Perspective: After a Century of Criticizing Premedical Education, Are We Missing the Point?

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Abstract

Ever since Abraham Flexner formalized the idea of premedical education in 1910, medical educators have argued about how best to prepare students for medical school. This back-and-forth about the premedical years has focused almost exclusively on the range and content of the required course work; noticeably absent from the debate is consideration of the ways in which the experience of the premedical years—including the curricular and noncurricular demands placed on students—shapes the moral education of the next generation of physicians. The authors review the century-long conversation about premedical education, highlighting the themes of that discussion and the important aspects of being a “premed” that have not been a part of the conversation. From their systematic review of college and university Web sites designed for premedical students and from comments collected from a symposium on the premedical years, the authors describe how life as a premedical student, and not just curricular content, teaches important lessons about what it means to be a professional. The authors also report important disparities in attitudes about premedical education; for example, premedical advisors regard the “sifting process” of premedical education as a “journey of discovery,” whereas students describe their premedical years as a competition. The authors’ work suggests a new approach to premedical education, an approach that combines the coursework needed to succeed in medical school with formal opportunities to reflect on both the positive and pernicious effects of the premedical years.


The making of a physician begins long before the first day in medical school. A young person’s interest in becoming a doctor often develops in the junior high and high school years and shapes a ‘premed’ student’s choice of secondary school courses, university or college, and undergraduate major. Given the important role of premedical education in shaping the physician work force, it is surprising that so little research has been done on how the experience of being a premedical student shapes the knowledge, character, and moral lives of would-be physicians. There has been a steady, albeit scant, stream of criticism of premedical education (most of which is based on opinion rather than research), but its focus is on the courses premedical students should or should not take, on the things a premed must know to succeed in medical school and as a physician.

Curiously, and despite the oft-acknowledged importance of extracurricular activities for the development of future physicians, would-be reformers of premedical education focus almost exclusively on curricular reform, as if the syllabus were all that mattered in the making of a physician. Generally, these calls for reform lack an appreciation of what might be termed the “hidden premedical curriculum”: the many things learned directly and indirectly from professors, advisors, peers, parents, “how-to” books, the media, and the extracurricular experiences that have become de rigueur for admission to medical school. The role of the hidden curriculum in medical education has long been acknowledged. Not surprisingly, this larger curriculum is also critical to the socializing experience of premedical students, introducing them to, and instructing them in, the competitive strategies they will need in order to succeed in their medical training. The hidden premedical curriculum shapes not only what students know, but also how they know, and thus, who they are.

We know that classroom instruction is not sufficient to produce morally proper conduct: witness the recent report that a required course in ethics at Duke University’s Fuqua School of Business did not prevent cheating. When it comes to premedical education, however, the debate goes on as if content trumped context, as if the socializing experience of being a “premed” did nothing to influence the behavior of future medical professionals. We must realize that when it comes to moral education, how students learn (including the environment in which they are learning) may be more important than what they learn.

It is no secret that, for medical school candidates, the undergraduate years serve to separate the wheat from the chaff. Far more students identify themselves as premeds in the first and second years of college than complete the premedical requirements, and not all successful premeds gain entry to medical school. What strategies must students develop in order to succeed as premeds? What are the moral implications of this hidden premedical education? The discussion of premedical education has ignored these important questions. Those calling for...
reform of premedical education pay insufficient attention to the lives of premedical students and to the ways the premedical years shape these students’ values and behavior. To begin a richer conversation about the process of becoming a doctor, we review a century of criticism of premedical education, offer a glimpse of the path to medical school from the point of view of a premed, and reflect on how the premedical years influence the moral education of a physician.

Premedical Education: A History of Critique

What should one do to prepare for medical education? Before Abraham Flexner’s 1910 report, Medical Education in the United States and Canada, requirements for entry to medical school were highly varied. Some schools required completion of a collection of preparatory courses, whereas others required only money enough to pay the tuition. Today, as a result of the Flexner report and the work of the Council on Medical Education of the American Medical Association, a rigorous, science-orientated premedical education is the sine qua non for entry to medical school. In the pre-Flexner years, any student with enough money could become a physician; today, gaining admission to medical school requires a different kind of capital: an undergraduate education, including high marks in biology, chemistry, and physics, extensive extracurricular and volunteer activities, and a high score on the MCAT.

As one would expect, in the nearly 100 years since Flexner’s report, there has been disagreement about the content of a “rigorous” premedical education. Review of these disagreements reveals three types of critics: those who argue for eliminating a defined premedical curriculum, those who believe premedical education is important but worry that it has become too focused on the sciences, and those who call for constant vigilance in keeping the premedical curriculum up-to-date so that students will be properly prepared for the new science and business of medicine.

