

Focusing on Physician Shortages within the United States

Nathaniel J. Cooper¹ and Dr. Bruce Lazar, MBA, DM²

¹MHA, Graduate Student, School of Health Sciences, Southern Illinois University, Carbondale, USA

Nathaniel.cooper@siu.edu

²School of Health Sciences, Southern Illinois University, Carbondale, USA

Bruce.lazar@siu.edu

Abstract: *Physician shortages in the U.S. healthcare system are a significant concern, with predictions indicating that the growing population will require more licensed physicians than are currently available, resulting in a further shortage of physicians. The systematic literature explored successful strategies that U.S. healthcare leaders use to address physician shortages and enhance overall health outcomes. A literature search employing Public Medline, Cumulative Index to Nursing and Allied Health Literature, Psychological Information, and Elton B. Stephens Company Information Services occurred, following the preferred Reporting Items for Systematic Reviews and meta-analysis recommendations. Data from the thirty-seven relevant articles were thematically analyzed using a screening process of constantly comparing notes from two reviewers, using a final consensus, and categorizing statements related to the research question. Four themes were from the literature during the data analysis process, which included physician shortage (95 percent), physician burnout (24 percent), strategy(ies) (54 percent), and health outcomes (16 percent). The findings indicated that no exclusive strategies exist that all healthcare leaders should follow. Adding elements such as increasing interest in medicine, establishing physician-centric centers of influence, bolstering incentives, and mandated federal legislation to strengthen faculty development and recruitment across the nation will assist in shoring up future physician recruitment rates. The implication of these findings allows healthcare leaders to comprehend further the urgency of addressing physician shortages and the opportunity to successfully collaborate in implementing innovative strategies to tackle physician shortages in the healthcare system.*

Keywords—Physician Shortage, Physician Burnout, Strategy(ies), Health outcomes, Leaders

1. INTRODUCTION

Physician shortages are a significant issue in the United States (U.S.) healthcare system. The World Health Organization's (2023) findings indicated that the physician-to-patient ratio in 2020 was 35.5 to 10,000 patients. By 2030, the projected U.S. population will increase, yet physicians' training, graduation, and workforce will vary adversely from the population's healthcare needs (World Health Organization, 2023). Also, the average age of physicians is increasing; most will be retirement eligible by 2030 (World Health Organization, 2023).

With the current and future-projected shortages of physicians in the U.S., the recent global pandemic and larger caseloads have taken a toll on physicians and are costly to the healthcare system. The COVID-19 pandemic claimed the lives of 1.03 million Americans (Centers for Disease Control and Prevention, 2023), and there were one hundred million confirmed cases of the virus, and patients with comorbidities require more medical care, surveillance, and intervention (Centers for Disease Control and Prevention, 2023). Physicians often experience patient burnout, which could produce adverse patient outcomes, further exacerbating the problem (Zioming Zhang, 2020). A significant challenge to healthcare and government leaders is managing service delivery among patients when dealing with physician shortages, which could lead to adverse health outcomes.

There is an opportunity for healthcare and government leaders to implement innovative strategies to address physician shortages through the possible deployment of recruiting

initiatives and lawmakers presenting legislation bolstering the future physician workforce. The overutilization of physicians is a significant problem, and in March 2023, bipartisan legislation introduced a proposal to combat physician scarcity and improve access to healthcare. Over seven years, U.S. Representative Terri Sewell backed an additional 14,000 graduate-level medical education (GME) residencies in earnest efforts to bolster medical treatment facilities' ability to strengthen access to care, reduce burnout, and generate qualified medical providers (Sewell, 2023). The American Medical Association (AMA) has proposed the expansion of graduate medical education (GME) for primary care specialties. Nevertheless, healthcare leaders need to have successful strategies to address physician shortages. This systematic literature review explored successful strategies healthcare and government leaders use to address physician shortages and enhance overall health outcomes.

