

This Medical Education theme issue introduced a new collaboration between the JAOA and the American Association of Colleges of Osteopathic Medicine (AACOM) to recruit, peer review, edit, and distribute articles through the JAOA on osteopathic medical education research and other scholarly issues related to medical education.

## JAOA and AACOM

### Premedical Students' Attitudes Toward Primary Care Medicine

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**Background:** Expanded insurance coverage will likely increase the demand for primary care physicians in the United States. Despite this demand, the number of medical students planning to specialize in primary care is decreasing.

**Objective:** To explore premedical students' attitudes toward the primary care specialty.

**Methods:** Students enrolled in premedicine at a large Midwestern university were invited to complete the Primary Care Attitudes Survey (Cronbach  $\alpha=.76$ ). This 25-item survey measures attitudes about primary care on a 5-point Likert scale, ranging from 1, "strongly disagree" to 5, "strongly agree." Basic sociodemographic characteristics were assessed using descriptive statistics, and frequencies of individual survey responses were calculated using SPSS statistical software version 21.0.

**Results:** A total of 100 premedical students (mean [SD] age, 19.8 [1.5] years; 59 female, 82 white non-Hispanic, and 33 freshman) completed the survey. Of 100 students, 33 planned to pursue primary care; 66 thought that primary care physicians would always have a job; 25 thought that primary care may become obsolete as medicine becomes more specialized; 48 thought that physician assistants and nurse practitioners would take over many primary care duties in the future; 91 thought that primary care physicians make important contributions to medicine; and 84 agreed that primary care focuses on the whole patient.

**Conclusions:** Premedical students held positive views about the importance of primary care; however, many expressed uncertainty about the stability of primary care careers in the future. Further, a substantial number of students believed common misconceptions about the scope and practice of primary care, such as primary care doctors are gatekeepers and mostly diagnose colds and ear infections.

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Primary care is essential to a high-quality, well-functioning health care system.<sup>1,2</sup> Strong primary care systems are associated with improved health outcomes, reduced health disparities, lower total costs of health services, and higher quality of care.<sup>3-6</sup> With the passing of and 2015 Supreme Court ruling to uphold the Patient Protection and Affordable Care Act (ACA),<sup>7,8</sup> the United States has an opportunity to reestablish primary care medicine as the foundation of its health care system.

Currently, the United States has a considerable imbalance between primary care and specialty care.<sup>9</sup> Only one-third of US physicians practice primary care medicine, whereas other countries with similar economies have 50% to 60% of physicians practicing primary care.<sup>3</sup> As insurance coverage expands under the ACA, the shortage of primary care physicians will likely increase. The Health Resources and Services Administration estimates that 7925 primary care physicians are required to eliminate Primary Care Health Professional Shortage Areas in the United States in 2015.<sup>10</sup>

Medical schools in the United States are not graduating enough students who plan to pursue primary care,<sup>11-14</sup> further contributing to the shortage in primary care physicians. To address the primary care shortage, the Council on Graduate Medical Education recommended that 40% of US physicians are needed to practice primary care.<sup>15</sup> However, increasing the number of practicing primary care physicians cannot be achieved with the current selection rate of 20%.<sup>14,16</sup> Thus, innovative strategies and educational approaches to make primary care a more attractive career choice are needed.<sup>14,17</sup> Before medical education can integrate new strategies and approaches, more research is needed to better understand factors that influence students' career choices. Attitudes toward primary care early in students' educational experiences may be a key factor influencing whether or not they elect primary care medicine as a career choice. Thus, the purpose of this study was to assess premedical students' attitudes about primary care medicine.

## Methods

This descriptive cross-sectional survey study assessed premedical students' knowledge and attitudes about primary care. Surveys were administered in the summer and fall semesters of 2014. The University Office of Research Compliance at the Ohio University Heritage College of Osteopathic Medicine in Athens approved the protocol and all recruitment procedures and materials.

### Participants

Premedical students in all undergraduate years were invited to participate in the study. All students enrolled in premedicine at the university's Pre-Professional Advising Center were sent an e-mail through the center's listserv. An advisor from the center assisted the study team by distributing the e-mail to the premedicine student listserv. The e-mail included a brief introduction to the study and a link to the survey. A follow-up e-mail was sent 2 weeks after the initial e-mail to remind students about the study. Participation was voluntary. The Pre-Professional Program includes students from all undergraduate majors who plan to apply to medical school. Approximately 300 students were enrolled in the premedicine program at the time of the study.

