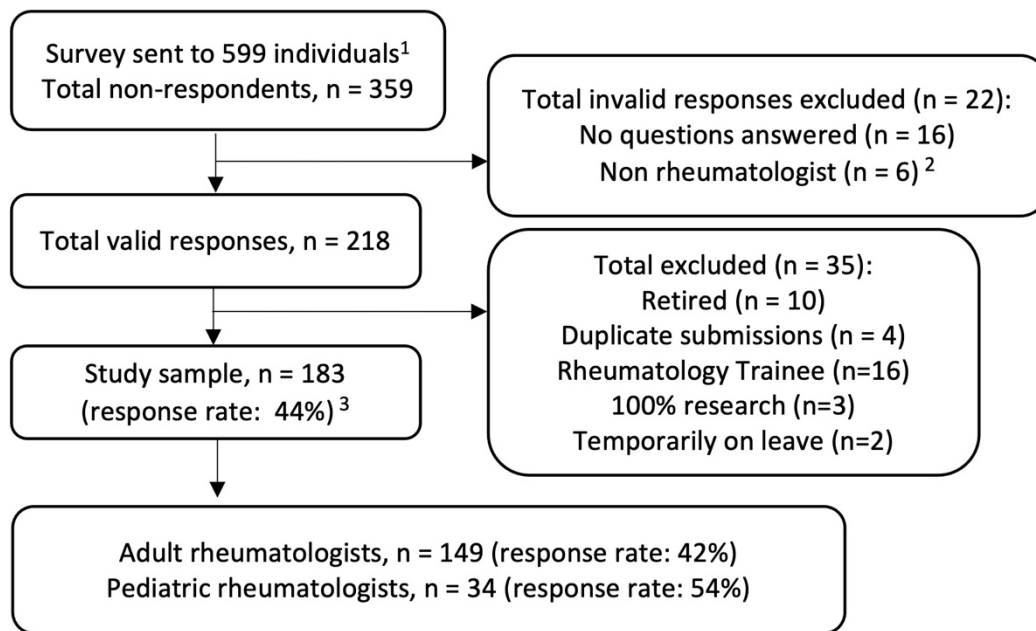


Supplementary material



Supplementary Figure 1. Response rate to workplace wellness survey. ¹Includes ineligible individuals who are CRA members (retired members, trainees, and researchers). ²Responses were deemed invalid if an individual consented to the survey but did not answer a single question, or did not confirm that they were a rheumatologist. ³Response rate for survey was 30.6%; however, surveys were sent to all CRA members including individuals who were not rheumatologists. CRA estimates there are 430 non-retired non-trainee members and of these 354 are adult rheumatologists, 63 are pediatric rheumatologists for a denominator of 417 eligible for the workforce survey (response rate 44% in this group). The remainder of CRA members are researchers and/or other specialists with an interest in rheumatology (not eligible for the survey).

Supplementary Table 1. Work characteristics by gender. Values are median (interquartile range¹) unless otherwise specified.

Work Characteristics, Median (IQR)	Total	Female	Male
Practice setting, n (%)	n = 167	n = 108	n = 59
Private practice	69 (41)	43 (40)	26 (44)
Academic setting	98 (59)	65 (60)	33 (56)
Allocation of time, %	n = 171 ¹	n = 106	n = 65
Clinical (in-person + virtual)	70 (45 – 88)	70 (50 – 85)	68 (34 – 90)
In-person	20 (10 – 50)	25 (10 – 50)	20 (10 – 40)
Virtual	25 (10 – 50)	30 (10 – 50)	25 (14 – 50)
Research	5 (0 – 15)	5 (0 – 15)	0 (0 – 12)
Administration	5 (0 – 10)	5 (0 – 10)	5 (0 – 10)
Teaching	5 (0 – 10)	5 (0 – 10)	5 (0 – 10)
Other	0 (0 – 0)	0 (0 – 0)	0 (0 – 0)
Weeks worked per year	n = 120	n = 75	n = 45
	48 (45 – 48)	48 (46 – 48)	48 (45 – 48)
Hours worked per week**	n = 121	n = 75	n = 46
	50 (40 – 55)	50 (40 – 55)	45 (40 – 55)
Call participation, n (%) ²	n = 142	n = 90	n = 52
Rheumatology call participation ³	86 (61)	55 (61)	31 (60)
Internal medicine or pediatric call only	12 (8)	9 (10)	3 (6)
COVID-19 inpatient call participation	11 (8)	7 (8)	4 (8)
Days per yr providing rheumatology on-call coverage ⁴	n = 85	n = 55	n = 30
	56 (40 – 76)	60 (42-75)	48 (29 – 89)
Half-day clinics per week ⁴	n = 135	n = 83	n = 51
	6 (3 – 7)	6 (3 – 7)	6 (3 – 8)
New patients seen per week ⁴	n = 129	n = 82	n = 47
	6 (4 – 12)	6 (4 – 10)	10 (4 – 15)
Follow-up patients seen per week ⁴	n = 132	n = 83	n = 49
	40 (25 – 60)	35 (24 – 50)	45 (30 – 60)
Hours spent per week on clinical paperwork	n = 130	n = 81	n = 49
	10 (5 – 12)	10 (6 – 12)	10 (5 – 10)
Number of respondents reporting that they are currently accepting new patients, n (%)	n = 145	n = 93	n = 52
	135 (93)	86 (92)	49 (94)

