Leadership Training in Undergraduate Medical Education: A Systematic Review

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Introduction

The American Association of Medical Colleges (AAMC) has identified leadership as, "the most critical component of success," for future medical professionals and describes various leadership skills in the Entrustable Professional Activities, a set of proficiencies medical students are expected to be able to perform upon entering residency.[1-2] The Liaison Committee on Medical Education (LCME) makes references to leadership skills in multiple competencies that MD granting schools must fulfill in order to maintain accreditation.[3]

Aims and Objectives

The purpose of this systematic review is to describe current leadership education interventions staged at LCME-accredited medical schools and classify interventions based on quality of evidence and impact on participants. Extracted data will help identify best practices for developing effective leadership education curricula that can be utilized by other schools while developing their own interventions.

Methods

Protocols for this review was developed utilizing the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement.[4] Comprehensive searches of literature (published between 2014-2021) were conducted with databases: PubMed (MEDLINE), Embase, ERIC, PsychINFO, and Web of Sciences, and studies were evaluated against predetermined inclusion and exclusion criteria. Selected articles underwent data extraction for various features such as size of cohort and length of intervention, leadership competencies covered using the Mangrulkar et al framework, and interventions were scored for effectiveness and data quality using validated tools.[5-7]

Results

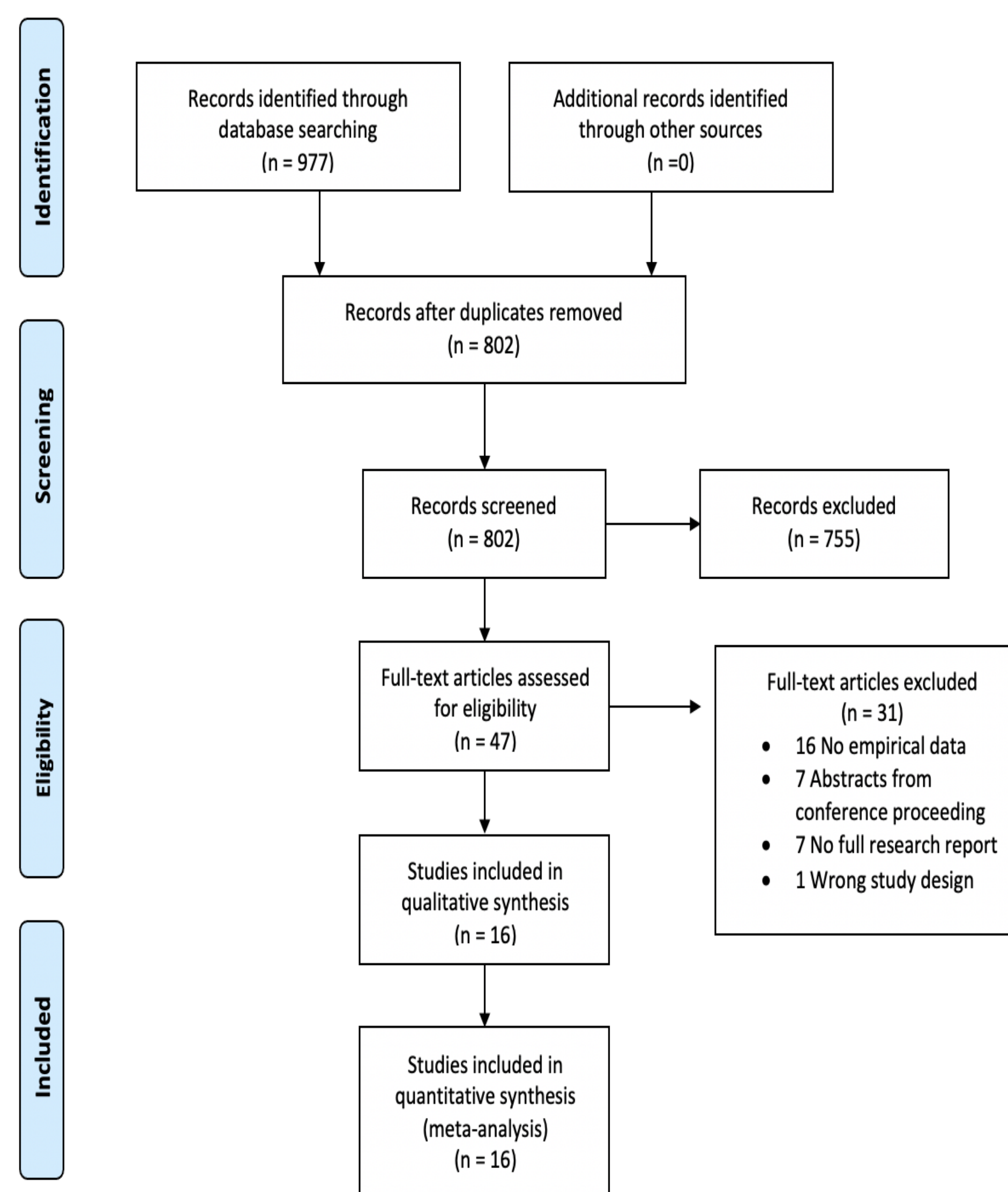**Figure 1.** PRISMA Diagram of Article Selection Process

Table 1. Effectiveness of Interventions Using Kirkpatrick's Evaluation Model[6]

Score	Definition	No. (%) of Curricula
0	None: Outcomes not evaluated	0 (0)
1	Reaction: Change in learners' attitudes	3 (18.75)
2	Learning: Modification or knowledge and/or skills	2 (12.5)
3	Behavior: Change in behaviors as a result of learning	6 (37.5)
4	Results: Tangible, as observed by change in the system/organizational practice; reduced cost, improved quality, efficiency, etc.	5 (31.25)

Table 2. Quality of Evidence Using the Hammick et al Data Evaluation Model[7]

Score	Definition	No. (%) of Curricula
1	No clear conclusions can be drawn, not significant	1 (6.25)
2	Results ambiguous, but appears to be a trend	7 (43.75)
3	Conclusions can probably be based on the results	6 (37.5)
4	Results are clear and very likely to be true	2 (12.5)
5	Results are unequivocal	0 (0)

Figure 2. Summary of Leadership Content Using Mangrulkar et al Domains[5]

Figure 3. Summary of Program Durations

Figure 4. Summary of Learner Levels

*One intervention included resident physicians

Discussion

Creating a standardized, competency-based framework would aid schools in the development of meaningful curricula, as well having a validated, substantive evaluation tool for students and instructors to provide mutual feedback would also benefit medical schools. Further research studying non-LCME accredited medical schools and ACGME-accredited residency programs would be valuable next steps to better understanding best practices for leadership education.

Conclusions

Longitudinal programs (programs lasting longer than six months) that have a didactic and project-based or other application component received consistently high quality and effectiveness scores, as did programs with smaller cohort sizes that received more consistent mentorship and monetary investment from institutions. Utilizing a combination of didactics and application (projects, simulations, etc.) components is ideal to teach and reinforce leadership concepts.
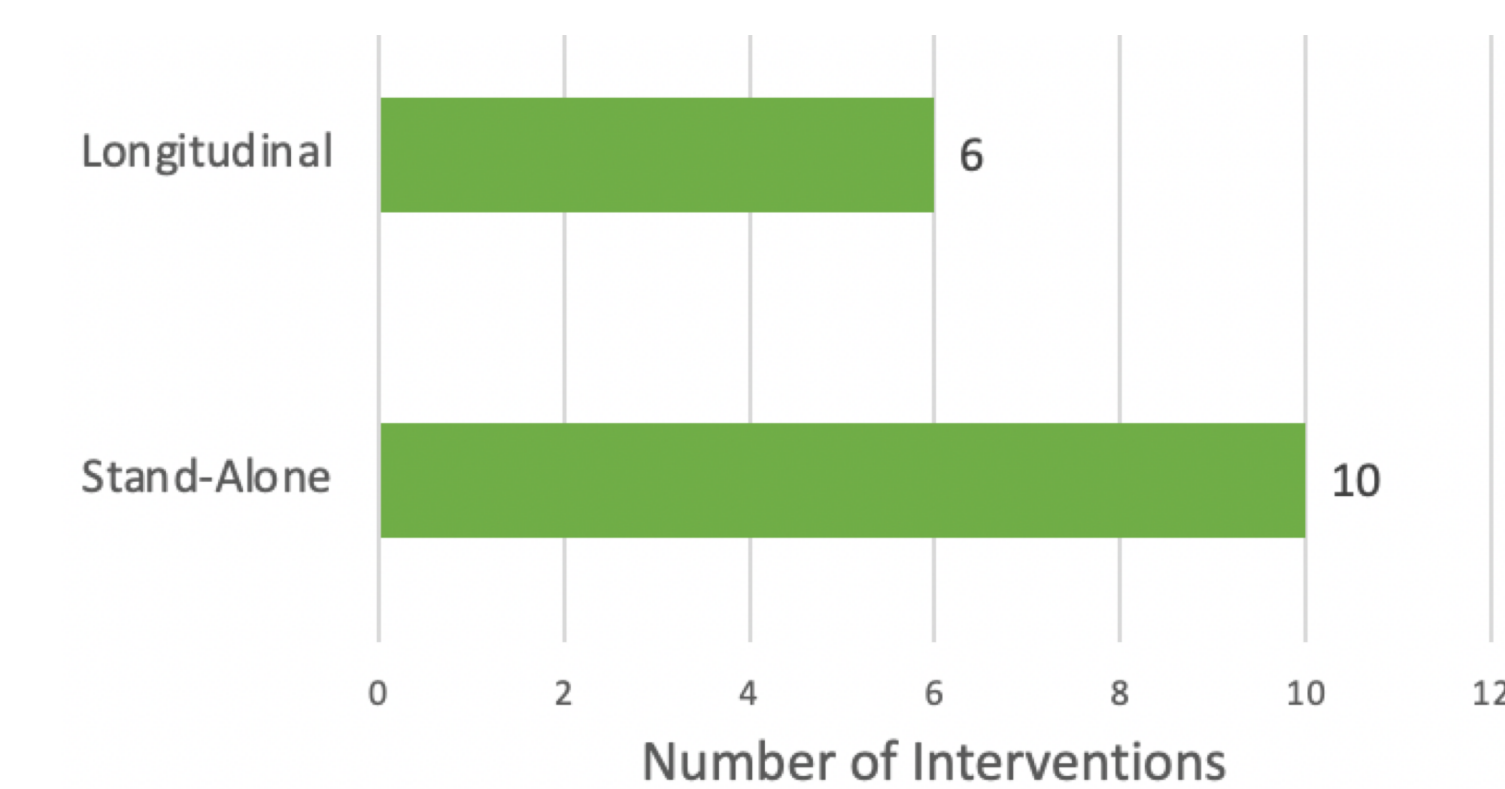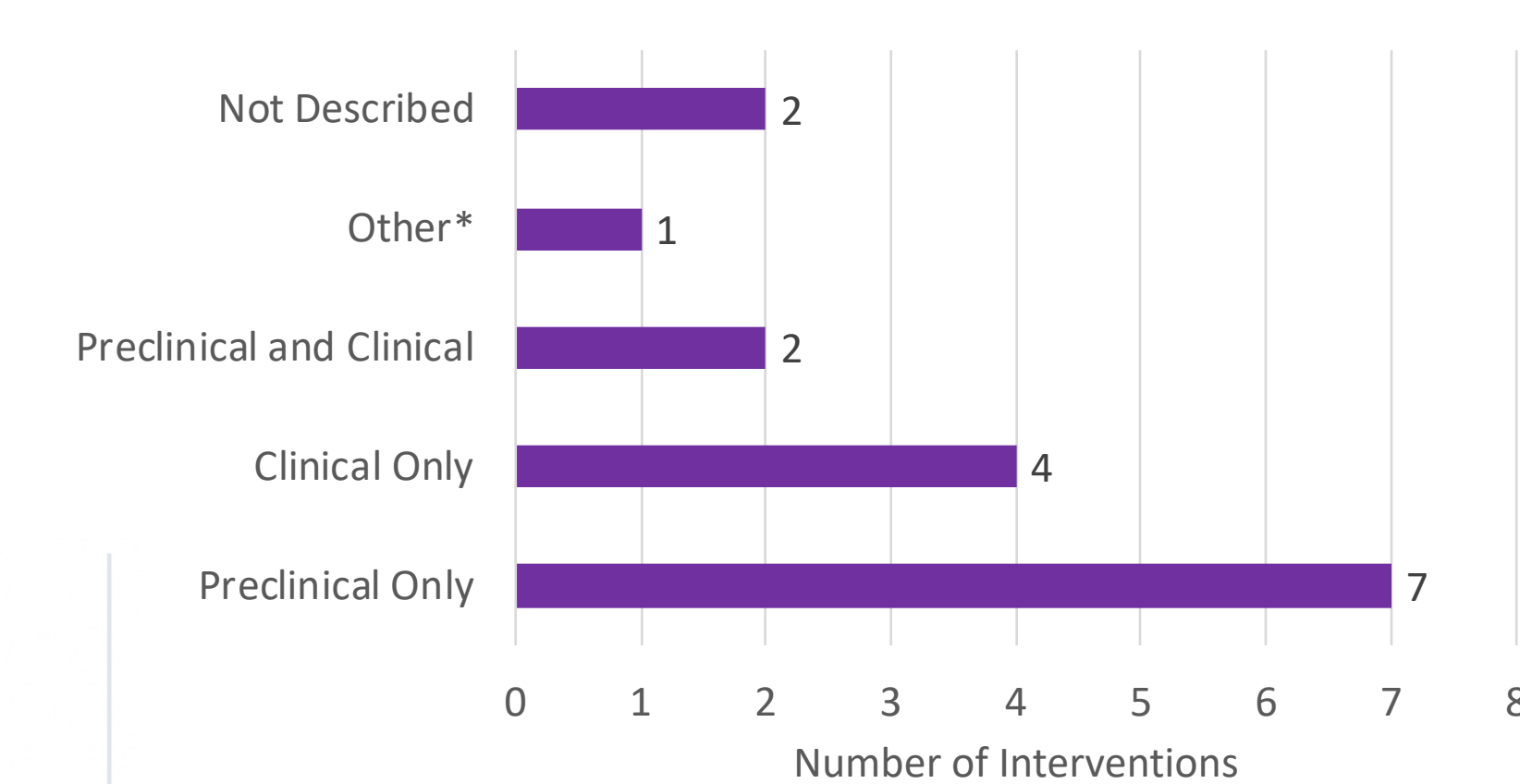
References and Catalog of Studies

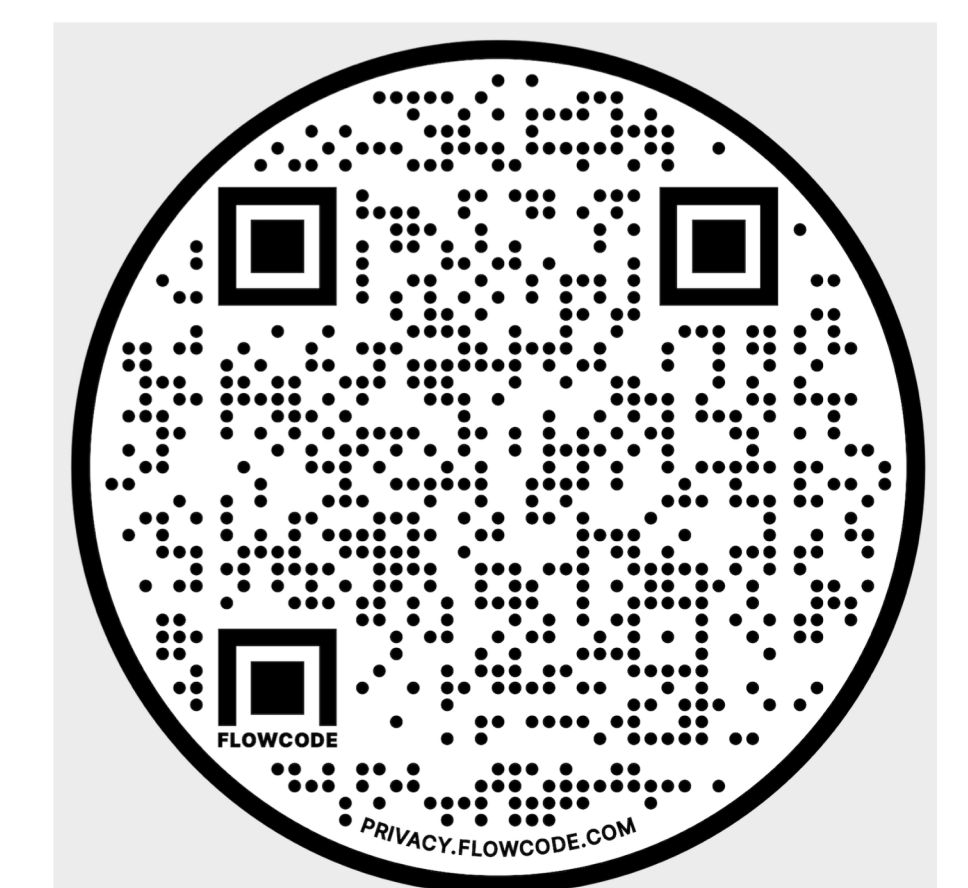

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Assessing the Educational Value of a Student-Run Free Clinic (SRFC)

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Introduction

OUWB Student Run Free Clinic (SRFC) has a partnership with Gary Burnstein Community Health Clinic in Pontiac, MI to provide health care to uninsured patients. Students are placed in pairs (M3/M4 with M1/M2) to conduct a history and physical exam and present the case to the physician. Procedures are performed as a team. SRFC has monthly family medicine and gynecology clinics, with supervision by Beaumont physicians and residents. In addition to medical services, SRFC also provides nutrition counseling, conducts COVID vaccine counseling, and has a community garden that provides free produce to patients.

Aims and Objectives

There is limited research on the benefits of SRFCs toward students' education. Our survey sought to examine what medical students aimed to gain from volunteering, learning outcomes, and quality of teaching.

Methods

Participants

- A total of 50 survey responses were collected from first-time M1-M4 SRFC volunteers.

Duration

- Surveys were collected for 6 months at every SRFC clinic from April 2021- September 2021.

Data Collection/Analysis

- SRFC volunteers were asked to complete a pre-and post clinic survey.
- All surveys, consisting of a mix of multiple choice and free response questions, were anonymous and optional.

Results

"What is your main motivation for signing up to volunteer at SRFC?": Pre-clinic survey option choices consisted of volunteer hours, clinical exposure, interest in working with underserved populations, and interest in the clinic specialty. Survey results found that 42% of medical students' main motivation to volunteer at SRFC was clinical exposure, 42% indicated desire to work with underserved populations, 12% of volunteers responded saying interest in the clinical specialty and 4% stated that their main motivation was volunteer hours.

"What specialties are you interested in going into?": 70% of students who filled out the survey were interested in primary care (internal medicine, pediatrics, OBGYN, family medicine).

"In comparison to my experience on clerkships, the quality of clinical teaching at SRFC was: worse, same or better." (only M3 and M4 student were asked to answered in the post-clinic survey): 54.5% of students indicated the quality of clinical teaching at SRFC the same as their clerkships and 45.5% of students indicated the quality of clinical teaching at SRFC better than their clerkship rotations.

Table 1: "What did you learn from volunteering at the SRFC clinic?"

THEME	REPRESENTATIVE QUOTES
Clinical Skills	"I appreciate seeing how patient encounters work outside of non- scripted scenarios like APM."
	"How to get a blood glucose, how to do a pap smear and how to do a blood draw."
Working with Underserved Populations	"We can do so much for patients without insurance."
	"I learned to not assume too much about patients and to pay attention to nonverbal cues."
Interest In Clinical Specialty	"...how to do a wet mount, how to take a comprehensive history and counseling on safe sex."
	"I learned…best practices during a pelvic exam"

Table 2: "What differences do you expect to see between providing care to patients at a free clinic vs. providing care to patients at an outpatient clinic?"

THEME	REPRESENTATIVE QUOTES
Pre-Clinic Perceptions	"Decreased speed, different patient populations, limited resources"
	"I'd expect to see more of an underserved population who are less likely to have gotten regular check ups"
Post-Clinic Perceptions	"No differences from my personal experience. Details + organized structure from start to finish. There is more time in the free clinic so it allows for more time with the patient."
	"No differences"

Conclusions

The survey results suggest that SRFC helps students interested in primary care explore the field, which is crucial as the projected primary care shortage is expected to be between 17,800 and 48,000 physicians by 2034.[1] All students believed that the quality of teaching at SRFC was the same or better compared to clerkships, demonstrating that free clinics provide an additional high-quality educational opportunity to students' medical education.

SRFC challenges students' perceptions of care at free clinics. Many students indicated that prior to clinic, they believed free clinics would have major differences in contrast to their clerkships. However, many reported that after clinic, they felt free clinics did not differ greatly from their rotations in non-free clinics. Lastly, students choose to volunteer mainly because of their interest in working with underserved populations and gaining clinical exposure.

