glaucoma visited practitioners more often (+0.74 / year), had more exams (0.42), and were more likely to be using drug combinations (+28.5%) and to be hospitalised (+16.2%). Drugs represented the bulk of the expenses followed by exams and office visits. Two main clinical factors contributed to costs: abnormalities of the papilla due to the presence of glaucoma (+ EURO 96.43) and the number of treatment switches (+ EURO 127.62 / switch). These were followed by IOP (+ EURO 7.08 / mm Hg) and VA (+ EURO 41.37 / 2 Lines lost VA). In comparison to work conducted in the mid-nineties, drug costs increased while hospital costs decreased, although methodologies were different. **CONCLUSION:** Two independent factors explained the bulk of total cost variance: the presence of glaucoma and therapy switches. They contributed independently in an additive way to total cost. Under isotropic hypotheses, effective early treatment strategies aimed at postponing the effects of glaucoma and controlling IOP are expected to be cost saving in the long-term.

PES3

LIFE-LONG SOCIETAL NET VALUE OF GLAUCOMA TREATMENT: A MARKOV MODEL APPROACH

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OBJECTIVE: To assess and to identify the key variables of the life-long societal net value of glaucoma treatment. **METHODS:** A Markov model was used to reproduce the average discounted cost of glaucoma treatment over 40 years in France on a 47-year-old cohort (52% female). Clinical states were first to fourth line treatment, no treatment, laser, surgery, blindness and death. All patients started first line, went successively to the next line after failure. After each failure (and always after the fourth line) patients could have either laser or surgery followed by no treatment, or a new first line treatment. Transition probabilities and resource utilisation came from of a cross-sectional study with 5 years retrospective data collection for the glaucoma treatment, and from national statistics. In-patient and out-patient direct medical costs and indirect costs were estimated from a societal point of view. The discount rate was fixed at 5%. Sensitivity analyses and second order Monte-Carlo simulation were performed. **RESULTS:** Life expectancy of this cohort was 32.5 years. Discounted total cost was €6,990 compared to €14,133 without discounting. Patients spent 12.3 years in first line, 5.1 in second, 3.9 in third, and 3.2 in fourth, and 5.7 without treatment. They had 1.1 laser treatments and 1.2 surgeries on average. They were legally blind for 2.1 years on average. Increasing first line treatment duration by 25% would reduce discounted total cost to €6,709, or €13,368 without discounting. Patients would stay 1.9 years more in first line, 0.8 years less in second, 0.6 years less in third, 0.6 years less in fourth and 0.3 years less without treatment. The use of surgery and laser

would decrease by 10%. **CONCLUSION:** Increasing first line glaucoma treatment duration is a cost saving approach over life of a patient according to our model.

PES4

A DISEASE SEVERITY STAGING SYSTEM FOR MEASURING THE COST OF GLAUCOMA PROGRESSION IN EUROPE

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OBJECTIVES: In order to conduct a multi-national retrospective chart review with the purposes of assessing resource utilization and costs associated with disease progression in Europe, a glaucoma staging system (GSS) was needed. To date no universally accepted GSS exists, particularly one that takes into account economic considerations. We developed and tested a modified system to allow for unambiguous stage assignment of patients experiencing varied severity of disease. **METHODS:** A review of currently developed GSSs was conducted and the Bascom Palmer GSS was selected as most adaptable for economic analyses. A modified-Delphi panel of physicians specializing in glaucoma treatment suggested modifications to the system, with the end goal of assessing the economic impact of treating glaucoma. Three centers were identified in each of the four participating countries: France, Germany, Italy and U.K. Approximately 12 charts per center were selected based on the inclusion/ exclusion criteria described in the study protocol. The revised GSS was applied on all identified charts to classify patients by disease severity. Clinical and demographic data were obtained from the charts and national-level financial data were obtained from health economists in each country. **RESULTS:** The final GSS comprises six stages based principally on visual field parameters. End-stage disease definition was based on poor visual acuity and inability to perform visual fields. The staging system was able to classify over 100 identified charts of glaucoma patients from normal to end-stage disease, and facilitated resource utilization abstraction by individual stage. **CONCLUSIONS:** An improved GSS to track progression was designed which allows staging of patients from historical chart data. This GSS may be used to monitor long-term progression and is a useful tool for the purposes of assessing the economic impact of glaucoma progression. The tool should be tested prospectively to determine its ultimate utility in clinical practice.

