

Supplementary materials

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Supplementary Table S1 Number of other specialty outpatient appointments, and comparison to 2019, by nation and year.

		April 2019-March 2020			April 2020 – March 2021			April 2020 – March 2021			April 2022 - March 2023		
		England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland
N*		138835	13021	3614	131195	12351	3412	124730	11791	3238	119295	-	-
Number of All Appointments, n (column %)	Zero appointments	20,570 (14.8)	1,609 (12.36)	933 (25.8)	22,490 (17)	2,278 (18.44)	1384 (40.6)	19,065 (15.2)	2,042 (17.32)	1256 (38.8)	17,485 (14.7)	-	-
	1-2 per year	34,830 (25.1)	3,584 (27.52)	1401 (38.8)	41,380 (31.3)	4,144 (33.55)	1166 (34.2)	35,190 (28)	3,156 (26.77)	975 (30.1)	32,645 (27.4)	-	-
	3-5 per year	35,655 (25.7)	3,839 (29.48)	844 (23.4)	33,455 (25.3)	3,452 (27.95)	574 (16.8)	31,410 (25)	3,171 (26.89)	615 (19.0)	30,485 (25.6)	-	-
	6 or more per year	47,780 (34.4)	3,989 (30.64)	436 (12.1)	34,750 (26.3)	2,477 (20.06)	288 (8.4)	39,980 (31.8)	3422 (29.02)	392 (12.1)	38,680 (32.4)	-	-
Difference in number of Appointments compared to 2019, n (column %)	Zero appointments both years	-	-	-	10,415 (7.9)	899 (7.3)	641 (18.8)	8,425 (617)	725 (5.87)	561 (17.3)	7,280 (6.1)	-	-
	Fewer appointments	-	-	-	65,930 (49.9)	6,469 (54.8)	1625 (47.6)	56,480 (45.0)	5,262 (42.6)	1411 (43.6)	52,895 (44.3)	-	-
	Same number or more appointments	-	-	-	55,735 (42.2)	4,983 (40.3)	1146 (33.6)	60,740 (48.3)	5,804 (46.99)	1266 (39.1)	59,120 (49.6)	-	-

* Counts for England rounded to the nearest 5.

Supplementary Table S2: Characteristics of patients by category of difference in the number of rheumatology outpatient appointments in 2020 compared with 2019

		No appointments either year			Fewer appointments			Same number or more appointments		
		England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland
	N	28,895	2271	1403	45,530	4666	1139	57,580	5414	860
Age category, n (row %)	18 - 40 years	1360 (18)	116 (15.5)	123 (48.4)	2790 (36.9)	298 (39.9)	63 (24.8)	3405 (45.1)	332 (44.5)	68 (26.8)
	41 - 60 years	6740 (17.7)	662 (16.9)	429 (38.8)	13855 (36.3)	1466 (37.4)	392 (35.4)	17570 (46)	1793 (45.7)	286 (25.8)
	61 - 80 years	14385 (20.8)	1165 (17.7)	663 (38.8)	24145 (34.9)	2514 (38.2)	607 (35.5)	30570 (44.2)	2909 (44.2)	439 (25.7)
	>80 years	6410 (37.3)	328 (29.9)	188 (56.6)	4740 (27.6)	388 (35.4)	77 (23.2)	6035 (35.1)	380 (34.7)	67 (20.2)
Sex, n (row %)	Female	19595 (20.9)	1501 (17.3)	873 (38.1)	32790 (35)	3360 (38.7)	808 (35.3)	41225 (44)	3831 (44.1)	610 (26.6)
	Male	9300 (24.2)	770 (21)	530 (47.7)	12740 (33.2)	1306 (35.7)	331 (29.8)	16360 (42.6)	1583 (43.3)	250 (22.5)
Rural Urban classification, n (row %)	Rural	7490 (22.9)	990 (25.1)	1008 (44.5)	10960 (33.5)	1395 (35.4)	652 (28.8)	14250 (43.6)	1555 (39.5)	607 (26.8)
	Urban	21405 (21.6)	1281 (15.2)	395 (34.8)	34565 (34.8)	3271 (38.9)	487 (42.9)	43335 (43.6)	3859 (45.9)	253 (22.3)
IMD, n (row %)	1 (Most deprived)	5060 (21.6)	378 (16)	73 (34)	8485 (36.2)	907 (38.3)	95 (44.2)	9925 (42.3)	1084 (45.8)	47 (21.9)