Discussion

Limitations

- Small sample size of 50 survey participants
- Only OUWB students were surveyed so results cannot be generalized to other student run free clinics

Future Directions

- It would be of interest to further investigate the perceptions of SRFC educational value on a wider scale

Predicted Impact

- Future studies can support potential development of SRFC national quality guidelines and advocacy resources

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AAMC Report Reinforces Mounting Physician Shortage. Aamc.org. Published June 11, 2021. Accessed March 1, 2022. https://www.aamc.org/news-insights/press-releases/aamc-report-reinforces-mounting-physician-shortage

Impact of Earlier Ophthalmology Clerkships on Medical Student Match Rates in Ophthalmology

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Introduction

- Ophthalmology has been known to be one of the more competitive specialties to match into with an average match rate of 74% from 2008-2017[1]
- The structure of each medical school clerkship curriculum varies in timing, length and availability of clinical rotations
- This study hopes to identify how significant the structural design of clinical ophthalmology clerkships plays in its correlation with students matching into ophthalmology residencies
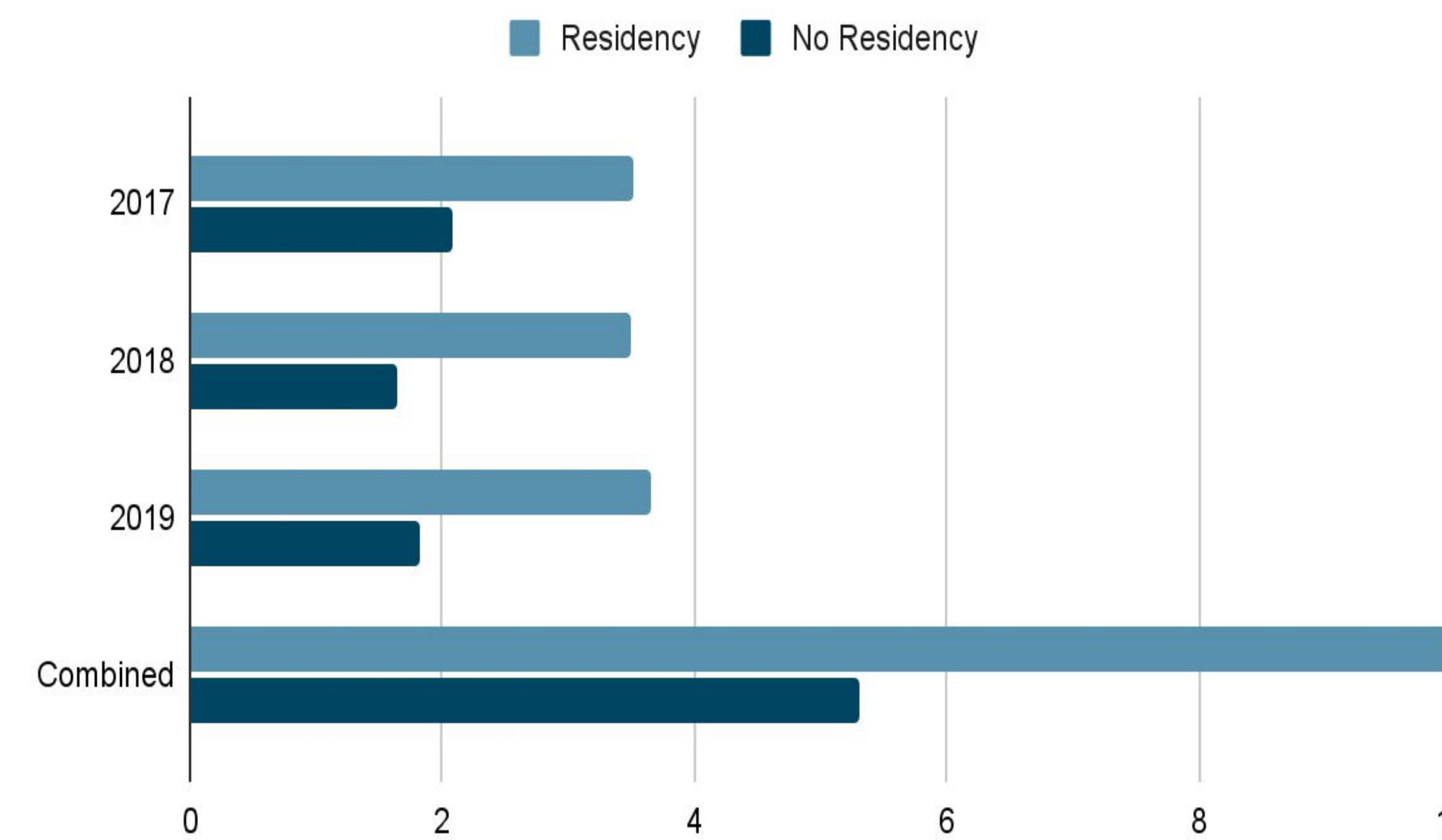
Methods

- A list of all accredited allopathic medical schools from the AAMC website was obtained
- Publicly accessible information on each school's website was reviewed and the following information was collected: elective vs mandatory ophthalmology clerkships, length, year offered, and associated ophthalmology residency programs
- Public match data of each school between 2017 and 2019 was collected and a two sample T-tests was performed for qualifying schools
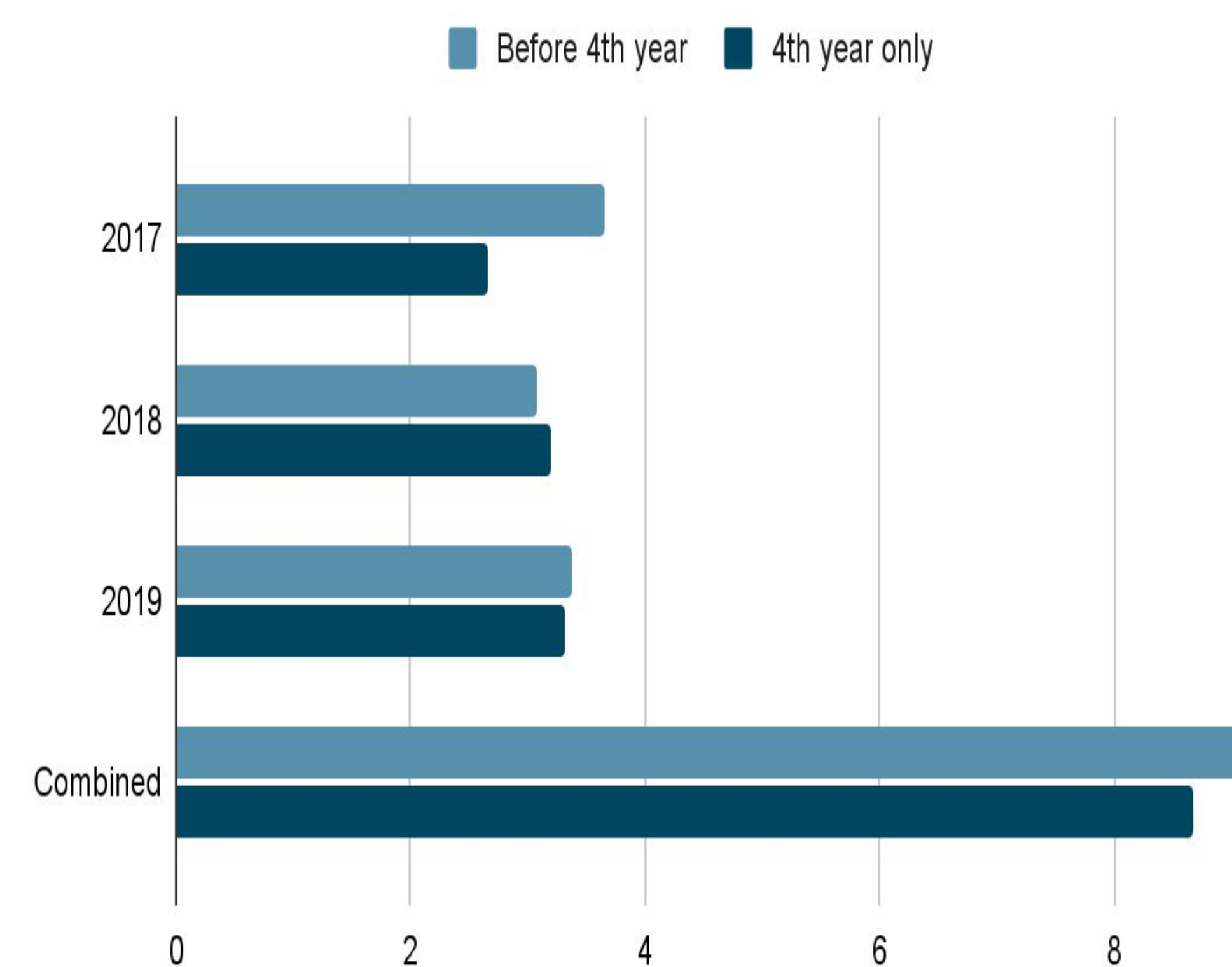
Results

- A total of 151 US-medical schools were found on the AAMC website
- Of these schools, 93 (62%) had both publicly available curriculum information and match data for analysis between 2017-2019
- There was no correlation between earlier ophthalmology clerkships to an increased number (P≤0.61), or percentage (P≤0.12), of students matching into ophthalmology
- There was a correlation between increased number of ophthalmology matches with an associated residency program (P≤0.01)
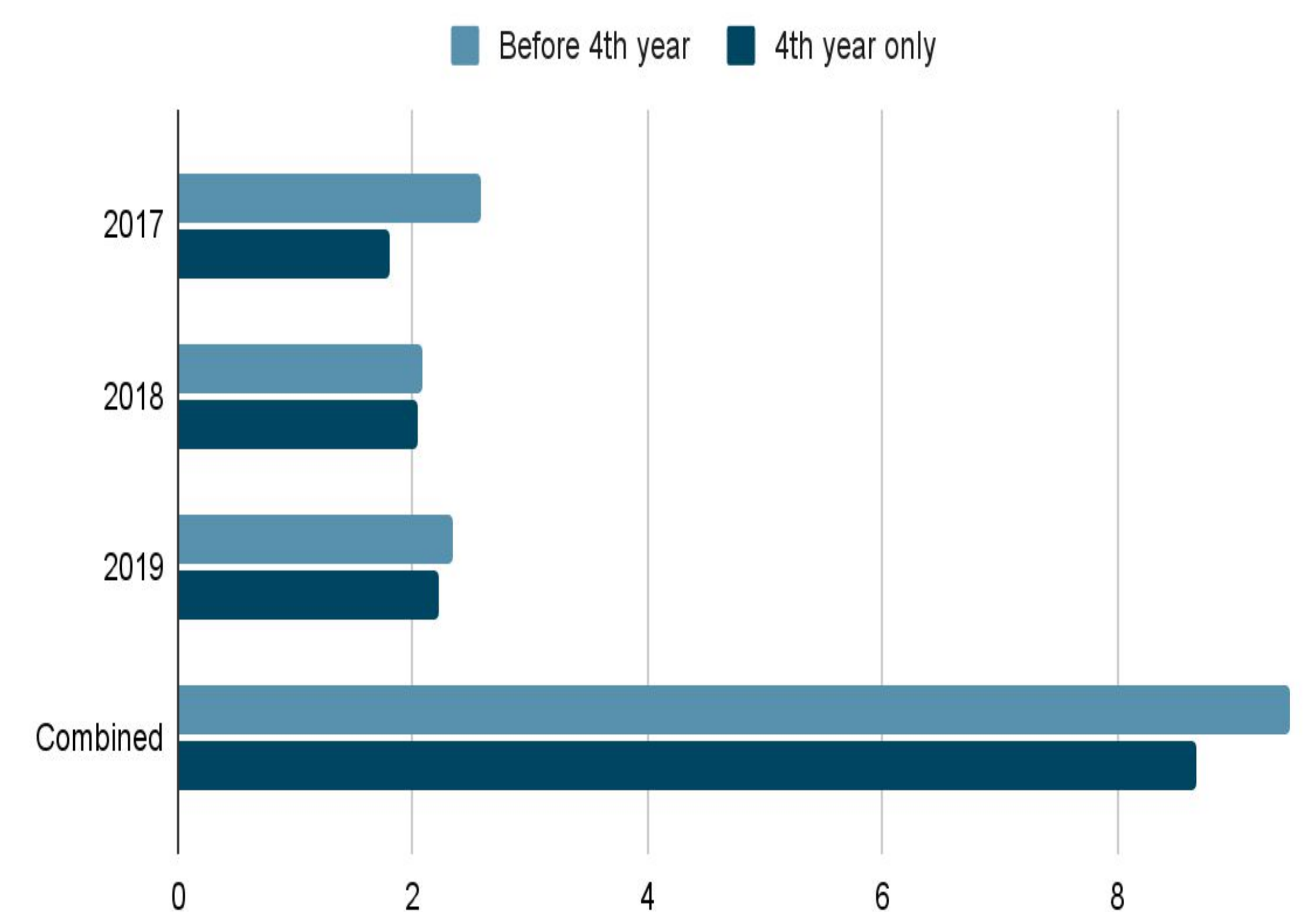
Average Number of Students Matching into Ophthalmology Based on Associated Residency

Average Number of Students Matching into Ophthalmology Based on Earliest Availability of Clerkship Offered

Average Percentage of Students Matching into Ophthalmology Based on Earliest Availability of Clerkship Offered

Discussion

- The results indicate that medical school clerkship curriculums may be a confounding variable for medical student match success
- Medical schools should consider making changes to their curriculum to match the goals of their program's mission and values
- Limitations to this study include the lack of available curriculum and/or match data for all US-medical schools, reducing the power of this study

Conclusion

- Earlier clinical exposure to ophthalmology did not correlate with increased match rates into ophthalmology
- Associated residency programs may contribute to the success of students matching into ophthalmology
- Match rates are multifactorial and should be further explored per specialty
- Future studies should try to expand the amount of data analyzed to increase the power of the study and eliminate potential biases

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Cannabis Use Disorder in the Setting of Primary Total Hip Arthroplasty (THA): Understanding the Epidemiology, Demographic Characteristics, and Inpatient Postoperative Outcomes

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Introduction

The recent legalization of cannabis in several states across the United States has been correlated with a marked increase in patient-reported cannabis use in the clinical setting and among those undergoing total joint arthroplasty.[1,2] However, little is known regarding the epidemiologic, demographic, and inpatient postoperative outcomes profile of patients with cannabis use disorder undergoing primary total hip arthroplasty (THA).

Aims and Objectives

This study aimed to:
i. Evaluate the epidemiology and demographic characteristics of patients with CUD undergoing primary THA in comparison to non-CUD patients.
ii. Compare primary THA inpatient postoperative clinical and economic outcomes in patients with and without CUD.

Methods

This retrospective cohort study used the NIS registry to identify patients undergoing THA between 2006 to the third quarter of 2015. Patients were stratified into two groups with and without CUD, and demographic, comorbidity, and postoperative outcomes data were comparatively analyzed between these two groups. Propensity score methodology was used to compare in-hospital complications and economic outcomes between the two groups.

Results

A total of 2,838,742 THAs were performed during the study period. The prevalence of CUD significantly increased from 0.10% in 2006 to 0.39% in 2015 (p<0.0001). CUD patients were significantly younger, more likely to be male, had higher rates of Medicaid insurance, and were more likely to be non-Hispanic Black and less likely to be non-Hispanic White when compared to the control group. When comparing patients with and without CUD, there was no significant difference in the composite "any complication" variable and no significant difference in 7 of 8 individual in-hospital complications assessed, with the exception being higher genitourinary (GU) complications in the CUD group. There were no significant differences in discharge disposition or length of stay (LOS) between the CUD cohort and control groups. Patients with CUD accrued significantly higher total charges in the immediate post-operative period.

Figure 1. Trend in cannabis use disorder (CUD) rate by year. Trends in self-reported cannabis use disorder (CUD) rate among patients undergoing total hip arthroplasty (THA) between years 2006 through the third quarter of 2015.

	CUD (n=5,390)	No CUD (n= 2,833,351)	P-Value
AIDS	73 (**1.36%**)	3,571 (**0.13%**)	<0.0001
Alcohol Abuse	1,295 (**24.02%**)	46,774 (**1.65%**)	< 0.0001
Chronic Pulmonary Disease	1,280 (**23.74%**)	406,578 (**14.35%**)	< 0.0001
Depression	1,018 (**18.89%**)	317,299 (**11.20%**)	< 0.0001
Liver Disease	317 (**5.87%**)	30,281 (**1.07%**)	< 0.0001
Psychoses	403 (**7.48%**)	53,476 (**1.89%**)	< 0.0001

Table 2. Elixhauser comorbidities, stratified by CUD vs. no CUD. Elixhauser-defining comorbidities among patients undergoing primary total hip arthroplasty (THA) between years 2006 through the third quarter of 2015. Prevalence of Elixhauser-defining comorbidities are stratified between patients with and without cannabis use disorder (CUD).

	CUD (n=5,390)	No CUD (n= 2,833,351)	P-Value
Mean Age (Years)	54.79	66.00	< 0.0001
Male	3,733 (**69.25%**)	1,235,375 (**43.60%**)	<0.0001
Female	1,658 (**30.75%**)	1,597,977 (**56.40%**)	<0.0001
Expected Primary Payor			
Medicare	1,641 (**30.45%**)	1,517,478 (**53.56%**)	<0.0001
Medicaid	1,183 (**21.94%**)	94,738 (**3.34%**)	<0.0001
Private	2,089 (**38.75%**)	1,122,876 (**39.63%**)	<0.0001
Race of Patient			
Non-Hispanic White	3,291 (**61.05%**)	2,120,111 (**74.83%**)	<0.0001
Non-Hispanic Black	1,219 (**22.61%**)	169,972 (**6.00%**)	<0.0001
Hispanic	143 (**2.65%**)	76,117 (**2.69%**)	<0.0001
Other Race	738 (**13.69%**)	467,151 (**16.49%**)	<0.0001
Location/Teaching Status of Hospital			
Rural	390 (**7.23%**)	277383 (**9.79%**)	<0.0001
Urban Nonteaching	1,534 (**28.45%**)	1,151,967 (**40.66%**)	<0.0001
Urban Teaching	3,457 (**64.14%**)	1,395,165 (**49.24%**)	<0.0001
Region of Hospital			
Northeast	908 (**16.85%**)	565,930 (**19.97%**)	<0.0001
Midwest	1,521 (**28.22%**)	745,119 (**26.30%**)	<0.0001
South	1,389 (**25.77%**)	937,718 (**33.10%**)	<0.0001
West	1,572 (**29.16%**)	584,584 (**20.63%**)	<0.0001

Table 1. Demographic and hospital factors, stratified by CUD vs. no CUD. Demographic and hospital characteristics of patients undergoing primary total hip arthroplasty (THA) between years 2006 through the third quarter of 2015. Demographic and hospital characteristics data is stratified between patients with and without cannabis use disorder (CUD).

Conclusions

This study reported a significant increase in the prevalence of CUD among patients undergoing primary THA between 2006 to 2015. While CUD is significantly associated with various demographic and hospital characteristics, it is not significantly associated with in-hospital complications, discharge disposition, and LOS outcomes in the immediate in-hospital, postoperative period.

Discussion

As marijuana becomes increasingly legalized, it is critical for clinicians to understand the epidemiologic and demographic characteristics of this evolving patient population. Additionally, having a grasp on the comorbidities and post-operative outcomes unique to this patient population will allow surgeons and perioperative providers to better tailor their care and management of these patients. Further research should aim to assess how these demographic and epidemiologic characteristics change over time in this evolving patient population and attention should be directed to create standardized protocols optimizing postsurgical outcomes.

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Self-Reinforcement Improves Academic Performance: The Role of Expressive Suppression as a Mediator

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Introduction

Predicting and improving student academic performance is a main aim of medical education. Previous research suggests that using positively reinforcing self-talk and cognitive reappraisal as an emotion regulation (ER) strategy have a beneficial impact on various aspects of cognitive performance. Conversely, expressive suppression, the alternative ER strategy, is known to be detrimental to cognitive performance. [1,2]

The aim of the present research was to establish whether expressive suppression is a mechanism through which self-reinforcement enhances academic performance of medical students. We hypothesized that using self-reinforcement will be negatively associated with expressive suppression which, in turn, results in enhanced academic performance.

Aims and Objectives

- Establish the relationship between positive self-talk and higher academic performance in medical students
- Establish the relationship between emotion regulation and higher academic performance in medical students
- Determine if a relationship between self-talk and higher academic performance is mediated by expressive suppression

Methods

Using a cross-sectional survey-based design, 59 students (75% female) from three different medical schools, were recruited to participate in the study. The Emotion Regulation Questionnaire, Cognitive Emotion Regulation Questionnaire, and Self-Talk Scale were used to assess ER strategies and self-talk patterns of participants. [3,4,5] Academic performance was measured using an average of three self-reported exam scores.

Results

The results of a mediation analysis using hierarchical regression analysis showed that self-reinforcement was negatively associated with expressive suppression $[\beta(59) = -.35, p = .006]$. A low level of expressive suppression was associated with higher academic performance, $[\beta(59) = -.34, p = .013]$
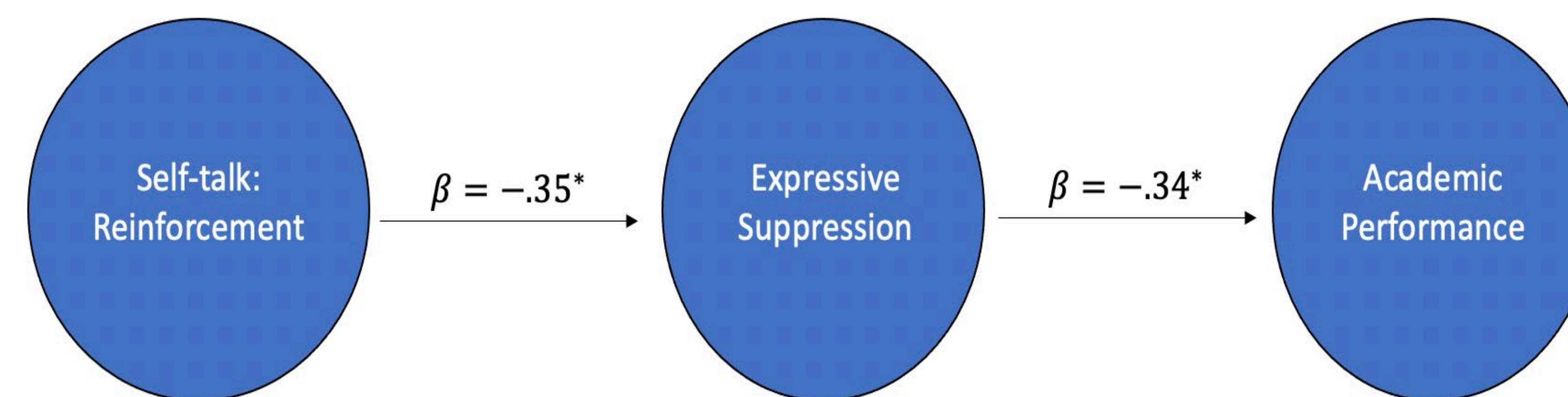

Figure 1. Model demonstrating the mediating effect of expressive suppression on the relationship between self-talk and academic performance. Self-reinforcement is negatively correlated to expressive suppression $[\beta(59) = -.35, p = .006]$. Expressive suppression is negatively correlated with academic performance $[\beta(59) = -.34, p = .013]$.

Conclusions

The results from this study reflect that students who use self-reinforcement are less likely to use expressive suppression as an ER strategy. Furthermore, those students who do use expressive suppression as an ER strategy are less likely to have high academic performance. These results suggest that self-reinforcement enhances academic performance with expressive suppression as a mediator.

Discussion

Our results indicate that interventions to increase self-reinforcement as a means of reducing emotional suppression could potentially enhance students' academic performance. Further research is needed to elucidate how best to cultivate self-reinforcement among medical students.

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Impact of Imposter Phenomenon on Medical Learners and Clinicians: A Scoping Review

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Introduction

- Imposter phenomenon (IP) is the belief one does not deserve success. Individuals with IP fear they will be exposed and others will realize they do not belong.[1]
- Medical students, residents, and physicians experience IP at significant rates.[2]
- Women and minorities experience some of the highest rates of IP.[3,4]
- Burnout, anxiety, and depression have also been associated with IP.[5]
- Impact of IP on medical professionals is unclear, including effects, instances, rates, outcomes, and intervention efforts.[2] More is needed to determine how IP plays a role in professional development, burnout, and overall career satisfaction.[6]

Aims and Objectives

To assess current literature and identify common factors and outcomes associated with IP for medical students, residents, and practicing physicians and to inform future research and guide medical educators towards possible interventions.

Methods

- _Databases:_ PubMed, PsycINFO, Cochrane Library, Embase, Scopus, Web of Science, Northern Lights Conference Abstracts, and Dissertations & Theses.
- We used various subject headings and keywords that related to imposter phenomenon and medical education.
- The PRISMA protocol was used during the screening process as depicted in Figure 1.[7]
- Extracted data from the included articles was tabulated to summarize characteristics and main findings from each study. Content analysis of this table identified major themes in the available literature.

Inclusion Criteria:
- Studies that clearly examined IP in medical students, residents, and attending physicians.
- Study was in English.