Em dashes (-) indicate a sample size too small to report. ¹11 participants were excluded because the total time allocations reported did not sum to 100%. ²Rheumatologists may be counted in multiple categories (e.g. rheumatology call participation and COVID-19 inpatient call participation) if they provided coverage for more than one category of call. ³Combination of those who participated in rheumatology alone or in rheumatology + a second roster. ⁴Rounded to the nearest whole. ⁵Due to small cell sizes, aggregated data for the Prairie provinces in reported. The Prairie provinces include Alberta, Manitoba, and Saskatchewan. ⁶Because of small cell sizes, aggregated data for the Atlantic provinces are reported. The Atlantic provinces include Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador.

Supplementary Table 2. Rheumatologists' participation in alternative delivery of care services over the past year.

Delivery of care services, n (%)	Pre-pandemic	Peak pandemic	Now	Not Applicable
Traveling clinic, n = 140	24 (17)	4 (3)	15 (11)	112 (80)
Telehealth with presenter, n = 140	11 (8)	27 (19)	26 (19)	108 (77)
Telephone visit, n = 148	6 (4)	134 (91)	125 (84)	3 (2)
Video visit, n = 144	19 (13)	94 (65)	81 (56)	42 (29)
Email, n = 144	50 (35)	66 (46)	65 (45)	68 (47)
Text messaging, n = 140	3 (2)	7 (5)	5 (4)	133 (95)
E-consult with physician, n = 140	20 (14)	19 (14)	24 (17)	110 (79)
ECHO ¹ , n = 139	1 (1)	0 (0)	0 (0)	138 (99)

This table includes adult rheumatologists, pediatric rheumatologists, and rheumatology trainees. ¹Extension for Community Health Outcomes (ECHO)

Supplementary Table 3. Responses to the open-text question to explain impact of the pandemic on burnout. A response could be coded as having mentioned more than one consequence in the table below. N=80

Effect	Frequency
Negative Effects of Pandemic	
Virtual Care	
Increased difficulty (general)	5
Difficulty assessing patients	3
Increased fatigue	2
Increased stress	2
Decreased quality of communication with patients	1
Increased patient no show rates	1
More time consuming	1
Clinical Practice	
Increased stress	8
Increased patient stress	7
Increased stress, frustration and fatigue from changes to practice and adjustment to changes	7
Concerns about personal safety/health/COVID and subsequent consequences	5
Lower quality of care	3
Limited clinic resources	3
Concerns about safety of clinic/staff/patients	3
New safety protocols and PPE	2
Implementing and learning new technology	2
More patients and/or visits	2
New or more restricted limits for new referrals and associated stress	2
Fewer patients	1
Increased stress from offloading outpatient clinic activities	1
Increased stress about opportunities for patient follow up	1
Interdisciplinary care more difficult	1
Increased patient complexity due to mental health impact of pandemic	1
Patients treating clinic staff poorly	1
Patients not understanding when virtual clinics running behind	1
Clinic staff burnout	1
Increased tension between clinic staff	1
Increased acuity	1
Pharmacy not dispensing full prescriptions	1
Feel unsupported by leadership	1
Tension between Government of Alberta and Alberta Medical Association	1
Workload	
Increased workload (general)	10
Increased hours (clinic hours, meetings, etc.)	7
Increased communications (e.g., patient phone calls)	7
COVID call (preparation or worked) and associated stress	5
Increased paperwork	3
Increased duration of patient encounters (i.e. for COVID education)	3
Increased call hours (rheumatology or other non-COVID call)	2
Falling or fell behind on workload	2
Increased reading/reviewing new and changing information	2
Increased teaching demands with virtual learning	1
Less productive	1
Personal	
Social isolation	7
Increased stress	6
Decreased work satisfaction	6
Financial stress	5
Personal coping	

