The Premedical Student: Training and Practice Expectations

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Abstract: Occupational burnout is a substantial and growing problem among current medical practitioners. Many practicing physicians lament the encroachment of managed care, infringement of physician autonomy by insurers, decreasing salaries, and decreasing prestige. In light of this unfavorable review of the profession, why are thousands of undergraduates all over the country still on the premedical track? Do these young men and women really know what kind of work environment awaits them at the end of their arduous training program? What motivates them to become physicians? In this case study, we explore the reasons for pursuing a career in medicine among a sample of premedical students at a liberal arts college on the East Coast. College administrators agree that the pre-medical curriculum is one of the most demanding and arduous study programs. What do these pre-medical students see as the ultimate goal? As a result of various volunteer, training, and shadowing experiences in the medical field, many of these students have a realistic perception of the current environment of medical practice. Although they recognize the challenges that await them, they are driven to become doctors by a deep vocational calling to serve. However, not all of the students expressed this calling. Results from this study suggest that eventual career satisfaction may be correlated with baseline career motivations. Students who are becoming doctors to fulfill parents’ aspirations, for upward mobility, and/or for prestige and high salaries may be disenchanted once they complete their training program.

Keywords: medical education, premedical student.

If the golden age of medicine has passed, why are thousands of young men and women still pursuing arduous premedical education programs in undergraduate institutions across the country? What are their expectations for what medical work will be like when they complete their training programs, and what are their motivations for becoming doctors? Numerous reports measure growing cases of physician burnout among current practitioners. Physicis publicly complain about the encroachment of managed care organizations, the rising cost of malpractice insurance, falling salaries, and the loss of autonomy. Ludmerer and Fox raised the question for medical students: “What has led them to become physicians in this era of ferment in American medicine?” We raise a similar question, though earlier in the training process: Given this dim view of medical practice, what motivates the current cohort of premedical students to pursue an arduous undergraduate and graduate training program? Past research has suggested that it is the promise of autonomy, prestige and high salaries in addition to a calling to serve that students hold unrealistic and naïve expectations about the nature of medical practice and their future work. Another explanation suggests that as the structure and character of medical practice have changed, the type of student attracted to medicine has also changed, and today’s students are driven less by the promise of autonomy, prestige and high salaries. In this case study, we explore both of these issues, the students’ visions of their future medical work and their motivations for becoming physicians. Using interviews and survey results, we explore these characteristics among a group of premedical students at a liberal arts college on the East Coast of the United States. These students all plan to enroll in medical schools in the United States. This preliminary study suggests that these students have a fairly realistic idea about the challenges and changing structure of the medical workplace. They also report, however, that despite the challenges, they are driven to a medical career by their vocational calling to serve. However, not all expressed this deep commitment to serve. Some students reported that they were becoming physicians to fulfill their parents’ wishes. We suspect that eventual overall satisfaction with career choice will be associated with initial motivations. We worry that students who are not driven by a calling to care for patients will be more likely to be dissatisfied with their career choice both during and after training.
Methodology

In the fall of 2003, an online survey was sent to 317 students at a small liberal arts college with a total admission of approximately 1400 students. A copy of the survey can be found in Appendix I. The survey instrument collected information on medical school plans, timing of decision to become a doctor, family exposure, undergraduate major, concerns about premedical and medical education, and about the level of help students received from college advisors and instructors. We also asked students to agree with statements about their own personal characteristics and with statements about their future work as medical professionals. These personal and practice statements were adapted from the Physician Worklife Study. Three hundred seventeen students had at some time during their enrollment requested to be on the premedical advisor’s email list. Therefore, the list includes everything from students wholly committed to the premedical curriculum to students toying with the idea of going to medical school. On average, about 34 students apply to medical school each year from this institution. Students were invited to take the online survey only if they were planning to apply to medical school upon graduation. This stipulation helped capture the ‘true’ premedical students from this list of names.

Recognizing the contextual limitations of survey research, we decided to supplement the survey with interviews with an additional sample of students to collect richer detail on their experiences and motivations. Gupta conducted extended interviews with 5 premedical students and O’Connell conducted a focus group discussion with 18 premedical students. The focus group met for 3 hours on 2 separate occasions while the extended individual interviews lasted between 1½ and 2 hours.

The interview/focus group guide can be found in Appendix II. The 23 students who were interviewed or took part in the focus group study were randomly chosen from a pool of 40 premedical students identified by the institution’s Health Science Advisory office and by professors in various natural science departments. Only one student withdrew from the study after deciding to withdraw from the premedical program. O’Connell and Gupta coded both sets of interviews and jointly analyzed the survey data. Survey data were analyzed using a personal-computer based version of Stata 8.0, an integrated statistical software program produced by the Stata Corporation, College Station, Texas, for Windows, Macintosh, and Unix. Stata is a data-management system with complete statistical and graphical capabilities.

This paper will use the findings from both the survey and the interviews in its analysis of significant trends. Due to our use of a combination of both quantitative and qualitative analysis, we have combined the “Results” and “Discussion” sections of the paper. The interview and focus group findings together provide a rich context for understanding the premedical student’s experience at this institution. We feel that providing the information together helps ground and enrich the numerical findings.