Exclusion Criteria:
- Studies that did not report methodology or results.
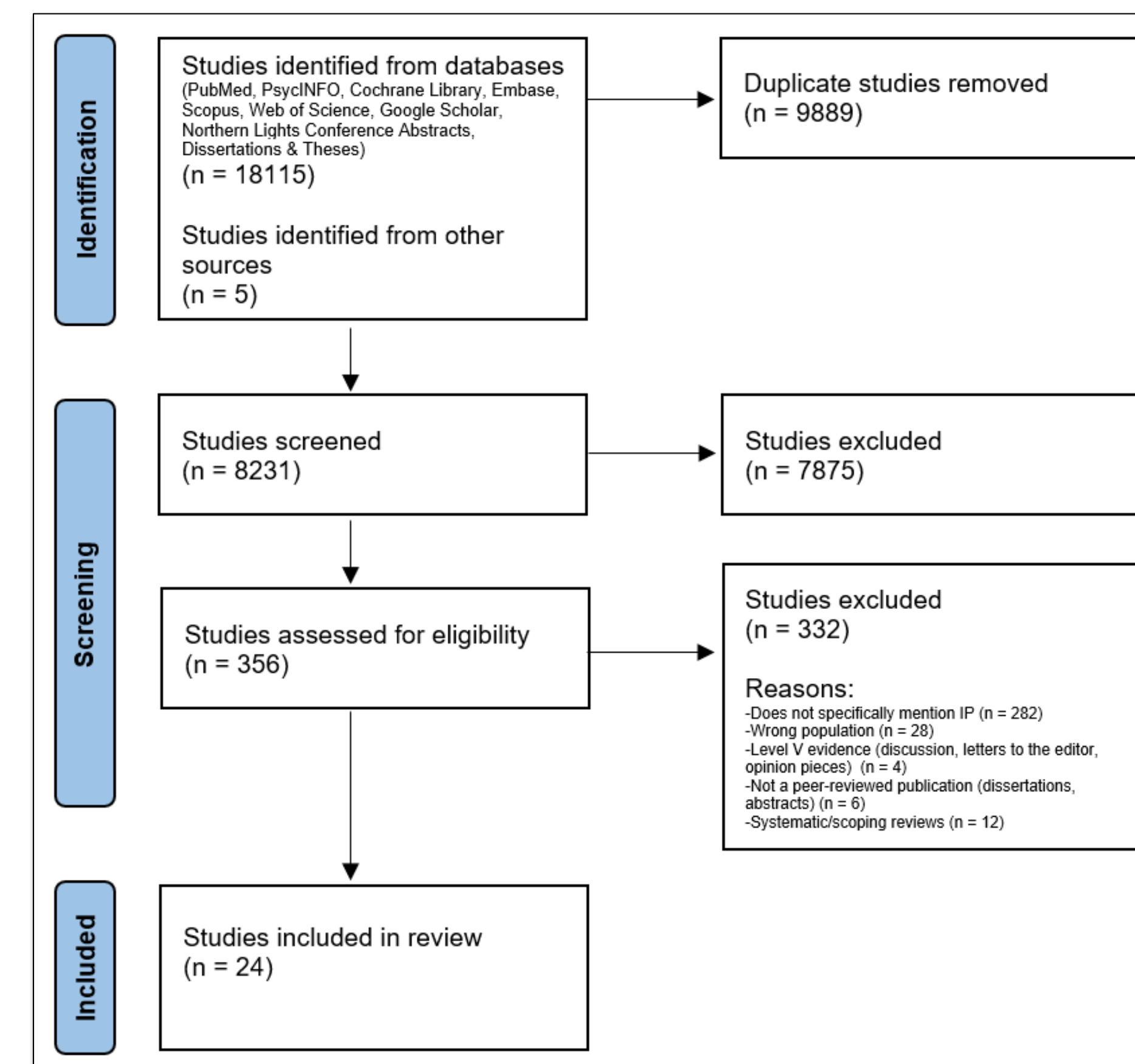- Previous systematic or scoping reviews in order to include only primary data sources.

Results
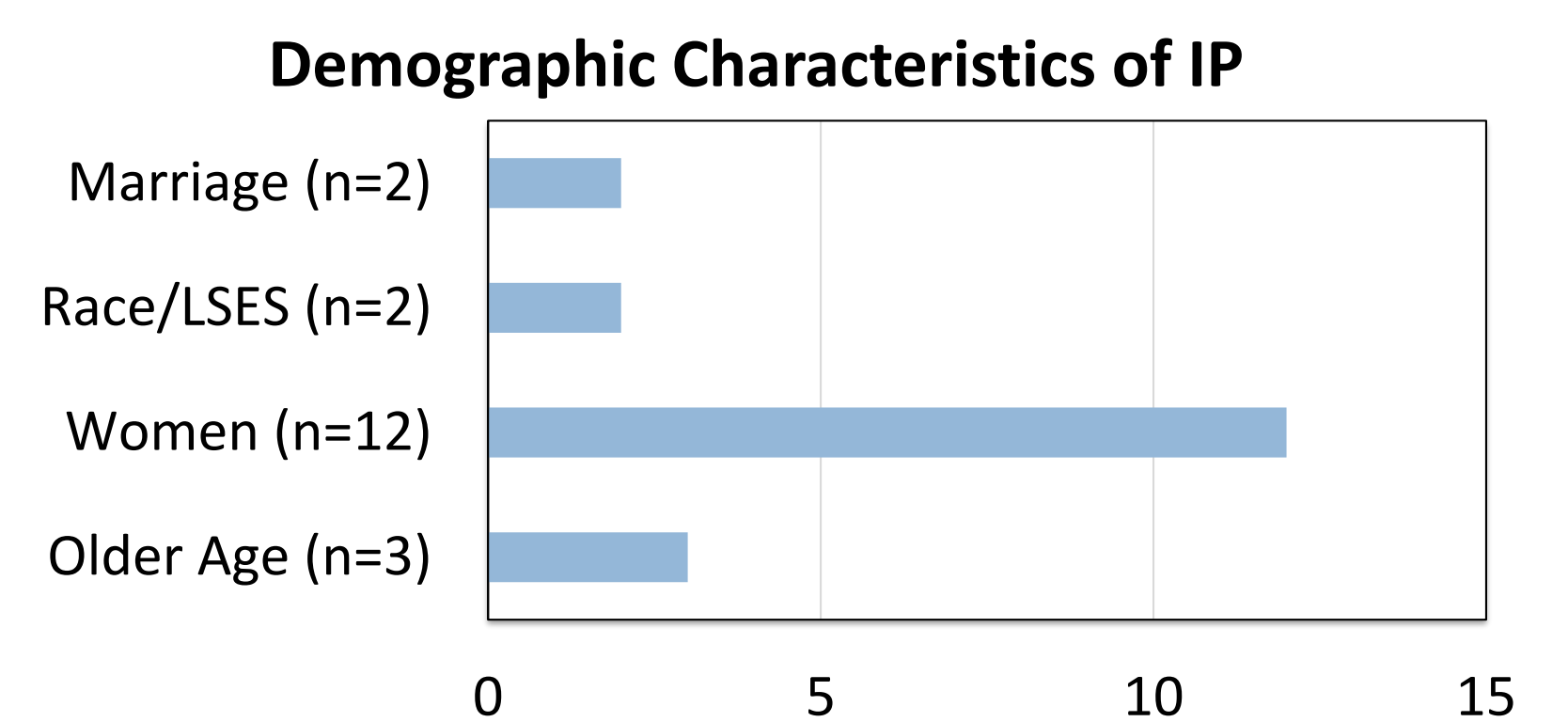

Figure 1: PRISMA Article Screening Diagram

Figure 2: Studies Citing Demographic Characteristics of IP (n=14)
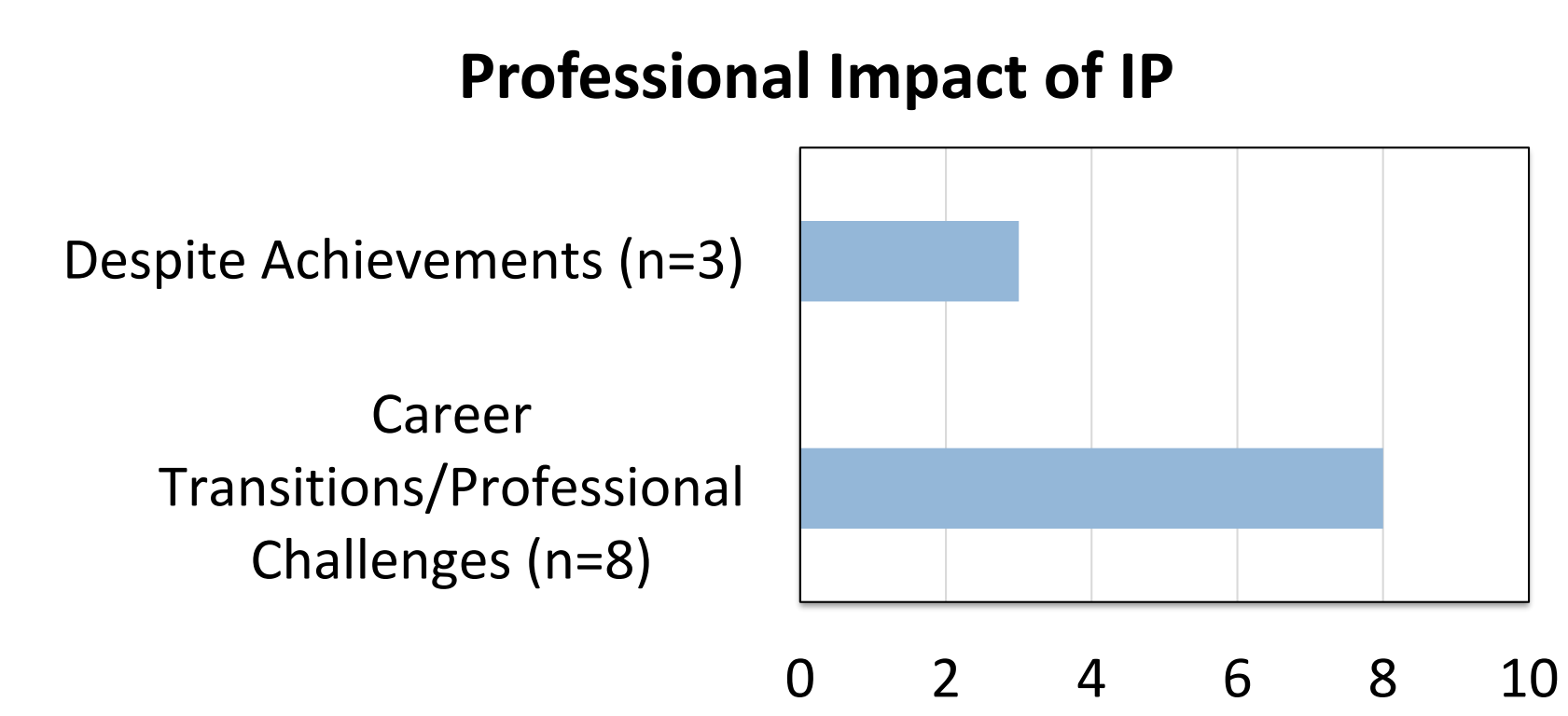

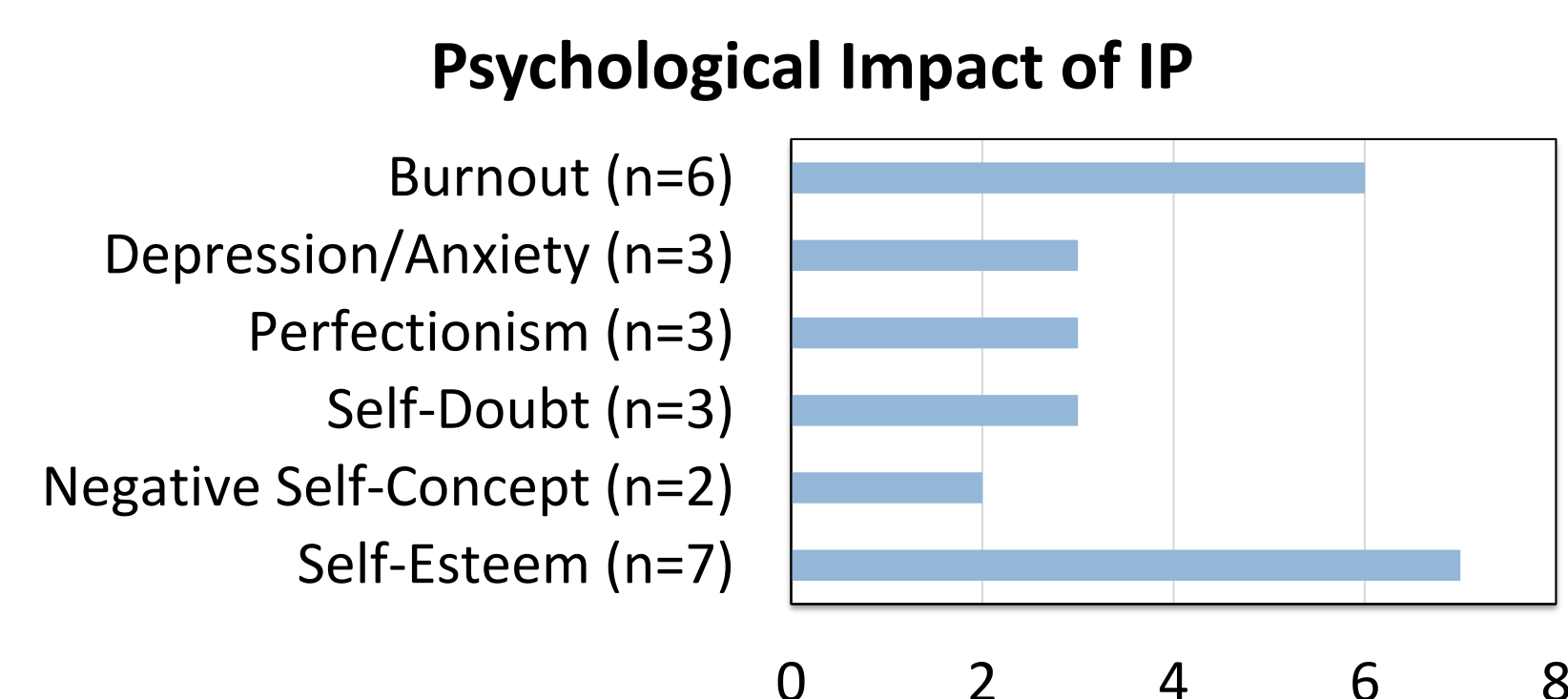_Figure 3: Studies Citing Professional Impact of IP (n=10)_

Figure 4: Studies Citing Psychological Impact of IP (n=17)

Key Results

- Half of the 24 included studies cited that IP was more common amongst women (n=12).
- IP was cited as highest during career transitions and professional challenges (n=8).
- IP was associated most frequently with low self-esteem (n=7) and burnout (n=6).
- Depression and anxiety were heightened amongst those experiencing IP (n=3).

Conclusions

- This scoping review reveals consequences of IP on one's success and wellbeing in medicine.
- Increased awareness of and engagement with IP in medical curriculums will benefit satisfaction, performance, and diversity across specialties.
- This could improve patient care as well as reduce burnout, anxiety, and depression. Thereby providing better educational experiences for medical learners and future careers for physicians.

Discussion

- IP differences in gender, age, marital status, cultural context, and race were noted and often significant.
- IP often surfaced during career transitions or new professional challenges.
- IP was seen to persist well into a physicians career despite numerous professional achievements.
- IP was associated with low self-esteem, a negative self-concept, perfectionism, and increased self-doubt.
- Anxiety, depression, and burnout heightened IP.
- Despite consequences current medical education needs improvement in IP education and prevention.[2]
- Medical educators may lessen the impact of IP by implementing mandatory classes on IP and mentoring opportunities[6], access to counselling services[8], and encouraging acceptance of talk therapy for IP.[9,10]
- Further research is needed to determine how IP relates to minorities' experiences and those with LSES and how this may contribute to lowered diversity in medicine.
- Future research may also look at whether IP impacts specialty choice and career satisfaction.

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Engaging Patients for Physical Exams During Virtual Care Visits

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Introduction

Over the last decade there has been a push towards utilization of virtually-based medicine as a way to limit healthcare costs and increase access to medicine (1). COVID-19 has since provided a catalyst, propelling many physicians into the use of telemedicine as a way to ensure patient safety and reduce spread of disease (2).

There are, however, some concerns regarding telemedicine, mainly the efficacy of patient evaluation. There have been videos validated previously in instructing healthcare providers through physical exams (3). Prior research shows that the use of a video aid has been beneficial in education of patients post-operatively, as well as in the education of medical students (4,5,6). Beyond this, video aids have very limited research supporting their use in telemedicine.

Aims and Objectives

The main aim of this study is to determine if added interactive components and patient-centered improvements to an existing provider video give the patient a greater understanding of both their hand/wrist anatomy, as well as carpal tunnel syndrome.

Methods

Portions of a previously validated Hand and Wrist Examination Video by NEJM (physician-oriented video) were modified to create a patient-oriented video. Some of these edits included slowing down the video, including pertinent medical definitions on the side bar, and various hyperlinks to different parts of the video. We also consulted a Patient Advisory Council, a panel of Dr. Charles Day's past/current patients, who gave suggestions on how to improve understanding of this video from a patient's perspective.

These participants were randomly assigned to first watch either the physician-oriented or patient-oriented video. After viewing the first video, participants were automatically redirected to a survey which evaluated their opinion of the video/content using a Likert scale of 1-5 (Figure 1). Participants were then redirected to a different survey which evaluated their actual understanding of the material presented in the video (Figure 2).

Opinion Survey
1. Was the information easy to understand?
2. What did you think about the education content of the video?
3. Did you think the amount of information was appropriate?
4. Did the video information help towards your understanding of carpal tunnel syndrome?
5. Did the information correlate to your wrist and/or wrist pain?
6. Do you feel confident in performing the wrist evaluation shown in the video on yourself?

Figure 1: Questions asked on opinion survey

Knowledge Survey
1. What bone, located in the anatomical snuffbox, Is the most commonly fractured/broken carpal/wrist bone?
2. Which term refers to the edge of the hand next to the thumb?
3. How many bones does the thumb have?
4. What is Carpal Tunnel Syndrome?
5. Which of the following is a potential treatment For Carpal Tunnel Syndrome?

Figure 2: Questions asked on knowledge survey

	Knowledge Survey		Opinion Survey	
	Physician Video	Interactive Video	Physician Video	Interactive Video
Question 1	0.833	0.75	3.58	4.33
Question 2	0.5	0.667	4	4.45
Question 3	0.917	1	3.67	4.25
Question 4	0.917	0.75	4.08	4.12
Question 5	0.833	0.927	2.92	2.83
Question 6	0.833	0.917	3.83	4.08
Question 7	N/A	N/A	3.75	4.33
Total Score Average	4.8	5.2	24.8	29.4

Table 1: Average scores for survey questions

Results

Overall, 16 patients completed both videos and the full set of surveys. On the objective knowledge survey following the physician-oriented video, patients scored an average of **4.8/6**; on the knowledge survey following the patient-oriented video, patients scored **5.2/6** (Table 1). These values, however, were found not to be significant. In regards to the subjective survey on the patient's perceived learning, the physician-oriented video scored **24.8/35** while the patient-oriented video scored **29.4/35 (p=0.001)** (Table 1). These values were found to be significant.

Conclusions

Though the interactive, patient-oriented video did not confer significantly greater knowledge gain it was preferred by patients for their learning.

Patients prefer video aids that implement interactive components and physicians should utilize these tools for patient education. If virtual based clinical visits are used more often in the future, then adding these interactive components to any videos aimed for patients will confer better understanding from the patient and strengthen the physician-patient relationship.

Discussion

One strong limitation that could affect the data is the current participant pool that we have, as only having 16 participants could skew the data. Increasing the amount of people who watch the videos and take the surveys could lead us to draw more conclusive results, and could cause the difference in knowledge to become significant.

It is worth investigating whether the knowledge quiz data being insignificant was due to the videos itself or if it can be attributed to having greater knowledge in general after viewing the video twice, by chance.

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William Davidson Medical Education Week

Antiracist Professional Development of Medical Students: Evaluating the Effects of a Peer-Led Virtual Book Club on Discussing Race in Medicine

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Introduction

There has been growing recognition among physicians of their responsibility to understand structural racism in medicine and its implications for health disparities.[1] Currently, medical school curricula insufficiently educate students on the history of structural racism in medicine. In response, medical students and residents have sounded the alarm for the need to improve anti-racism training in medical education.[2] Medical students at the Oakland University William Beaumont (OUWB) School of Medicine piloted a student-led book club to advocate for racial justice and antiracist professional development.

Learning Objectives

- Increase participants' awareness of the intersection of structural racism and healthcare inequities, which overwhelmingly burden Black Americans.[3,4]
- Foster bonding and sense of community amongst OUWB students

Methods

Participants read Harriet A. Washington's *Medical Apartheid* and discussed standardized, student-written questions in weekly, virtual small groups, each led by a student facilitator. Book club facilitators were selected from the OUWB Obstetrics and Gynecology Interest Group executive board. Pre- and post-book club surveys were administered to assess its impact on participants' professional and personal development, its perceived utility as a meaningful intervention, and changes in students' comfort levels discussing race. Qualitative and quantitative analyses were performed using participant responses.

Results

Twenty OUWB medical students participated in the book club, with pre- and post-survey response rates of 80% (N=16) and 35% (N=7) respectively. Pre- and post-survey responses were analyzed separately due to the sample size. Manual coding was used to identify patterns in free-text responses. Pre-survey responses (N=16) indicated an overwhelming desire to further understanding and awareness of the history of racism in medicine. Direct comparison of pre- and post-survey responses using unique identifiers (N=6) showed that 67% (N=4) reported increased awareness of the impact of racism in medicine by one Likert scale point (Figure 1). The majority, 88% of post-survey respondents, indicated a desire to participate in antiracist book clubs in the future and intent to engage in self-directed learning on antiracism in the next 12 months. All program evaluation responses either strongly agreed (66%, N=6) or somewhat agreed (33%, N=3) that participation in the book club positively facilitated engagement within the medical school community (Figure 2). Direct quotes from post-survey respondents (N=7) indicated the value of this intervention and its positive impact on professional development of medical students (Figure 3).
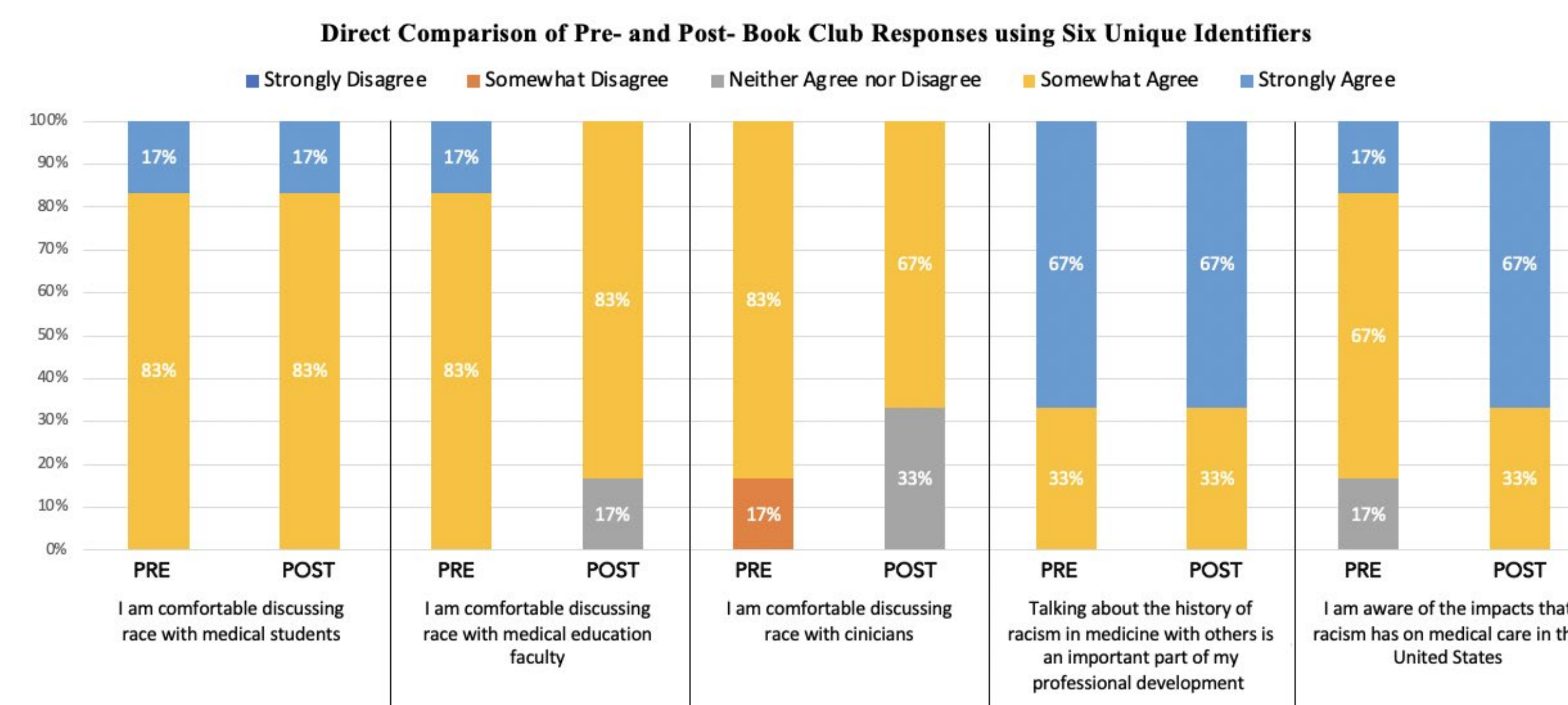

