

## ORIGINAL ARTICLE

# Educational needs among physicians treating patients with atrial fibrillation: lessons for Poland from the European Society of Cardiology international educational needs assessment study

Michał M. Farkowski<sup>1</sup>, Michał A. Karliński<sup>2</sup>, Maciej Sterliński<sup>3</sup>,  
Tomasz Tomasik<sup>4</sup>, Matthias Antz<sup>5</sup>, Alec Vahanian<sup>6</sup>, Karl-Heinz Kuck<sup>7</sup>,  
Gerhard Hindricks<sup>8</sup>, Nikolaos Dages<sup>8</sup>, Hein Heidbuchel<sup>9</sup>

1 2nd Department of Coronary Artery Disease, Institute of Cardiology, Warsaw, Poland

2 2nd Department of Neurology, Institute of Psychiatry and Neurology, Warsaw, Poland

3 Department of Arrhythmia, Institute of Cardiology, Warsaw, Poland

4 Department of Family Medicine, Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, Kraków, Poland

5 Braunschweig Hospital, Braunschweig, Germany

6 Bichat-Claude-Bernard Hospital, Paris, France

7 Asklepios St. Georg Hospital, Hamburg, Germany

8 Heart Center Leipzig, Leipzig Heart Institute, Leipzig, Germany

9 Department of Cardiology, Antwerp University Hospital, Edegem, Belgium

## KEY WORDS

atrial fibrillation,  
education, guidelines,  
physicians' knowledge,  
stroke

## ABSTRACT

**INTRODUCTION** A study by the European Society of Cardiology assessing international educational needs has identified educational and organizational barriers preventing the implementation of optimal therapy of atrial fibrillation (AF) across European countries.

**OBJECTIVES** Our aim was to investigate educational and organizational barriers in the implementation of guideline-recommended AF care that are specific to physicians and health-care system in Poland.

**PATIENTS AND METHODS** An internet-based survey was conducted to assess education, skills, and confidence in managing patients with AF among European cardiologists, neurologists, and family physicians (FPs) from 6 countries.

**RESULTS** Out of 571 respondents, the Polish sample included 90 physicians (16%): 44 cardiologists (15%), 21 neurologists (16%), and 25 FPs (18%). Polish physicians generally reported skills and confidence similar to those presented by their foreign colleagues, but there was high uncertainty concerning skills and confidence in the identification and pathophysiological classification of AF. Also, FPs reported low confidence in applying CHA<sub>2</sub>DS<sub>2</sub>-VASc and HAS-BLED scores to clinical practice. The need for access to long-term heart rhythm monitoring including implantable loop recorders was highlighted. There was a general dissatisfaction with the cooperation among Polish physicians, which was significantly higher than in other countries.

**CONCLUSIONS** The number of substantial educational gaps among physicians from Poland and other European countries is low. Nonetheless, educational programs tailored for different specialist groups separately to improve competence are warranted. There is a clear need for improvement of communication among different specialists treating patients with AF in Poland.

## Correspondence to:

Michał M. Farkowski, MD, PhD,  
2nd Department of Coronary Artery  
Disease, Institute of Cardiology,  
ul. Alpejska 42, 04-628 Warszawa,  
Poland, phone: +48 22 343 40 02,  
email: mfarkowski@gmail.com  
Received: July 14, 2019.

Revision accepted: August 5, 2019.

Published online: August 5, 2019.

Pol Arch Intern Med. 2019;

129 (9): 586-591

doi:10.20452/pamw.14924

Copyright by Medycyna Praktyczna,

Kraków 2019

**INTRODUCTION** Current European and Polish guidelines and position papers describe the optimal management of patients with atrial fibrillation (AF) in detail, both in terms of diagnosis and subsequent treatment.<sup>1-3</sup> Applying guideline-based treatment in patients with AF has a favorable effect on their outcomes although physicians' and patients' views on anticoagulation and risk of stroke may vary.<sup>4,5</sup> Therefore, numerous means of implementation (including congresses, webinars, and mobile applications) are employed to reach all relevant groups of health-care professionals. To further tailor the educational efforts in the field of AF, the European Society of Cardiology (ESC) and the European Heart Rhythm Association (EHRA) developed and conducted an international needs assessment study.<sup>6</sup> This was an internet-based study aimed at specialists in cardiology, neurology, and general practice / family medicine who were involved in providing care for patients with AF. The study was conducted in 6 European countries (France, Germany, Italy, Poland, Spain, and the United Kingdom). It included questions regarding the diagnosis of AF, heart rate and rhythm control, anticoagulation, and the organization of health-care systems. All countries surveyed revealed major educational gaps that need to be addressed by targeted educational initiatives in the future.<sup>6</sup>

