

A Cross-Sectional Study of Attitudes and Factors That Promote Medical Student Participation in Professional Medical Societies

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ABSTRACT

Purpose: Medical student participation in professional medical societies is an understudied extracurricular activity. The purpose of this study is to assess student characteristics associated with participation and their attitudes toward professional medical societies.

Methods: A cross-sectional study using a 21-item survey questionnaire was administered to Wisconsin medical students in the fall of 2019. Regression analysis was used to find factors associated with participation.

Results: A total of 308 questionnaire responses were collected with a response rate of 17.4%. Sixty-three percent of respondents participated in a professional medical society, and the most important reasons for participating included professional development, networking, and advocacy. Participation was positively associated with age (OR = 1.16; 95% CI, 1.01-1.33); years of medical education (OR = 1.4; 95% CI, 1.18-1.69); number of memberships in professional medical societies (OR = 2.02; 95% CI, 1.61-2.53); number of extracurricular advocacy events attended outside of professional medical societies (OR = 1.62; 95% CI, 1.17-2.23); belief that participation is important for professional development (OR = 1.76; 95% CI, 1.39-2.23), patients (OR = 1.51; 95% CI, 1.23-1.86), and medical education (OR = 1.43; 95% CI, 1.19-1.71); and the desire to participate as a physician (OR = 1.53; 95% CI, 1.25-1.88). Participation was negatively associated with male gender (OR = 0.51; 95% CI, 0.27-0.95).

Conclusions: Medical students who participate in professional medical societies believe participation supports their education, their patients, and their professional development. Further study is required to elucidate reasons for nonparticipation.

INTRODUCTION

Physician advocacy is a cornerstone to evoking change in our modern health care system and is recognized as a social responsibility of the profession.^{1,2} According to the Principles of Medical Ethics

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within the American Medical Association (AMA) Code of Medical Ethics, “a physician shall respect the law and also recognize a responsibility to seek change in those requirements which are contrary to the best interest of the patient.”³ The Liaison Committee on Medical Education (LCME) standards for United States medical school accreditation include service-learning and community service (§6.6) as one of many competencies to be achieved by medical students. Furthermore, the LCME calls for curricula to include instruction to address societal problems (§7.5), health care disparities (§7.6), and medical ethics and human values (§7.7).⁴ Additionally, the Accreditation Council for Graduate Medical Education (ACGME) common residency program requirements include demonstration of a “commitment to professionalism and adherence to ethical principles” (§VI.B.) as well as “an awareness of and responsiveness to the larger

context and system of health care” (§IV.B.1.f).⁵ As such, early exposure to and opportunity for advocacy can both help satisfy the LCME standards as well as prepare students for residency training and fulfillment of ACGME requirements.⁶⁻⁸

Professional medical societies can provide robust platforms for physician advocacy; these membership organizations aim to address key concerns of the medical profession, including health equity, physician training and wellness, and health care delivery. Many professional medical societies allow and encourage medical student membership and involvement on a variety of levels, allowing for students to both explore the multiple types of physician

advocacy as well as develop leadership skills in various contexts. A previous study has shown participation in community-based organizations such as professional medical societies can improve student advocacy knowledge and skills.⁹ Therefore, student participation in professional medical societies can help achieve the aforementioned LCME standards and prepare for the lifelong role as a physician advocate. While a previous study evaluated medical student extracurricular involvement and attitudes as they pertain to education and professional development,¹⁰ there is a paucity of studies formally examining medical student participation in professional medical societies. Although many of these organizations track and study their own membership to improve their relevance and effectiveness, these results are not often disseminated for consideration by their members or the public. We therefore aimed to survey medical student attitudes towards professional medical societies in order to better understand the major drivers of participation as well as student opinions on the relevance of these organizations for students' professional goals.

METHODS

Respondents

Medical students of all years and program types enrolled in the following Wisconsin medical schools were the target population of this cross-sectional study (number of enrolled students in 2019-2020 academic year):¹¹ University of Wisconsin (UW) School of Medicine and Public Health (n=747); Medical College of Wisconsin-Milwaukee, Medical College of Wisconsin-Green Bay, and Medical College of Wisconsin-Central Wisconsin (n=1022 for all Medical College of Wisconsin campuses).