Less (or no) vacation time taken	4
Inability to travel	3
Reduced stress management options	1
Reduced physical activity	
Increased home/family stress	3
Parenting stress (e.g., childcare/school closures/class isolating)	3
Suboptimal work-life balance	2
Uncertainty causing stress	2
Concerns about family health and safety	1
Increased fatigue	1
COVID fatigue	1
Positive Effects of Pandemic	
Effect	Frequency
No commute/working from home	4
Caught up on workload	1
Enjoy virtual care	1
Offloading some patients	1
No perceived impact of pandemic ¹	3
Insufficient detail ²	5

¹3 rheumatologists reported no perceived impact of the pandemic on their level of burnout. ²5 rheumatologists provided responses that did not offer sufficient detail to understand how the pandemic has impacted their level of burnout

Supplementary Table 4. Overall and gender-specific scores on burnout and risk factors for burnout.

Survey item or score (response)	Overall	Female ²	Male ²	OR (95% CI) ³	P value
Participants, n (%) ¹	171 (100)	106 (62)	65 (38)	NA	NA
Satisfaction with current job (agree or strongly agree), n = 140	94 (67)	55 (63)	39 (75)	0.55 (0.25, 1.17)	0.130
Burnout symptoms (present to severe), n = 140	71 (51)	53 (60)	18 (35)	2.86 (1.42, 5.93)	<i>p</i> = .004**
Values aligned with those of clinical leaders (agree or strongly agree), n = 137	98 (72)	60 (69)	38 (76)	0.70 (0.31, 1.53)	<i>p</i> = .381
My care team works efficiently together (satisfactory to optimal), n = 136	117 (86)	72 (85)	45 (88)	0.74 (0.24, 2.01)	<i>p</i> = .566
Personal control over workload (poor or minimal), n = 139	38 (27)	30 (34)	8 (15)	2.89 (1.26, 7.34)	<i>p</i> = .017*
Feeling a great deal of stress (agree or strongly agree), n = 138	57 (41)	44 (51)	13 (25)	2.99 (1.43, 6.55)	<i>p</i> = .005**
Sufficient time for documentation (poor, marginal), n = 138	61 (44)	42 (48)	19 (37)	1.57 (0.78, 3.22)	<i>p</i> = .210
Time spent on EMR at home (moderately high to excessive) ⁴ , n = 125	72 (58)	44 (57)	28 (58)	0.95 (0.46, 1.97)	<i>p</i> = .680
EMR adds frustration to the day (agree or strongly agree), n = 122	47 (39)	29 (39)	18 (38)	1.07 (0.51, 2.29)	<i>p</i> = .851
Work atmosphere (chaotic or tending toward chaotic), n = 139	28 (20)	17 (20)	11 (21)	0.91 (0.39, 2.17)	<i>p</i> = .819
Summary score \geq 40 (joyous workplace) ⁵ , n = 134	14 (10)	7 (8)	7 (14)	0.54 (0.17, 1.67)	<i>p</i> = .276
Subscale 1 score \geq 20 (supportive workplace) ⁶ , n = 134	37 (28)	17 (20)	20 (41)	0.36 (0.16, 0.79)	<i>p</i> = .011*
Subscale 2 score \geq 20 (manageable work pace and EMR stress) ⁷ , n = 134	9 (7)	6 (7)	3 (6)	1.16 (0.29, 5.72)	<i>p</i> = .835
Perceived impact of COVID-19 pandemic on burnout (increase), n = 139	97 (70)	65 (75)	32 (62)	1.85 (0.88, 3.88)	<i>p</i> = .104

¹Respondents with incomplete Mini-Z surveys (n = 47) were dropped from the analysis. ²Of the 136 rheumatologists who completed the Mini-Z survey, 1 did not indicate their gender and was removed from the analysis. Indigenous or other cultural minority identity was removed as a group from the analysis due to low cell count (n=1). ³All ORs from logistic regression models are for women compared to men. ⁴14 respondents indicated they do not have an EMR. Percentages are calculated for the 120 rheumatologists who use an EMR (45 male, 75 female). ⁵Summary score range 13 to 44. Mean (SD) score: 31.2 (6.2). ⁶Subscale 1 (including items 1-5) score range 8 to 24. Mean (SD) score: 17.3 (3.4). ⁷Subscale 2 (including items 6-10) score range 5 to 23. Mean (SD) score: 13.9 (3.8). **p* < .05, ***p* < .01. 6 respondents were omitted from summary and subscale scores for incomplete data.

