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Sports Medicine Physician Decision Making, Practice Changes, and Mental Health During the Early Phase of the SARS-COV-2 Global Pandemic

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Abstract

Objective: The SARS-CoV-2 pandemic has had a profound effect on the healthcare system. This study aimed to identify its effects on sports medicine physicians during the early phase of this pandemic.

Design: Survey study

Setting: Sports medicine providers

Participants: Physician members of the American Medical Society for Sports Medicine (AMSSM) were surveyed between March 25 and April 4, 2020. A total of 810 responses were obtained from 2,437 physicians who viewed the survey.

Interventions: The survey consisted of questions examining demographics, pre-pandemic practice patterns, anxiety & depression screening, and new beliefs and behaviors following government-based medical policy changes resulting from the pandemic.

Main Outcome Measures: Changes in clinical volume and treatment practices, Patient Health Questionnaire (PHQ-4).

Results: Mean in-person clinic visits reduced to 17.9%, telephone visits to 24.4%, telemedicine (video) visits to 21.8%, and procedural visits to 13.8% of pre-pandemic practice volume. Mean PHQ-4 scores for physicians were 2.38 ± 2.40. Clinic and procedural volumes were reduced

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less by male physicians, as well as more experienced physicians, non-Physical Medicine & Rehabilitation (PM&R) training background, in government or private practice, and in the Southern region of the United States ($p < 0.05$). Physicians were more likely to reduce their anti-inflammatory (37.8% decreasing vs. 6.8% increasing, $p<0.001$) and opioid (10.5% vs. 6.8%, $p = 0.003$) prescriptions rather than increase.

Conclusions: During the early phase of the SARS-COV-2 pandemic sports medicine physicians reported reducing in-person evaluation, management, and procedure volume by over 80%. Multiple demographic and geographic factors were associated with practice volume changes.

Keywords

Coronavirus; COVID; opioids; musculoskeletal; telemedicine

Introduction

The novel coronavirus 2019 (SARS-CoV-2) pandemic that began in China and spread across the globe has profoundly impacted healthcare systems. The effect on emergency room, hospital, and intensive care unit operations is well-described.[1–3] However, there was initially a substantial impact on outpatient care given recommendations from the Centers for Disease Control and Prevention (CDC),[4] as well as a variety of state and local governments, to eliminate elective, non-urgent evaluation and treatment. The impact of such recommendations on outpatient practices has not been studied systematically and will likely evolve.

The aim of the present study was to assess changes occurring within the practice of sports medicine, specifically. As the current pandemic persists into the fall season,[5] or the fact that a different pandemic may occur in the future, knowledge of physician decision-making and mental wellbeing are of utmost importance should this occur again. The membership of the American Medical Society for Sports Medicine (AMSSM) was surveyed in order to define physician decision-making, practice changes, and mental health associated with the early phase of the SARS-CoV-2 global pandemic. In addition to identifying the current state of musculoskeletal medicine, this study aimed to identify demographic factors and pre-pandemic practice patterns associated with these changes.

Methods

An anonymous survey was sent to physician members of the AMSSM on two occasions, March 25 and April 4, 2020, via email. For reference, the average United States statewide school closure occurred on March 15 and the first statewide stay-at-home measure (California) was enacted on March 18.[6] The survey consisted of a standardized series of questions assessing demographics and pre-pandemic practice patterns, as well as new beliefs and behaviors following government-based medical policy changes resulting from the SARS-CoV-2 global pandemic (see appendix). The Patient Health Questionnaire – 4 question (PHQ-4)[7] was used to screen for symptoms of anxiety and depression, though participants were allowed to opt out of completing this portion of the survey. Statistical analysis was performed with Stata/MP 16.0 for Windows (StataCorp LLC, College

Station, TX), with an α level of 0.05. Descriptive statistics were calculated. Binomial comparisons were used for comparisons of more vs less prescriptions. Multiple linear and logistic regression models were fit to the continuous and dichotomous dependent variables, respectively, with independent variables consisting of the following: gender, age, training background, number of years since training, region (Northeast, Midwest, South, Northwest, and international), practice regional density (i.e. rural, suburban, or urban), practice setting (e.g. private practice, academic, hospital system, community clinic, or government), pre-pandemic clinic/procedure volumes, and personal relationship with someone who has tested positive for SARS-CoV-2 infection. Due to a high proportion of respondents indicating unchanged practice with regards to NSAID and opioid prescription, responses were re-categorized from the original five scales (much less, slightly less, unchanged, slightly more, or much more) into two scales (decreased or increased). Analyses were then performed to determine if NSAID and opioid prescriptions were more likely to increase or decrease among those who changed their practice. Preliminary examinations indicated heteroscedasticity for some of the continuous dependent variables, so the Huber-White sandwich estimator of variance was used in such cases.[8–10]

Ethical Considerations

This study was deemed exempt by the University of Utah institutional review board.

