Figure:

Figure 1 Summary of economic evaluation.
(A-D) Cost-effectiveness planes and cost-acceptability curves for the different initial treatment strategies compared to each other.
IMTX 25mg/week, HCQ 400mg/day, GCs oral tapering scheme starting with 15mg/day.
Abbreviations: EQ-5D, Dutch EuroQol-5D; iHCQ, initial hydroxychloroquine; IGCs, initial glucocorticoids; IMTX, initial methotrexate;
QALYs, Quality Adjusted Life Years; WTP, willingness-to-pay.

Disclosure of Interests: None declared
DOI: 10.1136/annrheumdis-2020-eular.1394

OP0284

AN AGENT-BASED SIMULATION OF THE EFFECTS OF VARYING TIME TO TREATMENT WITH BIOLOGICAL AGENTS ON PATIENT HEALTH AND COST IN AXIAL SPONDYLOARTHRITIS USING NATIONAL REGISTER DATA

A. Roach¹, I. Scott², G. Macfarlane³, G. T. Jones³, A. Macgregor⁴. ¹University of East Anglia, Norwich, United Kingdom; ²Keele University, Keele, United Kingdom; ³University of Aberdeen, Aberdeen, United Kingdom; ⁴University of East Anglia, Norwich, United Kingdom

Background: Evaluating the long-term impacts of healthcare policies on patient's health and treatment costs for people with axial spondyloarthritis (axSpA) is challenging due to its chronic nature, and the variation in individual patient journeys post-diagnosis. Agent-based simulations are a novel approach to interrogating this complexity, and allow the consequences of different policy scenarios on outcomes to be explored.

Objectives:

1. Develop and validate an agent-based simulation of the UK axial spondyloarthritis healthcare system, using real-world data.
2. Interrogate the effects of earlier biologic treatment on costs and patient outcomes.

Methods: Anonymised data were obtained from the UK National Early Inflammatory Arthritis Audit, and BSR Biologics Register (BSRBR-AS). This provided data on 162 units, and 702 patients with 1,631 patient-years of follow-up. An agent-based model was designed and programmed on the NetLogo platform to simulate patients and units individually over time. New patients were created based on national disease prevalence statistics. Patients' disease journeys were modelled with a Bath AS Disease Activity Index (BASDAI) score. The model included hospital outpatient attendances, treatment histories, drug costs, and key patient demographics. The baseline simulation was run for two simulated years, repeated 10 times, and assessed against the BSRBR-AS dataset for validation. The model was subsequently used to explore five experimental scenarios in which the time between the date of diagnosis, to first introduction to biologics (d-b) was varied by increasing the number of appointments. The experiment was run 10 times for each parameter setting.

Results: In the baseline model in a typical two year run, 13,631 new patients attended 5,167 baseline, and 6,966 follow-up appointments. Of these, 6,324 and 623 were prescribed ≥ 1 NSAID, and biologics, respectively. The validation comparison tests showed a high-level of similarity between simulated output and target datasets. In the target data, d-b was 250 days. In the experimental scenarios, as might be expected, earlier biologic access improved outcomes but at higher-costs (Figure 1; Table 1). Reducing d-b to 150 days doubled the number of patients on biologics at 2 years from 623 to 1,286. It also led to 8% more patients achieving a BASDAI of 0 to 2.5 at 2 years, with 5%, 1%, and 2% less patients achieving 2.5 - 5, 5 to 7.5 and 7.5 to 10 BASDAI, respectively. Reducing d-b to 150 days increased drug costs from £3.2 million to £8.8 million. However, the total number of appointments (a proxy for staff costs) increased proportionally less from 16,000 to 20,000.

Table 1. Influence of varying the time between diagnosis to biologic treatment (d-b) on drug-use and staffing costs

Diagnosis to Biologic (d-b)	Drug Costs Unit (£k)	Total Appointments	No. patients prescribed NSAIDs	No. patients prescribed Biologics
150	8,796	20,384	7,154	1,283
220	5,702	18,592	6,796	971
250	3,259	16,214	6,324	621
260	2,054	14,700	5,968	382
265	1,297	13,411	5,562	233

Figure 1. Influence of varying the time between diagnosis to biologic treatment (d-b) on 2 year BASDAI outcome

Conclusion: We have successfully developed, and validated an agent-based approach to model the effect of key policy changes on the whole healthcare system, providing output estimates of cost and patient outcomes, based on integrated real-world data. To our knowledge this is the first attempt to explore the patient journey in people with axSpA in this way. The model provides a useful tool for exploring the effects of changing the way healthcare is delivered to patients with this disease. Our experimental analysis lends support to the case for increasing staffing and drug expenditure to achieve current NICE standards of care in AS.

Acknowledgments: Financial support National Axial Spondyloarthritis Society (NASS), data access BSR.

Disclosure of Interests: Alan Roach Grant/research support from: I was awarded an I-CRP grant from Pfizer for a similar simulation in RA, this was for about £50k and ran from 1/9/15 to 28/2/17, Ian Scott: None declared, Gary Macfarlane: None declared, Gareth T. Jones Grant/research support from: Pfizer, AbbVie, UCB, Celgene and GSK., Alex MacGregor: None declared

DOI: 10.1136/annrheumdis-2020-eular.1507

OP0285

TOWARDS IMPLEMENTING THE OMOP CDM ACROSS FIVE EUROPEAN BIOLOGIC REGISTRIES

E. Burn¹, L. Kearsley-Fleet², K. Hyrich³, M. Schaefer⁴, D. Huscch⁵, A. Strangfeld⁶, J. Zavada⁶, M. Lagová⁷, D. Courvoisier⁸, C. Tellenbach⁹, K. Lauper¹⁰, C. Sánchez-Piedra¹¹, N. Montero¹¹, J. T. Sanchez-Costa¹¹, D. Prieto-Alhambra¹². ¹University of Oxford, NDORMS, Oxford, United Kingdom; ²The University of Manchester, Centre for Epidemiology Versus Arthritis, Manchester, United Kingdom; ³The University of Manchester, Manchester Academic Health Science Centre, Centre for Epidemiology Versus Arthritis, Manchester, United Kingdom; ⁴Epidemiology Unit, German Rheumatism Research Center, Berlin, Germany; ⁵Epidemiology Unit, German Rheumatism Research Center, Berlin, Germany; ⁶Institute of Rheumatology, Prague, Czech Republic; ⁷Institute of Biostatistics and Analyses Ltd, Brno, Czech Republic; ⁸Division of Rheumatology, University Hospitals of Geneva, Geneva, Switzerland; ⁹Swiss Clinical Quality Management in Rheumatic Diseases, Zurich, Switzerland; ¹⁰Centre for Epidemiology Versus Arthritis, The University of Manchester, Manchester Academic Health Science Centre, Manchester, United Kingdom; ¹¹Research Unit, Spanish Society of Rheumatology, Madrid, Spain; ¹²University of Oxford, NDORMS, Oxford, United Kingdom

Background: The Observational and Medical Outcomes Partnerships (OMOP) common data model (CDM) provides a framework for standardising health data.

Objectives: To map national biologic registry data collected from different European countries to the OMOP CDM.