Figure 1. Direct comparison (N=6) of descriptive only pre- and post-survey responses listed by percentage of respondents that indicated the given statements related to comfort, perception, and awareness.
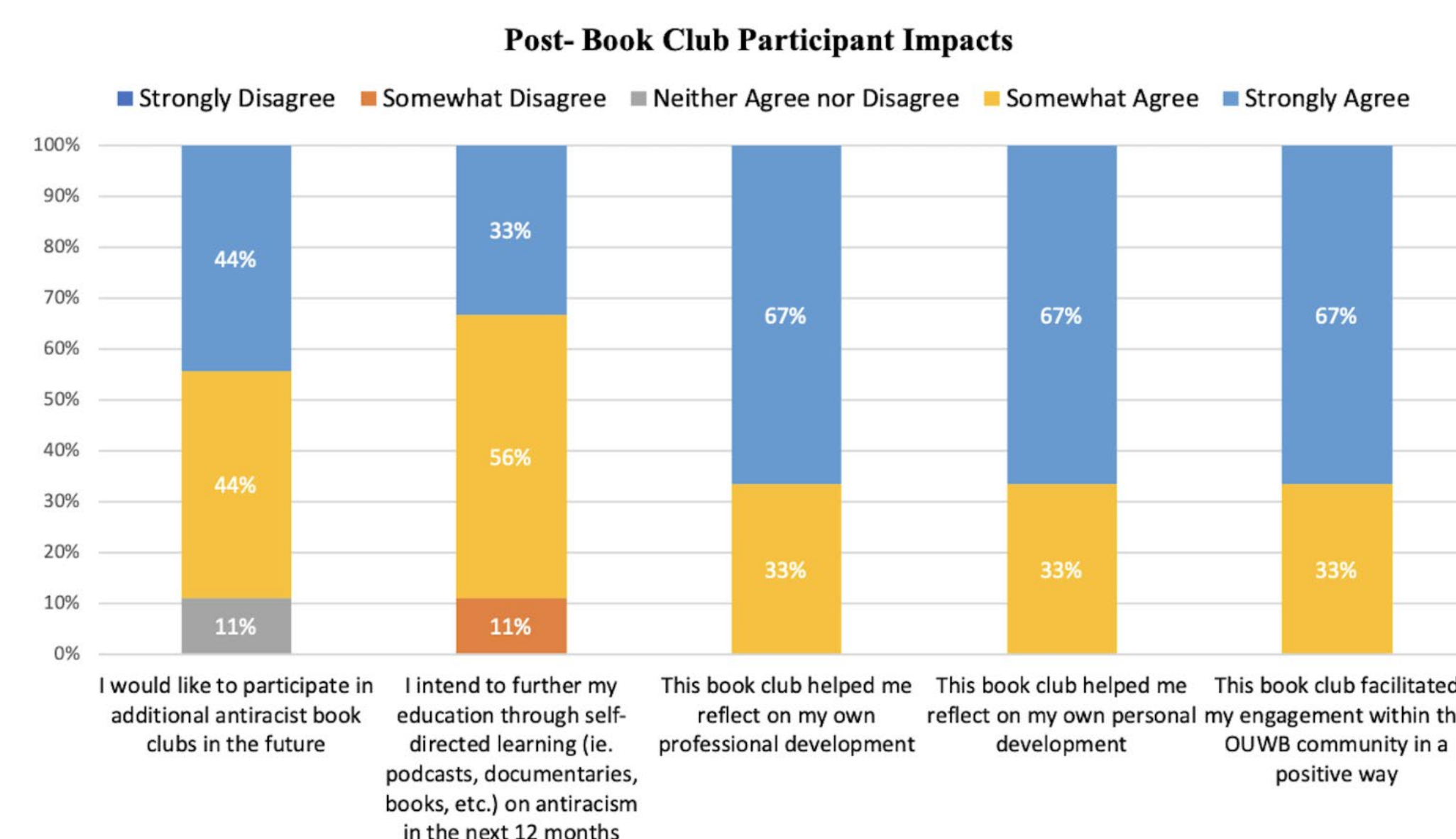

Figure 2. Descriptive only post-survey program evaluation responses by percentage (N=9)

> "It is a great priority of mine to provide the highest level of care for my patients, and this is not possible without having discussions about race and racism in medicine"
>
> "In my opinion, this was the perfect way to start my graduate medical education."

Figure 3. Direct quotes from anonymous post-survey respondents

Discussion

The results of this exploratory study demonstrate that this student-led initiative achieved its objectives of increasing medical student participants' awareness of the history of structural racism and its impact in medicine as well as strengthening student engagement within the OUWB community. Additionally, the book club's virtual platform makes it affordable, accessible and easily transferable to other institutions. The primary limitations of this study were its small sample size and lack of diversity with regard to age, race, and student status of participants. Limited advertisement also favored students interested in the topic, creating selection bias. Further studies should address barriers to recruitment and incentivize participation to attract students who may not have a prior interest in the topic. The inclusion of medical school faculty, staff, and clinicians may increase diversity and contribute to more robust exploration of the material and improve student comfortability discussing the topic in the future.

Conclusion

Generalizability of this study's results are limited due to its small sample size. However, the overwhelmingly positive experiences reported by this study's participants suggest that peer-led book clubs may be an effective interactive, anti-racist teaching method for medical schools to incorporate into their curricula. Ideally, institutional financial investment in peer-led book clubs would allow for increased facilitator training and purchase of reading materials.

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Current Public Trends in the Discussion of Dry Eyes: A Cross-Sectional Analysis of Popular Content on TikTok

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Introduction

- Dry eye disease (DED) affects between 5-50% of the US population[1]
  - Interferes with reading, driving, and using electronic screens
- As a common medical condition, patients seek to gain information from multiple, easy-to-access sources
- Physicians and non-physicians are increasingly using social media to impart medical advice
- A growing trend is the use of TikTok to share videos related to a specific disease, its detection, and possible interventions or treatments[2]
- A majority of videos on TikTok contain low quality information, and this can have negative downstream effects on patients[3]
- By understanding what the determinants are of a "high quality" video, we can impart this knowledge to physicians and providers so they can share information that improves the health of their viewers/patients

Aims and Objectives

1. Assess the educational quality of DED-related videos on TikTok
2. Stratify this data in regards to the type of content creator, the quality of communication, and the subject of the video content
3. Understand what creates a video of high educational quality
4. Impart this information to medical providers so they can create higher-quality content to better educate both patients and a public audience at large

Methods

- Cross-sectional analysis of DED content on TikTok, utilizing the search term #DryEye
- The top 150 videos presented to our new account, as determined by TikTok's sorting algorithm, were assessed
- Videos were included or excluded based on our criteria (Fig.1)
- The videos included in our study videos were analyzed for descriptive statistics, including views, likes, comments uploader profession, and the number of uploader followers
- Videos were given a score based on their richness of media
  1. No supplementary images
  2. One supplementary image
  3. Multiple or moving supplementary images
- Videos were assessed utilizing DISCERN, a tool used to appraise consumer health information
- One-way analysis of variance (ANOVA) was used to determine statistical significance groups
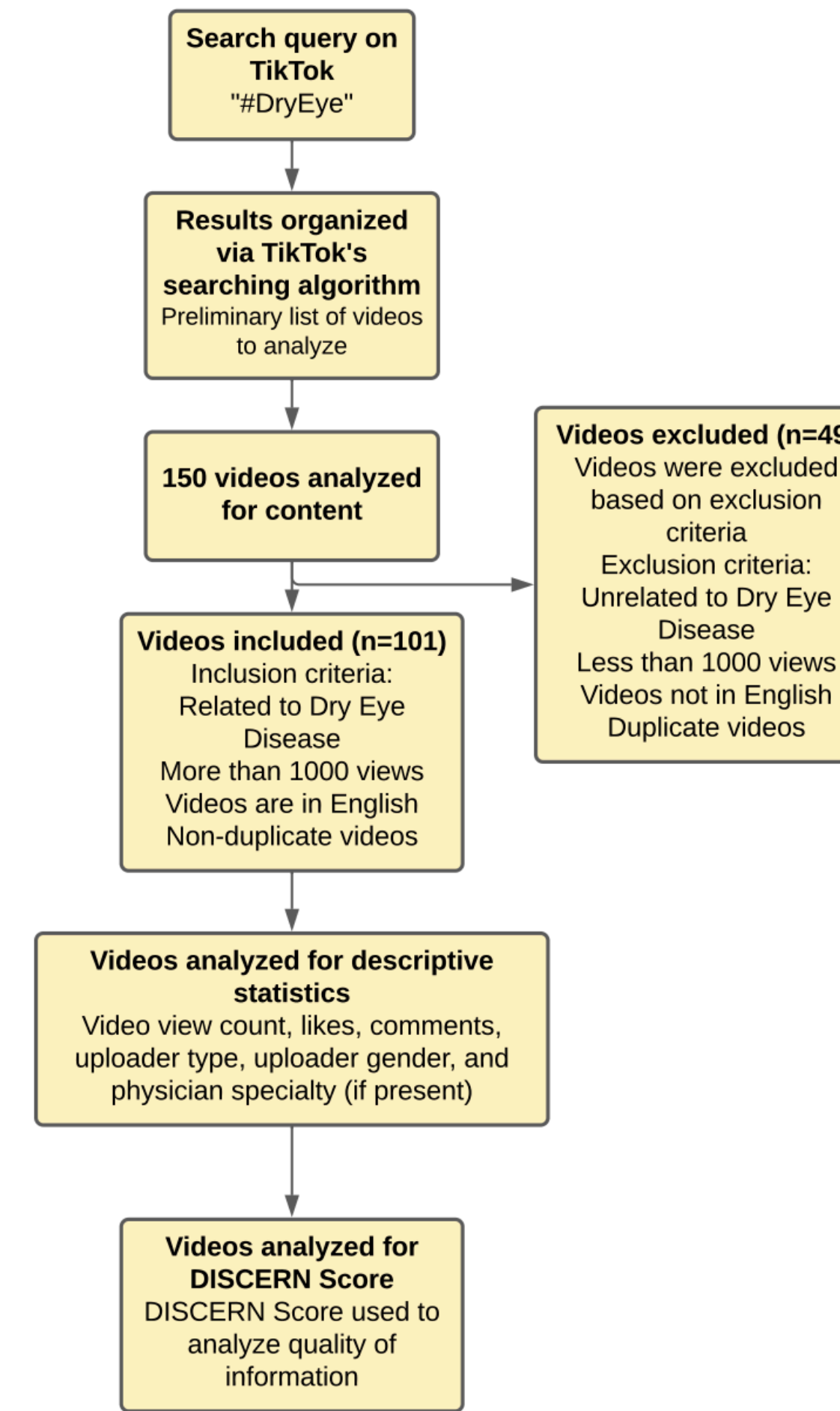
Results

- 101 videos were included in the final analysis (Table 1)
- Videos had a mean DISCERN score of 33.91 with high inter-rater reliability (Cohen's Kappa > 0.9)
- Physicians received a significantly greater number of views (p<0.001) and higher DISCERN scores (p=0.0151) compared to non-physicians and non-medical individuals
- Videos were mostly educational content (n=39, 38.6%) or treatment information (n=37, 36.6%), followed by home remedies (n=10, 9.9%) and personal anecdotes (n=8, 7.9%)
- Videos with rich supplementary visuals (multiple images/moving images) had higher DISCERN scores compared to videos with no supplementary visuals or one supplementary visual (p=0.0104) (Table 2)
- DISCERN scores were significantly higher for videos 30-45 seconds in duration (p=0.0201) (Table 3)

Conclusions

- With the growing popularity of medical education on TikTok, it is important to provide high-quality content to ensure the dissemination of medically accurate information and reduce the prevalence of disinformation
- Our results demonstrate that while TikTok is a powerful platform, the quality of videos can be vastly improved
  - Content creators scored highest on DISCERN questions 1, 2, 3, and 6 (Fig. 2)
  - Scores were distinctively lower on DISCERN questions 4, 5, 7, 8, 11, and 12 (Fig. 2)
- Content creators, regardless of profession, can improve their DISCERN through the use of rich supplementary material, citation of sources, and a thorough evaluation of the risks and necessity of proposed treatments
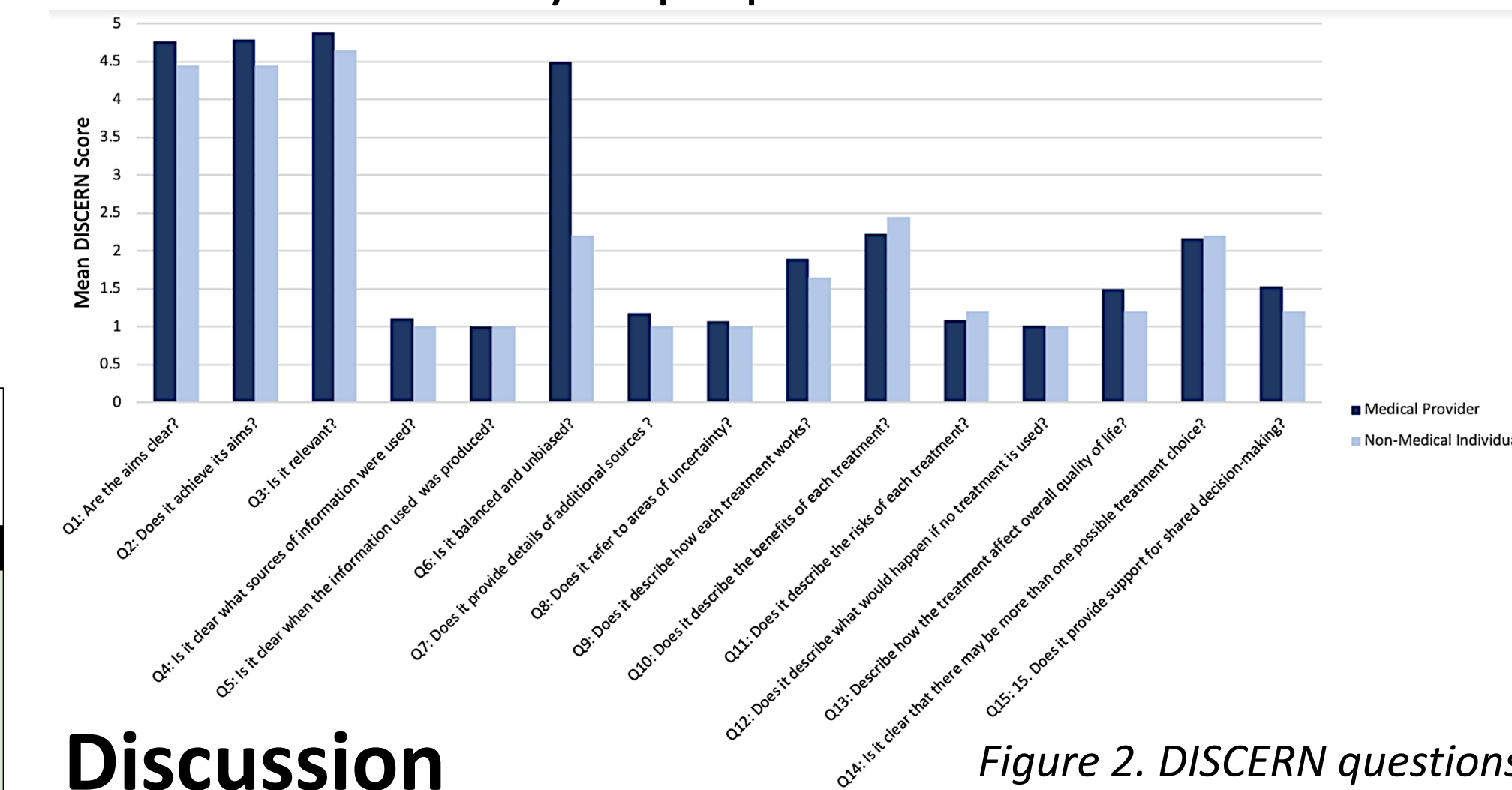
Discussion

- Due to the cross-sectional nature of our study, we are unable to establish any causal relationships
- Our findings cannot be extended to other popular languages on TikTok such as Spanish or Chinese
- There are several other methods that can appraise consumer health information such as the QUality Evaluation Scoring Tool and JAMA benchmarks

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Figure 1. Flow diagram

Figure 2. DISCERN questions

Table 1. Stratifications

	Total Number of Videos, (%)	Mean Number of Views, (SD)	P-Value	Mean Number of Likes, (SD)	P-Value	Mean Number of Comments, (SD)	P-Value	Mean DISCERN Scores, (SD)	P-Value
Content Creator									
Physician	16 (15.842)	4,784,567 (1,114,133)		34,930 (87,372)		257 (421)		38.25 (6.88)	
Non-physician medical provider	65 (64.356)	1,007,088 (2,777,836)	P<0.001*	79,791 (347,239)	P=0.864*	835 (4,309)	P=0.910*	33.85 (6.69)	P<0.01*
Non-medical Individual	17 (16.832)	1,132,564 (3,655,497)		23,537 (48,262)		311 (693)		30.82 (7.88)	
Private company	3 (2.970)	1,933,711 (2,182,004)		44,010 (56,256)		677 (1,113)		29.67 (2.31)	
Provider Type									
Ophthalmology	16 (15.841)	4,784,567 (1,114,133)	P=0.0001^	34,930 (87,372)	P=0.590^	257 (421)	P=0.580^	38.25 (6.88)	P=0.032^
Optometry	61 (60.396)	1,055,317 (2,861,215)		83,760 (358,188)		882 (4,447)		34.05 (6.83)	
Video Types									
Home Remedy	10 (9.901)	102,586 (99,071)		5,001 (5,494)		82 (88)		32.80 (7.44)	
Educational Content	39 (38.614)	1,223,030 (3,241,257)		115,385 (441,418)		1,254 (5,540)		33.31 (4.74)	
Personal Anecdote	8 (7.921)	722,227 (965,961)	P=0.548*	72,212 (43,350)	P=0.689*	2856 (452)	P=0.336*	25.63 (9.15)	P=0.0014*
Product Advertisement	7 (6.931)	2,272,758 (5,659,796)		34,862 (63,176)		552 (1,011)		33.57 (7.07)	
Treatment Info	37 (36.634)	806,658 (1,902,198)		35,070 (95,842)		282 (547)		36.74 (7.63)	

*One way ANOVA
^Two Tailed T-Test

Table 2. Media Richness

Visual Quality	N	Mean	SD	P
Category 1 (No supplementary visuals)	39	31.871	6.538	
Category 2 (Minimal supplementary visuals)	5	28.8	4.494	P=0.0104*
Category 3 (Rich in supplementary visuals)	57	35.517	7.0427	

Table 3. Video length

Video Length (seconds)	N	Mean DISCERN	SD	P
0-15	40	31.075	6.857	
15-30	21	34.761	7.368	P <0.01
30-45	22	36.260	7.405	
>45	17	35.562	6.459	

Moving Forward with a Pass/Fail USMLE Step 1: A Scoping Review

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Introduction

- Step 1 has been used to screen and compare residency applicants, with 86.2 of residency directors citing it as a factor in offering an interview, and 61.8% for ranking an applicant[1].
- The goal of making Step 1 Pass/fail was to reduce the overemphasis on USMLE performance while maintaining the initial purpose of the exam, which was medical licensure. However, the fear is that Step 2 will now serve to fill the void of a missing score, forcing students to sacrifice quality learning in clinic for supplemental resources[2–5].
- Medical education requires adjustments as we move to a Pass/Fail Step 1 score, including greater emphasis of certain components of residency applications[2].
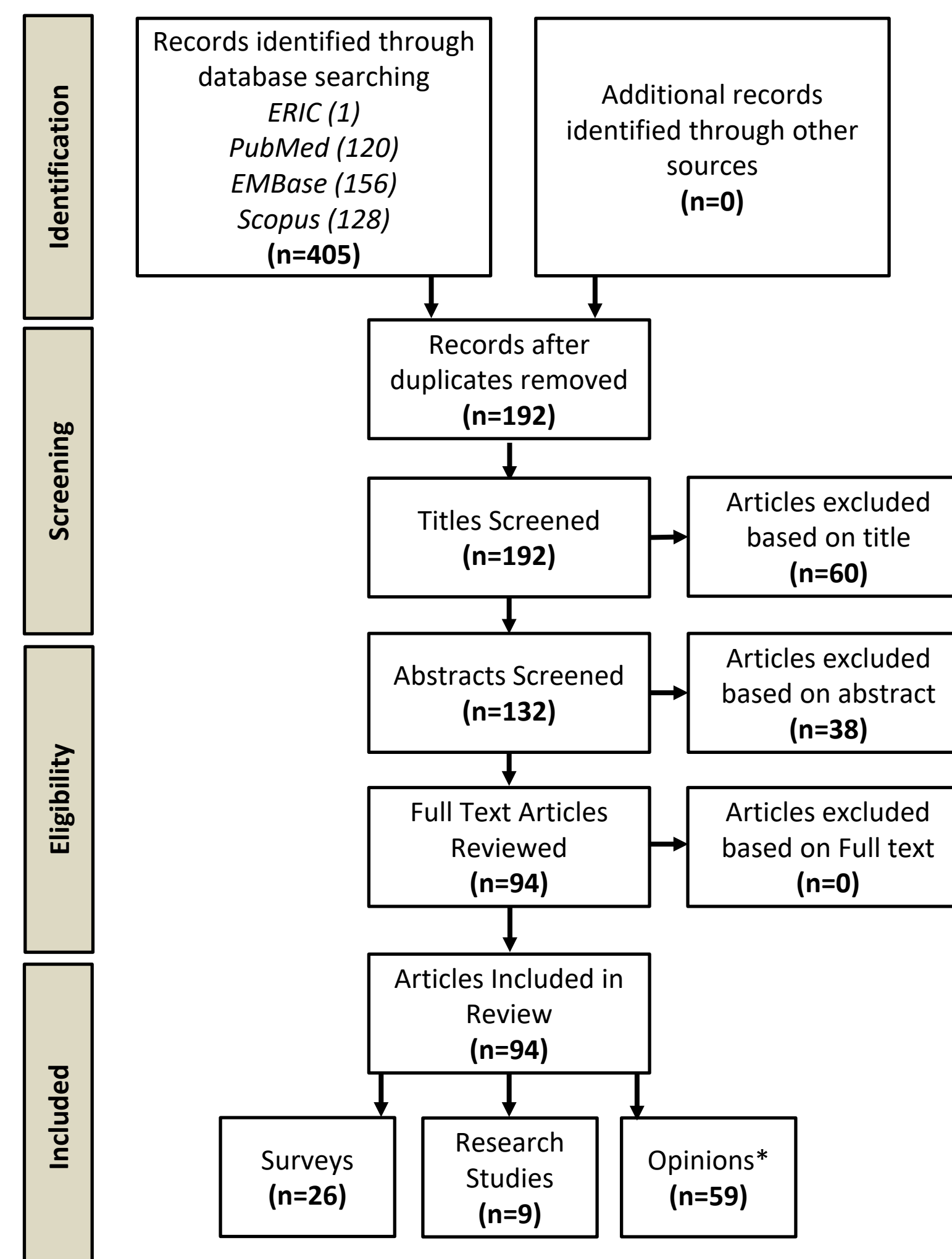
Aims and Objectives

- Summarize the opinions and views of all stakeholders regarding P/F Step 1
- Address the impact a P/F Step 1 will have on the residency application process, specifically screening applicants and interview offers.
- Discuss recommendations on how to evaluate applicants/students in the era of a P/F Step 1.

