

Henriksson reported that surgery plus medical management can be considered cost effective as a treatment of asymptomatic carotid stenosis in 65 year-old men. He assumed a surgery relative risk reduction of 65.5%, or approximately an absolute risk reduction (ARR) of 8% in this population. However, data for the comparator arm (medical management alone) were dated and did not reflect efficacies of current medical therapies. **OBJECTIVES:** To analyze using Bayesian methods, asymptomatic carotid stenosis clinical trial data, and more current medical therapy data the probability of achieving this 8% ARR and an incremental cost per QALY of approximately \$50,000 (US, inflated - 2013 dollars). **METHODS:** The outcome of interest from the clinical trials was the mean difference in the probability of any stroke or perioperative death between surgery (carotid endarterectomy [CEA]) and aggressive medical management (MM). The CEA data came from the Asymptomatic Carotid Atherosclerosis Study (ACAS) and the Asymptomatic Carotid Surgery Trial (ACST). The updated medical management data came from a systematic review published in the journal *Stroke* (Abbott, 2009). The Bayesian analysis employed a Beta-Binomial Model. **RESULTS:** The posterior distribution of the Bayesian analysis representing the ARR of CEA versus MM had a mean of 0.008 with an essentially zero probability of achieving the Henriksson assumption of 8% ARR. Using the mean of this posterior distribution, the resulting incremental cost per QALY exceeded \$500,000 in 65 year-old men – a value unlikely to be considered cost effective in any country. **CONCLUSIONS:** Bayesian analysis allows the prediction of the probability that a treatment alternative exceeds a predefined threshold. A powerful feature of Bayesian analysis is the ability to incorporate additional and/or newer data. This newer data can drastically alter assumptions about the cost effectiveness of treatment alternatives.

PCV71

COST-EFFECTIVENESS OF TRANSCATHETER AORTIC-VALVE IMPLANTATION FOR SEVERE SYMPTOMATIC AORTIC STENOSIS IN INOPERABLE PATIENTS IN THE BRAZILIAN PRIVATE HEALTH CARE SYSTEM

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OBJECTIVES: Aortic stenosis is the most common valvular heart disease in the elderly – its prevalence is estimated to be up to 5% in individuals over 75 years. Surgical replacement of aortic valve is considered the standard care and in the absence of serious coexisting conditions, the procedure is associated with low operative mortality. However, a significant proportion of patients cannot undergo surgery due to high surgical risk associated with advanced age or presence of multiple coexisting conditions. Treatment with transcatheter aortic-valve implantation (TAVI) is a therapy with potentially lower peri-procedure risk and has been used as a therapeutic option in this group considered inoperable. This study aims to develop a cost-effectiveness analysis of TAVI in patients with severe aortic stenosis who are not suitable for surgical treatment according to Brazilian Private System Perspective. **METHODS:** A Markov model was developed to compare TAVI versus standard therapy (drug treatment with or without aortic balloon valvuloplasty) with a 5-year time horizon. Outcomes in the model were based on safety and effectiveness (as measured by clinical outcomes of chance of successful implantation procedure and survival from PARTNER cohort B trial). Resource use included early perioperative complications (30 days) and late events. Cost data were obtained from Brazilian public lists (CMED/SIMPRO/CBHPM). Results were expressed as incremental cost-effectiveness ratio (ICER) per life years gained (LYG). Probabilistic sensitivity analysis was performed to confirm robustness of results. **RESULTS:** Compared with standard therapy with or without aortic balloon valvuloplasty, use of TAVI improves survival in 0.97 life years with an incremental cost of US\$43,602, resulting an ICER of US\$45,080/LYG. In an alternative scenario considering 10-year time horizon, ICER was 27,565/LYG. **CONCLUSIONS:** Use of TAVI results in improved survival with a low risk of serious adverse events, and demonstrates a cost-effectiveness profile when compared to other technologies already incorporated in Brazil.

