



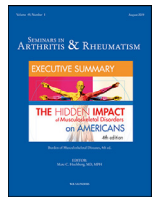
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Addressing the rheumatology workforce shortage: A multifaceted approach

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A B S T R A C T

A significant challenge facing the field of rheumatology is the projected gap between the growing demand for rheumatologists and the available workforce. In order to improve access to care, augmenting the rheumatology workforce is required. Herein we discuss potential solutions to the anticipated workforce shortage, including 1) expanding the training of rheumatology physicians; 2) increasing nurse practitioner, physician assistant and pharmacist utilization in rheumatology practice; 3) growing the use of telemedicine; and 4) reducing burnout in order to retain practicing rheumatologists. Building on the existing literature in these areas, we propose a multifaceted approach to addressing the rheumatology workforce shortage.

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1. Introduction

In the coming decades, the field of rheumatology will have tremendous opportunities while facing mounting pressures. Advances in science and drug development continue to improve outcomes in patients with rheumatic diseases. However, the ability of the field to continue to deliver outstanding care is facing significant challenges. By 2040, the number of United States (U.S.) adults diagnosed with arthritis is projected to increase by 49%, to 78.4 million. [1] Other rheumatic diseases will also increase in prevalence due to aging of the baby boomer generation and increasing life expectancy. At the same time, a significant shortfall in the adult rheumatology workforce is anticipated. The 2015 American College of Rheumatology (ACR) Workforce Study projected that by 2030 adult rheumatology providers (physicians, nurse practitioners and physician assistants), will decline by 25%, in terms of full time equivalents (FTEs), resulting in demand exceeding the supply of rheumatology providers by 102%. [2] Multiple factors contribute to this projection, including anticipated retirement of nearly 50% of the current workforce, the increasing number of women and millennials entering the field and fewer providers anticipating entry into community practice. [2,3] This imbalance is likely to be even greater in rural areas of the country. [2,4] The mismatch between anticipated demand and supply for rheumatology providers represents one of the biggest challenges facing our specialty.

Herein we discuss potential solutions to the anticipated workforce shortage. Specifically, we will focus on four main targets for intervention: 1) expanding the training of rheumatology physicians; 2)

increasing nurse practitioner, physician assistant and pharmacist utilization in rheumatology; 3) growing the use of telemedicine and 4) reducing burnout in order to retain practicing rheumatologists.

2. Expanding training of rheumatology physicians

2.1. Supply and demand of fellowship candidates

The number of fellowship graduates entering the U.S. rheumatology workforce is influenced by multiple factors including the number of trainees interested in rheumatology, the available fellowship positions and the proportion of graduates going into community or academic practice in the U.S.

The number of trainees interested in rheumatology has been steadily increasing. From 2015 to 2019 the number of fellowship applicants increased by 49%, from 256 to 366. [5] This increase significantly outpaced the expansion in rheumatology fellowship positions which went up by 27 slots, to 236 available positions, over the same period. As a result, there has been a marked increase in the number of unmatched candidates with 1.6 candidates vying for each rheumatology position, making rheumatology among the top 4 most competitive specialties in IM. [5] This trend has not been observed in other IM subspecialties. [6]

Given the increase in rheumatology fellowship applicants, the greatest limitation in training rheumatologists is the number of available fellowship positions. It should be noted that from 2005–2015 there was a 35% increase in the number of rheumatology fellowship spots, from 156 to 210, with a more recent slowing in expansion. [3] Fellowship positions are funded through various organizations with the largest being the Center for Medicare and Medicaid Services (CMS, United States). Other sources of funding include hospitals,

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philanthropy, industry and the Rheumatology Research Foundation (RRF, United States). In order to increase the number of training positions, funding for graduate medical education (GME) in rheumatology must increase substantially. While sources of funding outside of CMS remain important, it is likely that significant increases in funding, if they were to occur, would be driven by CMS. Reexamination of CMS funding is in line with recommendations from the National Academy of Medicine which advocates for reassessment of GME support to align with current health care needs. [7] Furthermore, increasing the number of fellowship positions may require an increase in clinical faculty and other departmental resources to optimize fellow training. In 2015, 40% of graduating rheumatology fellows had planned to pursue careers in academic medicine, an increase from prior data which suggested that approximately 20% of graduates entered academic careers. [3] Because academic rheumatologists generally see fewer patients than those in community practice, more graduates pursuing academic careers may further impact the imbalance between patient demand and supply of rheumatologists, particularly in rural areas.

