fibrillation?

Atrial fibrillation (AF) is an irregular heartbeat (arrhythmia) that can form blood clots and lead to stroke, heart failure and other cardiovascular complications. It occurs when there is a fault in the electrical activity in the heart muscle, causing the heart to beat irregularly and in an uncoordinated way.<sup>3</sup> It is the most common sustained cardiac arrhythmia, occurring in up to 2% of the general population.<sup>4</sup>

The pumping action of the heart is provided by a network of electrical connections, which deliver electrical signals to the heart muscle. Inside the right atrium (upper chamber of the heart) is the normal impulse-generating tissue of the body, its natural 'pacemaker', called the sinus node. As part of the electrical conduction system of the heart, it generates regular

<sup>3</sup> European Society of Cardiology, European Heart Rhythm Association, Afibmatters website, <http://www.afibmatters.org/About-atrial-fibrillation>, visited 23/04/15.

<sup>4</sup> Guidelines for the management of Atrial Fibrillation, European Society of Cardiology, European Heart Journal, 2010, (2010) 31, 2369–2429, <http://dx.doi.org/10.1093/eurheartj/ehq278>

electrical impulses so that the heart contracts regularly. The sinus node controls the rate at which the heart beats and can change the heart rate depending on the requirements of the body.<sup>5</sup>

In persons with AF the 'normal' regular electrical signal from the sinus node is no longer working properly. Instead of just the sinus node firing, other parts of the atria begin to send electrical signals. However, these signals are not as regular or as co-ordinated as the signals from the sinus node and this leads to the atria (upper chambers of the heart) not contracting properly and the ventricles (bottom chambers) beating irregularly. Depending on how many electric impulses reach the ventricles, the heart beat could be slow or fast, but it tends to be very fast in AF. For example, in a person without AF, the normal sinus node generates approximately 60 to 90 beats per minute when at rest. In a resting person with AF the atria generate about 600 impulses per minute, resulting in 80 to 120 beats per minute.<sup>6</sup>

There are three types of AF: paroxysmal, persistent and permanent. Paroxysmal AF consists in sporadic episodes of arrhythmia that can last hours or days. They come and go and do not last normally longer than a week.<sup>7</sup> Patients have persistent AF when these episodes last longer than a week and do not go away on their own. Finally, the last type of AF, permanent AF, is when irregular heartbeat does not return to normal rhythm and medical treatment cannot return the heart to normal rhythm.<sup>8</sup>

## Cardiovascular diseases

Over the past 30 years death rates from cardiovascular diseases (CVD), in particular coronary heart disease (CHD) and stroke, have fallen by more than 50% in several European countries.<sup>9</sup> Between 50-75% of the fall has been explained by risk factor improvements.<sup>10</sup> The greatest benefits appear to have come from reductions in mean cholesterol concentrations, smoking prevalence and blood pressure levels.<sup>11</sup> The remaining 25-50% of the fall is attributed to improvements in medical and surgical treatments.

Nevertheless, CVD remain the main cause of death in the EU accounting for over 1.9 million deaths each year. CHD is the single most common cause of death in the EU accounting for over 680 000 deaths every year; 15% of deaths among men, and 13% of deaths among women. Stroke is the second most common single cause of death in the EU, accounting for over 460 000 deaths in the EU each year. Around one in every eleven men (9%) and approximately one in ten women (11%) die from the disease.

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<sup>5</sup> European Society of Cardiology, European Heart Rhythm Association, Afibmatters website, <http://www.afibmatters.org/About-atrial-fibrillation>, visited 28/04/15.

<sup>6</sup> Ibidem

<sup>7</sup> However, the more often they occur, shorter the interim period is (German Heart Foundation, Am häufigsten: Vorhofflimmern - Das vollständig arrhythmische Herz, Prof. Dr. Med. Michael Oeff)

<sup>8</sup> Irish Heart Foundation, AF and You, A booklet for patients living with atrial fibrillation, IE.DRO.10.08.06 September 2010

<sup>9</sup> Nichols M, Townsend, N, Scarborough P, Luengo-Fernandez R, Real J, Gray A, Rayner M (2012) ; *European Cardiovascular Disease Statistics 2012*. European Heart Network, Brussels, European Society of Cardiology, Sophia Antipolis - <http://www.ehnheart.org/cvd-statistics.html>

<sup>10</sup> EuroHeart II; Work Package 6: CHD mortality projections to 2020, comparing different policy scenarios - <http://www.ehnheart.org/projects/euroheart-ii/euroheart-ii-publications/publication/787-chd-mortality-projections-to-2020-comparing-different-policy-scenarios.html>