PCV72

ECONOMIC EVALUATION OF IVABRADINE IN CHRONIC HEART FAILURE IN GREECE

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OBJECTIVES: In the SHIFT trial, ivabradine administered to chronic heart failure (CHF) patients in combination with standard therapy significantly reduced cardiovascular death and hospital admission for cardiovascular problems. An economic evaluation of ivabradine plus standard care against standard care alone, for the management CHF in patients with a baseline heart rate ≥ 75 b.p.m. was conducted from the Greek third party-payer perspective. **METHODS:** An existing Markov model consisting of two health states for CHF NYHA classes I to IV (i.e. alive, dead) was adapted to the Greek health care setting. In each one month cycle, patients can either remain alive or die, during their life span or 29 months (i.e. within SHIFT trial period). Health state utilities were estimated from EQ-5D index scores obtained from the SHIFT clinical trial and using appropriate modeling techniques the data were extrapolated beyond the trial period. All costing data reflects the year 2013. Probabilistic sensitivity analyses (PSA) were conducted. Both cost and outcomes were discounted at 3.5% per year. **RESULTS:** Results for within trial analysis revealed that ivabradine had an incremental cost and incremental QALY of €905 and 0.05 respectively, leading to an incremental cost per QALY gained of €16,635/QALY. Ivabradine was a cost-effective alternative at a willingness to pay threshold of €36,000 per QALY gained. Moreover, the cumulated lifetime analysis showed incremental cost of €2,792 and incremental QALY of 0.28. The ICER for ivabradine was calculated to be €9,986 per QALY gained. The PSA showed that the likelihood

of ivabradine plus standard therapy being cost-effective at a threshold of €36,000/QALY was found to be 96% in both within trial and lifetime analysis. This result is driven by a reduction in mortality and hospitalisations and the associated costs of care. **CONCLUSIONS:** Ivabradine added to standard care could be a cost-effective treatment for the treatment in CHF patients in Greece.

PCV73

COST-EFFECTIVENESS ANALYSIS OF RIVAROXABAN IN SECONDARY PREVENTION OF ACS IN SWEDEN

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With 7 million deaths per year, ischaemic heart disease is the leading cause of mortality worldwide. In Acute Coronary Syndrome (ACS), the vast majority of fatal cardiovascular events occur after hospital discharge. Guidelines recommend antithrombotic treatment for secondary prevention after ACS. **OBJECTIVES:** To assess the cost-effectiveness of rivaroxaban 2.5mg BID in combination with standard antiplatelet therapy (ASA alone or in combination with a thienopyridine [clopidogrel or ticlopidine]) versus standard antiplatelet therapy alone for prevention of secondary events in ACS patients from a Swedish societal perspective. **METHODS:** A Markov model is used to capture single and multiple events, costs and utilities based on the time since index event to reflect clinical practice. For the first 2 years the model uses data from the ATLAS ACS 2-TIMI 51 clinical trial including efficacy, safety, treatment discontinuation and average patient age. After 2 years, transition probabilities were extrapolated using an exponential function method. Estimates for life expectancy, drug acquisition costs and other medical and indirect costs were derived from published Swedish sources. Cost and effects are discounted at 3.0%. Univariate and probabilistic sensitivity analyses were conducted with an assumed willingness to pay (WTP) threshold of SEK 500,000. **RESULTS:** For the base case scenario, incremental life time costs are estimated at SEK 10,000.44 (€1,156), incremental QALYs at 0.14, and incremental cost per QALY at SEK 71,245.76 (€8,236). Univariate sensitivity analyses indicate that the results are sensitive to changes in the cost of rivaroxaban and baseline utility value. At an assumed WTP of SEK 500,000, rivaroxaban in combination with standard antiplatelet therapy is expected to be cost-effective. **CONCLUSIONS:** From a Swedish societal perspective, secondary prevention with rivaroxaban 2.5mg BID in combination with standard antiplatelet therapy can be considered a cost-effective option for patients with ACS. Sensitivity analyses demonstrated that the results are robust.

