for income was higher than that of health. In all cases, as often observed, hyperbolic discounting characterised by decreasing rate over increasing delay, was ob-

served.

PRM60

GENERAL METHODOLOGICAL ISSUES IN COST-EFFECTIVENESS ANALYSIS INSPIRED BY THE ASSESSMENT OF DASATINIB, NILOTINIB AND IMATINIB FOR 1ST- LINE CHRONIC MYELOID LEUKAEMIA

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OBJECTIVES: In 2011-12, the cost-effectiveness of imatinib, dasatinib and nilotinib for 1st-line chronic myeloid leukaemia in the UK was evaluated by NICE. We discuss three methodological issues which strongly influence the estimated cost-effectiveness of these agents, and present possible solutions for the cost-effectiveness of many other drugs and medical devices. METHODS: We discuss the pros and cons of the following competing methods: 1) Estimation of overall survival: Method A: estimated as the cumulative duration of 1st-, 2nd-, and 3rd-line of treatments. Method B: estimated from the surrogate responses: complete cytogenetic response and major molecular response; 2) Cost-effectiveness of subsequent treatments: the cost-effectiveness of 1st-line drugs are substantially affected by the cost-effectiveness of subsequent drugs. Method A: traditional method of modelling estimated costs and QALYs of subsequent drugs. Alternatively, minimise impact of cost-effectiveness of subsequent treatments by either Method B: setting per patient costs and QALYs of subsequent treatments equal between treatment arms, or Method C: cap the cost-effectiveness ratio whilst on subsequent treatments at the willingness to pay threshold. 3) Future drug prices: This is an important issue given that the patent for imatinib will expire soon, in 2016, whereas nilotinib and dasatinib may fall substantially. Method A: use the current list prices of all drugs in the future, as required by NICE. Method B: assume constant drug prices until patent expiry, at which time assume a fixed price cut. Assuming a modest 25% price cut on patent required by NICE. Method C: assume constant drug prices until patent expiry, at which time allow for the cost-effectiveness of nilotinib and dasatinib.

CONCLUSIONS: This study informs important methodological issues which apply to many health technologies. The study ultimately contributes to more accurate assessments of the cost-effectiveness of health technologies, and hence whether a given technology should be publicly-funded.

PRM61

EXTERNAL VALIDATION OF A CARDIO-VASCULAR DISEASE MODEL

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OBJECTIVES: Cardiovascular disease is the leading cause of death in Germany. For a better communication of the individual risk profile, a group of researchers of the University of Marburg developed ARRiBA, a tool for a better communication between patients and the doctors. However, ARRiBA reports the individual 10-year probability of a cardiovascular event. To further enhance communication and to include lifetime risk and time-to-event estimates in this tool, we developed and validated a state-transition microsimulation model (STMM). The focus of this pre-

sentation is the external validation of our model. METHODS: Our STMM was validated against the results from a US observational multi-cohort study (Berry et al., 2012) which included 18 cohort studies with a total of 257,384 subjects and estimated the lifetime risk of cardiovascular events. Our STMM was populated with 28 cohorts closely matching 7 risk profiles and 4 age groups of the observational study and was evaluated for the time period of data collection in the observational study. Projected outcomes were proportion experiencing myocardial infarction, stroke, cardiovascular death, or any cardiovascular event. These outcomes were compared to the observed outcomes. RESULTS: When comparing the lifetime risk of experiencing any cardiovascular event estimated by the model to the observed data, 15 and 14 of the 28 cohorts were within the 95% confidence intervals of the observed results for men and women, respectively. The other estimates were within two and a half times this range. Although the observational study was a useful source for validation, the validation process was challenging with respect to matching cohorts and outcomes. One issue is whether a validation to a US cohort study is suitable for a European model. CONCLUSIONS: External validation increased our confidence in the microsimulation model. When comparable European data become available the validation will be repeated.

PRM62

TIME-DEPENDENCY FOR TREATMENT SEQUENCES: A CASE-EXAMPLE IN EPILEPSY

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OBJECTIVES: The memory-less feature of Markov models can be a limiting factor when treatment-sequencing needs to be modeled and the transition probability in second- and subsequent-line treatments are not constant. Although funnel-stages are commonly used to model time-dependency, they can become unruly. Hence, patient simulation models and/ or sophisticated software packages such as R are required to model complex time dependency. An alternate method of using nested markov models was presented at a previous conference to model time-dependency in treatment sequence for a hypothetical model in Excel. This method is now applied to a published model to extend the method and to show the results on real data.

METHODS: The Wilby 2004 epilepsy model is used as a reference to derive model inputs and validate results. It is a probabilistic treatment sequencing decision model in epilepsy implemented using R. The nested markov model involves first discounting, then combining the net present values of each treatment into the treatment sequence by weighting proportional to the time spent in the sequence, lastly followed by further discounting to account for place-

mentation in the sequence. Results obtained using the nested markov methods are validated against those published in Wilby 2004. RESULTS: Quality-adjusted life-years obtained with the nested Markov modeling approach were similar and were within the confidence intervals of results obtained by Wilby 2004. CONCLUSIONS: Nested markov models can be a simple alternative to model time-dependency if transpar-

ency of subsequent drugs and medical devices is required. A straightforward and intuitive approach to modeling a fixed treatment sequence, however, it may not be suitable if the position in a sequence is inter-changeable, and treatment effectiveness depends on the position in a sequence (e.g. cancer therapies where disease progression impacts treatment effectiveness).