Results

The email containing the link to the study survey was viewed by 2,437 physicians. The survey was completed by 810 respondents (estimated response rate of 33.2%). Table 1 shows the demographic information and survey responses for the participants. Notably, in-person clinical volumes were 17.9% telephone visits were 24.4%, and telemedicine visits were 21.8% of pre-pandemic clinical volumes. Procedural visits were only 13.8% of pre-pandemic procedural volumes. More physicians prescribed fewer NSAIDs ($p < 0.001$) and opioids ($p = 0.003$) than those who reported prescribing more.

Of the 810 completed surveys, the following respondents were dropped from the following regression analysis because of relatively low frequencies: gender with “other or prefer not to answer” ($n = 2$), rare specialties (orthopaedics [$n = 1$] and “unlisted/other” [$n = 7$]), and region outside the United States ($n = 5$). Consequently, 795 survey responses were analyzed for the study. Regression modeling revealed several significant demographic and pre-pandemic practice factors associated with new beliefs and behaviors following government-based medical policy changes resulting from the SARS-COV-2 global pandemic. Positive and negative beta coefficients in the models with continuous dependent variables indicate positive and negative associations, respectively, while odds ratios (ORs) of > 1.00 and < 1.00 in the models with dichotomous variables indicate higher and lower odds, respectively. These beta coefficients and odds ratios were adjusted for by the other independent variables. Beta coefficients represent the difference between absolute reduction between groups. To simplify, example interpretations from Table 2a are as follows for the first outcome variable for volume of clinic patients: male physicians, as compared to female physicians, reported to have seen about an absolute 2.91% (e.g. 19.5% vs 16.6%) higher volume of clinic patients since the outbreak ($p = 0.026$). Physical Medicine & Rehabilitation (PM&R) physicians, as compared to Family Medicine physicians, reported to have seen a significantly lower volume of clinic patients in person by an absolute 8.7% (e.g. 7.5% vs 16.2%) since the initiation of practice changes associated with the pandemic ($p < 0.001$). Examples for the interpretations of the odds ratio (Table 2b) are: the odds of a participant reporting increasing opioid prescriptions in the South region was approximately 70% lower than the odds reported by physicians in the Midwest region (OR = 0.30, $p = 0.037$).

The significant results of table 2 are summarized as follows:

- *Volume of clinic patients*: Male physicians, family medicine-trained (compared to PM&R-trained) physicians, physicians in the Southern region (compared to those in the Midwest), all practice types (compared to the academic/university setting), and physicians without a personal relationship to a person with SARS-CoV-2 were more likely to have a higher volume of clinic patients compared to their pre-pandemic baseline.

- *Volume of procedures*: Family medicine-trained (compared to PM&R-trained) physicians, physicians in the Southern region (compared to those in the Midwest), and physicians in private practice or the VA/government setting (compared to the academic/university setting) were more likely to have a higher volume of procedures relative to their pre-pandemic baseline.

- *Volume of telephone encounters*: Family medicine-trained (compared to emergency medicine-, internal medicine, or pediatrics-trained) physicians, physicians in the urban (compared to those in the rural) setting, physicians in the community clinic setting (compared to the academic/university setting) and physicians with a lower baseline procedure volume were more likely to have a higher volume of telephone encounters relative to their pre-pandemic clinical patient volume.

- *Volume of telemedicine (video) encounters*: Internal medicine-trained (compared to family medicine- or emergency medicine-trained) physicians, family medicine-trained (compared to emergency-medicine trained) physicians, physicians in the West or Northeast (compared to the Midwest) region, physicians with a higher baseline clinic volume or lower procedural volume, and physicians with a personal relationship to someone with SARS-CoV-2 were more likely to have a higher volume of telemedicine encounters relative to their pre-pandemic clinical patient volume.

- *Time to reduce patient (in-person clinic) contact*: Physicians in the Midwest (compared to the West) or South (compared to the Midwest or West) region, physicians with a lower baseline clinical volume, and physicians without a personal relationship to someone with SARS-CoV-2 were more likely to take longer to reduce their clinical patient contact.

- *Time to reduce patient (procedural) contact*: Physicians in the South (compared to the Midwest) region, physicians in the rural (compared to urban) setting, and physicians without a personal relationship with SARS-CoV-2 were more likely to take longer to reduce their procedures.

- *PHQ-4 scores*: Female physicians and those with those more recently out of training were more likely to have higher PHQ-4 scores (anxiety subscores, depression subscores, and total scores).
- *Alteration of opioid prescription patterns*: Physicians from the Midwest (compared to the South or Northeast) were more likely to relatively increase their opioid prescriptions.
- *Alteration of NSAID prescription patterns*: No significant associations were noted.

