SUPPLEMENTARY MATERIAL

Remission or not remission, that's the question. Shedding light on remission and the impact of objective and subjective measures reflecting disease activity in rheumatoid arthritis

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### Supplementary Table 1: Association between variables and remission among rheumatoid arthritis patients during 2019 using multivariable logistic regression.

|                          | DAS28(4) Remission | DAS28(3) Remission | CDAl Remission | SDAI Remission | 4vRemission | 4vRemission (≥20 PGA) | 3vRemission (Without PGA) | 2vRemission (Subjective) | 2vRemission (Objective) |
|--------------------------|--------------------|--------------------|----------------|----------------|-------------|---------------------|--------------------------|--------------------------|--------------------------|
| Age (years)              | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0)| 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           |
| Female                   | 0.9 (0.4, 1.9)     | 0.8 (0.4, 1.5)     | 1.0 (0.5, 2.0) | 1.2 (0.6, 2.4) | 1.1 (0.5, 2.6)| 0.7 (0.3, 1.5)     | 0.8 (0.4, 0.4)           | 1.4 (0.5, 3.2)           | 0.9 (0.5, 1.9)           |
| BMI (kg/m²)              | 1.0 (0.9, 1.1)     | 1.0 (0.9, 1.1)     | 1.0 (0.9, 1.1) | 1.0 (0.9, 1.1) | 1.0 (0.9, 1.1)| 0.9 (0.9, 1.0)     | 1.0 (0.9, 1.0)           | 1.0 (0.9, 1.1)           | 1.0 (0.9, 1.1)           |
| Education (years)        | 1.0 (0.9, 1.1)     | 1.1 (1.0, 1.1)     | 0.9 (0.8, 1.0) | 1.0 (0.9, 1.1) | 1.0 (0.9, 1.2)| 1.0 (0.9, 1.1)     | 1.0 (1.0, 1.1)           | 1.0 (0.9, 1.1)           | 1.1 (1.0, 1.2)           |
| Smoker                   | 0.8 (0.3, 1.9)     | 1.1 (0.4, 2.7)     | 0.7 (0.3, 1.8) | 1.0 (0.4, 2.4) | 1.0 (0.3, 2.2)| 0.4 (0.1, 1.2)     | 0.6 (0.3, 1.3)           | 1.5 (0.4, 5.2)           | 0.9 (0.4, 2.0)           |
| Disease Duration (years) | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.1) | 1.0 (1.0, 1.1) | 1.0 (1.0, 1.1)| 1.0 (1.0, 1.1)     | 1.0 (1.0, 1.1)           | 1.0 (1.0, 1.1)           | 1.0 (1.0, 1.1)           |
| aCCP Positive            | 2.5 (0.9, 7.2)     | 2.8 (1.0, 7.4)     | 2.1 (0.8, 6.1) | 2.0 (0.8, 5.4) | 1.7 (0.5, 5.7)| 3.5 (1.2, 10.8)    | 2.2 (0.9, 5.2)           | 1.2 (0.3, 4.1)           | 2.0 (0.7, 5.4)           |
| RF Positive              | 0.7 (0.3, 2.1)     | 0.6 (0.2, 1.6)     | 0.7 (0.3, 1.7) | 0.8 (0.3, 2.0) | 0.5 (0.2, 1.5)| 0.7 (0.3, 1.8)     | 0.6 (0.3, 1.5)           | 0.6 (0.2, 2.0)           | 1.0 (0.4, 2.5)           |
| ESR (mm/h)               | 1.0 (0.9, 1.0)     | 1.0 (0.9, 1.0)     | 1.0 (0.9, 1.0) | 0.9 (0.8, 1.0) | 1.0 (0.9, 1.0)| 1.0 (0.9, 1.0)     | 1.0 (0.9, 1.0)           | 1.0 (0.9, 1.0)           | 1.0 (0.9, 1.0)           |
| Pain (VAS, 0–100 mm)     | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)     | 0.9 (0.8, 1.0) | 0.9 (0.8, 0.9) | 0.9 (0.8, 1.0)| 0.9 (0.8, 1.0)     | 1.0 (1.0, 1.0)           | 0.9 (0.8, 0.9)           | 1.0 (1.0, 1.0)           |
| M-HAQ (0–3)              | 1.0 (0.3, 3.2)     | 0.5 (0.2, 1.5)     | 0.7 (0.3, 2.1) | 1.0 (0.3, 4.1) | 0.3 (0.0, 2.3)| 0.5 (0.1, 2.4)     | 1.1 (0.4, 2.9)           | 0.2 (0.0, 1.7)           | 1.2 (0.4, 3.3)           |
| Fatigue (VAS, 0–100 mm)  | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0) | 1.0 (1.0, 1.0)| 1.0 (1.0, 1.0)| 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           |
| Morning stiffness (h)    | 0.7 (0.5, 1.0)     | 0.9 (0.7, 1.2)     | 0.5 (0.3, 0.9) | 0.5 (0.3, 0.9)| 0.9 (0.5, 1.6)| 0.6 (0.3, 1.0)     | 0.8 (0.6, 1.0)           | 1.1 (0.6, 2.1)           | 0.9 (0.6, 1.1)           |
| IGA (VAS, 0–100 mm)      | 0.9 (0.8, 0.9)     | 0.9 (0.9, 0.9)     | 0.9 (0.8, 0.9) | 0.9 (0.8, 0.9)| 0.9 (0.8, 0.9)| 0.9 (0.8, 0.9)     | 1.0 (0.9, 1.0)           | 0.9 (0.8, 0.9)           | 1.0 (0.9, 1.0)           |
| PGA (VAS, 0–100 mm)      | NA                 | 1.0 (1.0, 1.0)     | NA             | NA             | 1.0 (1.0, 1.0)| 1.0 (1.0, 1.0)     | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           | 1.0 (1.0, 1.0)           |
| TJC28 (0–28)             | NA                 | NA                 | NA             | NA             | NA             | NA                 | NA                       | NA                       | NA                       |
| SJC28 (0–28)             | NA                 | NA                 | NA             | NA             | NA             | NA                 | NA                       | NA                       | NA                       |
| CRP (mg/L)               | NA                 | NA                 | 1.0 (0.9, 1.0) | NA             | NA             | NA                 | NA                       | NA                       | NA                       |