The primary analysis of the study data indicated that Polish cardiologists, as compared with cardiologists from other countries, reported a greater need for improvement in the use of the pathophysiological classification of AF and limited access to implantable loop recorders (ILRs).<sup>6</sup> Polish family physicians (FPs) were least inclined to use a rate control strategy. Cardiologists and FPs were dissatisfied especially with the level of collaboration between themselves. Since this was a general analysis of data obtained in all countries involved in the study, a more detailed focus on Polish physicians was lacking.

Our aim was to perform an analysis of the data collected by the ESC to identify educational needs and organizational barriers preventing the implementation of guideline-recommended AF diagnosis and treatment specifically among Polish cardiologists, neurologists, and FPs. Particular emphasis was placed on identifying potential gaps in self-perceived levels of expertise among physicians from Poland and other European countries.

**PATIENTS AND METHODS** A detailed methodology of the survey was described elsewhere.<sup>4</sup> The study complied with the Declaration of Helsinki, and the protocol was approved by an independent international ethical review board (IRB Services, Aurora, Canada).

Using a mixed-methods approach involving different methodological designs (qualitative and quantitative), data collection methods (literature review, interviews, and surveys), and data sources (cardiologists, FPs, and neurologists), the AXDEV Group Inc. (Brossard, Quebec, Canada) conducted

the study, and the ESC and EHRA were responsible for clinical cases, interpretation of the generated data, and development of the manuscript for publication.<sup>6</sup> Our group analyzed and interpreted the data provided by the Polish participants and compared them with the data collected in other countries.

The study targeted active cardiologists, neurologists, and FPs who had dedicated 50% or more of their time to regular clinical work for more than 5 years. To be included in the analysis, their AF caseload was expected to comprise at least 5% of all their patients. Potential participants were invited by email using membership lists from the ESC (cardiologists) or via contacts obtained from an international health-care provider database (neurologists, FPs).

After literature search and specialist consultation, areas of investigation regarding the care pathway of patients with AF were identified. During the first phase of the study, the survey was tested with 30 semistructured telephone interviews. In the second, quantitative phase of the study, participants were asked to complete a survey that lasted from 15 to 20 min and comprised 11 questions and 2 cases exploring their knowledge, skills, and confidence in the diagnosis and treatment of patients with AF. The complete description of the questions and clinical cases was discussed elsewhere.<sup>6</sup> Physicians were asked to respond to questions by indicating: a) their level of knowledge regarding aspects of clinical practice (not acceptable, could be improved, acceptable); b) their level of skills required to apply that knowledge to practice (needs significant improvement, needs minor improvement, optimal), for example, the ability to calculate the CHA<sub>2</sub>DS<sub>2</sub>-VASc score when they indicated that their knowledge was sufficient enough to use the score in decision making concerning treatment; and c) their current level of confidence (1 = low; 5 = optimal) in applying their knowledge and skills to clinical practice.

Self-reported data on knowledge, skills, and confidence were dichotomized: 1) knowledge: "not acceptable" and "could be improved" were grouped as "needs improvement;" 2) skills: "needs significant improvement" and "needs minor improvement," as "needs improvement;" and 3) confidence: 1-3 on the 5-point scale, as "low to moderate confidence." This classification was adopted arbitrarily by the AXDEV Group Inc. to simplify analyses and the authors of the Polish substudy followed this division due to inability to access the raw data of the study.

The areas in which more than 70% of physicians reported the need for skill improvement or low to moderate confidence were considered relevant and requiring the most targeted educational effort.

