Figure:

Figure – Illness Perception Questionnaire items over 12 months, stratified by the latent profiles [10 represents worst illness perception]

B-IPQ1: How much does arthritis affect your life?
 B-IPQ2: How long do you think your arthritis will continue?
 B-IPQ3: How much control do you feel you have over your arthritis? (reverse coded)
 B-IPQ4: How much do you think your treatment can help your arthritis? (reverse coded)
 B-IPQ5: How much do you experience symptoms from your illness? (reverse coded)
 B-IPQ6: How concerned are you about your arthritis?
 B-IPQ7: How well do you feel you understand your arthritis? (reverse coded)
 B-IPQ8: How much does your arthritis affect you emotionally?

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SAT0039

ADAPTIVE DEEP LEARNING FOR THE PREDICTION OF INDIVIDUAL DISEASE ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: Rheumatoid arthritis (RA) lacks reliable biomarkers that predict disease evolution on an individual basis, potentially leading to over- and under-treatment. Deep neural networks learn from former experiences on a large scale and can be used to predict future events as a potential tool for personalized clinical assistance.

Objectives: To investigate deep learning for the prediction of individual disease activity in RA.

Methods: Demographic and disease characteristics from over 9500 patients with 65.000 visits from the Swiss Quality Management (SCQM) database were used to train and evaluate an adaptive recurrent neural network (AdaptiveNet). Patient and disease characteristics along with clinical and patient reported outcomes, laboratory values and medication were used as input features. DAS28-BSR was used to predict active disease and future numeric individual disease activity by classification and regression, respectively.

Results: AdaptiveNet predicted active disease defined as DAS28-BSR > 2.6 at the next visit, with an overall accuracy of 75.6% and a sensitivity and specificity

of 84.2% and 61.5%, respectively. Apart from DAS28-BSR, the most influential characteristics to predict disease activity were joint pain, disease duration, age and medication. Longer disease duration, age > 50 or antibody positivity marginally improved prediction performance. Regression allowed forecasting individual DAS28-BSR values with a mean squared error of 0.9.

Conclusion: Deep neural networks have the capacity to predict individual disease outcome in RA. Low specificity remains challenging and might benefit from alternative input data or outcome targets.

References:

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Figure 1. Examples of true disease activity and corresponding predictions of AdaptiveNet by regression analysis. Predictions are made step to step from the current to next visit.

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SAT0040

RISK FACTORS FOR DEVELOPING AND MORTALITY FOR ACUTE EXACERBATION OF RHEUMATOID ARTHRITIS-ASSOCIATED INTERSTITIAL LUNG DISEASE

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Background: Among collagen vascular diseases, rheumatoid arthritis-associated interstitial lung disease (RA-ILD) is the most commonly associated with ILD with acute exacerbation (AE) [1]. One study reported that ILD diagnosis at an older age, the usual interstitial pneumonia (UIP) pattern on high-resolution computed tomography, and methotrexate (MTX) use were associated with AE in patients with RA-ILD [2]. However, because these studies included few patients, the risk factors and prognosis of AE in patients with RA-ILD remain unclear.