Methods

- The search term "Step 1 Pass fail" was used to identify relative articles across multiple databases.
- The search was further refined to only include articles published in English within five years of the date of search and had the full text available. After removing duplicates, the search generated 192 articles for review.
- Articles were then screened for relevance, first by title alone, then by reviewing the abstract, and lastly by reviewing the full text.
- 94 publications remained following the screening process.
- Papers were then categorized as either surveys, research studies, or opinions. **Figure 1** provides a detailed breakdown of this process.

Figure 1. Article Selection Process[6]

Results

- Survey results across all articles are compiled in **Table 1**.
- Qualitative review of opinion based articles concluded medical educators anticipated a shift of importance toward Step 2 CK and letters of recommendation and suggested offering more research opportunities to increase their students' competitiveness[7].
- One suggestion was the potential shift of the Step 1 dedicated study period to Step 2 CK, potentially at the cost of elective rotation time[7].
- Recently, many institutions have moved the timeframe their students take the Step 1 exam to post-clerkship years. While this move increased Step 1 scores and reduced the failure rate, there are problems with considerations for the timeline of medical education with the increased value of Step 2 CK and increase in risk with a potential Step 1 failure[8,9].
- Medical education is not limited to US Allopathic seniors, and noted that the risks for IMGs and osteopathic students have increased given the change[7].

Selected Quotes:

"support the educational engagement and overall experience of medical students and … increasing the dialogue about how multiple assessments of competency could best be utilized by stakeholders in medical regulation and medical education"[5]

"Excellence can be defined by the learner's rate of growth, not just their current level of proficiency."[6]

"It is time to embrace assessment as an intervention rather than a static outcome"[5]

Table 1. Summary of Survey Data
D=Disagree, N=Neutral, A=Agree

Specialty/Population	Author (Year)	N_T	Changing the USMLE Step 1 to Pass Fail Is a Good Idea			Will Increase Emphasis on Step 2 CK Scores			Will put IMGs at a Disadvantage			Will decrease socioeconomic disparities in the application process			Will Improve Medical Student Well Being			Where an applicant goes to medical school will become more important			Step 2 Should/Will Also be changed to Pass/Fail		
			D	N	A	D	N	A	D	N	A	D	N	A	D	N	A	D	N	A	D	N	A
Multi-specialty	Makhoul (2020)[11]	2095	60.8	23.9	15.3	7.2	12.1	80.7	19.5	36.1	44.4	43.2	42.3	14.4	34.8	40.3	24.9	17.4	25.7	56.8	77.3	13.7	9.0
Anesthesia	Erath (2020)[12]	72	74.0	20.0	6.0	0.0	8.0	92.0	7.0	37.0	56.0	44.0	49.0	7.0	43.0	42.0	15.0	14.0	24.0	61.0	89.0	7.0	4.0
Dermatology	Wei (2020)[13]	37	42.9	28.6	28.6	18.0	18.0	64.1										20.5	25.6	53.8			
General Surgery	Aziz (2021)[14], Pontell (2021)[15]	452	77.1	16.0	6.5	4.6	5.0	90.1	12.6	33.4	54.1	44.9	38.0	16.8	44.6	36.7	18.6	11.6	24.0	64.1	85.8	9.1	5.1
Internal Medicine	Choudhary (2021)[16], Mun (2021)[17]	329	73.5	14.6	11.9	3.3	8.5	88.2	40.1	23.1	36.8	45.4	42.9	11.7	43.7	37.4	18.9	11.3	33.7	55.0	88.8	7.8	3.4
Neurosurgery	Ganesh (2020)[18], Huq (2020)[19]	123	78.7	10.7	10.6	10.6	26.8	62.6	6.5	30.4	63.0	62.5	27.1	10.4	50.0	35.4	14.6	16.7	12.5	70.8	78.3	6.5	15.2
Orthopedic Surgery	Gu (2021)[20]	53	75.5	13.2	11.4				37.7	11.3	50.9	66.0	26.4	7.5									
Otolaryngology	Goshtasbi (2021)[21], Mamidi (2021)[22]	298	69.8	13.4	16.8	5.0	15.4	79.5	19.1	27.2	53.4	22.5	37.5	40.0	40.1	34.7	24.9	10.7	18.5	60.4			
PM&R	Chator (2021)[23]	39	51.3	35.9	12.8	10.3	10.3	79.5	12.8	46.2	41.0	46.2	43.6	10.3	33.3	41.0	25.6	28.9	28.9	42.1	71.8	12.8	15.4
Plastic Surgery	Lin (2020)[24], Pontell (2021)[15]	146	82.0	13.9	4.2	8.3	2.4	87.2	11.4	42.5	46.1	56.1	38.7	5.3	46.0	36.5	17.5	26.2	19.4	54.3	86.3	10.5	3.2
Radiology	MacKinnon (2020)[25]	140	69.6	22.5	8.0	2.1	8.6	89.3	7.9	42.1	46.4	42.9	45.7	11.4	32.4	46.0	21.6	6.5	20.9	72.7	76.3	16.5	7.2
Thoracic Surgery	Pontell (2021)[15]	28	54.5	27.3	18.2	0.0	27.3	72.7	27.3	18.2	54.5	72.7	27.3	0.0	54.5	27.3	18.2	9.1	36.4	54.5	72.7	0.0	27.3
Urology	Chisholm (2020)[26]	65	58.7	22.2	19.0	7.7	7.7	84.6	26.6	34.4	39.1	47.7	41.5	10.8	34.4	46.9	18.8	23.8	17.5	58.7	78.5	12.3	9.2
Vascular Surgery	Pontell (2021)[27]	63	72.7	21.2	6.1	2.9	20.0	77.1	25.7	31.4	42.9	60.0	37.1	2.9	40.0	34.3	25.7	2.9	17.6	79.4	74.3	14.3	11.4
ALL SPECIALITY SUMMARY			66.4	20.5	13.1	6.2	11.3	82.3	19.8	33.9	46.2	45.1	41.2	13.6	37.7	39.3	23.0	15.5	24.8	58.7	79.4	12.4	8.2
ALL MEDICAL STUDENTS	Ehrlich (2020)[27], Lin (2020)[4]	379	52.8	18.0	29.3	94.5	1.2	4.2				18.9	25.0	56.1	29.0	15.3	54.3	2.4	6.1	91.5	45.1	33.5	21.8

Discussion

- 82.3% of program directors (PDs) anticipate a greater emphasis on Step 2 CK. It is important to try and avoid repeating the mistakes of the past emphasis on Step 1, at the cost of gaining clinical experience[2,28].
- There is a clear disconnect between medical students, PDs, and educators in perception about improved well-being and ongoing importance of institution in residency selection, accentuating the need for involvement of all stake holders in the continued development of medical education.
- Objective comparison methods are needed without increasing student stress by focusing on a single exam, such as a standardized MSPE rating system[29–31], a criterion-based sub-internship[32], or a composite score of USMLE scores, NBME Shelf exams, and other standardized measures[11,28,33].
- Limitations include the lack of implementation of new methods, which will become available following the matriculation of P/F students. Further, this scoping review did not review all data available on the topic, and was subject to potential selection biases[34].

Conclusions

- There are several challenges precipitated by the change to a P/F Step 1: the rise in anticipated importance of the Step 2 CK score, notable disconnects in survey data between PDs and medical students, and the need for objective comparison of students.
- More data is needed moving forward to determine whether similar problems with Step 1 are subsequently transferred to Step 2 CK.

References

Please scan for a list of references:

Use of third-party resources to supplement pre-clinical education: a single institution experience

Ryan Ko BS[1]*, Nicholas Ludka BS[1]*, Berkley Browne Ph.D.[1]
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[1]Oakland University William Beaumont School of Medicine

Introduction

Medical students at Oakland University William Beaumont School of Medicine (OUWB) follow an organ systems-based curriculum to prepare for future clinical practice and the USMLE Step 1 exam. In the Fall of 2021, OUWB transitioned from NBME-written exams to exclusively using exams written by OUWB professors. Many OUWB students have utilized third-party resources (TPR) such as Boards & Beyond, Sketchy, and Pathoma to supplement their learning. The use of TPR is notably growing in-part due to a collaborative effort among medical students to integrate these materials into efficient, spaced-repetition flashcards (i.e. Anki) as well as recent exam changes. Researchers at other institutions have indicated that the use of TPR and Anki may be more popular among U.S. medical students than previously anticipated[1]. In this study, we evaluated how current students use TPR at OUWB.

Aims and Objectives

1. Evaluate students' study techniques for NBME-written versus OUWB-written exams.
2. Report the most commonly used TPR during the organ systems-based curriculum.
3. Report subjects where students felt TPR was especially helpful for learning.
4. For Anki users, assess the source of flashcards.
5. Assess financial burden associated with use of TPR.

Methods

An 11-question survey was distributed to all current students at OUWB. The survey evaluated which TPR were being used during the students' preclinical education, how they utilized these resources, and how much money each student spent on the materials.

Results

Study Technique (M2-M4 only)

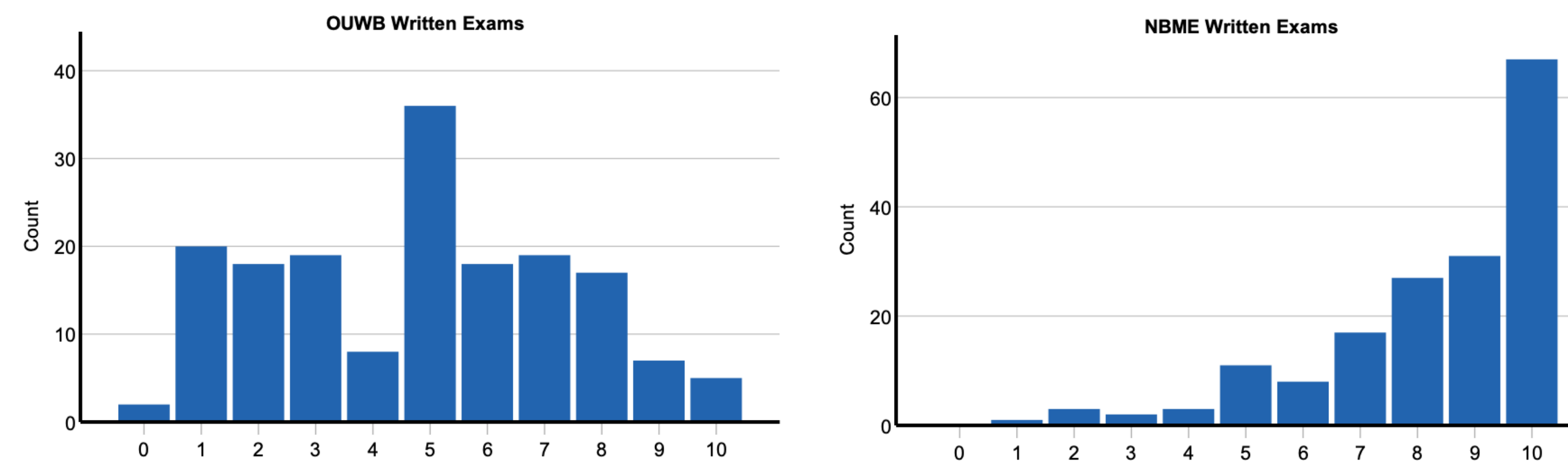0 (OUWB resources only) ⟷ 10 (Third-party resources only)

Figure 1. Histogram showing distribution of study techniques for OUWB written exams (left) and NBME exams (right) from only using OUWB resources (0) to only using TPR (10) for only the M2, M3, and M4 classes (n=170). M1 class was excluded since they did not have NBME exams. There were no differences between classes in how they used TPR (i.e. before/during/after lecture) to prepare for NBME-written or OUWB-written exams.

Paired samples t-test showed a **significant increase in TPR use when the exam is NBME-written as compared to OUWB-written** (p <0.001)

Commonly used third-party resources and popular subjects of study

Table 1. Frequency table of the most commonly used TPRs and what subjects students found TPR to be especially helpful. The most popular TPRs were Pathoma (96.9%), Sketchy (96.4%), Question Banks (89.7%), Boards & Beyond (89.3%), and First Aid (88.4%). The subjects where TPRs were the most helpful were pharmacology (94.6%), pathology (92.0%), and microbiology (88.8%).

		Type of TPR									Popular subjects						
		Pathoma	Sketchy	Question Banks	Boards & Beyond	FirstAid	Youtube	AMBOSS	Costanzo	Physeo	Pixorize	Pharmacology	Pathology	Microbiology	Physiology	Anatomy	Embryology	Total
Year	M1 Count	51	52	37	41	43	40	7	0	3	16	50	49	37	31	27	25	55
	M1 % within Year	92.7%	94.5%	67.3%	74.5%	78.2%	72.7%	12.7%	0.0%	5.5%	29.1%	90.9%	89.1%	67.3%	56.4%	49.1%	45.5%	
	M2 Count	74	73	73	73	67	47	47	32	14	17	72	70	71	61	44	61	75
	M2 % within Year	98.7%	97.3%	97.3%	97.3%	89.3%	62.7%	62.7%	42.7%	18.7%	22.7%	96.0%	93.3%	94.7%	81.3%	58.7%	81.3%	
	M3 Count	44	45	46	46	43	26	20	19	7	16	44	42	44	39	20	19	46
	M3 % within Year	95.7%	97.8%	100.0%	100.0%	93.5%	56.5%	43.5%	41.3%	15.2%	34.8%	95.7%	91.3%	95.7%	84.8%	43.5%	41.3%	
	M4 Count	48	46	45	40	45	22	17	16	11	12	46	45	47	39	23	23	48
	M4 % within Year	100.0%	95.8%	93.8%	83.3%	93.8%	45.8%	35.4%	33.3%	22.9%	25.0%	95.8%	93.8%	97.9%	81.3%	47.9%	47.9%	
Total	Count	217	216	201	200	198	135	91	67	35	61	212	206	199	170	114	128	224
	%	96.9%	96.4%	89.7%	89.3%	88.4%	60.3%	40.6%	29.9%	15.6%	27.2%	94.6%	92.0%	88.8%	75.9%	50.9%	57.1%	100.0%

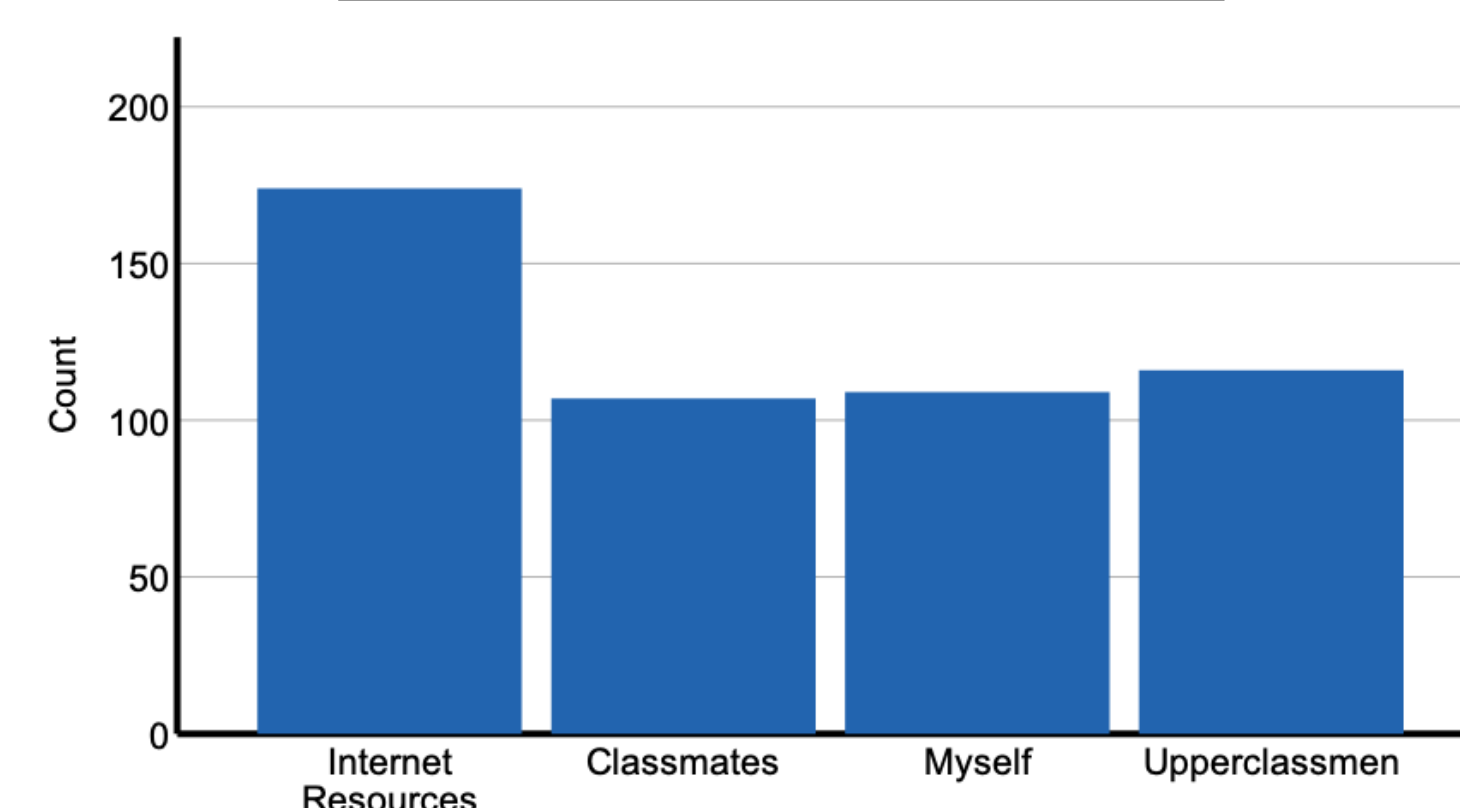### Source of Anki flashcards

Figure 2. Distribution of Anki card sources. 81.4% of respondents reported using Anki (n=188/231). 92.6% of Anki users (n=174) reference flashcards from internet sources such as AnKing, lolnotacop, Zanki, etc. M4 students were less likely to use cards from upperclassmen, likely because they were the first class to make cards and pass them on to subsequent classes.
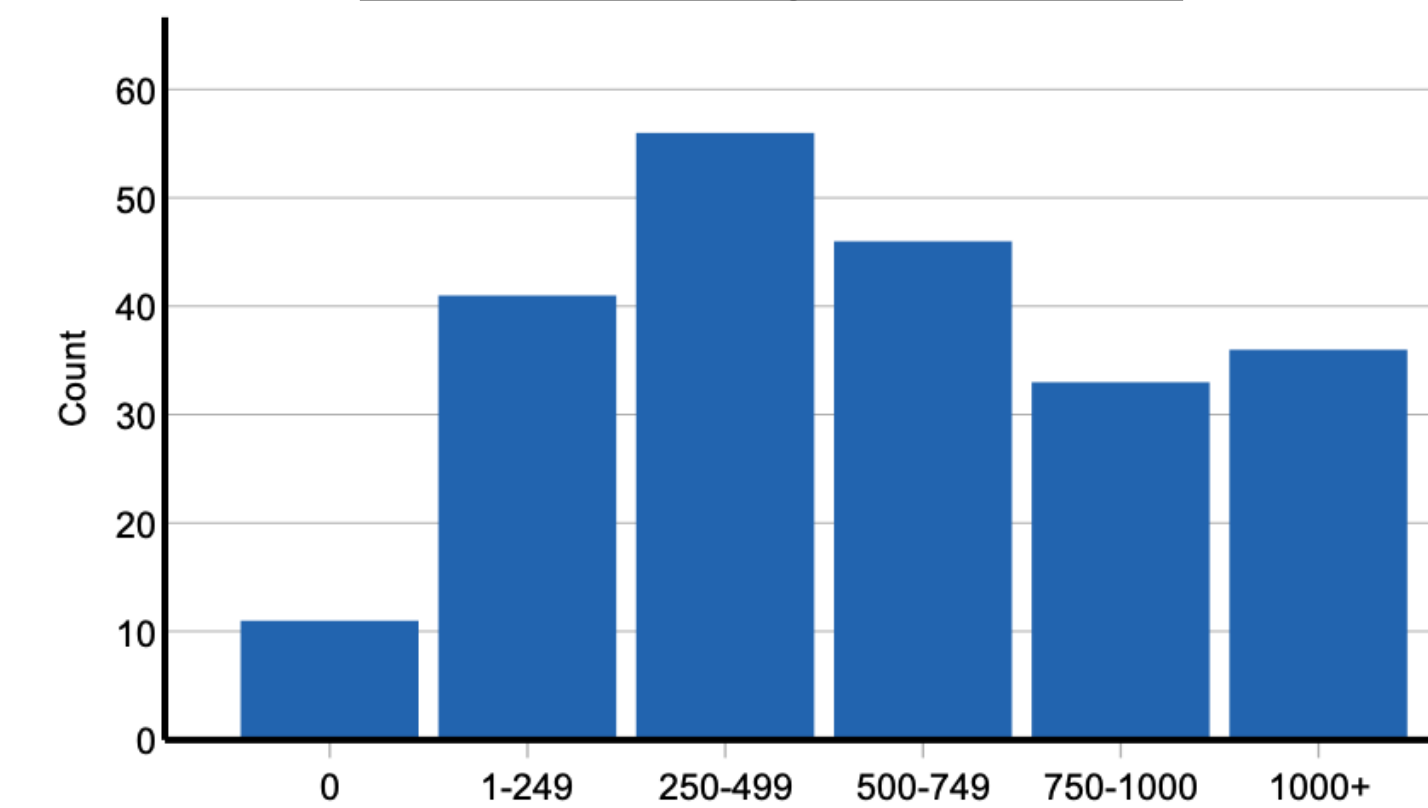
Financial impact of TPR

Figure 3. Total amount of money spent ($USD) per person on TPR across all four classes at OUWB (n=223). Upperclassmen spent more on average, likely due to accumulation of TPR over time. 52% of responding students spent at least $500 on TPR.

Results summary

97% of responding OUWB students (n=224) used TPR. Pathoma (96.9%), Sketchy (96.4%) and Question Banks (89.7%) were the most popular. The top three subjects where TPR was used included pharmacology, pathology, and microbiology. Anki flashcards were used by 81.4% of respondents with 92.6% of those using flashcards from online sources. The use of TPR was significantly higher when an upcoming exam was NBME-written as opposed to professor-written (p<0.001). 52% of responding students spent at least $500 on TPR.

Conclusions

This study indicates a high prevalence of TPR use at OUWB. Although TPR utilization decreased with professor-written exams, they were still embraced by many respondents. Considering financial burden, content overlap between lectures and TPR, and the ways in which respondents use TPR, our study suggests that TPR would be well-received as a formally integrated supplement to non-redundant in-house lectures.

Discussion

A limitation of this study is the sample of survey respondents. Approximately one-half of the entire student body voluntarily completed the survey, but the results may display bias towards those who use TPR. Based on our findings, the authors suggest that the formal integration of TPR into preclinical medical education would be equitable for students, well-received by students, and would have an added benefit of freeing up space for additional career development or clinical experiences in the early curriculum.

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A Systematic Review on the Value of Robotic Surgery Simulation for Training Surgical Residents and Attendings

Kathryn K. Howard[1], MD, Hussein Makki[1], BS, Nathan M. Novotny[1], MD, Misa Mi[2], PhD MA MLIS, Ngan Nguyen[2], PhD CHSE

1. Beaumont Hospital Department of Surgery
2. Oakland University William Beaumont Department of Foundational Studies

INTRODUCTION

- Robotic surgery is becoming more prevalent in scope and usage for surgical cases.
- Simulation has been the go-to method of training robotic surgical skills.
- Compared with no intervention, simulation is associated with impressive benefits with respect to knowledge and skill acquisition. However, its impact on patient and hospital outcomes is unclear.