### Data Collection

Students were recruited via e-mail from premedical science classes and organizations as well as through word of mouth. All students provided informed consent online before participation. A standard consent form was created and uploaded to the welcome screen of the survey link homepage. Rather than asking for students to electronically sign their names, we created statements for them to click that indicated their consent preference. Specifically, to consent, students were asked to click a radio button indicating "Yes, I consent to participate in this study. I may withdraw my participation at any time." To decline, students clicked a radio button indicating "I decline to participate." To avoid coercion, the welcome screen and the informed consent document below it specified the voluntary nature of

participation. Potential students were explicitly informed that their responses had no bearing on academic performance and that they could decline participation at any time during the process. No researchers were present when potential students agreed or declined to participate so that they would not feel pressured. Students with questions about the study were directed to e-mail or phone the study investigators (E.A.B., D.A.W.). Survey completion took approximately 15 minutes.

Students completed the survey online through the electronic survey service Qualtrics. Qualtrics permitted the research team to download students' survey responses into a spreadsheet without including identifying information (eg, e-mail address, name) to protect their confidentiality.

### Data Analysis

Demographic factors were assessed using descriptive statistics and presented as means and SDs or sample size and percentages. Frequencies of individual question responses were also calculated.  $\chi^2$  tests were used to examine differences for each survey question by sex, growing up in a rural community, year in school, type of medical degree students planned to earn, whether they planned a career in primary care, and whether they had a primary care physician. Statistical significance was defined as a *P* value less than .05. All analyses were conducted with SPSS statistical software version 21.0 (SPSS Inc).

## Results

One hundred of the approximately 300 premedical students completed the survey for a response rate of 33%. The mean (SD) age of the students was 19.8 (1.5) years, 59 were women, 82 were non-Hispanic white, and 12 grew up in a rural community (Table 1). Thirty-three students were freshman, 18 planned to earn a doctor of osteopathic medicine degree, 33 planned to pursue a career in primary care, and 72 currently saw a primary care physician. Frequencies for the students' responses to each of the 25 survey questions are presented in Table 2. In the following paragraphs, the responses "strongly agree" and "agree"

are aggregated as "agree," and the responses "strongly disagree" and "disagree" are aggregated as "disagree."

Eighty-seven students agreed that there is an increased demand for more primary care physicians; however, 44 students did not think that primary care physicians would always have a job. Twenty-five students thought that primary care may become obsolete as medicine becomes more specialized, and 48 students thought that physician assistants and nurse practitioners would take over a lot of primary care duties in the future. Despite uncertainty about the future of primary care, 91 students thought that primary care made important contributions to the field of medicine.

Students agreed with several common misconceptions about primary care. For example, 48 students thought that primary care physicians were "gatekeepers," mostly referring patients to other specialists, and 67 thought that primary care physicians spent a lot of time diagnosing colds, ear infections, etc. Also, 50 thought that primary care was equally as exciting as other specialties. Although many students agreed with these misconceptions, most (78) thought that primary care was a well-respected field in medicine. Importantly, students were aware that primary care focuses on the whole patient and that primary care physicians concentrate on prevention as well as the treatment of disease (84 and 82, respectively).

More female students thought that (1) primary care physicians are less likely to be sued for malpractice ( $\chi^2=7.18$ , *P*=.028); (2) primary care physicians build long-term relationships with patients ( $\chi^2=6.41$ , *P*=.041); and (3) primary care physicians have more opportunity for work-life balance ( $\chi^2=6.57$ , *P*=.037). Students who grew up in a rural community were less likely to agree that primary care physicians had the opportunity to perform different procedures (eg, colonoscopy, thoracenteses, insertion of central intravenous catheters) ( $\chi^2=9.40$ , *P*=.009). Freshmen were more likely to agree that (1) primary care physicians build long-term relationships with patients ( $\chi^2=18.96$ , *P*=.004), (2) medicine is becoming specialized and primary care may become obsolete ( $\chi^2=16.26$ , *P*=.012), and (3) primary