2. METHODS

After applying the Google Scholar search engine to taper the research topic further, a selection of articles aligned with the research question occurred. The research question was as follows: What successful strategies do healthcare leaders use to address physician shortages to enhance overall health outcomes? The literature was examined using the following databases, EBSCO Host, Public Medline (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Psychological Information (PsycINFO); all accessed via the Southern Illinois University Morris Library. These searches were performed per the Preferred Reporting Items for the systematic review Reviews and Meta-Analyses guidelines (Moher, et al. 2009)

The method phases included the following:

1. Searching for relevant studies.
2. Screening for inclusion and exclusion criteria.
3. Data extraction based on the screening criteria.
4. Synthesis of the data to identify key themes.
5. Reporting and disseminating the findings (Page et al., 2021)

Searching for the academic databases utilizing keywords *strategies, physician, shortages, health care, leaders, and burnout* gave standardized parameters for choosing the most appropriate articles to review the topic and answer the research question.

For consideration in the systematic literature review, the following conditions were required: publication between 2019 and 2023, English language, peer-reviewed journal articles, full-text availability, published in the United States (US), and related to the research question. When the eligibility criteria were put in place, searching EBSCO, PubMed, CINAHL, and PsycINFO databases and a secondary review using Cohen's Kappa Index Valuation (see Figure 2), a total of thirty-seven articles for the literature review remained (See Figure 1). This review excludes any articles not meeting the inclusion criteria.

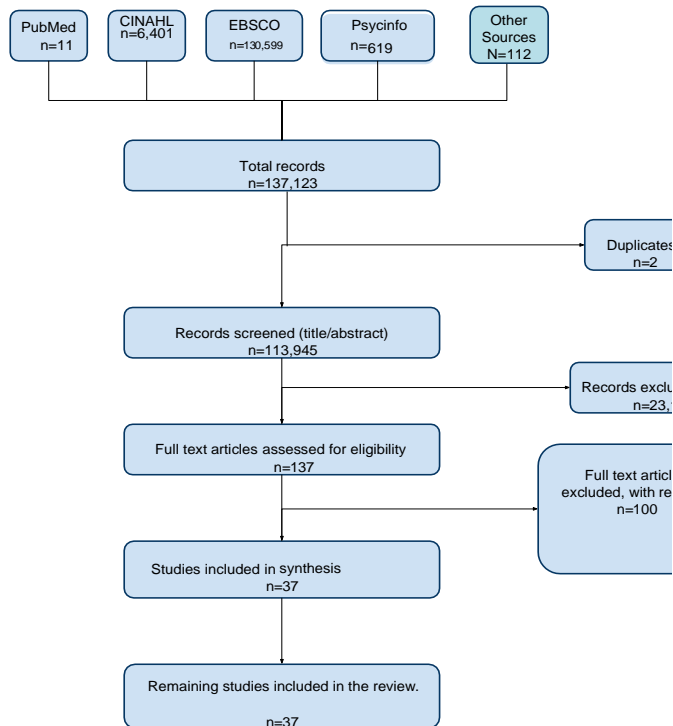


Fig.1-Search with inclusion and exclusion criteria.

2.1 Kappa Index

		Reviewer two		
		Yes=1	No=0	
		Yes	No	Total %
Reviewer one	Yes	95	1	
	No	0	25	
Total		95 (78.5%)	26 (21.5%)	121 (100%)

Kappa Index Value: 0.97

Fig. 2- Kappa Index

A Boolean search was conducted using the keywords listed above through EBSCO, PubMed, CINAHL, and PsycINFO databases. The results yielded around 137,000 sources. Using only studies published between 2019-2023 added to the validity of the systematic literature review. After filtering for full text, peer-reviews, abstracts, and English-based articles/reports, research articles kept within the continental United States, and excluding duplicate articles, the results produced 137 articles to analyze. Reviewer One and Reviewer two reviewed all 137 studies separately and recommended whether the studies were germane to the research topic and could help answer the research question.

The Kappa coefficient transpired, and the analysis results for this review were calculated at $[K=0.975]$, near-perfect agreement (Cohen, 1960), see Figure 2. The two independent reviewers then came together, compared notes, and agreed on a final analysis sample ($K=1.0$). Twenty-six articles were removed from the review, and it is noted that the agreement went beyond the expectation of only chance.