<http://www.euro.who.int/en/health-topics/noncommunicable-diseases/cardiovascular-diseases/data-and-statistics>

<sup>11</sup> <http://www.euro.who.int/en/health-topics/noncommunicable-diseases/cardiovascular-diseases/data-and-statistics>

These diseases are also a major cause of disability. Hospital discharge rates for all CVD rates combined are 2 400 per 100 000 population. CHD accounts for 80% of these, or 600 per 100 000; while hospital discharge rates from stroke in the EU are 390 per 100 000 population, which is around 16% of all discharges from CVD.<sup>12</sup>

Inequalities in mortality from CVD account for almost half of the excess mortality in lower socio-economic groups in most European countries.<sup>13</sup>

Therefore, any reduction in CVD will result in major health gains and reductions in health inequalities.

## **Atrial fibrillation and cardiovascular diseases**

AF increases the risk of developing a blood clot inside the chambers of the heart. It disturbs the normal flow of blood through the heart, causing turbulence. The turbulence causes the blood to form small clots. If a clot forms in the heart, it can travel through the bloodstream and cause a stroke.<sup>14</sup> Blood clots can also damage heart muscle, if blood supply is stopped.

AF is a major cause of stroke. It confers a 5-fold risk of stroke, and one in five of all strokes is attributed to AF. Strokes in association with AF are often fatal, and patients who survive are left more disabled by their stroke and more likely to suffer a recurrence than patients with strokes from other causes. The risk of death from AF-related stroke is doubled and the cost of care is increased 1.5-fold.<sup>15</sup> 30% of people who experience atrial fibrillation-related strokes will never leave hospital, and another 20% will die within a year.<sup>16</sup>

The other main cause of stroke is high blood pressure, with readings higher than 120/80 millimetres of mercury (mm Hg).<sup>17</sup> Three out of four people who have a stroke for the first time have high blood pressure.

AF can also damage the heart over time. An uncontrolled heart rate for weeks or months reduces the heart's ability to pump as well as it needs to. This can lead to long-term complications, such as heart failure and other heart conditions.<sup>18</sup>

## ***Prevalence and impact***

Latest figures estimate the prevalence of AF at almost 2% of the general population, meaning that in the EU, approximately 10 million people live with this condition. Prevalence varies

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<sup>12</sup> Nichols M, Townsend, N, Scarborough P, Luengo-Fernandez R, Real J, Gray A, Rayner M (2012) ; *European Cardiovascular Disease Statistics 2012*. European Heart Network, Brussels, European Society of Cardiology, Sophia Antipolis - <http://www.ehnheart.org/cvd-statistics.html>

<sup>13</sup> Prof. Dr Johan P. Mackenbach, 'Health Inequalities: Europe in Profile' 2006  
[http://ec.europa.eu/health/ph\\_determinants/socio\\_economics/documents/ev\\_060302\\_rd06\\_en.pdf](http://ec.europa.eu/health/ph_determinants/socio_economics/documents/ev_060302_rd06_en.pdf)

<sup>14</sup> British Heart Foundation, Atrial Fibrillation, Booklet, HIS24, 2012, \_  
[https://www.bhf.org.uk/~media/files/publications/large-print/his24lp\\_atrial-fibrillation\\_0312.pdf](https://www.bhf.org.uk/~media/files/publications/large-print/his24lp_atrial-fibrillation_0312.pdf)

<sup>15</sup> Guidelines for the management of Atrial Fibrillation, European Society of Cardiology, European Heart Journal, 2010, (2010) 31, 2369–2429, <http://dx.doi.org/10.1093/eurheartj/ehq278>

<sup>16</sup> European Brain Council, Report of stakeholders event, June 2014,  
<http://www.europeanbraincouncil.org/pdfs/EBC%20Satellite%20Event%20AF%20Stroke%20Prevention.pdf>

<sup>17</sup> Mayo Clinic, Causes of Strokes, <http://www.mayoclinic.org/diseases-conditions/stroke/symptoms-causes/dxc-20117265>

<sup>18</sup> Irish Heart Foundation, AF and You, A booklet for patients living with atrial fibrillation, IE.DRO.10.08.06  
September 2010

with age and sex. AF is present in 0.12%–0.16% of those younger than 49 years, in 3.7%–4.2% of those aged 60–70 years, and in 10%–17% of those aged 80 years or older. It occurs more frequently in males, with a male to female ratio of 1.2:1.<sup>19</sup>

Observational studies performed in the general population or in patients hospitalised for AF show that permanent AF is the most frequent form; it occurs in 40%–50% of diagnosed patients, followed by the paroxysmal and persistent forms that each occur in 20%–30% of cases.<sup>20</sup>

With an ageing population and given the fact that a higher prevalence of AF is found in the elderly, the number of people affected by the condition is likely to increase in Europe in the future.

