

<b>Supplementary table 1. Demographic and clinical characteristics of patients according to flare occurrence</b>				
		<b>Patients with flare (n=272)</b>	<b>Patients without flare (n=7064)</b>	<b>All patients (n=7336)</b>
<b>Age, years</b>	Mean (SD)	56.2 (14.3)	58.4 (15.5)	58.3 (15.5)
	Range	19 to 88	18 to 96	18 to 96
<b>Sex</b>	Female	204 (75)	4779 (67.7)	4983 (67.9)
	Male	68 (25)	2285 (32.3)	2353 (32.1)
<b>Primary I-RMD diagnosis</b>	Rheumatoid arthritis	112 (41.2)	2535 (35.9)	2647 (36.1)
	Axial spondyloarthritis	37 (13.6)	1147 (16.2)	1184 (16.1)
	Psoriatic arthritis	33 (12.1)	859 (12.2)	892 (12.2)
	Other peripheral spondyloarthritis (including reactive arthritis)	14 (5.1)	164 (2.3)	178 (2.4)
	Non-systemic juvenile idiopathic arthritis	3 (1.1)	85 (1.2)	88 (1.2)
	Systemic juvenile idiopathic arthritis	0	14 (<1)	14 (<1)
	Gout or other crystal arthritis	2 (<1)	98 (1.4)	100 (1.4)
	Other inflammatory arthritis	5 (1.8)	99 (1.4)	104 (1.4)
	Systemic lupus erythematosus	16 (5.9)	530 (7.5)	546 (7.4)
	Primary anti-phospholipid syndrome	3 (1.1)	30 (<1)	33 (<1)
	Sjogren's syndrome	12 (4.4)	282 (4)	294 (4)
	Systemic sclerosis	3 (1.1)	242 (3.4)	245 (3.3)
	Idiopathic inflammatory myopathy	0	86 (1.2)	86 (1.2)
	Mixed connective tissue disease	2 (<1)	42 (<1)	44 (<1)
	Undifferentiated connective tissue disease	2 (<1)	70 (1)	72 (1)
	Large vessel vasculitis - Takayasu arteritis	0	18 (<1)	18 (<1)
	Large vessel vasculitis - giant cell arteritis	3 (1.1)	154 (2.2)	157 (2.1)
	Polymyalgia rheumatica	8 (2.9)	262 (3.7)	270 (3.7)
	Medium-vessel vasculitis - polyarteritis nodosa, Kawasaki disease	4 (1.5)	10 (<1)	14 (<1)
	ANCA-associated vasculitis - MPA, GPA, EGPA	5 (1.8)	134 (1.9)	139 (1.9)
	Immune complex small vessel vasculitis	0	9 (<1)	9 (<1)
	Bechet's disease	1 (<1)	49 (<1)	50 (<1)
	Other vasculitis	1 (<1)	28 (<1)	29 (<1)
	Monogenic autoinflammatory syndrome	1 (<1)	17 (<1)	17 (<1)
Non-monogenic autoinflammatory syndrome	1 (<1)	14 (<1)	15 (<1)	
IgG4-related disease	0	16 (<1)	16 (<1)	