3. RESULTS

The fundamental research question was, what successful strategies do healthcare leaders use to address physician shortages and enhance overall health outcomes? A substantial literature search and review transpired using four academic electronic databases, which were EBSCO Host, Public Medline (PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Psychological Information (PsycINFO). A well-established process for the literature search, selection, and data analysis process (Gehad et al., 2019) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page, 2021) were followed to ensure reliability in the systematic approach. Based on the data from 120 articles, thirty-seven were applied to the research question. A final decision

occurred by comparing and finalizing the summary of findings from each article (See Fig. 1). Table 1 lists the articles and key summation findings from these thirty-seven articles.

Table 1

Summarized findings of the literature.

Title	Findings
[1] Addressing Provider Shortages in Rural America: The Role of State Opt-Out Policy Adoptions in Promoting Hospital Anesthesia Provision	States who are in an opt-out status did not realize an increase in access to care regarding anesthesiologists rendering medical services. Thus, there was not a significant notice regarding healthcare expenditure reduction.
[2] Building the Rural Healthcare Workforce: Challenges--and Strategies--in the Current Economy	There seems to be difficulty in recruiting physicians and healthcare providers to rural areas. Healthcare leaders should develop strategies to reduce barriers to entry for the rural sector and mitigate negative connotations associated with rural health.
[3] Higher US Rural Mortality Rates Linked to Socioeconomic Status, Physician Shortages, And Lack of Health Insurance	Research suggests life expectancy is strongly linked to socioeconomic status. To mitigate factors reducing life expectancy, there needs to be an increase in access to primary care in rural areas.
[4] Medical school expansion policies: educational access and physician distribution	One method to combat a looming doctor deficit is by taking a more liberal approach in access to education, encouraging diversity, and advocating provider distribution across most needed areas.
[5] California’s Physician Shortage During COVID-19: A Policy Roadmap to Expand Access to Care	Covid-19 exacerbated an already diminishing physician force in the state of California. The policy is needed to help stop the decline of physicians.
[6] Medicine as a Job and Not as a Career-Recruiting and Retaining an Evolving Physician Workforce	Healthcare leadership must make concerted efforts in bolstering recruiting tactics. As the demographic amongst physicians increases, so should the approach to retain and attain this same group.

[7] Multi-Faceted Human Capital Workforce Solutions and Innovative Staffing Strategies for Healthcare Systems during the Covid-19 Pandemic	The COVID-19 pandemic dealt a crushing blow to healthcare workers. America’s healthcare leaders should posture themselves to welcome solutions and techniques to rebuild the healthcare workforce, especially among a myriad of physician specialties.
[8] Nothing Great About Physician Resignation Trends	Currently, physician resignation is high. Leadership is concerned that strategies to retain physicians are presenting at too slow of a rate.
[9] Physician Burnout in the ICU: The Importance and the Solution	Physicians who work in the ICU, especially during COVID, face high burnout rates. Leaders in healthcare organizations are beginning to provide their doctors with emotional support and resources to face the mental and emotional burdens they face.
[10] Physician workforce in the United States of America: forecasting nationwide shortages	By the 2030s, there is a projected physician shortage in the hundreds of thousands. There needs to be legislation established to curb this coming predicament.
[11] Post-ACA trends in the US primary care physician shortage with index of relative rurality	Legislation is needed to curb a physician shortage in rural areas across the U.S.
[12] Rehabilitation scholarship program: A solution to personnel shortages in the vocational rehabilitation system	The vocational rehabilitation scholarship program is achieving in its endeavor to bolster workforce rates. The physician community could use their strategies in efforts to bolster its own specialties.
[13] Retention of physicians and surgeons in rural areas—what works?	This article presents innovative methods to increase physician readiness in rural communities.
[14] Combating the Shortage of Primary and Specialty Care Physicians	Regardless of efforts to bolster physician percentages, the lack of this profession will have lasting effects in the 2030s.