	2	5785 (22.5)	455 (16.7)	187 (35.5)	8975 (34.9)	1025 (37.5)	209 (39.7)	10930 (42.5)	1252 (45.8)	131 (24.9)
	3	6525 (21.9)	555 (21.4)	323 (34.1)	10060 (33.8)	973 (37.5)	310 (32.7)	13160 (44.2)	1065 (41.1)	315 (33.2)
	4	5980 (21.6)	521 (21.9)	636 (52.7)	9375 (33.9)	885 (37.3)	323 (26.8)	12325 (44.5)	968 (40.8)	247 (20.5)
	5 (Least deprived)	5540 (21.8)	362 (15.9)	184 (36.4)	8635 (34)	876 (38.4)	202 (39.9)	11245 (44.2)	1045 (45.8)	120 (23.7)
smoking, n (row %)	Never smoked	11055 (22.3)	581 (18)	-	17175 (34.7)	1234 (38.3)	-	21290 (43)	1406 (43.7)	-
	Current smoker	4120 (22)	555 (19.6)	-	6375 (34.1)	1062 (37.5)	-	8200 (43.9)	1217 (42.9)	-
	Ex-smoker	13635 (21.5)	1135 (18)	-	21855 (34.4)	2370 (37.6)	-	27970 (44.1)	2791 (44.3)	-
	Unknown	85 (25.8)	-	-	120 (36.4)	-	-	125 (37.9)	-	-
Time since first RA code, mean (standard deviation)		15 (42.9)	10.52 (7.1)	7.22 (4.63)	10 (28.6)	8.9 (5.34)	7.74 (5.23)	10 (28.6)	9.29 (5.9)	8 (5.18)
BMI, n (row %)	Missing	4775 (26)	-	-	5990 (32.6)	-	-	7620 (41.4)	-	-
	Underweight	645 (23.7)	-	-	935 (34.4)	-	-	1140 (41.9)	-	-
	Healthy range	7175 (21)	-	-	12025 (35.2)	-	-	14995 (43.9)	-	-
	Overweight	8270 (21.3)	-	-	13480 (34.8)	-	-	17035 (43.9)	-	-
	Obese	6845 (21.3)	-	-	11125 (34.7)	-	-	14120 (44)	-	-
	Morbidly obese	1180 (20.3)	-	-	1975 (33.9)	-	-	2670 (45.8)	-	-

Ethnicity, n (row %)	White	26125 (21.8)	-	-	41135 (34.3)	-	-	52610 (43.9)	-	-
	South Asian	1505 (19.5)	-	-	2960 (38.3)	-	-	3270 (42.3)	-	-
	Black	415 (23.6)	-	-	595 (33.9)	-	-	745 (42.5)	-	-
	Mixed	155 (18.7)	-	-	325 (39.2)	-	-	350 (42.2)	-	-
	Other	220 (22)	-	-	360 (36)	-	-	420 (42)	-	-
	Missing	475 (59)	-	-	145 (18)	-	-	185 (23)	-	-

Supplementary Table S3: Characteristics of patients by category of difference in the number of rheumatology outpatient appointments in 2021 compared with 2019

		No appointments either year			Fewer appointments			Same number or more appointments		
		England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland
	N	26,480	2127	1348	44,650	2659	1006	54,445	5203	776
Age category, n (row %)	18 - 40 years	1320 (17.8)	110 (14.9)	124 (50.6)	2905 (39.2)	291 (39.3)	71 (29)	3180 (39.2)	339 (45.8)	50 (20.4)
	41 - 60 years	6435 (17.2)	609 (15.7)	428 (39.7)	14040 (37.4)	1459 (37.7)	378 (35.1)	17045 (37.4)	1805 (46.6)	272 (25.2)
	61 - 80 years	13425 (20.3)	1126 (17.9)	632 (39)	23445 (35.5)	2408 (38.4)	572 (35.3)	29135 (35.5)	2741 (43.7)	417 (25.7)
	>80 years	5300 (36.2)	282 (31.2)	164 (57.5)	4260 (29.1)	303 (33.6)	84 (29.5)	5085 (29.1)	318 (35.2)	37 (13)
Sex, n (row %)	Female	17960 (20.1)	1388 (21.3)	852 (38.9)	32205 (36)	1388 (21.3)	766 (35)	39265 (36)	3746 (57.4)	573 (26.2)
	Male	8520 (23.6)	739 (21.3)	496 (47.8)	12440 (34.4)	1271 (36.7)	339 (32.7)	15180 (34.4)	1457 (42)	203 (19.6)

