Results: The 333 included patients shared typical characteristics of an early RA population (69.5% being woman, mean(SD) age of 52.3 (13.0) years), with no differences in demographics between patients for the different response profiles. In almost all regression models, the initial clinical response profiles were identified as significant predictors for each psychosocial outcome at week 52 (table 2). A rapid and sustained response, when compared to having a relapse after initial response or a delayed response or no response at all, resulted in higher vitality, less interference with normal social activities, less problems with work or other daily activities because of emotional problems, an improved mental health, more positive beliefs about disease consequences, a higher belief in the effect of treatment, and a more coherent illness understanding.

Abstract FRI0022 – Table 1. Definitions of the self-created profiles of initial clinical response throughout the first year of treatment in patients with early rheumatoid arthritis.

Clinical response* profiles	Group size	Definition of the profiles
Persistent responders	n=140	Early response at week 16 and stability of this response over year 1
Secondary failures	n=92	Early response, but relapse between week 16 and week 52 of treatment
Delayed responders	n=71	Late response, between week 16 and week 52 of treatment
Non-responders	n=30	No response to treatment throughout year 1

* Having a response was defined as a disease activity score (DAS28CRP) <2.6 indicating remission.

Abstract FRI0022 – Table 2. The contribution of the initial clinical response to psychological outcomes (patient-reported) after 1 year of early RA treatment.

Psychosocial outcome at year 1	Number of patients	Persistent responders	Secondary failures	Delayed responders	Non-responders	Adjusted R square of the model
Vitality (SF-36)	n=326	REF	$\beta = -.169^{**}$ (-10.86, 2.85)	$\beta = -.177^{**}$ (-12.46, -3.26)	$\beta = -.270^{**}$ (-23.70, 11.41)	34.6%
Social functioning (SF-36)	n=327	REF	$\beta = -.121^{*}$ (-10.64, 0.78)	$\beta = -.170^{**}$ (-14.41, -3.15)	$\beta = -.325^{**}$ (-32.28, 17.13)	27.0%
Role emotional (SF-36)	n=324	REF	$\beta = -.137^{*}$ (-20.04, 2.49)	$\beta = -.229^{**}$ (-30.32, 10.57)	$\beta = -.199^{**}$ (-40.23, 12.96)	23.8%
Mental health (SF-36)	n=327	REF	$\beta = -.168^{**}$ (-9.71, -2.65)	$\beta = -.112^{*}$ (-8.53, -0.47)	$\beta = -.198^{**}$ (-17.13, -6.25)	37.5%
Consequences (IPQ-R)	n=325	REF	$\beta = .202^{**}$ (1.06, 2.98)	$\beta = .241^{**}$ (1.54, 3.74)	$\beta = .319^{**}$ (3.68, 6.70)	37.4%
Treatment control (IPQ-R)	n=326	REF	$\beta = -.202^{**}$ (-1.65, -0.46)	$\beta = -.221^{**}$ (-1.94, -0.57)	$\beta = -.196^{**}$ (-2.55, -0.71)	10.6%
Illness coherence (IPQ-R)	n=325	REF	$\beta = -.130^{**}$ (-1.83, -0.27)	$\beta = -.111^{*}$ (-1.87, -0.08)	$\beta = -.083$ (-2.27, 0.14)	36.6%

Note. SF-36: Short Form-36 items; IPQ-R: Revised Illness Perception Questionnaire; REF: Reference category: the beta values show the relative difference between each group and the persistent responders group (i.e., the group we chose as the reference category); β : standardized beta coefficient with 95% Confidence Interval; Regression analyses (enter method) were adjusted for age, gender, baseline disease activity, presence of depression, baseline value of the outcome and treatment strategy; Significant results in bold (** $p < 0.01$. * $p < 0.05$).

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FRI0023

FIVE-YEAR PROGRESSION OF RHEUMATOID ARTHRITIS DISEASE ACTIVITY AND QUALITY OF LIFE IN 2002 AND 2011. HAVE REDUCTIONS IN DISEASE ACTIVITY IN RECENT YEARS RESULTED IN IMPROVEMENTS IN QUALITY OF LIFE?

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Background: The treat-to-target (T2T) approach, with earlier, aggressive treatment has resulted in improvements in rheumatoid arthritis (RA) outcomes^{1,2}. Whether these improvements have translated into improvements in patient reported outcomes is less clear. Studies have indicated declines in pain and function as well as depression and anxiety. However, these studies are limited to short

follow-up periods or were restricted to cross-sectional, rather than longitudinal analyses.

Objectives: To assess changes in 5 year progression rates for disease activity and patient reported outcomes in a prospective cohort of early RA patients between 2002 and 2011.