<p>[15] Predicted shortages of physicians might even disappear if we fully account for PAs and NPs</p>	<p>Utilization of Physician Assistants and Nurse Practitioners is one method to use to address physician shortages.</p>	<p>[21] The U.S. Physician Shortage Is Only Going to Get Worse. Here Are Potential Solutions</p>	<p>83.7 million people in the U.S. live in a primary-care health professional shortage area (HPSA). Potential solutions include increasing access to care through telemedicine, incentivizing primary care physicians, and legislation dedicated to supplementing the most needed areas.</p>
<p>[16] Helping to Alleviate the Projected Physician Shortage</p>	<p>The author suggests policymakers intervene through collaboration with other healthcare networks and legislators to help thwart this current trend.</p>	<p>[22] Does the U.S. have a shortage of physicians?</p>	<p>Every physician specialty is facing workforce shortages. A solution is needed to bolster all areas of medicine.</p>
<p>[17] Telemedicine, the current COVID-19 pandemic, and the future: a narrative review and perspectives moving forward in the USA.</p>	<p>The advantage of telemedicine is its ease of use for patients and providers. A benefit telemedicine presents is ease of access and convenience for all parties involved. This can alleviate physician shortages in rural communities.</p>	<p>[23] AAMC estimates 124K more physicians will be needed by 2034, with the largest gap among specialists.</p>	<p>There could be a physician shortage of 134,000 to 184,000 by the 2030s. Leadership will be needed to shore up the looming shortage along with legislation to address this issue.</p>
<p>[18] Addressing Kentucky's Physician Shortage While Securing a Network for a Research-Intensive, Referral Academic Medical Center: Where Public Policy Meets Effective Clinical Strategic Planning</p>	<p>The University of Kentucky could be especially affected by the looming physician shortages. A suggestion to healthcare leadership is changing their access to graduate medical education programs. Additionally, making their access to medical school less restrictive could also assist in securing a robust network for Kentucky's medical academic complex.</p>	<p>[24] In face of physician shortage, 85% of healthcare facilities rely on locum tenens.</p>	<p>Eight out of ten healthcare organizations have utilized locum tenens to fill voids in physician positions.</p>
<p>[19] Do we have the ACHD physician resources we need to care for the burgeoning ACHD population?</p>	<p>Research points to the U.S. experiencing strains in access to care for patients who have been diagnosed with heart disease.</p>	<p>[25] The Physician Leader's Role in Navigating the Anesthesia Provider Shortage</p>	<p>CRNAs could be used as a substitute for Anesthesiologists but this is not the only answer to address Anesthesia provider shortages.</p>
<p>[20] Survey of the US Surgeon Workforce: Practice Characteristics, Job Satisfaction, and Reasons for Leaving Surgery</p>	<p>Although surgeons experience a high job satisfaction rate, they still experience attrition due to long working hours. This is resulting in surgeons leaving their professions for less stressful positions and occupations.</p>	<p>[26] How COVID-19 exacerbates the physician shortage.</p>	<p>Physician shortage in the U.S. brought by the global COVID-19 pandemic, the reasons rural and underserved communities suffered even more during the shortage, and how the shortage has exacerbated the problem of burnout in medicine and healthcare.</p>
<p>[20] Survey of the US Surgeon Workforce: Practice Characteristics, Job Satisfaction, and Reasons for Leaving Surgery</p>	<p>Although surgeons experience a high job satisfaction rate, they still experience attrition due to long working hours. This is resulting in surgeons leaving their professions for less stressful positions and occupations.</p>	<p>[27] COVID-19 has flipped the physician job search to a seller's market, recruiters say.</p>	<p>The recent pandemic has contributed to the low supply of physicians across the United States. Recruiters must become</p>

	innovative in their tactics to acquire future talent.		
[28] Experts Fear a Shortage of Forensic Pathologists Will Leave Deaths Unexplained.	Due to the recent pandemic, opioid crisis, and a rise in violence, these factors have taken a toll on forensic pathology medical specialty.	[32] Exploring the behavioral health clinician shortage at a rural Midwestern U.S. agency.	There is a Behavioral health provider shortage in Midwestern states. Researchers submit a qualitative analysis which points to factors contributing to this problem
[29] More medical students than ever, but more residency slots needed to solve physician shortage, AAMC says	There is an increase in medical school students but not an increase in medical specialties positions. Leadership is being called upon to open more specialty slots for medical school graduates.	[33] Pipelines to pathways: Medical school commitment to producing a rural workforce	Numerous rural communities in the United States continue to experience physician and clinician shortages.
[30] Biden admin's student loan relief is a first step on physician workforce barriers and resilience, AAMC says.	The Biden administration suggests student loan debt forgiveness will help bolster the future physician force.	[34] Outcomes of a Survey-Based Approach to Determine Factors Contributing to the Shortage of Occupational Medicine Physicians in the United States	Occupational Medicine (OEM) physicians, like other specialties, are experiencing shortages.