Rural Urban classification , n (row %)	Rural	6940 (22.3)	909 (24.1)	983 (45.6)	10680 (34.3)	1348 (35.8)	667 (30.9)	13500 (34.3)	1508 (40.1)	508 (23.5)
	Urban	19545 (20.7)	1218 (15.2)	365 (34.1)	33965 (36)	3113 (38.8)	438 (40.9)	40945 (36)	3695 (46)	268 (25)
IMD, n (row %)	1 (Most deprived)	4610 (20.7)	366 (16.2)	63 (31.5)	8135 (36.6)	870 (38.5)	81 (40.5)	9510 (36.6)	1022 (45.3)	56 (28)
	2	5295 (21.7)	421 (16.1)	177 (35.8)	8830 (36.2)	1005 (38.5)	186 (37.6)	10285 (36.2)	1182 (45.3)	132 (26.7)
	3	5940 (21)	525 (21.1)	303 (34)	9920 (35)	944 (38)	327 (36.7)	12450 (35)	1014 (40.8)	262 (29.4)
	4	5525 (20.9)	481 (21.1)	624 (53.9)	9225 (35)	821 (36.1)	325 (28.1)	11630 (35)	974 (42.8)	208 (18)
	5 (Least deprived)	5110 (21.1)	334 (15.4)	181 (37.3)	8540 (35.3)	821 (37.9)	186 (38.4)	10570 (35.3)	1011 (46.7)	118 (24.3)
smoking, n (row %)	Never smoked	10275 (21.6)	566 (18.3)	-	16835 (35.4)	1197 (38.6)	-	20475 (35.4)	1336 (43.1)	-
	Current smoker	3750 (21)	494 (18.1)	-	6290 (35.3)	1034 (38)	-	7775 (35.3)	1194 (43.9)	-
	Ex-smoker	12375 (20.7)	1067 (17.9)	-	21395 (35.7)	2230 (37.4)	-	26085 (35.7)	2673 (44.8)	-
	Unknown	85 (26.6)	-	-	125 (39.1)	-	-	110 (39.1)	-	-
Time since first RA code, mean (standard deviation)		15 (42.9)	10.55 (7.01)	7.25 (4.62)	10 (28.6)	8.91 (10.40)	7.84 (5.4)	10 (28.6)	9.13 (5.83)	7.79 (4.93)

BMI, n (row %)	Missing	4320 (24.7)	-	-	6045 (34.6)	-	-	7125 (34.6)	-	-
	Underweight	505 (21.1)	-	-	880 (36.8)	-	-	1005 (36.8)	-	-
	Healthy range	6530 (20.2)	-	-	11550 (35.7)	-	-	14230 (35.7)	-	-
	Overweight	7680 (20.7)	-	-	13210 (35.6)	-	-	16180 (35.6)	-	-
	Obese	6350 (20.7)	-	-	10970 (35.7)	-	-	13410 (35.7)	-	-
	Morbidly obese	1100 (19.7)	-	-	1990 (35.6)	-	-	2495 (35.6)	-	-
Ethnicity, n (row %)	White	23920 (21)	-	-	40270 (35.4)	-	-	49670 (35.4)	-	-
	South Asian	1430 (19)	-	-	2955 (39.3)	-	-	3135 (39.3)	-	-
	Black	370 (21.8)	-	-	600 (35.4)	-	-	725 (35.4)	-	-
	Mixed	140 (17.4)	-	-	315 (39.1)	-	-	350 (39.1)	-	-
	Other	195 (20.4)	-	-	355 (37.2)	-	-	405 (37.2)	-	-
	Missing	425 (57.8)	-	-	150 (20.4)	-	-	160 (20.4)	-	-

Supplementary Table S4: Logistic regression results measuring characteristics of those who had fewer appointments in 2020 compared to 2019.