Supplementary Table 5. Associations between age, burnout and risk factors for burnout.

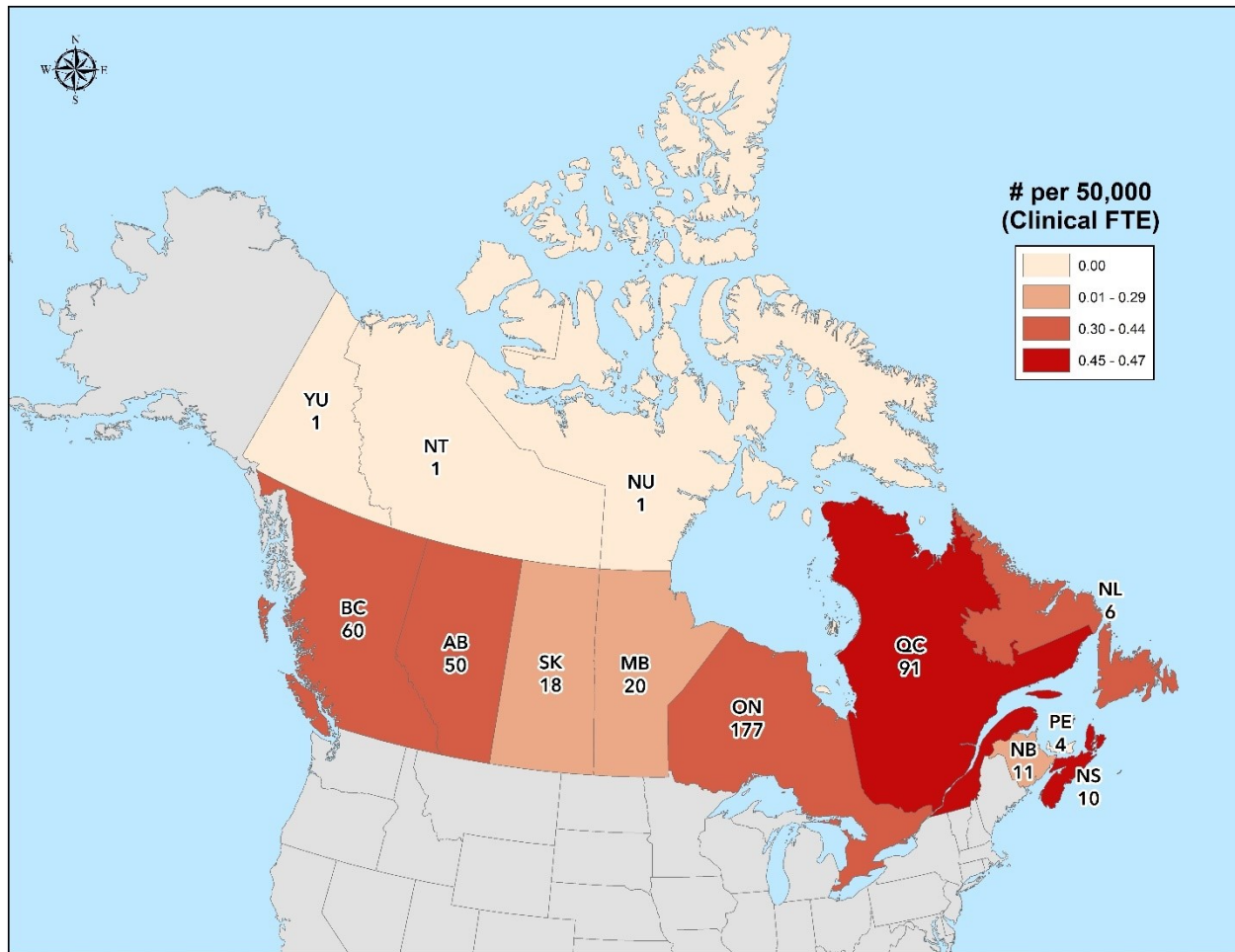
Survey item or score (response), n = 122 ^{1,2}	OR (95% CI)	P value
Satisfaction with current job (agree or strongly agree)	1.02 (0.99, 1.06)	<i>p</i> = 0.279
Burnout symptoms (present to severe)	0.95 (0.92, 0.98)	<i>p</i> = 0.004**
Values aligned with those of clinical leaders (agree or strongly agree)	1.03 (0.99, 1.07)	<i>p</i> = 0.148
My care team works efficiently together (satisfactory to optimal)	1.01 (0.97, 1.06)	<i>p</i> = 0.524
Personal control over workload (poor or minimal)	1.00 (0.96, 1.03)	<i>p</i> = 0.262
Feeling a great deal of stress (agree or strongly agree)	0.98 (0.95, 1.01)	<i>p</i> = 0.738
Sufficient time for documentation (poor, marginal)	0.98 (0.95, 1.01)	<i>p</i> = 0.160
Time spent on EMR at home (moderately high to excessive) ³	0.99 (0.96, 1.03)	<i>p</i> = 0.973
EMR adds frustration to the day (agree or strongly agree)	1.01 (0.98, 1.05)	<i>p</i> = 0.843
Work atmosphere (chaotic or tending toward chaotic)	1.00 (0.96, 1.04)	<i>p</i> = 0.404
Summary score ≥ 40 (joyous workplace)	1.03 (0.98, 1.08)	<i>p</i> = 0.267
Subscale 1 score ≥ 20 (supportive workplace)	1.05 (1.02, 1.09)	<i>p</i> = 0.004**
Subscale 2 score ≥ 20 (manageable work pace and EMR stress)	0.92 (0.83, 0.99)	<i>p</i> = 0.039*
Perceived impact of COVID-19 pandemic on burnout (increase)	0.96 (0.92, 0.99)	<i>p</i> = 0.010**

