| Concomitant csDMARDs (%) | 0 | 1 | 2 | ≥3 | None | MTX | MTX + other than MTX | Other than MTX | GC at baseline | CRP (mg/l) (mean (SD)) |
|--------------------------|---|---|---|----|------|----|-----------------------|---------------|--------------|-------------------|
| 0 | 1201 (57.9) | 323 (15.6) | 385 (18.6) | 165 (8.0) | 994 (47.9) | 829 (40.0) | 117 (5.6) | 134 (6.5) | 708 (34.1) | 8.5 (15.9) |
| 1 | 831 (37.5) | 229 (34.8) | 559 (26.7) | 253 (38.4) | 258 (39.2) | 167 (25.4) | 115 (17.5) | 118 (17.9) | 190 (31.0) | 18.1 (29.1) |
| 2 | 31 (1.1) | 48 (15.2) | 40 (12.7) | 92 (29.2) | 1074 (35.4) | 302 (34.0) | 155 (5.1) | 774 (25.5) | 341 (33.5) | 11.1 (18.7) |
| ≥3 | 132 (5.9) | 449 (24.1) | 647 (34.7) | 748 (40.1) | 71 (22.5) | 927 (49.7) | 14 (4.4) | 30 (9.5) | 313 (20.0) | 9.5 (14.0) |
| Concomitant csDMARDs (%) | 0 | 1 | 2 | ≥3 | None | MTX | MTX + other than MTX | Other than MTX | GC at baseline | CRP (mg/l) (mean (SD)) |
|--------------------------|---|---|---|----|------|----|-----------------------|---------------|--------------|-------------------|
| 0 | 1201 (57.9) | 323 (15.6) | 385 (18.6) | 165 (8.0) | 994 (47.9) | 829 (40.0) | 117 (5.6) | 134 (6.5) | 708 (34.1) | 8.5 (15.9) |
| 1 | 831 (37.5) | 229 (34.8) | 559 (26.7) | 253 (38.4) | 258 (39.2) | 167 (25.4) | 115 (17.5) | 118 (17.9) | 190 (31.0) | 18.1 (29.1) |
| 2 | 31 (1.1) | 48 (15.2) | 40 (12.7) | 92 (29.2) | 1074 (35.4) | 302 (34.0) | 155 (5.1) | 774 (25.5) | 341 (33.5) | 11.1 (18.7) |
| ≥3 | 132 (5.9) | 449 (24.1) | 647 (34.7) | 748 (40.1) | 71 (22.5) | 927 (49.7) | 14 (4.4) | 30 (9.5) | 313 (20.0) | 9.5 (14.0) |

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 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 2074 | 658 | 3035 | 315 | 1865 | 2319 | 741 | 394 | 757 | 1562 | 515 | 801 | 262 | 470 | 583 | 2167 | 2319 |
| 0.5 | 0.7 | 0.8 | 0.7 | 0.3 | 0.7 | 0.7 | 0.9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| 3 (3.4) | 1.3 | 1.4 | 1.0 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |

**Supplemental material**

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| Country | CDAI (mean (SD)) | DAS28 (mean (SD)) | HAQ (mean (SD)) | Smoking (%) | Body mass index (mean (SD)) | Any comorbidity, % |
|---------|-----------------|------------------|----------------|--------------|--------------------------|------------------|
| AU      | 17.0 (8.4)      | 4.1 (1.3)        | 1.1 (0.7)      | Current      | 158 (7.6)              | 1218 (7.6)      |
| CA      | 23.1 (12.5)     | 4.6 (1.5)        | 1.2 (0.6)      | Never        | 1837 (88.6)            | 568 (86.3)      |
| CH      | 20.6 (12.1)     | 4.3 (1.4)        | 0.9 (0.7)      | Past         | 216 (21.2)             | 15 (3.8)        |
| CZ      | 20.7 (15.8)     | 5.5 (1.5)        | 1.5 (0.6)      |              | 116 (43.3)             | 0 (0.0)         |
| DE      | 24.3 (11.9)     | 4.7 (1.3)        | 1.3 (0.6)      |              | 471 (26.5)             | 284 (58.7)      |
| ES      | 23.1 (12.5)     | 4.7 (1.4)        | 1.3 (0.6)      |              | 428 (23.2)             | 2170 (71.5)     |
| FI      | 15.0 (9.3)      | 3.6 (1.4)        | NaN (NA)       |              | 44 (13.3)              | 173 (54.9)      |
| IL      | 16.9 (11.2)     | 4.8 (1.3)        | 1.3 (0.6)      |              | 46 (15.9)              | 955 (51.2)      |
| IT      | 15.1 (11.5)     | 3.8 (1.5)        | NaN (NA)       |              | NaN (NA)               | 848 (36.6)      |
| NL      | 17.6 (11.9)     | 4.0 (1.6)        | 0.7 (0.6)      |              | NaN (NA)               | 454 (61.3)      |
| NO      | 26.3 (13.3)     | 5.2 (1.4)        | 1.1 (0.7)      |              | NaN (NA)               | NaN (NA)        |
| PT      | 26.0 (12.7)     | 5.7 (1.0)        | 1.8 (0.7)      |              | NaN (NA)               | NaN (NA)        |
| RO      | 31.2 (14.1)     | 5.8 (1.2)        | 1.6 (0.5)      |              | NaN (NA)               | NaN (NA)        |
| RU      | 28.2 (12.9)     | 5.5 (1.3)        | 1.6 (0.7)      |              | NaN (NA)               | NaN (NA)        |
| SI      | 28.2 (12.9)     | 5.6 (1.2)        | 0.9 (0.7)      |              | NaN (NA)               | NaN (NA)        |
| TR      | 2022;          | 5.6 (1.2)        | 1.6 (0.8)      |              | 118 (20.3)             | 466 (24.5)      |
| UK      | 28.2 (12.9)     | 5.6 (1.2)        | 1.6 (0.8)      |              | 118 (20.3)             | 466 (24.5)      |

**Notes:**
- **CDAI:** Clinical Disease Activity Index
- **DAS28:** Disease Activity Score in 28 joints
- **HAQ:** Health Assessment Questionnaire
- **Body mass index (BMI):** Calculated as weight (kg) / height (m)^2
- **Any comorbidity:** Percentage of participants with at least one comorbidity

**Location Abbreviations:**
- **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
- **RU:** Russia
- **SI:** Slovenia
- **TR:** Turkey
- **UK:** United Kingdom

**MTX:** Methotrexate

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

|                        | TNFi | 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 (51.0) | 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**

|                    | TNFi   | IL-6i  | Abatacept | JAKi   |
|--------------------|--------|--------|-----------|--------|
| 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

Treatment courses included
19 registers
n=31,936

Main analysis (retention)
19 registers
n=31,846

No individual patient data
2 registers excluded (BE, DK)
n=11,009

Different covariates for adjustments
1 register excluded (BE)
n=6,288

Main analysis
TNFi  n=17,522
ABA   n=2,775
IL6i  n=3,863
JAKI  n=7,686

Sensitivity analysis
TNFi  n=15,080
ABA   n=2,049
IL6i  n=2,856
JAKI  n=5,573

Secondary analysis 1 (discontinuation reasons)
17 registers
n=20,837

No CDAI
4 registers excluded (IL, TR, UK, RO)
n=5,142

Secondary analysis 2 (CDAI response)
13 registers
n=15,695

TNFi  n=8,404
ABA   n=1,523
IL6i  n=1,843
JAKI  n=3,925
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.