Table 1. Descriptive Statistics (N = 102)

| Category              | Percentage |
|-----------------------|------------|
| Males                 | 31%        |
| African American/Black| 4%         |
| Asian                 | 23%        |
| Caucasian             | 52%        |
| Latino                | 15%        |
| Middle Eastern        | 2%         |
| Native American       | 1%         |
| Other race            | 8%         |
| Age                   | 19.5 years |
| Christian             | 42%        |
| Income                | $51,000-$100,000 |

Results and Discussion

One hundred two students responded to the survey. It is practically impossible to define a definitive response rate since the initial contact list included both premedical students and students toying with the idea of attending medical school. It is also difficult as some of the respondents may drop out of the premedical program before the end of their undergraduate program. However, we did try to weed out the less committed students through the survey invitation as noted above. No respondent answered “no” to the first question of the survey: ‘At this stage or your college career, are you planning to go to medical school? As the study stands, it is a cross-sectional look and not a longitudinal study.

The responders were primarily women, with 69 female and 31 male; two responders did not record their sex. This ratio is significantly different from the current gender composition of U.S. medical school which is 49% female and 51% male. The percent of Caucasians in the sample (52%) is also significantly different than the percent of Caucasians among the first year medical school class in 2002/2003 which was 67%. We also note a smaller percent of African-American students and an overrepresentation of Latino students compared to the percent of first year medical school students. We controlled for race and gender in our analyses in order to control for certain groups’ disproportionate representation in this case study. Descriptive statistics of the sample appear in Table 1. Table 2 compares the sample population...
with the demographics of a first year medical school class in 2002/2003.

**Undergraduate Major** - We asked respondents to identify their major to test the representativeness of this sample with the wider premedical population at other institutions. The trend in premedical education has been toward a preponderance of natural science majors. We also wanted to correlate cited motivations and expectations for pursuing a medical career with declared major. Many academic and popular press articles have been written bemoaning the tendency for premedical students to be science majors at the cost of a liberal arts education. Many reformers have called for revisions in the premedical curriculum, encouraging a greater focus on the social sciences and humanities.7-10 The almost exclusive focus on hard science training has even been blamed for doctors’ estrangement from their patients and patients’ subsequent dissatisfaction with doctor/patient interactions.11 As Brieger has noted, students who do not major in the natural sciences perform as well as their science major counterparts in medical school and beyond.7

Among the students in this study, we found a high concentration of natural science majors, with 75 of 101 respondents reporting a natural science major. However, since it is relatively easy for students to double major at this institution, we find that many of the students leave this institution with both a natural science and either social science or humanities major or minor. Thirty-six of the 75 students with a natural science major also indicated a major or minor in either the humanities or the social sciences. Table 3 shows the distribution of major and double majors among the sample.

**Early Deciders and Family Influence** - Medical students have repeatedly been shown to be “early deciders.” Some analysts have argued that early decision making, especially before college age, is not unusual since it has long been Erikson’s contention, and more recently Henry’s that adolescence is the period in which identity formation is most concentrated.12 This appears particularly true for students who intend on pursuing vocations as opposed to occupations. We found that the premedical students in our sample were “early deciders.” Among our sample, 43 of the students decided to pursue a health-related career before high school, 40 decided in high school, while only 17 decided once they had come to college.

In many ways, the academic requirements for a professional career necessitate early career choice. Students work hard in high school to get into undergraduate programs with recognized premedical programs so that they can hope to get into medical school. Subsequently, early deciders tend to have some personal exposure to the field and practice of medicine before starting their college programs. The traditional model for pursuing a medical ca-

| Race/Ethnicity* | Sample Percent | Percent First Year Medical School Class 2002/2003 |
|-----------------|----------------|-----------------------------------------------|
| African American/Black | 4% | 8.2% |
| Asian | 23% | 21.9% |
| Caucasian | 52% | 67.3% |
| Latino | 15% | 7.3% |
| Middle Eastern | 2% | N/A |
| Latino | 1% | 1.1% |
| Other Race | 8% | N/A |

n=102

* Respondents were allowed to check more than one racial identity and 4 students identified themselves as 2 races.

**Table 3. Choice of Major and Double Major Status: Natural Science**

| Major | Engineering | Humanities | Social Science |
|-------|-------------|------------|----------------|
| Natural Science | 75 | 12 | 24 |
| Not Natural Science | 26 | 3 | 8 | 15 |
| Total | 101 | 20 | 39 |
I needed when I was sick….Although he worked late hours, was out of the house before I woke up and returned at around 8:00 every night, I never heard him complain about his job.” (Asian male)

“My father is a huge influence on my life… I model myself after him, and he has always urged me to follow his footsteps into medicine.” (Caucasian female)

“My mother has several debilitating disorders that has motivated me to become a healer.” (Asian female)

Some of the family influence, however, is not experienced as benign. It is pressure rather than positive role modeling or encouragement:

“Family pressure. I was a doctor even before I was born.” (Middle Eastern male)

“I’m from an immigrant family…my mother wanted me to be a doctor or a lawyer. She died of cancer and like you have to fulfill your dying mother’s wish…I think that in my case, it has really exasperated me—I feel like I have no choice other than to become a doctor…You have to fulfill your expectations because when your parents invest so much of their lives into you, the only thing that you can do to ever sort of do anything worthwhile is to repay them, to fulfill their expectations for you.” (Asian male II)

| Occupation             | Percent |
|------------------------|---------|
| general/primary physician | 21%     |
| specialist physician    | 23%     |
| physician administrator | 2%      |
| primary nursing         | 10%     |
| specialty nursing        | 4%      |
| nursing administration   | 1%      |
| pharmaceuticals         | 4%      |
| research                | 15%     |
| medical support staff    | 2%      |
| hospital administration  | 3%      |
| other medical personnel  | 5%      |
| medical educator         | 3%      |
| other                   | 7%      |

Table 5. The Medical Occupations of Family Members
Career Plans - We asked students basic questions about the kind of career they envisioned, including whether they thought they would pursue primary care or specialty care training. There has been a growing concern over the past few decades that we are producing far too many specialists in this country. Currently, about 70% of all physicians are specialists even though only approximately 20% of all patient complaints require specialty care. About 27 students thought they would pursue general/primary care training, while 35 thought they would pursue specialty training. Eight students expressed an interest in public health training, while 19 reported being unsure at this time. Another 12 reported being interested in other specialties such as dentistry, psychotherapy, and respiratory therapy.