**Statistical analysis** Using the data provided by the ESC, we calculated the proportions of physicians reporting low to moderate confidence or need for skill improvement in Poland and in other

**TABLE 1** Proportions of clinicians from Poland and other European countries reporting the need for skill improvement with regard to diagnostic workup and treatment of atrial fibrillation

Areas of investigation	Cardiologists			Neurologists			Family physicians		
	Poland (n = 44)	Control group (n = 250)	P value	Poland (n = 21)	Control group (n = 111)	P value	Poland (n = 25)	Control group (n = 111)	P value
Classifying AF	89 <sup>a</sup>	58	<0.001	95 <sup>a</sup>	88 <sup>a</sup>	0.70	76 <sup>a</sup>	79 <sup>a</sup>	0.72
Identifying the underlying pathophysiology of AF	61	46	0.07	86 <sup>a</sup>	76 <sup>a</sup>	0.40	56	68	0.27
Using ILR	68	55	0.11	90 <sup>a</sup>	87 <sup>a</sup>	1.00	76 <sup>a</sup>	89 <sup>a</sup>	0.08
Knowledge of new therapies and trials	66	55	0.17	76 <sup>a</sup>	87 <sup>a</sup>	0.19	68	79 <sup>a</sup>	0.22
Handling renal problems associated with NOACs	32	38	0.46	52	59	0.60	40	57	0.13
Handling gastric problems associated with NOACs	43	48	0.59	71 <sup>a</sup>	60	0.34	24	50	0.02
Using CHA <sub>2</sub> DS <sub>2</sub> -VASc score	11	16	0.47	43	54	0.35	68	64	0.70
Using HAS-BLED score	20	34	0.08	43	64	0.07	72 <sup>a</sup>	74 <sup>a</sup>	0.85
Educating patients	32	32	0.94	67	59	0.49	56	51	0.67
Helping to overcome side effects of NOACs	50	51	0.88	52	46	0.59	24	37	0.22

Data are presented as percentage of clinicians.

**a** Areas in which educational needs are particularly high (>70% of responses indicating the need for improvement)

Abbreviations: AF, atrial fibrillation; ILR, implantable loop recorder; NOACs, non-vitamin K antagonist oral anticoagulants

countries (interpreted as a whole). Data from Polish and non-Polish physicians were calculated using the  $\chi^2$  test or 2-tailed Fisher exact test if the expected value in any cell of a 2 × 2 contingency table was 5 or higher.

P value less than 0.05 was considered significant. Calculations were carried out using the STATISTICA software package, version 13.0 (Dell, Texas, United States).

**RESULTS General results** There were 8014 physicians invited to participate in the study and 561 (7%) of them accepted the invitation. Respondents were from 6 European countries: France, Germany, Italy, Poland, Spain, and the United Kingdom. The majority of the physicians had between 11 and 20 years of experience, reported the AF caseload of at least 11% and about half of them worked in a community-based practice setting. The Polish sample included 90 (16%) of enrolled physicians: 44 cardiologists (15%), 21 neurologists (16%), and 25 FPs (18%).

The arbitrary 70% threshold of expected educational support was reached in the following areas: AF classification (all 3 groups of participants), AF identification (neurologists and FPs), access to ILR and its use (all 3 groups), knowledge of new therapies and trials (only neurologists), handling gastric problems associated with non-vitamin K oral anticoagulants (NOACs) (only neurologists), using CHA<sub>2</sub>DS<sub>2</sub>-VASc and HAS-BLED scores (only FPs), and collaboration with other specialists (all 3 groups) (TABLES 1 and 2).

Higher percentage of Polish physicians reported suboptimal collaboration with other

specialists. A general dissatisfaction in this area was high among European doctors irrespectively of their specialties. Nevertheless, it was significantly higher in the Polish sample than in Western European countries (TABLES 1 and 2).

In comparison with specialists from other countries, Polish cardiologists more frequently reported a higher need for improvement of skills (89% vs 58%, respectively) and insufficient confidence (59% vs 43%, respectively) in pathophysiological classification of AF (TABLES 1 and 2). They also declared low to moderate confidence in using ILR more frequently (73% vs 42%, respectively). There was also a greater need for improvement of skills in identifying AF (61% vs 46%, respectively), lower need for skill improvement in using the HAS-BLED score (20% vs 34%, respectively) as well as insufficient confidence in physicians' knowledge of new therapies and trials (59% vs 45%, respectively).

