HTA will not be the appropriate instrument for its own, but should be used in combination with comprehensive HTA.

THE TIME INCONSISTENCY OF DECISIONS IN PHARMACOECONOMIC SEQUENTIAL DECISION PROBLEMS

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The time inconsistency of decisions (TID) is the phenomenon, studied in various domains of economics, when a decision is optimal from the perspective of one moment in time and ceases being so in a subsequent moment. **OBJECTIVES:** The aim of the study was to check for the feasibility of prevailing of the TID in the pharmacoeconomic sequential decision problems as well as to identify the impact of this phenomenon on the process of decision implementation and its outcomes. **METHODS:** A formal model of sequential decision problems, both with and without uncertainty, based on a graph theory, was provided. In such a framework the decision problem is represented by a graph and a set of functions over the vertices representing the costs, effects and the probability distributions; decision alternatives are subgraphs; alternatives are described by the expected values of costs and effects; the rule of choice is to minimize criterion function of the expected cost and effectiveness, representing the preferences of a decision maker. The flow of time can be modelled by analyzing subsequent decision problems, called reduced problems, being the subgraphs of the original problem obtained by cutting the original graph in a certain vertex. **RESULTS:** There exist criteria susceptible to TID phenomenon, in particular the cost-effectiveness criterion is susceptible to TID in problems both with and without uncertainty and cost-benefit criterion or incremental cost-effectiveness criterion are resistant to TID in these kinds of problems. TID can lead actual decision makers to behave differently than advised accordingly to the model solutions and can make them choose actions that lead to pareto-nonoptimal decisions. **CONCLUSIONS:** The TID is immanently present in pharmacoeconomic decision problems as the widely used cost-effectiveness criterion is susceptible to it. It causes ambiguities in decision problem solving as the actual decision maker(s) may not stick to the model solution in a real life. The effect of this phenomenon can be pareto-nonoptimal behaviour.

COST-ASSESSMENT RE-CONSIDERED: THE CASE OF HIP FRACTURE

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OBJECTIVE: Hip fracture has long been associated with significantly increased morbidity as well as mortality. It is argued that the currently available methodological guidance on cost assessment falls short of distinguishing between costs associated with a hip fracture and costs associated with "old age". **METHODS:** It is suggested that additional insight into this question can be gained by linking data on a patient's resource consumption with his or her outcomes data: In order to establish that costs were directly attributable to the sustained hip fracture, they needed to be accompanied by corresponding changes in physical functioning, and changes in physical functioning which the patient might associate with the sustained hip fracture rather than "old age". An analysis of the incremental health and social care costs associated with 449 hip fractures in Tayside, Scotland (UK) in the year following the fracture suggests that in only a minority of patients did long-term costs due to changes in accommodation needs coincide with a decline in physical functioning. **RESULTS:** Even fewer patients attributed any changes that did occur in this respect to the sustained fracture. Taking outcomes data into account thus reduced the costs, which can be directly attributed to a hip fracture by 40% in this patient group. **CONCLUSIONS:** The data of this patient group thus appears to suggest that cost estimates of hip fracture based on current methodologies of cost assessment are overestimating the real costs of the condition by 40%.

METHODOLOGICAL ISSUES—Modeling

CHALLENGES FOR MODEL-BASED ECONOMIC EVALUATIONS OF GLAUCOMA AND OCULAR HYPERTENSION TREATMENTS

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OBJECTIVES: The few decision analytic models of glaucoma treatment that exist have focused on absolute reduction (in mmHg) of intraocular pressure (IOP) rather than achievement of target IOP, which varies greatly by patient. We provide an overview of an innovative glaucoma model and highlight important modeling challenges. **METHODS:** A simulation model of the management of patients with open-angle glaucoma and/or ocular hypertension was developed in Microsoft Excel. The model examined competing strategies involving sequential use of up to six interventions with switches based on the monthly probability that a patient was "successfully maintained" on therapy. These probabilities were based on discontinuation data from actual clinical practice. Therapy discontinuation could be due to lack of IOP control, adverse events, or lack of compliance/persistence. Outputs of the model include months of treatment, switching frequency, days of IOP control,

frequency of ophthalmologist visits, probability of surgery and total costs. The user can specify country-specific treatment strategies, therapy discontinuation, surgical rates, practice patterns and costs. **RESULTS:** The key challenges included: selection of a disease outcome that was relevant to current clinical practice; choice of time horizon; incorporation of therapy discontinuation; reflection of diversity in treatment options; and consideration of variability in patient response. **CONCLUSIONS:** Modeling the clinical and economic impacts of glaucoma treatment involve challenges shared with other chronic diseases where the definition of treatment success is patient-specific. The model offers insights into accommodating patient-specific variability through the use of persistence distributions from actual clinical practice. The model provides a clinically relevant tool for decision-makers and clinicians to assess management strategies for glaucoma.