care physicians focus on prevention as well as management of disease ( $\chi^2=14.43$ ,  $P=.025$ ). Students who did not plan on pursuing primary care medicine were more likely to agree that primary care is not as challenging as other specialties ( $\chi^2=7.07$ ,  $P=.029$ ) and that training in other specialties is harder than primary care training ( $\chi^2=10.99$ ,  $P=.004$ ); these students were also less likely to view primary care as equally exciting as other specialties ( $\chi^2=6.72$ ,  $P=.035$ ). Students who planned on earning a doctor of medicine (ie, MD) degree were less likely to agree that training in other specialties is harder than primary care training ( $\chi^2=6.72$ ,  $P=.035$ ). Students who currently had a primary care physician were more likely to agree that primary care medicine is diagnostically challenging ( $\chi^2=8.51$ ,  $P=.014$ ).

## Discussion

The majority of premedical students recognized the demand for primary care and valued its contributions to the health care system. Specifically, most students acknowledged the comprehensiveness and continuity of care provided by primary care physicians. Although these students reported positive attitudes toward primary care, many still believed common misconceptions about the field, including a high frequency of patient referrals to specialists (ie, gatekeepers), and narrow scope of practice (eg, mostly diagnosing colds and ear infections). Further, one-fourth of the students expressed uncertainty about the future of primary care, and nearly half thought that physician assistants and nurse practitioners would assume primary care responsibilities.

Primary care is the cornerstone to building a health care system that promotes high-quality individual-level and population-focused care.<sup>9,18</sup> A strong primary care system emphasizes positive health outcomes, effectiveness and efficiency, health equity, and collaboration among health care professionals.<sup>3,9,18</sup> Primary care is characterized by first contact, patient-centeredness, longitudinality, comprehensiveness, coordination of care, and community orientation.<sup>3,9</sup> Countries with strong primary care systems report lower health care spending,

**Table 1.**  
**Characteristics of Premedical Students Surveyed About Their Attitudes Toward the Primary Care Specialty (N=100)<sup>a</sup>**

Characteristics	Participants
Age, mean (SD), y	19.8 (1.5)
<b>Sex</b>	
Female	59
Male	41
<b>Race<sup>b</sup></b>	
Non-Hispanic white	82
Hispanic	5
Mixed race	5
Black	3
Asian	2
American Indian	1
Other	1
<b>Community Where Participant Was Raised<sup>b</sup></b>	
Major metropolitan area ( $\geq 1$ million people)	3
Metropolitan area (500,001-1,000,000 people)	2
City (100,001-500,000 people)	8
Small city (50,001-100,000 people)	30
Town (2500-50,000 people)	44
Rural area (<2500 people)	12
<b>Undergraduate Year<sup>b</sup></b>	
Freshman	33
Sophomore	28
Junior	19
Senior	19
<b>Preferred Medical Degree Program<sup>b</sup></b>	
Osteopathic	18
Allopathic	31
Either osteopathic or allopathic	50
<b>Planning to Specialize in Primary Care<sup>b</sup></b>	
Yes	33
No	65
<b>Currently Have a Primary Care Physician</b>	
Yes	72
No	28

<sup>a</sup> Data are given as No. unless otherwise indicated.

<sup>b</sup> Participant responses missing.