Polish neurologists did not differ from colleagues from other European countries in declared needs for skill improvement (TABLES 1 and 2). However, they reported low to moderate confidence more frequently (86% vs 60%, respectively) in one essential area, namely, diagnosing AF (TABLE 2).

There were no significant differences between FPs from Poland and from other European countries apart from a lower need for skill improvement in handling patients with gastric problems (24% vs 50%, respectively;  $P = 0.02$ ). However, Polish FPs tended to express low to moderate confidence in identifying AF more frequently (76% vs 57%, respectively), handling gastric problems

**TABLE 2** Proportions of clinicians from Poland and other European countries reporting low to moderate confidence in handling issues related to atrial fibrillation

Areas of investigation	Cardiologists			Neurologists			Family physicians		
	Poland (n = 44)	Control group (n = 250)	P value	Poland (n = 21)	Control group (n = 111)	P value	Poland (n = 25)	Control group (n = 111)	P value
Classifying AF	59	43	0.045	81 <sup>a</sup>	74 <sup>a</sup>	0.59	68	65	0.77
Identifying the underlying pathophysiology of AF	45	36	0.21	86 <sup>a</sup>	60	0.03	76 <sup>a</sup>	57	0.08
Using ILR	73 <sup>a</sup>	42	<0.001	90 <sup>a</sup>	74 <sup>a</sup>	0.16	76 <sup>a</sup>	79 <sup>a</sup>	0.72
Knowledge of new therapies and trials	59	45	0.08	76 <sup>a</sup>	73 <sup>a</sup>	1.00	68	75 <sup>a</sup>	0.49
Handling renal problems associated with NOACs	25	24	0.84	57	52	0.68	68	54	0.20
Handling gastric problems associated with NOACs	32	36	0.56	67	50	0.17	68	49	0.08
Using CHA <sub>2</sub> DS <sub>2</sub> -VASc	23	18	0.50	48	47	0.95	72 <sup>a</sup>	56	0.14
Using HAS-BLED	23	30	0.30	43	60	0.14	76 <sup>a</sup>	65	0.28
Educating patients	32	26	0.46	52	43	0.44	56	48	0.46
Helping to overcome side effects of NOACs	23	18	0.50	57	41	0.16	56	36	0.06
Quality of collaboration between specialists	80 <sup>a</sup>	63	0.03	86 <sup>a</sup>	59	0.02	68	41	0.02
Quality of referrals from FPs to specialists	80 <sup>a</sup>	63	0.03	86 <sup>a</sup>	59	0.02	NA	NA	NA
Quality of feedback information from specialists	NA	NA	NA	NA	NA	NA	72 <sup>a</sup>	41	0.006

Data are presented as percentage of clinicians.

**a** Areas in which educational needs are particularly high (>70% of responses indicating the need for improvement)

Abbreviations: FP, family physician; NA, nonapplicable; others, see [TABLE 1](#)

(68% vs 49%, respectively), and helping patients to overcome side effects of NOACs (56% vs 36%, respectively) ([TABLE 2](#)).

**DISCUSSION** Our subanalysis of the ESC international educational needs assessment study clearly confirms the need for additional education expressed by physicians both from Poland and other European countries, especially neurologists and FPs. There are also several important educational gaps in terms of managing patients with suspected or diagnosed AF that should be addressed in order to improve the level of self-perceived degree of expertise across Europe.