¹Respondents with incomplete Mini-Z surveys (n = 47) were dropped from the analysis. analysis ²Of the 136 rheumatologists who completed the Mini-Z survey, 14 did not report their age and were removed from the analysis. ³2 respondents indicated they do not have an EMR. **p* < .05, ***p* < .01.

Supplementary Table 6. Estimates of clinical full time (FTE) rheumatologists nationally and provincially in Canada compared to recommended targets.

Province	Rheumatologists (Clinical FTE)	Rheumatologists ¹ per 50,000	Rheumatologists ¹ per 75, 000	Target ² (deficit)
AB	39	0.440	0.659	60-89 (21-50)
BC	44	0.423	0.634	69-104 (25-60)
MB	8	0.282	0.424	19-28 (11-20)
NB	5	0.291	0.436	11-16 (6-11)
NL	5	0.437	0.656	7-11 (2-6)
NS	10	0.465	0.697	14-20 (4-10)
ON	119	0.403	0.605	197-296 (78-177)
PE	0	0.000	0.000	3-4 (3-4)
QC	81	0.470	0.705	115-172 (34-91)
SK	6	0.248	0.372	16-24 (10-18)
NT	0	0.000	0.000	1 (1)
NU	0	0.000	0.000	1 (1)
YU	0	0.000	0.000	1 (1)
Canada	314	0.413	0.619	508-761 (194-447)

¹Adult and pediatric rheumatologists were considered together. ²Target range is based on the recommended thresholds of 1:75,000 and 2:100,000(23). Adult and pediatric rheumatologists are combined for target and deficit calculations. FTE were estimated based on the national median reported time allocated to clinics from all respondents of the Workplace Wellness Survey and used to adjust the 2019 CMA numbers of rheumatologists in each province. All rheumatologist counts are rounded up to the nearest whole number. NT, NU, PE, YU are reported as having 0 rheumatologists according to the (19). AB: Alberta; BC: British Columbia; MB: Manitoba; NB: New Brunswick; NL: Newfoundland and Labrador; NS: Nova Scotia; ON: Ontario; PE: Prince Edward Island; QC: Quebec; SK: Saskatchewan; NT: Northwest Territories; NU: Nunavut; YU: Yukon



Supplementary Figure 2. Map of Canada depicting the number of FTE-practicing rheumatologists per 50,000 population (see legend colors) and the number of FTE rheumatologists required to meet the target of 1:50,000 benchmark (superimposed provincial count). FTE were estimated based on the national median reported time allocated to clinics from all respondents of the 2020 Workforce and Wellness survey and used to adjust the 2019 Canadian Medical Association numbers of rheumatologists in each province. FTE: full-time equivalent; YU: Yukon; NT: Northwest Territories; NU: Nunavut; BC: British Columbia; AB: Alberta; SK: Saskatchewan; MB: Manitoba; ON: Ontario; QC: Quebec; NL: Newfoundland and Labrador; PE: Prince Edward Island; NB: New Brunswick; NS: Nova Scotia.