Discussion

This large survey study demonstrates a substantial impact of the SARS-COV-2 pandemic on sports medicine physician practices, with numerous demographic and geographic factors associated with new behaviors. First and foremost, the fact that physicians are seeing less than 20% of their patients in person and performing less than 15% of their usual procedures is unprecedented, particularly because this change appears to have occurred within just a few weeks at the most. Physicians are seeing approximately 2/3 of their typical clinical volume in-person or remotely, as respondents noted seeing, on average, 18% of their clinic patients in person, with 24% by telephone and 22% by video telemedicine. The fact that only 14% of procedures are being performed, on average, is an even more of a stark decrement. This decrease is driven, at least in part, by physician attempt to promote public, personal, and staff safety, as evidenced by physicians' responses to their rationale for decreasing visits (table 1). Social distancing appears to play an important role in diminishing the spread of the disease, as well as limiting the day-to-day impact on the healthcare system;[11,12] and as sports medicine physician view public safety as their primary motivation, they may be adhering to these principles. Additionally, however, patients appear to opt out of in-person visits, which suggests they too have a collective commitment (personal and/or societal) to avoid in-person contact.

The use of video telemedicine and telephone visits with patients is notable. As a baseline question regarding pre-pandemic video telemedicine of telephone visit volume was not asked, and to date no pre-pandemic utilization patterns are available in the scientific literature, it cannot be stated if this is an increase above prior utilization patterns. However, given the limited reimbursement, it is unlikely that sports medicine physicians were using a significant amount of remote means of patient assessment and management. The Centers for Medicare and Medicaid Services broadened access to these services at the time of the pandemic,[13] which allowed for reimbursement for these services in the context of this global emergency. Although literature exists on the use of telemedicine within sports medicine,[14–16] the sudden explosion in its use brings opportunities and challenges. We anticipate a rapid increase in studies examining its utility and cost-effectiveness for patient assessment and management compared to in-person encounters.

The regression analysis displayed several significant factors related to practice changes. Physicians with a background in PM&R tended to decrease their clinic and procedure volumes the most drastically compared to sports-medicine physicians with other primary training backgrounds. One could speculate that PM&R-trained physicians may have less interaction with primary care issues, as are often seen in the other subspecialties, and thus have more "elective" patient practices. Alternatively, physicians with PM&R training often do electromyographic and fluoroscopically-guided procedures more often than other sports medicine physicians, thus, the types of procedures may also explain a portion of this difference. Physicians practicing in academic/university settings also reduced their in-person clinic volumes more, which may relate to the fact that SARS-COV-2 patients may receive care at these institutions, thus administrative or resource-driven changes may require these physicians to see less patients. Another explanation may be that physicians in the academic/ university setting may have more up-to-date information from their colleagues, and thus decided to start reducing patient volume more substantially. It is also likely that those in academic institutions have a higher percentage of their income in the form of a salary, as do their staff, and thus less personal and staff-related financial incentive to see patients. Finally, it is possible that universities may have sent their students home early, reducing potential clinical patient volumes. Physicians in the southern region of the United States saw higher clinical and procedure volumes, and also took longer to reduce their clinical/procedural loads, which may relate to a potentially lower numbers of patients with the virus in that part of the country, political differences, cultural differences, or other factors.

Many factors were associated with physicians who embraced telemedicine more rapidly than others, including internal medicine-trained physicians, those in the western or northeastern regions of the country, and those with a greater baseline clinic volume. It is challenging to say why this is the case, as no literature exists on telemedicine-related changes due to this pandemic, but may relate to differences in training, patient population, or familiarity with the medium.

Physicians with a personal connection to an individual with SARS-COV-2 infection (self, family member, personal patient, or co-worker) appeared to have an effect on physician practices. Respondents reduced their clinical and procedural volumes earlier and they reported seeing fewer patients in-person compared to those without a personal connection to an individual with SARS-COV-2 infection. It is well-known that the prior experiences of physicians play a role in their patient care,[17] and it has been well-documented that SARS-COV-2 has caused significant fear and anxiety.[18,19] Thus, having a personal connection to the disease would understandably alter the practice patterns of physicians. Unexpectedly, physicians with a personal connection to an individual with SARS-COV-2 infection did not demonstrate more anxiety or depression tendencies as measured by the PHQ-4. Female physicians did show higher anxiety scores, as did physicians in practice for more years since their training. This observed gender difference may be related to the fact that women consistently have a higher prevalence of anxiety than men[20,21], but it may demonstrate that women physicians carry a greater burden of domestic responsibilities,[22,23] which are often greatly affected in this pandemic, which add to overall stress and workload.