More than 60% of Polish cardiologists declared the need for improvement of skills in identifying the underlying pathophysiology of AF. It can be anticipated that the pathophysiology-guided management of AF (ie, based on the etiology of the disease) may be superior to the current, mainly symptom-based classification (ie, based on the frequency and duration of episodes). There are also clear difficulties with the availability of long-term Holter monitoring. This was in concordance with the already reported lack of access to ILR in Poland as those devices are not directly reimbursed by the Polish National Health Fund.<sup>6</sup>

Both these factors explain the very high need for improvement of skills in classifying this most frequent arrhythmia. The need in question was also strongly expressed by neurologists and FPs, which may reflect uncertainty about contemporary definitions and the state of knowledge on AF. A recently published expert consensus on the use of ILR in patients after ischemic embolic stroke of undetermined source underlines the need to apply long-term cardiac monitoring especially in this high-risk population in Poland.<sup>7</sup>

It may seem questionable whether noncardiologists, such as FPs, should be expected to be able to classify AF according to the underlying pathophysiology on a daily basis or be up-to-date with the latest clinical trials in AF. On the other hand, in Poland they are patients' first-line contact with health care. Therefore, one could argue that they should have no problems with diagnosing this highly prevalent condition.<sup>1</sup> One should also note that Polish FPs have a wide variety of screening opportunities at their disposal (ie, a simple pulse check with blood pressure monitors, single-lead and regular 12-lead electrocardiogram) but they are not able to schedule Holter monitoring. Evidence unambiguously supports opportunistic screening for AF, especially in

high-risk populations and is reflected in the ESC guidelines.<sup>1,8-10</sup>

Polish FPs and cardiologists reported good skills and confidence regarding the use of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score, while neurologists reported the need for improvement in both areas. The CHA<sub>2</sub>DS<sub>2</sub>-VASc score, which is an established tool for risk stratification and clinical decision making, was perceived by some of the respondents as a tool for clinical or academic research with limited applicability to everyday practice.<sup>6</sup> Nevertheless, the CHA<sub>2</sub>DS<sub>2</sub>-VASc score is now used worldwide for selecting patients with AF for anticoagulation therapy. This score is by no means perfect and does not perform uniformly well in all clinically important situations. While relatively content with their level of knowledge, over 70% of Polish FPs admitted low to moderate confidence in the clinical application of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score. This should definitely be targeted in future educational projects concerning this group of physicians. In-depth knowledge of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score may seem a little less relevant to neurologists, who deal mainly with secondary stroke prevention. As all patients with a history of previous ischemic stroke by definition score at least 2 points, they are suitable candidates for oral anticoagulation. Nonetheless, the available data support the high accuracy of the CHA<sub>2</sub>DS<sub>2</sub>-VASc score in predicting stroke, and there are also cases of AF in patients after intracranial hemorrhage.<sup>11,12</sup> The ABC (age, biomarkers, clinical history) stroke risk score is a more recent tool to stratify the risk of thrombotic complications in AF, but has not gained recognition equal to the one obtained by the CHA<sub>2</sub>DS<sub>2</sub>-VASc score so far.<sup>13,14</sup>

Polish physicians and the rest of the study group provided similar answers with regard to the HAS-BLED score. However, the need for improvement of both skills and confidence in this area seems to be especially high among FPs. Generally, respondents regarded the HAS-BLED score as imprecise and impractical since there were no specific clinical decisions indicated in the guidelines based on this score.<sup>1,6</sup> The HAS-BLED score is a systematic tool that reminds physicians of possible correctable bleeding risk factors which were stressed in the 2016 ESC guidelines for the management of AF.<sup>1</sup> There is evidence of good correlation between the score and risk of major bleeding.<sup>12</sup> The influence of stroke and bleeding risk on recommending anticoagulation was examined among Australian general practitioners.<sup>15</sup> The study is slightly outdated (neither NOACs nor antiplatelets were considered in the AF setting); however, it is worth noting that respondents tended to administer warfarin in high-risk stroke patients, but in the case of bleeding, the percentage of prescriptions for oral anticoagulants fell significantly. Also, the type of bleeding (nose bleed, gastrointestinal or intracranial hemorrhage) clearly impacted this decision.

Regarding patients with renal or gastric problems who are treated with NOACs, Polish

physicians generally reported the level of skills and confidence consistent with their European counterparts. As expected, cardiologists were the group with the best education level, but as high as 30% to 40% of them would like to improve their skills in this matter. Surprisingly, cardiologists reported a relatively low level of knowledge of new AF therapies and trials. This was in line with the outcomes of the primary analysis where more than 60% of cardiologists reported the level of skills that was inadequate to appropriately select candidates for AF ablation.<sup>6</sup> It should be kept in mind that a proper rhythm control strategy may be superior in a selected population of AF patients.<sup>16</sup> As interventional procedures are the cornerstone of the rhythm control strategy, this outcome is of particular importance to the future educational interventions for general cardiologists.