This study utilized an anonymous questionnaire survey for data collection and was considered quality improvement (QI)/program evaluation by the UW-Madison QI/Program Evaluation Self-Certification Tool (June 10, 2019); therefore, formal institutional review board evaluation was not conducted. The questionnaire was optional, and completion of the questionnaire was taken as consent to participate in the study.

Questionnaire Design

A questionnaire was designed to explore medical student participation and attitudes toward professional medical societies. The questionnaire consisted of 21 items with a variety of multiple choice, 5-point Likert scale, and free text responses (Appendix 1). The questionnaire included branching logic to avoid asking nonapplicable or irrelevant questions. All questions were optional except for questions required for the branching logic. In order to gauge what aspects of professional medical societies are important to medical students, several survey questions were designed with the option to rank the top 3 choices. To parallel these ranking questions, respondents were asked to rank the top 3 greatest challenges expected when they become physicians. Three questions requested a self-reported score ranging from 0 to 100 with 3

descriptive markers placed at 0, 50, and 100 as follows: (1) professional medical society participation score: not involved, somewhat involved, extremely involved; (2) professional medical society satisfaction score: extremely dissatisfied, neither satisfied nor dissatisfied, extremely satisfied; (3) extracurricular participation score: not involved, somewhat involved, extremely involved. Finally, as many medical societies are faced with changes in their internal governance structure to maximize membership engagement, a final set of questions was included to probe beliefs in the way professional medical societies adopt or amend policy that directs their activity.

The questionnaire was reviewed by the UW-Madison Cancer Prevention and Outcomes Data (C-POD) Shared Resource (UW Carbone Cancer Center) and was piloted on several medical students before distribution; the pilot data were excluded from the analysis. The survey time was approximately 5 to 7 minutes.

Questionnaire Administration

Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Wisconsin-Madison.^{12,13} REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for data integration and interoperability with external sources.

The questionnaire was distributed by a REDCap weblink via email sent to all enrolled students addressed from the lead author. The email was sent via a listserv containing all enrolled students at their respective institution. No login or password was required to take the survey, and there was no tracking of respondent contact information or unique identifiers during the collection period. No compensation was provided for questionnaire completion. Response collection occurred over a 3-week period from September 17, 2019 to October 4, 2019, with a single email reminder sent to all students on October 2, 2019. Questionnaire results were compiled by REDCap and exported for external analysis.

Statistical Analysis

All questionnaire responses were included for analysis, and no imputation was conducted to fill in missing data. All statistical analyses were conducted using R version 3.6.2 (R Core Team). Respondent characteristics were divided into continuous and categorical variables, and categorical variables were dummy coded for regression analysis. For Likert scale questions used in regression analysis, the following values were used for coding: -4 (strongly disagree), -1 (disagree), 0 (neutral or no opinion/not applicable), 1 (agree), 4 (strongly agree).¹⁴

Logistic regression was used to determine significant predictors of participation in professional medical societies (binary yes/

Table 1. Wisconsin Medical Student Characteristics Associated With Participation in Professional Medical Societies