PES5

COST-UTILITY ANALYSIS OF TIMOLOL VERSUS LATANOPROST VERSUS TRAVOPROST IN THE TREATMENT OF GLAUCOMA AND OCULAR HYPERTENSION

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OBJECTIVE: To compare the incremental cost-utility ratio (ICUR) of latanoprost and travoprost versus timolol in France. **METHOD:** The probability to develop a visual field defect (VFD) was issued from a double-masked double-dummy, phase III multi-centre clinical trial comparing travoprost 0.004% od, latanoprost 0.005% od and timolol 0.5% bid, using the 2 discriminant functions (stable and progressive patients) published by Stewart, 1993. A Markov model was constructed to reproduce the cost and utility of a patient treated over five years, including the following states: VFD and no VFD. Utility was derived from Brown (2000), based on visual acuity. Direct medical and indirect costs were estimated from a five-year retrospective patient chart analysis. Both costs and outcomes were discounted at a 5% rate. The economic perspective was the one of Society. Sensitivity analysis was performed on the 25th to 75th percentile range of the discriminant empirical distribution function. **RESULTS:** The ICUR of latanoprost over timolol was €20,327/QALY and €15,374 for travoprost. Results without discounting were similar, €20,150 and €15,196, respectively. At the 25th percentile of the discriminant function, the ICUR were €58,250 and €38,428 respectively and €11,262 and €11,639 at the 75th percentile. At the median of the distribution function, travoprost in comparison to latanoprost brings 0.01 QALY at a €51 additional cost. **CONCLUSION:** According to our model, travoprost is a cost-effective alternative to timolol. The additional cost to be paid for one QALY in comparison to timolol is lower with travoprost than with latanoprost.

PATIENT REPORTED OUTCOMES AND HEATH SYSTEM ECONOMIC IMPACT OF A REFORMULATION TO IMPROVE BRIMONIDINE 0.2% PATIENT OUTCOMES

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OBJECTIVE: To improve patient reported outcomes of brimonidine 0.2% ophthalmic solution, a new formulation was researched and developed. The intent was to improve patient satisfaction and patient comfort while maintaining patient efficacy. The economic impact of these improvements was also evaluated. **METHODS:** Randomized, controlled trials were conducted in 743 patients to evaluate the original formulation vs. the new formulation. The new formulation reduced the concentration of the active ingredient from 0.2% to 0.15% and replaced the preservative, benzalkonium chloride (BAK), with Purite. Patient outcomes were satisfaction and comfort level with the product. The economic evaluation model estimated the annual cost per patient including pharmacy and medical office visits (including those that may occur due to adverse events.) **RESULTS:** More patients were satisfied with the new formulation (83%) than the original (75%) (p < 0.05). 85% of patients reported the new formulation was comfortable vs. 79% for the original. Approximately 90% of the new formulation patients had no reported ocular allergy vs. 84% of the original formulation patients. Considering the additional costs associated with allergy as an additional office visit, the economic model estimated the cost of an allergy patient was 36% higher than for an allergy free patient. **CONCLUSION:** Patients receiving the new 0.15% reformulation of brimonidine rated their treatment satisfaction and comfort level higher than patients on the original formulation while experiencing the same level of efficacy. The estimated cost savings for allergy-free patients could have a positive impact on medical budgets.

COST-UTILITY OF VITAMINS FOR THE TREATMENT OF MACULAR DEGENERATION

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OBJECTIVES: High-dose vitamin supplementation (HDVS) has recently been demonstrated to be of benefit for the prevention of progression of age-related macular degeneration (AMD) by the investigators of the Age-Related Eye Disease Study (AREDS), a National Eye Institute-sponsored randomized clinical trial. The aim of our study was to determine the cost-utility of HDVS in patients with the moderately advanced form of "dry" AMD. The analysis was performed from the perspective of a third party-insurer who was considering adding HDVS to their list of insured benefits. **METHODS:** Various decision analyses, based on Markov processing, were performed. Our models incorporated published data from the AREDS, our own patient-based utilities (n = 127) and anticipated reductions in the need for treatments and services needed to treat the "wet" form of this disease. In addition, we created a cost-utility model by considering incremental medical costs incurred through the use of HDVS. Various sensitivity analyses were carried out to determine the robustness of our models. **RESULTS:** Our decision analysis, based on patient-derived utilities, demonstrated that HDVS with both antioxidants and zinc was found to be the preferred method of action, as it was associated with an expected relative gain in utility of 2.9 percent. Monte Carlo simulation demonstrated that the observed difference between treatment and placebo was statistically significant (p = 0.021). Our cost-effective model, which employed a 5% discount rate, demonstrated that the cost per quality-of-life adjusted year (QALY) associated with high dose vitamin supplementation, when applied to patients with the moderately advanced form of dry age-related macular degeneration (group 3 or 4 disease according to the AREDS), was $2,816.63. **CONCLUSION:** High-dose vitamin supplementation of patients with the moderately advanced form of "dry" age-related macular degenera-