ClinicoEconomics and Outcomes Research

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ORIGINAL RESEARCH

# Cost-Effectiveness of Apixaban versus Other Direct Oral Anticoagulants and Warfarin in the Prevention of Thromboembolic Complications Among Finnish Patients with Non-Valvular Atrial Fibrillation

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**Purpose:** Direct oral anticoagulant (DOAC) use for the prevention of thromboembolic complications in patients with non-valvular atrial fibrillation (AF) has increased steadily in Finland. DOACs have been shown to be cost-effective in comparison to warfarin, but published evidence of relative cost-effectiveness between DOACs is still scarce and mostly based on indirect comparisons of clinical trial evidence. The aim of this study was to compare the cost-effectiveness of apixaban to dabigatran, rivaroxaban and warfarin in a Finnish setting using real-life evidence where available.

**Patients and Methods:** A lifetime Markov simulation model used previously in a published Finnish assessment comparing apixaban and warfarin was modified and updated with the relative effectiveness and safety data available from the real-world NAXOS-study and representative Finnish input data for patient characteristics, event risks, mortality, resource use, costs, and quality of life. Apixaban's cost-effectiveness was assessed from health care payer perspective (using 3% per year discount rate) based on incremental cost-effectiveness ratio (ICER, cost per quality-adjusted life year [QALY] gained), probability of cost-effectiveness (at willingness-to-pay [WTP] of 35,000 euros/QALY), and net monetary benefit (NMB).

**Results:** Apixaban increased the average modelled quality-adjusted life-expectancy and reduced the average total health care costs of AF patients when compared to warfarin (+0.14 QALYs, −3691 euros), dabigatran (+0.11 QALYs, −404 euros), and rivaroxaban (+0.03 QALYs, −43 euros). The resulting NMB of apixaban versus warfarin, dabigatran and rivaroxaban was 8723, 4168, and 1129 euros, respectively. The respective probabilities of apixaban being cost-effective against each comparator were 100%, 92.7%, and 64.0%.

**Conclusion:** In this modelling study, apixaban dominated other anticoagulants in the Finnish real-life setting.

**Keywords:** apixaban, cost-utility, dabigatran, economic evaluation, rivaroxaban, warfarin

## Introduction

Atrial Fibrillation (AF) is the most common form of cardiac arrhythmia with increasing prevalence in the aging western populations. Currently lifetime risk for AF is 1 in 3 individuals of European ancestry at index age of 55.[1] It causes a significant burden to both primary and specialized healthcare. Approximately 30% of patients with AF have at least one hospitalization annually,[1] and in Finland over one third of arrhythmia related hospitalizations are caused by AF.[2] If

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Received: 22 April 2021
Accepted: 19 July 2021
Published: 13 August 2021

untreated, AF predisposes patients to stroke, thromboembolic complications, heart failure and death, as well as worsens their quality of life.[1,2] The single most important prognostic factor for AF patients is well-managed anticoagulation treatment.[2]

Warfarin was the treatment of choice for anticoagulation treatment of AF patients before the advent of direct oral anticoagulants (DOACs) such as apixaban, dabigatran, rivaroxaban and edoxaban. DOACs have been shown to be superior or non-inferior to warfarin in the prevention of stroke and systemic embolism with similar or lower risk of major bleeds. Especially risk of intracranial bleeds is lower with DOACs.[3–6] Accumulating real-life evidence support these findings.[7–9]

DOACs have been shown to be cost-effective in comparison to warfarin in numerous treatment settings,[10–16] including Finland.[17,18] As a result, the use of DOACs as the first treatment alternative for the prevention of thromboembolic complications in patients with non-valvular atrial fibrillation (AF) has steadily increased over time.[19,20] In Finland, the use of warfarin has drastically decreased, with an almost 50% reduction in the number of users since 2016,[21] despite the aging of the population. At the same time, the use of DOACs has more than tripled with almost half of the DOAC-treated patients currently using apixaban.[21] Currently available published evidence of relative cost-effectiveness of DOACs is mostly based on indirect comparative evidence from the clinical trials.[22–25] Since clinical trials often enroll more homogeneous patient populations differing from those being treated in the real-life setting, it is of interest to investigate the relative cost-effectiveness of DOACs based on the comparative effectiveness findings from real-world studies. Such evidence is useful in assessing how the societal resources can be allocated in a cost-effective manner. Here, we report results from a cost-effectiveness assessment comparing apixaban to two other DOACs (dabigatran, rivaroxaban) and warfarin in the Finnish real-world setting.

## Materials and Methods

The cost-effectiveness assessment was performed using a lifetime Markov state transition model with 6-week cycles. The model has been previously adapted and modified for cost-effectiveness assessments in numerous countries including Finland,[10,11,18,26] and its structure and validation has been described in detail previously.[10,11] Here, the model structure is therefore only briefly summarized.