Although others have found a significant gender effect in the choice of a primary care or specialty practice, we did not find a difference between our male and female respondents. We did, however, find a number of other interesting relationships. The Asian students in the sample were significantly more likely to cite wanting to pursue primary care training (10 of the 17 (43%) Asian students compared to 17 of the 78 (22%) non-Asian students combined). Statistical significance was determined through chi-square analyses of bivariate tables. All significance levels in this study reported at p=0.05 or better. Very early deciders (those who decided prior to high school) were also significantly more likely to cite interest in primary care (16 out of 43 (37%) very early deciders versus 11 out of 58 (19%) later deciders). Students who were majoring in the natural sciences and students with someone currently working in the medical profession were significantly more likely to cite interest in specialty training. These findings suggest interesting differences between earlier and later deciders, different undergraduate majors, and those with and without family members in the medical profession on motivations for pursuing a career in medicine and training decisions. Some studies have suggested that an expression of interest in primary care at the undergraduate level is a strong predictor of eventual primary care choice in residency.

Exposure to the Practice of Medicine

In his 1996 article, “Do premeds know what they’re getting into?”, Chuck claims that premedical students do not have an accurate sense of what the practice of medicine will be like, especially in the new era of managed care. We thought that the shadowing and volunteer work that premedical students undertake as part of their premedical curricula had to provide some, if not complete, exposure to both the joys and the challenges of a medical career. As Alexander et al. argued, even a summer course introducing college students to healthcare environments helps premedical students make more informed health care choices.

In order to assess their exposure, we asked students about their participation in a variety of premedical work, including shadowing physicians, working in hospital settings, participating in research, and internship opportunities.

We can see from Table 6 above that students had the most experience with volunteering in a healthcare setting and shadowing a physician. Only 5 students reported no experience with any of these activities, while the largest group (32 students) reported having little to moderate experience with most of these activities. T-test comparisons of the average level of experience between various groups revealed some interesting significant differences. Very early deciders reported significantly more experience with shadowing, while women respondents reported more volunteering experience. Natural science majors were significantly more likely to report experience in bio-

Table 6. Experience with Career Preparation Activities

| Pre-career Activities          | Level of Experience* Average (S.D.) | Percent with Some Experience** |
|-------------------------------|-------------------------------------|-------------------------------|
| shadowing a physician         | 2.48 (0.951)                        | 80.20%                        |
| volunteering in a healthcare setting | 2.82 (1.048)      | 84.16%                        |
| clinical experience           | 2.08 (1.032)                        | 61.39%                        |
| biomedical research experiences | 2.18 (1.255)      | 54.46%                        |
| paid work in a health care setting | 1.67 (1.045)      | 33.66%                        |
| internship(s)                | 1.86 (1.085)                        | 45.54%                        |
| premed summer programs        | 1.55 (0.932)                        | 31.68%                        |

* Scale used: 1=no experience, 2=little experience, 3=moderate experience, and 4=extensive experience.
** “some experience” defined as a dichotomous variable with 0=no experience and 1=little to extensive experience.
medical research, paid work in a healthcare setting and internship(s). Students with family incomes greater than $100,000 reported significantly more experience in every one of these pre-career activities.

We also asked students if they had spoken to a variety of individuals for career advice. Ninety-one of the 102 respondents had a conversation with at least one physician. Sixty-four had also talked to non-MD health professionals. Seventy had spoken with medical students, and about the same number had spoken to the health science advisor at their college. Only 5 of the students had not spoken to any of these professionals before taking the survey. There were no significant predictors associated with the likelihood of speaking with these professionals.

We can measure participation and have some sense of the level of experience, but it only indirectly translates into knowledge of the realities of medical practice. The interviews provide a richer description of students’ experiences. Students told us in detail about the nature of medical work, especially students who had spent up to 3 months shadowing physicians in academic, managed care, and office practice settings. They related detailed information about scheduling pressures, paperwork and administrative hassles, dealing with insurance companies, and managing difficult patients. In the full sample, only 20 students had no shadowing experience, while 56 had moderate to extensive experience.