Categorical Characteristics	n (%)	Odds Ratio	95% CI	P value	
Medical School				0.472	
University of Wisconsin – Madison (reference level)	128 (46.4)	-	-		
Medical College of Wisconsin – Milwaukee	125 (45.3)	1.00	0.60–1.66		
Medical College of Wisconsin – Green Bay	15 (5.4)	0.90	0.30–2.69		
Medical College of Wisconsin – Central Wisconsin	8 (2.9)	4.20	0.5–35.19		
University of Wisconsin – Madison Program				0.275	
Traditional program (reference level)	88 (69.8)	-	-		
Wisconsin Academy of Rural Medicine (WARM)	20 (15.9)	0.81	0.30–2.15		
Training in Urban Medicine and Public Health (TRIUMPH)	18 (14.3)	2.31	0.70–7.60		
Medical College of Wisconsin – Milwaukee Pathway				0.091	
Quality Improvement and Patient Satisfaction (reference level)	28 (23.9)	-	-		
Health Systems Management and Policy	19 (16.2)	3.25	0.86–12.28		
Clinical and Translational Research	18 (15.3)	1.08	0.33–3.56		
Urban and Community Health	17 (14.5)	2.08	0.58–7.49		
Molecular and Cellular Research	12 (10.3)	2.60	0.58–11.69		
Global Health	12 (10.3)	1.21	0.31–4.76		
Clinical Educator	7 (6.0)	0.14	0.02–1.36		
Bioethics	4 (3.4)	2.60	0.24–28.14		
Degree Type				0.707	
None (reference level)	210 (76.1)	-	-		
MD/PhD	29 (10.5)	1.03	0.46–2.29		
MD/MPH	21 (7.6)	2.01	0.71–5.70		
Other	10 (3.6)	1.47	0.37–5.83		
Extended or split program	6 (2.2)	1.26	0.22–7.01		
Gender				0.042	
Female (reference)	91 (50.8)	-	-		
Male	84 (46.9)	0.51	0.27–0.95	0.034	
Other	2 (1.1)	>100	0–∞	0.993	
Prefer not to answer	2 (1.1)	>100	0–∞	0.993	
Ethnicity				0.760	
White (reference)	135 (76.7)	-	-		
Other	34 (19.3)	1.27	0.57–2.82		
Prefer not to answer	7 (4.0)	1.52	0.28–8.11		
Continuous Characteristics	% Agree	Mean (SD, n)	Odds Ratio	95% CI	P value
Years of medical education completed	-	2.75 (1.53, 276)	1.41	1.18–1.69	<0.001
Age (years)	-	25.78 (2.57, 172)	1.16	1.01–1.33	0.032
Number of memberships	-	2.03 (1.40, 276)	2.02	1.61–2.53	<0.001
Extracurricular participation (self-scored)	-	59.73 (26.26, 195)	1.08	0.97–1.19	0.152
Number of extracurricular advocacy activities	-	0.78 (1.09, 195)	1.62	1.17–2.23	0.002
“I believe participation is important for my...”					
Professional development	60.5	1.00 (1.77, 200)	1.76	1.39–2.23	<0.001
Patients	50.0	0.57 (1.75, 200)	1.51	1.23–1.86	<0.001
Medical education	54.0	0.70 (1.90, 200)	1.43	1.19–1.71	<0.001
“I plan on participating as a physician”	70.0	1.41 (1.71, 200)	1.53	1.25–1.88	<0.001

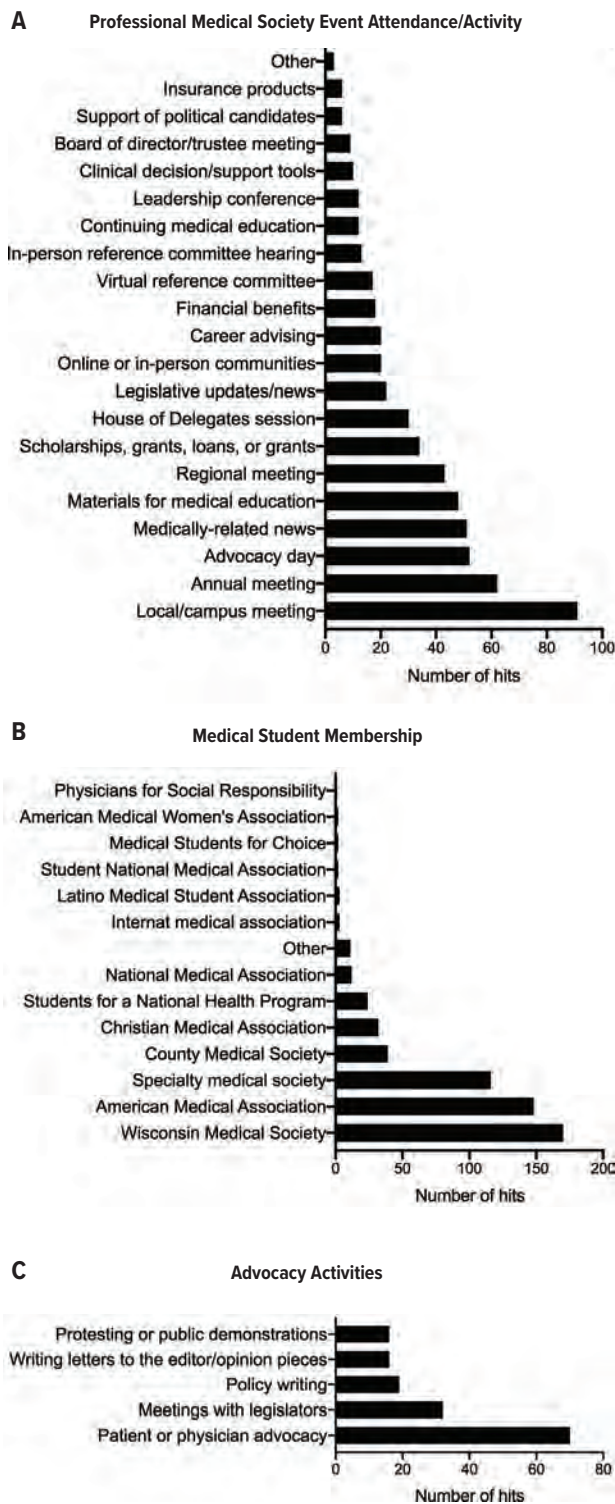
Characteristics displayed are divided into categorical (dummy coded) and continuous variables; each characteristic was used as the dependent variable in a logistic regression model to predict the odds of participation in a professional medical society. For extracurricular participation, the odds ratio corresponds to the change in odds for every 10-point change in self-reported score. For Likert-style questions, results are displayed in 2 formats: (1) percent agree that is a combination of agree and strongly agree and (2) the mean and SD using the following scale: -4 = strongly disagree, -1 = disagree, 0 = neutral or no opinion/not applicable, 1 = agree, and 4 = strongly agree.