		Univariable, odds ratio (95% confidence intervals)			Multivariable, odds ratio (95% confidence intervals)		
Variable	Group	England	Scotland	Wales	England	Scotland	Wales
Age	18-40	1.04 (0.98, 1.1)	0.83(0.6, 1.15)	1.11(0.95, 1.31)	1.03 (0.97, 1.09)	0.62(0.45, 0.85)	0.94(0.73, 1.2)
	41-60	Reference	Reference	Reference	Reference	Reference	Reference
	61-80	1 (0.97, 1.03)	0.61(0.45, 0.83)	1.03(0.95, 1.12)	1.01 (0.99, 1.04)	0.99(0.84, 1.16)	1.06(0.93, 1.2)
	>80	1 (0.95, 1.04)	0.46(0.34, 0.62)	0.92(0.8, 1.05)	1.02 (0.98, 1.07)	0.52(0.39, 0.7)	0.9(0.73, 1.09)
Sex	Male	0.98 (0.95, 1.01)	0.6(0.44, 0.82)	0.88(0.81, 0.95)	0.99 (0.96, 1.01)	0.81(0.69, 0.95)	0.83(0.74, 0.94)
Rural-urban classification	Urban	1.04 (1.01, 1.07)	0.84(0.61, 1.16)	1.16(1.07, 1.26)	1.02 (0.99, 1.05)	1.7(1.44, 2)	1.19(1.04, 1.35)
IMD	1 (Most deprived)	Reference	Reference	Reference	Reference	Reference	Reference
	2	0.96 (0.92, 1)	0.55(0.41, 0.73)	0.97(0.86, 1.08)	1 (0.96, 1.05)	0.91(0.66, 1.26)	0.93(0.78, 1.1)
	3	0.89 (0.86, 0.93)	1.06(0.92, 1.22)	0.97(0.86, 1.09)	0.95 (0.91, 0.99)	0.77(0.56, 1.06)	1(0.84, 1.19)
	4	0.89 (0.86, 0.93)	1.86(1.6, 2.16)	0.96(0.85, 1.08)	0.94 (0.9, 0.98)	0.61(0.44, 0.83)	0.95(0.79, 1.14)
	5 (Least deprived)	0.9 (0.86, 0.94)	0.78(0.67, 0.91)	1(0.89, 1.13)	0.94 (0.9, 0.98)	0.88(0.63, 1.22)	1.08(0.89, 1.29)
Ethnicity	White	Reference	Reference	Reference	Reference	Reference	Reference
	South Asian	1.16 (1.1, 1.22)	-	-	1.21 (1.15, 1.28)	-	-
	Black	1.02 (0.92, 1.14)	-	-	1.11 (0.99, 1.24)	-	-

	Mixed	1.2 (1.03, 1.39)	-	-	1.26 (1.08, 1.47)	-	-
	Other	1.1 (0.95, 1.26)	-	-	1.18 (1.03, 1.37)	-	-
	Missing	1.02 (0.82, 1.27)	-	-	1.06 (0.85, 1.32)	-	-

Supplementary Table S5: Logistic regression measuring characteristics of those who had fewer appointments in 2021 compared to 2019.

		Univariable, odds ratio (95% confidence intervals)			Multivariable, odds ratio (95% confidence intervals)		
Variable	Group	England	Scotland	Wales	England	Scotland	Wales
Age	18-40	1.11 (1.05, 1.17)	0.88(0.63, 1.24)	1.07(0.91, 1.26)	1.1 (1.04, 1.16)	0.79(0.58, 1.06)	0.96(0.75, 1.24)
	41-60	Reference	Reference	Reference	Reference	Reference	Reference
	61-80	0.98 (0.95, 1)	0.85(0.62, 1.17)	1.03(0.95, 1.12)	0.99 (0.96, 1.02)	0.99(0.84, 1.17)	1.07(0.94, 1.22)
	>80	1.02 (0.97, 1.07)	0.57(0.42, 0.78)	0.84(0.72, 0.97)	1.04 (0.99, 1.09)	0.75(0.56, 1)	0.76(0.61, 0.95)
Sex	Male	1 (0.97, 1.03)	0.76(0.56, 1.02)	0.93(0.86, 1.01)	1.01 (0.98, 1.04)	0.93(0.8, 1.1)	0.86(0.76, 0.97)
Rural-urban classification	Urban	1.05 (1.02, 1.08)	0.91(0.65, 1.28)	1.14(1.05, 1.23)	1.03 (1, 1.06)	1.49(1.26, 1.76)	0.99(0.87, 1.14)
IMD	1 (Most deprived)	Reference	Reference	Reference	Reference	Reference	Reference
	2	1 (0.96, 1.05)	0.77(0.58, 1.02)	1(0.89, 1.12)	1.02 (0.98, 1.07)	0.95(0.68, 1.34)	0.97(0.81, 1.16)
	3	0.93 (0.9, 0.97)	1.09(0.95, 1.27)	0.98(0.87, 1.1)	0.97 (0.93, 1.01)	1.01(0.73, 1.41)	1.06(0.89, 1.27)