Lewis Thomas is perhaps the best-known advocate for eliminating a separate and clearly defined premedical curriculum. His strong belief in the value of a baccalaureate education led him to lament the “baleful and malign influence of the modern medical school on the liberal arts:

I have a suggestion, requiring for its implementation the following announcement from the deans of all the medical schools: henceforth, any applicant who is self-labeled as a “premed,” distinguishable by his course selection from his classmates, will have his dossier placed in a third stack of three. Membership in a “premedical society” will, by itself, be grounds for rejection. Any college possessing something called a “premedical curriculum,” or maintaining offices for people called “premedical advisors,” will be excluded from recognition by the medical schools.

Less radical than Thomas, but nonetheless concerned with the overemphasis on the hard sciences in premedical education, are those critics who push for more humanities and social sciences in the premedical curriculum. As early as 1937, Reineke worried that doctors were becoming technicians: “Does the modern physician have any better insight into human nature than his predecessor? Is he a doctor in the ancient meaning of the word, or is he only a healer of organs?” His remedy? “To catch the vision of past generations, the wisdom of the poet and the seer, we must turn to literature.” More than 40 years later, Wolfe echoes this worry, adding a comment about the types of minds created by too much science:

My concern is that we not only are bringing into medical school young men and women who lack a Civilization background in the humanities, who have read little and may have written not at all, but also we are making medical school admission easy for concrete thinkers, those who know how to learn only if the material to be learned is clearly laid out.

Critics of this stripe fear that science courses tend to crowd out work in humanities and the human sciences. Gelhorn writes:

In order to give the committed premedical student time for a broad education in the humanities and social sciences, it is necessary to eliminate those courses which are not contributory . . . and to revise the course material in mathematics, chemistry, biology, and physics so that it is directly pertinent to the biomedical disciplines.

Sympathy for a “revise, but do not reject” approach to premedical education is found in the comments of a third set of critics who are concerned that premedical preparation lags behind the science and practice of medicine. Page recommends constant vigilance:

Although most schools now require ‘minimum’ amounts of biology, chemistry, and physics, there does not seem to be a clear rationale for these prerequisites. Are the courses needed to give the student a foundation of knowledge important for his medical studies? Must he have these intellectual tools to practice medicine?

Writing in 2006, Emanuel’s critique is the most recent example of the “keep it current” concern. He notes:

Many premed requirements are irrelevant to future medical education and practice. Does knowing how to integrate sinθ have anything to do with caring for a patient or elucidating the role of TERC in aplastic anemia? Do any physicians, even researchers, have to know about Diels–Alder adducts? Is calculating the angular momentum of a spinning top relevant to any medical practice? Most of what is contained in one year of calculus, organic chemistry, and physics is irrelevant to medical practitioners, researchers, and administrators.

Emanuel acknowledges that many of the requirements of premedical education are outdated and serve simply to “weed out” students. He recommends that calculus, organic chemistry, and physics be dropped from the required curriculum, which would open up six semesters for potentially more useful courses in statistics, genetics, molecular biology, biochemistry, general ethics, and human psychology. In a nod to the other varieties of criticism, he adds that his idea of a new curriculum would give students extra time to “pursue other interests in this formative period, ensuring they [receive] a true liberal education.”

Although Emanuel’s recent and rather radical suggestions for reform generated some support, they also brought a chorus of voices raised in defense of the current premedical requirements. Kramer defends that bane of the premed—organic chemistry: “I would not so hastily dismiss organic chemistry as a mere tool to thin the applicant herd. Indeed, I believe that no other premedical course so directly impacts clinical practice.” Higgins and Reed are also wary about dismissing the value of hard science: “While we agree with many of
[Emanuel's] views, we think it is misguided to exclude courses in organic chemistry and physics.”

What's Missing?

After 100 years of debate, we are not any closer to understanding what may or may not be wrong with premedical education. As we noted above, the century-old discussion is remarkable for its lack of attention to the lives of premedical students. The tradition of complaint about premedical education that extends from Flexner (1910) to Emanuel (2006) ignores the fact that the premedical years do more than fill the heads of future physicians with knowledge. The requirements established by medical school admission committees and the courses and tests used to “weed out” those who are not “qualified” to become physicians do more than lay the groundwork for the rigors of medical school—they also create a premedical student culture with a distinctive set of norms and values. One does not have to believe in the existence of the “premed syndrome”15—excessive concern with grades, extreme competitiveness, and lack of sociability—to acknowledge that during the premedical years, students learn more than information from their textbooks and teachers. During their undergraduate years, the physicians of tomorrow learn how to learn and how to succeed in the contest for admission to medical school.

Thinking Like a Premed

When medical schools review applicant dossiers, they rightly want to know one thing: does this student have what it takes—the intellectual ability and the character—to succeed and become a competent and caring doctor? For their part, premedical students ask, “How do I present myself so that an admissions committee will see that I have what it takes?”

