NIHR | Manchester Biomedical Research Centre

The National Institute for Health and Care Research (NIHR) Manchester Biomedical Research Centre (BRC) and NIHR Manchester Clinical Research Facility (CRF): Inclusive Research examples

Title	Aggregate distributional cost-effectiveness analysis of biologics for rheumatoid arthritis
BRC Cluster(s)	Inflammation
BRC Theme(s)	Rheumatic and Musculoskeletal Diseases
Inclusive Research Element	Methodological: aggregate distributional cost-effectiveness analysis (DCEA)
Rationale for case study	To provide quantitative evidence of the health equity impact of prescribing a biologic for the treatment of moderate to severe rheumatoid arthritis in NHS England.
Background	Biological medicines (hereafter 'biologics'), designed to target components of the immune response, have been shown to be highly effective as treatments for moderate to severe rheumatoid arthritis (RA). Specifically, biologics can reduce the symptoms of RA, slow the rate of disease progression, and improve physical function and quality of life measures. In NHS England, recommendations for the use of biologics, and their biosimilars ('copy' of an existing biologic), have been produced biologics for the treatment of severe, active RA in adult patients when the response to disease-modifying anti-rheumatic drugs including methotrexate has been inadequate. These recommendations are based on technology appraisals, using the results of model-based cost-effectiveness analysis, conducted by The National Institute for Health and Care Excellence. In 2001, the British Society of Rheumatology joined a collaboration between The University of Manchester and relevant pharmaceutical companies to establish a cohort study, the British Society for Rheumatology Biologics Register(BSRBR – RA), following people with RA-prescribed biologics, or more recently targeted synthetic medicines (JAK inhibitors) with the primary goal of monitoring their safety in routine clinical practice. Since its inception, the BSRBR has registered ~ 30,000 people with RA. It has been observed in a sample of the first 10,749 subjects [2,545 men and 8204 women] who commenced on their first anti-tumour necrosis factor (TNF) agent between 2001 and 2008 and were recruited to the BSRBR-RA during a time of mandated recruitment, only 3.9% of patients of the sample were non-Caucasian. Another important factor potentially affecting response to a biologic is an individual's socio-economic status. In England, the official measure of relative deprivation that is commonly used as an index for socioeconomic status, is known as the Indices of Multiple Deprivation (IMD). Current economic evidence supporting the use of biologics for moderate to severe RA uses a decision model to show the average effect on healthcare costs and health consequences (quality-adjusted life years (QALYs)). Researchers and policymakers may also be interested in whether those changes in costs and health (QALYs) are the same or different across different population groups (such as socioeconomic status; and ethnicity). A method called distributional cost-effectiveness analysis can produce equity-informative estimates of cost-effectiveness to show how a healthcare intervention influences the health outcomes experienced in different population groups.
What we did	Data on health benefits (QALYs), costs, and patient populations will be extracted from published model-based cost-effectiveness analyses of biologics for RA. Aggregate DCEA was used to calculate the net health benefit for exemplar biologics distributed to specified sub-groups (IMD; ethnicity). Published inequality measures and estimates of cost-effectiveness will be compared using the health inequality impact plane.

What the outcome(s) is/are	This analysis will produce a measure of the potential health (QALYs) lost when specified (ethnic) groups in a population are not prescribed a biologic for moderate to severe RA. Published inequality measures and estimates of cost-effectiveness for exemplar biologics prescribed for moderate to severe RA will be compared using the health inequality impact plane.
Conclusions	None to date; work ongoing
Recommendations	None to date; work ongoing
Future work	This work is not completed. Future work will present the results of this aggregate DCEA of biologics for moderate to severe RA.

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