**Table 2.**  
**Premedical Students' Attitudes Toward the Primary Care Specialty (N=100)<sup>a</sup>**

In general, I believe that...	Disagree <sup>b</sup>	Neutral	Agree <sup>c</sup>
1. There is a demand for more primary care physicians.	5 (5.0)	8 (8.0)	87 (87.0)
2. Primary care physicians will always have a job. <sup>d</sup>	16 (16.2)	17 (17.2)	66 (66.7)
3. Primary care makes important contributions to medicine. <sup>d</sup>	2 (2.0)	6 (6.1)	91 (91.9)
4. Primary care medicine is diagnostically challenging.	4 (4.0)	24 (24.0)	72 (72.0)
5. Primary care physicians receive the same amount of training as other specialists. <sup>d</sup>	35 (35.4)	28 (28.3)	36 (36.4)
6. Primary care physicians are on call a lot of the time.	27 (27.0)	33 (33.0)	40 (40.0)
7. Primary care physicians have the opportunity to perform different procedures.	12 (12.0)	24 (24.0)	64 (64.0)
8. Primary care physicians are less likely to be sued for malpractice. <sup>d</sup>	46 (46.5)	27 (27.3)	26 (26.3)
9. Other specialists make more money than primary care physicians.	8 (8.0)	21 (21.0)	71 (71.0)
10. Primary care is equally as exciting as other specialties.	27 (27.0)	23 (23.0)	50 (50.0)
11. Primary care is a well-respected field of practice in medicine. <sup>d</sup>	11 (11.1)	10 (10.1)	78 (78.8)
12. In the future, PAs and NPs will take over a lot of primary care duties. <sup>d</sup>	15 (15.2)	36 (36.4)	48 (48.5)
13. Primary care focuses on the whole patient.	2 (2.0)	14 (14.0)	84 (84.0)
14. Primary care physicians are predominantly women.	52 (52.0)	35 (35.0)	13 (13.0)
15. Primary care is not as challenging as other medical specialties.	58 (58.0)	25 (25.0)	17 (17.0)
16. Primary care physicians treat a wide range of complex diseases.	13 (13.0)	10 (10.0)	77 (77.0)
17. Primary care physicians are less focused on research. <sup>d</sup>	31 (31.3)	25 (25.3)	43 (43.4)
18. Primary care physicians are "gatekeepers" and mostly refer to other specialists.	23 (23.0)	29 (29.0)	48 (48.0)
19. Training in other specialties is harder than training in primary care.	27 (27.0)	43 (43.0)	30 (30.0)
20. Primary care physicians build long-term relationships with patients.	3 (3.0)	8 (8.0)	89 (89.0)
21. It is impossible for primary care physicians to know enough. <sup>d</sup>	33 (33.3)	22 (22.2)	44 (44.4)
22. Primary care physicians have more opportunity for work-life balance. <sup>d</sup>	9 (9.1)	28 (28.3)	62 (62.6)
23. Primary care physicians spend a lot of time diagnosing colds, ear infections, etc. <sup>d</sup>	9 (9.1)	23 (23.2)	67 (67.7)
24. Medicine is becoming specialized, and primary care may become obsolete.	54 (54.0)	21 (21.0)	25 (25.0)
25. Primary care physicians focus on prevention as well as management of disease. <sup>d</sup>	3 (3.0)	14 (14.1)	82 (82.8)

<sup>a</sup> Data are given as No. (%).

<sup>b</sup> Values comprise "strongly disagree" and "disagree" responses.

<sup>c</sup> Values comprise "strongly agree" and "agree" responses.

<sup>d</sup> Item is missing 1 response.

**Abbreviations:** NP, nurse practitioner; PA, physician assistant.

reduced health disparities, and higher quality of care.<sup>3</sup> The ACA<sup>7,8</sup> has the potential to strengthen the primary care system in the United States<sup>1</sup> and to increase the nation's capacity of primary care physicians.<sup>19</sup> This legislation provides funding for primary care curriculum development in medical schools. Curricula devoted to primary care can inform premedical students about the importance of primary care in the health care system.<sup>20</sup>

The current study builds on earlier work examining medical students' attitudes toward primary care.<sup>17,21-28</sup> Studies have identified several factors that influenced medical students' career choice, including perceived value of the specialty, intellectual challenge, lifestyle factors (eg, hours worked), and income.<sup>29-31</sup> Similar to the findings in the current study, medical students were found to value the contributions of primary care medicine; however, many held negative attitudes about the field, including the view that primary care physicians earned less income<sup>17,26,28-30</sup> and had lower levels of scientific prestige compared with other specialists.<sup>23,24,26-28</sup> It is important to note that on average, primary care physicians earn less than other medical specialties<sup>32</sup>; however, primary care physicians earn more than 4 times the amount of the national wage average.<sup>33</sup> Other similarities between the current findings and previous studies are students' perceptions that primary care is less intellectually challenging than other specialties<sup>17,23</sup> and is mainly involved in managing predominantly minor health conditions.<sup>17,23</sup> These findings necessitate learning environments that encourage students to enter primary care while simultaneously changing negative attitudes toward and misperceptions about the field.