**Abbreviations:** BMI = Body Mass Index, aCCP = Anti-cyclic citrullinated peptide, RF = Rheumatoid Factor, ESR = Erythrocyte Sedimentation Rate, CRP = C-Reactive Protein, TJC28 = Tender 28-Joint Count, SJC28 = Swollen 28-Joint Count, IGA = Investigators Global Assessment, VAS = Visual Analog Scale (Measured 0–100), DAS28 = Disease Activity Score, PGA = Patient Global Assessment, MHAQ = Modified Health Assessment Questionnaire. DAS28 = Disease Activity Score, CDAl = Clinical Disease Activity Index, SDAI = Simple Disease Activity Index, NA = Not Available. **Note:** All data are collected from an ordinary outpatient clinic in southern Norway. All values represent the Exp(B) (Odds Ratio) for remission with its confidence interval of 95% in parentheses. Variables constructing the given remission-assessing methods are omitted. **4vRemission** is achieved when ≤10 CRP, ≤1 TJC28, ≤1 SJC28, and ≤1 PGA. 3vRemission is achieved when ≤30 CRP, ≤1 TJC28, and ≤1 SJC28. **2vRemission (Objective)** is achieved when ≤10 CRP and ≤1 SJC28. **2vRemission (Subjective)** is achieved when ≤10 PGA and ≤1 TJC28. **Category Variables:** Sex (Female, Male), Smoking Status (Smokers, Non-Smokers), aCCP Evaluation (Positive, Negative), RF Evaluation (Positive, Negative). **Significance:** All values marked bold have significant p-values with *** <0.001, ** <0.01, and * <0.05.**
### Supplementary Table 2: Multivariable (enter) association between PGA and the patient's variables in rheumatoid arthritis patients using linear regression reported in different disease activity subgroups (2019)

|                  | 3-variable Remission | DAS28(4) m-hDa | CDAI m-hDa | SDAI m-hDa |
|------------------|----------------------|---------------|-----------|-----------|
|                  | N = 327 (65%)        | N = 105 (21%) | N = 99 (20%) | N = 92 (18%) |
| β (95% CI)       | P                    | β (95% CI)    | P         | β (95% CI) | P |