PRM63

LONG-TERM BURDEN OF ASTHMA IN CHILDREN WITH ALLERGIC RHINITIS/ CONJUNCTIVITIS

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OBJECTIVES: To assess the long-term burden of asthma in children with allergic rhinitis/conjunctivitis. METHODS: We reviewed the literature on incidence of asthma in patients with allergy. Furthermore we estimated long-term outcomes associated with allergic rhinitis/conjunctivitis in children using a Markov health state model. RESULTS: Projected outcomes were proportion experiencing myocardial infarction, estimated the lifetime risk of cardiovascular events. Our STMM was populated with 28 cohorts closely matching 7 risk profiles and 4 age groups of the observational study and was evaluated for the time period of data collection in the observational study. Projected outcomes were proportion experiencing myocardial infarction, stroke, cardiovascular death, or any cardiovascular event. These outcomes were compared to the observed outcomes. RESULTS: When comparing the lifetime risk of experiencing any cardiovascular event estimated by the model to the observed data, 15 and 14 of the 28 cohorts were within the 95% confidence intervals of the observed results for men and women, respectively. The other estimates were within two and a half times this range. Although the observational study was a useful source for validation, the validation process was challenging with respect to matching cohorts and outcomes. One issue is whether a validation to a US cohort study is suitable for a European model. CONCLUSIONS: External validation increased our confidence in the microsimulation model. When comparable European data become available the validation will be repeated.

PRM64

BAYESIAN MTC MODELS TO COMBINE EVIDENCE FROM DIFFERENT TRIAL DESIGNS

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OBJECTIVES: Bayesian mixed treatment comparison models (MTCs) provide a powerful methodology to obtain estimates of relative efficacy between alternative treatments when head to head evidence is not available or not sufficient. Most evaluations only consider evidence from randomized controlled trials (RCTs), while information from other trial designs is ignored. In this work we propose 3 methods to extend MTC models to systematically include evidence from different trial designs using an application in Rheumatoid Arthritis (RA). METHODS: A sys-

ternatic literature review identified 13 RCTs and 3 observational trials assessing the treatment effects of five anti-TNF agents currently licensed in Europe. Naive Pool-

ing does not differentiate between designs, one simply pools across all studies. It is not possible to down-weight designs of lesser quality or to adjust for bias. Alterna-

tively observational data can be analysed separately and the results used to inform the MTC model. This allows for bias adjustments and controlling the influence on the overall effect. In addition to that, a 3-level hierar-

chical model allows the direct comparison of estimates on study type level to overall level. The method accounts for between trial design heterogeneity; overall estimates become more conservative when study type estimates differ. RESULTS: Including evidence from observational trials to estimate the relative effec-

tiveness between anti-TNF agents in RA has strengthened our belief in the effect estimates. Overall, the observational trial data found less difference between the agents than was reported by RCT evidence and results from observational trials are available for many disease areas providing additional information on treatment effec-

tiveness. We think it is important for an informed decision making process to include all available evidence. The proposed techniques provide a framework for systematically including evidence from different trial designs in a MTC model.

PRM65

A MINIMAL INFORMATION DECISION-AnALYTIC APPROACH TO EARLY HTA OF DIAGNOSTIC TESTS

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OBJECTIVES: To assess the long-term burden of asthma in children with allergic rhinitis/conjunctivitis. METHODS: We reviewed the literature on incidence of asthma in patients with allergy. Furthermore we estimated long-term outcomes associated with allergic rhinitis/conjunctivitis in children using a Markov health state model. RESULTS: Projected outcomes were proportion experiencing myocardial infarction, estimated the lifetime risk of cardiovascular events. Our STMM was populated with 28 cohorts closely matching 7 risk profiles and 4 age groups of the observational study and was evaluated for the time period of data collection in the observational study. Projected outcomes were proportion experiencing myocardial infarction, stroke, cardiovascular death, or any cardiovascular event. These outcomes were compared to the observed outcomes. RESULTS: When comparing the lifetime risk of experiencing any cardiovascular event estimated by the model to the observed data, 15 and 14 of the 28 cohorts were within the 95% confidence intervals of the observed results for men and women, respectively. The other estimates were within two and a half times this range. Although the observational study was a useful source for validation, the validation process was challenging with respect to matching cohorts and outcomes. One issue is whether a validation to a US cohort study is suitable for a European model. CONCLUSIONS: External validation increased our confidence in the microsimulation model. When comparable European data become available the validation will be repeated.
The use of health economic models in Hungarian health technology assessment.

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OBJECTIVES: To identify the possible problems and trends regarding health economic modelling in Hungarian Health Technology Assessment. We were especially interested in the general quality of health economic models. METHODS: We analyzed the communication texts based on a health economic model, assessed by the Hungarian HTA Office since 2004. We created a database in which we summed up our findings: the type of the model, the quality and robustness of the model, the type of disease which was modelled. We sorted the models by these criteria and calculated the scores for each model. RESULTS: The models were classified in five categories: (1) Markov models, (2) Discrete Event Simulations (DES), (3) Decision Analytic Models (DAM), (4) Hybrid models, and (5) others. The most common type of model was the Markov model (48%), followed by DAM (24%) and DES (15%). The robustness of the models varied widely, with some models being very robust and others being comparatively weak. We also compared the quality of the models with the results of previous studies. CONCLUSIONS: Hungarian health technology assessment is facing challenges in terms of model quality and robustness. The implementation of new technologies and therapies requires a clear understanding of model quality and robustness to ensure that the models are effective and reliable.