Finally, prescription patterns have seen some changes. Opioids, for which there is undoubtedly a crisis in the United States,[24] do not appear to be prescribed significantly more often than after the pandemic. It stands to reason that if patients are unable to receive in-person consultation or procedures, they may be at an increased risk for pain. This study demonstrates that more physicians are prescribing less opioids compared to those prescribing more. Several reasons could explain this phenomenon, including a heightened awareness of the dangers of opioids, decreased patient activity due to the current societal restrictions, decreased peri-procedural opioid prescriptions due to decreased procedural volumes, or physician concerns about the effects of opioids on patients who could become infected with the virus. Interestingly, sports medicine physicians are prescribing fewer NSAIDs than before the pandemic, and to a much larger degree (more than one out of three physicians report prescribing fewer). Similar reasons as before could be cited, but there is also likely an effect of the potential for worsening SARS-CoV-2 infections. A letter published in the Lancet suggested a theoretical concern from the binding mechanism of the virus being enhanced by use of NSAIDs.[25] Though at the time of writing, no particular guidelines are restricting its use by the World Health Organization or CDC, some physicians may feel it prudent to restrict with some or all patients.

This study has limitations. Though the sample was large, studies of this type are always subject to non-response bias. We allowed subjects to opt out of the PHQ-4, which could create further selection bias within that portion of the study. Though we collected the information during a relatively short time-span, temporal differences from the beginning to the end of the survey may be obscured, given the rapidly-changing government and public policy related to the pandemic. During the timeframe of the study, many physicians' practices likely changed significantly. Finally, as with any survey, to avoid overburdening respondents, many additional detailed questions were omitted, which could have identified further nuances of rationales for these practice changes.

In conclusion, this survey study of 810 sports medicine physicians during the early phase of the SARS-COV-2 global pandemic demonstrates that practice patterns have changed dramatically. In-person evaluation and management volume decreased by approximately 80%, and procedure volume decreased by approximately 85%. Clinic and procedural volumes were reduced less by male physicians, those physicians in practice for longer, with a non-PM&R training background, in VA/government or private practice, and in the Southern region of the United States. Less anti-inflammatory medications are being prescribed, though there does not appear to be an increase in opioid prescriptions. To our knowledge this is the first study to assess the decision making, practice changes, and mental health of sports medicine physicians during this global pandemic. These insights may help guide our response to the current global pandemic and allow us to prepare for future episodes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Demographic and post-pandemic survey response information for survey participants (*N* = 810)

		n	%	Mean	SD
Age				41.6	9
Years post-training				9.8	9.1
Weekly clinic volume (before pandemic)	**Number patients**			71.7	35.8
	Number procedures			19.9	19.1
Gender	**Male**	552	68.30%		
	Female	256	31.70%		
Practice population density	**Urban**	315	38.90%		
	Suburban	428	52.80%		
	Rural	67	8.30%		
Training background	**FM**	564	69.60%		
	PM&R	91	11.20%		
	Pediatrics	73	9.00%		
	IM	50	6.20%		
	EM	24	3.00%		
	Other	8	1.00%		
Region of the US	**Midwest**	257	31.70%		
	South	222	27.40%		
	West	183	22.60%		
	Northeast	143	17.70%		
	Outside of US	5	0.60%		
Practice type	**Academic/University**	270	33.30%		
	Hospital system	246	30.40%		
	Private practice	224	27.70%		
	Community clinic	40	4.90%		
	VA/Government	16	2.00%		
	Other	14	1.70%		
In-person clinic visit volume (% of normal)				17.9	18.8
Telephone visit volume (% of normal)				24.4	28.4
Telemedicine (video) visit volume (% of normal)				21.8	28.5
In-person procedural visit volume (% of normal)				13.8	19.6
Rationale for decreasing in-person visits	**Public safety**	579	71.50%		
	Patients are not coming in	508	62.70%		
	Patients you interact with	504	62.20%		
	Staff safety	501	61.90%		
	Administration requirement	477	58.90%		
	Personal/family safety	414	51.10%		
	Overwhelming healthcare system	325	40.10%		
	Limited PPE	283	34.90%		
	Corticosteroid concerns	139	17.20%		

		n	%	Mean	SD
	Other	31	3.80%		
Opioid prescriptions	**Much less**	60	7.40%		
	Less	25	3.10%		
	Unchanged	670	82.70%		
	More	53	6.50%		
	Much more	2	0.20%		
NSAID prescriptions	**Much less**	118	14.60%		
	Less	188	23.20%		
	Unchanged	451	55.70%		
	More	50	6.20%		
	Much more	3	0.40%		
Knowledge of person testing positive for SARS-CoV-2	**Someone in the hospital system**	445	54.90%		
	Someone in the building	147	18.10%		
	One of your patients	139	17.20%		
	Colleagues in department/group	135	16.70%		
	Staff you work with	105	13.00%		
	Self	13	1.60%		
	Someone you're living with	12	1.50%		
PHQ-4	**Anxiety subscale (0–6)**			1.7	1.63
	Depression subscale (0–6)			0.67	1.05
	Total (0–12)			2.38	2.4

PM&R = Physical Medicine & Rehabilitation, US = United States

Table 2a.

