

Impact of Desire to Work in Underserved Communities on Selection of Specialty among Fourth-Year Medical Students

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Objective: The objective of this study was to explore the specific factors that influence medical student's choice of primary care as a specialty. Special attention is given to the influence of desire to work in underserved communities on selection of a specialty.

Design and Settings: A web-based survey of factors affecting choice of specialty was completed by 668 fourth-year students from 32 medical schools.

Results: Students interested in primary care reported an increased likelihood of working with underserved populations when compared with other specialties. The independent impact of both student's social compassion attitudes and values, and subjective and reinforcing influences on the selection of primary care, when compared with all other specialties, was strong. Personal practice-oriented considerations showed an independent negative impact on the selection of primary care when compared with surgery and support specialties. Financial considerations strongly influence the selection of support specialties. Medical training experiences showed an independent influence on the selection of surgery over primary care.

Conclusion: The need for primary care physicians and specialists in underserved communities is considerable. Addressing health disparities in underserved communities requires a concerted effort to increase the availability of primary care providers in these communities. This study observed that primary care practice or specialty selection by medical students is influenced by individual values and subjective external influences other than predicted by medical training alone. This observation necessitates a closer determination of strategies required to ensure an increase in the number of primary care physicians serving underserved communities.

Key words: education ■ primary care ■ underserved communities ■ specialties

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INTRODUCTION

According to the survey study of the National Graduate Medical Education (GME) Census, conducted by the American Medical Association (AMA) and Association of American Medical Colleges (AAMC), there were 101,291 active physicians-in-training during the 2004-2005 academic year—the highest ever recorded by the National GME Census in ACGME-accredited programs.¹ An increasing proportion of these physicians are pursuing subspecialty training, while the number in primary care specialties has leveled off after a period of popularity in the mid 1990s.^{1,2} The recent decreases in the number of students entering primary care specialties have prompted reconsideration of what is known about the factors affecting specialty choice.³

The need for physicians in underserved communities has been well documented and is becoming more critical as demographic changes create a more diverse population.^{4,5} The substantial growth in the number of physicians in the United States has not eliminated the problem of geographic maldistribution; most of this growth is comprised of specialists who practice in affluent metropolitan areas, while most of the underserved population live in rural and inner-city areas and need enhanced primary care services.⁵ The 16th Report of the Council on Graduate Medical Education (COGME) indicates that this nation is likely to face a shortage of physicians in the coming years (a shortage of ≥85,000 physicians in 2020), and this projected shortage of physicians is likely to have the greatest impact on underserved and poorer communities that have historically had the greatest difficulty recruiting and retaining physicians.⁵

There have been a number of attempts at understanding the reasons behind physicians' specialty choices.^{2,6-19} The factors most often cited to explain variation in specialty choice include expected income, intellectual content of the specialty, research opportunities in the specialty, prestige of the specialty, gender, race/ethnicity of the physician, family considerations, perceived controllable lifestyle, patient centeredness and others. In addition, reviewing existing literature, Senf and colleagues (2004) identified 36 articles on family medicine specialty choice published since 1993. Multiple factors are consistently shown to be related to the choice of the specialty of family medicine.²⁰

The growing shortage of primary care physicians in medically underserved areas of the nation led medical schools and policymakers years ago to design and fund numerous innovative medical education programs to foster the development of a more-balanced physician workforce.²¹ There is some evidence that primary care clinicians in general, and family physicians in particular, have a greater propensity to care for underserved populations than other specialties.^{22,23} Additionally, receiving training in historically minority medical schools, shown to be associated with the intention to practice medicine in underserved communities, suggests that a medical education program can have a positive effect on students' goals to practice in underserved areas.²⁴ However, only four historically minority medical schools exist in the United States.²⁵

The objective of this study was to investigate the specific factors that influence a student's choice of primary care as a specialty. Special attention is given to the influence of desire to work in underserved communities on selection of a specialty. It is hypothesized that, regardless

of demographic characteristics, students who show more interest working with underserved populations are more likely to select primary care as a specialty.

