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Unmet Needs and Unused Skills: Physicians' Reflections on Their Liberal Arts Education

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Abstract—Physicians who graduated from 1955 to 1982 from three liberal arts colleges in southeastern Pennsylvania were asked about the ways that their undergraduate education had prepared or failed to prepare them for careers in medicine and about changes that they would, in retrospect, have made in their courses of undergraduate study. For many, college had failed to meet their perceived need, as physicians, for skill in dealing with people, but had provided skills in the form of basic science knowledge

and willingness to be different that exceeded the demands of their careers. They wished that in college they had taken more courses in the humanities—especially art, history, music, and English literature—and less chemistry, mathematics, physics, and biology. Would-be physicians should be encouraged to take full advantage of the humanizing opportunities of a liberal arts education with confidence that it will contribute to their future professional and personal lives. *Acad. Med.* 64(1989):532-537.

Ever since Abraham Flexner called for separating college study from medical school, relying on the former to provide basic science training for the latter, the interrelation of undergraduate education and professional training has been the subject of recur-

rent debate. In the last ten years, the debate has centered on the importance of the humanities to the practice of medicine and on the worrisome tendency of premedical students to study too much natural science in college, to the exclusion of the rest of the liberal arts.¹⁻⁴ Medical educators, drawing on their personal experience and their observations of the behavior of students and physicians, have come to such conclusions. However, little information about the reflections of practicing physicians on their own undergraduate educations is available. Because physicians themselves may be uniquely qualified to assess the strengths and weaknesses

of preparation for their own careers, it seemed worthwhile to ask them about their liberal arts educations.

Method

Those graduates of the classes of 1955 through 1982 from Franklin and Marshall College, Haverford College, and Swarthmore College whom their respective alumni offices knew to be medical or osteopathic physicians were eligible for the study. The three colleges, all in southeastern Pennsylvania, were chosen because of their strong liberal arts undergraduate programs, success in preparing future physicians, and willingness to cooper-

The data from this study were presented in part at the Symposium on Medical Education at Harvard Medical School, October 9, 1987.

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ate in the study. Swarthmore College has always been coeducational; both Franklin and Marshall College and Haverford College were founded as men's colleges but began admitting women in 1969 and 1980, respectively. To facilitate comparison across colleges, samples of 320 physician-graduates from each college were selected, using a table of random numbers. Sampling fractions were as follows: Franklin and Marshall College, .297 (320 of 1,079, that is, 320 physician-graduates were selected from the total of 1,079 physician-graduates from that school during the time period studied); Haverford College, .884 (320 of 362), and Swarthmore College, .465 (320 of 688).

In June 1987, each physician chosen was mailed a questionnaire about his or her undergraduate curriculum, medical career, and personal characteristics. Regarding the last, the questionnaire asked physicians to rank on a four-point scale the importance to their medical careers, and the degrees to which their college education had fostered development, of 15 characteristics relating to personal qualities (high standards for self, persistence,

moral development, and willingness to be different), relationships with others ("skill with people," commitment to service, appreciation of alternative values, and understanding of various cultures), and intellectual skills (ability to identify critical question, ability to find information, ability to organize information, basic science knowledge, speaking skill, writing skill, and research skills). For purposes of this study academic disciplines were aggregated into the following academic divisions: humanities—art, classics, English literature, history, linguistics, modern languages, music, philosophy, and religion; social sciences—anthropology, archeology, economics, political science, psychology, and sociology; natural sciences—astronomy, biology, chemistry, computer science, engineering, geology, mathematics, and physics.

Results

Completed questionnaires were received from 589 (61%) of those sampled (range across the colleges: 57% to 65%). Eighty respondents (13.6%)

were women. Overall, the respondents were quite satisfied with their medical careers, but even more satisfied with their undergraduate educations. Specifically, 23.5% were "reasonably satisfied" and 70.7% were "very satisfied" with their undergraduate educations, and 39.6% were "reasonably satisfied" and 54.9% were "very satisfied" with their medical careers. By far the largest percentage of their time as physicians was devoted to providing clinical care (63.5% to 76.7% of their time, by college), with roughly equal portions of research (3.3% to 12.6%, by college), teaching (6.3% to 10.1%, by college), and administration (4.8% to 10.1%, by college).