Increasing the number of fellowship positions however does not correspond to an equal increase in the U.S. rheumatology workforce because international medical graduates (IMGs) constitute a large proportion of rheumatology trainees. In 2019, 63% of rheumatology fellowship applicants and 49% of matched candidates were IMGs. Only 80% of IMG graduates remain to practice in the U.S., representing a considerable loss of fellowship-trained physicians. [3] As of 2017, IMG rheumatologists accounted for one third of the rheumatology workforce. [8] Data suggest that IMG physicians deliver care on par with that of U.S. graduates [9] and enhance the diversity of the physician workforce which is essential given the growing diversity of the U.S. population. [10] In order to increase the number of IMG rheumatologists practicing in the U.S., easing immigration and work visa barriers are critical. The drive to increase opportunities for IMG physicians to work in the U.S. must be balanced against the need to minimize “brain drain” on developing nations through medical migration as well as the unpredictability of depending on an immigration system to sustain the U.S. workforce. [11] Therefore, continuing to cultivate an interest in rheumatology among both U.S. and international medical graduates remains a high priority.

2.2. *Enhancing interest in rheumatology among trainees*

A career in rheumatology offers many aspects that appeal to Internal Medicine (IM) residents. A 2009 study of nearly 15,000 graduating IM residents demonstrated that time with family, time available for non-work activities, long-term relationships with patients and broad areas of practice were amongst the most important reasons for career decisions. [12] Other studies have also identified work-life balance and flexibility as important factors in career choice. [13] In addition, 40% of rheumatology fellows reported intellectual interest in the field as critical to their decision to pursue the specialty. [14] Given that the inherent attributes of the field appear to align with factors important to IM trainees, increasing rheumatology exposure during residency training may have a significant impact. Indeed, studies of students, residents and fellows have demonstrated that trainees perceive increasing exposure to the field as a critical recruitment tool. [13,14]

While many fellowship applicants develop an interest in rheumatology during medical school, more than 50% become interested in rheumatology during IM residency, and more than 75% make the decision to pursue a career in rheumatology during this critical stage of training. [14] Therefore, interventions should focus on increasing exposure to rheumatology in both medical school and residency. [13] While there are limited data evaluating the effect of rheumatology exposure on career choice, several studies suggest a positive impact. A 2009 study of Canadian IM trainees demonstrated that there was a

correlation between rheumatology clinical opportunities during intern year and the likelihood of choosing rheumatology as a career choice. [15] Notably, clinical opportunities during the second and third years of IM residency training did not demonstrate this positive relationship. Furthermore, in a survey of students and residents from the University of Western Ontario, 70% of respondents reported that a rheumatology rotation increased their interest in the field. [13] Therefore, interventions aimed at enhancing clinical exposure to rheumatology in medical school and residency have the potential to further increase the number of fellowship candidates.

Increasing exposure to rheumatology can also take place independently of dedicated rheumatology rotations. These experiences are an important target for innovation because many fall outside medical school and residency scheduling constraints. The impact of a pre-clinical rheumatology curriculum on students' career choice has not been evaluated. However, a recent study demonstrated that the introduction of a student-led rheumatology interest group significantly increased the number of students participating in the rheumatology clerkship as well as rheumatology-related academic scholarship submissions. [16] Trainees at all levels have reported rheumatology mentorship and role modeling as among the most important factors in choosing a career in rheumatology. [13,14] In addition, IM residents have reported that subspecialty fellows have an impact on their career choice; [17] interaction with subspecialty fellows is often a critical area of exposure in the first year of residency training. Therefore, involvement of rheumatologists in both undergraduate and graduate medical education, as well as in enhancing resident-fellow interactions holds promise. [18,19] The impact of other interventions such as formal outreach programs, national awards and grants for conference attendance require investigation. It should be noted that there may be a discrepancy between perceived impact of various programs between trainees and practicing rheumatologists. Practicing rheumatologists have rated national awards programs, invitations to conferences, and formal outreach programs as some of the most effective recruitment strategies while rating positive role models and mandatory rotations as the least effective. In contrast, medical students have rated clinical exposure and positive role models as the most effective recruitment strategies, a discrepancy that may impact resource selection and funding. [13]