AIMS AND OBJECTIVES

- **Research Question**: To what extent are robotic simulations for training novice robotic general surgery residents and attendings associated with improved outcomes in comparison with no simulation training?
- **Aim**: Summarize all available evidence on the effectiveness of robotic simulation training on patient and hospital outcomes (Levels 3 -5) using an evidence-based evaluation framework called the ROI Methodology

Level		Measurement Focus
1.	Reaction, Satisfaction and Planned Action	Measures participant's reaction to and satisfaction with a training program and participant's plans for action
2.	Learning	Measures increase in knowledge and/or skills, and changes in attitudes
3.	Application and Implementation	Measures transfer of knowledge, skills, and/or attitudes from classroom to the job (change in job behavior due to a training program)
4.	Impact	Measures business and/or healthcare (e.g., patient safety, quality of patient care, etc.) impact
5.	Return on Investment (ROI)	Compares the monetary value of the business and/or healthcare outcomes with the cost of the training program

Table 1: Details on each level in the Return on Investment methodology

METHODS

- **Search**: Pubmed, Embase, Cochrane Library and Web of Science were searched with key words and terms. We excluded papers not in English or English translation available and non-full text papers. The papers were then uploaded into Covidence software with duplications removed.
- **Screening**: Abstract and title screening was preformed by one individual. Level 1 and 2 outcome papers along with those not including general surgery residents were excluded. Full text screening was then completed by two screeners independently and in duplicate.
- **Data Extraction:** Data extraction and quality assessments were preformed with findings synthesized in narrative themes.

RESULTS

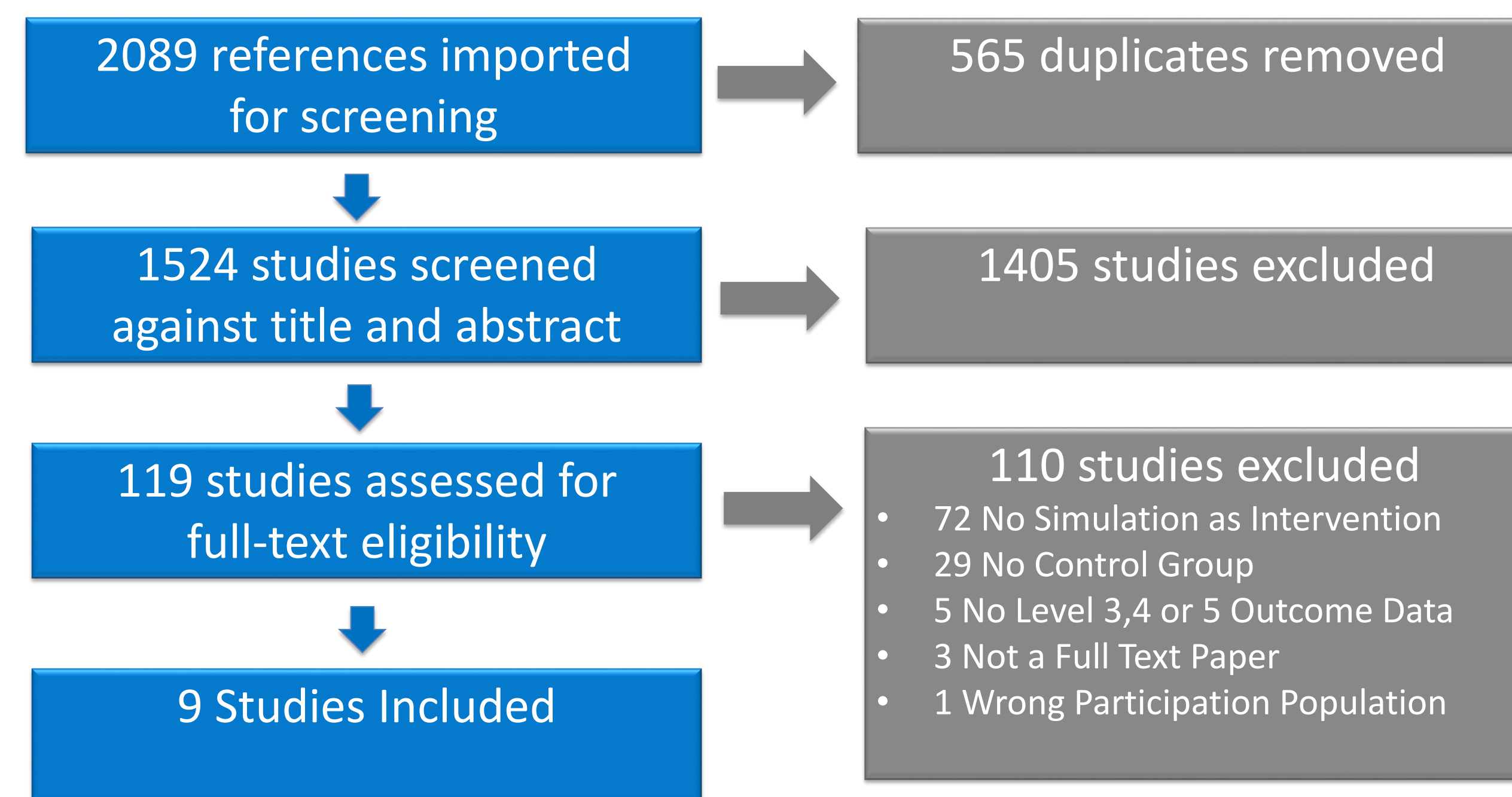| 2089 references imported for screening | → | 565 duplicates removed |
1524 studies screened against title and abstract	→	1405 studies excluded
119 studies assessed for full-text eligibility	→	110 studies excluded • 72 No Simulation as Intervention • 29 No Control Group • 5 No Level 3,4 or 5 Outcome Data • 3 Not a Full Text Paper • 1 Wrong Participation Population
9 Studies Included		

Figure 1: PRISMA schematic detailing the inclusion and exclusion of papers at different levels. 9 papers of the original 1524 papers met the inclusion metrics of full text paper, in English with Level 3,4 or 5 outcome data and a control group.
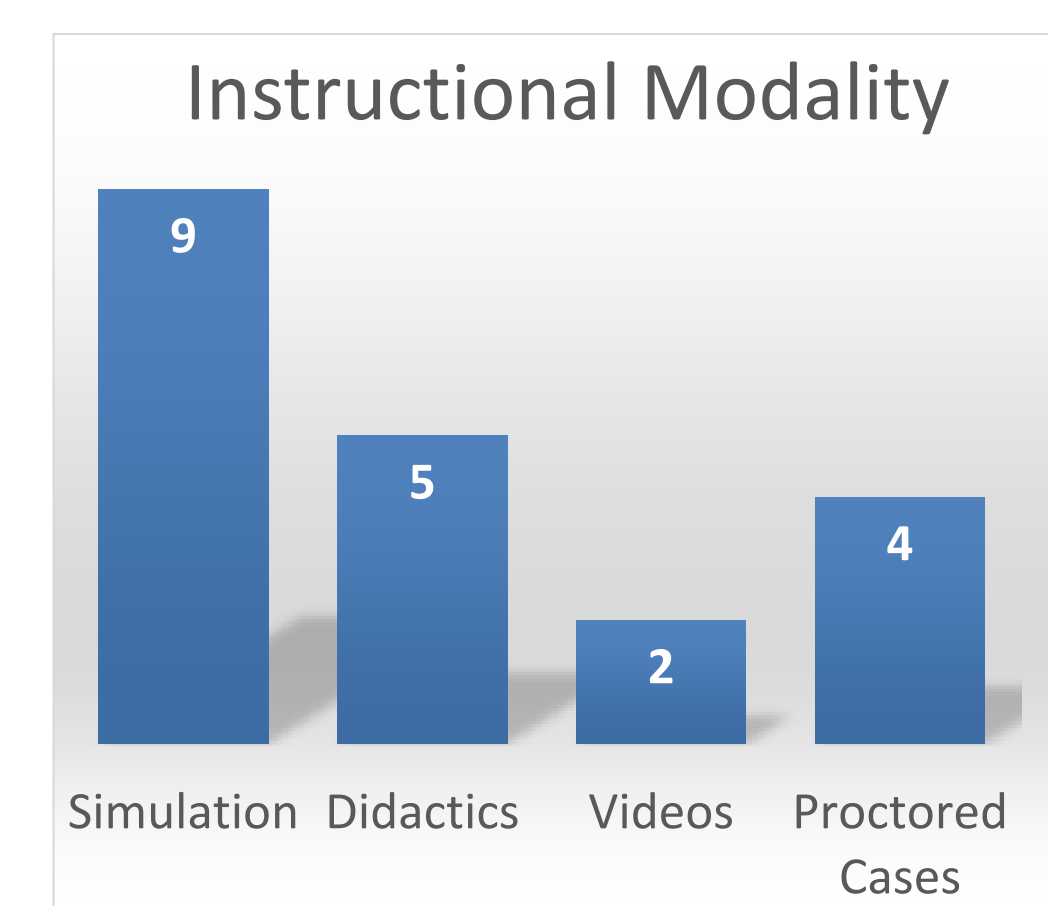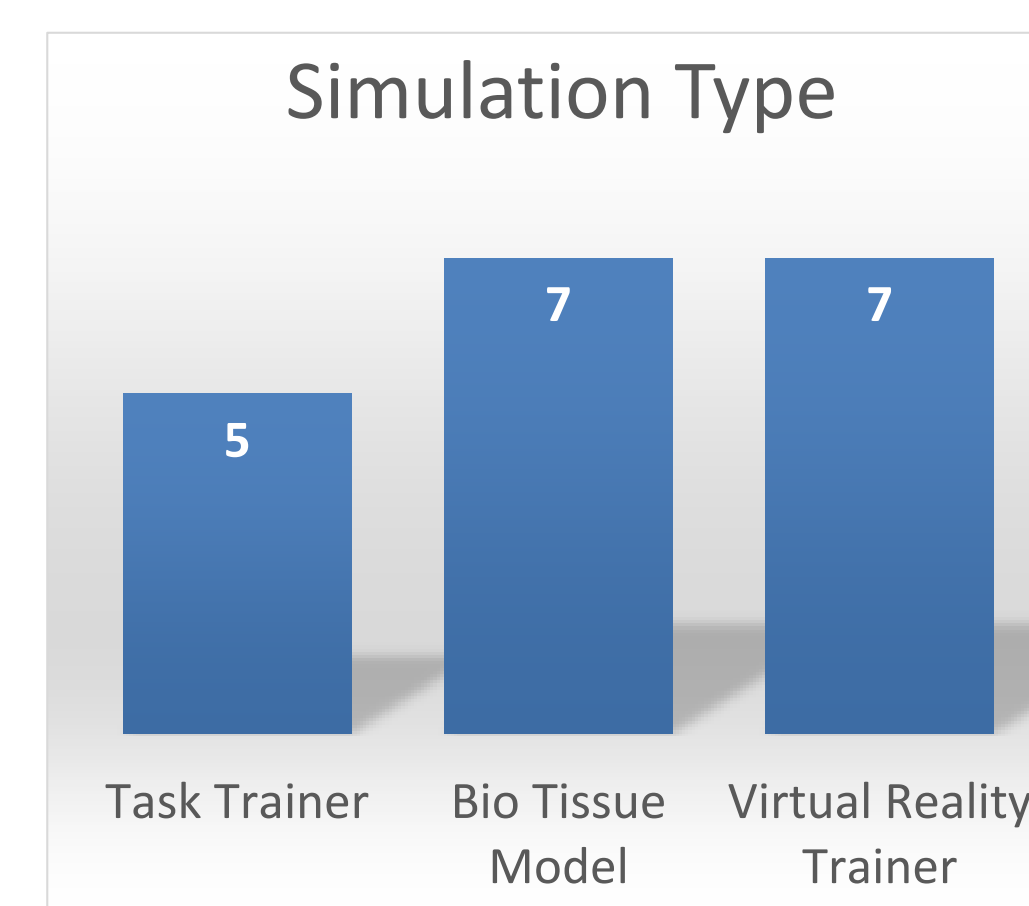

Instructional Modality: Simulation 9, Didactics 5, Videos 2, Proctored Cases 4

Simulation Type: Task Trainer 5, Bio Tissue Model 7, Virtual Reality Trainer 7

Outcome Levels in Included Papers	
Level 1	1
Level 2	0
Level 3	4
Level 4	6
Level 5	0

Figures 2 and 3:Instructional modality and simulation types present in the nine included papers. Multiple instructional and simulation types are present in many of the studies.

Table 2: Outcome levels using ROI Methodology for the nine included papers. Some papers have multiple outcome levels present

CONCLUSIONS

Level 3: 4/1524 (0.26%)
- There is no benefit of simulation to increase resident/fellow/attending usage of a robotic platform.

Level 4: 6/1524 (0.39%)
- Less blood loss and greater lymph node harvests were noted in pancreas cases done by the simulation group in two papers but the third found no difference.
- Decreased cost in inguinal hernia cases who have surgeons that have completed a simulation course.

Level 5: 0/1524 (0%)

DISCUSSION

- Despite the increase in the use of simulation for robotic surgery training, there is limited evidence demonstrating the benefits of simulation on patient and hospital related outcomes.
- What limited data exist point to a possible benefit in operating room time, cost and blood loss but shows no congruency between the studies.
- The three Level 3 studies available suggest that simulation does not increase usage of the robotic platform.
- To fill these gaps significant increases in research will need to be done at higher outcome levels.

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Addition of a Team-Based Competition Improves Scores on the American Board of Surgery In-Training Examination

Sean E. Masters, MD; Kathryn K. Howard, MD; Darci C. Foote, MD; Diane Studzinski, BS; Rose Callahan, MS; Felicia A. Ivascu, MD; Begum Akay, MD

Introduction

- Poor performance on the American Board of Surgery In-Training Examination (ABSITE) predicts failure of American Board of Surgery (ABS) exams.[1]
- Question banks[2], assigned reading[3], gamification[4] and other methods have been shown to improve ABSITE scores.
- We implemented several strategies to enhance ABSITE scores from 2017-2021
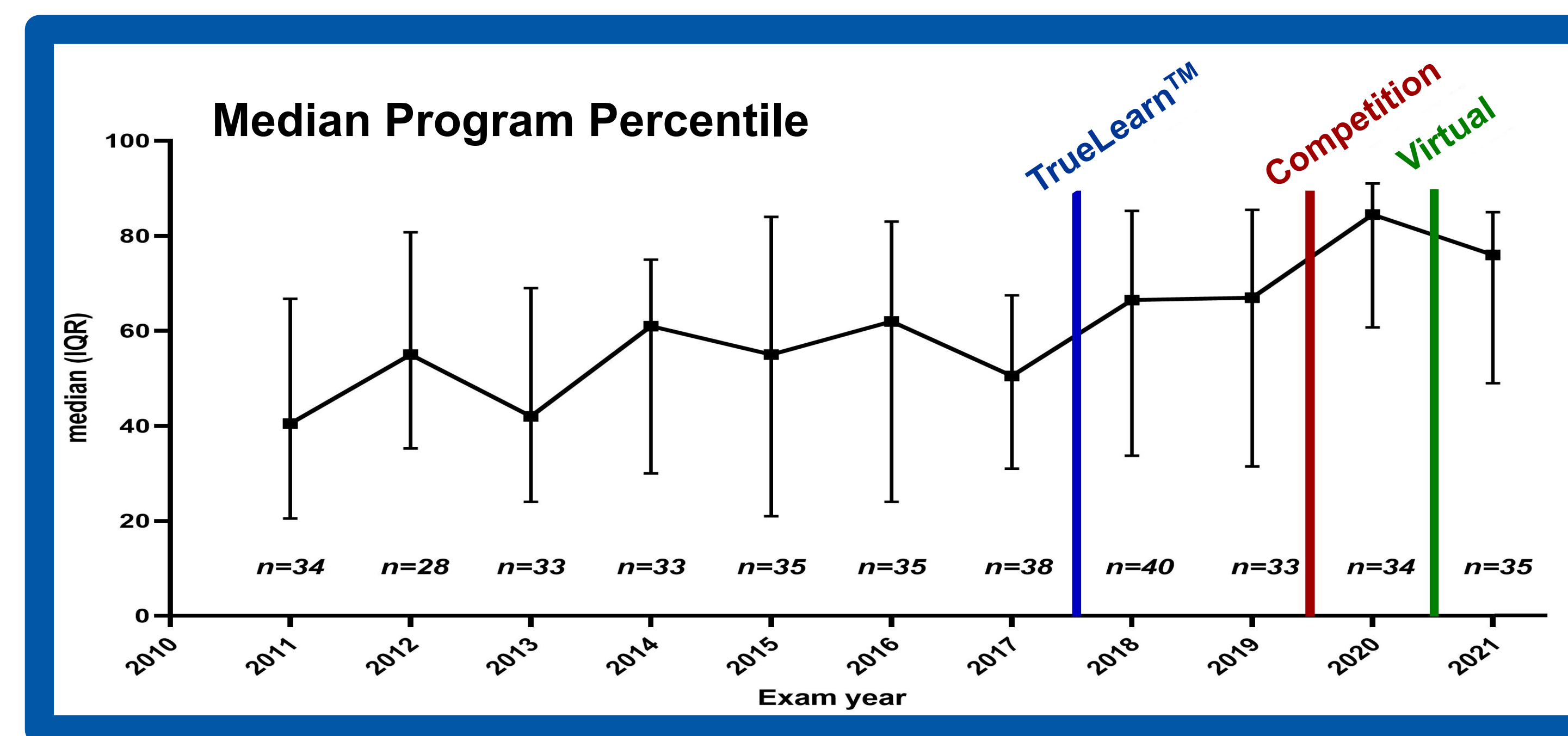
Aims and Objectives

- Does implementation of a team-based competition significantly improve ABSITE percentiles?
- Does implementation of a purchased online question bank improve ABSITE percentiles?
- Does moving from an in-person format to online format affect ABSITE percentiles?

Methods

- Retrospective study of ABSITE percentile scores and data from TrueLearn™ question bank (Moorseville, NC)
- ABSITE percentile compared before and after implementation of the question bank, in-person team-based competition, and virtual format of team-based competition.
- Team-based competitions were composed of questions answered by individuals with points awarded for accuracy and speed. Points summed by drafted teams.
- Statistical analysis was performed with ANOVA, Mann Whitney, regression, and Spearman's correlation using GraphPad Prism v9.2 (San Diego, CA)
- Approved by Beaumont Health IRB, protocol #2021-113

Results

- 378 ABSITE Scores from 112 residents over 11 years from 2011-2021
- **TrueLearn™ question bank** purchased in 2017
- **In-person team competition** implemented prior to 2020 exam to introduce a spirit of competition and teamwork
- Due to COVID, daily lectures and competition were transitioned to a **Virtual team-based competition** for 2021 exam

Median Program Percentile

ABSITE mean percentile at the program level increased from 40.5 to 76.0 (P<0.001) over the period from 2011 to 2021

Modest improvement in program percentile with **TrueLearn™ question bank**
57% 67%
P= .068

Significant increase in program percentile with **In-person team competition**
67% 85%
P= .026

No change in program percentile with **Virtual team competition**
85% 76%
P= .146

Weak positive correlation between number of **TrueLearn™** questions and Individual ABSITE percentile
$R^2=.002$
Spearman's r(174) 0.23, ***P<.01***

No significant increase in number of questions after **In-person team competition**
1019 1116
Median, *P= .416*

No correlation between number of questions and ABSITE percentile before and after **team competition**
$R^2=.0002$
Spearman's r(66) 0.06, *P=.605*

Conclusions

- Overall ABSITE percentiles increased after multiple curriculum changes.
- Only modest improvement of percentiles was seen after implementation of a question bank alone.
- There is evidence that more practice questions leads to better performance.
- Residents did not answer significantly more practice questions *on their own time* after implementation of the team-based competition.
- A team-based competition significantly improves ABSITE percentiles by means other than taking more practice questions on own.

Discussion

- A team-based competition may drive residents to begin studying earlier and fosters discussion that improves understanding of tested concepts.
- In-person competition likely fosters improved motivation and attention to content over virtual competition, although the difference in ABSITE percentiles was not significant.
- An online format of the team-based competition is feasible but could be improved.
- Future directions include analyzing Step exam scores to assess if program is recruiting better test takers and addition of 2022 ABSITE scores.

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OUWB School of MEDICINE
OAKLAND UNIVERSITY WILLIAM BEAUMONT

William Davidson Medical Education Week

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The Importance of Evaluating and Analyzing Published Systematic Reviews in Medical Education

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Introduction

Research engagement provides medical students with a prudent skill set to critically assess literature, conduct their research projects and practice evidence-based medicine.[1,6] An increasing number of medical schools have a research requirement for MD students, including OUWB.[5] Therefore conducting efficient and meticulous research is a critical step in fulfilling such requirements. Among various types of research, systematic reviews (SRs) provide medical students an ideal starting point in developing their research skills.[1] SRs is a form of investigation that synthesizes existing evidence to provide statements of conclusions, therefore playing an important role as a form of evidence-based medicine[3,4,8] However, conducting and assessing SRs can be challenging due to in depth recommendations and standards that must be followed to provide an high quality form of evidence that could guide clinical decision making.[2-4]
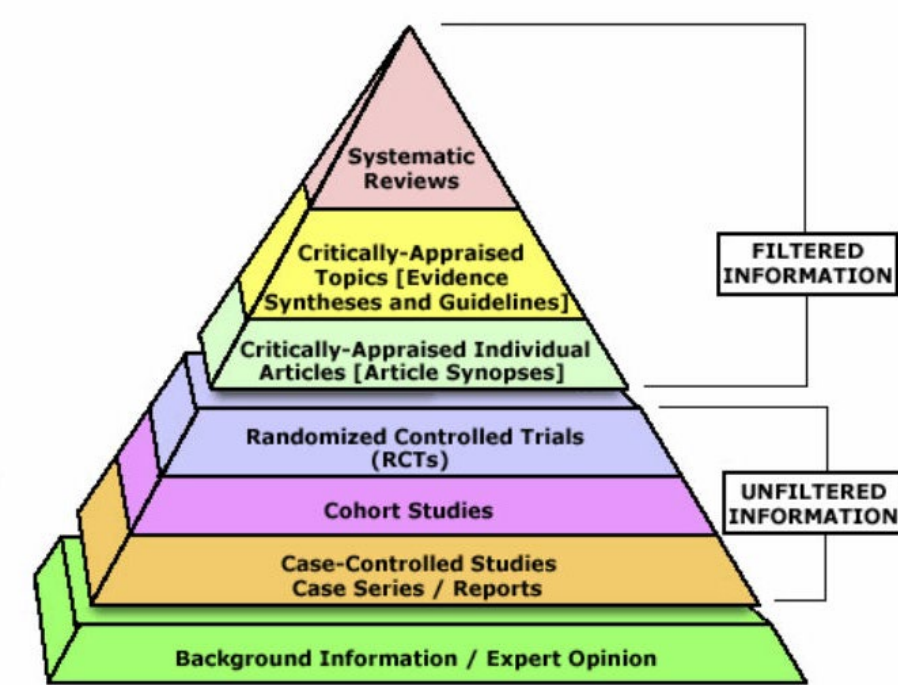
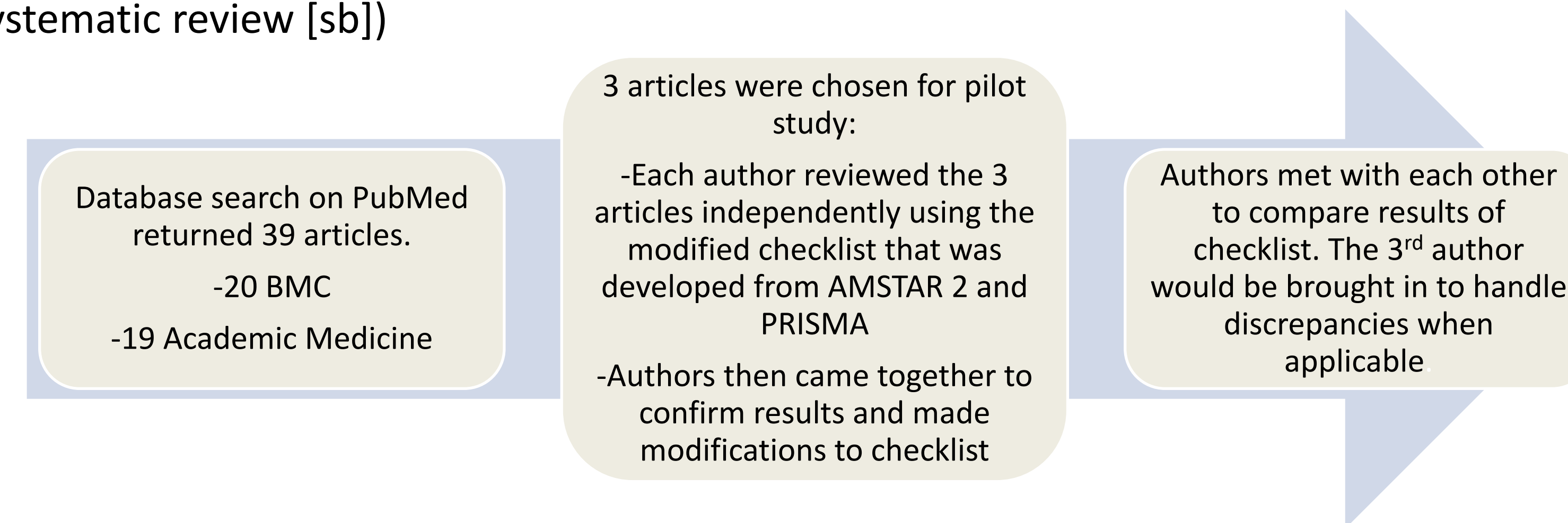Figure 1: Systematic review pyramid[7]

Aims and Objectives

We evaluated published SRs in two journals, Academic Medicine (considered a traditional, prestigious journal) and BioMed Central Medical Education (BMC) (from a for profit publisher) to compare and contrast whether systematic reviews published within each journal maintain their quality in following recommended criteria and standards of publishing SRs.