	Sarcoidosis	2 (<1)	61 (<1)	63 (<1)
	Relapsing polychondritis	2 (<1)	7 (<1)	9 (<1)
	Chronic recurrent multifocal osteomyelitis	0	3 (<1)	3 (<1)
<b>Physician-reported disease activity</b>	Remission	98 (36)	2817 (39.9)	2915 (39.7)
	Low disease activity	103 (37.9)	1908 (27)	2011 (27.4)
	Moderate disease activity	51 (18.8)	887	938 (12.8)
	High disease activity	4 (1.5)	164	168 (2.3)
	Missing/unknown	16 (5.9)	1288	1304 (17.8)
<b>Anti-rheumatic medication exposure</b>				
<b>csDMARDs</b>		138 (50.7)	4131(58.5)	4269 (58.2)
	Antimalarials	29 (10.7)	945 (13.4)	974 (13.3)
	Leflunomide	15 (5.5)	388 (5.5)	403 (5.5)
	Methotrexate	82 (30.1)	2420 (34.3)	2502 (34.1)
	Sulfasalazine	12 (4.4)	378 (5.4)	390 (5.3)
<b>bDMARDs</b>		122 (44.9)	3227 (45.7)	3349 (45.7)
	Abatacept	7 (2.6)	114 (1.6)	121 (1.6)
	Belimumab	0	38 (<1)	38 (<1)
	Rituximab	6 (2.2)	315 (4.5)	321 (4.4)
	IL-1 inhibitors	2 (<1)	27 (<1)	29 (<1)
	IL-6 inhibitors	11 (4)	342 (4.8)	353 (4.8)
	IL-12/23 inhibitors	3 (1.1)	46 (<1)	49 (<1)
	IL-23 inhibitors	1 (<1)	5 (<1)	6 (<1)
	IL-17 inhibitors	9 (3.3)	200 (2.8)	209 (2.8)
	TNF-inhibitors	83 (30.5)	2140 (30.3)	2223 (30.3)
<b>tsDMARDs</b>		12 (4.4)	237 (3.4)	249 (3.4)
	Apremilast	0	13 (<1)	13 (<1)
	JAK inhibitors	12 (4.4)	224 (3.2)	236 (3.2)
<b>Immunosuppressants</b>		80 (29.4)	2501 (35.4)	2581 (35.2)
	Glucocorticoids (systemic)	67 (24.6)	2154 (30.5)	2221 (30.3)
	Azathioprine/6-mercaptopurine	5 (1.8)	144 (2)	149 (2)
	Cyclosporine	0	29 (<1)	29 (<1)
	Cyclophosphamide	0	13 (<1)	13 (<1)
	Mycophenolate mofetil/mycophenolic acid	8 (2.9)	153 (2.2)	161 (2.2)
	Tacrolimus	0	8 (<1)	8 (<1)
<b>Other medications</b>				

	Intravenous immunoglobulin	0	16 (<1)	16 (<1)
	Antifibrotics	1 (<1)	9 (<1)	10 (<1)
<b>None</b>		33 (12.1)	483 (6.8)	516 (7)
<b>Unknown</b>		0	87 (1.2)	87 (1.2)

All medications including monotherapy and/or combination therapy. ANCA: anti-neutrophil cytoplasmic antibody; bDMARDs: biologic disease-modifying anti-rheumatic drugs; csDMARDs: conventional synthetic disease-modifying anti-rheumatic drugs; IgG4: Immunoglobulin G4; EGPA: eosinophilic granulomatosis with polyangiitis; GPA: granulomatosis with polyangiitis; IL: interleukin; I-RMD: inflammatory/autoimmune rheumatic and musculoskeletal disease; JAK: janus kinase; MPA: microscopic polyangiitis; tsDMARDs: targeted synthetic disease-modifying anti-rheumatic drugs; TNF: tumor necrosis factor.