3. **Increasing utilization of advanced practice providers**

3.1. *Nurse practitioners and physician assistants*

With an increasing gap between supply of and demand for the rheumatology workforce [2], it is imperative to increase the number of practitioners available to provide care for patients in need of rheumatic disease evaluation and management. It is clear that even a doubling of the number of rheumatology fellows entering the field will not meet the increased demand imposed on the rheumatology workforce. [3] Nurse practitioners (NPs) and physician assistants (PAs) represent rheumatology colleagues who can extend the reach of the delivery of rheumatic disease care. There are many roles for NPs and PAs in an outpatient practice, including but not limited to, providing follow up care, urgent appointments for established patients, patient education, test results follow up for patients, response to patient phone calls, as well as new patient evaluations. A recent survey of the roles of NPs and PAs in rheumatology practice found that nearly 100% see patients in routine or urgent follow-up and upwards of 70% of NPs and PAs are performing new patient evaluations. [20] NPs and PAs in a rheumatology practice not only improve access to care but also have been shown to deliver high-quality care. [20] It has been demonstrated that rheumatology advanced practice providers (APPs; NPs, PAs) demonstrate a significant degree of independence, only occasionally seeking guidance from their supervising physician colleagues, [20,21] and this independent practice provides a strong

platform on which to depend for workforce expansion. There are likely a subset of diseases for which NPs and PAs will excel in care delivery, [21,22] and there is evidence to support that NPs and PAs are facile with diagnosing RA, making medication adjustments and utilizing treat-to-target strategies. [20] Importantly, in considering the role of NPs and PAs in rheumatology practice, as compared to rheumatologists, it is also reassuring to recognize that they have demonstrated similar acceptance levels by patients. [23]

NPs and PAs obtain a broad education as part of their training such that they are able to enter many different fields or specialties. Whereas rheumatologists follow a specific training path that includes IM residency and rheumatology fellowship training, NPs and PAs do not receive this focused education and training. While the hiring of an APP to a practice provides the potential for improved access to care, this is not an immediately felt advantage as it is recognized that new NPs and PAs require time for learning as well as integration into the practice. The ACR, Association of Rheumatology Professionals (ARP) and RRF acknowledge the benefits for NPs and PAs in rheumatology practice by having rheumatology-specific educational resources and specialty-specific learning modules across the breadth of rheumatology practice. [24] Additionally, a Rheumatology Curriculum Outline was created to help NPs and PAs new to a rheumatology practice most efficiently expand their rheumatology fund of knowledge and integrate into the practice. [22] Knowing that time is required to train a NP or PA in rheumatology, as well as for the NP or PA to become familiar with the practice patterns of the rheumatologists within the practice, the RRF offers grants to ease the financial burden of reduced productivity for the physician and NP or PA while the APP becomes incorporated into the practice. In addition to “on-the-job” training for an APP to integrate into the practice, two academic institutions have been innovative with a rheumatology fellowship training program for APPs. [25,26] While the earlier program at University of Texas-Southwestern, 2004–2008, is no longer available due to lack of funding support, [25] the opportunity for rheumatology fellowship training for APPs is available at Duke University at the time of this writing.