Linear regression models on continuous outcome variables

Continuous outcome	Predictor		*B* (95% CI)	*p*
Volume of clinic patients *(a positive B coefficient suggests that the the predictor variable sees a larger percentage of clinic patients compared to their pre-pandemic baseline)*	Gender (vs. female)	Male	2.91 (0.34, 5.47)	**0.026**
	Age		0.50 (−0.05, 1.05)	0.077
	Training (vs. Family Medicine)	Emergency Medicine	5.51 (−6.31, 17.34)	0.360
		Internal Medicine	0.02 (−4.51, 4.55)	0.993
		Pediatrics	−0.54 (−5.18, 4.09)	0.818
		Physical Medicine & Rehabilitation	−8.73 (−11.76, −5.69)	**< 0.001**
	Years since training		−0.54 (−1.10, 0.01)	0.053
	Region (vs. Midwest)	West	1.97 (−1.23, 5.17)	0.227
		South	7.21 (3.98, 10.44)	**< 0.001**
		Northeast	−0.37 (−3.71, 2.98)	0.830
	Density (vs. urban)	Rural	−1.90 (−6.54, 2.73)	0.421
		Suburban	−0.56 (−3.43, 2.31)	0.701
	Practice type (vs. academic/ university)	Hospital system	4.95 (1.91, 8.00)	**0.001**
		Community clinic	6.45 (1.13, 11.77)	**0.018**
		Private practice	7.48 (4.16, 10.80)	**< 0.001**
		VA/government	19.20 (3.91, 34.49)	**0.014**
	Baseline clinic volume		0.04 (−0.01, 0.08)	0.089
	Baseline procedural volume		−0.02 (−0.09, 0.06)	0.637
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−2.70 (−5.16, −0.24)	**0.032**
Volume of procedures *(a positive B coefficient suggests that the predictor variable performs a larger percentage of procedures compared to their pre-pandemic baseline)*	Gender (vs. female)	Male	1.54 (−1.53, 4.62)	0.324
	Age		0.26 (−0.31, 0.83)	0.368
	Training (vs. Family Medicine)	Emergency Medicine	0.83 (−7.53, 9.18)	0.846
		Internal Medicine	2.19 (−3.26, 7.65)	0.430
		Pediatrics	−5.48 (−11.14, 0.18)	0.058

Continuous outcome	**Predictor**		***B* (95% CI)**	***p***
		Physical Medicine & Rehabilitation	−6.70 (−10.74, −2.65)	**0.001**
	Years since training		−0.24 (−0.80, 0.31)	0.393
	Region (vs. Midwest)	West	−0.35 (−3.85, 3.15)	0.843
		South	5.41 (1.87, 8.95)	**0.003**
		Northeast	0.52 (−3.60, 4.64)	0.805
	Density (vs. urban)	Rural	−4.15 (−9.22, 0.91)	0.108
		Suburban	−1.50 (−4.74, 1.74)	0.364
	Practice type (vs. academic/ university)	Hospital system	0.86 (−2.70, 4.42)	0.636
		Community clinic	1.57 (−4.33, 7.48)	0.601
		Private practice	4.73 (0.84, 8.61)	**0.017**
		VA/government	20.04 (3.73, 36.36)	**0.016**
	Baseline clinic volume		0.03 (−0.03, 0.08)	0.377
	Baseline procedural volume		0.01 (−0.08, 0.11)	0.749
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−2.30 (−5.18, 0.59)	0.118
Volume of patients by telephone *(a positive B coefficient suggests that the predictor variable "sees" a larger percentage of patients by telephone compared to their pre-pandemic baseline)*	Gender (vs. female)	Male	−3.59 (−8.16, 0.97)	0.123
	Age		−0.43 (−1.16, 0.31)	0.255
	Training (vs. Family Medicine)	Emergency Medicine	−11.12 (−20.20, −2.05)	**0.016**
		Internal Medicine	−11.60 (−17.09, −6.10)	**< 0.001**
		Pediatrics	−15.49 (−21.45, −9.53)	**< 0.001**
		Physical Medicine & Rehabilitation	−0.41 (−7.24, 6.43)	0.907
	Years since training		0.49 (−0.22, 1.21)	0.177
	Region (vs. Midwest)	West	1.37 (−4.32, 7.06)	0.637
		South	−2.73 (−7.78, 2.33)	0.290
		Northeast	1.45 (−4.32, 7.22)	0.621

