

Supplementary Materials

Supplementary Table 1. Covariates included in propensity score models*

Model covariates	Regression outcome				
	Shared decision making	Physician disease tracking	Low disease activity at the last visit	Improvement in disease activity	Treatment intensification
Age	•	•	•	•	
Gender	•	•	•	•	•
Employment status		•	•		
Highest level of education			•		
Physician gender			•		
Clinic type	•	•			
Diagnosis	•	•	•	•	•
Disease duration	•		•		•
Z-score of baseline disease activity ^{&}			•	•	•
Patient-reported health status	•	•	•		•
EQ-5D				•	
Body mass index (BMI)			•		•
Number of chronic conditions			•		
Smoking history	•	•			
Conventional synthetic disease-modifying antirheumatic drug (csDMARD) use	•	•			•
Biologic use			•		
Corticosteroid use	•	•	•	•	•
Confidence in using smartphones/internet	•	•			

*These propensity score models modeled the probability of app exposure for individuals in each regression analysis. The propensity scores were used to calculate inverse probability of treatment weights for each regression analysis.

[&]Z-score of disease activity (DAS28/BASDAI/physician global disease activity for RA/axSpA/PsA patients) at 1 year prior to the last visit.

Supplementary Table 2. Level of missingness among covariates included in propensity score models*

Model covariates	Number missing	Percent missing
Age	0	0
Gender	0	0
Employment status	691	32.7
Highest level of education	201	9.52
Physician gender	2	0.1
Clinic type	2	0.1
Diagnosis	0	0
Disease duration	31	1.5
Z-score of baseline disease activity*	262	12.4
Patient-reported health status	291	13.8
EQ-5D	290	13.7
Body mass index (BMI)	707	33.5
Number of chronic conditions	0	0
Smoking history	12	0.6
Conventional synthetic disease-modifying antirheumatic drug (csDMARD) use	0	0
Biologic use	0	0
Corticosteroid use	0	0
Confidence in using smartphones/internet	0	0

*These propensity score models modeled the probability of app exposure for individuals in each regression analysis. The propensity scores were used to calculate inverse probability of treatment weights for each regression analysis.

Supplementary Table 3. Covariates used for multiple imputation of missing values in propensity score models*

Type of covariate	Covariates included
Continuous	Age Disease duration Patient-reported health status EQ-5D BMI Number of chronic conditions Number of consultations in the last 12 months Z-score of baseline disease activity* Z-score of disease activity at the visit 1 year prior to the last visit*
Binary	Gender Employment status Biologic use DMARD use Corticosteroid use Low disease activity at baseline Alcohol use Physician gender Confidence in using smartphones/internet Regular use of health apps
Ordered factor	Highest level of education
Unordered factor	Diagnosis Smoking history Clinic type (hospital, clinic, or academic medical center) Language (French, German, or Italian)

*These propensity score models modeled the probability of app exposure for individuals in each regression analysis. The propensity scores were used to calculate inverse probability of treatment weights for each regression analysis.

Supplementary Tables 4-8. Unweighted and weighted baseline characteristics of participants**Supplementary Table 4. Analysis of shared decision making: unweighted and weighted baseline characteristics of participants***

	No app	App only	App + discussion
	<u>Unweighted mean or %</u>		
Age in years	50.9	46.6	47.5
% Male	43%	45%	44%
Highest level of education completed			
% compulsory	9%	6%	8%
% vocational	57%	55%	56%
% tertiary	34%	39%	36%
% Employed	74%	82%	76%
Diagnosis			
% RA	37%	37%	38%
% PsA	29%	21%	15%
% axSpA	35%	43%	47%
Disease duration in years	8.7	10.2	9.5
# of comorbid conditions	1.4	1.3	1
% biologic DMARD users	63%	71%	72%
% non-biologic DMARD users	46%	39%	38%
Low disease activity at baseline	51%	58%	64%
Confident user of internet/smartphone in daily life	88%	95%	97%
Regular use of health tracking apps	30%	27%	37%
	<u>Weighted mean or %[#]</u>		
Age in years		49.2	47.5
% Male	43%	40%	44%
Highest level of education completed			
% compulsory	9%	5%	8%
% vocational	56%	61%	56%
% tertiary	35%	34%	36%

% Employed	75%	82%	76%
Diagnosis			
% RA	43%	42%	40%
% PsA	21%	21%	19%
% axSpA	35%	37%	40%
Disease duration in years	8.9	8.8	9.0
# of comorbid conditions	1.4	1.4	1.1
% biologic DMARD users	63%	72%	73%
% non-biologic DMARD users	45%	45%	43%
Low disease activity at baseline	52%	53%	57%
Confident user of internet/smartphone in daily life	89%	97%	94%
Regular use of health tracking apps	30%	29%	36%

*Based on multiply imputed data.

#Weights based on the multinomial propensity score model for the analysis of shared decision making.