It is valuable to have resources available for NPs and PAs new to rheumatology practice, yet the other essential facet of expanding the rheumatology workforce includes the requisite recruitment of these individuals to the field of rheumatology. Similar to the recruitment of medical students and IM residents, it behooves rheumatologists to distinguish the best mechanisms by which to enhance interest in joining a rheumatology practice for NPs and PAs during their postgraduate education i.e. while seeking postgraduate education for a NP or PA degree, respectively. While it is not essential that this exposure occurs during the training years, since NPs and PAs do not graduate with a differentiated degree or certificate (as occurs with MDs receiving subspecialty training and certification), the postgraduate education period ideally provides a fertile time of training for exposure to rheumatology. Although less studied, it is likely that factors important for recruitment, as have been identified for medical students and IM residents, are similar for NPs and PAs including mentorship, role modeling, and early exposure to didactic and clinical opportunities. Also identified as important in PA choice of specialties is salary potential, and over the past decade there has been a decline in PAs choosing to enter primary care and an uptick in entry into IM subspecialties and surgery. [27]

NPs differ from PAs in their course of training as well as the level of independence they may demonstrate in practice. NPs are able to practice independently in 20 states, while PAs must have a supervising physician. These differences, based on ability for independent practice, provide potential for NPs to have a greater impact on alleviating the maldistribution of rheumatology providers in the U.S. [4] Trends have demonstrated an increase in NPs in primary care whereas PA specialty choices have seen a decline in choice for primary care, [27,28] and this disparity may relate to the independence

ceafforded to NPs in practice. With the relationship between PA and supervising physician, PAs may also develop different motivations for specialty selection.

3.2. Pharmacists

In addition to having NPs and PAs extend the rheumatology workforce there is consideration for the role of other providers, such as pharmacists, in the monitoring of patients who may not require a physician, NP or PA encounter for each office visit. Clinical pharmacists with a scope of practice to be an APP, including prescribing and other patient care responsibilities, are facilitating the chronic care of patients within the Veterans Health Administration (VHA) and improving access to care within primary care clinics. [29] During fiscal year 2015, 41% of VHA clinical pharmacists had an active scope of practice enabling prescribing and provided nearly 2 million prescriptions within the VHA for chronic illness care (Hepatitis C, diabetes, anemia, anticoagulation). [29] Globally, including the United Kingdom (U.K.), U.S, Canada, New Zealand and Australia, pharmacists are acquiring greater responsibility for the prescribing of medications in a collaborative way with physicians. [30] While physicians continue with diagnostic and clinical decision making, pharmacists are involved in monitoring and prescribing for patients with protocol-amenable medical conditions. Other disease processes have been investigated for the benefits of pharmacist-run clinics and care, and these have demonstrated increased medication adherence and enhanced clinical efficacy in treatment for diseases such as hypertension and hyperlipidemia. [31,32] Additionally pharmacist-run clinics have resulted in reduced hospitalizations in patients with congestive heart failure. [33]

For rheumatic conditions such as gout, stable rheumatoid arthritis or a seronegative spondyloarthropathy, the routine monitoring of continued medication efficacy as well as for toxicity could occur in a setting managed by APPs, including pharmacists. Such a model has been implemented in Singapore General Hospital. [34] The Singapore model utilizes a NP or PA, or a pharmacist, each of whom have prescribing abilities for disease modifying anti-rheumatic drugs (DMARDs). Patients with stable inflammatory arthritis are seen for assessment of disease flare and medication toxicity by an advanced practice nurse or pharmacist who may review any patient with a rheumatologist. Through surveys, a high level of patient satisfaction (>92%) with the level of service, receipt of detailed information, and familiarity with potential side effects, as well as with medication adherence and willingness to follow-up in the monitoring clinic have been demonstrated. Additionally, physicians demonstrated a high level of satisfaction with the program. [34] While a U.K. initiative implemented nurse-led monitoring rather than a pharmacist-led clinic, there is evidence in support of non-physician monitoring of patients with gout and the achievement of increased adherence and attainment of treat-to-target goals. [35] Taken together, the evidence strongly supports the option of pharmacist-driven care for patients with stable rheumatic disease for which management would be amenable to use of guidelines for efficacy and safety management such that physicians are not the pivot point for providing the care. With the appropriate design of guideline- or protocol-driven care, physicians could oversee efficacy and safety monitoring of many patients seen in a rheumatology office including those with gout, RA, seronegative spondyloarthropathies and osteoporosis.