**Expectations for Medical Practice** - The structure of medical work today is unlikely to change by the time these premedical students enter medical practice. With the influx of managed care organizations, tomorrow’s physicians will likely work as employees in a group practice setting. They will likely have their work and professional decisions monitored both by managed care organizations and insurance companies. They will see a quota of patients in order to meet the financial demands of the work setting. Their patient base will likely consist primarily of older, chronically ill patients who follow complicated medication regimens. They will be salaried, so increasing the number of patients seen or the number of procedures ordered will not necessarily translate into higher incomes. To what extent do our premedical students recognize “what they are getting themselves into?” We asked students to agree or disagree with a variety of statements about their expectations for their future work as medical professionals. The students’ responses show a perceptive sense of the realities of medical practice, both as it exists today and as it might be when these college-age students assume their work as medical practitioners. Table 7 shows their level of agreement or disagreement with various statements about medical practice. Again, we use t-test comparisons of the average score from the seven-point scale described below to compare their responses. Students in this case study were significantly more likely to agree that they would be able to help people rather than cure people, suggesting a realistic perception of the chronic medical needs of their patient population. They were also significantly more likely to agree that their work would be challenging than fun.

The students only somewhat agreed that they would make a lot of money and that they would have a prestigious job. However, we feel compelled to note that although physician salaries have dropped over the last decade, the average median income of all physicians still outscores the average median income of all other professionals, and the general population still ranks physicians as the most prestigious occupation.

Despite the fact that students reported that their work as physicians will be challenging, they also reported that their work will be personally rewarding. This is true even though the students somewhat disagreed with the statements that they will have control over the number of hours or of the pace of their work. It is also notable that students scored between a 4 (neutral) and a 5 (somewhat agree) on the following statements: “I will have enough time for my family”; “I will have enough time for my friends”; and “I will have autonomy in my medical decisions”.

Although physicians currently in practice are reporting increasing rates of dissatisfaction with the structure and nature of medical care, the hours worked, the loss of autonomy, and the loss of salary, these premedical students appear to anticipate that this will be the reality of their work lives. There were some interesting differences among the sample members, however, in their perception of their future work as medical professionals. Male students were significantly more likely than their female colleagues to agree that they would be able to cure people, that they would make a lot of money, and significantly more likely to disagree with the statement that their work would be challenging. Minority students were significantly less likely than Caucasian students to agree that their work would be fun or that the future of their job would be secure. On the other hand, students with higher incomes were significantly more likely to agree that their job would be secure. A very interesting finding was that students with more shadowing experience and those students with extensive overall experience (shadowing, volunteer work, clinical experience, research experience, and various other internships and programs) were significantly more likely to agree with the statements “I will be able to help people” and “My work will be challenging.”
or over the number of hours that they work. Given these realities, what motivates these students to pursue a medical career?

As Lovecchio and Dundes found, the students we studied appear motivated both by the academic and professional challenge of being a doctor and by a deep sense of vocation, a calling to service. Both Lovecchio’s and Dundes’ sample and this sample cite intellectual stimulation and the power to help others as significant motivating factors. For some, it is primarily fascination with the human body that drives their career choice:

“Initially I had my sights on architecture. Then, towards the end of my high school years, I was compelled by the sheer complexity and architectural genius of the human body and decided to pursue a medical career.” (Asian male III)

For others it is the intellectual stimulation and the demand of the work that entices:

“I’m the kind of person that hate vacations…I hate sitting around and I like having two weeks off from school I get really depressed because I’m watching TV and not working…I just like being under the gun and being under pressure and doing lots of work…I find life more satisfying…I get more out of my life than just sitting around.”

All of these findings suggest interesting gender, race, income, and experiential effects on future work expectations, especially the amount of pre-career exposure.

Differences between majors were slight, with natural science majors being more likely to agree with the statement, “My work will be fun,” than social science or humanities majors. But there were a number of interesting differences between students with some family member(s) in the medical field and those without any immediate family members in the field. Students without family members were less likely to agree with the statements “I will be able to cure people”, “I will be able to help people”, “I will have control over the number of hours I work”, and “I will have control over the pace of my work”. These results suggest that second-generation premedical students have more complex exposure to the medical field than first-generation students, even more than those first-generation students who acquire premedical experience through shadowing, internships, volunteer work, etc. This exposure may come through a more informal transfer of information between family members than through formal experiences such as shadowing opportunities.

Our analysis suggests that, unlike the students interviewed by Chuck, students in this sample have a much more realistic grasp on the challenges that await them in the coming years. Their focus is more on care than cure, more on challenge than fun, and includes a realization that they will not have control over the pace of their work or over the number of hours that they work. Given these realities, what motivates these students to pursue a medical career?

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But most of the comments students made in the interviews, during the focus group, and on the survey, reflect the force of a vocational “calling” behind their decision to become a medical professional, coinciding with Martini et al.’s findings that a sense of social responsibility and commitment to service had the strongest influence on the career choice of the practicing physicians they sampled.

“I think one of the most rewarding aspects of medicine is the ability to alleviate the pain of another human being. I also feel that I have a ‘calling’ to perform these responsibilities.” (Caucasian male)

“From the time I was a small child, I wanted to help everything and everyone with anything regarding their physical well-being. It was as if it were innate.” (Caucasian female)

Although the drive to care and heal may be great, how do these premedical students face the prospect of challenging working conditions? As noted by a number of those interviewed and those in the focus groups, the difference between them and the physicians who are currently burned out/burning out is that they are making the choice aware of the negative realities of the workplace, while the current cohort of practicing physicians have had to watch their work environment dramatically change for the worse over the last few decades. While the current cadre of premedical students can make the informed choice to accept the challenges of the current state of medical practice, their predecessors had chosen a different work environment, one that is now forever altered:

“...I mean the people who watch the trend change over the past 20 years are the unhappiest, you know, whereas like people who are entering the medical profession now, it is almost like you are doing something after the fact, you don’t realize how bad it is because you are used to it.” (Asian male II)