Given the choice of four degrees of importance (not very important, moderately important, very important, and essential) of the 15 characteristics to their medical career, the proportions of respondents who rated individual characteristics "essential" ranged from 64.4% to 10.2% (Table 1). Among the personal qualities, high standards for self, persistence, and moral development were seen most often to be essential. Among factors

Table 1

Comparison of the Proportions of 589 Physicians* Who Ranked Each of 15 Personal Characteristics as Essential to Their Medical Careers and as Excellently Developed in College, and Ranges Observed across Colleges in the Proportions of Physician-Graduates Who Gave Those Rankings

Characteristic	Essential to Medical Career		Excellently Developed in College		Difference	
	Percent, All Physicians (A)	Range of Percentages, by College†	Percent, All Physicians (B)	Range of Percentages, by College†	Percent, All Physicians (A - B)	Range of Percentages, by College†
Skill with people	63.4	(59, 57)	19.2	(16, 23)	44.2	(37, 48)
Ability to identify critical question	61.3	(57, 66)	44.4	(31, 51)	16.9	(5, 35)
Speaking skill	31.3	(29, 33)	15.8	(12, 18)	15.5	(11, 20)
Commitment to service	54.2	(47, 59)	38.8	(22, 52)	15.4	(-5, 37)
Persistence	55.0	(47, 61)	42.3	(34, 48)	12.7	(12, 14)
High standards for self	64.4	(63, 67)	55.2	(40, 64)	9.2	(-1, 24)
Ability to organize information	54.5	(51, 57)	47.9	(41, 51)	6.6	(0, 15)
Moral development	43.9	(42, 47)	39.5	(16, 66)	4.4	(-19, 26)
Ability to find information	45.1	(39, 52)	44.8	(39, 49)	0.3	(-10, 12)
Understanding various cultures	10.2	(7, 15)	13.2	(8, 18)	-3.0	(-11, 1)
Research skills	16.2	(8, 21)	19.7	(13, 31)	-3.5	(-12, 7)
Writing skill	24.5	(16, 29)	28.2	(15, 39)	-3.7	(-12, 1)
Appreciation of alternative values	28.6	(23, 37)	35.6	(13, 54)	-7.0	(-31, 12)
Willingness to be different	21.6	(15, 31)	39.3	(16, 51)	-17.7	(-32, 1)
Basic science knowledge	31.6	(30, 34)	52.3	(45, 66)	-20.7	(-32, -13)

*The 589 physicians were those who responded to a questionnaire sent to 960 randomly selected physicians who graduated between 1955 and 1982 from three liberal arts colleges (Haverford College, Swarthmore College, and Franklin and Marshall College); 320 from each college were sent the questionnaire.

†The range is of the percentages calculated for each of the three colleges.

involving relationships with others, skill with people and commitment to service ranked highest. Among intellectual skills, the abilities to identify critical question, organize information, and find information ranked high. Graduates of the three colleges were remarkably similar in their assessment of characteristics essential for a medical career.

Given the choice of four degrees of success (poor, fair, good, and excellent) of their college educations in developing the same 15 characteristics, the proportions of physicians who reported that individual characteristics had been excellently developed in college ranged from 55.2% to 13.2% (Table 1). High standards for self, basic science knowledge, and the abilities to identify critical question, organize information, and find information stood out as having been well developed. The three colleges were judged to be very different in their developments of some characteristics. A range of 30% or more in the proportions who saw a characteristic as excellently developed in college was seen for moral development, willingness to be different, commitment to service, and appreciation of alternative values.

The degree of match between the physicians' college educations and the needs of their medical careers can be illustrated by the difference between the proportion of physicians who said a characteristic was essential to their medical careers and the proportion who judged it to have been excellently developed in college (Table 1). Skill with people showed the greatest difference, in the direction of a need unmet by college education, followed distantly by ability to identify critical question, speaking skill, and commitment to service. Basic science knowledge, followed closely by willingness to be different, showed the greatest discrepancy in the other direction: these were skills developed in college but not fully used in medicine. For some of the elements the degree of match between college education and the demands of a medical career varied greatly from college to college. Differences of 40% or more from college to college between the propor-

tions of physicians who saw a skill as having been excellently developed in college and as being essential in their medical careers were seen for commitment to service, moral development, and appreciation of alternative values.