4. Telemedicine

Telemedicine enables the delivery of clinical care using technology to advance communications between patients, their providers, and specialists, and it provides a novel mechanism for health care delivery to those who do not have access to a rheumatologist as may relate to the workforce shortage and/or the maldistribution of U.S.

Table 1
Definitions of telemedicine modalities.

Telemedicine Approach	Performance	Advantages	Limitations
E-consult	Provider to provider electronic asynchronous communication	<ul style="list-style-type: none"> • Easy access to expert advice • Reduced wait time for answers to consultative questions • Eliminates travel to a specialist • Improved access to care • High provider satisfaction 	<ul style="list-style-type: none"> • Increased work load for the requestor of the e-consult • No insurance reimbursement
E-visit	Patient and provider electronic asynchronous communication	<ul style="list-style-type: none"> • Progress report without requisite travel to office • Enables treat-to-target with laboratory monitoring 	<ul style="list-style-type: none"> • No insurance reimbursement • Not widely available
Asynchronous visit	Provider to provider transmission of information for interpretation at any time	<ul style="list-style-type: none"> • Eliminates patient travel to a specialist • Accumulation of data that is forwarded as available to specialist 	<ul style="list-style-type: none"> • Patient is not present for the evaluation
Synchronous visit	Patient and provider May also have provider with patient	<ul style="list-style-type: none"> • Teleconferencing between patient and specialist; there may be a second provider present with the patient • Eliminates patient travel to a specialist • Two- way communication and interaction in real time between patient and specialist • Ability to obtain additional information in the assessment • Ability to provide clinical evaluation and management recommendations in real time 	<ul style="list-style-type: none"> • Limitations to the physical examination

rheumatology care providers. [2–4] The use of telemedicine provides a platform by which specialty health care can be delivered remotely. There are varying modes of telemedicine delivery of care that occur across a spectrum including electronic consults (e-consults), electronic patient visit (e-visits), and more comprehensive care provided by asynchronous or synchronous patient visits (see Table 1).

E-consults permit providers to obtain rapid access, with a high level of satisfaction, to subspecialty expertise by providing a system by which providers can email a subspecialist through an established system for online consultation. The utilization of e-consults largely relates to the need for specialty advice, guidance on additional work-up, and the question of need for referral to a subspecialist. E-consults are utilized by PCPs, as well as between subspecialty providers, with hematology and endocrinology being amongst the greatest targets for e-consultations. [36,37] The advantages are many, including efficient attainment of specialty guidance in patient evaluation. A high level of PCP satisfaction with e-consults relates to rapid access to specialty input, improved communication between providers, reduced travel for patients to specialty appointments, and enhanced access to care for those patients needing face-to-face specialty visits. However, it is noteworthy that e-consults can result in additional work for the requesting provider; this work was previously handled by the consultant. [36] There are not clear data on the ability to provide higher quality care or of patient satisfaction with e-consults. [36] Practices providing e-consults benefit in many ways with the improved access to expert guidance and patient care, however insurance company reimbursement for time and effort is an area that warrants further development, structure, and durability.

While e-consults provide a mechanism for provider to provider advice, the electronic visit (e-visit) facilitates a patient-care visit. Patients and their providers interact electronically in an asynchronous fashion in lieu of a face-to-face visit. This mechanism has been used to improve treat-to-target in gout care. [38] There are many limitations to this form of telemedicine as it is currently not widely available and is less likely to be reimbursed by insurance companies. The advantages however are easily identifiable in reducing the need for travel time for patients when a face-to-face visit may not be necessary. Additionally, the asynchronous electronic visit between provider and patient has the potential to offer patient education opportunities, laboratory testing reminders, and encouragement for medication adherence. Thus, further consideration of the value of this form of telemedicine may be warranted.