METHODS

A cross-sectional 51-item, voluntary, anonymous, web-based survey was developed for this study. The link to the survey was sent to the associate deans of student affairs (or equivalent) of all 126 U.S. medical schools, with a request for permission to survey their students. Thirty-two medical schools (25.4%) agreed to participate in the study. In addition to demographic information, the survey measured the influence of 31 factors on specialty choice on a Likert scale ranging from 1–5. The study was conducted with the approval of the Charles R. Drew University of Medicine & Science Institutional Review Board.

Outcome Variable

The primary outcome variable of interest was self-reported medical students' first practice specialty choice. To facilitate analysis, specialty choices of students and mentor specialties were classified into four groups commonly used for reporting by the AAMC.²⁶ These groups are primary care (including general family practice, internal medicine and general pediatrics), medical subspecialties (including specialized family practice, internal medicine and pediatrics, dermatology, and psychiatry), surgery (including obstetrics and gynecology, general surgery, ophthalmology and surgical subspecialties), and support specialties (anesthesiology, emergency medicine, pathology, physical medicine and rehabilitation, preventative medicine, and radiology).

Table 1. Factor analysis: grouping of factors into six groups and corresponding factors on survey

Social Compassion Attitudes and Values	Personal Practice- Oriented Considerations	Financial Considerations	Family & Personal Concerns	Subjective and Reinforcing Influences	Medical Training Experiences
1. Volunteer experience with underserved	1. Desired practice setting	1. Receipt of financial aid in medical school	1. Children or family responsibility	1. Role models prior to medical school	1. Role models in medical school
2. Obligation to serve (public health)	2. Desired future practice (HMO, private, etc.)	2. Debt for medical education	2. Marriage or spouse	2. Interest in specialty prior to medical school	2. Clerkship experience
3. Clerkship experience with underserved	3. Extra-curricular activities	3. Potential income of specialty	3. Hours and lifestyle of specialty	3. Parental preferences	3. Sub-internship experience
4. Policies and mission of medical school	4. Desired geographic location			4. Peer pressure	4. Role of primary mentor
5. Personal social values					

Statistical Analyses

Factor analysis was performed to identify underlying variables that explain the pattern of correlations within the variables and to identify factors that explain most of the variance observed. In the bivariate analysis, one-way analysis of variance (ANOVA) and Chi-squared tests were performed to document the relationship between the outcome variable (first specialty choice) and independent variables. Multivariate techniques, including multinomial logistic regression, were utilized. Correlations between independent variables and factors were examined to check for multicollinearity. Variables significant at the 0.05 level in the stepwise runs were entered into full model runs.

RESULT

There were 668 survey responses from 32 U.S. medical schools. Responses represented 19% of fourth-year students from the 32 schools that participated in this study. Comparison of the study data with 2003 AAMC Graduation Questionnaire found that our data were comparable to national demographic data for race, age and region of medical school.²⁷

Primary care specialties were the first choice for 35% of the respondents, 26% chose a surgical specialty, 24% chose a support specialty and 15% chose a medical subspecialty. When asked whether they were interested in serving the underserved, 81% responded “yes.” Students chose their specialty, during clerkships (61%), before medical school (22%), during basic science years (9%) or after their clerkships (8%).

Specialties of primary mentors were reported by 497 students (76% of sample), of which 80% self-selected their mentor, and 20% had a mentor assigned to them. Student specialty choice correlated with that of the mentor ($p < 0.05$). There was no significant difference in correlation based on how the student-mentor relationship originated. However, it is important to note that assigned mentors were significantly more likely to be in

primary care specialties than chosen mentors ($p < 0.05$). Students choosing primary care are more likely to desire working with the underserved than students choosing support specialties ($p < 0.05$). Medical subspecialties and surgery had intermediate rates that did not differ significantly from other groups.