Title	Findings
[31] Examining intention among future physicians to practice in high-need health professional shortage areas in Tennessee.	Primary care physician shortages in Health Professional Shortage Areas have plagued underserved and rural areas for decades. Previous research has found that these areas experience less access to health care, poorer health outcomes, factors, and social determinants have lower health literacy, and struggle with recruiting and retaining qualified Primary Care physicians. who understand the health needs of rural/underserved populations.

[35] The Retention of Nevada Medical Graduates: A 6-Year Study	The state of Nevada realizes the importance of retaining physicians.
[36] America Needs More Family Doctors: The 25x2030 Collaborative Aims to Get More Medical Students into Family Medicine.	Legislation has been presented at the federal level to bolster the physician workforce by 2030.
[37] Physician Burnout Calls for Legal Intervention	Physician burnout is being researched. Solutions to mitigate are presented for the implementation of best practices to mitigate this issue.

The data retrieved from the thirty-seven articles connect to categorizing the frequency of occurrence of strategies,

addressing physician shortages, and enhancing overall health outcomes, leading to developing several themes directly relevant to the research question. The four themes identified included (a) physician shortages, (b) physician burnout, (c) successful strategy(ies), and (d) health outcomes. These themes related to noting what may have caused the shortage and remedies that can resolve the looming physician shortage. From the research findings, theme (a) occurred in articles 1-11, 13-31, and 33-37, for an instance of thirty-five times, which is 95%. Theme (b) occurred in articles 7-9, 14, 21-22, 27-28, and thirty-seven, for an instance of nine times, which is 24%. Theme (c) occurred in articles 2, 4, 6-10, 12-14, 18, 21, 25-26, 28, 32-34, and thirty-seven, for an instance of nineteen times, which is 54%. Theme (d) occurred in articles 3-4, 8, 15, 17, and 31, for a total of six times, which is 16%. Of note, one unexpected finding was that of the thirty-seven articles; one yielded no emerging themes (see Table 2).

Table 2:

Frequency of occurrence in the literature.

Theme	Occurrences	Instances of Attributes (n)	Percentage (%)
Theme 1: Physician Shortage(s)	Article(s) 1-11, 13-31, 33-37.	35	95%
Theme 2: Physician Burnout	Article(s) 7-9, 14, 21-22, 27-28, 37	9	24%
Theme 3: Strategy(ies)	Article(s) 2, 4, 6-10, 12-14, 18, 21, 25-26, 28, 32-34, 37	19	54%
Theme 4: Health Outcomes	3-4, 8, 15, 17, 31	6	16%

4. DISCUSSION

Physicians play an integral in the health and welfare of Americans. Their expertise, breadth of knowledge, and expertise are critical to many functions involving care. As the population is aging, there is an anticipated shortage of these professionals. By the early 2030s, America could see a need for more than 139,000 physicians (AAMC, 2020). Overall, there are perceived challenges to recruiting and retaining physicians in general. This systematic literature review explored successful strategies healthcare and government leaders use to address physician shortages and enhance overall health outcomes. As Table two portrays, the research revealed four common themes throughout the researched literature. These attributes support the assertion that a looming physician shortage and strategy(ies) are needed to address the shortfall.

The feasibility and acceptability of the United States (US) facing a physician shortage were substantiated by a sizable ratio (95%) of the articles in this review (1-11, 13-31, 33-37). Dayaratna et al. (2019) mentioned that the U.S. lack of physicians in the U.S. is a profound predicament that must be resolved. Physician burnout, notably during Covid-19, contributed to physicians resigning from practicing medicine. Numerous authors' findings accounted for 24% of this review (7-9, 14, 21-22, 27-28, 37). Hoffman (2019) concluded that burnout needs lawful intervention and is not left to itself to aid in resolving this phenomenon. The acceptability of the need for and or implementation of strategies to improve physician shortages were substantiated by a notable amount (54%) of the articles (2-4, 6-10, 12-14, 18, 21, 25-26, 28, 32, 34-37). Peters and Young (2022) developed a strategy specific to the subspecialty of Anesthesia of how to shore up anesthesiologists' shortages through incentives, career mentorship, and a multi-tiered step that allows the field to thwart attrition. However, to date, there is still a lack of Anesthesia providers, nationally.