Continuous outcome	Predictor		B (95% CI)	p
	Density (vs. urban)	Rural	−12.28 (−18.26, −6.30)	**< 0.001**
		Suburban	0.29 (−4.21, 4.79)	0.900
	Practice type (vs. academic/ university)	Hospital system	3.00 (−2.35, 8.35)	0.271
		Community clinic	10.43 (0.34, 20.52)	**0.043**
		Private practice	−3.68 (−8.75, 1.39)	0.155
		VA/government	11.33 (−6.35, 29.01)	0.209
	Baseline clinic volume		−0.02 (−0.10, 0.05)	0.542
	Baseline procedural volume		−0.15 (−0.26, −0.04)	**0.008**
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−0.33 (−4.55, 3.89)	0.878
Volume of patients by telemedicine *(a positive B coefficient suggests that the predictor variable "sees" a larger percentage of patients by telemedicine compared to their pre-pandemic baseline)*	Gender (vs. female)	Male	−0.77 (−5.25, 3.71)	0.736
	Age		−0.20 (−0.88, 0.49)	0.572
	Training (vs. Family Medicine)	Emergency Medicine	−7.19 (−14.14, −0.25)	**0.042**
		Internal Medicine	11.93 (1.20, 22.66)	**0.029**
		Pediatrics	−1.55 (−9.00, 5.90)	0.684
		Physical Medicine & Rehabilitation	6.00 (−0.75, 12.74)	0.081
	Years since training		0.15 (−0.54, 0.85)	0.664
	Region (vs. Midwest)	West	9.13 (3.32, 14.94)	**0.002**
		South	3.44 (−1.77, 8.66)	0.195
		Northeast	7.11 (1.07, 13.16)	**0.021**
	Density (vs. urban)	Rural	−2.77 (−8.97, 3.43)	0.380
		Suburban	3.77 (−0.91, 8.45)	0.114
	Practice type (vs. academic/ university)	Hospital system	−0.76 (−6.08, 4.56)	0.779
		Community clinic	2.41 (−7.93, 12.75)	0.647
		Private practice	3.89 (−2.15, 9.94)	0.206
		VA/government	−7.97 (−21.38, 5.44)	0.243

Continuous outcome	Predictor		*B* (95% CI)	*p*
	Baseline clinic volume		0.08 (0.01, 0.16)	**0.032**
	Baseline procedural volume		−0.16 (−0.29, −0.02)	**0.022**
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	4.96 (0.55, 9.37)	**0.028**
Amount of time elapsed until patient contact was reduced *(a positive B coefficient suggests that the predictor variable took longer to reduce patient contact)*	Gender (vs. female)	Male	−0.49 (−1.18, 0.19)	0.159
	Age		0.11 (−0.01, 0.23)	0.064
	Training (vs. Family Medicine)	Emergency Medicine	1.52 (−0.63, 3.67)	0.165
		Internal Medicine	−0.15 (−1.40, 1.11)	0.815
		Pediatrics	0.06 (−0.84, 0.95)	0.902
		Physical Medicine & Rehabilitation	−0.20 (−1.28, 0.87)	0.711
	Years since training		−0.09 (−0.21, 0.02)	0.115
	Region (vs. Midwest)	West	−0.93 (−1.74, −0.12)	**0.024**
		South	0.97 (0.12, 1.81)	**0.025**
		Northeast	−0.32 (−1.21, 0.56)	0.472
	Density (vs. urban)	Rural	0.70 (−0.51, 1.92)	0.257
		Suburban	0.19 (−0.53, 0.90)	0.610
	Practice type (vs. academic/ university)	Hospital system	0.24 (−0.57, 1.04)	0.562
		Community clinic	−0.06 (−1.89, 1.77)	0.948
		Private practice	0.77 (−0.14, 1.68)	0.097
		VA/government	−0.17 (−2.22, 1.89)	0.873
	Baseline clinic volume		−0.01 (−0.02, 0.00)	**0.031**
	Baseline procedural volume		0.02 (0.00, 0.04)	0.058
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−0.95 (−1.62, −0.27)	**0.006**
Amount of time elapsed until procedures were reduced *(a positive B coefficient suggests that the predictor variable took longer to reduce procedure volume)*	Gender (vs. female)	Male	−0.29 (−1.02, 0.44)	0.437
	Age		0.12 (0.00, 0.24)	0.052
	Training (vs. Family Medicine)	Emergency Medicine	0.67 (−0.83, 2.17)	0.379