In the current assessment apixaban was compared to rivaroxaban, dabigatran and warfarin based on the relative effectiveness data available from the real-world NAXOS study (Evaluation of Apixaban in Stroke and Systemic Embolism Prevention in Patients With Nonvalvular Atrial Fibrillation),[7] and representative Finnish input data for event risks, mortality, resource use, costs, and quality of life. NAXOS-study was chosen to provide relative effectiveness estimates for the comparison, because it is one of the largest real-world studies conducted on DOACs and thus far the largest in Europe. Because the NAXOS-study compared apixaban separately to each of the comparators using propensity score matching,[7] the relative cost-effectiveness was likewise assessed pair-wise as apixaban versus comparator, and comparisons between the other three anticoagulants could not be assessed in this setting. As NAXOS did not include comparison between apixaban and edoxaban (due to lack of reimbursement for the latter), edoxaban was excluded from the current analysis.

The primary outcome measures for this analysis were the incremental cost-effectiveness ratio (ICER), given as cost per quality-adjusted life year (QALY) gained and probability of cost-effectiveness based on the societal willingness-to-pay (WTP). In addition, net monetary benefit (NMB = ΔQALY * WTP threshold – Δcosts) was estimated to assess the value of apixaban versus its comparators in monetary terms. In addition, a cost-effectiveness acceptability curve for each comparison was drawn to depict the probability of cost–effectiveness of apixaban versus each comparator at different values of WTP per QALY gained.

In Finland, Health Technology Assessments including cost-effectiveness analyses for new innovative treatments or significant extensions of a therapeutic indication are appraised by separate governmental appraisal committees depending on where the treatment is administered. New hospital-only medicinal products are appraised by the Finnish Medicines Agency (Fimea) whereas self-administered new medicinal products that are used in an outpatient setting are appraised by the Finnish Pharmaceuticals Pricing Board. As for now, there are no publicly announced WTP thresholds in Finland that could be used to determine whether a treatment, new or existing, is considered as cost-effective. When evaluating possible price discount levels for new hospital only products, Fimea has used WTP thresholds ranging from 50,000 €/QALY to 100,000 €/QALY in its recent appraisals.[27,28] Since no official Finnish threshold value for cost–effectiveness exists for

established outpatient products, we applied the value of 35,000 €/QALY gained as the threshold value, which has been used in Finnish cost-effectiveness assessments in chronic diseases.[29] This threshold is in line with the ICER-threshold (20,000–30,000 £/QALY) applied by NICE.[30]

## Model

The modelled cohort consists of 50.6% male and have an average age of 76.3 years at baseline reflecting the current Finnish AF population using anticoagulants.[19] The model (Figure 1) captures the health and cost outcomes of the AF cohort starting anticoagulation treatment (AF health state) through transitions to mutually exclusive health states as the result of the following events: ischemic stroke (IS), myocardial infarction (MI), systemic embolism (SE), intracranial hemorrhage (ICH; further classified as either hemorrhagic stroke (HS) or other ICH), other major bleeds (further classified as gastrointestinal [GI] or non-GI bleed) and clinically relevant non-major bleeds. IS, HS, MI and SE events are modelled as permanent health states where the patients reside until death. The remaining health states are modelled as transient states where patients reside for one model cycle.

In the analysis, apixaban served as the reference product to which the other products were compared. The baseline risk of the modelled events for apixaban treated patients in Finnish real-world setting were derived from the rates reported for warfarin treated AF patients in Finnish real-world studies[31–33] and relevant clinical trial evidence where Finnish data is currently lacking (Table 1). The risk of event for treatment comparators were then derived from apixaban rates through the hazard ratios detailed in Table 1. To maintain comparability between the previously conducted clinical trial-based cost-effectiveness analysis for warfarin and apixaban in the Finnish setting, the modelling assumptions and inputs (eg, age-associated increase in the risk of events, severity of IS and HS events, proportion of GI-bleeds among other major bleeds, proportion of HS among ICH, event fatality and post-event mortality risk adjustment factors) were mostly implemented as reported previously by Hallinen et al.[18] (Supplementary file, Tables S1–S3).