The physicians of different generations reported similar views as to the importances of most of the characteristics for a medical career and their development in college. Skill in writing was an exception. The proportions of physicians who judged it essential to their medical practices dropped, more or less steadily, over 28 years: 1955-1959: 31%; 1960-1964: 31%; 1965-1969: 22%; 1970-1974: 24%; 1975-1979: 21%; and 1980-1982: 16%.

Time spent in various professional activities did not, on average, vary much by perceived degree of development of the various characteristics in college. However, those who reported better development of willingness to be different tended to spend less time in direct clinical care and more time on research and administration.

In college, most of the respondents had taken advanced courses in chemistry and biology; about half of them had taken this level of courses in mathematics, modern languages, and English literature; and about a fourth had taken such courses in history, philosophy, psychology, and physics (Table 2). On average, the students had taken advanced courses in 2.7 of the natural science disciplines,

Table 2
Proportions of 589 Physicians* Who Reported Taking One or More Advanced Undergraduate Courses in Selected Disciplines, and Proportions of These Physicians Who Reported That They Wished They Had Taken More or Less Study in Selected Disciplines Than They Did

Discipline	Percent Taking Advanced Course	Percent Wishing for More (A)	Percent Wishing for Less (B)	Difference (A - B)
Humanities				
Art	10	56.4	1.5	54.9
History	27	56.0	2.5	53.5
Music	8	47.2	1.5	45.7
English literature	46	43.3	2.4	40.9
Classics	10	35.1	1.0	34.1
Philosophy	25	37.9	4.7	33.2
Religion	15	28.2	3.9	24.3
Modern languages	49	29.4	14.2	15.2
Linguistics	4	14.5	2.9	11.6
Social sciences				
Economics	11	41.7	6.3	35.4
Anthropology	8	35.6	2.4	33.2
Archeology	1	34.7	1.5	33.2
Political science	12	35.7	5.0	30.7
Psychology	27	22.8	6.6	16.2
Sociology	10	21.6	7.1	14.5
Natural sciences				
Computer science	1	58.1	1.2	56.9
Astronomy	2	38.8	3.1	35.7
Geology	1	22.7	2.1	20.6
Engineering	2	13.8	3.7	10.1
Biology	83	14.9	16.7	-1.8
Physics	27	11.2	18.7	-7.5
Mathematics	61	12.8	24.1	-11.3
Chemistry	91	7.2	27.7	-20.5

*The 589 physicians were those who responded to a questionnaire sent to 960 randomly selected physicians who graduated between 1955 and 1982 from three liberal arts colleges (Haverford College, Swarthmore College, and Franklin and Marshall College); 320 from each college were sent the questionnaire.

1.9 of the humanities disciplines, and 0.7 of the social science disciplines.

Of the 571 respondents who provided information about their undergraduate majors, 419 (73%) had majored in one of the natural sciences, 75 (13%) in one of the social sciences, and 77 (13%) in one of the humanities. Physicians reported that, had they been assured admission to the medical schools in which they finally enrolled, 306 (54%) would have majored in the natural sciences, 95 (17%) in the social sciences, and 170 (30%) in the humanities.

In retrospect, 63.1% wished they had studied more of the humanities in college and 1.2% wished they had studied less (a difference of 61.9%). The corresponding figures for the social sciences were 40.1% and 3.7% (a difference of 36.4%) and for the natural sciences, 16.8% and 15.9% (a difference of 0.9%). Among the individual disciplines, differences between the proportion who wished more study and the proportion who wished less study in computer science, art, history, music, and English literature were at least 40%. (For example, as shown in Table 2, 54.9% more wished for more study of art than wished for less study of that discipline.) For chemistry, mathematics, physics, and biology, the number of physicians who wished they had studied less of those disciplines in college exceeded the number who wished they had studied more.