Health outcomes accounted for 16% of the articles reviewed (3-4, 8, 15, 17, 31). These outcomes demonstrated the need for more physicians, particularly in rural areas and various demographics, including physician subspecialties and the shortage of Latino physicians. Additionally, Green-McKenzie et al. refer to the consequences of medical school students not hearing or knowing the Occupational Medicine (OEM) specialty exists and plans to advertise to prospective medicine students (Judith Green-McKenzie et al., 2021). However, there is still a shortage of physicians who matriculate into this specialty. While there have been proposed strategies to mitigate physician shortages, none have proven to be successful.

Examples of strategies that have been implemented include federal legislation, advertising, and utilization of lower-level practitioners. To date, the presentation of these elements has not produced needed physicians in rural areas, and access to care is not enhanced. Thus, the need for federal intervention to mitigate the looming shortage is encouraged to combat the looming physician shortage slated to be realized by the 2030s.

The review had some limitations, even with the results mentioned above. The review transpired over 12 weeks. The literature review utilized a preliminary search strategy using Google Scholar first. An additional search strategy occurred using PubMed, CINAHL, EBSCOHost, and PsychInfo academic databases for examining peer-reviewed journal articles. The search used keywords such as *physician shortage, burnout, strategies, and Health outcomes*. Using different terminology while searching the academic databases might have produced additional articles not captured in the present study. The study excluded non-English language articles that eliminated certain publications from consideration. The last limitation is the subjective nature of

the reviewer of the articles. There exists a potential for different interpretations of the articles.

Minimizing the abovementioned limitations occurred by following the PRISMA-based systematic review protocols (Page et al., 2021). A collection of records appeared at 137,123 and filters were applied from the PubMed, CINAHL, EBSCOHost, and PsychInfo databases until no additional information was available to advance these ideas. A review of each article happened, along with determining whether the article aligned with the research question. Despite any limitations in the review, the research did not reveal, at a national level, proven strategies readily available to immediately utilize, to manage physician shortages to improve overall health outcomes.

Future researchers can use the results of this systematic literature review as a basis for information in any future studies related to the topic. Additionally, researchers are encouraged to incorporate verified academic data collection processes to verify the efficacy of implementing strategies necessary to bolster physician rates within the healthcare field. Moreover, researchers can utilize the study in consulting with physician leaders and legislators to, if necessary, monitor the results of any successful strategies as a case study for best practices.

5. CONCLUSION

The systematic literature explored successful strategies that U.S. healthcare leaders use to address physician shortages and enhance overall health outcomes. The findings indicated that strategies are needed to address a looming physician shortage. However, a gap in the literature existed concerning a nationwide formula or strategies used across all healthcare organizations to address physician shortages. The outcomes demonstrated no exclusive strategies set for all healthcare leaders to follow. Adding elements such as increasing interest in medicine, establishing physician-centric centers of influence, bolstering incentives, and mandated federal legislation to strengthen faculty development and recruiting across the nation will assist in shoring up future physician percentages. The implication of these findings allows healthcare leaders to comprehend the urgency of addressing physician shortages and the opportunity to successfully collaborate in implementing innovative strategies to tackle physician shortages in the healthcare system.

6. ACKNOWLEDGMENT

I would like to express my deepest appreciation to Dr. Bruce Lazar. I could not have undertaken this journey without his tutelage. I would also like to express my deepest gratitude to my lovely wife of 18 years, Shemeca Cooper. Her love and support were motivation to continue my pursuit of higher education. Next, this endeavor would not be possible without my loving mother, Tina McLaurin; thank you, Mom. Lastly, I would like to extend my sincere gratitude to my close friend and "brother from another mother," Oather Walker, III. "Momma, we made it!"