On a more comprehensive scale, there are many successful telehealth models in the U.S. to provide synchronous or asynchronous care of patients by their providers. The communication goals between patients, their health care providers, and specialists may differ according to the specific needs of a patient population. Examples of telehealth programs, that are both far-reaching and well-established, providing health care delivery in separate underserved regions within the U.S., are Project ECHO (Extension for Community Healthcare Outcomes), the Alaska Native program, and the Veterans Health Administration.

Project ECHO, founded and directed by the University of New Mexico (NM) Health Sciences Center, is a well-developed and highly integrated network providing medical education to primary care providers and delivery of consultative care services by specialists throughout New Mexico. [39] Another exemplary model for incorporating telehealth into everyday practice is the Alaska Native program led by Ferucci and colleagues. [40] This program provides access to rheumatology care for patients in over 200 locations within Alaska. Within this program, rheumatology care is delivered via a combination of telemedicine and face-to-face visits to 12 rheumatology field clinics. Much can be learned from best practices within well-established telehealth programs. It is incumbent upon us to effectively integrate telemedicine into the current rheumatology care delivery models.

Telerheumatology implementation for new patient evaluations has been explored through the Veterans Health Administration by Nguyen-Oghalai et al, and this model addresses access to care in terms of distance traveled as well as timeliness of a new patient appointment. [41] Although a small study, several important implications were found. New patients were seen with a synchronous visit conducted by a NP with a Veterans Affairs (VA) rheumatologist, and a strong correlation was found between suspected inflammatory rheumatic conditions by the NP and diagnosis confirmation at a subsequent face-to-face visit with a rheumatologist. Non-inflammatory conditions were identified with 100% accuracy via telemedicine visits, thus providing a mechanism for recommendations to the PCP as well as a potential screening tool for patients who may not need rheumatology in-person appointments. Distance travelled by patients was less for the telemedicine visit, and the highest level of patient satisfaction was observed on immediately-obtained surveys. At a subsequent survey time, 95% of patients were willing to have another telemedicine visit, and those with inflammatory conditions had a significantly shorter interval between telemedicine and in-

person visits. Clear limitations were also delineated, some relating to the small sample size, and included technology malfunctions, no reduction in visit-time spent for the rheumatologist, and additionally cost analyses were not performed [41] Several studies have found that inflammatory arthritis is a condition particularly amenable to telerheumatology. [41–43]

It is noteworthy that there is a paucity of published works to provide evidence and guidance in the use of telerheumatology. A systematic review of telerheumatology publications found this to represent a rich area for further development and publication [43]. Nearly 1500 studies were considered and only twenty were included in the systematic review. Of twenty articles reviewed, ten were in abstract form only. The limited published evidence on telerheumatology leaves the door open for deeper investigation. Important facets for consideration in the integration of telerheumatology into practice include disease selection, complexity of systemic disease, established vs. new patient evaluations, synchronous vs. asynchronous visits, patient-only vs. the presence of another provider to facilitate the patient visit, and the level of training of the presenter to the rheumatologist. Technology and cost considerations are also central to implementation. Although characterized by several important limitations, including a paucity of cost/benefit analyses, this systematic review found that rheumatoid arthritis was the most common condition applied to telerheumatology, and the evaluation of established patients demonstrated superiority over new patient assessments. The level of training of the presenter, strengthened by the presence of a physician presenter, played an important role. [43]

While there is a paucity of published evidence on the work flow, cost analysis, and optimal diseases amenable to assessment using telerheumatology, our specialty has been thrust forward along this path, along with our colleagues across all medical specialties, in the time of the COVID-19 crisis. We have quickly recognized the value of telemedicine for ensuring access to care for new and established patients, monitoring of disease activity and therapeutic interventions, and maintenance of the longitudinal relationships we have with our patients. Telemedicine not only potentially extends our reach to underserved populations, but with rapid integration of phone and video virtual visits, our eyes have been opened to enhanced opportunities to provide care within our usual inpatient and outpatient settings.