Research has shown that curricula can change attitudes and dispel negative stereotypes about primary care.<sup>17,23,28,34-38</sup> Given the shortage of primary care physicians and the established importance of primary care, students may benefit from in-depth exposure to primary care early in their premedical education. Premedical education comprises a series of undergraduate courses in science and mathematics, such as organic chemistry, biology, biochemistry, physics, math, and microbiology. Courses in health systems, strategies, and policy are seldom included

as requisite classes for premedical education. However, in the face of the rapidly changing US health care system and the shortage in primary care physicians, premedical students would benefit greatly from curricula that address such areas. Learning environments that demonstrate primary care medicine in ways that are intellectually and diagnostically challenging, professionally fulfilling, and compatible with work-life balance may encourage students to pursue this field in the future.<sup>14</sup> One approach to creating a positive learning environment is to develop primary care career workshops and programs. Research has shown that workshops and programs can inform students about career plans and raise awareness about different medical specialties.<sup>39,40</sup> The use of clinical vignettes and role modeling in workshops may be a novel teaching method to discuss attitudes toward primary care and increase opportunities for positive role-modeling experiences in the preclinical setting.<sup>41</sup>

For example, a clinical vignette that describes a primary care physician performing a history and physical examination on a patient presenting with flu-like symptoms can facilitate discussions about the importance of treating perceived minor illnesses. The negative perception is that one disease affecting the body is more important than another. Premedical students can learn that the reason a patient comes in to see the physician opens up a myriad of opportunities for the physician to make a real impact on multiple facets of the patient's health. In turn, premedical students can learn that a diagnosis of the influenza virus can lead to a high-impact medical encounter. For example, an encounter can facilitate a discussion about routine screenings (eg, colonoscopy, skin cancer), an assessment of comorbid conditions (eg, impact of influenza on blood glucose readings for a patient with type 2 diabetes mellitus), and counseling on lifestyle behaviors (eg, diet, exercise, tobacco use). Further, students can learn the importance of establishing a rapport with patients to build a trust-based relationship.<sup>41</sup>

Limitations to the current study include the homogeneity of the study sample from 1 university in the Midwestern United States, the cross-sectional study design, students' self-selection, and the self-reported

data, which are vulnerable to selection bias and social desirability bias. The study sample limits the ability to generalize the findings to all premedical students in the United States. Further, only students enrolled in premedicine at the university's Pre-Professional Advising Center were sent an e-mail with the link to the study. Other students considering medical school who were not enrolled in the university's premedicine program did not have the opportunity to participate. Moreover, one-third of the premedical students enrolled at the university completed the survey. The participating students who volunteered to complete the survey may have been more willing or motivated to answer questions about primary care compared with the students who did not participate. Another important consideration is that this Midwestern university includes a large osteopathic medical school. The presence of an osteopathic medical school may have influenced students' attitudes toward primary care, given that the osteopathic community has historically demonstrated a greater commitment to support primary care medicine. We did not ask students whether they had family members who practiced medicine and, if applicable, their specialties, which could have influenced students' attitudes about primary care. In addition, we did not ask students who currently had a primary care physician about the quality of their patient-physician relationship. Collecting this information would be necessary for future research on this topic.

Research with a larger, more heterogeneous sample should involve the collection of mixed-methods data to determine whether or not early attitudes toward primary care influence acceptance to medical schools and subsequent choice of specialty. Additionally, research is needed to assess how attitudes change over time with and without curricular interventions to explain potential secular trends, such as the transition to the single accreditation system for graduate medical education in the United States and its impact on primary care career choice. In particular, curricula that dispel negative stereotypes about primary care should be integrated into premedical education.

## Conclusion

Many students expressed uncertainty about the stability of primary care careers in the future. Further, a substantial number of students believed common misconceptions about the scope and practice of primary care. As population growth, aged population growth, and insurance expansion increase the demand for primary care physicians in the United States, the need for more medical students to choose primary care will increase. To address the growing primary care shortage, novel methods to engage the physicians of tomorrow is paramount to rebuilding the US primary care physician foundation. Therefore, increased exposure to and immersion in primary care early in premedical education may be necessary to dispel misconceptions and encourage students to pursue this field in the future.

## Author Contributions

Dr Beverly and Ms Wietecha provided substantial contributions to conception and design, acquisition of data and data analysis; Drs Beverly, Rush, and Law and Ms Nottingham provided substantial contributions to the interpretation of data; Dr Beverly drafted the article; Drs Beverly, Rush, and Law and Ms Nottingham revised the article critically for important intellectual content; all authors gave final approval of the version of the article to be published; and all authors agree to be accountable.

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