Methods

We searched PubMed for systematic reviews published in *BMC Medical Education* and *Academic Medicine* between 2020-2021 using the following search strategy:
- (Academic medicine[ta] AND systematic review [sb]) or (BMC medical education [ta] AND systematic review [sb])

Database search on PubMed returned 39 articles.
-20 BMC
-19 Academic Medicine

3 articles were chosen for pilot study:
-Each author reviewed the 3 articles independently using the modified checklist that was developed from AMSTAR 2 and PRISMA
-Authors then came together to confirm results and made modifications to checklist

Authors met with each other to compare results of checklist. The 3rd author would be brought in to handle discrepancies when applicable

Results

Criteria	Academic Medicine	BMC	Criteria	Academic Medicine	BMC
Research questions and inclusions utilize PICO	100%	100%	Included sample search strategy	84%	65%
Consulted informational specialist	53%	55%	Grey literature used	11%	25%
Inclusion criteria defined	100%	95%	Study selection performed in duplicate	95%	90%
Exclusion criteria defined	100%	100%	Data extraction performed in duplicate	84%	80%
Protocol registration	21%	40%	Authors assessed RoB or quality of individual studies	73%	75%
Reported PRISMA use	89%	95%	Reported funding and/or conflicts of interest	47%	100%
PRISMA flowchart included	100%	95%	Range of number of authors	2-13	2-20
Included subject headings, MeSH terms, or indexed terms	48%	60%	Average databases used for study review	5.89	6.05

Table 1: Summary of results comparing Academic Medicine and BMC Medical Education SRs

Protocol not registered/ unclear
Consulted specialist?
No 45.5%
Yes 54.5%

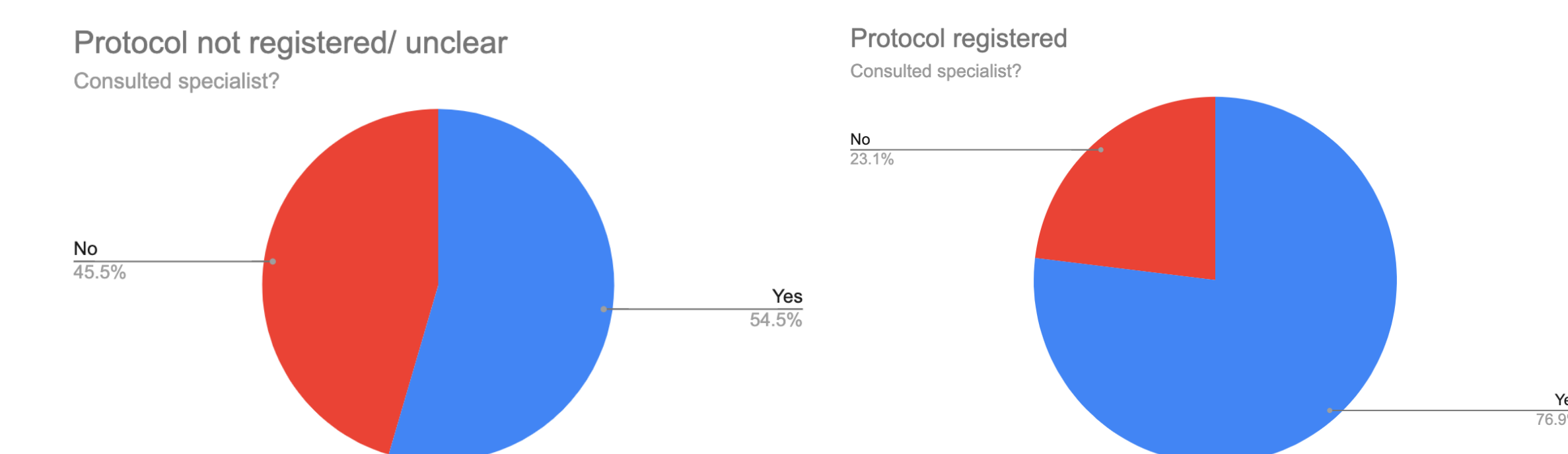Protocol registered
Consulted specialist?
No 23.1%
Yes 76.9%

Figure 2: Involvement of an Informational specialist on reporting of protocol registration. Among the SRs that registered their protocol, a higher percentage reported consulting an informational specialist.

Discussion

Evaluation of the two peer-reviewed journals focusing on medical education reveals that the quality of SRs published is not always consistent in following the SR guidelines or standards that guard against biases and errors in SRs. Numerous SRs published in both a "prestigious" and "commercial" journals failed in adhering to recommended quality guidelines from critical appraisal tools such as AMSTAR 2 and PRISMA in criteria such as protocol registration, utilizing subject headings and MeSH/indexed terms and having a minimum of three authors.

Conclusions

Ultimately, our evaluation of the two scholarly journals focusing on medical education suggests that authors need to better adhere to recommended standards that minimize bias in published SRs. With the rapidly evolving literature, introduction in conducting and appraising the quality SRs early should be an important component in the medical education program since SRs employ a rigorous methodology and provide high-level evidence in practicing evidence-based health care.[1,5]

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Heart Rate Metrics in Surgical Residents Performing an Educational Task Under Stress

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Introduction

- Although a moderate amount of stress can be beneficial for performance, excess stress can lead to a decrease in fine motor skills, focus, decision-making skills, and communication.[1-3]
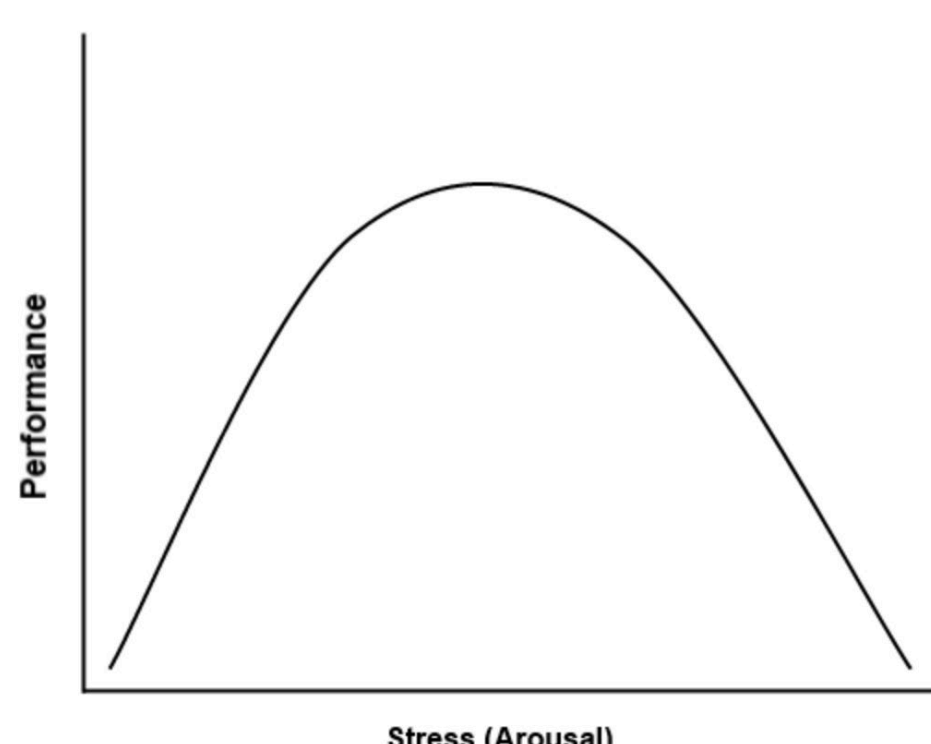

Figure 1. The Yerkes-Dodson curve, which demonstrates the inverted U-shaped hypothesis for the relationship between stress and performance.

- These effects can be especially detrimental in the operating room, where a stress-induced lapse in performance can lead to catastrophic outcomes for patients.
- One unique stressor experienced by surgical residents is observation by an attending surgeon during procedures, which has been shown to lead to an increase in stress related behaviors.[4]
- Mimicking the stress of the operating room in simulation environments presents the opportunity for residents to improve their ability to recognize and manage stress.

Aims and Objectives

Objective: To examine the effect of an attending surgeon versus a neutral observer on learners' heart rate metrics during the performance of two simulated surgical tasks.

Hypothesis: Observation by an attending surgeon will increase participants' levels of stress and result in an increase in participants' minimum, maximum and average heart rates, and a decrease in heart rate variability.

Approved by the Beaumont Health IRB, protocol #2018-371 .

Methods

Sixteen General Surgery residents completed an institution-created resident stress survey and demographic survey, from which two attendings were identified and recruited to be the "stressful" attending surgeon observers. The participants were divided into two groups, with one group observed first by the attending, and the other observed first by a neutral observer. Each participant then crossed over and repeated the two tasks with the other observer. During task performance, the learners' heart rate metrics were collected using a wireless heart rate monitor.

Results

Table 1. Results from the stress survey showing the top five most common stressors in the operating room reported by participants. N=20 for the stress survey.

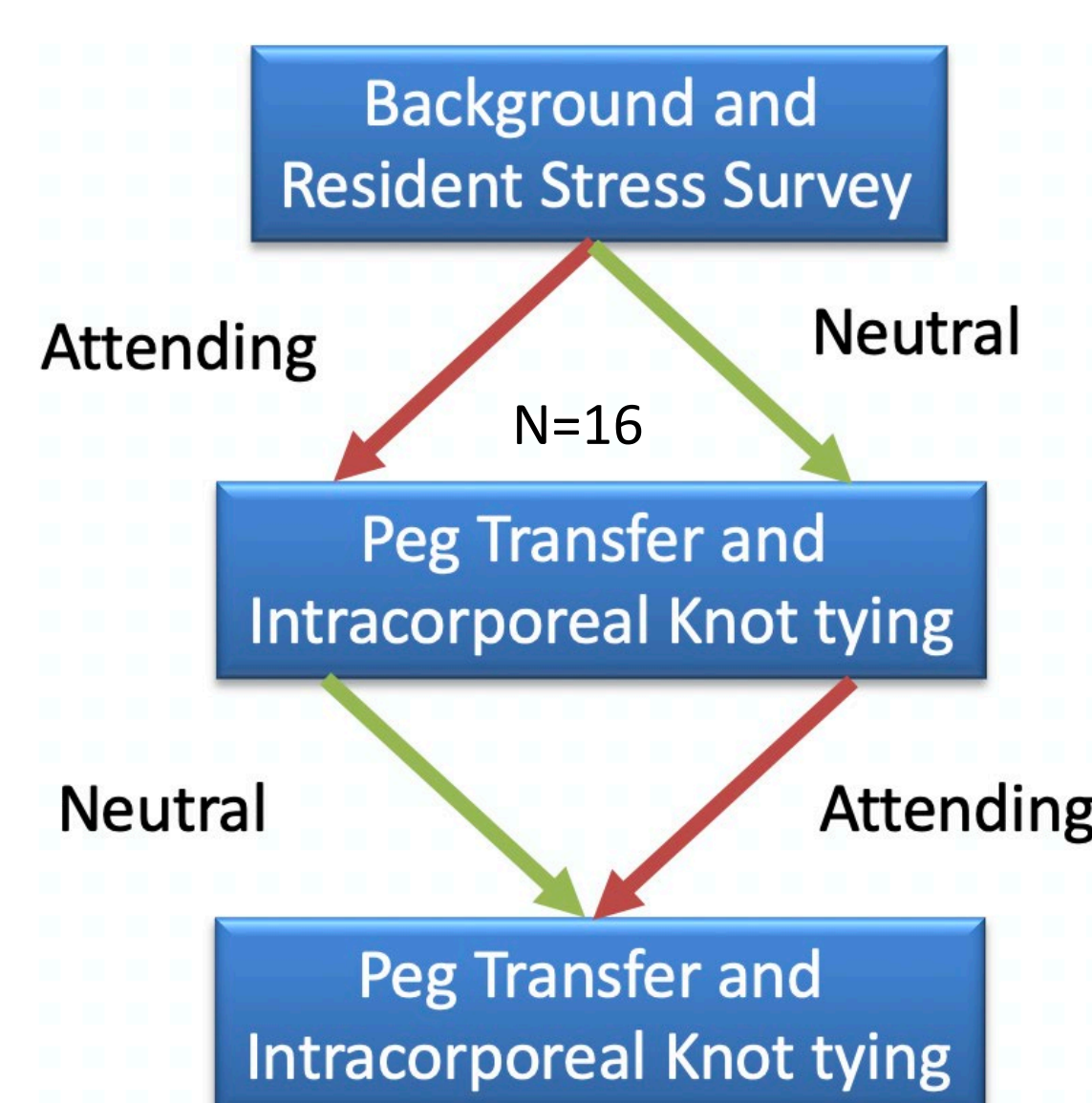| Stressor	N (%)
Unfamiliar Procedure	13 (65%)
Operating with Certain Attendings	12 (60%)
Negative Feedback	11 (55%)
Case Complexity	11 (55%)
Performance Anxiety	10 (50%)

Figure 2. The study used a crossover design with order of observer randomized.
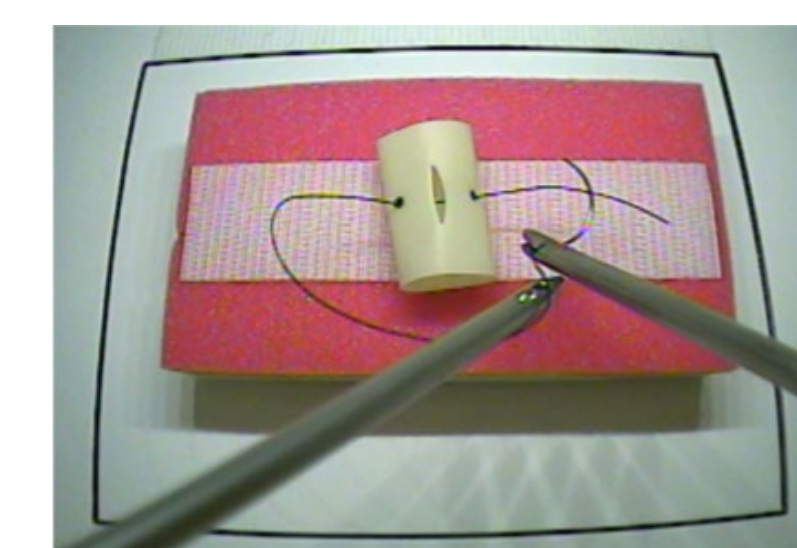

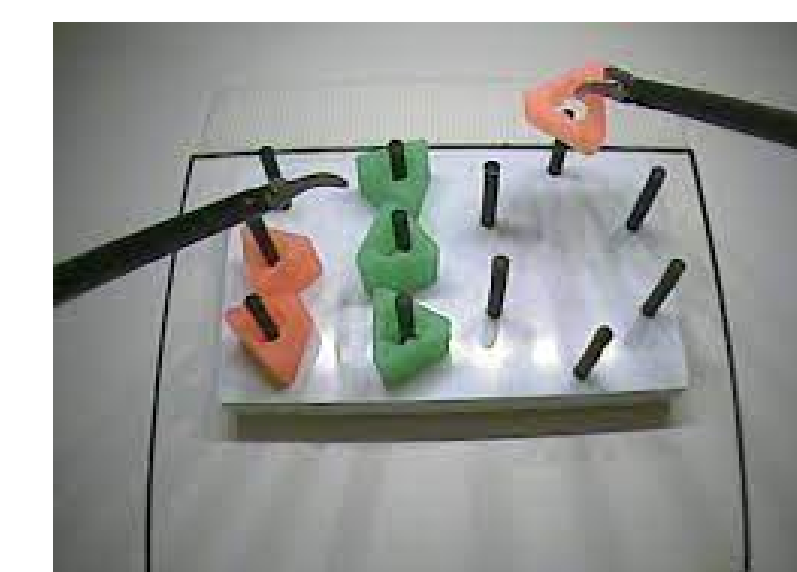**Figure 3.** Intracorporeal Knot Tying task

Figure 4. Peg Transfer task

Intracorporeal Knot Tying

Table 2. Heart rate metrics and total time for Intracorporeal Knot Tying with attending vs neutral observation. Red boxes indicate significant values (p<0.05). Data analyzed using students T-test or Wilcoxon matched test, as appropriate.

Parameter mean, (SD)	Attending Observation	Neutral Observation	P value
Heart Rate Variability	44.1 (10.3)	44.81 (8.6)	.717
R-R Interval, ms	640.9 (95.4)	672.7 (97.8)	.006
Minimum Heart Rate, bpm	76.8 (13.1)	72.2 (8.9)	.130
Maximum Heart Rate, bpm	115.1 (17.8)	108.3 (17.5)	.005
Average Heart Rate, bpm	95.8 (15.5)	88.8 (17.5)	.038
Total Time, seconds	128.7 (126.0)	150.56 (99.9)	.088

Peg Transfer

Table 3. Heart rate metrics and total time for Peg Transfer with attending vs neutral observation. Red boxes indicate significant values (p<0.05). Data analyzed using students T-test or Wilcoxon matched test, as appropriate.

Parameter mean, (SD)	Attending Observation	Neutral Observation	P value
Heart Rate Variability	44.5 (9.5)	44.3 (8.0)	.063
R-R Interval, ms	656.3 (97.5)	653.1 (168.0)	.042
Minimum Heart Rate, bpm	78.0 (13.5)	73.7 (9.7)	.036
Maximum Heart Rate, bpm	109.7 (13.5)	105.3 (16.0)	.049
Average Heart Rate, bpm	93.4 (14.3)	88.8 (10.6)	.007
Total Time, seconds	70.6 (32.9)	83.9 (42.0)	.393

Conclusions

- During the intracorporeal knot tying task, the participants had higher maximum heart rates and average heart rates while under attending observation compared to neutral observation.
- During the peg transfer task, the participants had higher minimum heart rates, maximum heart rates, and average heart rates while under attending observation compared to neutral observation.
- The time to complete either task was shorter with attending observation but did not reach significance, which may represent an example of eustress improving performance.

Discussion

- The results suggest that observation by an attending surgeon results in a greater stress response compared to a neutral, non-physician observer, indicated by an increase in heart rate.
- Future studies should aim to assess the impact of variant stress conditions on the acquisition of surgical skills, and how stress management techniques, such as performance psychology curricula, may ameliorate the effect of stress in the learner.

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Assessing Research Trends in Medical Student / Resident Biases and Curricular Mitigation Efforts: A Mapping Review
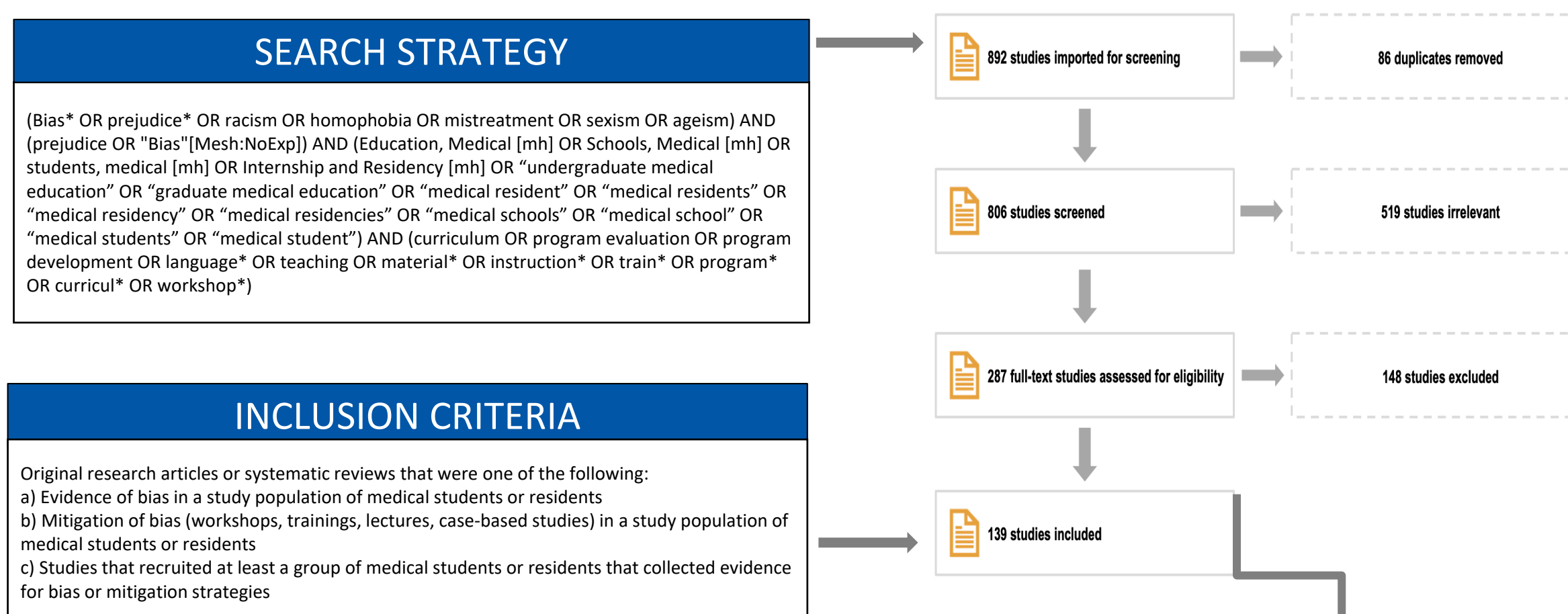
Brianne Lewis,[1] PhD and Akshata Naik,[1] PhD

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INTRODUCTION AND AIMS

Several studies identify physician bias against patient groups[1]. Physician bias is suggested to contribute to diminished patient outcomes and healthcare disparities[2-3]. Further, there are studies that identify effective training strategies to mitigate these biases. While research focusing on physician bias has been underway for decades, the research field is broad. Additionally, it lacks organization and consensus with regards to the professional stage (medical school or residency) at which training needs to be provided.

The aim of this study is to conduct a mapping review to organize original research articles related to physician bias. Specifically, we aim to identify the types of bias that have been studied in the literature and sort the studies by their focus: 'evidence of bias' (EOB) and/or 'mitigation of bias' (MOB) based on the population studied (medical students [MS] or residents [Res] or both). Results from this mapping review study will provide a visual synthesis of existing research and identify gaps in knowledge within medical education and residency programs. We anticipate that these findings will help educators evaluate the need for evidence based studies on physician bias and encourage a shift in our responsibility as educators to think beyond the science presented in our classrooms.