For simplicity, the assessment considers only the first line antithrombotic treatment. Patients experiencing HS were assumed to discontinue the first line anticoagulation treatment permanently whereas patients with other ICHs

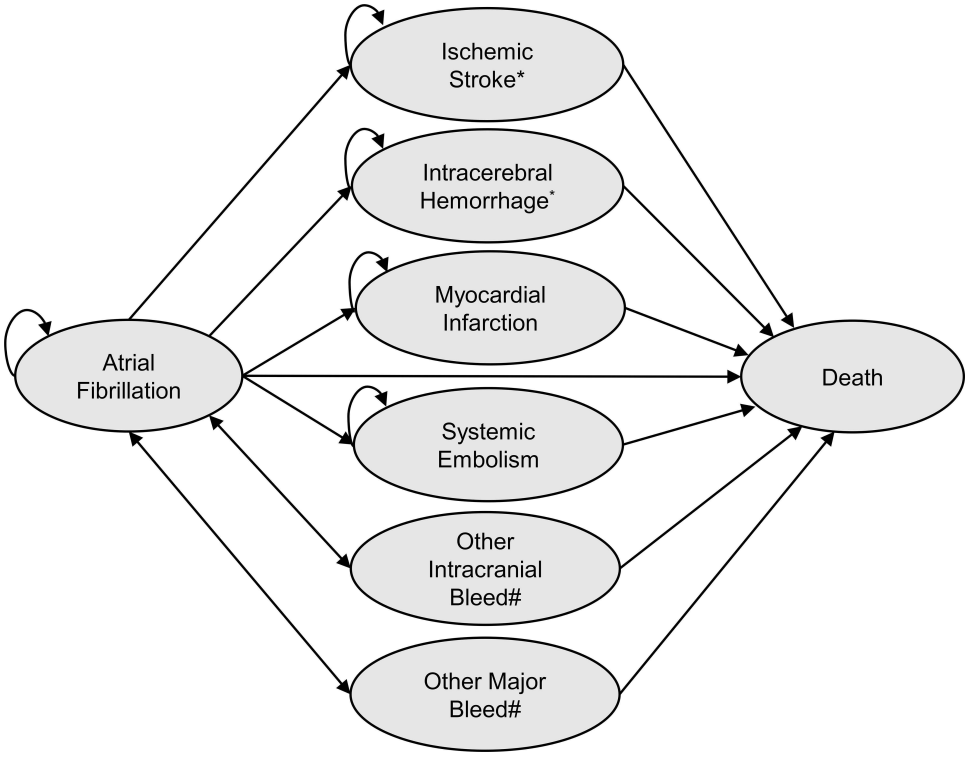


**Figure 1** Schematic presentation of the model. *Mild, moderate or severe, #transient state (ie, the patients transit back to the previous health state after one cycle and either continue or discontinue anticoagulation treatment). Reproduced from Hallinen T, Soini EJ, Linna M, Saarni SI. Cost-effectiveness of apixaban and warfarin in the prevention of thromboembolic complications among atrial fibrillation patients. *Springerplus*. 2016;5(1):1354, under the terms of the creative commons attribution 4.0 international license (http://creativecommons.org/licenses/by/4.0/).[18]

**Table 1** Risk of Modeled Health Events According to Treatment

| | Rate per 100 Patient Years | | Hazard Ratio (95% CI) vs Apixaban | | |
|---|---|---|---|---|---|
| | Apixaban | No Treatment[26] | Warfarin | Dabigatran | Rivaroxaban |
| Stroke[a] | 1.359[b] | 4.186 | 1.67 (1.54–1.79)[7] | 1.08 (0.90–1.28)[7] | 0.95 (0.87–1.03)[7] |
| Intracranial hemorrhage | 0.249[b] | 0 | 2.38 (2.08–2.70)[7] | 1.02 (0.62–1.68)[7] | 1.15 (0.99–1.33)[7] |
| Other major bleed | 1.603[c] | 0 | 2.33 (2.17–2.50)[7] | 1.08 (0.93–1.24)[7] | 1.49 (1.39–1.59)[7] |
| Clinically relevant non-major bleed | 2.090[d] | 0 | 1.433 (1.241–1.655)[d] | 1.00 (0.900–1.100)[34] | 1.52 (1.28–1.80)[34] |
| Myocardial infarction | 1.654[e] | 1.003 | 1.149[3] | 1.460 (0.960–2.200)[34] | 1.060 (0.730–1.520)[34] |
| Systemic embolism[a] | 0.060[f] | 0.956 | 1.67 (1.54–1.79)[7] | 1.08 (0.90–1.28)[7] | 0.95 (0.87–1.03)[7] |
| Other CV hospitalizations[g] | 10.46 | 16.506 | 1.00 | 1.00 | 1.00 |
| Treatment discontinuation for non-event related reasons | 13.107[d] | | 1.10 (1.04–1.16)[d] | 1.50 (1.36–1.67)[34] | 1.18 (1.08–1.61)[34] |

**Notes:** [a]Assumed equal to stroke and systemic embolism. [b]Total number of events among 16,741 Finnish AF patients using warfarin were 375 for stroke and 99 for ICH.[31] Assuming a full follow-up of one year for each patient, these were converted to a rate per 100 patient-years: 2.27 and 0.59, respectively. [c]Total number of bleeding events in 125,261 Finnish patients using warfarin was 5412,[32] and the corresponding rate was 4.32 per 100 patient-years. By subtracting the ICH rate from total bleeds, the rate for other major bleeds was estimated at 3.73 per 100 patient-years. [d]Secondary analysis of ARISTOTLE-trial. [e]1.900 per 100 patient-years for warfarin.[33] [f]0.1 per 100 patient-years for warfarin. [g]Secondary analysis of AVERROES-trial, all treatments assumed equal.

