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Machine Learning to Predict Remission Between Six and 24 Months in Rheumatoid Arthritis: Insights from the JAK-POT Collaboration

When a rheumatoid arthritis patient starts a new biologic or targeted drug, it is not known whether that drug will bring the disease into remission. This international study analysed nearly 29,000 treatment courses from 11 rheumatoid arthritis registries. It examined whether routine information available could predict remission 6–24 months later using artificial intelligence. An artificial intelligence model was trained on 63 baseline patient characteristics (such as joint counts, patient-reported scores, treatment history...) to predict whether a patient would be in remission. Around 27–29% of treatment courses were followed by remission at least once.

The model was then tested using Swiss registry data. The machine-learning model had moderate accuracy and was better at identifying patients unlikely to reach remission than correctly identifying those who would. Key predictors included patients' assessment of their disease, tender joints, previous advanced treatments, disability, physicians' global assessment, age, inflammation, pain and anti-CCP antibodies. A simpler ten-factor model and conventional statistical regression performed as well as the complex 63-variable artificial intelligence model.

With the data routinely collected in clinics today, we can't yet reliably predict in advance which rheumatoid-arthritis patients will achieve remission on a given drug. A complex artificial intelligence model did not predict that better than a conventional statistical analysis. To get real personalised predictions, future models might likely need richer data (e.g., biomarkers or imaging).

Link to the publication: Machine Learning to Predict Remission Between Six and 24 Months in Rheumatoid Arthritis: Insights from the JAK-POT Collaboration at <https://doi.org/10.1002/art.70165>