METHODS

SEARCH STRATEGY

(Bias* OR prejudice* OR racism OR homophobia OR mistreatment OR sexism OR ageism) AND (prejudice OR "Bias"[Mesh:NoExp]) AND (Education, Medical [mh] OR Schools, Medical [mh] OR students, medical [mh] OR Internship and Residency [mh] OR "undergraduate medical education" OR "graduate medical education" OR "medical resident" OR "medical residents" OR "medical residency" OR "medical residencies" OR "medical schools" OR "medical school" OR "medical students" OR "medical student") AND (curriculum OR program evaluation OR program development OR language* OR teaching OR material* OR instruction* OR train* OR program* OR curricul* OR workshop*)

INCLUSION CRITERIA

Original research articles or systematic reviews that were one of the following:
a) Evidence of bias in a study population of medical students or residents
b) Mitigation of bias (workshops, trainings, lectures, case-based studies) in a study population of medical students or residents
c) Studies that recruited at least a group of medical students or residents that collected evidence for bias or mitigation strategies

- 892 studies imported for screening → 86 duplicates removed
- 806 studies screened → 519 studies irrelevant
- 287 full-text studies assessed for eligibility → 148 studies excluded
- 139 studies included

- We conducted a mapping review[4-5] using Covidence software for data storage, collection and analysis.
- The authors performed searches of online databases (PubMed, PsycINFO, WebofScience) for articles, between 1980 and 2021.
- All relevant references were imported into Covidence where authors independently screened initial studies.
- Conflicts were reviewed by both authors until a consensus was reached.
- The same protocol was followed for full text review.
- Data was mapped by year to show general trend. Additional mapping was performed by the three categories shown in **figure 1**.
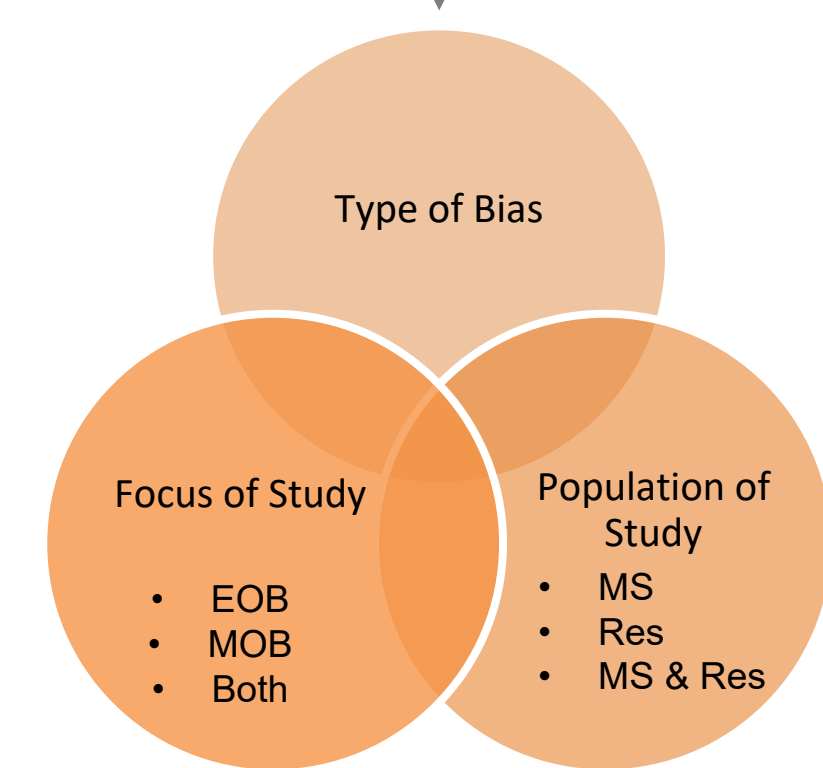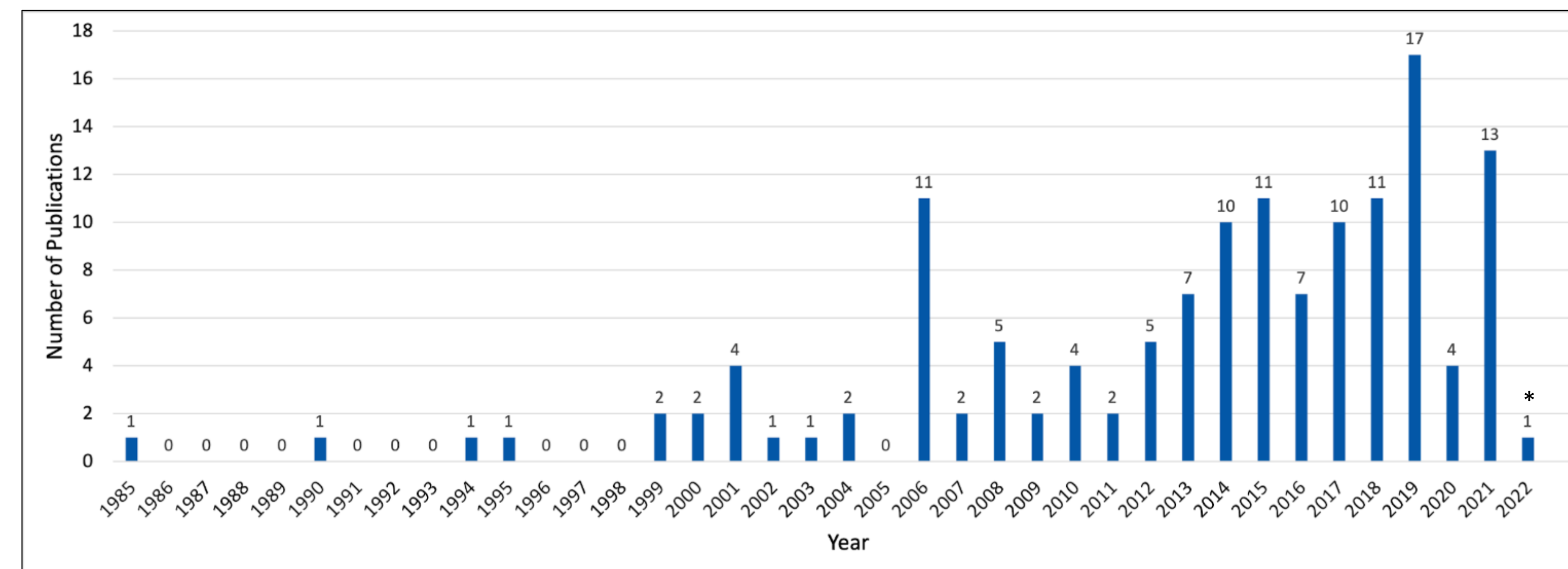
Figure 1: Mapping Strategy Scheme

RESULTS

Figure 2: Studies meeting inclusion criteria mapped with respect to year.
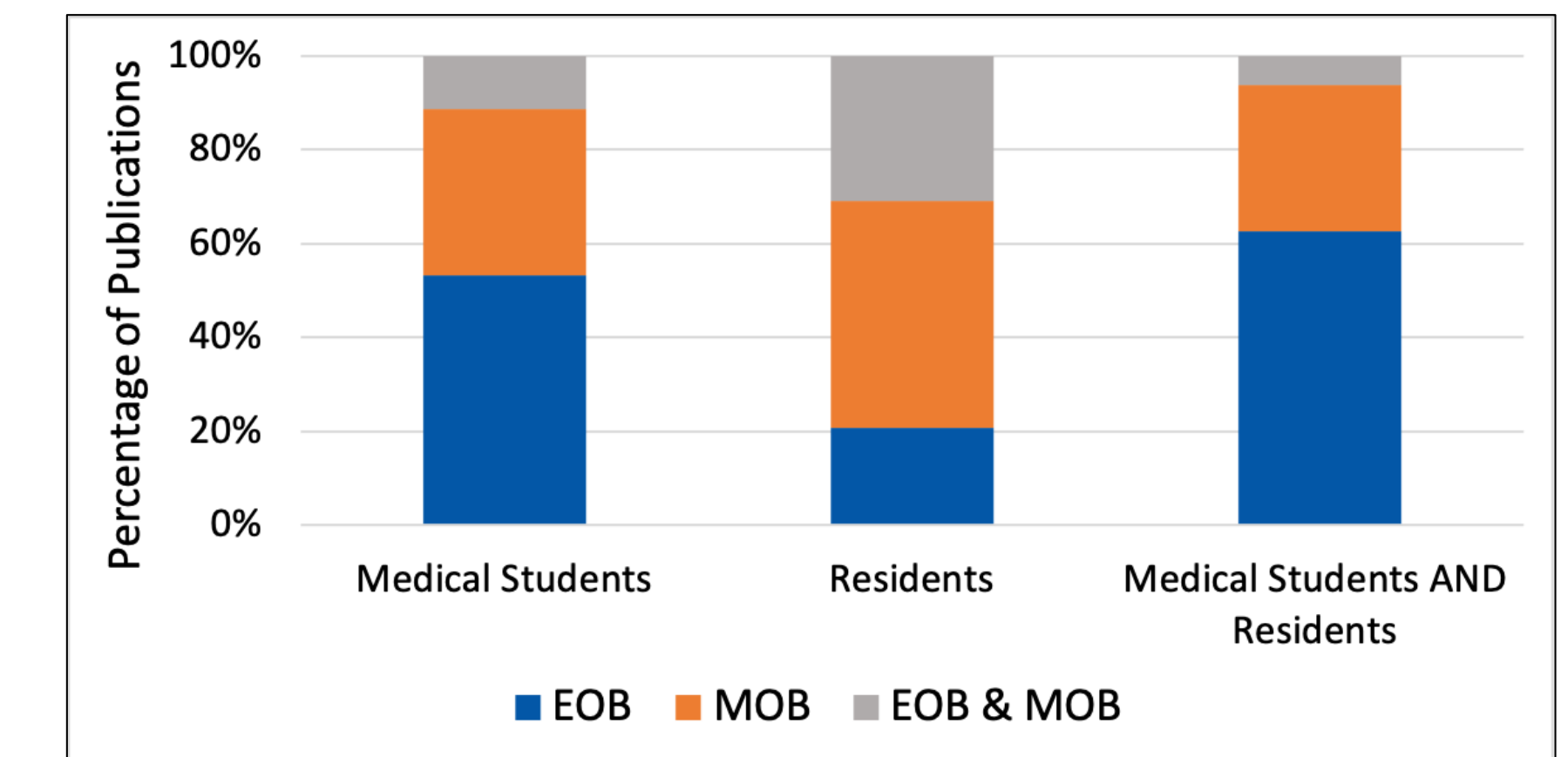*Search strategy included 1 preprint paper for 2022.

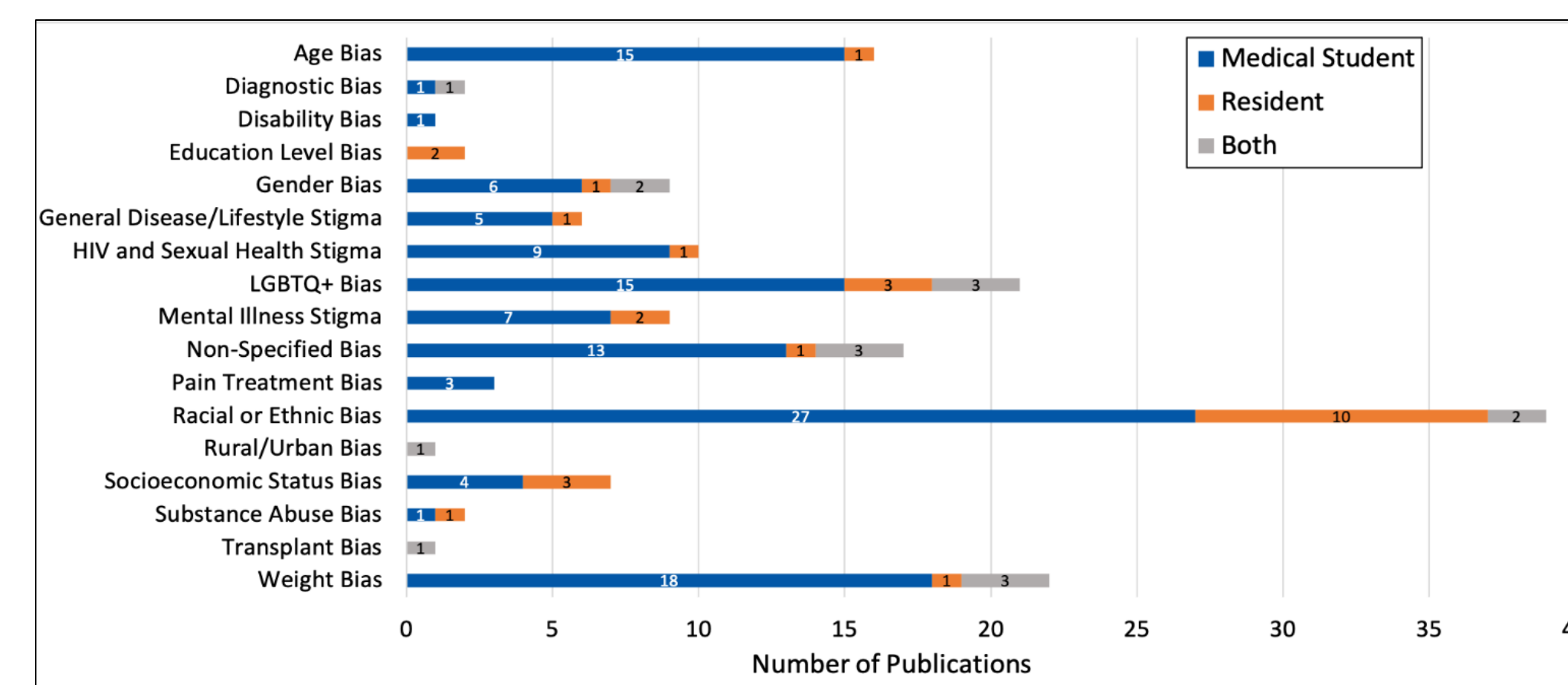**Figure 3: Distribution of bias type by population studied**

Figure 4: Distribution of bias type by focus of study

Figure 5: Ratio of focus of study by population type

CONCLUSIONS

- We found fewer original research articles than anticipated for this project. Many publications could have added to this project were excluded (N=76) since no evidence was collected (for e.g. commentaries, perspectives or editorials).
- We observed a gradual increase in frequency (**Figure 2**) of original research articles for bias in medical school or residency programs with respect to time. Collection of data related to bias spurred in early 2000s likely as a result of cultural events, agency call to action and funding.
- Most studies for each type of bias were collected in medical student populations (**Figure 3**)
- For each types of bias, a higher frequency of studies were aimed at documenting evidence of bias rather than mitigation with the exception of race/ethnic bias studies (**Figure 4**).
- More EOB studies were conducted focused on medical students only whereas MOB studies were largely researched in a study population containing only residents (**Figure 5**). This shows that medical students enter medical school with biases and it is not effectively mitigated in the curriculum.
- Top three areas of bias research include: Racial/Ethnic bias, Weight bias, LGBTQ+ bias. We categorized all available research on bias types that were studied (**Figures 3-4**).

DISCUSSION

- Based on our findings, we suggest that research should be focused on mitigation of bias targeted towards medical students to eliminate propagation of bias throughout the curriculum.
- Now that we have identified types of biases that have been studied, it is our responsibility as educators create and analyze mitigation efforts in our own curriculum.
- While we were able to categorize types of bias that have been studied researched bias , it is likely that there are additional categories that were not represented in our findings
- Future work that would enhance the field includes longitudinal studies of mitigation efforts

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Beyond COVID-19: The Impact of Recent Pandemics on Medical Students and their Education: A Scoping Review

Moneb Bughrara, Keaton Schmitz, Stephanie M. Swanberg, MSI, AHIP, Victoria C. Lucia, PhD, Dawn Jung, MD, Tracy Wunderlich-Barillas, PhD
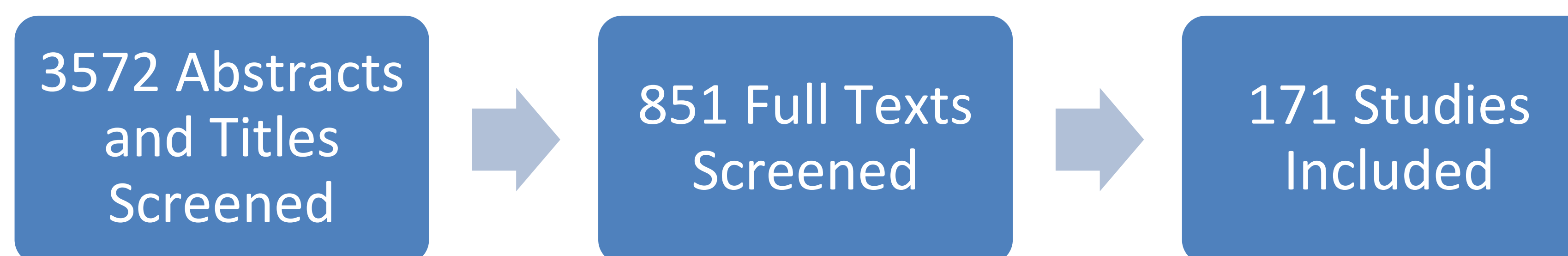
Introduction

Since the World Health Organization's first announcement of a mysterious coronavirus-related pneumonia in Wuhan, China on January 9th 2020, undergraduate medical education (UME) has been significantly impacted (AJMC 2020). The rapidly spreading disease forced UME to abruptly alter its means of delivery. With the cessation of face-to-face activities, UME resorted to delivering education through alternate means such as video conferencing tools like Zoom. However, COVID-19 was not the only recent pandemic. This posed the question, were similar disruptions and adaptations also seen in other past pandemics such as Severe Acute Respiratory Syndrome (SARS) or Middle East Respiratory Syndrome (MERS) that could have prepared UME for COVID-19? This scoping review investigated the educational and personal impact of recent pandemics on UME and medical students.
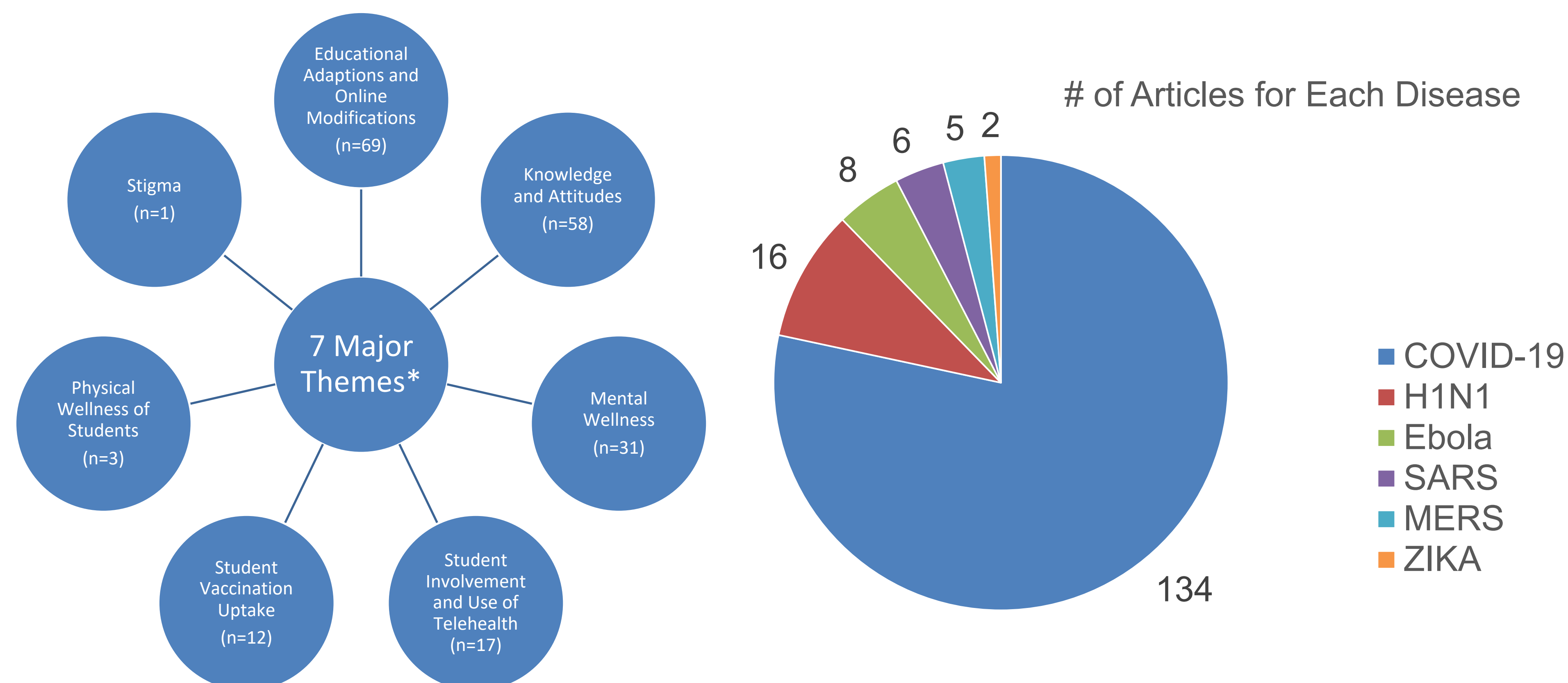
Aims and Objectives

1. To explore prior research on the effect of pandemics and epidemics on undergraduate medical education as well as medical students.

2. To discover common themes and lessons that transcend various pandemics, that could potentially affect the way we conduct undergraduate medical education in the future.

Methods

This review followed the PRISMA guidelines for scoping reviews. Nine databases including PubMed, ERIC, and EMBASE were systematically searched using keywords and subject headings related to medical students/UME and SARS, Ebola, H1N1, MERS, Zika, and COVID-19. Articles were limited to research studies published between 2000-2020 and in English. Based on exclusion and inclusion criteria, all articles were independently screened by two reviewers first by the title/abstract and then via full text. Data was extracted from the included studies and analyzed qualitatively using thematic analysis.

3572 Abstracts and Titles Screened → 851 Full Texts Screened → 171 Studies Included

Results

# of Articles for Each Disease

- COVID-19: 134
- H1N1: 16
- Ebola: 8
- SARS: 6
- MERS: 5
- ZIKA: 2

7 Major Themes*
- Educational Adaptions and Online Modifications (n=69)
- Knowledge and Attitudes (n=58)
- Mental Wellness (n=31)
- Student Involvement and Use of Telehealth (n=17)
- Student Vaccination Uptake (n=12)
- Physical Wellness of Students (n=3)
- Stigma (n=1)

* Sum of all themes exceeds 171 due to several studies belonging to multiple themes

Conclusions

- A majority of articles addressed COVID-19 due to its worldwide scale, but other pandemics had similar impacts on UME and medical students at a regional level.
- **Educational adaptations and online modifications** were unique to COVID-19. Various adaptations were utilized and had mixed reception but also demonstrated increased flexibility for education delivery.
- **Student knowledge** was mostly sufficient regarding disease transmission and symptoms but could improve in treatment options. Medical students tended to have better general understanding of diseases compared to other students.
- **Mental wellness** topics were well studied in COVID-19 including measuring depression, anxiety, and stress levels. However, most did not explore strategies for managing stressors.
- **Students remained involved** through volunteer opportunities. Telehealth was a significant outlet for student participation in community outreach and enhancing clinical skills.
- **Vaccine** studies were related to H1N1 only due to a December 2020 search end date, offering a need for future studies. Studies demonstrated varying uptake with low comprehensive knowledge regarding the vaccine and disease.
- **Physical wellness and stigma** demonstrated Asian students faced increased stigma during COVID-19 and varying effects of student physical wellness.

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