<b>Supplementary table 2. Anti-rheumatic medication exposure in patients with post-vaccination flare</b>					
	<b>IJD, n= 206</b>	<b>CTD, n= 38</b>	<b>Vasculitis, n= 22</b>	<b>OIRMD, n= 6</b>	<b>All patients, n= 272</b>
<b>csDMARDs</b>	105 (51)	26 (68.4)	5 (22.7)	2 (33.3)	138 (50.7)
<b>Antimalarials</b>	9 (4.4)	19 (50)	0	1 (16.7)	29 (10.7)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>Leflunomide</b>	14 (6.8)	1 (2.6)	0	0	15 (5.5)
Held before vaccination	2	0	0	0	2
Reduced before vaccination	0	0	0	0	0
Held after vaccination	1	0	0	0	1
Reduced after vaccination	0	0	0	0	0
<b>Methotrexate</b>	70 (34)	6 (15.8)	5 (22.7)	1 (16.7)	82 (30.1)
Held before vaccination	5	1	2	0	8
Reduced before vaccination	0	0	0	0	0
Held after vaccination	17	0	0	0	17
Reduced after vaccination	0	0	0	0	0
<b>Sulfasalazine</b>	12 (5.8)	0	0	0	12 (4.4)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>bDMARDs</b>	110 (53.4)	4 (10.5)	7 (31.8)	1 (16.7)	122 (44.9)
<b>Abatacept</b>	7 (3.4)	0	0	0	7 (2.6)
Held before vaccination	2	0	0	0	2
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>Belimumab</b>	0	0	0	0	0
<b>Rituximab</b>	4 (1.9)	0	2 (9.1)	0	6 (2.2)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0

Held after vaccination	0	0	0	0	0
Reduced after vaccination	1	0	0	0	1
<b>IL-1 inhibitors</b>	0	1 (2.6)	0	1 (16.7)	2 (<1)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>IL-6 inhibitors</b>	7 (3.4)	1 (2.6)	3 (13.6)	0	11 (4)
Held before vaccination	0	0	1	0	1
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>IL-12/23 inhibitors</b>	2 (1)	1 (2.6)	0	0	3 (1.1)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>IL-23 inhibitors</b>	1 (<1)	0	0	0	1 (<1)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>IL-17 inhibitors</b>	9 (4.4)	0	0	0	9 (3.3)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	1	0	0	0	1
Reduced after vaccination	1	0	0	0	1
<b>TNF-inhibitors</b>	80 (38.8)	1 (2.6)	2 (9.1)	0	83 (30.5)
Held before vaccination	10	0	1	0	11
Reduced before vaccination	2	0	0	0	2
Held after vaccination	9	1	0	0	10
Reduced after vaccination	4	0	0	0	4
<b>tsDMARDS</b>	12 (5.8)	0	0	0	12 (4.4)
<b>Apremilast</b>	0	0	0	0	0
<b>JAK inhibitors</b>	12 (5.8)	0	0	0	12 (4.4)

Held before vaccination	1	0	0	0	1
Reduced before vaccination	0	0	0	0	0
Held after vaccination	2	0	0	0	2
Reduced after vaccination	0	0	0	0	0
<b>Immunosuppressants</b>					
<b>Glucocorticoids (systemic)</b>	27 (13.1)	21 (55.3)	14 (63.6)	5 (83.3)	67 (24.6)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	1	0	0	1
Held after vaccination	0	0	0	0	0
Reduced after vaccination	1	0	0	0	1
<b>Azathioprine/6-mercaptopurine</b>	0	3 (7.9)	0	2 (33.3)	5 (1.8)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>Cyclosporine</b>	0	0	0	0	0
<b>Cyclophosphamide</b>	0	0	0	0	0
<b>Mycophenolate mofetil/mycophenolic acid</b>	0	7 (18.4)	1 (4.5)	0	8 (2.9)
Held before vaccination	0	1	0	0	1
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>Tacrolimus</b>	0	0	0	0	0
<b>Other</b>					
<b>Intravenous immunoglobulin</b>	0	0	0	0	0
<b>Antifibrotics</b>	0	1 (2.6)	0	0	1 (<1)
Held before vaccination	0	0	0	0	0
Reduced before vaccination	0	0	0	0	0
Held after vaccination	0	0	0	0	0
Reduced after vaccination	0	0	0	0	0
<b>None</b>	22 (10.7)	5 (13.2)	6 (27.3)	0	33 (12.1)
<b>Unknown</b>	0	0	0	0	0

\* Including monotherapy and/or combination therapy. bDMARDs: biologic disease-modifying anti-rheumatic drugs; csDMARDs: conventional synthetic disease-modifying anti-rheumatic drugs; IL: interleukin; JAK: janus kinase; tsDMARDs: targeted synthetic disease-modifying anti-rheumatic drugs; RMD: rheumatic and musculoskeletal disease; TNF: tumor necrosis factor.