Continuous outcome	**Predictor**		***B*** **(95% CI)**	***p***
		Internal Medicine	−0.47 (−1.80, 0.86)	0.488
		Pediatrics	−0.09 (−1.44, 1.26)	0.900
		Physical Medicine & Rehabilitation	−0.08 (−1.19, 1.03)	0.888
	Years since training		−0.10 (−0.22, 0.01)	0.086
	Region (vs. Midwest)	West	−0.44 (−1.31, 0.43)	0.321
		South	1.04 (0.18, 1.90)	**0.018**
		Northeast	−0.39 (−1.33, 0.56)	0.423
	Density (vs. urban)	Rural	1.43 (0.19, 2.67)	**0.024**
		Suburban	0.49 (−0.27, 1.25)	0.206
	Practice type (vs. academic/ university)	Hospital system	−0.24 (−1.11, 0.62)	0.579
		Community clinic	−1.22 (−3.13, 0.70)	0.212
		Private practice	0.62 (−0.34, 1.58)	0.205
		VA/government	−0.32 (−2.44, 1.81)	0.770
	Baseline clinic volume		−0.01 (−0.02, 0.00)	0.117
	Baseline procedural volume		0.02 (0.00, 0.04)	0.134
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−0.73 (−1.43, −0.02)	**0.044**
PHQ-4 anxiety scores *(a positive B coefficient suggests that the predictor variable has a higher PHQ-4 anxiety subset score)*	Gender (vs. female)	Male	−0.86 (−1.17, −0.56)	**< 0.001**
	Age		0.03 (−0.02, 0.08)	0.262
	Training (vs. Family Medicine)	Emergency Medicine	0.06 (−0.78, 0.90)	0.889
		Internal Medicine	0.00 (−0.58, 0.59)	0.989
		Pediatrics	0.21 (−0.24, 0.66)	0.362
		Physical Medicine & Rehabilitation	0.04 (−0.41, 0.49)	0.858
	Years since training		−0.05 (−0.10, −0.01)	**0.042**
	Region (vs. Midwest)	West	−0.04 (−0.38, 0.31)	0.832
		South	0.05 (−0.30, 0.40)	0.763

Continuous outcome	Predictor		*B* (95% CI)	*p*
		Northeast	0.07 (−0.31, 0.44)	0.732
	Density (vs. urban)	Rural	0.11 (−0.39, 0.60)	0.672
		Suburban	−0.01 (−0.29, 0.27)	0.944
	Practice type (vs. academic/ university)	Hospital system	0.06 (−0.26, 0.39)	0.698
		Community clinic	0.11 (−0.58, 0.80)	0.754
		Private practice	0.30 (−0.05, 0.65)	0.094
		VA/government	−0.30 (−1.14, 0.53)	0.475
	Baseline clinic volume		0.00 (−0.01, 0.00)	0.364
	Baseline procedural volume		0.00 (−0.01, 0.01)	0.628
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	−0.01 (−0.29, 0.26)	0.919
PHQ-4 depressive scores *(a positive B coefficient suggests that the predictor variable has a higher PHQ-4 depression subset score)*	Gender (vs. female)	Male	−0.23 (−0.44, −0.01)	**0.037**
	Age		0.04 (−0.01, 0.09)	0.111
	Training (vs. Family Medicine)	Emergency Medicine	0.18 (−0.58, 0.94)	0.640
		Internal Medicine	−0.11 (−0.46, 0.24)	0.546
		Pediatrics	0.18 (−0.17, 0.54)	0.306
		Physical Medicine & Rehabilitation	0.15 (−0.18, 0.49)	0.367
	Years since training		−0.05 (−0.09, −0.01)	**0.048**
	Region (vs. Midwest)	West	−0.05 (−0.31, 0.20)	0.678
		South	−0.06 (−0.30, 0.18)	0.634
		Northeast	0.00 (−0.27, 0.26)	0.984
	Density (vs. urban)	Rural	0.02 (−0.29, 0.33)	0.890
		Suburban	0.19 (−0.01, 0.38)	0.062
	Practice type (vs. academic/ university)	Hospital system	0.08 (−0.17, 0.32)	0.543
		Community clinic	−0.16 (−0.52, 0.20)	0.373
		Private practice	−0.01 (−0.24, 0.22)	0.906