Furthermore, a dire need to improve the cooperation between physicians of various specialties was identified, which may reflect a greater problem with communication among health-care professionals in Poland. Both cardiologists and neurologists complained about the quality of referrals from FPs. The main issue cited was incomplete or lacking information about the referred patient. On the other hand, FPs complained about the quality of feedback, described as incomplete or out-of-date. This seems to be a universal problem in Europe and may deserve wider recognition as well as a systematic approach at the ESC or EHRA level, yet this is a particularly important issue to be dealt with in Poland.<sup>6</sup>

**Limitations** This was a subanalysis of the previously published study and all the limitations stated in the main publication are valid for this study as well.<sup>6</sup> The survey was based on voluntary participation and self-reports. This could be a source of selection and cultural biases. Together with a relatively low response rate, those factors can limit the generalizability of the findings. Available data did not allow reliable comparisons between educational needs of academic and community-based physicians. This would be especially interesting with regard to a significant disparity in the clinical profile and knowledge among patients with AF derived from university and nonuniversity hospitals in Poland.<sup>17,18</sup> However, a country-specific analysis could overcome those limitations to some degree. Clinical experience shows that a fraction of patients with AF is diagnosed and treated ad hoc at emergency departments without the direct involvement of any of the specialists included in the survey, which is not discussed in our study. Finally, deficiencies of the Polish health-care system (ie, lack of public coverage for long-term heart rhythm monitoring) might have a significant impact on certain outcomes of the Polish sample.

**Conclusions** This substudy of a study by the European Society of Cardiology assessing international educational needs has highlighted considerable

educational and organizational barriers in the implementation of guideline-recommended AF therapy in Poland. The number of substantial educational gaps among physicians from Poland and other European countries is small, but there is still room for improvement. It appears necessary to develop and carry out educational programs tailored to each group of specialists instead of adopting a single, universal program. There also seems to be a great need to improve the level and culture of communication among specialists treating AF patients.

## ARTICLE INFORMATION

**ACKNOWLEDGMENTS** The analysis was financed by departmental resources of Institute of Cardiology, Warsaw, Poland.

**CONTRIBUTION STATEMENT** MMF conceived the concept of the study and contributed to data analysis and interpretation as well as drafting the article. MK contributed to statistics, data analysis and interpretation, and critical revision of the article. MS and TT contributed to data analysis and interpretation as well as critical revision of the article. MA, AV, KHK, GH, and ND reviewed the article. HH conceived the concept of the study, contributed to data analysis and interpretation, and reviewed the article.

**CONFLICT OF INTEREST** None declared.

**OPEN ACCESS** This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License (CC BY-NC-SA 4.0), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, provided the original work is properly cited, distributed under the same license, and used for noncommercial purposes only. For commercial use, please contact the journal office at pamw@mp.pl.

**HOW TO CITE** Farkowski MM, Karliński MA, Sterliński M, et al. Educational needs among physicians treating patients with atrial fibrillation: lessons for Poland from the European Society of Cardiology international educational needs assessment study. *Pol Arch Intern Med.* 2019; 129: 586-591. doi:10.20452/pamw.14924

