

Supplementary Table 1: Patient characteristics by country for registers with individual patients data available

	AU	CA	CH	CZ	DE	ES	FI	IL	IT	NL	NO	PT	RO	RU	SI	TR	UK
N	2074	658	3035	315	1865	2319	741	394	757	1562	515	801	262	470	583	2167	2319
Treatment duration, years (median [IQR])	3.0 (3.4)	1.3 (1.1)	1.4 (1.3)	0.5 (0.4)	1.0 (0.7)	0.8 (0.8)	0.7 (0.5)	1.5 (1.2)	0.3 (0.4)	3.3 (2.8)	0.7 (0.6)	0.9 (0.7)			0.8 (0.6)	1.0 (1.1)	0.9 (0.7)
Age, years (mean (SD))	58.0 (13.0)	58.2 (13.2)	57.7 (13.2)	57.5 (10.4)	58.0 (13.0)	57.3 (12.7)	55.2 (14.2)	59.4 (13.6)	58.8 (12.2)	56.9 (13.1)	55.2 (14.2)	55.7 (12.6)	57.5 (11.1)	52.6 (12.4)	58.1 (11.7)	51.3 (12.5)	58.2 (12.7)
Gender (female) (%)	1628 (78.5)	510 (77.5)	2310 (76.1)	259 (82.2)	1385 (74.3)	1834 (79.1)	570 (76.9)	327 (83.0)	589 (77.8)	1157 (74.5)	387 (75.3)	672 (83.9)	229 (87.4)	385 (81.9)	467 (80.1)	1773 (82.4)	1771 (76.4)
Disease duration, years (mean (SD))	10.8 (9.6)	11.1 (10.3)	10.0 (9.1)	13.7 (9.2)	9.4 (8.6)	10.5 (8.6)	12.7 (10.6)	12.3 (10.1)	12.8 (9.9)	7.0 (5.3)	11.6 (11.0)	10.3 (8.4)	11.4 (7.8)	8.9 (7.7)	9.0 (7.9)	10.4 (7.5)	10.0 (9.5)
Seropositivity (RF and/or ACPA), (%)	1426 (78.4)	443 (71.2)	2204 (74.0)	266 (88.4)	1345 (74.7)	1699 (84.3)	419 (83.5)	302 (95.3)	437 (79.3)	1205 (89.2)	151 (89.3)	552 (81.4)	111 (77.6)	324 (96.7)	471 (82.1)	937 (72.9)	1625 (85.3)
Number of previous b/tsDMARDs (%)																	
0	1201 (57.9)	0 (0.0)	831 (27.5)	135 (42.9)	21 (1.1)	1329 (57.3)	327 (44.1)	126 (32.0)	0 (0.0)	1139 (72.9)	199 (39.2)	471 (58.8)	95 (36.3)	291 (63.8)	263 (45.1)	1518 (70.1)	1616 (69.7)
1	323 (15.6)	229 (34.8)	790 (26.1)	48 (15.2)	449 (24.1)	512 (22.1)	193 (26.0)	110 (27.9)	108 (37.5)	281 (18.0)	120 (23.6)	178 (22.2)	65 (24.8)	101 (22.1)	162 (27.8)	412 (19.0)	247 (10.7)
2	385 (18.6)	176 (26.7)	559 (18.5)	40 (12.7)	647 (34.7)	238 (10.3)	107 (14.4)	78 (19.8)	62 (21.5)	90 (5.8)	81 (15.9)	84 (10.5)	46 (17.6)	44 (9.6)	90 (15.4)	159 (7.3)	234 (10.1)
≥3	165 (8.0)	253 (38.4)	843 (27.9)	92 (29.2)	748 (40.1)	240 (10.3)	114 (15.4)	80 (20.3)	118 (41.0)	52 (3.3)	108 (21.3)	68 (8.5)	56 (21.4)	20 (4.4)	68 (11.7)	78 (3.6)	222 (9.6)
Concomitant csDMARDs (%)																	
None	994 (47.9)	258 (39.2)	1074 (35.4)	71 (22.5)	851 (45.6)	792 (34.2)	219 (29.6)	9 (2.3)	308 (40.7)	350 (22.4)	171 (33.2)	190 (23.7)	82 (31.3)	266 (56.6)	246 (42.2)	819 (37.8)	662 (28.5)
MTX	829 (40.0)	167 (25.4)	1032 (34.0)	200 (63.5)	927 (49.7)	861 (37.1)	139 (18.8)	53 (13.5)	317 (41.9)	560 (35.9)	259 (50.3)	276 (34.5)	48 (18.3)	37 (7.9)	156 (26.8)	527 (24.3)	612 (26.4)
MTX + other than MTX	117 (5.6)	115 (17.5)	155 (5.1)	14 (4.4)	0 (0.0)	137 (5.9)	191 (25.8)	305 (77.4)	38 (5.0)	287 (18.4)	15 (2.9)	196 (24.5)	28 (10.7)	90 (19.1)	35 (6.0)	228 (10.5)	570 (24.6)
Other than MTX	134 (6.5)	118 (17.9)	774 (25.5)	30 (9.5)	87 (4.7)	529 (22.8)	192 (25.9)	27 (6.9)	94 (12.4)	365 (23.4)	70 (13.6)	139 (17.4)	104 (39.7)	77 (16.4)	146 (25.0)	593 (27.4)	475 (20.5)
GC at baseline	708 (34.1)	198 (30.1)	1016 (33.5)	230 (73.0)	1211 (65.0)	1427 (61.5)	374 (50.5)	235 (98.3)	403 (53.2)	423 (27.1)	200 (38.8)	554 (69.2)	43 (16.4)	166 (35.3)	169 (29.0)	551 (100.0)	503 (21.7)
CRP (mg/l) (mean (SD))	8.5 (15.9)	18.1 (29.1)	11.1 (28.7)	21.5 (29.0)	9.5 (14.0)	15.8 (36.9)	10.6 (20.8)	NaN (NA)	7.7 (14.9)	12.8 (20.2)	10.0 (14.9)	13.2 (18.4)	17.0 (28.7)	21.2 (31.5)	17.7 (26.1)	16.9 (31.4)	14.7 (22.0)