There was also a certain amount of optimism among those interviewed that they might be able to make some changes once they were members of the medical community. They hoped that some changes like more time with patients, less bureaucratic control by health maintenance organizations and insurance companies, a greater focus on primary care, and other reforms could still be instituted by practicing physicians. They were acutely aware that they needed to understand the business side of medicine if they were going to make a difference in the structure and administration of medical care while realizing their own limitations (“I can’t be a doctor and a CEO and an activist!”). One student offered this advice:

“...I think that the real reason someone should go into medical school is—and become a physician—is to take care of patients. And even though there are different issues out there in terms of what care you should give the patients and what insurance companies say you should give as opposed to what you think you should give, if you’re really out there to care for the patients, then you’ll always come out on top...” (Asian male)

**Conclusion**

The findings from this case study suggest that the next cohort of medical students have a realistic perception of the professional and practice challenges that await them if they have had adequate exposure to a variety of practice environments. As has been noted by others including Cantor et al. it is important for premedical students to have experience with managed care organizations and with the business aspects of medicine, especially if they are expected to make informed career choices. Opportunities to shadow physicians in a variety of practice settings can help increase awareness, and health service career offices can help provide these opportunities.

This study also notes an income effect. Students from families in higher income brackets gain more premedical experiences than students with lower family incomes. College programs can try to assure adequate premedical exposure for lower income students through a variety of special scholarship funds and targeted mentoring programs. Additionally, these results suggest a difference between first-generation and second-generation students. First-generation students may need more premedical exposure than second-generation students since they cannot benefit from both the formal and informal transfer of knowledge about the medical professional from family interactions. However, we also note an interesting conundrum. Although many medical educators and practitioners argue that we need to produce more primary care physicians, our study indicates that greater exposure to medical practice (at least to practicing family members) prior to medical school leads to a greater desire to seek specialty training. Providing greater exposure prior to medical school may result in the untoward production of more students interested in specialty training. Exposure during undergraduate training should, perhaps, be more focused more on primary care practice settings.
We need to explore in greater detail the effects of career motivations and family influence on these students’ perceptions of their future medical careers. Do students who pursue a medical career on the basis of “fascination with the human body” differ in significant ways from those students who are being pressured by their families, from students who have had personal experiences with medicine, or from those who express a personal “calling” to the field? We are interested in the effects of these different motivations on career choice. There are many roads the health professional can take: private or academic medicine, primary or specialty care, large group practices or smaller practice settings. We are also interested because of the potential impact on eventual career satisfaction. Does greater exposure prior to career track choice help insure satisfaction with that choice? Can similar studies help students match their underlying motivations for becoming doctors with the track that will best fulfill those motivations? These are timely questions, especially in light of the growing rate of occupational burnout among medical professionals. To answer these questions, we need to undertake a longitudinal study and follow the premedical student throughout the training process and into the practice setting.

It is not surprising to find that most students remain driven to medical careers by a vocational calling. When we think of the central aspect of medical work, the confrontation of the very meaning of human existence through the experiences of birth, death, illness and accident, we expect that the people who choose these careers will share a deep commitment to caring for people in vulnerable social, physical, and spiritual states. Coupled with the intellectual demands of a medical career, the premedical student remains a driven, hard-working, committed and devoted student. For many of the premedical students in this study, the motivation behind all of the hard work is the promise of an opportunity to serve the world, combining their intellectual talents with direct service work. At the same time, they are aware that the structure of medical practice has dramatically changed over the past few decades. They enter the training process aware of the changes, armed with some hope that they can affect some necessary reforms. Some analysts have suggested that the solution to physician burnout and dissatisfaction with the current state of medical care would be to choose students who would be happy in a “service” industry setting, more akin to a retail business, where doctors would be happier serving as employees rather than as autonomous professionals. Because of the intellectual demands of the medical curriculum, the ever-changing body of knowledge, the spiritual challenges faced by physicians, and the intimate connections between physician and their patients, we cannot envision a time when going to the doctor will ever equate to a trip to the grocery store. We should not be looking for less-motivated, less-independent medical students to solve the problem. Although the distribution of medical care has irrevocably changed, we can try to find better ways to support those who are called to the field so that they can provide caring and, hopefully, some curing for us all.

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References

1. Danto LA.. The prevention and cure of physician burnout. West J Med. 2001 May;174(5):309-10.
2. Gundersen, L. Physician burnout. Ann Intern Med. 2001 Jul 17;135(2):145-8.
3. Linzer M, Visser MR, Oort FJ, Smets EM, McMurray JE, de Haes HC; Society of General Internal Medicine (SGIM) Career Satisfaction Study Group (CSSG). Predicting and preventing physician burnout: results from the United States and the Netherlands. Am J Med. 2001 Aug;111(2):170-5.
4. Ludmerer KM, Fox RC. Caring and medical education. In: Cluff LE. and Binstock RH. The lost art of caring:a challenge to health professionals, families, communities and society. Baltimore: Johns Hopkins University Press; 2001.
5. ChuckJM.Dopremedicalstudentsknowwhatthey’regettinginto? West J Med. 1996 Mar;164(3):228-30.
6. AAMC. Facts—applicants, matriculation and graduates. Washington, DC: American Association of Medical Colleges; 2004.
7. Brieger GH. The plight of the premedical education myths and misperceptions—Part II: science ‘versus’ the liberal arts. Acad Med. 1999 Nov;74(11):1217-21.
8. Ranum, D.L. Strength of a liberal arts education in preparing future physicians. Acad Med. 1993 Sep;68(9):672-3.
9. Gruson L. Penn ends required studies for premedical student. The New York Times. 1987 Feb 13; Sect. A:16 (col. 1).
10. Sullivan R. Health Education; Training doctors early with the liberal arts. The New York Times. 1982 Nov 14; Sect. 12; Special Sect:59 (col. 1).