	4	0.93 (0.89, 0.97)	1.55(1.33, 1.8)	0.9(0.8, 1.02)	0.96 (0.92, 1)	0.71(0.51, 0.98)	0.94(0.78, 1.14)
	5 (Least deprived)	0.94 (0.91, 0.98)	0.9(0.77, 1.05)	0.97(0.86, 1.1)	0.97 (0.93, 1.01)	0.95(0.68, 1.35)	1(0.82, 1.21)
Ethnicity	White	Reference	Reference	Reference	Reference	Reference	Reference
	South Asian	1.16 (1.1, 1.23)	-	-	1.16 (1.1, 1.22)	-	-
	Black	1.02 (0.92, 1.14)	-	-	1.05 (0.94, 1.17)	-	-
	Mixed	1.12 (0.96, 1.3)	-	-	1.12 (0.96, 1.31)	-	-
	Other	1.08 (0.93, 1.24)	-	-	1.1 (0.95, 1.27)	-	-
	Missing	1.11 (1.05, 1.17)	0.88(0.63, 1.24)	1.07(0.91, 1.26)	1.17 (0.93, 1.46)	-	-

Supplementary Table S6: OpenSAFELY Collaborative

First name and middle initial	Surname
Alex J	Walker
Brian	MacKenna
Peter	Inglesby
Ben	Goldacre
Helen J	Curtis
Caroline E	Morton
Jessica	Morley
Amir	Mehrkar
Sebastian CJ	Bacon
George	Hickman
Richard	Croker
David	Evans
Tom	Ward
Nicholas J	DeVito
Louis	Fisher
Amelia CA	Green
Jon	Massey
Rebecca M	Smith
William J	Hulme
Simon	Davy
Colm D	Andrews
Lisa EM	Hopcroft
Henry	Drysdale
Iain	Dillingham
Robin Y	Park
Rose	Higgins
Christine	Cunningham
Milan	Wiedemann
Linda	Nab
Steven	Maude
Orla	Macdonald
Ben FC	Butler-Cole
Thomas	O'Dwyer
Catherine L	Stables
Christopher	Wood
Andrew D	Brown
Victoria	Speed
Lucy	Bridges
Andrea L	Schaffer
Caroline E	Walters
Christopher T	Rentsch

Krishnan	Bhaskaran
Anna	Schultze
Elizabeth J	Williamson
Helen I	McDonald
Laurie A	Tomlinson
Rohini	Mathur
Rosalind M	Eggo
Kevin	Wing
Angel YS	Wong
John	Tazare
Richard	Grieve
Daniel J	Grint
Sinead	Langan
Kathryn E	Mansfield
Ian J	Douglas
Stephen JW	Evans
Liam	Smeeth
Jemma L	Walker
Viyaasan	Mahalingasivam
Harriet	Forbes
Thomas E	Cowling
Emily L	Herrett
Ruth E	Costello
Bang	Zheng
Edward P K	Parker
Christopher	Bates
Jonathan	Cockburn
John	Parry
Frank	Hester
Sam	Harper
Shaun	O'Hanlon
Alex	Eavis
Richard	Jarvis
Dima	Avramov
Paul	Griffiths
Aaron	Fowles
Nasreen	Parkes
Brian	Nicholson
Rafael	Perera
David	Harrison
Kamlesh	Khunti
Jonathan AC	Sterne
Jennifer	Quint