### ***Burden and Costs***

It is estimated that hospitalisations due to AF account for one-third of all admissions for cardiac arrhythmias.<sup>21</sup> A survey in Italy showed that 1.5% of all emergency visits were due to AF<sup>22</sup>; a German study illustrated that the average number of hospitalisations per year of patients diagnosed with AF was 0.24 and the average number of outpatient consultations was 5.62.<sup>23</sup>

AF represents a sizeable healthcare burden. A survey undertaken in five European countries (Greece, Italy, Spain, Poland and The Netherlands) showed that the total cost per country per year is around 1 billion Euros.<sup>24</sup> This figure comprises costs for diagnosis, drugs, interventions, inpatient care, consultations and work loss. Intervention and inpatient care represent the highest proportion, accounting for more than 70% of total costs.<sup>25</sup>

### **Diagnosis and treatment**

Irregular pulse can indicate a heart rhythm problem. If arrhythmia is suspected, an electrocardiogram (ECG) is necessary in order to diagnose AF.<sup>26</sup> In high-risk populations (advanced age, cardiac patients, and family history), pulse palpation and ECG tests should take place regularly to monitor the risk of occurrence of AF. As recommended by the ESC

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<sup>19</sup> Zoni-Berisso et al, Epidemiology of Atrial Fibrillation: European Perspective, 2014, Dovepress, Clinical Epidemiology 2014 :6, 213-220, <http://dx.doi.org/10.2147/CLEP.S47385>

<sup>20</sup> Zoni-Berisso et al, Epidemiology of Atrial Fibrillation: European Perspective, 2014, Dovepress, Clinical Epidemiology 2014 :6, 213-220, <http://dx.doi.org/10.2147/CLEP.S47385>

<sup>21</sup> Task force of the management of atrial fibrillation of the European Society of Cardiology (ESC), Guidelines for the management of atrial fibrillation, 2010, European Heart Journal (2010) 31, 2369–2429 <http://dx.doi.org/10.1093/eurheartj/ehq278>.

<sup>22</sup> Santini M, De Ferrari GM, Pandozi C, et al. FIRE Investigators Atrial fibrillation requiring urgent medical care. Approach and outcome in the various departments of admission. Data from the atrial Fibrillation/Flutter Italian Registry (FIRE) Ital Heart J. 2004;5:205–213.

<sup>23</sup> Wilke et al, Incidence and prevalence of atrial fibrillation: an analysis based on 8.3 million patients, 2012, Europace, Europace (2013) 15, 486–493, <http://dx.doi.org/10.1093/europace/eus333>

<sup>24</sup> Ringborg et al, Costs of atrial fibrillation in five European countries: results from the Euro Heart Survey on atrial fibrillation, Europace (2008) 10, 403–411, <http://dx.doi.org/10.1093/europace/eun048>

<sup>25</sup> Ibidem

<sup>26</sup> Task force of the management of atrial fibrillation of the European Society of Cardiology (ESC), Guidelines for the management of atrial fibrillation, 2010, European Heart Journal (2010) 31, 2369–2429 <http://dx.doi.org/10.1093/eurheartj/ehq278>.

guidelines, opportunistic screening in patients over 65 years of age using pulse-taking followed by an ECG allow timely detection of atrial fibrillation (Class I recommendation).<sup>27</sup>

However, early recognition of AF is not that obvious. Due to its often ‘silent’ nature, about one-third of patients with this arrhythmia are not aware of so-called ‘asymptomatic atrial fibrillation’. Screening and monitoring allow timely introduction of therapies to protect the patient, not only from the consequences of the arrhythmia, but also from progression of AF from an easily treated condition to an unmanageable problem.<sup>28</sup>

Once diagnosed with AF, a patient may be offered different medication options: anticoagulant drugs (blood-thinner pills), and/or antiarrhythmic drugs (heart rhythm control).