As they navigate their way through the undergraduate years, premeds learn how to manage both the academic and nonacademic portions of their resumes. With regard to academics, premeds choose courses that are required by medical schools and that are necessary to perform well on the MCAT. On the other hand, they avoid courses that, although interesting, may lower the all-important grade point average. As for their nonacademic work, premeds organize their summer and their spare-time experiences to demonstrate that they are the kind of caring, curious, involved, and dedicated people that medical schools are looking for.

Students learn how to manage their premedical years by listening to advice given from a variety of sources. Books, Web sites, relatives, friends, and health professionals stand ready to supply information on what one must do to get into medical school. Aware of the need for guidance in the process of preparing for and applying to medical school, most undergraduate schools have designated premedical advisors and prepared Web sites that offer lists of resources, links to various medical school admission-oriented Web sites, and answers to the frequently asked questions of premeds.16

Advice on how to succeed

To better understand the type of advice that premeds receive, we looked at the premed-oriented Web sites of a stratified random sample of undergraduate colleges and universities. Using the 2007 rankings of colleges and universities done by the U.S. News and World Report,17 we selected a stratified random sample of 40 colleges and 40 universities from the four “tiers,” choosing more from the first and second tiers. We found 35 usable Web sites for universities and 34 usable Web sites for colleges. Between January and March 2007, two researchers combed these 69 Web sites looking for the resources available to premeds and the kinds of advice they were given regarding how to succeed in gaining admission to medical school.

The majority of these Web sites offer practical advice on the courses one should take as an undergraduate, direct students to local resources (premedical clubs, meetings, lending libraries), and explain local procedures (the role of the premedical committee, the scheduling of mock interviews, the requirements for a committee letter). Given our focus on the experience of premeds, we looked most closely at the nature of the advice on how to put together a competitive medical school application. In particular, we looked at what students are told regarding nonscience courses, volunteer work, and involvement in research and extracurricular activities.

We found a subtle, but important, tension in the nature of this advice. Whereas advisors are aware that the premedical years should both build and reflect the character of the next generation of physicians, they cannot help being strategic in their advice to students. There exists a continuum of advice giving. On one end of this continuum is the strategic—“you must do this to satisfy the admission committee”—and on the other end there is advice on creating character—“do this to develop the kind of character that will make a good physician.”

Fine gradations in language distinguish advice on “how to build one’s character” from the more instrumental “how to impress an admissions committee.” For example, with regard to nonscience courses, students at MIT are told, rather directly, “A number of medical schools also require classes in behavioral and social sciences.”18 whereas at Yale, students learn that “all schools recognize the desirability of a strong foundation in the natural sciences . . . and a solid background in the social sciences and humanities.”19 MIT simply advises students that these courses must be on their transcript, whereas Yale gives a nod to the value of a “solid background in social sciences in the humanities.”

Should premedical students get involved in research? The University of Virginia tells premeds that doing research will “demonstrate in-depth, sustained scholarly exploration, as well as the presence of lifelong learning skills, that are essential in these professions”20 (emphasis added). Notice that premeds are not told that research will develop these qualities; rather, the advice is geared toward the strategic goal of demonstrating character. Similarly, premeds at Iowa State are told of the strategic value of extracurricular activities: “Extracurricular activities that focus on leadership and community service have become VERY important for admission, especially to medical school. Get involved!”21 (emphasis in original).

Advice about the value of volunteer work is much the same. At Wittenburg College, students are told: “Volunteering two to three hours each week during the semester demonstrates to the schools your loyalty and commitment to the profession.”22 At Swarthmore: “If you
volunteer either during the school year or the summer in health care related facilities, it shows you are motivated and committed to helping people. It also demonstrates to medical school admissions committees that you have seen firsthand what a medical setting is like. The emphasis is on the strategic—medical school applicants must “show” or “demonstrate” their character.

Journey or tourney?
We realize the subtle nature of the distinction between developing a trait and demonstrating it. However, it is a distinction that reflects a social process whereby experiences that were meant to be a way to check a student’s character become nothing more than “boxes to be checked” when putting together a medical school application. To translate what we were reading on the Web to the lives of premedical students, we convened a half-day symposium on premedical education in Ann Arbor, Michigan, in April 2007. The 27 attendees included premedical students, (10) first- and second-year medical students, (9) premedical advisors, (4) and medical school admissions committee members (4) from five universities in the Midwest. We presented our research on critiques of medical education and on advice to premeds, and, using breakout groups, we solicited comments from the attendees about their perceptions of the premedical years.

