

and utility, providing an opportunity to evaluate estimates of utility from physical function. **METHODS:** A total of 2070 patients with active RA participated in 4 clinical trials (ARMADA, DE011, DE019 and STAR). The Health Assessment Questionnaire Disability Index (HAQ) measured physical function for all patients and the Health Utilities Index Mark-3 (HUI3) measured utility for 2000 patients at baseline and months 3 and 6. HAQ scores range from 0 (good physical function) to 3. HUI3 was regressed on HAQ using both repeated measure mixed models and cross-sectional models controlling for age, sex, disease duration, clinical trial and fatigue (measured by the Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F)). The cross-sectional models used end-of-study data with Last Observation Carried Forward (LOCF) imputation. These analyses include the 1990 patients with non-missing values for these variables. **RESULTS:** The mixed models and the cross-sectional models provided almost identical coefficient estimates. Disease duration and trial were not significant and were deleted from the model. Age (in years) was statistically significant but trivial ($\beta = 0.00087$). The basic estimated cross-sectional model was: $HUI3 = 0.76 - 0.28 * HAQ + 0.05 * FEMALE$ ($p < 0.0001$ for each regressor, Adj. $R^2 = 0.49$). However, the relationship between HUI3 and HAQ appears to be non-linear: coefficients for HAQ-squared and HAQ-cubed were significant ($p = 0.013$ and $p = 0.003$, respectively) when added to the regression. Adding FACIT-F to the basic cross-sectional model substantially improved model fit (Adj. $R^2 = 0.63$). **CONCLUSIONS:** The basic algorithm developed in this study is consistent with published predictions of utility from HAQ (Kobelt et al., Arthritis and Rheumatism, 1999). However, these algorithms' predictions are limited and should only be used when direct utility scores are not available.

SESSION III

INFECTIOUS DISEASE STUDIES II

IN4

DISCOUNTING HEALTH BENEFITS: A NOVEL APPROACH TO ENSURE PROPER VALUING OF VACCINATION STRATEGIES

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OBJECTIVES: During the last ten years the influence of pharmacoeconomics has increased in decision-making. Due to budget constraints, decision makers often have to choose which intervention is given priority, for example, using league tables. The current practice of discounting both health and monetary benefits at the same rate places a higher priority on direct medical interventions, with health benefits occurring immediately. Due to this, pre-

ventive interventions such as vaccination strategies are possibly under-appreciated, leading to inconsistencies. Some researchers have suggested to not discount health benefits at all. We developed a novel approach combining the rationales underlying both theories of fully and not-at-all discounting of health benefits. We illustrate our novel approach with the conjugate meningococcal B/C vaccine for newborns in the Netherlands. **METHODS:** Firstly, we discard the relevance of the Keeler-Cretin paradox for day-to-day practice. Secondly, we note that by discounting the analyst implicitly corrects for a number of uncertainties and preferences, which are among others time preference and force of innovation. Our novel approach appreciates these factors, but also elaborates on the uncertainty that is already implicitly covered in the concept of life-years gained, which is part of the QALY assessment. **RESULTS:** Our illustration for vaccination with the conjugate meningococcal B/C vaccine renders estimates per QALY gained of €16,000 (monetary figures and QALYs discounted at 4%), €7000 (monetary figures discounted at 4%, QALYs non-discounted) and approximately €10,000 (monetary figures at 4% and QALYs according to the novel approach). **CONCLUSIONS:** We have developed a novel approach for discounting health benefits that may be considered a consensus approach between fully and not-at-all discounting of health benefits. The method can be applied to vaccines. Its application may ensure a more proper pharmacoeconomic valuing of vaccination strategies.

IN5

ECONOMIC EVALUATION OF A LARGE-SCALE MENINGOCOCCAL C VACCINATION PROGRAM IN THE NETHERLANDS

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OBJECTIVES: In the Netherlands, the incidence of meningococcal C infections has strongly increased during the last years. Should the Netherlands follow the UK and start a large-scale meningococcal C vaccination campaign? We calculated the health effects and costs of such a vaccination program. **METHODS:** The health effects, the costs and savings, as well as the cost-effectiveness of vaccinating all persons aged 14 months to 19 years in the Netherlands against meningococcal C infection was estimated, from a societal perspective using a decision analytic model. Data were derived from the Netherlands Reference Laboratory for Bacterial Meningitis, the Dutch costing guidelines, PRISMANT Healthcare, and national and international literature. Direct and indirect costs