no response as the dependent variable); a separate model was run for each characteristic, and regression coefficients were converted to odds ratios (OR) with respect to the reference category (if applicable). Since response rates for individual questions varied, each logistic regression model included a different subset (n) of the total questionnaire respondents (N). The overall P value of each logistic regression model is reported via the likelihood ratio test

comparing the full model to the intercept-only model, and if statistically significant, the P values of individual factors are reported.

A general linear model was used to identify significant categorical and continuous predictors associated with the self-reported participation score in professional medical societies. Models relied on an alternative heteroskedasticity-consistent covariance matrix estimator (HCCME)^{15,16} to produce standard errors used for sig-

Figure 1. Wisconsin Medical Student Involvement in Professional Medical Societies and Advocacy



1A. Events and activities participated in that are hosted or provided by professional medical societies.
 1B. Professional medical society membership by respondents.
 1C. Events and activities participated in that are not hosted or provided by professional medical societies.

nificance testing and confidence interval estimation. An F-test for significance of the overall model together with individual regression coefficient *P* values (*t* tests) are reported, with supporting 95% confidence intervals.

Significance for all statistical testing was determined at a threshold of $\alpha = 0.05$.

RESULTS

A total of 308 (N) questionnaire responses were collected, constituting a response rate of 17.4%. Respondent characteristics are displayed in Table 1. Of note, 50.8% of respondents were female and 76.7% were white, which closely matches the demographics of Wisconsin medical students (49.4% and 71.3%, respectively).¹¹ Additionally, 10.5% of respondents were enrolled in MD/PhD programs, higher than the percentage for Wisconsin medical schools (6.8%).¹¹

Sixty-three percent (174 out of 276) of respondents actively participate or have participated in a professional medical society, and the most commonly attended events included local/campus meetings, annual meetings, and advocacy days (Figure 1A). Each respondent was, on average, a member of 2.03 professional medical societies/organizations (SD 1.40) with the Wisconsin Medical Society and American Medical Association being the top 2 most common (Figure 1B). Interestingly, many respondents reported participation in advocacy activities outside of professional medical societies, with patient/physician advocacy and meeting with legislators as the top 2 activities (Figure 1C).

Logistic regression analysis was conducted to elucidate factors that drive participation in professional medical societies (Table 1). Medical school, program type, degree type, ethnicity, and self-scored extracurricular participation (ranging from 0-100; mean 59.73, SD 26.26) did not significantly associate with the odds of participation. For ethnicity, results were aggregated into 3 groups (white only, other, and prefer not to answer) in order to avoid sparsity and instability in the model. The breakdown of ethnicity categories was as follows: White (n=135; 76.7%), Asian (n=11; 6.25%), Latino/Spanish/Hispanic (n=7; 4.0%), White + Asian (n=6; 3.4%), Black or African American (n=6; 3.4%), White + Latino/Spanish/Hispanic (n=2; 1.1%), Middle Eastern or North African (n=2; 1.1%), and prefer not to answer (n=7; 4.0%). Male gender, compared to female gender, was associated with decreased odds of participation (OR 0.51; 95% CI, 0.27-0.95). Age (OR 1.16; 95% CI, 1.01-1.33), years of medical education (OR 1.41; 95% CI, 1.18-1.69), number of memberships in professional medical societies (OR 2.02; 95% CI, 1.61-2.53), and number of extracurricular advocacy events attended outside of professional medical societies (OR 1.62; 95% CI, 1.17-2.23) was associated with a greater odds of participation. Finally, respondents generally agreed that participation in professional medical societies was beneficial for their professional development (60.5% agree or strongly agree), patients (50.0%), and medical education