5. Retaining physicians in the workforce

Physician burnout and job satisfaction may have a major impact on the U.S. rheumatology workforce. Rates of physician burnout vary considerably among studies, although burnout among rheumatologists has not been well studied. [44] Recent publications have reported that rates of burnout range from approximately one third to one half of physicians and have increased over time. [45–48] Burnout, in turn, may have an impact on work effort. It has been demonstrated that an increase in emotional exhaustion is associated with workload reduction [49] and likelihood of leaving the current place of employment. [45] Moreover, burnout may be greater in early-career physicians. [47] A survey conducted by the American Medical Association (AMA) found that 56% of millennials report unhappiness with the current state of medicine although 83% reported that they are very or extremely likely to continue practicing. [50] These data are of particular importance since millennials are projected to comprise 44% of the rheumatology workforce by 2030. [3] In addition to potential burnout, millennials saw fewer patients than their counterparts in 2005. This may be particularly true for female providers who are projected to comprise 57% of the U.S. rheumatology workforce by 2030, up from 41% in 2015. [2,51] The same AMA study demonstrated that approximately 80% of millennials report that they hope to seek related fields beyond patient care, potentially further affecting workforce projections. [50] Given the changing makeup of the

Table 2
Factors contributing to physician burnout.

Organizational factors	Personal and relational factors	Modulators of burnout factors
<ul style="list-style-type: none"> • High workload • Excessive documentation • Insufficient time to complete tasks • Lack of work diversity 	<ul style="list-style-type: none"> • Challenging interactions • Emotional investment in patients and families • Burden of responsibility • Balancing family and work life 	<ul style="list-style-type: none"> • Stage of training • Gender • Race

rheumatology workforce, addressing physician happiness and burnout may have a significant impact.

Multiple factors have been implicated in physician burnout (see Table 2).

Perhaps the most commonly described stressors relate to organizational factors such as high workload, excessive documentation, insufficient time to complete tasks and lack of work diversity. [52] Relational factors such as challenging interactions between providers and emotional investment in patients and their families also contribute to burnout. Finally, the burden of personal responsibility, in particular balancing family and work life, remains a major stressor. [52] It should be noted that stage of training, gender and perhaps race modulate these factors considerably. Trainees are disproportionately affected by factors including but not limited to new patient responsibility, autonomy, communication with supervisors, the learning environment and uncertainty about the future. [53] A recent study demonstrated that higher levels of depression among female interns as compared to male interns were significantly accounted for by work-family conflict. [54] Racism and discrimination have been demonstrated to impact black physicians. [55] Organizational factors have been suggested to play a greater role in burnout than individual factors, and these may inform and provide potential for possible interventions. [52]

The study of interventions to address physician burnout is relatively nascent and much needs to be done to determine the most effective means of addressing this issue. [56] However, recent interventional studies and development of a research agenda are helping to shape this landscape. [57] Generally, programs aimed at enhancing wellness and reducing burnout can be divided into two categories. Physician-directed interventions include interventions that enhance coping skills and personal wellness such as mindfulness, exercise and cognitive-behavioral techniques. In contrast, organization-directed interventions focus on healthcare system changes and include reductions in workload, optimization of electronic medical record use, and increased support and schedule changes, among others. While both types of interventions have an impact on burnout, organization-directed interventions may have a greater effect. [58,59] Interventions to reduce stress, burnout and competing responsibilities among fellows and practicing rheumatologists will be important in order to maximize the ability of rheumatology providers to provide optimal access to care.

6. Conclusions

In the setting of increasing demand for and declining rheumatology providers, the rheumatology workforce faces a tremendous gap, and this will inherently limit access to care. We must take a multifaceted approach to augmenting the rheumatology workforce to improve access to care for those with rheumatic diseases. Not only will this involve the training of more rheumatology fellows, attracting advanced practice providers, including NPs, PAs and clinical pharmacists, to the specialty, broader implementation of telemedicine, but it is also imperative that we examine the factors important in retaining the strength of the current rheumatology workforce.

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