11. Altman LK. The doctor’s world: Physicians endorse more humanities for premed students. The New York Times. 1989 Nov 14; Sect. C:3 (col. 1).

12. Henry P. Effectiveness of career-development courses for non-traditional premedical students improving professional identity. Psychol Rep. 1993 Dec;73(3 Pt 1):915-20.

13. Lentz BF, Laband DN. Why so many children of doctors become doctors: nepotism vs. human capital transfers. J Hum Resour. 1989 Summer; 24(3):396-413.

14. Martini CJ, Veloski JJ, Barzansky B, Xu G, Fields SK. Medical school and student characteristics that influence choosing a generalist career JAMA. 1994 Sep 7;272(9):661-8.

15. United States General Accounting Office. Medical education: curriculum and financing strategies need to encourage primary care training: report to congressional requestors. Washington, DC: The Office; 1994.

16. Bodenheimer T. The American health care system—physicians and the changing medical marketplace. N Engl J Med. 1999 Feb 18;340(7):584-8.

17. Schieberl JL, Covell RM, Berry C, Anderson J. Factors associated with choosing a primary care career West J Med. 1996 Jun;164(6):492-6.

18. Alexander SF, Lyon LJ, Nevins MA, Ycre LR Jr, Thayer HS. Ten years orienting college students to careers in medicine. JAMA. 1992 Jun 24;267(24):3330-1.

19. Gamliel S, Politzer RM, Rivo ML, Mulvan F. Managed care on the march: will physicians meet the challenge? Health Aff (Millwood). 1995 Summer;14(2):131-42.

20. Weiner JP. Prepaid group practice staffing and U.S. physician supply: lessons for workforce policy. Health Aff (Millwood). 2004 Jan-Jun;Suppl Web Exclusives:W4-43-59.

21. Davis JA, Smith TW, Marsden PV. General social surveys, 1972-2003: cumulative codebook. Chicago (IL): National Opinion Research Center; 2003.

22. Lovecchio K, Dundes L. Premed survival: understanding the culling process in premedical undergraduate education. Acad Med. 2002 Jul;77(7):719-24.

23. Cantor JC, Baker LC, Hughes RG. Preparedness for practice: young physicians’ views of their professional education. JAMA. 1993 Sep 1;270(9):1035-40.

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Appendix I.

The Pre-Med Survey

The purpose of this survey is to gather information about the undergraduate pre-med experience, about your career aspirations, and about your exposure to the practice of medicine. Your answers are completely confidential. Pre-tests have shown that this survey takes approximately 15 minutes to complete. Thank you for your participation.

1. At this stage of your college career, are you planning to go to medical school?
   □ yes  
   □ no  
   □ maybe

2. What type of medical career are you anticipating?
   □ general/primary care practice (internist, family practice, pediatrics, etc.)
   □ specialty practice (cardiologist, surgery, etc.)
   □ public health
   □ unsure
   □ other (please specify): ________________________

If choosing a specialty, what field: ________________________

3. Do you plan on entering medical school immediately upon completing your undergraduate degree?
   □ yes  
   □ no  
   □ maybe

If no, please briefly describe what you might do before going to medical school:
________________________________________________________________________
________________________________________________________________________

4. When did you first decide to choose a health-related career?
   □ before high school
   □ during high school
   □ while in college
   □ other: _______________________________
5. Have any of your family members ever worked in a health-related profession? If yes, in what occupation(s)? Check all that apply.

| Occupation                              | father | mother | sibling(s) | grandparents | aunt(s)/uncles(s) | cousin(s) | other |
|----------------------------------------|--------|--------|------------|--------------|-------------------|-----------|-------|
| general/primary physician              |        |        |            |              |                   |           |       |
| specialist physician                   |        |        |            |              |                   |           |       |
| physician administration               |        |        |            |              |                   |           |       |
| primary nursing                        |        |        |            |              |                   |           |       |
| specialty nursing                      |        |        |            |              |                   |           |       |
| nursing administration                  |        |        |            |              |                   |           |       |
| pharmaceuticals                        |        |        |            |              |                   |           |       |
| research                               |        |        |            |              |                   |           |       |
| medical support staff (i.e. nursing assistants) |        |        |            |              |                   |           |       |
| hospital administration                |        |        |            |              |                   |           |       |
| other medical personnel                |        |        |            |              |                   |           |       |
| medical educator                       |        |        |            |              |                   |           |       |
| other:                                 |        |        |            |              |                   |           |       |

6. Was your decision to pursue a medical career influenced by a particular person(s)? Please briefly explain:

☐ yes
☐ no

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
7. How important are the following traits and characteristics for the physician?

| Trait                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------------------------|---|---|---|---|---|---|---|
| academic excellence                   |   |   |   |   |   |   |   |
| good interpersonal skills            |   |   |   |   |   |   |   |
| motivation to practice medicine      |   |   |   |   |   |   |   |
| compassion for others                |   |   |   |   |   |   |   |
| knowledge of basic science           |   |   |   |   |   |   |   |