Continuous outcome	**Predictor**		***B* (95% CI)**	***p***
		VA/government	−0.12 (−0.75, 0.50)	0.698
	Baseline clinic volume		0.00 (0.00, 0.00)	0.739
	Baseline procedural volume		0.00 (−0.01, 0.01)	0.880
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	0.08 (−0.12, 0.27)	0.436
PHQ-4 total scores *(a positive B coefficient suggests that the predictor variable has a higher PHQ-4 total score)*	Gender (vs. female)	Male	−1.10 (−1.55, −0.65)	**< 0.001**
	Age		0.07 (−0.02, 0.16)	0.140
	Training (vs. Family Medicine)	Emergency Medicine	0.23 (−1.30, 1.76)	0.764
		Internal Medicine	−0.04 (−0.89, 0.82)	0.931
		Pediatrics	0.39 (−0.32, 1.10)	0.283
		Physical Medicine & Rehabilitation	0.19 (−0.51, 0.89)	0.592
	Years since training		−0.10 (−0.18, −0.01)	**0.029**
	Region (vs. Midwest)	West	−0.09 (−0.62, 0.44)	0.748
		South	−0.04 (−0.56, 0.49)	0.890
		Northeast	0.05 (−0.51, 0.62)	0.854
	Density (vs. urban)	Rural	0.13 (−0.56, 0.83)	0.706
		Suburban	0.20 (−0.22, 0.61)	0.360
	Practice type (vs. academic/ university)	Hospital system	0.14 (−0.36, 0.63)	0.594
		Community clinic	−0.05 (−0.94, 0.84)	0.909
		Private practice	0.25 (−0.26, 0.77)	0.334
		VA/government	−0.43 (−1.61, 0.75)	0.477
	Baseline clinic volume		0.00 (−0.01, 0.00)	0.414
	Baseline procedural volume		0.00 (−0.01, 0.02)	0.754
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	0.06 (−0.35, 0.47)	0.788

Boldface = statistical significance ($p < 0.05$).

B = beta coefficient; CI = confidence interval.

Table 2b.

Logistic regression models on dichotomous outcome variables

Dichotomous outcome	Predictor		OR (95% CI)	*p*
Prescribing more opioids *(an odds ratio [OR] greater than 1 suggests that the predictor variable is more likely to prescribe more opioids, rather than prescribing less)*	Gender (vs. female)	Male	0.80 (0.30, 2.11)	0.649
	Age		0.86 (0.73, 1.01)	0.065
	Training (vs. Family Medicine)	Emergency Medicine	2.14 (0.26, 17.83)	0.481
		Internal Medicine	2.12 (0.38, 11.92)	0.393
		Pediatrics	0.78 (0.07, 9.12)	0.845
		Physical Medicine & Rehabilitation	2.42 (0.60, 9.77)	0.216
	Years since training		1.09 (0.92, 1.28)	0.326
	Region (vs. Midwest)	West	0.97 (0.31, 2.97)	0.951
		South	0.30 (0.09, 0.93)	**0.037**
		Northeast	0.18 (0.05, 0.75)	**0.019**
	Density (vs. urban)	Rural	0.52 (0.09, 3.10)	0.474
		Suburban	0.77 (0.29, 2.04)	0.593
	Practice type (vs. academic/ university)	Hospital system	0.94 (0.27, 3.22)	0.918
		Community clinic	0.22 (0.02, 3.04)	0.261
		Private practice	1.04 (0.27, 3.97)	0.954
		VA/government	0.33 (0.02, 5.44)	0.441
	Baseline clinic volume		1.00 (0.99, 1.01)	0.759
	Baseline procedural volume		1.02 (1.00, 1.04)	0.065
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	1.56 (0.66, 3.71)	0.310
Prescribing more NSAIDs *(an odds ratio [OR] greater than 1 suggests that the predictor variable is more likely to prescribe more NSAIDs, rather than prescribing less)*	Gender (vs. female)	Male	1.75 (0.79, 3.84)	0.166
	Age		0.98 (0.88, 1.10)	0.784
	Training (vs. Family Medicine)	Emergency Medicine *	-	-
		Internal Medicine	0.79 (0.22, 2.88)	0.719

Dichotomous outcome	Predictor		OR (95% CI)	p
		Pediatrics	0.29 (0.03, 2.39)	0.248
		Physical Medicine & Rehabilitation	0.53 (0.16, 1.74)	0.295
	Years since training		0.99 (0.89, 1.10)	0.892
	Region (vs. Midwest)	West	0.63 (0.25, 1.59)	0.328
		South	0.66 (0.29, 1.51)	0.321
		Northeast	0.85 (0.35, 2.09)	0.725
	Density (vs. urban)	Rural	0.65 (0.18, 2.30)	0.502
		Suburban	1.08 (0.52, 2.24)	0.827
	Practice type (vs. academic/ university)	Hospital system	1.80 (0.76, 4.29)	0.182
		Community clinic	0.99 (0.18, 5.29)	0.989
		Private practice	1.06 (0.41, 2.76)	0.903
		VA/government	5.88 (0.81, 42.47)	0.079
	Baseline clinic volume		1.00 (0.99, 1.01)	0.440
	Baseline procedural volume		1.02 (1.00, 1.04)	0.084
	Personal relationship with SARS-CoV-2 (vs. no)	Yes	1.18 (0.61, 2.30)	0.617

Boldface = statistical significance ($p < 0.05$).

OR = odds ratio; CI = confidence interval; NSAIDs = non-steroidal anti-inflammatory medications.

*Everyone in Emergency Medicine responded “no” to the question on prescribing more NSAIDs, resulting in no calculations of an odds ratio.