A MULTI-OUTCOME DECISION MODEL FOR PARKINSON'S DISEASE

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OBJECTIVE: To develop a generic decision-analytic model for the evaluation of long-term clinical and economic consequences of interventions in patients with Parkinson's disease (PD) which can be applied to different research questions, interventions, and outcomes, and is based on (untreated) biological progression. **METHODS:** We developed a Markov model, in which a hypothetical cohort of patients moves through health states reflecting patient characteristics that are observed under treatment (Hoehn and Yahr "on" state [HYon]) and would be observed in the absence of treatment (Hoehn and Yahr "off" state [HYoff]). We used HYoff I–V s as Markov states, because those reflect underlying biologic progression of PD. Interventions: diagnostic or treatment strategies in PD patients such as Levodopa, dopamine agonists, or other anti-parkinsonian drugs as well as surgical therapies such as deep brain stimulation. Data: Transition probabilities for HYoff states were derived from the literature. The distribution of HYon was modeled conditional on HYoff using studies that report both characteristic. Complications were modeled conditional on HYon using data from a registry established by the "Competence Network Parkinson Disease". Utilities, and costs were modeled conditional on HYon and presence of complication. Mortality is a function of age- and gender-specific background mortality and PD-specific mortality Time horizon: lifetime with annual cycle length. **RESULTS:** Remaining (quality-adjusted) life expectancy, direct costs, and incremental cost-effectiveness ratios. Further outcomes comprise clinical events or complications such as motor complications, dementia, depression, and hallucinations. In addition, complication-free survival, time in HYoff and HYon states, and UPDRS scores were modeled as additional outcomes. Perspective: societal and third party payer. Sensitivity analysis: 1-way and multiway. An interactive interface allows to model different settings or countries. **CONCLUSIONS:** In contrast to formerly published models, this generic PD model has the ability to consider multiple interventions and outcomes and to switch between outcomes depending on which outcomes are reported in a clinical trial.

MODELLING OF PREVALENCE, COSTS AND OUTCOME OF ACID-RELATED DISORDERS USING CLAIMS DATA

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OBJECTIVES: The most wide-spread acid-related disorders are peptic ulcer disease (PUD) and gastroesophageal reflux (GERD). The literature indicates that during past years PUD had been diagnosed less frequently, whereas GERD had been diagnosed more often. Our study aimed at modelling the prevalence of PUD and GERD using claims data of a major sickness fund. The second aim was to quantify the drug expenditures for acid-related disorders and to analyse the outcomes of eradication therapy under non-interventional routine treatment conditions. **METHODS:** On the basis of prescription records from 2000 and 2001, insured persons were classified as GERD or PUD patients according to typical prescription patterns, to the diagnoses of sick leave periods and hospitalisations. According to this classification, the prevalence of acid-related disorders was modelled. Outcomes were analysed by comparing hospitalisations, sick leave periods and costs in groups with and without eradication therapy. **RESULTS:** From a total of 1,408,902 insured persons 134,759 had at least one antacid prescription. With regard to the defined prescription patterns we estimated a 2-year treatment prevalence of 3.93% and 3.77% for PUD and GERD, respectively. Within the 2-year period, drug expenditures for the treatment of acid-related disorders added up to €5.9 and €8.1 million, respectively. For 5,926 out of 41,301 people assumed to suffer from PUD, an eradication therapy could be detected. In groups without eradication therapy the risk for hospitalisation or sick leave periods was twice as high as in groups with eradication therapy. Hospitalisation costs were considerably higher, too. **CONCLUSIONS:** Although eradication therapy was found to reduce the risk for hospitalisation, sick leave periods and costs, this therapeutic approach was practised only for a minor proportion of patients suffering from PUD. Our findings suggest that there is still room for diagnostic and therapeutic improvement in the management of acid-related disorders.