We discovered that the “strategic/creating character” continuum tracked closely with differences in how students and administrators perceive the admissions process. Several premedical advisors and medical school admissions committee members described the path to medical school as a “journey” where the demands of the premedical years helps students discover their fit with a career in medicine and/or with the characteristics of different medical schools. Most students did not accept this metaphor, describing their premedical years more as a competition than as a journey. They saw the premedical years not as a voyage of self-discovery but as a set of obstacles to overcome on the way to the elusive goal of medical school admission. Taking their cue from the strategic advice they had been given, they carefully planned their undergraduate years—avoiding classes that may have been helpful to a future physician but might harm their grade point average, calculating which clinical and research experiences would look good on their application, and cultivating relationships with professors in order to get positive letters of reference.

Rethinking the Premedical Years
The premedical years are a vital yet understudied part of the process of becoming a doctor in the United States. Those who call for the reform of premedical education focus almost exclusively on the content of the courses, ignoring the many lessons learned by premedical students as they prepare their applications to medical school. The premedical experience gives students a moral education, showing them what it takes to succeed, and thereby creating the character of our next generation of physicians.

Medical educators see the teaching of ethics and professionalism in medical school as an important way to ensure that physicians in the United States are compassionate, competent, and ethical. However, we believe that this teaching comes too late in the student’s training. The moral education of a physician begins in the premedical years (or perhaps even earlier as middle school and high school students develop strategies for admission to the “best” undergraduate institutions). By the time a student reaches medical school, he or she has already learned how to learn and how to succeed, often by demonstrating character as a shortcut to developing it.

Our review calls attention to the blind spots of those who believe that reform of premedical education requires only altering the content of course material. There is a need for more research on what students learn from the experiences of the premedical years and the influence of these experiences on their ethical behaviors of future health care professionals. Whereas various authors have demonstrated the importance of evaluating “noncognitive” attributes of students seeking admission to medical school24–25 (with some even going as far as offering techniques for identifying “cunning” applicants, who “have a chameleon-like ability to adopt the short-term personality of ‘Mother Theresa’ and the career interest du jour”26), no one seems concerned with understanding how premedical education may be implicated in the development of an applicant’s noncognitive attributes, both positive and negative.

On the basis of our research and observations, we suggest a new approach to premedical education—an approach that not only provides the nuts and bolts of recommended coursework and necessary preparation for the MCAT but that also gives students the opportunity to step back and reflect on the path to a career in health care. Students must realize that the undergraduate premedical experience is not just a means to enter medical school; it is also an experience that is shaping their character. The best way to help premeds understand the influence of the hidden curriculum is not another class on ethics or professionalism. What is needed is a course that encourages students, early in the premedical careers, to reflect on their motives for choosing to become a physician, to recognize the influence of premedical culture on their behavior, and to understand the difference between the demonstration and the development of character.

When students and their advisors are aware of the ways that the premedical years are both a journey and a competition, they will see the positive and pernicious influences of the way we in the United States select our future physicians, and they will be better equipped to become and to create “good” doctors—in both senses of that word.

Acknowledgments
This work was supported by a grant from the President’s Initiative on Ethics in Public Life at the University of Michigan, the Department of Medical Education, and the Bioethics Program at the University of Michigan Medical School. The authors report no conflicts of interest.

References
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It's Okay Not to Know

“I don’t know” isn’t usually the best answer a teacher gets from a class, but one morning in tutor group where the topic was abortion, it stood out from the rest.

Abortion is always a tricky subject to discuss as logic, medicine, law, and emotion quickly intertwine. In our first-year curriculum medical students are encouraged to follow the self-directed learning path espoused by problem-based learning. They explore new medical and scientific topics with zeal, but they carry with them the framework of their religious and/or social belief system. Many of them are still young enough to think that others in their peer group (medical students) will think like them on The Big Topics, like abortion and euthanasia, and they can be surprised, perplexed, and sometimes horrified by what others believe.

That morning in tutor group we found ourselves discussing abortion, and the classic arguments soon crowded the table as students rushed their ideas forward. Eventually the students acknowledged their differences and offered individual views about abortion and, as often happens, the talk turned to the question of when life begins. The statements were easy to predict, with “at conception” or “at implantation” leading the pack, often accompanied by labels of “of course” and “unquestionably.” But an unusual answer came from one of the quieter members of the group when she said, “I don’t know.” The rest of the group turned to her, astonished. “I don’t know when life begins,” she added quietly, “and I’m amazed that you are so absolute about your answers.” She had earlier said she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense, saying if a woman’s health was in danger she accepted abortion as self-defense.

I was reminded of a quote from William Cowper (1731–1800):

“Knowledge is proud that it knows so much; wisdom is humble that it knows no more.” I shared the quote with the group for discussion and one student, an English major, responded with another Cowper quote: “Where men of judgment creep and feel their way, the positive pronounce without dismay.” The talk turned to when physicians can say “I don’t know” to their patients and not lose patient trust, and, for the first time in the month the group had been meeting, the quiet young woman eagerly led the way.

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