7. REFERENCES

- [1] AAMC. (2020, June 26th). *New AAMC Report Confirms Growing Physician Shortage*. Retrieved from Association of American Medical Colleges: <https://www.aamc.org/news/press-releases/new-aamc-report-confirms-growing-physician-shortage>
- [2] Centers for Disease Control and Prevention. (2023, March 15th). *CDC Museum/COVID timeline*. Retrieved from CDC: <https://www.cdc.gov/museum/timeline/covid19.html>
- [3] Cohen, J. (1960). A Coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, pp. 20, 37-46.
- [4] David Moher, A. d. (2009, July 21st). *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement*. Retrieved from thebmj: <https://www.bmj.com/content/339/bmj.b2535>
- [5] Gehad Mohamed Tawfik, K. A. (2019, August 01). *Tropical Medicine and Health*. Retrieved from Biomed Central: <https://tropmedhealth.biomedcentral.com/articles/10.1186/s41182-019-0165-6>
- [6] Hoffman, S. (2019, November-December). *Policy and Politics*. Retrieved from EBSCOHost-The Hasting Center: <https://web-s-ebSCOhost-com.proxy.lib.siu.edu/ehost/pdfviewer/pdfviewer?vid=5&sid=41dff66a-6da4-4af6-a221-7a2e993d052a%40redis>
- [7] Jeffrey A. Peters and David Young, M. (2022, November 1st). *Peer-Reviewed: The Physician Leader's Role in Navigating the Anesthesia Provider Shortage*. Retrieved from Physician Leadership Journal: <https://web-s-ebSCOhost-com.proxy.lib.siu.edu/ehost/pdfviewer/pdfviewer?vid=7&sid=f8f9cbbf-13a3-4188-80dc-953931034f24%40redis>
- [8] Judith Green-McKenzie, S. U., Duran, H., Jones, C., Vearrier, D., Malak, P., Emmett, E. A., & Shofer, F. S. (2021, May/June). *Outcomes of a Survey-Based Approach to Determine Factors Contributing to the Shortage of Occupational Medicine Physicians in the United States*. Retrieved from Journal of Public Health and Management: <https://web-s-ebSCOhost-com.proxy.lib.siu.edu/ehost/detail/detail?vid=6&sid=9920e997-6fd9-437d-bf03-5092b6ff9905%40redis&bdata=JnNpdGU9ZWWhvc3QtbGl2ZSZyY29wZT1zaXRl#AN=149636725&db=rzh>
- [9] Kevin Dayaratna, P. P. (2019, January 19th). *REFORMING AMERICAN MEDICAL LICENSURE*. Retrieved from Harvard Journal of Law and Public Policy: [898031068069021006086100094005126113024008049068035042027073082093009085104110112102101009029001009024018095075026123089117017098004058073081094070071087115073075073065014043110025](https://www.harvardjournaloflawandpublicpolicy.org/2019/01/19/2019-01-19-01-009-029001009024018095075026123089117017098004058073081094070071087115073075073065014043110025)

004108091120093103113005090105018106087001018

080116084092007020026088120

- [10] Page, M. J.-W. (2021). *The PRISMA 2020 statement: an updated guideline for reporting systematic reviews*. Retrieved from BMJ: <https://doi.org/10.1136/bmj.n71>
- [11] Scott L Feyereisen, N. P. (2021, September). *PubMed*. Retrieved from National Library of Medicine: <https://pubmed.ncbi.nlm.nih.gov/32613667/>
- [12] Sewell, U. C. (2023, March 29th). *Press Release*. Retrieved from U.S. Alabama's 7th District: <https://sewell.house.gov/2023/rep-sewell-fitzpatrick-introduce-bipartisan-legislation-to-combat-physician-shortage-and-improve-access-to-care>
- [13] World Health Organization . (2023, January). *The Global Health Observatory*. Retrieved from WHO: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-\(per-10-000-population\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-(per-10-000-population))
- [14] Zioming Zhang, D. L. (2020, February 6th). *Physician workforce in the United States of America: forecasting nationwide shortages*. Retrieved from Human Resources for Health: <https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-020-0448-3>