Anticoagulants reduce the chance of blood clotting, thereby reducing the chance of a stroke occurring. There are two types of anticoagulant medicines: vitamin K antagonist (like warfarin) or the more recent novel oral anticoagulants (NOACs). Both are Class I recommendations for AF patients with high risk of stroke in the ESC guidelines.<sup>29</sup>

Antiarrhythmic drugs help to restore the heart's 'normal' rhythm (sinus rhythm) and to prevent the return of AF.<sup>30</sup> ESC guidelines recommend<sup>31</sup> Dronedarone<sup>32</sup> in the treatment of paroxysmal and persistent AF and control resistant symptoms (Class I recommendation).

Non-surgical interventions can also be considered. This includes cardioversion (an electrical shock is given on the outside of the chest to “reset” the heart to a normal rhythm), or catheter ablation (a catheter destroys the malfunctioning tissues so abnormal signals are no longer sent). Catheter ablation is only used when long-term medication or cardioversion is no longer effective. However, there is currently no consensus on the long-term benefits of this technique.<sup>33</sup>

In most cases, AF cannot be cured. However, today’s treatments methods help patients live a normal life with some dietary adjustments as well as regular physical activity.

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<sup>27</sup> 2012 focused update of the ESC Guidelines for the management of atrial fibrillation, 2012, European Society of Cardiology, *Europace*(2012) 14, 1385–1413, <http://dx.doi.org/10.1093/europace/eus305>

<sup>28</sup> Task force of the management of atrial fibrillation of the European Society of Cardiology (ESC), Guidelines for the management of atrial fibrillation, 2010, *European Heart Journal* (2010) 31, 2369–2429 <http://dx.doi.org/10.1093/eurheartj/ehq278>

<sup>29</sup> 2012 focused update of the ESC Guidelines for the management of atrial fibrillation, 2012, European Society of Cardiology, *Europace*(2012) 14, 1385–1413, <http://dx.doi.org/10.1093/europace/eus305>

<sup>30</sup> European Society of Cardiology, European Heart Rhythm Association, Afibmatters website, <http://www.afibmatters.org/About-atrial-fibrillation>, visited 30/04/15.

<sup>31</sup> 2012 focused update of the ESC Guidelines for the management of atrial fibrillation, 2012, European Society of Cardiology, *Europace*(2012) 14, 1385–1413, <http://dx.doi.org/10.1093/europace/eus305>

<sup>32</sup> Other antiarrhythmic drugs are used in patients with AF to maintain sinus rhythm, depending on underlying heart disease and comorbidities: Amiodarone, Dofetilide, Flecainide, Propafenone, Sotalol (January CT, Wann LS, Alpert JS, Calkins H, Cigarroa JE, Cleveland JC Jr, Conti JB, Ellinor PT, Ezekowitz MD, Field ME, Murray KT, Sacco RL, Stevenson WG, Tchou PJ, Tracy CM, Yancy CW. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol* 2014;64:2246–80).

<sup>33</sup> Task force of the management of atrial fibrillation of the European Society of Cardiology (ESC), Guidelines for the management of atrial fibrillation, 2010, *European Heart Journal* (2010) 31, 2369–2429 <http://dx.doi.org/10.1093/eurheartj/ehq278>

## Conclusions and recommendations

As this paper demonstrates, atrial fibrillation is a condition to be taken seriously. It is associated with a high risk of hospitalisation, cardiovascular complications, increased risk of stroke, worsening clinical course of strokes, and death.<sup>34</sup> It warrants attention. Some diagnosis methods can help to identify and treat patients in due time. Opportunistic screening, for example as part of a cardiovascular risk assessment<sup>35</sup>, is a recommended technique<sup>36</sup> to detect AF, both in the general and high-risk population.

EHN recommends:

- the opportunistic screening of patients older than 65 years of age, with pulse-taking and ECG-monitoring, if suspected AF
- to implement the current guidelines on medication and management
- more studies to ascertain the benefits of promising new treatment procedures
- effective communication between healthcare professionals and the patient.

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<sup>34</sup> Helms et al, Prediction and personalised treatment of atrial fibrillation—stroke prevention: consolidated position paper of CVD professionals, 2014, The EPMA Journal 2014, 5:15, <http://www.epmajournal.com/content/5/1/15>

<sup>35</sup> European Heart Network, Cardiovascular Risk Assessment Programmes, Position Paper, December 2014, <http://www.ehnheart.org/component/downloads/downloads/1917.html>

<sup>36</sup> 2012 focused update of the ESC Guidelines for the management of atrial fibrillation, 2012, European Society of Cardiology, Europace(2012) 14, 1385–1413, <http://dx.doi.org/10.1093/europace/eus305>