and other major bleeds were assumed to discontinue treatment either permanently (56% and 25% of patients, respectively) or temporarily for 6 weeks (44% and 75%, respectively).[10,18] Treatment discontinuations that were not related to modelled events were modelled in accordance with the pivotal clinical trials for each product. The subsequent risk of modelled events for patients residing in AF state at the time of treatment discontinuation are detailed in Table 1. Apart for the cost of treatment-related dyspepsia, other adverse events were not considered in the model.

## Treatment Costs and Quality of Life Estimates

The health-related quality of life and cost inputs were modelled in line with the analysis by Hallinen et al[18] apart for the health state associated cost inputs which were updated to year 2019 real values (Table 2). The assessment was performed from health care payer perspective with all costs and outcomes discounted at an annual rate of 3% in line with the national guidelines.[40]

According to Finnish treatment recommendations,[39] the routine monitoring of patients using anticoagulants should take place 1–4 times per year. Therefore, the cost of an annual general physician visit and monitoring of basic blood count (incl. thrombocytes) as well as renal and liver function were implemented as routine monitoring costs for all compared treatments. In addition, monitoring of international normalized ratio (INR) was modelled to take place for warfarin treated patients on average 18.5 times a year.[41] Drug costs were estimated at Finnish retail prices (excluding value added tax) in February 2021.[37] The DOAC costs were estimated based on the reimbursed price of the pack with approximately one-month supply for each product. Similar pack sizes for DOACs were used due to the modelling approach where drug wastage associated with treatment discontinuations are not considered due to the complexity of such modelling.

## Sensitivity Analyses

We tested the impact of discounting, modelling timeframe, and warfarin monitoring costs as deterministic sensitivity analyses. In addition, we performed the analyses using the wholesale and retail prices of the largest available pack size for DOACs. These scenarios were conducted to show the impact of the Finnish pharmaceutical pricing scheme on the results of the analyses. In Finland, the retail prices

**Table 2** Costs and Quality of Life Inputs

| | Cost[b] | Utility |
|---|---|---|
| **Drug cost per day**[a] | | |
| Apixaban 2.5 or 5 mg, twice a day | 2.53 | |
| Dabigatran 110 or 150 mg, twice a day | 2.58 | |
| Rivaroxaban 20 mg, once a day | 2.59 | |
| Warfarin 5 mg | 0.10 | |
| **Routine care & Monitoring** | | |
| General physician visit | 119.97[35] | |
| INR-monitoring, warfarin only (Nurse visit and INR-test) | 64.85[35,36] | |
| Laboratory tests[c] | 13.20[36] | |
| **Health states/Events**[18] | | |
| **AF** | | 0.743 |
| **Ischemic stroke** | | |
| Mild | | −0.087 |
| Acute Care | 4543.12 | |
| Long-term Maintenance | 0 | |
| Moderate | | −0.198 |
| Acute Care | 7719.71 | |
| Long-term Maintenance | 967.57 | |
| Severe | | −0.644 |
| Acute Care | 7725.75 | |
| Long-term Maintenance | 4403.61 | |
| Fatal | 5475.59 | |
| **Hemorrhagic Stroke** | | |
| Mild | | −0.071 |
| Acute Care | 2696.51 | |
| Long-term Maintenance | 2696.51 | |
| Moderate | | −0.352 |
| Acute Care | 9455.08 | |
| Long-term Maintenance | 2183.41 | |
| Severe | | −0.578 |
| Acute Care | 9641.27 | |
| Long-term Maintenance | 3818.62 | |
| Fatal | 5708.06 | |
| **Systemic Embolism** | | −0.084 |
| Acute Care | 2125.68 | |
| Long-term Maintenance | 106.76 | |
| **Other ICH** (excluding hemorrhagic stroke) | 4366.50 | −0.168 |
| **Other Major Bleeds** (excluding ICH) | | −0.168 |
| GI Bleeds | 3537.48 | |
| Non-ICH and Non-GI Related Major Bleeds | 3537.48 | |
| **CRNM Bleeds** | 2058.10 | −0.0582 |
| **MI** | | −0.005 |
| Acute Care | 5453.00 | |
| Long-term Maintenance | 538.50 | |
| **Other CV Hospitalization** | 3774.93 | |
| **Adverse events** | | |
| Dyspepsia[d] | 125.49 | |