Table 2. Wisconsin Medical Student Characteristics That Contribute to Self-reported Degree of Participation in Professional Medical Societies

Predictors	Estimate (β)	SE	P value
Intercept (β_0)	5.69	6.16	0.358
Number of event types attended (x_1)	2.52	0.83	0.003
Leadership experience (x_2)	28.32	7.50	<0.001
Satisfaction with participation (x_3)	2.75	1.04	0.010

F-statistic = 45.05 on 86 observations (P value = <0.001); R^2 = 0.622

Characteristics were used as dependent variables in a general linear model to predict the self-reported scale of participation (0-100); number of events attended and satisfaction with participation are continuous while leadership experience is binary (yes/no). For participation satisfaction, the regression coefficient corresponds to the change in participation score for every 10-point change in self-reported satisfaction score. SE, standard error.

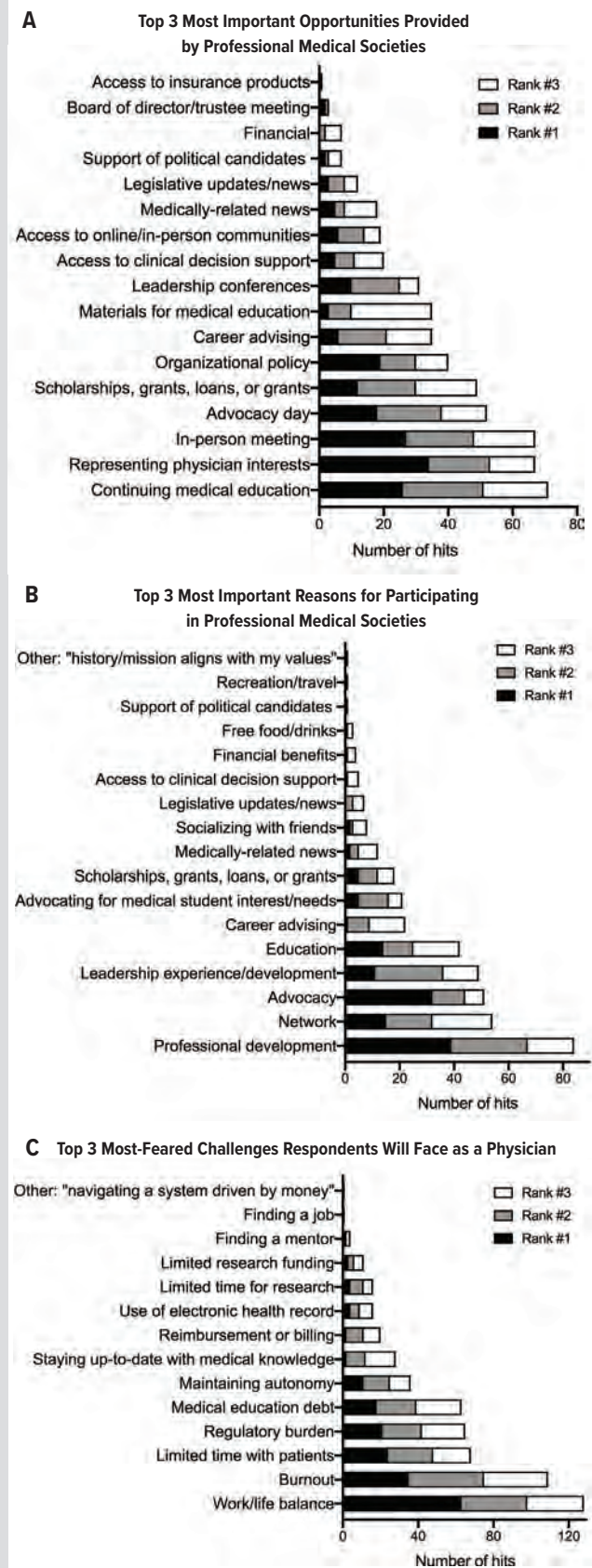
(54.0%). Likewise, respondents generally agreed that they will participate in professional medical societies as physicians (70.0% agree or strongly agree). As such, agreeing with these 4 questions all associated with increased odds of participation: professional development (OR 1.76; 95% CI, 1.39-2.23), patients (OR 1.51; 95% CI, 1.23-1.86), medical education (OR 1.43; 95% CI, 1.19-1.71), desire to participate as a physician (OR 1.53; 95% CI, 1.25-1.88).