PCV74

COST-EFFECTIVENESS ANALYSIS OF APIXABAN IN THE TREATMENT OF ATRIAL FIBRILLATION IN MEXICO

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OBJECTIVES: The most common cardiac arrhythmia (atrial fibrillation, AF) increases the risk of morbidity and mortality. We estimated the health and economic consequences of the use of apixaban compared with warfarin reducing the risk of stroke in patients with AF, from the perspective of the Instituto Mexicano del Seguro Social (IMSS). **METHODS:** We performed a cost-effectiveness analysis using a Markov model (17 health states, six-week cycles), which simulates patients treated with warfarin (fixed dose: 5mg/day) or apixaban (10mg/day). Patients enter the model at age 70 and remain there until death (disease-related or according to Mexican life tables). Safety, efficacy and utilities were extracted from published sources. The costs of warfarin and AF-related clinical events were extracted from IMSS sources. The cost of apixaban was provided by the manufacturer. Costs are expressed in US\$, 2013 and a 5% per-year discount rate was applied. Years of life and quality adjusted life years (QALYs) gained were the health outcomes. Univariate and probabilistic sensitivity analyses were performed. **RESULTS:** The model estimated 7.645 life years and 5.454 QALYs in the apixaban arm, which means 0.147 and 0.160 gained life years and QALYs, respectively (regarding warfarin). The costs of apixaban and warfarin were US\$14,943 and US\$15,042, respectively (apixaban is a dominant alternative). Health gains with apixaban are driven by fewer event-related deaths (10/1000 patients at risk) as well as fewer hemorrhagic strokes (12) and bleeding (13 major bleeds, 41 clinically non-major bleeds) compared to warfarin-treated patients. Treatment costs are driven by drug acquisition cost (apixaban) and monitoring cost (warfarin). **CONCLUSIONS:** Apixaban is more effective and safer than warfarin reducing the risk of stroke associated with AF, as well as bleeding events. To achieve this improvement, no additional economic resources need to be invested, which makes apixaban a cost-saving intervention in the context of the IMSS.

PCV75

COST-EFFECTIVENESS OF APIXABAN VERSUS STANDARD OF CARE FOR THE PREVENTION OF STROKE: AN ANALYSIS OF PATIENTS WITH ATRIAL FIBRILLATION IN GREECE

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OBJECTIVES: Apixaban is an oral anticoagulant that has demonstrated a superior clinical profile compared to warfarin and aspirin in the management of patients with non-valvular Atrial Fibrillation (NVAF) and at least one additional risk factor for stroke. The objective of the present analysis was to assess the cost-effectiveness of apixaban against warfarin and aspirin for the prevention of stroke in patients with NVAF in Greece. **METHODS:** A Markov model that evaluated clinical events, quality adjusted life expectancy and costs for patients treated with apixaban and warfarin or aspirin (VKA-suitable and

VKA-unsuitable, respectively) formed the basis of the analysis. Clinical events (ischemic strokes, hemorrhagic strokes, intracranial hemorrhages, other major bleeds, clinically relevant non-major bleeds, myocardial infarctions and cardiovascular hospitalizations) were modeled over a lifetime horizon based on the clinical efficacy of each comparator, as reported by two phase-III clinical trials (ARISTOTLE and AVERROES). Resource use with regards to patient monitoring was elicited via an experts' panel (cardiologists & internists). Cost calculations reflect the local clinical setting, and followed a third-party payer perspective (Euros, year 2013, discounted at 3%). **RESULTS:** Apixaban was projected to reduce the occurrence of clinical events and increase quality adjusted life expectancy compared to warfarin and aspirin (an incremental increase of 0.225 and 0.274 QALYs per patient, respectively). Taking into account costs of medications, treatment and management of events, the incremental cost-effectiveness ratio for apixaban versus warfarin and aspirin was estimated at 12,154.6 €/QALY and 5,980.6 €/QALY gained, respectively. Extensive sensitivity analyses indicated that results were robust over a wide range of inputs. **CONCLUSIONS:** Based on the results of this analysis, apixaban can be a cost-effective alternative to warfarin and aspirin for the management of VKA-suitable and VKA-unsuitable patients with NVAf, respectively, in Greece.

PCV76

TOTAL COSTS AND OUTCOMES OF DRUG-ELUTING STENT PLACEMENT WITH INTRAVASCULAR ULTRASOUND (IVUS) COMPARED WITH ANGIOGRAPHY ALONE: A COST-EFFECTIVENESS ANALYSIS FROM THE PERSPECTIVE OF THE ITALIAN HEALTH SYSTEM

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OBJECTIVES: Intravascular ultra-sound (IVUS) allows physicians to generate a superior image of coronary arteries during percutaneous coronary interventions (PCI), providing a tomographic, 360-degree view of the arterial wall from the inside, which allows a more accurate and complete assessment than is possible with angiography. The purpose of this study was to understand the cost-effectiveness of IVUS compared with traditional angiography techniques in drug-eluting stent (DES) implantation, from the perspective of the Italian health system. **METHODS:** A Markov model was developed to extrapolate the comparative costs and outcomes of a theoretical population of 1000 patients undergoing DES implantation with traditional angiography alone, or in conjunction with IVUS. The model assesses cardiac events, including revascularisations and myocardial infarctions from a health system perspective. Outcomes with and without IVUS were based on a meta-analysis by Zhang et al (2013). Because of limited clinical evidence to inform the long-term outcomes of IVUS compared with angiography, the model either assumes the benefit of IVUS is conferred only in the first year of treatment, or that the benefit is maintained permanently. **RESULTS:** Using IVUS during PCI cost an average of €542 per patient, and yields an additional 0.022 quality adjusted life years (QALYs) per patient. In a population of 1,000 patients, IVUS led to a reduction of 6.7 revascularisations and 5.9 less myocardial infarctions (MI) over the lifetime of a patient. When the revascularisation and MI benefit of IVUS is assumed to extend for the patient's lifetime, angiography with IVUS costs €38 per patient and yields an additional 0.09 QALYs over a patient's lifetime; avoiding 13.4 MIs and 12.3 revascularisations per 1,000 patients. **CONCLUSIONS:** IVUS appears to be a cost-effective addition to traditional angiography in DES placement in Italy, with the increased upfront cost of IVUS offset by reduced cardiac events in IVUS-treated patients over time.