8. How much experience have you had with the following career preparation activities?

| Activity                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------------------------------|---|---|---|---|---|---|---|
| shadowing a physician                   |   |   |   |   |   |   |   |
| volunteering in a healthcare setting    |   |   |   |   |   |   |   |
| clinical experience                     |   |   |   |   |   |   |   |
| biomedical research experience          |   |   |   |   |   |   |   |
| paid work in a health setting           |   |   |   |   |   |   |   |
| internship(s)                           |   |   |   |   |   |   |   |
| pre-med summer program(s)               |   |   |   |   |   |   |   |

9. In what area is your major or intended major? Please check more than one if you are a double major.

☐ Engineering
☐ Humanities
☐ Natural Sciences
☐ Social Sciences

Please specify your major or intended major: ___________________________________________
10. Have you generally been encouraged to or discouraged from choosing this major by faculty members and advisors?

| strongly discouraged | discouraged | somewhat discouraged | neither | somewhat encouraged | encouraged | strongly encouraged |
|----------------------|-------------|----------------------|---------|---------------------|-----------|---------------------|
| 1                    | 2           | 3                    | 4       | 5                   | 6         | 7                   |

11. Would you have chosen this major if you were not a pre-medical student?

- [ ] yes
- [ ] no
- [ ] maybe

If no, what major would you have chosen?

_________________________________________

12. Rank the importance of the following characteristics in your choice of a medical school.

| Characteristics                                      | not important | somewhat important | moderately important | very important |
|------------------------------------------------------|---------------|--------------------|----------------------|---------------|
| prestige                                             | 1             | 2                  | 3                    | 4             |
| school ranking in national reports                   | 1             | 2                  | 3                    | 4             |
| clinical facilities                                  | 1             | 2                  | 3                    | 4             |
| research opportunities                               | 1             | 2                  | 3                    | 4             |
| affiliated hospitals                                 | 1             | 2                  | 3                    | 4             |
| success in placing students in top residencies       | 1             | 2                  | 3                    | 4             |
| curriculum                                           | 1             | 2                  | 3                    | 4             |
| focus on primary care                                | 1             | 2                  | 3                    | 4             |
| focus on specialty care                              | 1             | 2                  | 3                    | 4             |
| location                                             | 1             | 2                  | 3                    | 4             |
| cost                                                 | 1             | 2                  | 3                    | 4             |
| support services                                     | 1             | 2                  | 3                    | 4             |
| diversity of faculty                                 | 1             | 2                  | 3                    | 4             |
| diversity of student population                      | 1             | 2                  | 3                    | 4             |
| nationally recognized faculty                        | 1             | 2                  | 3                    | 4             |
| credentials of students                              | 1             | 2                  | 3                    | 4             |
13. To what degree are you concerned about the following aspects of your **pre-medical education**?

| Aspect                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------------------|---|---|---|---|---|---|---|
| financial cost                   |   |   |   |   |   |   |   |
| level of stress                  |   |   |   |   |   |   |   |
| number of hours devoted to studying |   |   |   |   |   |   |   |
| curriculum requirements          |   |   |   |   |   |   |   |
| grade competition                |   |   |   |   |   |   |   |

14. To what degree are you concerned about the following aspects of a **medical education**?

| Aspect                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------------------|---|---|---|---|---|---|---|
| length of program                |   |   |   |   |   |   |   |
| financial cost                   |   |   |   |   |   |   |   |
| level of stress                  |   |   |   |   |   |   |   |
| number of hours devoted to studying |   |   |   |   |   |   |   |
| curriculum requirements          |   |   |   |   |   |   |   |

15. About how many times have you had contact with the Health Sciences Office since coming to Swarthmore? __________

How have you made contact?

| Type of contact                                                                 | Check all that apply |
|--------------------------------------------------------------------------------|----------------------|
| visited the office                                                              |                      |
| made appointment with the Health Science Advisor                                |                      |
| email                                                                           |                      |
| phone call                                                                      |                      |
| visited the website                                                             |                      |
| attended an information session                                                 |                      |

5
16. What type of medical school will you most likely apply?

☐ allopathic (M.D. degree)
☐ osteopathic (D.O. degree)
☐ don’t know

17. Have you spoken with any of the following types of people to get career advice? Please check all that apply.

☐ physicians
☐ non-MD health professionals
☐ medical students
☐ health science advisor at college
☐ undergraduate professors
☐ other(s) (briefly specify): ________________________________

18. How much help have you received from your college advisor(s) in obtaining information on the following topics?

| Topic                                                   | no help | some help | moderate help | extensive help | N/A |
|---------------------------------------------------------|---------|-----------|---------------|----------------|-----|
| MCATs                                                   | 1       | 2         | 3             | 4              | 5   |
| premedical course requirements                          | 1       | 2         | 3             | 4              | 5   |
| premedical course scheduling                            | 1       | 2         | 3             | 4              | 5   |
| study abroad for premedical students                    | 1       | 2         | 3             | 4              | 5   |
| summer school                                           | 1       | 2         | 3             | 4              | 5   |
| extracurricular health related opportunities             | 1       | 2         | 3             | 4              | 5   |
| medical school applications                             | 1       | 2         | 3             | 4              | 5   |
| summer job opportunities                                | 1       | 2         | 3             | 4              | 5   |
| tutoring                                                | 1       | 2         | 3             | 4              | 5   |
| career counseling                                       | 1       | 2         | 3             | 4              | 5   |
19. From what you know about the medical school curriculum, how well will these courses prepare you for medical school? Comment only on the classes you have already taken.