**Demographics**
- Age (years)
- Female
- BMI (kg/m²)
- Education (years)
- Smoker
- Disease Duration (years)

**Biomarkers**
- aCCP Positive
- RF Positive

**Disease Activity Variables**
- ESR (mm/h)
- CRP (mg/L)
- TJC28 (0–28)
- SJC28 (0–28)
- IGA (VAS, 0–100 mm)

**Patient-Reported Outcome Measures**
- Pain (VAS, 0–100 mm)
- MHAQ (0–3)
- Fatigue (VAS, 0–100 mm)
- Morning stiffness (h)

|                  | Adjusted R Square |
|------------------|-------------------|
|                  | 0.8               | 0.8            | 0.8       | 0.8         |

**Abbreviations**: 3v-Remission = 3-variable remission (≤1 SJC28, ≤1 TJC28, ≤10 CRP), CDAI = Clinical Disease Activity Index, SDAI = Simple Disease Activity Index, m-hDa = moderate-high Disease Activity, β = Standardized Coefficient Beta, B = Unstandardized Coefficient B, BMI = Body Mass Index, aCCP = Anti-cyclic citrullinated peptide, RF = Rheumatoid Factor, ESR = Erythrocyte Sedimentation Rate, CRP = C-Reactive Protein, TJC28 = Tender 28-Joint Count, SJC28 = Swollen 28-Joint Count, IGA = Investigators Global Assessment, VAS = Visual Analog Scale (Measured 0–100), PGA = Patient Global Assessment, MHAQ = Modified Health Assessment Questionnaire. **Note**: All data are collected from an ordinary outpatient clinic in southern Norway in 2019 using a complete dataset (N=502). **Significance**: All values marked bold have significant p-value with *** <0.001, ** <0.01, and * <0.05.
## Supplementary Table 3: Comparison between excluded and included rheumatoid arthritis patients recruited for the period 2015 and 2019

| Demographic | 2015 Included (n = 544) | P | 2016 Included (n = 554) | P | 2017 Included (n = 389) | P | 2018 Included (n = 349) | P | 2019 Included (n = 502) | P |
|-------------|------------------------|---|------------------------|---|------------------------|---|------------------------|---|------------------------|---|
| Age (years) | 65 (15) [0.05] | 0.75 | 65 (14) [0.05] | 0.01 | 64 (14) [0.05] | 0.02 | 64 (14) [0.05] | 0.01 | 64 (14) [0.05] | 0.05 |
| Female (%)  | 39 (73%) | 0.8 | 38 (71%) | 0.02 | 36 (73%) | 0.04 | 37 (70%) | 0.05 | 37 (74%) | 0.9 |
| BMI (kg/m²) | 27 (4.2) | 27 (4.7) | 26 (4.1) | 0.08 | 25 (4.6) | 0.71 | 25 (4.4) | 0.16 | 25 (4.6) | 0.46 |
| Education (%) | 12 (3.7) | 12 (3.5) | 11 (3.5) | 0.03 | 12 (3.8) | 0.12 | 12 (3.6) | 0.22 | 12 (3.8) | 0.15 |
| Current (%)  | 92 (19%) | 0.8 | 88 (18%) | 0.04 | 92 (19%) | 0.26 | 89 (19%) | 0.38 | 88 (19%) | 0.39 |
| Smokers (%)  | 5 (1%) | 0.05 | 5 (1%) | 0.25 | 5 (1%) | 1.3 | 5 (1%) | 0.06 | 5 (1%) | 1.06 |
| Duration (%) | 55 (11%) | 12 (10%) | 0.02 | 12 (10%) | 0.02 | 12 (10%) | 0.03 | 12 (10%) | 0.06 |

### Disease Activity Variables

| ESR (mm/h)  | 6 (0.9) | 6 (0.9) | 6 (0.9) | 0.05 | 6 (0.9) | 0.03 | 6 (0.9) | 0.06 | 6 (0.9) | 0.02 |
| CRP (mg/L) | 2.8 (1.0) | 2.8 (1.0) | 2.8 (1.0) | 0.04 | 2.8 (1.0) | 0.05 | 2.8 (1.0) | 0.06 | 2.8 (1.0) | 0.03 |
| SJC28 (%)  | 12 (28%) | 12 (28%) | 12 (28%) | 0.06 | 12 (28%) | 0.07 | 12 (28%) | 0.08 | 12 (28%) | 0.05 |
| TJC28 (%)  | 3.2 (2.3) | 3.2 (2.3) | 3.2 (2.3) | 0.07 | 3.2 (2.3) | 0.08 | 3.2 (2.3) | 0.09 | 3.2 (2.3) | 0.05 |
| CDAI (%)   | 10.6 (11) | 10.6 (11) | 10.6 (11) | 0.04 | 10.6 (11) | 0.05 | 10.6 (11) | 0.06 | 10.6 (11) | 0.04 |