Bivariate and Multivariate Analyses

The principal component factor analysis with the 23 items produced six distinct, but conceptually meaningful groups of factors (Table 1). These were named Social Compassion Attitudes and Values, Personal Practice-Oriented Considerations, Financial Considerations, Family and Personal Concerns, Subjective and Reinforcing Influences, Medical Training Experiences). The first factor, Social Compassion Attitudes and Values, comprised five items regarding the experiences of participants with underserved and disadvantaged communities as well as personal values and obligations to serve minority and disadvantaged populations. The second factor, Practice Oriented Considerations, contained four items regarding the desired future geographic location, setting and type of practice. Financial Considerations contained three items that directly reflect the financial concerns of the participants. Family and Personal Concerns contained three items regarding family, children and spouse as well as hours/lifestyle of specialty. Subjective and Reinforcing Influences was associated with four items that measured premedical conceived interest as well as parental preferences and peer pressure. The last factor, Medical Training Experiences, carried four items that measured medical school influences (clerkship and subinternship experiences) and the influence of mentors. These six factors explained just over 60% of the variance observed in all 23 manifest variables; the internal consistency of each subscale measured by Cronbach’s alpha were between 0.66–0.74.

Table 2 shows a bivariate analysis between specialty choice and demographic characteristics. Female and

Table 2. Bivariate relationships: selection of the first specialty choice versus demographic characteristics and subscale predictor variables (n=668)

Independent Variables	χ^2 , df & p (F, DF & p)
Age	(7.07; 3 & 656; $p < 0.001$)
Gender	29.7; df=3; $p < 0.0001$
Ethnicity	8.01; df=6; $p < 0.234$
SES of parents	6.3; df=9; $p = 0.84$
Marital status	0.9; df=3; $p = 0.80$
Inner-city/rural area	2.9; df=3; $p = 0.40$
Social compassion attitudes and values	(45.5, 3 & 656; $p < 0.0001$)
Personal practice-oriented considerations	(9.0; 3 & 656; $p < 0.0001$)
Financial considerations	(16.2; 3 & 656; $p < 0.0001$)
Family and personal concerns	(12.4, 3 & 656; $p < 0.0001$)
Subjective and reinforcing influences	(3.2; 3 & 656; $p < 0.025$)
Medical training experiences	(7.4; 3 & 656; $p < 0.0001$)

younger medical students in our sample were more likely to select primary care as their first choice and least likely to choose support specialties ($\chi^2=29.7$, $p<0.0001$; $F=7.0$, $p<0.001$). Race, socioeconomic status (SES) of parents, marital status and geographic location of medical school showed no significant association with the selection of a specialty. All six factor groups were significantly associated with the first specialty choice. Overall, the zero-order bivariate analysis of data shows that medical students who participated in this study were more likely to select primary care as their first choice if they showed stronger social compassion attitudes and values, and were less concerned about financial issues. However, the support group was the most likely choice and the surgery group the least likely choice if the applicant paid more attention to personal practice-oriented considerations. Subjective and reinforcing influences showed the least impact on specialty selection and influenced the choice of support specialties the most. Medical training experiences were a strong determinant factor for selection of the surgery group as the first specialty choice.

Employing the multinomial logistic regression technique, the probability of selecting primary care, surgery, support and medical subspecialty was analyzed for the possible effects of demographic characteristics and six

factor groups identified in factor analysis. The results relating the selection of the first specialty choice to the 11 selected independent variables/subscales are summarized in Table 2. To verify the absence of multicollinearity, the correlations among the predictors were also examined. The interrelationships among independent variables/subscales were found to be negligible. In addition, controlling for all demographic and SES variables, each subscale identified in the factor analysis exerted a different impact on selection of the first specialty choice. The estimated Nagelkerke R^2 indicates that this set of variables/subscales explains >40% of the variance of the dependent variable.