**Supplementary table 3.** Univariable logistic regression analyses of factors associated with flare, using either “I-RMD flare” or “new anti-rheumatic medication or dosage increase due to flare” as the dependent variable

Covariates	Outcome: flare		Outcome: new medication or dosage increase due to flare	
	OR (95% CI)	p-value	OR (95% CI)	p-value
<b>Age, per decade of life</b>	0.91 (0.84-0.98)	<b>0.024</b>	0.99 (0.98-1.004)	0.19
<b>Female sex</b>	1.43 (1.08-1.89)	<b>0.011</b>	1.24 (0.82-1.88)	0.32
<b>Diagnostic group</b>				
Inflammatory joint diseases	Reference		Reference	
Connective tissue diseases	0.72 (0.51-1.02)	0.066	0.85 (0.46-1.59)	0.61
Vasculitis	0.80 (0.51-1.25)	0.34	0.94 (0.47-1.86)	0.85
Other I-RMD	1.24 (0.54-2.86)	0.61	1.09 (0.32-3.70)	0.89
<b>Disease activity</b>				
Remission	Reference		Reference	
Low disease activity	1.56 (1.18-2.08)	<b>0.002</b>	1.46 (0.94-2.25)	0.093
Moderate/high disease activity	1.35 (0.97-1.90)	0.076	3.08 (1.91-4.97)	<b>&lt;0.001</b>
<b>Vaccine</b>				
Pfizer	Reference		Reference	
Moderna	0.90 (0.58-1.39)	0.65	1.38 (0.77-2.48)	0.28
AstraZeneca	1.19 (0.87-1.62)	0.27	1.42 (0.90-2.22)	0.13
Other	0.09 (0.01-0.68)	<b>0.02</b>	0	1
<b>Anti-rheumatic medication</b>				
None	Reference		Reference	
Immunosuppressants	0.39 (0.09-1.64)	0.20	0	1
Methotrexate	0.87 (0.59-1.30)	0.52	0.48 (0.26-0.89)	<b>0.019</b>
Leflunomide	1.49 (0.74-2.97)	0.26	0.77 (0.26-2.29)	0.64
Sulfasalazine	1.19 (0.50-2.83)	0.68	0.75 (0.22-2.63)	0.66
Antimalarials	0.75 (0.43-1.29)	0.30	0.47 (0.19-1.17)	0.10
TNFi	0.93 (0.66-1.32)	0.71	0.60 (0.33-1.09)	0.095
tsDMARDs	1.22 (0.64-2.31)	0.54	0.39 (0.13-1.18)	0.095
Rituximab	0.46 (0.19-1.07)	0.074	0.10 (0.01-0.77)	<b>0.027</b>
Other bDMARDs	1.03 (0.66-1.60)	0.88	0.57 (0.28-1.14)	0.11
<b>Glucocorticoids</b>	0.77 (0.55-1.09)	0.14	0.96 (0.56-1.64)	0.87
<b>Cessation/reduction of anti-rheumatic medications at the time of vaccination</b>	4.60 (3.40-6.23)	<b>&lt;0.001</b>	2.25 (1.33-3.79)	<b>0.002</b>

For “Outcome: flare”, the total N was 7336 (272 flares); for “Outcome: new medication or dosage increase due to flare” some outcome data was missing, and the total N was 5287 (122 flares). Missing values for vaccine type and disease activity were derived by multiple imputation using full conditional specification. bDMARDs: biological disease-modifying antirheumatic drugs; CI: confidence interval; Combi: combination therapy; I-RMDs: inflammatory rheumatic and musculoskeletal diseases; Mono: monotherapy; OR: odds ratio; TNFi: tumor necrosis factor inhibitors; tsDMARDs: targeted synthetic disease-modifying antirheumatic drugs.