	AU	CA	CH	CZ	DE	ES	FI	IL	IT	NL	NO	PT	RO	RU	SI	TR	UK
CDAI (mean (SD))	17.0 (8.4)	23.1 (12.5)	20.6 (12.1)	29.7 (15.8)	24.3 (11.9)	23.1 (12.5)	15.0 (9.3)	NaN (NA)	16.9 (11.2)	15.1 (11.5)	17.6 (11.9)	26.3 (13.3)	26.0 (12.7)	31.2 (14.1)	28.2 (12.9)	NaN (NA)	NaN (NA)
DAS28 (mean (SD))	4.1 (1.3)	4.6 (1.5)	4.3 (1.4)	5.5 (1.5)	4.7 (1.3)	4.7 (1.4)	3.6 (1.4)	4.8 (1.3)	3.8 (1.5)	3.8 (1.6)	4.0 (1.5)	5.2 (1.4)	5.7 (1.0)	5.8 (1.2)	5.5 (1.3)	NaN (NA)	5.6 (1.2)
HAQ (mean (SD))	1.1 (0.7)	1.2 (0.6)	0.9 (0.7)	1.5 (0.6)	1.3 (0.6)	NaN (NA)	1.0 (0.7)	NaN (NA)	1.0 (0.8)	0.9 (0.8)	0.7 (0.6)	1.3 (0.7)	1.8 (0.5)	1.6 (0.7)	1.2 (0.7)	0.9 (0.7)	1.6 (0.8)
Smoking (%)																	
Current	158 (7.6)	90 (13.7)	216 (21.2)	116 (43.3)	471 (26.5)	428 (23.2)	44 (13.8)	46 (15.9)	NaN (NA)	159 (22.6)	33 (12.3)	111 (19.7)	NaN (NA)	16 (12.5)	118 (20.3)	466 (24.5)	325 (16.4)
Never	1837 (88.6)	568 (86.3)	462 (45.3)	152 (56.7)	758 (42.6)	1416 (76.8)	238 (74.6)	183 (63.1)	NaN (NA)	326 (46.3)	109 (40.5)	383 (68.0)	NaN (NA)	98 (76.6)	394 (67.7)	1139 (59.8)	866 (43.7)
Past	79 (3.8)	0 (0.0)	342 (33.5)	NaN (NA)	551 (31.0)	0 (0.0)	37 (11.6)	61 (21.0)	NaN (NA)	219 (31.1)	127 (47.2)	69 (12.3)	NaN (NA)	14 (10.9)	70 (12.0)	300 (15.7)	792 (39.9)
Body mass index (mean (SD))	26.4 (5.0)	28.4 (7.7)	26.6 (5.6)	26.5 (5.3)	27.5 (5.5)	27.3 (5.4)	27.0 (6.1)	27.4 (5.7)	25.4 (4.8)	25.8 (4.6)	27.7 (4.9)	27.1 (5.2)	27.1 (5.0)	26.9 (7.0)	25.8 (4.5)	28.9 (5.7)	28.4 (6.7)
Any comorbidity, %	1218 (58.7)	NaN (NA)	2170 (71.5)	173 (54.9)	955 (51.2)	848 (36.6)	454 (61.3)	NaN (NA)	131 (17.3)	NaN (NA)	248 (50.9)	227 (28.3)	182 (69.5)	214 (45.9)	284 (48.7)	79 (4.0)	NaN (NA)