Methods: The Early RA Network (ERAN) is a longitudinal prospective cohort study that recruited 1236 early RA patients from 2002 to 2011. DAS-28 and SF-36 were measured at baseline, 6 months, 12 months and then yearly. Multi-level linear regression were used to model 5 year progression rates of both DAS-28 and SF-36 in patients recruited between 2002–2011. Models controlled for sex and age and seropositivity at baseline. DMARD use at baseline was controlled for using propensity score weighting. Year of diagnosis was entered as a continuous variable, allowing for the mean of the outcome variables to be estimated for 2002 and 2011. Restricted cubic splines were used to account for non-linear progression over time.

Results: Disease activity for patients diagnosed in 2011 demonstrated a statistically significant decrease at year 5 compared to patients diagnosed in 2002 (5 year estimated mean difference –0.35; 95% CI 0.22–0.49, $p < 0.001$). Using the SF-36 measure, Physical Function, Bodily Pain, Vitality (indicating fatigue) and Mental Health indicated similar levels at year-5 between those patients diagnosed in 2011 to those diagnosed in 2002 ($p > 0.05$). Mental health was similar to the normalised population mean of 50, irrespective of year diagnosed. However, levels of vitality/fatigue, function and pain remain less favourable for all early RA patients over the first 5 years.

Conclusions: Although disease activity has shown a marked decline at 5 years between 2002 and 2011, there is little evidence that this has led to improvements of an equivalent magnitude in function, pain, fatigue and mental health. Treatment should also focus on improved function, pain management, fatigue and mental health as part of the T2T protocol.

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FRI0024

DO AGE AND EDUCATION INFLUENCE THE DISEASE ACTIVITY SCORE? AN EXPLORATIVE ANALYSIS IN THE NORWEGIAN COHORT STUDY NOR-DMARD

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Background: While ageing influences auto-immune inflammation and the structure of the joints, knowledge about its influence on appraisal of disease outcomes is more limited.

Objectives: To examine the effect of age and education on the components of the 28-joint Disease Activity Score (DAS28-ESR) in patients with rheumatoid arthritis (RA).

Methods: Baseline data of Disease Modifying Anti-Rheumatic Drug (DMARD)-naïve patients with RA from the Norwegian Register of DMARDs (NOR-DMARD) were used. Linear regression models, adjusted for gender and education (low, intermediate and high level), were used to investigate the strength of the association between age (<45, 45–65 and >65 years) and each DAS28-component (Erythrocyte Sedimentation Rate (ESR), 28-tender joint count (28-TJC), 28-swollen joint count (28-SJC), and patient global assessment of disease activity (PGA)). Adjusted scores for components of DAS28 and total DAS28-ESR were computed and relative change across age categories was explored. Interactions between age and gender and age and education were also tested.

Results: Baseline data from 2037 patients (mean (SD) age 55.2 (14.0) years, 68% female) were available. Regression models were stratified for gender (p – interaction <0.05); education was a significant covariate in all regression analyses. Older males (>65 years) with an intermediate level of education would have a 21% higher ESR and 14% higher 28-SJC, as compared to their younger counterparts (<45 years). For females in the intermediate education category, the corresponding differences were 16% and 15%, respectively. Conversely, differences in 28-TJC and the PGA between the highest and lowest age group were negligible in both males and females (table 1). In absolute effects on DAS28, this means that in male patients the adjusted DAS28 for those >65 years was 4.8 compared to 4.3 in patients<45 years (females 5.0 compared to 4.6). For low and high levels of education, the results were comparable in terms of relative contribution to each DAS28-component.

Abstract FRI0024 – Table 1. Effect of age on DAS28 (ESR) for patients with an intermediate educational level.

Component	< 45 years (reference)	45 – 65 years	> 65 years	Difference between
Predicted values	n = 181 (25%)	n = 419 (58%)	n = 123 (17%)	highest and lowest age group (%)
Males				
28-TJC	1.32	1.33	1.34	2%
28-SJC	0.62	0.66	0.71	14%*
PGA	0.57	0.59	0.58	2%
ESR	1.83	2.00	2.22	21%*
DAS28-ESR	4.34	4.58	4.83	11%
Females				
28-TJC	1.32	1.39	1.33	1%
28-SJC	0.59	0.63	0.68	15%*
PGA	0.67	0.68	0.68	1%
ESR	1.99	2.14	2.31	16%*
DAS28-ESR	4.57	4.84	5.00	9%

Abbreviations: TJC, tender joint count; SJC, swollen joint count; PGA, patient global assessment; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; DAS28, 28-joint Disease Activity Score.
 *Difference in scores is significant (p < 0.05).