**Notes**: [a]Drug costs were assessed based on the cost of the reimbursed price of the pack with approximately one-month supply for each product in 2/2021.[37] [b]Conversion from previous years (to year 2019 real values) were made using the communal health care price index by statistics Finland.[38] [c]Basic blood count, thrombocytes, creatinine, estimated glomerular filtration rate, alanine aminotransferase.[39] [d]Assumption: GP visit, pantoprazole 20 mg 100 tablets. The proportion of patients experiencing dyspepsia was obtained from the respective clinical trials and were 1.7% for apixaban and rivaroxaban, 3.5% for dabigatran, and 1.8% for warfarin.

are determined from the wholesale prices using a stepwise scheme that provides the dispensing pharmacies with diminishing retail margins as the wholesale price increases. Thus, the Finnish pricing scheme tends to artificially increase the cost of products with smaller pack sizes relative to those with larger pack sizes.[42] Rivaroxaban is currently available in packs containing tablets for 28-day and 98-day treatment whereas dabigatran and apixaban packs provide tablets for a 30-day treatment.

A probabilistic sensitivity analysis (PSA) was performed to explore the impact of parameter uncertainty on the outcomes of the assessment. The values of the key input parameters were varied based on their probability distributions over 2000 simulations and a cost–effectiveness plane was drawn of the findings to illustrate the observed differences in costs and effects between apixaban and its comparators. Probabilities of cost-effectiveness were separately reported for strong dominance (<0 €/QALY) and cost-effectiveness (<35,000 €/QALY).

# Results

## Base Case Analysis

Apixaban increased life-expectancy and quality-adjusted life-expectancy compared to warfarin, dabigatran, and rivaroxaban (Table 3). The discounted gain in life-years and QALYs with apixaban was 0.05 and 0.03 years compared to rivaroxaban, and 0.13 and 0.11 when compared to dabigatran, respectively. Highest total treatment costs over patients' lifetime were seen in the warfarin group (22,033 euros) followed by dabigatran (18,746 euros), rivaroxaban (18,385 euros), and apixaban (18,342 euros). Apixaban dominated both warfarin and other DOACs. With WTP of 35,000 euros per QALY gained, NMB of apixaban was 8723, 4168, and 1129 euros per patient when

**Table 3** Results of the Cost-Effectiveness Analysis

| | LY | QALY | Costs | | | | Difference, Apixaban vs Comparator | | | ICER (€/QALY) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Monitoring | Event | Drug | Cost | LY | QALY | |
| Apixaban | 8.37 | 6.09 | 18,342 | 1068 | 13,356 | 3918 | | | | |
| Rivaroxaban | 8.32 | 6.05 | 18,385 | 1057 | 13,703 | 3625 | −43 | 0.05 | 0.03 | Apixaban dominates |
| Dabigatran | 8.23 | 5.98 | 18,746 | 1046 | 14,588 | 3112 | −404 | 0.13 | 0.11 | Apixaban dominates |
| Warfarin | 8.22 | 5.94 | 22,033 | 5877 | 16,008 | 149 | −3691 | 0.15 | 0.14 | Apixaban dominates |

compared to warfarin, dabigatran, and rivaroxaban, respectively.

## Sensitivity Analyses

The cost-effectiveness plane illustrating differences between apixaban and its comparators over 2000 model simulations are shown in Figure 2. Based on these simulations, the average total treatment costs were 18,384 euros for apixaban, 18,552 euros for rivaroxaban, 19,074 euros for dabigatran and 22,237 euros for warfarin during patient's lifetime. The respective average QALYs were 6.09 for apixaban, 6.06 for rivaroxaban, 5.98 for dabigatran and 5.95 for warfarin. Apixaban dominated warfarin in 99.8% of the simulations and was cost-effective in all. As WTP increases from 35,000 to 100,000 euros/QALY, the probability of apixaban being cost-effective increases from 64% to 79% and from 92% to 99% versus rivaroxaban and dabigatran (Figure 3), respectively.

Apixaban remained cost-effective versus warfarin and other DOACs in all conducted deterministic sensitivity analyses (Table 4). Cost-savings associated with apixaban ranged from 824 to 4257 euros when compared to warfarin and from 270 to 507 euros when compared to dabigatran. When compared to rivaroxaban the cost difference ranged from −109 to 279 euros. Apixaban was associated with additional costs only in the scenario where drug costs were based on the largest pack size and retail prices where the distorting impact of the Finnish Pharmaceutical Pricing Scheme used for determining retail prices is visible.

# Discussion

Apixaban improved the outcomes of Finnish AF patients, when compared to warfarin, dabigatran, and rivaroxaban in our real-world based analysis. At the current Finnish drug prices, apixaban was also a less costly treatment alternative than warfarin despite the higher drug acquisition costs. Apixaban dominated warfarin, dabigatran, and rivaroxaban as it was both less costly and more effective. Apixaban's incremental NMB was positive in all comparisons indicating that the cost to derive the benefits associated with apixaban treatment is less than what the society is willing to pay (here 35,000 euros/QALY gained). Our analysis confirmed the importance of even slight differences in relative efficacy between the different DOACs and suggests that, overall, apixaban has slightly better overall efficacy than rivaroxaban and dabigatran. While it also appears to have slightly higher overall drug costs during patients' lifetime due to improved survival, the analysis demonstrated that the investment "pays itself back" through reduced event costs.