Supplementary Table S7: The LH&W NCS Collaborative

First name	Surname
Nishi	Chaturvedi
Chloe	Park
Alisia	Carnemolla
Dylan	Williams
Anika	Knueppel
Andy	Boyd
Emma L	Turner
Katharine M	Evans
Richard	Thomas
Samantha	Berman
Stela	McLachlan
Matthew	Crane
Rebecca	Whitehorn
Jacqui	Oakley
Diane	Foster
Hannah	Woodward
Kirsteen C	Campbell
Nicholas	Timpson
Alex	Kwong
Ana Goncalves	Soares
Gareth	Griffith
Renin	Toms
Louise	Jones
Herbert,	Annie
Ruth	Mitchell
Tom	Palmer
Jonathan	Sterne
Venexia	Walker
Lizzie	Huntley
Laura	Fox
Rachel	Denholm
Rochelle	Knight
Kate	Northstone
Arun	Kanagaratnam
Elsie	Horne
Harriet	forbes
Teri	North
Kurt	Taylor
Marwa AL	Arab
Scott	Walker
Jose IC	Coronado
Arun S	Karthikeyan
George	Ploubidis
Bettina	Moltrecht
Charlotte	Booth
Sam	Parsons
Bozena	Wielgoszewska
Charis	Bridger-Staat
Claire	Steves
Ellen	Thompson
Paz	Garcia
Nathan	Cheetham
Ruth	Bowyer
Maxim	Freydin
Amy	Roberts
Ben	Goldacre

Alex	Walker
Jess	Morley
William	Hulme
Linda	Nab
Louis	Fisher
Brian	MacKenna
Colm	Andrews
Helen	Curtis
Lisa	Hopcroft
Amelia	Green
Praveetha	Patalay
Jane	Maddock
Kishan	Patel
Jean	Stafford
Wels	Jacques
Kate	Tilling
John	Macleod
Eoin	McElroy
Anoop	Shah
Richard	Silverwood
Spiros	Denaxas
Robin	Flaig
Daniel	McCartney
Archie	Campbell
Laurie	Tomlinson
John	Tazare
Bang	Zheng
Liam	Smeeth
Emily	Herrett
Thomas	Cowling
Kate	Mansfield
Ruth E	Costello
Kevin	Wang
Kathryn	Mansfield
Viyaasan	Mahalingasivam
Ian	Douglas
Sinead	Langan
Sinead	Brophy
Michael	Parker
Jonathan	Kennedy
Rosie	McEachan
John	Wright
Kathryn	Willan
Ellena	Badrick
Gillian	Santorelli
Tiffany	Yang
Bo	Hou
Andrew	Steptoe
Di Gessa,	Giorgio
Jingmin	Zhu
Paola	Zaninotto
Angela	Wood
Genevieve	Cezard
Samantha	Ip
Tom	Bolton
Alexia	Sampri
Elena	Rafeti
Fatima	Almaghrabi

Aziz	Sheikh
Syed A	Shah
Vittal	Katikireddi
Richard	Shaw
Olivia	Hamilton
Michael	Green
Theocharis	Kromydas
Daniel	Kopasker
Felix	Greaves
Robert	Willans
Fiona	Glen
Steve	Sharp
Alun	Hughes
Andrew	Wong
Lee Hamill	Howes
Alicja	Rapala
Lidia	Nigrelli
Fintan	McArdle
Chelsea	Beckford
Betty	Raman
Richard	Dobson
Amos	Folarin
Callum	Stewart
Yatharth	Ranjan
Jd	Carpentieri
Laura	Sheard
Chao	Fang
Sarah	Baz
Andy	Gibson
John	Kellas
Stefan	Neubauer
Stefan	Piechnik
Elena	Lukaschuk
Laura C	Saunders
James M	Wild
Stephen	Smith
Peter	Jezzard
Elizabeth	Tunncliffe
Zeena-Britt	Sanders
Lucy	Finnigan
Vanessa	Ferreira
Mark	Green
Rebecca	Rhead
Milla	Kibble
Yinghui	Wei
Agnieszka	Lemanska
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Supplementary text S8: RHEUMAPS study investigators

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