Additional analysis was performed on the 174 respondents who actively participate or have actively participated in professional medical societies; for convenience, this subgroup of respondents will be referred to as “participants.” These participants provided a self-rated participation score from 0 (no participation) to 100 (maximum participation), which resulted in a mean score of 35.6 (SD 28.9, n = 141). Additionally, these participants attended, on average, 3.33 different event types (SD 3.31, n = 174; see Figure 1A), and overall satisfaction with participation was 67.0 (range 0-100; SD 21.5, n = 101). Of this group, 28.2% (44 of 156) of participants have served in a leadership role in a professional medical society. Using a general linear model, the number of event types attended, holding a prior leadership role, and satisfaction with participation were all significant predictors of participation score (Table 2).

When asked to choose the current most important opportunities provided by professional medical societies, the top 3 responses were continuing medical education, representing physician interest, and in-person meetings (Figure 2A). Furthermore, the most important reasons for participating in professional medical societies included professional development, networking, and advocacy (Figure 2B). Finally, the top 3 choices that are predicted to be the greatest challenges as a physician included work/life balance, burnout, and limited time with patients (Figure 2C).

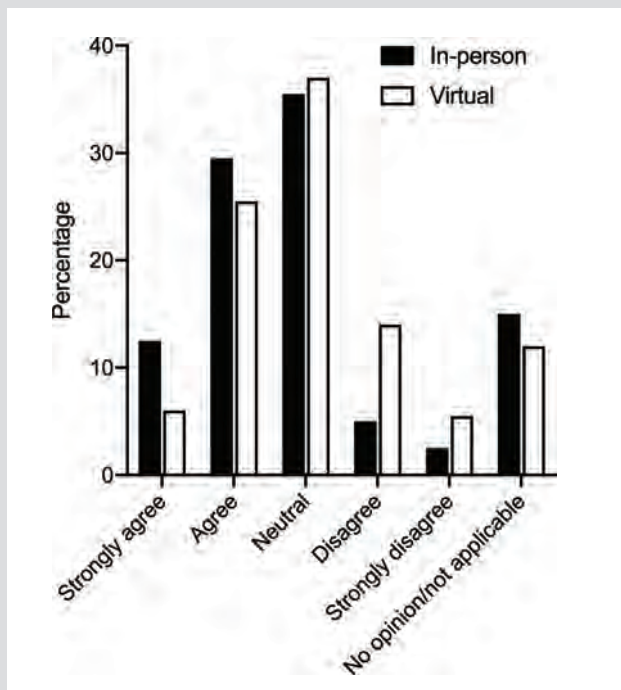
Respondents were mostly neutral on the opinion that an in-person House of Delegates, which serves as a legislative body of the organization, is important to adopt or amend policy (mean 3.00, SD 1.52; 1 = strongly disagree and 5 = strongly agree), but

Figure 2. Attitudes Driving Wisconsin Medical Student Participation in Professional Medical Societies



Data are from 200 respondents.

Figure 3. Wisconsin Medical Student Beliefs in Virtual (White Bars) vs In-person (Black Bars) Policy-Making Processes for Professional Medical Societies



a significant portion of respondents who answered this question (30 of 200; 15%) did not have an opinion (Figure 3). Finally, respondents were also mostly neutral on the opinion that a virtual or online platform to adopt or amend professional medical society policy would be as good as an in-person mechanism (mean 2.77, SD 1.37, $n=200$; 1 = strongly disagree and 5 = strongly agree).