PCV77

COST-EFFECTIVENESS OF APIXABAN VERSUS OTHER NEW ORAL ANTICOAGULANTS FOR THE PREVENTION OF STROKE: AN ANALYSIS OF PATIENTS WITH ATRIAL FIBRILLATION IN GREECE

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OBJECTIVES: Apixaban, dabigatran (150 mg BID and 110 mg BID) and rivaroxaban are three novel oral anticoagulants (NOACs) currently approved for stroke prevention and systemic embolism in non-valvular atrial fibrillation (NVAf) patients. The objective of this analysis was to assess the cost-effectiveness (CE) of apixaban against other NOACs for the prevention of stroke in patients with NVAf in Greece. **METHODS:** A Markov model that evaluated clinical events, quality adjusted life expectancy and costs for patients treated with apixaban or other NOACs formed the basis of the analysis. Clinical events (ischemic strokes, hemorrhagic strokes, intracranial hemorrhages, other major bleeds, clinically relevant non-major bleeds, myocardial infarctions and cardiovascular hospitalizations) were modeled for a lifetime horizon. Due to lack of head-to-head comparisons, efficacy and safety data was derived from an indirect treatment comparison (ITC). The key pivotal trials, ARISTOTLE, ROCKET-AF and RE-LY, all included warfarin as a comparator therefore allowing for an ITC. Resource use with regards to patient monitoring was elicited via a panel of experts (cardiologists & internists). Cost calculations reflect the local clinical setting and followed a third-party payer perspective (Euros, year 2013, discounted at 3%). **RESULTS:** Apixaban was projected to reduce the occurrence of clinical events and increase quality-adjusted life expectancy and costs of treatment compared to other NOACs. Taking into account costs of medications, treatment and management of events, the incremental cost-effectiveness ratios for apixaban 5 mg BID versus dabigatran 150 mg BID, dabigatran 110 mg BID and rivaroxaban 20 mg QD were estimated at 15,403€/QALY, 4,955€/QALY and 10,130 €/QALY gained, respectively. Extensive sensitivity analyses indicated that results were robust over a wide range of inputs. **CONCLUSIONS:** Based on the results of this analysis, apixaban can be a cost-effective alternative to other NOACs, for the prevention of strokes in patients with NVAf in Greece.

PCV78

PHARMACOECONOMIC EVALUATION ACCEPTABILITY OF CLOPIDOGREL VERSUS ACETYSALICYLIC ACID IN PATIENTS WITH CARDIOVASCULAR DISEASE FOR STROKE PREVENTION IN UKRAINE

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OBJECTIVES: The results of many clinical trials demonstrate the benefit of long-term antiplatelet therapy in reducing the risk of cardio- and cerebrovascular complications. Both acetylsalicylic acid (ASA) and clopidogrel are effective, but have potentially serious side effects, and clopidogrel is more expensive than ASA. The purpose of the study is to evaluate the pharmacoeconomic acceptance of clopidogrel versus ASA in patients with atherosclerotic vascular disease manifested as either recent ischaemic stroke, recent myocardial infarction, or symptomatic peripheral arterial disease to prevent non-fatal stroke and death rate according to the clinical trial CAPRIE from Ukrainian perspective. **METHODS:** Outcomes of the clinical study CAPRIE, modeling "decision tree" and analysis "cost-effectiveness" were used. **RESULTS:** The results of the clinical trial CAPRIE study showed, that clopidogrel is more effective versus ASA for reducing the risk of nonfatal stroke: absolute risk reduction is -2.7%. Model "decision tree" was built using the probabilities of events (nonfatal stroke and death) from the study CAPRIE. Direct costs were calculated taking into account the costs of antiplatelet therapy, of nonfatal stroke treatment (drugs, diagnosis, patient's stay in hospital) and the cost of rehabilitation after stroke. Indirect costs are not taken into account because the patients were of retirement age (62.5 years old). As a result of calculations it was found, that antiplatelet therapy with clopidogrel is more expensive and more effective (2 additional lives saved per 1000 patients over 1.91 years) compared with ASA. Due to the threshold of society "willingness to pay" per 1 life saved, or 1 QALY, use of clopidogrel as antiplatelet agent in patients with cardiovascular disease is economically profitable for Ukraine. **CONCLUSIONS:** The use of clopidogrel as an antiplatelet agent in patients with cardiovascular disease to prevent nonfatal stroke compared to the ASA is economically profitable for Ukraine.