Supplementary Table 5. Analysis of physician disease tracking: unweighted and weighted baseline characteristics of participants*

	No app	App only	App + discussion
	<u>Unweighted mean or %</u>		
Age in years	50.9	46.6	47.5
% Male	43%	45%	44%
Highest level of education completed			
% compulsory	9%	6%	8%
% vocational	57%	55%	56%
% tertiary	34%	39%	36%
% Employed	74%	82%	76%
Diagnosis			
% RA	44%	37%	38%
% PsA	22%	21%	15%
% axSpA	35%	43%	47%
Disease duration in years	8.7	10.2	9.5
# of comorbid conditions	1.4	1.3	1
% biologic DMARD users	63%	71%	72%
% non-biologic DMARD users	46%	39%	38%
Low disease activity at baseline	51%	58%	64%
Confident user of internet/smartphone in daily life	88%	95%	97%
Regular use of health tracking apps	30%	27%	37%
	<u>Weighted mean or %[#]</u>		
Age in years	50.9	46.6	47.5
% Male	43%	45%	44%
Highest level of education completed			
% compulsory	9%	6%	8%
% vocational	57%	55%	56%
% tertiary	34%	39%	36%

% Employed	75%	81%	75%
Diagnosis			
% RA	43%	42%	42%
% PsA	21%	21%	19%
% axSpA	36%	37%	38%
Disease duration in years	8.7	10.6	9.7
# of comorbid conditions	1.3	1.5	1.3
% biologic DMARD users	63%	74%	76%
% non-biologic DMARD users	45%	45%	44%
Low disease activity at baseline	52%	55%	56%
Confident user of internet/smartphone in daily life	89%	96%	91%
Regular use of health tracking apps	30%	31%	34%

*Based on multiply imputed data.

#Weights based on the multinomial propensity score model for the analysis of physician disease tracking.

Supplementary Table 6. Analysis of low disease activity at the last visit: unweighted and weighted baseline characteristics of participants*

	No app	App only	App + discussion
	<u>Unweighted mean or %</u>		
Age in years	51.4	47.8	48.3
% Male	44%	42%	46%
Highest level of education completed			
% compulsory	10%	5%	8%
% vocational	56%	54%	58%
% tertiary	34%	41%	34%
% Employed	74%	79%	75%
Diagnosis			
% RA	39%	35%	38%
% PsA	26%	21%	17%
% axSpA	35%	44%	45%
Disease duration in years	9.4	11.2	9.8
# of comorbid conditions	1.6	1.2	1.0
% biologic DMARD users	68%	77%	76%
% non-biologic DMARD users	47%	40%	37%
Low disease activity at baseline	47%	59%	63%
Confident user of internet/smartphone in daily life	87%	95%	97%
Regular use of health tracking apps	29%	31%	37%
	<u>Weighted mean or %[#]</u>		
Age in years	51.4	47.8	48.3
% Male	44%	42%	46%
Highest level of education completed			
% compulsory	10%	5%	8%
% vocational	56%	54%	58%
% tertiary	34%	41%	34%

% Employed	74%	78%	76%
Diagnosis			
% RA	38%	38%	36%
% PsA	25%	23%	21%
% axSpA	36%	39%	43%
Disease duration in years	9.5	10.0	9.8
# of comorbid conditions	1.5	1.2	1.2
% biologic DMARD users	69%	77%	76%
% non-biologic DMARD users	45%	44%	41%
Low disease activity at baseline	48%	54%	56%
Confident user of internet/smartphone in daily life	88%	95%	97%
Regular use of health tracking apps	29%	29%	37%

*Based on multiply imputed data.

#Weights based on the multinomial propensity score model for the analysis of low disease activity at the last visit.

Supplementary Table 7. Analysis of improvement in disease activity: unweighted and weighted baseline characteristics of participants*

	No app	App only	App + discussion
	<u>Unweighted mean or %</u>		
Age in years	51.6	47.4	48.1
% Male	45%	39%	47%
Highest level of education completed			
% compulsory	10%	5%	7%
% vocational	55%	54%	57%
% tertiary	35%	41%	36%
% Employed	74%	79%	75%
Diagnosis			
% RA	37%	34%	36%
% PsA	29%	22%	19%
% axSpA	35%	43%	45%
Disease duration in years	9.3	11.5	9.9
# of comorbid conditions	1.5	1.2	1.0
% biologic DMARD users	68%	79%	74%
% non-biologic DMARD users	47%	40%	37%
Low disease activity at baseline	46%	59%	63%
Confident user of internet/smartphone in daily life	88%	95%	98%
Regular use of health tracking apps	29%	31%	36%
	<u>Weighted mean or %[#]</u>		
Age in years	51.6	47.4	48.1
% Male	45%	39%	47%
Highest level of education completed			
% compulsory	10%	5%	7%
% vocational	55%	54%	57%
% tertiary	35%	41%	36%
% Employed	74%	77%	73%

Diagnosis			
% RA	36%	38%	34%
% PsA	28%	24%	24%
% axSpA	36%	39%	42%
Disease duration in years	9.3	12.0	10.4
# of comorbid conditions	1.5	1.5	1.1
% biologic DMARD users	68%	79%	75%
% non-biologic DMARD users	46%	44%	39%
Low disease activity at baseline	48%	54%	58%
Confident user of internet/smartphone in daily life	88%	96%	97%
Regular use of health tracking apps	29%	31%	35%

*Based on multiply imputed data

#Weights based on the multinomial propensity score model for the analysis of improvement in disease activity.