AU: Austria, CA: Canada, CH: Switzerland, CZ: Czech Republic, DE: Germany, ES: Spain, FI: Finland, IL: Israel, IT: Italy, NL: Netherlands, NO: Norway, PT: Portugal, RO: Romania, RU: Russia, SI: Slovenia, TR: Turkey, UK: United Kingdom.

MTX: methotrexate

Supplementary Table 2: Patient characteristics for DANBIO (Denmark) by treatment group

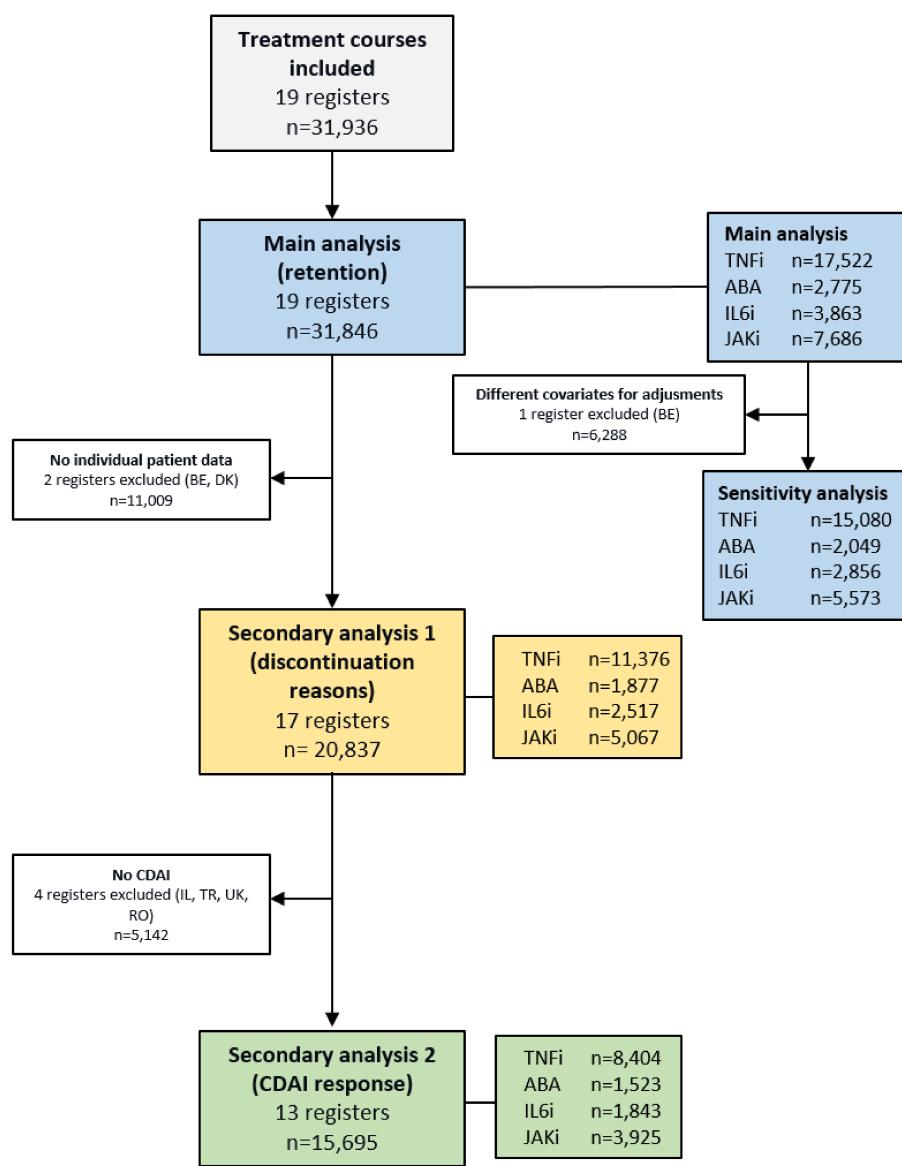
	TNF α	IL-6i	Abatacept	JAKi
N	3704	339	172	506
N visits (median [IQR])				
Total patient-years	-	-	-	-
bDMARD treatment duration, years (median [IQR])	-	-	-	-
Age, years (mean (SD))	58.7 (13.8)	58.5 (13.2)	59.8 (13.0)	60.0 (12.9)
Gender (female) (%)	956 (25.8)	75 (22.1)	37 (21.5)	98 (19.4)
Disease duration, years (mean (SD))	12.3 (10.4)	13.8 (11.4)	13.7 (10.4)	13.7 (11.3)
Seropositivity (RF and/or ACPA), (%)	1193 (81.3)	128 (89.5)	58 (84.1)	185 (83.3)
Number of previous bDMARDs (%)				