The results of our analysis were insensitive to changes in most modelling assumptions and the probability of apixaban being cost-effective was high in all comparisons. However, due to the Finnish pharmaceutical pricing scheme that provides the dispensing pharmacies with a lower relative retail margin for larger pack sizes, apixaban was slightly more expensive than rivaroxaban in a scenario using the retail price of the largest available rivaroxaban pack as the acquisition cost for rivaroxaban. In this scenario, apixaban remained nevertheless a cost-effective treatment alternative when compared to rivaroxaban.

In our analysis, we applied the relative risk estimates for the primary efficacy and safety outcomes from the NAXOS study (Evaluation of Apixaban in Stroke and Systemic Embolism Prevention in Patients With Nonvalvular Atrial Fibrillation).[7] NAXOS was a French real-world study including altogether 321,501 patients initiating VKA (35.0%), apixaban (27.2%), rivaroxaban (31.1%) or dabigatran (6.6%) with the aim to compare the safety, effectiveness, and mortality of the alternative anticoagulants in oral anticoagulant-naive patients with nonvalvular atrial fibrillation. Even though the NAXOS study was conducted in France we chose it for the current analyses, since it had a highly representative sample of AF patients in France and it is one of the largest real-world

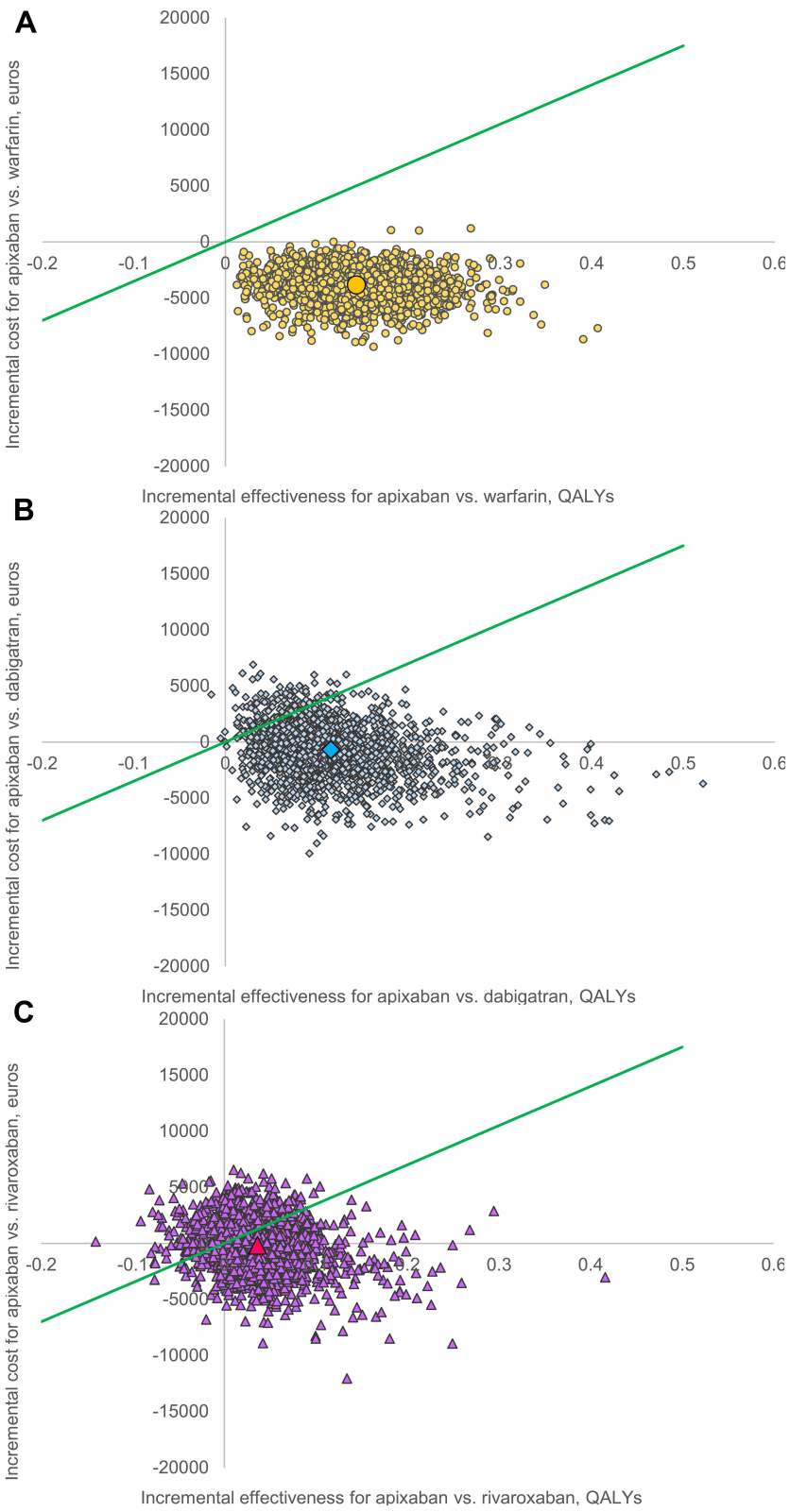


**Figure 2** The cost-effectiveness plane for apixaban versus (**A**) warfarin, (**B**) dabigatran and (**C**) rivaroxaban. Green line depicts ICER threshold of 35,000 euros per QALY gained. The points lying below the line represent the simulations where apixaban was either cost-effective or dominating (South-West quadrant) versus its comparator.

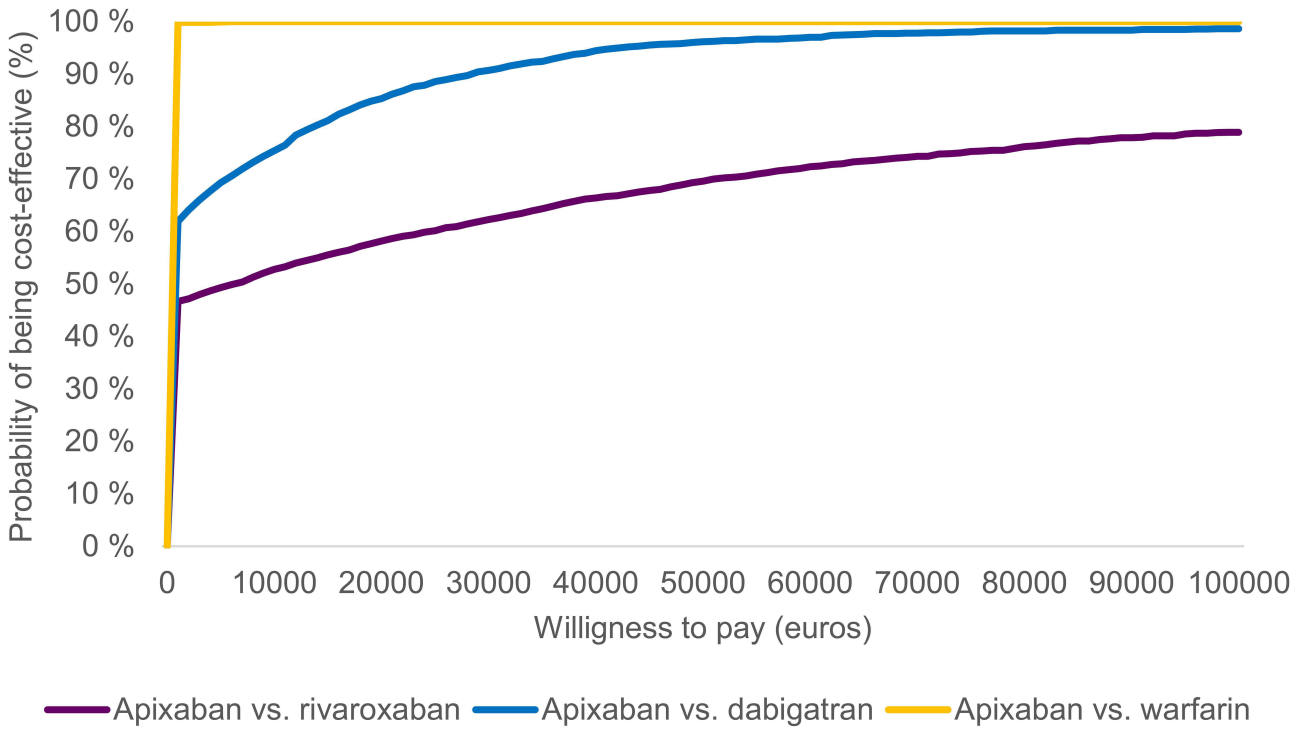


**Figure 3** The cost-effectiveness acceptability curve for apixaban versus warfarin, dabigatran and rivaroxaban.

studies ever conducted in Europe. Even though large real-world studies have been conducted in the United States,[8,9] there are remarkable differences in the organization of health care between the United States and European countries. The modelled life-expectancy of AF patients in our analyses is well in line with what would be expected for the population in Finland. The remaining life-expectancy for Finns aged 76 years is currently 12 years,[43] and the mortality risk in AF is approximately two-fold compared to the general population.[44]