### Composite Disease Activity Scores

| DAS24 (%) | 7.1 (2.1) | 7.1 (2.1) | 7.1 (2.1) | 0.05 | 7.1 (2.1) | 0.03 | 7.1 (2.1) | 0.04 | 7.1 (2.1) | 0.02 |
| DAS28 (%) | 3.9 (1.4) | 3.9 (1.4) | 3.9 (1.4) | 0.04 | 3.9 (1.4) | 0.05 | 3.9 (1.4) | 0.06 | 3.9 (1.4) | 0.03 |
| SDAI (%)  | 13.6 (11.1) | 13.6 (11.1) | 13.6 (11.1) | 0.03 | 13.6 (11.1) | 0.04 | 13.6 (11.1) | 0.05 | 13.6 (11.1) | 0.03 |

### Patient-Reported Outcomes

| PGA (%)   | 15 (29%) | 15 (29%) | 15 (29%) | 0.04 | 15 (29%) | 0.03 | 15 (29%) | 0.03 | 15 (29%) | 0.02 |
| Pain (%)  | 12 (26%) | 12 (26%) | 12 (26%) | 0.03 | 12 (26%) | 0.02 | 12 (26%) | 0.02 | 12 (26%) | 0.01 |
| MHAQ (%)  | 16 (39%) | 15 (39%) | 15 (39%) | 0.13 | 16 (39%) | 0.13 | 16 (39%) | 0.13 | 16 (39%) | 0.13 |
| Fatigue (%)| 43 (10%) | 43 (10%) | 43 (10%) | 0.09 | 43 (10%) | 0.09 | 43 (10%) | 0.09 | 43 (10%) | 0.09 |

### Treatment

| bDMARDs (%)| 55 (11%) | 55 (11%) | 55 (11%) | 0.04 | 55 (11%) | 0.03 | 55 (11%) | 0.02 | 55 (11%) | 0.02 |
| TNFs (%)  | 13 (25%) | 13 (25%) | 13 (25%) | 0.03 | 13 (25%) | 0.03 | 13 (25%) | 0.03 | 13 (25%) | 0.03 |
| Mone (%)  | 25 (55%) | 25 (55%) | 25 (55%) | 0.04 | 25 (55%) | 0.03 | 25 (55%) | 0.02 | 25 (55%) | 0.02 |
| JTIC (%)  | 20 (45%) | 20 (45%) | 20 (45%) | 0.04 | 20 (45%) | 0.03 | 20 (45%) | 0.02 | 20 (45%) | 0.02 |
| Methotrexate (%) | 7 (15%) | 7 (15%) | 7 (15%) | 0.03 | 7 (15%) | 0.03 | 7 (15%) | 0.03 | 7 (15%) | 0.03 |
| Prednisone (%) | 28 (60%) | 28 (60%) | 28 (60%) | 0.04 | 28 (60%) | 0.03 | 28 (60%) | 0.02 | 28 (60%) | 0.02 |

Note: All data are collected from an ordinary outpatient setting in Southern Norway. Categorical variables are presented as numbers and percentages (%) and continuous variables as mean (standard deviation). Missing data are presented as mean in percentage [%]. *x² test for categorical variables and one-way ANOVA for continuous variables was used to assess the differences between included and excluded datasets for each consecutive year. Abbreviations: BMI = Body Mass Index, aCP = Anti-cyclic citrullinated peptide, RA = Rheumatoid Factor, ESR = Erythrocyte Sedimentation Rate, CRP = C-Reactive Protein, TJC28 = Tender 28-Joint Count, SJC28 = Swollen 28-Joint Count, IGA = Investigators Global Assessment, VAS = Visual Analog Scale (Measured 0-100), DAS24 = Disease Activity Score with CRP, DAS28 = Classical Disease Activity Index, SDAI = Simple Disease Activity Index, PGA = Patient Global Assessment, MHAQ = Modified Health Assessment Questionnaire, bDMARDs = Biological and target synthetic Disease-Modifying Antirheumatic Drugs, TNF = Tumour necrosis factor, cDMARDs = conventional synthetic Disease-Modifying Antirheumatic Drugs, No Treatment = Implies patient is not receiving either bDMARDs, cDMARDs or Prednisolone.