0	1266 (34.2)	28 (8.3)	8 (4.7)	71 (14.0)
1	1028 (27.8)	70 (20.6)	29 (16.9)	98 (19.4)
2	738 (19.9)	85 (25.1)	36 (20.9)	66 (13.0)
≥ 3	672 (18.1)	156 (46.0)	99 (57.6)	271 (53.6)
GC at baseline	530 (14.3)	92 (27.1)	49 (28.5)	124 (24.5)
Concomitant csDMARDs (%)				
None	760 (20.5)	170 (50.1)	63 (36.6)	228 (45.1)
MTX	1643 (44.4)	93 (27.4)	77 (44.8)	142 (28.1)
MTX + other than MTX	635 (17.1)	44 (13.0)	15 (8.7)	94 (18.6)
Other than MTX	666 (18.0)	32 (9.4)	17 (9.9)	42 (8.3)
CDAI (mean (SD))	15.4 (9.1)	19.5 (10.4)	19.5 (9.5)	20.0 (9.3)
HAQ (mean (SD))	1.1 (0.7)	1.4 (0.7)	1.4 (0.7)	1.4 (0.7)
Smoking				
Current	826 (23.8)	83 (25.9)	34 (20.4)	98 (20.2)
Never	1817 (52.4)	170 (53.0)	83 (49.7)	268 (55.4)
Past	826 (23.8)	68 (21.2)	50 (29.9)	118 (24.4)
Body mass index (mean (SD))	25.9 (5.8)	26.5 (6.1)	25.5 (5.6)	26.5 (6.1)
Any comorbidity, (%)	39 (31.2)	4 (33.3)	2 (100.0)	17 (63.0)