**Supplementary Table 4.** Multivariable logistic regression analysis of factors associated with flare, using either “I-RMD flare” or “new anti-rheumatic medication or dosage increase due to flare” as the dependent variable (secondary model without data imputation)

Covariates	Outcome: flare		Outcome: new medication or dosage increase due to flare	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age, per decade of life	0.89 (0.82-0.97)	<b>0.009</b>	0.94 (0.83-1.06)	0.32
Female	1.43 (1.06-1.93)	<b>0.02</b>	1.16 (0.76-1.76)	0.50
<b>Diagnostic group</b>				
Inflammatory joint diseases	Reference		Reference	
Connective tissue diseases	0.73 (0.45-1.19)	0.21	0.77 (0.39-1.50)	0.44
Vasculitis	1.02 (0.60-1.72)	0.95	1.01 (0.51-2.03)	0.97
Other inflammatory RMDs or condition	1.37 (0.57-3.28)	0.49	1.18 (0.35-3.99)	0.79
<b>Disease activity</b>				
Remission	Reference		Reference	
Low disease activity	1.44 (1.08-1.93)	<b>0.014</b>	1.49 (0.95-2.32)	0.083
Moderate or high disease activity	1.54 (1.08-2.19)	<b>0.017</b>	3.05 (1.88-4.96)	<b>&lt;0.001</b>
<b>Vaccine type</b>				
Pfizer-BioNTech	Reference		Reference	
Moderna	0.91 (0.58-1.43)	0.68	1.47 (0.82-2.65)	0.19
AstraZeneca	1.19 (0.86-1.65)	0.29	1.45 (0.92-2.30)	0.11
Others	0.14 (0.02-0.99)	<b>0.048</b>	0	1
<b>Anti-rheumatic medications</b>				
None	Reference		Reference	
Immunosuppressants	0.38 (0.09-1.64)	0.19	0	<b>1</b>
Methotrexate	0.60 (0.38-0.97)	<b>0.036</b>	0.44 (0.23-0.84)	<b>0.013</b>
Leflunomide	1.13 (0.50-2.52)	0.77	0.62 (0.18-2.12)	0.44
Sulfasalazine	0.93 (0.38-2.32)	0.88	0.74 (0.21-2.58)	0.63
Antimalarials	0.96 (0.52-1.77)	0.89	0.55 (0.22-1.40)	0.21
TNFi	0.59 (0.37-0.92)	<b>0.021</b>	0.57 (0.31-1.06)	0.074
tsDMARDs	0.61 (0.30-1.24)	0.17	0.38 (0.12-1.17)	0.092
Rituximab	0.32 (0.13-0.79)	<b>0.013</b>	0.11 (0.01-0.81)	<b>0.03</b>
Other bDMARDs	0.65 (0.39-1.08)	0.09	0.56 (0.27-1.13)	0.10
<b>Glucocorticoids</b>	0.63 (0.41-0.98)	<b>0.038</b>	0.79 (0.45-1.40)	0.42
<b>Cessation/reduction of anti-rheumatic medications at the time of vaccination</b>	4.17 (2.98-5.83)	<b>&lt;0.001</b>	2.29 (1.34-3.91)	<b>0.003</b>

For “Outcome: flare”, the total N was 5958 (254 flares); for “Outcome: new medication or dosage increase due to flare” some outcome data was missing, and the total N was 4900 (115 flares). bDMARDs: biological disease-modifying antirheumatic drugs; CI: confidence interval; Combi: combination therapy; I-RMDs: inflammatory rheumatic and musculoskeletal diseases; Mono: monotherapy; MTX: methotrexate; OR: odds ratio; TNFi: tumor necrosis factor inhibitors; tsDMARDs: targeted synthetic disease-modifying antirheumatic drugs.