PCV79

AN ANALYSIS OF THE COST EFFECTIVENESS OF LEFT ATRIAL APPENDAGE CLOSURE FOR THE PREVENTION OF STROKE IN PATIENTS WITH ATRIAL FIBRILLATION AND ABSOLUTE CONTRAINDICATIONS TO WARFARIN THERAPY

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OBJECTIVES: Stroke and its associated disability costs the European Union an estimated €62 billion per year. Warfarin is the mainstay for stroke prevention in atrial fibrillation (AF), but many patients have absolute contraindications to this drug. The Watchman device for left atrial appendage closure (LAAC) received CE mark for stroke prevention in AF patients with contraindications to warfarin. This analysis sought to estimate the cost effectiveness of treating warfarin-ineligible AF patients with LAAC as compared to standard aspirin therapy. **METHODS:** A Markov model was developed comparing clinical outcomes and total costs between patients treated with LAAC or aspirin over 5 and 10 years based largely on clinical outcomes from the Aspirin and Plavix Registry (ASAP) and ACTIVE trials. Clinical events included ischemic stroke, TIA, systemic embolism, bleeding, and acute myocardial infarction as well as procedure-related events. Germany was chosen as the country of analysis because of its unique DRG for the LAAC procedure. Acute costs were taken from German DRGs and long-term disability costs were taken from the Berlin Acute Stroke Study. Sensitivity analysis was performed on clinical and cost inputs; the model was most sensitive to changes in the rate of ischemic stroke. **RESULTS:** LAAC demonstrated a benefit in terms of ischemic strokes and mortality avoided. The cost per ischemic stroke avoided was €91,020 and €24,722 at 5 and 10 years, respectively. The cost per life year gained for LAAC versus aspirin was €22,694 at 5 years and decreased to €5,859 at 10 years. **CONCLUSIONS:** LAAC is a cost-effective alternative to aspirin therapy in patients with contraindications to warfarin. Cost offsets achieved with LAAC become considerably more pronounced over time. This analysis highlights the importance of considering the lifetime costs of stroke prevention in AF, especially as the probability of both stroke and bleeding increases with patient age.

PCV80

COST-EFFECTIVENESS OF RIVAROXABAN IN THE PREVENTION OF STROKE IN NON-VALVULAR ATRIAL FIBRILLATION PATIENTS IN ITALY

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OBJECTIVES: To perform a cost-effectiveness analysis of rivaroxaban (once-daily) in the prevention of stroke and systemic embolism of patients with non-valvular atrial fibrillation (NVAf) and in patients sub-groups from the perspective of the Italian health care system (SSN). **METHODS:** A Markov model was developed with a lifetime timeframe where a hypothetical NVAf patients' cohort is treated with Vitamin-K antagonists (VKAs), antiplatelet drugs (ASA) or no therapy. Patients remain stable or progress towards other health states (ischemic or hemorrhagic stroke, myocardial infarction and bleedings) until death. The base case compares rivaroxaban with VKAs. In subgroup analyses, rivaroxaban is compared with patients at highest unmet medical need: 1. VKA patients with poor INR control, 2. patients under ASA or 3. not treated. Clinical data were derived from ROCKET-AF trial or a network meta-analysis. Utility data were retrieved from published literature. Health care resources consumption was valued using average regional tariffs in Italy. Since rivaroxaban price is not officially published, the price of the first novel oral anticoagulant approved in this indication in Italy was considered. Model outcomes are expressed in terms of incremental cost per quality adjusted life year (QALY) gained (ICER). Univariate and probabilistic sensitivity analyses were performed. **RESULTS:** In the base case, rivaroxaban showed to be cost-effective compared to VKA with an