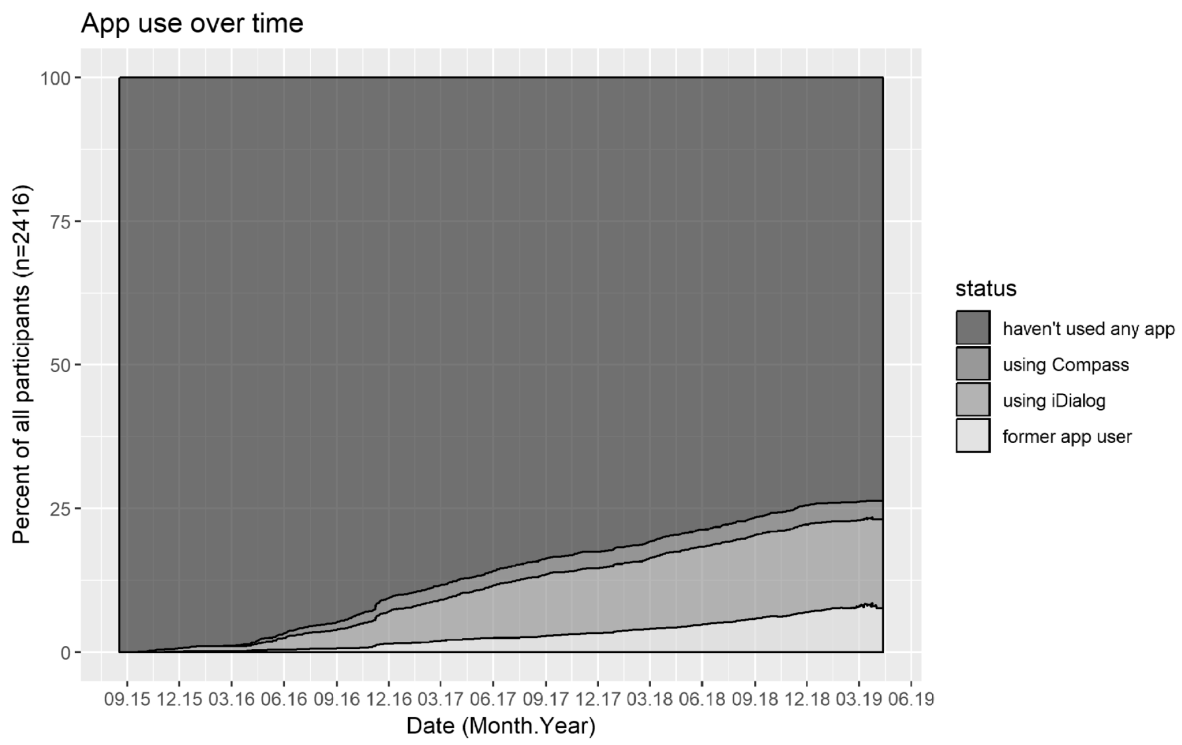
Supplementary Table 8. Analysis of treatment intensification: unweighted and weighted baseline characteristics of participants*

	No app	App only	App + discussion
	Unweighted mean or %		
Age in years	51.9	47.6	48.3
% Male	42%	42%	44%
Highest level of education completed			
% compulsory	10%	5%	8%
% vocational	57%	54%	58%
% tertiary	33%	41%	35%
% Employed	72%	80%	75%
Diagnosis			
% RA	47%	37%	41%
% PsA	22%	20%	16%
% axSpA	31%	43%	43%
Disease duration in years	9.4	11.2	9.8
# of comorbid conditions	1.5	1.3	1.1
% biologic DMARD users	67%	77%	77%
% non-biologic DMARD users	50%	39%	41%
Low disease activity at baseline	50%	59%	64%
Confident user of internet/smartphone in daily life	86%	96%	97%
Regular use of health tracking apps	29%	31%	37%
	Weighted mean or %[#]		
Age in years	51.9	47.6	48.3
% Male	42%	42%	44%
Highest level of education completed			
% compulsory	10%	5%	8%
% vocational	57%	54%	58%
% tertiary	33%	41%	35%
% Employed	73%	79%	72%

Diagnosis			
% RA	46%	42%	44%
% PsA	21%	22%	21%
% axSpA	33%	36%	35%
Disease duration in years	9.4	11.1	10.0
# of comorbid conditions	1.5	1.4	1.3
% biologic DMARD users	67%	76%	80%
% non-biologic DMARD users	48%	44%	46%
Low disease activity at baseline	52%	52%	57%
Confident user of internet/smartphone in daily life	88%	93%	92%
Regular use of health tracking apps	29%	30%	34%

*Based on multiply imputed data

#Weights based on the multinomial propensity score model for the analysis of treatment intensification.

Supplementary Figure 1. Status plot of SCQM app use over time

Supplementary Figure 2.**Detection of moderate/high disease activity (MHDA) via SCQM visits and app entries among app users (n=637)**