| Course                                | check if taken | not well | somewhat well | moderately well | very well |
|----------------------------------------|----------------|----------|---------------|-----------------|-----------|
| Cellular and Molecular Biology         |                |          |               |                 |           |
| Organismal and Population Biology      |                |          |               |                 |           |
| General Chemistry                      |                |          |               |                 |           |
| Organic Chemistry I                    |                |          |               |                 |           |
| Organic Chemistry II                   |                |          |               |                 |           |
| Biological Chemistry                   |                |          |               |                 |           |
| General Physics I                      |                |          |               |                 |           |
| General Physics II                     |                |          |               |                 |           |
| Calculus I                             |                |          |               |                 |           |
| Calculus II                            |                |          |               |                 |           |
| Statistical Methods                    |                |          |               |                 |           |
| English courses                        |                |          |               |                 |           |

20. Does your pre-medical program lack any topics that you think are vital to your pre-med training and preparation?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
21. Please rate your level of agreement or disagreement with the following statements about yourself.

| Statement                                      | strongly disagree | disagree | somewhat disagree | neutral | somewhat agree | agree | strongly agree |
|------------------------------------------------|-------------------|----------|-------------------|---------|----------------|-------|----------------|
| I am very achievement oriented.               | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I am academically competitive.                | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I like to work alone.                         | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I like to work in groups.                     | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I like to be in control.                      | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I like to be challenged.                      | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I like to keep my feelings to myself.         | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I always make time for my family.             | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I always make time for my friends.            | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| My life priorities are properly ordered.      | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| Saying “no” is difficult for me.              | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I routinely take time off from my studies to relax. | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I get an adequate amount of sleep.            | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I eat nutritious, balanced meals.             | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I have a regular exercise routine.            | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
| I am emotional.                               | 1                 | 2        | 3                 | 4       | 5              | 6     | 7              |
22. Please rate your level of agreement or disagreement with the following statements about your future work as a medical professional.

| Statement                                                                 | strongly disagree | disagree | somewhat disagree | neutral | somewhat agree | agree | strongly agree |
|---------------------------------------------------------------------------|-------------------|----------|-------------------|--------|----------------|-------|----------------|
| I will be able to cure people.                                            | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will be able to help people.                                            | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have a prestigious job.                                            | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| My work will be fun.                                                      | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| My work will be challenging.                                              | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will make a lot of money.                                               | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| My work will be personally rewarding.                                     | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| My work will be professionally challenging.                               | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have control over the number of hours I work.                      | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have control over the pace of my work.                             | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| The future of my job will be secure.                                      | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have input into decisions regarding patient care.                  | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have enough time for my family.                                    | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have enough time for my friends.                                   | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
| I will have autonomy in my medical decisions.                             | 1                 | 2        | 3                 | 4      | 5              | 6     | 7              |
23. Do you regularly watch any prime-time medical shows on television? If so, which shows do you watch? Please indicate how well you think the show represents medical professional’s real experiences.

| Show                  | Representation |  |  |  |  |
|-----------------------|----------------|---|---|---|---|
|                       | poor           | fair | good | very good |  |
|                       |                |      |      |            |  |
|                       |                |      |      |            |  |
|                       |                |      |      |            |  |

24. How important are good **MCAT** scores for the following:

|                              | not important | somewhat important | moderately important | very important |
|------------------------------|---------------|--------------------|----------------------|---------------|
| getting into medical school  | 1             | 2                  | 3                    | 4             |
| doing well in medical school | 1             | 2                  | 3                    | 4             |
| doing well in your residency program | 1 | 2 | 3 | 4 |
| doing well throughout your medical career | 1 | 2 | 3 | 4 |

25. How important is a good science **GPA** for the following:

|                              | not important | somewhat important | moderately important | very important |
|------------------------------|---------------|--------------------|----------------------|---------------|
| getting into medical school  | 1             | 2                  | 3                    | 4             |
| doing well in medical school | 1             | 2                  | 3                    | 4             |
| doing well in your residency program | 1 | 2 | 3 | 4 |
| doing well throughout your medical career | 1 | 2 | 3 | 4 |
Your Demographics

26. Sex:
   □ male
   □ female

27: Age: __________

28. Please report your race/ethnicity (check all that apply):
   □ African-American
   □ Asian
   □ Black
   □ Caucasian
   □ Latino/Latina
   □ Middle Eastern
   □ Native American
   □ Other (please describe):

29. Are you currently active in any religious organizations?
   □ yes
   □ no

30. Were you raised as a member of a particular faith? If so, please check all that apply:
   □ Baptist
   □ Buddhist
   □ Catholic
   □ Church of Christ
   □ Episcopal
   □ Hindu
   □ Jehovah’s Witnesses
   □ Jewish
   □ Lutheran
   □ Methodist
   □ Muslim
   □ Protestant
   □ Quaker
   □ Other Christian sect
   □ Other:

□ N/A
31. Year you will graduate:

☐ 2004
☐ 2005
☐ 2006
☐ 2007

32. Please give a rough estimate of your family’s total income (for respondents whose parents are divorced or separated, please estimate the income of your primary residence):

☐ less than $20,000
☐ $21,000-$30,000
☐ $31,000-$50,000
☐ $51,000-$100,000
☐ $100,000-$200,000
☐ over $200,000

Thank you for participating in this survey.