Finally, the last item of the questionnaire allowed for free text input on the topic of participation in professional medical societies, of which 18 of 308 respondents (5.8%) added comments. Common concerns mentioned included the following (number of respondents): mismatched political views or values held by the organization (2); feeling unwelcomed or not included within the organization (3); not worth the money (2); and unfamiliarity with the purpose or benefit of participation (6). Additional comments included the following: “they must acknowledge their past and be definitive on a direction;” “I want to see the society put good policy for both patients and physicians over internal politics;” and “professional societies allow me to exert some amount of policy influence despite my relative lack of formal legislative experience.”

DISCUSSION

Participation in professional medical societies provides hands-on advocacy skill education for medical students⁹ and facilitates professional development and networking. Such extracurricular engagement serves to fulfill medical education LCME standards like service-learning and community service and addresses societal

problems and health care disparities, which develops future physicians for a lifelong duty of social responsibility.

Among the first of its kind, our cross-sectional study elucidates medical student attitudes and participation in professional medical societies on a state and national level. Approximately 63% of respondents in our study reported a history of participation in a professional medical society. We found a positive association between participation and female gender, age, years of medical education, number of memberships in professional medical societies, and number of extracurricular advocacy events attended outside of professional medical societies. Additionally, we found that medical students identified professional medical societies as important for professional development, patients, and medical education and that participating students believed that they were likely to participate in the future as a physician. We did not find an association with ethnicity, medical school, program type, degree type, and self-scored extracurricular participation. While many of the positive associations with participation were not surprising, factors such as gender do deserve attention. While the association was only modestly significant ($P=0.042$), this could represent a shift in participant demographic in these traditionally male-dominated organizations.¹⁷ More robust study would be required to verify this observation. Additionally, assessing the association between participation and ethnicity is severely limited by inadequate sampling of ethnicities beyond white, which is reflective of the Wisconsin medical student population; thus, it is imperative that further study draws from a more diverse population to better assess the impact of ethnicity on participation.

Additional analysis on those participants who gave a self-rated participation score in professional medical societies provided further insight into factors that encourage active engagement with these organizations. As expected, satisfaction with the experience in participating in professional medical societies, which was rated 67 on average (range 0-100), was positively associated with the self-rated participation score. Therefore, it is easy to conclude that appealing to medical student satisfaction can further engage those in professional medical societies. Additionally, while it is not surprising that having a history of holding a leadership position is positively correlated with an increased participation score, it is also plausible that allowing for adequate leadership opportunities within an organization can increase participation.

What remains to be fully elucidated are the characteristics and attitudes of nonparticipants, specifically highlighting the reasons why they choose not to participate in professional medical societies. For example, it is possible that these nonparticipants have differing attitudes about what challenges they are expected to face as a physician; we did conduct an analysis to test this hypothesis, but no significant differences were found between participants and nonparticipants (analysis not shown). Further study would be required to design questionnaire items with the intent of gathering

attitudes and opinions of nonparticipants, specifically probing on why they choose not to participate.

Within the surveyed attitudes toward professional medical societies, there were some comparisons between the top-rated opportunities provided by these organizations, the most important reasons for participating, and the greatest challenges expected as physicians that are worth discussing. Respondents ranked the most important opportunity as continuing medical education; however, education was the fifth reason for participating, and staying up-to-date with medical knowledge was the seventh top fear expected as a physician. Whether this represents a mismatch in expectation versus reality remains to be determined. Additionally, what heavily dominated the top fears included physician health and wellness issues such as work/life balance and burnout. Therefore, a continuing niche of professional medical societies is inclusion of advocacy on these areas, which is in agreement with representing physician interest as the second most important opportunity provided, as well as advocacy as the third highest reason for participating.

Our study includes several limitations. With no prior studies assessing the factors that drive participation in professional medical societies, we constructed 16 different regression models without any corrections for multiple comparisons; these preliminary analyses should serve as a launching point for future study and not be taken as a robust assessment. The relatively low response rate limits the generalizability of these findings to medical students in Wisconsin, as 83% of students did not respond. Additionally, the survey design and administration is not able to fully represent medical students nationally or internationally. Finally, there were no protections against a single respondent submitting multiple questionnaire responses, which could introduce some bias and overrepresentation of certain attitudes.

Nonetheless, we believe our study is the first of its kind to formally report on factors that drive medical student participation within professional medical societies, as well as the attitudes medical students have toward these organizations. As participation in professional medical societies can help achieve LCME and eventually ACGME standards by preparing medical students for lifelong involvement in advocacy, further study is warranted to elucidate the distinction between participants and nonparticipants and tap into this important educational resource.

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