Legend : ACPA: anti-citrullinated protein antibody; bDMARDs: biological disease-modifying antirheumatic drugs; csDMARDs: conventional synthetic disease-modifying antirheumatic drugs; CDAI: Clinical Disease Activity Index; GC: glucocorticoids; HAQ: Health Assessment Questionnaire; MTX: methotrexate; RF: rheumatoid factor

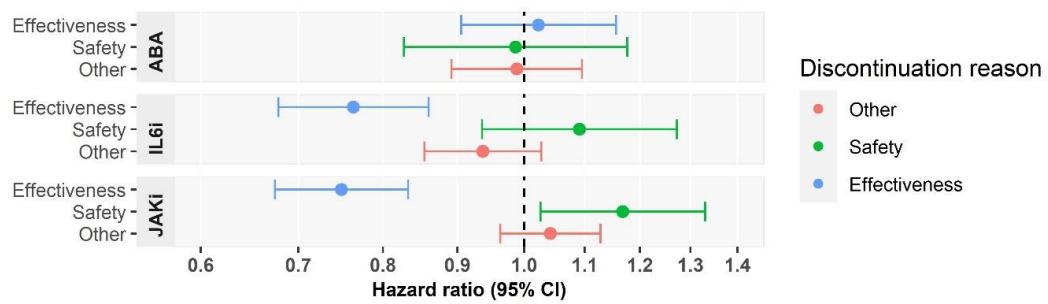
Supplementary Table 3: Patient characteristics for TARDIS (Belgium) by treatment group

	TNF α	IL-6 α	Abatacept	JAK α
N	2442	1007	726	2113
Female (n %)	1782 (73%)	735 (73%)	552 (76%)	1564 (74%)
Age, years (mean (SD))	54.4 (14.2)	56.8 (14.1)	58.5 (13.3)	57.5 (13.1)
Disease duration, years (mean (SD))	7.2 (8.0)	9.4 (9.2)	10.4 (9.2)	10.2 (9.2)
Number of previous bDMARDs: %				
0	62.1	39.3	35.3	38.9
1	24.4	30.7	34.0	31.1
2	8.1	16.7	18.5	15.6
≥ 3	5.4	13.3	12.2	14.4
CRP (mg/l) (mean (SD))	12.1 (17.3)	19.1 (28.1)	12.9 (21.5)	12.9 (17.2)
DAS28 (mean (SD))	4.8 (1.01)	4.7 (1.3)	4.8 (1.15)	4.8 (1.0)

Supplementary Figure 1: Flow chart



Supplementary Figure 2: Hazard ratio of discontinuation by reason of discontinuation compared to TNF inhibitors



Supplementary Methods

Variable in the imputation model

The imputation model included the main exposure (treatments), the outcome and all covariates used in the adjusted cox model (gender, age, disease duration, seropositivity, number of previously used bDMARDs/tsDMARDs (0, 1, 2, ≥ 3), concomitant conventional synthetic DMARDs (csDMARDs) treatment (none; methotrexate; other csDMARDs without methotrexate; methotrexate and at least one other csDMARDs), concomitant glucocorticoids (presence/absence), tobacco smoking, functional status (Health Assessment Questionnaire Disability Index -HAQ-DI), CDAI (or DAS28 if CDAI was not available), CRP, year of treatment initiation, country).

The imputed covariates are all covariates that had at least 1 missing data (see Table 1): gender, age, disease duration, BMI, comorbidities, seropositivity, number of previous b/tsDMARDs, CRP, smoking, CDAI at baseline, HAQ at baseline and concomitant treatment with glucocorticoids.

Comorbidity

We included as a comorbidity: cardiovascular problem, interstitial lung disease, chronic infection, malignancy, metabolic disorder or neuropsychiatric disorder.