Table 3 reports the odds ratio comparing surgery, medical subspecialty and support groups with primary care. This table testifies that in multivariate analysis, including all other variables and subscales, age remains a significant variable that exerts an independent impact on selection of the first specialty choice. Overall, younger medical students were more likely to select primary care over other specialties even after all other variables and factors were accounted for. The impact of gender on selection of specialty, controlling for other variables and subscales, was limited to selection of support versus primary care. Female medical students showed a greater interest in selecting primary care, whereas their male

Table 3. Multinomial logistic regression between other practice choices versus primary care by demographic and subscale predictors of first practice choice (n=668)

Independent Variables/Factors	Medical Subspecialty		Surgery		Support	
	B	Exp (B)	B	Exp (B)	B	Exp (B)
Age						
21–25	-1.6	0.20**	-1.3	0.26**	-1.9	0.15***
26–30	-1.3	0.28*	-0.77	0.46	-1.3	0.29*
≥31	r	r	r	r	r	r
Gender	0.04	1.05	0.29	1.33	0.64	1.90*
Ethnicity						
White	0.01	1.00	0.15	1.17	0.16	1.18
Asian/Pacific Islander	r	r	r	r	r	r
Other	-0.16	0.95	-0.64	1.90	-0.60	0.55
SES of Parents	0.36	1.44	0.04	1.04	-0.05	0.95
Inner-City/Rural Area	-0.29	0.75*	-0.13	0.88	-0.24	0.79
Social Consciousness (A&V)	-0.70	0.50***	-0.97	0.38***	-1.35	0.26***
Personal Practice	0.04	0.96	-0.29	0.75*	0.38	1.46**
Financial Considerations	0.36	1.43*	0.38	1.46**	0.92	2.52***
Family and Personal Concerns	-0.11	0.90	0.52	0.60***	0.25	1.29*
Subjective Influences	-0.03	0.98	-0.04	0.96	-0.36	0.70**
Medical Training Experiences	0.01	1.01	0.55	1.74***	0.07	1.07

-2 Log likelihood of final model = 1,358.4; $P<0.0001$; Nagelkerke $R^2 = 0.418$

"r" refers to reference group; * refers to $p<0.05$; ** refers to $p<0.01$, and *** refers to $p<0.001$; First Specialty Choice groups are: 1) primary care, 2) medical subspecialty, 3) surgery, and 4) support (primary care is selected as the reference and is used for comparison with the other 3 specialty groups); B: estimated coefficients; Exp (B): the change in odds when a given independent variable increases by one unit. For example, when comparing medical specialties choice by age, from first group (21–25) to reference group (≥31 years) the odds are decreased by a factor of 0.20, as is shown in the Exp (B) column. Indicating that student at age group 21–25 years of age are 0.20 times less likely to select medical subspecialty over primary care (as their first choice), compared to age group ≥31 years of age. Inverse of 0.20 times is five times, therefore, one may express this as, younger group compared to older group are five times more likely to select primary care as their first specialty over medical subspecialty.

counterparts showed a greater interest in selecting a support specialty as their first specialty choice. Race, SES status of parents and the area where they grew up (inner-city versus rural area versus suburban, etc.) showed no independent impact on selection of specialty.

Controlling for demographic variables and SES of parents, each of the six factors exerted a significant independent impact on the selection of the first specialty choice. With no exception, the independent impact of social consciousness attitudes and values on the selection of primary care compared with all other specialties was strong. Medical students who scored higher on this factor were 2, 2.6 and 3.9 times more likely to select primary care over medical subspecialty, surgery and support groups, respectively ($p < 0.001$ for all). Personal practice-oriented considerations showed an independent impact on the selection of primary care only when compared with surgery and support. Those medical students who were more concerned about personal practice-oriented considerations items, such as the desired future geographic location, setting and type of practice, were 1.5 times less likely to select primary care over support ($p < 0.01$). However, they were 1.3 times more likely to select primary care over surgery ($p < 0.02$). Financial considerations exerted the strongest impact on the selection of support as the first specialty choice over primary care by a factor of 2.5 to 1 ($p < 0.0001$). The impact of financial considerations on selection of medical subspecialty and surgery over primary care were 1.43 ($p < 0.02$) and 1.46 times ($p < 0.005$), respectively. Medical students in this sample who were influenced by family and personal concerns were 1.2 times more likely to select primary care over surgery ($p < 0.001$) and 1.3 times less likely to choose primary care over support specialties. Subjective and reinforcing influences on selection of first specialty choice was limited to selection of primary care over support by a factor of 1.28 to 1. Finally, the medical training experiences of our sample only showed an independent influence on the selection of surgery over primary care (OR=1.74, $p < 0.01$).

