65. Similarly, a 5-point lower MCS score among those with depression was associated with a 14% increase in MRS at age 25 but only at age 55. **CONCLUSIONS:** Differences in SF-12v2 scores, particularly PCS, had substantial impact on MRS, allowing enhanced interpretation of intervention-based improvements in SF-12v2 scores. In arthritis and depression, age significantly impacted the association between HRQL and MRS.

**PP3**

**CONDITION SPECIFIC UTILITIES: IMPACT ON ICER IN A MARKOV MODEL FOR MULTIPLE SCLEROSIS**

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**OBJECTIVES:** Perceived and observed insensitivity of the EQ-5D instrument in certain clinical areas has led to the development of condition specific preference based instruments, also for Multiple Sclerosis (MS). It is uncertain how these instruments perform in economic evaluations. This study investigates the effect on the incremental cost-effectiveness ratio (ICER) of using multiple sound specific utility values vs. generic utility values. **METHODS:** A Markov model with a lifetime time horizon comparing symptom management with subcutaneous glatiramer acetate was based on a previously published study. The model has four EDSS health states and two regimes of specific anticatabolic capacity and discontinuation of therapy. Costs and effects were discounted with 3%. For this study, QALYs were calculated with utility values from the MSIS-12, a sensitive condition specific utility instrument based on a Time-Trade-off valuation of MSIS-29, and EQ-5D utility values. Values were both taken from the UK risk sharing scheme. Deterministic and Monte Carlo simulation based probabilistic sensitivity analyses were used to assess impact on ICER. **RESULTS:** The mean ICER after 5000 simulations was £291.545 using MS specific utilities, and 180.633 using EQ-5D based utilities. **CONCLUSIONS:** This study used condition specific and generic utility values in a hypothetical Markov model for relapsing remitting MS patients and showed that the incremental cost-effectiveness ratio was 60% higher when applying the condition specific utilities. Contrary to what might be expected, the condition specific utility instrument was not better at demonstrating treatment value than the generic EQ-5D.

**PP4**

**THE RELATIONSHIP BETWEEN GLUCOSE-LOWERING MODIFICATIONS, ADHERENCE, AND OUTCOMES IN PATIENTS WITH TYPE 2 DIABETES**

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**OBJECTIVES:** Addherence to diabetes medications per day, adherence, glycaemic control and Quality of life (Qol). **METHODS:** Data were drawn from the 2013 Diabetes Disease Specific Programme, a large cross-sectional real-world survey of primary care physicians (PCP) and specialists and their patients consulting for diabetes. Physicians provided clinical data including treatment and non-adherence of medications recorded in RWD databases, and patients were asked about the number of oral and injectable diabetes medications per day, adherence, glycaemic control and Quality of life (Qol). **RESULTS:** The mean ICER after 5000 simulations was £291.545 using MS specific utilities, and 180.633 using EQ-5D based utilities. **CONCLUSIONS:** This study used condition specific and generic utility values in a hypothetical Markov model for relapsing remitting MS patients and showed that the incremental cost-effectiveness ratio was 60% higher when applying the condition specific utilities. Contrary to what might be expected, the condition specific utility instrument was not better at demonstrating treatment value than the generic EQ-5D.

**RM5**

**NETWORK META-ANALYSIS OF BIOLOGICAL RESPONSE MODIFIERS IN RHEUMATOID ARTHRITIS INCLUDING REAL WORLD EVIDENCE AT MULTIPLE TIME POINTS**

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**OBJECTIVES:** Network meta-analysis (NMA) is widely used to compare multiple interventions of interest when head-to-head comparisons of active treatments are not available. Most NMAs pool data from randomized controlled trials (RCT) on a single clinical outcome. However, in the case of chronic diseases such as rheumatoid arthritis (RA), outcomes are often reported at different time points and long-term real world data is used as part of natural history models. The model includes different time measure in NMA, especially from both a regulatory and reimbursement perspective, is thus warranted and is considered here. **METHODS:** RCTs and observational studies evaluating biological agents in RA were searched using standard filters and electronic databases. Networks of RCTs were supplemented with RWD to include outcomes excluded for as many time points as possible. Multivariate NMA models were extended to incorporate repeated measures, adjusting for correlation between time points and bias of RWD. Sensitivity and scenario analyses were performed to test different network sizes, correlation structures and bias adjustments. **RESULTS:** Addition of RWD and studies reporting treatment effects at multiple time points significantly increased the evidence base for NMA in RA. The inclusion of RWD led to a reduction in the level of uncertainty around most of the effect estimates. Furthermore, the additional evidence from multiple times has potential of reducing uncertainty by ‘borrowing’ evidence and giving a fuller view of treatment effect over time, not just at a specific single time point. **CONCLUSIONS:** Initial evaluation of these models in NMA indicates that extending an evidence base to include repeated measures and RWD maximises study network sizes and can significantly impact the level of uncertainty in treatment effects. Further investigation of correlation and bias modelling is warranted, as too is the application of new NMA fractional polynomials model to RA.

**RM7**

**SIMULATION OPTIMISATION OF TREATMENT SEQUENCES FOR RHEUMATOID ARTHRITIS**

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**OBJECTIVES:** Using simulated annealing (SA) to inform the economic evaluation of treatment sequences for rheumatoid arthritis (RA). **METHODS:** A discrete event simulation (DES) model was developed to estimate lifetime costs and Quality Adjusted Life Years (QALYs) of alternative sequences for the treatment of patients with severe RA. Thirteen Disease Modifying Anti-Rheumatic Drugs (DMARDs) can be used sequentially, with a theoretical maximum size of the decision space of over 1 billion unique sequences. This problem can be formulated as an optimisation problem – finding the treatment sequence that maximises net monetary benefit (NMB). However, it was not feasible to evaluate the NMB of every treatment sequence in the decision space. SA, a stochastic optimisation algorithm, was used to identify a sequence that was optimal, or near optimal. Given the evaluation of the NMB of some particular sequence by the DES model, the SA algorithm then selects a “nearby” sequence to evaluate. Better solutions are accepted, and worse solutions are sometimes accepted with a probability reducing as the algorithm progresses. This attempts to prevent the optimiser from getting stuck in a local optimum. **CONCLUSIONS:** The optimisation of the parameters of the SA algorithm was undertaken, and scenario analysis was performed. **RESULTS:** At a willingness to pay of £50,000 per QALY gained, the best performing sequence found was exclusively composed of conventional DMARDs. At £50,000 per QALY gained, the best performing sequence began with conventional DMARDs for the first four treatment lines, before beginning biologic DMARD treatment. The results were consistent when re-run, and when alternative specifications of the SA algorithm were used. **CONCLUSIONS:** SA is a computationally intensive technique, but it has a range of possible applications. In this instance, SA performed well and may be an appropriate method for health resource allocation decision-making where there is a large decision space.