Conclusions: As expected, DAS28 increases with age. However, the components of DAS28 increase at different rates. The age-related increase in ESR and 28-SJC without a simultaneous increase in 28-TJC and PGA might imply that age-related processes (e.g. osteoarthritis and physiological increase in ESR) drive the DAS28 in older patients. The observed patterns were largely comparable between males and females. The age effect on DAS28 is relevant in a treat-to-target strategy and may be considered when identifying a defined target in individual patients.

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FRI0025 SERUM MEDIATED PEPTIDYLARGININE DEIMINASE (PAD) ACTIVATION IN EARLY RHEUMATOID ARTHRITIS

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Background: Peptidylarginine deiminases (PADs) are a family of enzymes catalysing the conversion of arginine residues to citrulline, a post translational modification which has been recognised in the generation of neo-epitopes due to anti-citrullinated protein antibodies (ACPAs) in rheumatoid arthritis (RA). ACPAs are

included in the classification criteria for RA, and may be present before disease onset and predictive of disease progression.

Objectives: To investigate whether serum of patients with early RA have the capacity to significantly increase the citrullination performed by PAD enzymes, and the possible role of increased enzyme activation as a mechanism preceding the production of ACPAs.

Methods: Serum from DMARD-naïve, early RA patients from the ARCTIC trial¹ classified according to the 2010 ACR/EULAR criteria were analysed for PAD4 activating capacities using HPLC fluorometric method. A sample was defined as positive if above mean +2 SD of the healthy controls. Patient characteristics and subgroups with PAD activity were assessed using Mann-Whitney U-test and chi-square test as appropriate.

Results: A total of 225 patients and 63 controls were included in the study. Patient characteristics and measures of disease activity and radiographic damage are presented in the table 1. Median PAD activity levels were higher in patients than in healthy controls (8768 [7491,11393] vs. 7046 [6347,7905], p<0.0001; figure 1). ACPA and rheumatoid factor (RF) positive patients had higher PAD activity than ACPA and RF negative patients (9104 [7739,13213] vs. 7281 [6764,9010], p<0.0001, and 8871 [7715,12259] vs. 8407 [6867,10062], p=0.048, respectively). PAD positivity occurred in 42% (n=95) of the patients and was more prevalent in ACPA positive compared to ACPA negative patients (47 vs. 20%, p=0.002), but not in RF positive vs. RF negative patients (44 vs. 38%, p=0.49). Disease Activity Score was numerically higher in patients positive for PAD than patients who were PAD negative (3.6 (1.1) vs. 3.3 (1.2), p=0.08).

Abstract FRI0025 – Table 1. Baseline characteristics in subgroups of RA patients and healthy controls

	All patients (n=225)	PAD4+ (n=95)	PAD4- (n=130)	Healthy controls (n=63)
Age ¹ , years	51.3 (13.8)	48.7 (13.5)	53.2 (13.7)	53.7 (9.0)
Female ²	137(61)	56(59)	81(62)	30 (48)
ACPA positivity ²	184(82)	87(92)	97(75)	0
RF positivity ²	160(71)	70(74)	90(69)	NA
Disease duration ¹ , months	7.1 (5.4)	8.3 (6.1)	6.2 (4.7)	NA
Ever-smoker ²	149(66)	63(66)	86(66)	NA
ESR ³	19 [11,32]	18 [11,30]	21 [11,32]	NA
SJC4 ³	9 [4,14]	10 [5,15]	8 [4,14]	NA
Ultrasound grey scale	18 [10,28]	20 [11,28]	17 [10,26]	NA
Ultrasound power Doppler ³	7 [3,14]	7 [3,14]	6 [2,13]	NA
Disease Activity Score ¹	3.4 (1.2)	3.6 (1.1)	3.3 (1.2)	NA
vdHS total score ³	4 [1.5,8.5]	4 [1.5,7.5]	4.5 [2,9]	NA
PAD activity level ³	8768 [7491,11393]	13175 [10370,19374]	7659 [6865–8316]	7046 [6347,7906]

¹Mean(SD), ²n(%), ³Median[25,75 percentile] Abbreviations: PAD, peptidylarginine deiminase; ACPA, anti-citrullinated protein antibody; RF, rheumatoid factor; ESR, erythrocyte sedimentation rate; SJC, swollen joint count; vdHS, van der Heijde modified Sharp

Abstract FRI0025 – Figure 1. PAD4 activity in patients and controls. Centre bar indicates median PAD4 activity level and error bars 25 and 75 percentile. The dashed line represents the cut-off value for increased PAD4 activity, defined as the mean plus two times the SD of the healthy controls.