DISCUSSION

Our factor analysis revealed six core factors that have significant impact on students' specialty choices. These factors influence specialty group choice in different ways: social compassion attitudes and values was a strong factor influencing the choice of primary care specialties over any other specialty. Personal practice-oriented considerations were more important for students selecting primary compared to surgery and less important to the choice of primary care compared to support specialties. This suggests a continuum, which has been noted before,^{10,12,14} where surgery has distinctly rigorous lifestyle requirements with less flexibility than many specialties, and support specialties such as radiology are thought to have the most "comfortable" lifestyles.^{14,28}

Financial concerns have long been recognized as having a significant role in specialty choice. In general, students with higher debt levels were less likely than their counterparts to pursue a career in primary care choice.^{8,14,29} In our study, we found this factor significantly influenced the choice of surgical and medical subspecialties over primary care specialties. As indebtedness of students rises, they must take into account their earning power in their specialty, and primary care specialties are among the least financially rewarding, though this can be mitigated through loan repayment programs that reward generalists in certain underserved communities.^{8,14}

Family and personal concerns in this study matched the pattern seen by personal practice-oriented considerations but acted as an independent factor nevertheless. Subjective and reinforcing influences were only significant in the choice of primary care over support specialties. This may reflect more contact with primary care providers in the students' lifetime or a generalized concept of meeting expectations of being "a doctor," whereas support specialists are much less regularly encountered by the average medical student.

Medical training experiences were significant only in influencing the choice of surgical specialties over primary care. Surgery is not a specialty that is often familiar to premedical students. Surgical experiences and mentorship are only likely to be present during medical school, whereas the choice of primary care is often made before medical school.

Although a common specialty grouping was used in this analysis,²⁶ it may not be the most appropriate grouping to address the issues here, especially since specialties in the Support category have a wide variety in: 1) the types of cases encountered; 2) lifestyle, whether they are hospital-based; and 3) the income compared with the other three specialty groups. The names/concepts we applied to the factors identified here are also subject to further interpretation.

CONCLUSION

This study demonstrates that the overwhelming majority of medical students in training intend to serve medically underserved communities. It, however, also outlines a growing observation that while a third of students profess a desire to practice in primary care specialties a great majority of them will opt for nonprimary care specialties. Increasing the number of primary care physicians is critical in light of growing disparities in access to healthcare.⁵ Achieving a more equitable pattern of service to needy populations will require ongoing, active commitment by policymakers, educational institutions and the professions to a mission of public service and to incentives that support and promote care to the underserved.²³ During the last decade, the past success of national programs to increase the number of primary care

physicians, and the clear success of specific medical programs that train graduates that are more likely to practice in underserved communities,²⁴ demonstrate that medical programs can influence the specialties and future practice of their medical students.

With due consideration to the necessity of a healthy mix of specialty care and primary care and with an increasing medically underserved community, this study identified predictors of future practice by medical students that can inform student selection and guidance processes by medical schools with a primary mission of increasing the primary care physician workforce. These predictors include the fact that two-thirds of medical students have selected a practice specialty even before embarking on clinical clerkships and that a tendency towards social compassion and reduced financial burden will facilitate a preference for primary care. This especially raises the issue of premedical engagement in humanities as a basic prerequisite for preparing for medical school. In addition, medical students are not entirely devoid of societal influences such as libertarian versus egalitarian values and belief sets, normative societal financial expectations, family and personal lifestyle concerns, and the subjective influence of role models in deciding on practice specialties. Finally, this study suggests that a lot still needs to be done to achieve the objective of increasing primary care practice in medical students and that some gap exists between the practice choice expectations from medical students and the subjective and normative influences on these students that will ensure an increase in primary care practice for the underserved.

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