## REFERENCES

- 1 Kirchhof P, Benussi S, Kotecha D, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J.* 2016; 37: 2893-2962. [↗](#)
- 2 Steffel J, Verhamme P, Potpara TS, et al. The 2018 European Heart Rhythm Association Practical Guide on the use of non-vitamin K antagonist oral anticoagulants in patients with atrial fibrillation. *Eur Heart J.* 2018; 39: 1330-1393. [↗](#)
- 3 Pruszczyk P, Tomaszuk-Kazberuk A, Słowik A, et al. Management of bleeding or urgent interventions in patients treated with direct oral anticoagulants: 2017 recommendations for Poland. *Pol Arch Intern Med.* 2017; 127: 343-351.
- 4 Nieuwlaet R, Olsson SB, Lip GY, et al. Guideline-adherent antithrombotic treatment is associated with improved outcomes compared with undertreatment in high-risk patients with atrial fibrillation. The Euro Heart Survey on Atrial Fibrillation. *Am Heart J.* 2007; 153: 1006-1012. [↗](#)
- 5 Devereaux PJ, Anderson DR, Gardner MJ, et al. Differences between perspectives of physicians and patients on anticoagulation in patients with atrial fibrillation: observational study. *BMJ.* 2001; 323: 1218-1222. [↗](#)
- 6 Heidbuchel H, Dagues N, Antz M, et al. Major knowledge gaps and system barriers to guideline implementation among European physicians treating patients with atrial fibrillation: a European Society of Cardiology international educational needs assessment. *Europace.* 2018; 20: 1919-1928. [↗](#)
- 7 Farkowski MM, Karliński MA, Kaźmierczak J, et al. Statement by a Working Group conceived by the Polish National Consultants in Cardiology and Neurology addressing the use of implantable cardiac monitors in patients after ischaemic embolic stroke of undetermined source. *Neurol Neurochir Pol.* 2019; 53: 181-189.
- 8 Hald J, Poulsen PB, Qvist I, et al. Opportunistic screening for atrial fibrillation in a real-life setting in general practice in Denmark – the Atrial Fibrillation Found On Routine Detection (AFFORD) non-interventional study. *PLoS One.* 2017; 12: e0188086. [↗](#)
- 9 Lowres N, Neubeck L, Redfern J, Freedman SB. Screening to identify unknown atrial fibrillation. A systematic review. *Thromb Haemost.* 2013; 110: 213-222. [↗](#)
- 10 Quinn FR, Gladstone DJ, Ivers NM, et al. Diagnostic accuracy and yield of screening tests for atrial fibrillation in the family practice setting: a multi-centre cohort study. *CMAJ Open.* 2018; 6: E308-E315. [↗](#)
- 11 Chao TF, Liu CJ, Wang KL, et al. Incidence and prediction of ischemic stroke among atrial fibrillation patients with end-stage renal disease requiring dialysis. *Heart Rhythm.* 2014; 11: 1752-1759. [↗](#)
- 12 Friberg L, Rosenqvist M, Lip GY. Evaluation of risk stratification schemes for ischaemic stroke and bleeding in 182 678 patients with atrial fibrillation: the Swedish Atrial Fibrillation cohort study. *Eur Heart J.* 2012; 33: 1500-1510. [↗](#)
- 13 Hijazi Z, Lindbäck J, Alexander JH, et al. The ABC (age, biomarkers, clinical history) stroke risk score: a biomarker-based risk score for predicting stroke in atrial fibrillation. *Eur Heart J.* 2016; 37: 1582-1590. [↗](#)
- 14 Rivera-Caravaca JM, Roldán V, Esteve-Pastor MA, et al. Long-term stroke risk prediction in patients with atrial fibrillation: comparison of the ABC-Stroke and CHA<sub>2</sub>DS<sub>2</sub>-VASc scores. *J Am Heart Assoc.* 2017; 6: e006490. [↗](#)
- 15 Gattellari M, Worthington J, Zwar N, Middleton S. Barriers to the use of anticoagulation for nonvalvular atrial fibrillation: a representative survey of Australian family physicians. *Stroke.* 2008; 39: 227-230. [↗](#)
- 16 Kosior DA, Szulc M, Rosiak M, et al. Functional status with rhythm-versus rate-control strategy for persistent atrial fibrillation. *Pol Arch Intern Med.* 2018; 128: 658-666. [↗](#)
- 17 Janion-Sadowska A, Sadowski M, Koniczyńska M, et al. Polish regional differences in patient knowledge on atrial fibrillation and its management as well as in patterns of oral anticoagulant prescription. *Kardiol Pol.* 2019; 77: 437-444. [↗](#)
- 18 Bednarski J, Balsam P, Tyminska A, et al. District versus academic hospitals: differences in the clinical characteristics of patients with atrial fibrillation without valvular heart disease treated with oral anticoagulants. *Pol Arch Intern Med.* 2018; 128: 274-279. [↗](#)