In cost-effectiveness assessments the compared treatments are assumed to be perfect substitutes which means that they would be interchangeable. However, in real-world setting the treatments may nevertheless be prescribed to slightly different kind of patients. In Finland[19] and elsewhere[45] DOAC-treated patients have been younger and with less comorbidities than patients treated with warfarin. In Finland, patients using apixaban and warfarin appear to be at increased risk of thromboembolic complications (based on CHA2DS2-VASc) when compared to users of dabigatran and rivaroxaban.[19] In addition, apixaban is more frequently prescribed to women and patients with prior history of myocardial infarction.[19] Even factors not related to patient's disease characteristics may influence treatment choices in real life. Current evidence suggests that there may be inequalities in access to DOACs as DOAC-treated patients tend to have higher education and income levels.[45,46] In our NAXOS-study based analysis, the relative treatment effects were obtained from analyses where apixaban was separately compared to each of the comparators using propensity score matching.[7] Because of this, the current analysis should not be interpreted to provide evidence of the relative cost-effectiveness between the other three anticoagulants. Furthermore, it should be kept in mind that the results may not be generalizable to other countries since country-specific differences (eg drug prices, costs of other health care resources) influence the results.

Our assessment was conducted from a health care payer perspective. Therefore, the analysis excluded productivity losses as well as time and travelling costs. In the elderly patient population, the inclusion of productivity losses would have been unlikely to have a significant impact on the results of the analysis. However, the total costs associated with warfarin treatment may have been underestimated due to the exclusion of time and travelling costs which have been estimated to form 26.6% of total therapy costs for warfarin in Finland.[47]

## Conclusion

Apixaban use increased the life-expectancy and quality-adjusted life-expectancy of Finnish AF-patients when

**Table 4** Results of the Deterministic Sensitivity Analyses

| Scenario | Treatment | QALY | Costs | Net Cost | Net QALY | ICER (€/QALY), Apixaban vs Comparator |
|---|---|---|---|---|---|---|
| No discounting | Apixaban | 7.34 | 22,511 | | | |
| | Rivaroxaban | 7.30 | 22,553 | −42 | 0.04 | Apixaban dominates |
| | Dabigatran | 7.20 | 22,951 | −440 | 0.14 | Apixaban dominates |
| | Warfarin | 7.15 | 26,769 | −4257 | 0.19 | Apixaban dominates |
| 5-year timeframe | Apixaban | 3.06 | 8028 | | | |
| | Rivaroxaban | 3.05 | 8095 | −68 | 0.01 | Apixaban dominates |
| | Dabigatran | 3.04 | 8298 | −270 | 0.02 | Apixaban dominates |
| | Warfarin | 3.03 | 10,263 | −2235 | 0.04 | Apixaban dominates |
| Retail prices, largest available pack | Apixaban | 6.09 | 18,342 | | | |
| | Rivaroxaban | 6.05 | 18,063 | 279 | 0.03 | 8978 |
| Wholesale prices, largest available pack | Apixaban | 6.09 | 17,329 | | | |
| | Rivaroxaban | 6.05 | 17,438 | −109 | 0.03 | Apixaban dominates |
| | Dabigatran | 5.98 | 17,837 | −507 | 0.11 | Apixaban dominates |
| | Warfarin | 5.94 | 21,987 | −4658 | 0.14 | Apixaban dominates |
| Warfarin monitoring cost reduced[a] | Apixaban | 6.09 | 18,342 | | | |
| | Warfarin | 5.94 | 19,166 | −824 | 0.14 | Apixaban dominates |

**Notes**: [a]Phone call, 13.08 euros, instead of a nurse visit. Dominates = more effective, less costly.

**Abbreviations**: AF, atrial fibrillation; DOAC, direct oral anticoagulant; GI, gastrointestinal; HS, hemorrhagic stroke; ICH, intracranial hemorrhage; ICER, incremental cost-effectiveness ratio; IS, ischemic stroke; MI, myocardial infarction; NMB, net monetary benefit; SE, systemic embolism; PSA, probabilistic sensitivity analysis; QALY, quality-adjusted life-year; WTP, willingness-to-pay.

compared to warfarin, dabigatran, and rivaroxaban in a real-world setting. Apixaban dominated warfarin, dabigatran and rivaroxaban as these gains were obtained with lower total health care costs.

## Disclosure

TH and ES are partners and employees, and CA is an employee of ESiOR Oy, which was commissioned by Pfizer Oy to perform this study. ESiOR has carried out commissioned studies and health-economic analyses for several other pharmaceutical companies, food industry companies, device companies, research groups, health care organizations, and hospitals. ML is an employee of Aalto University. PE, SS and MK are employees of Pfizer Oy. This study was sponsored by Pfizer and Bristol Myers Squibb. Medical Writing support was provided by Taru Hallinen at ESiOR Oy and was funded by Pfizer and Bristol Myers Squibb. The authors report no other conflicts of interest in this work.

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