When asked to explain why in college they had studied so much of particular disciplines of which they now wished they had studied less, the physicians' answers varied by academic division (Table 3) and by individual discipline. For example, in 482 instances a physician cited one of the disciplines in the natural sciences. (Notice that a physician who cited more than one of the disciplines in a division would be counted more than once.) The most common reasons these physicians gave for the "excessive" study were to gain admission to medical school (68%), to meet undergraduate requirements (62%), and on the advice of college faculty (51%). Among the courses the physicians regretted taking, biology was the disci-

Table 3

Numbers and Proportions of 589 Physicians* Who Studied More of Disciplines in the Three Undergraduate Academic Divisions than They Now Wished They Had, and Their Reasons for Having Done So

Reason	In Humanities (n = 140)		In Social Sciences (n = 116)		In Natural Sciences (n = 482)	
	No.	Percent	No.	Percent	No.	Percent
To fulfill personal intellectual interests	39	28	64	55	121	25
To meet undergraduate requirements	108	77	64	55	300	62
To gain admission to medical school	21	15	2	2	329	68
On advice of college faculty	42	30	18	16	246	51
On advice of family	8	6	1	1	39	8

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pline most often cited as having been studied so much because of personal intellectual interests at the time (reason given by 36 physicians). Chemistry was the discipline most often cited as having been studied so much to gain admission to medical school (122 physicians), to meet undergraduate requirements (97 physicians), and on the advice of college faculty (90 physicians). For the 140 instances in which one of the humanities was cited, the overwhelming reason was to meet undergraduate requirements. For the 116 instances involving social sciences, equally common reasons were to fulfill personal intellectual

interests at that time and to meet undergraduate requirements (55% each).

When asked to explain why they now wished that they had studied more of particular disciplines in college than they did, a prominent reason in all three divisions was to have a more satisfying personal life (Table 4). However, a desire for greater expertise was cited in 208 instances in regard to the natural sciences, and enhanced ability to work with patients was cited in 268 instances in regard to the humanities. Foremost among the disciplines that were looked to to provide greater expertise

Table 4

Numbers and Proportions of 589 Physicians* Who Wished They Had Studied More than They Did in the Three Undergraduate Academic Divisions, and Their Reasons for Wishing It Now

Reason	In Humanities (n = 1,069)		In Social Sciences (n = 457)		In Natural Sciences (n = 386)	
	No.	Percent	No.	Percent	No.	Percent
To gain greater expertise in chosen field	129	12	161	35	208	54
To have a more satisfying personal life	970	91	336	74	205	53
To enhance ability to work with patients	268	25	136	30	47	12
To encourage a different career choice	42	4	52	11	42	11

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was computer science (cited by 130 physicians), followed distantly by economics (51 citations), and psychology (40 citations). To achieve a more satisfying personal life, the largest number of physicians would have chosen to study more art (209 citations), followed by history (168 citations), English literature (135 citations), and music (123 citations). Enhanced ability to work with patients was reported likely from more study of philosophy (51 citations), modern languages (45 citations), and art or psychology (37 citations each).

Discussion

The telling paradox of this survey is that the physicians from the three colleges in this study both were remarkably satisfied with their undergraduate educations and wished that they had taken different courses of study. The educations that they received appear to have been reasonably broad, at least as judged by the number of disciplines in which advanced work was taken and the self-perceived degrees of development of various intellectual skills. The proportion of humanities majors was about five times that reported in a national survey of medical school applications and acceptances in 1978-79.⁵ Such breadth has been reported among premedical students from other institutions that have strong liberal arts programs, including the University of Rochester⁶ and Macalester and St. Olaf colleges,⁷ and differs from a common stereotype of premedical education. However, these physicians still felt that their educations focused more on the natural sciences than necessary and gave them too little exposure to the humanities, especially art, history, literature, and music.

The paradox may have been accentuated by the choice of colleges to study, and this choice in turn raises questions about the ability to generalize from the results. The three colleges are highly selective, small, private, residential institutions with

strong traditions of liberal arts education. They vary somewhat in their emphasis on preprofessional education and in the ethnic and geographic diversity of their student bodies, but have more in common than not. One advantage of focusing on a single type of undergraduate institution for this sort of study is that their graduates may have a common understanding of the features of a liberal arts education and hence their observations and recommendations may form more distinct patterns. Moreover, the small, residential character of the colleges may have given students a clearer sense of what they were missing when they selected curricula weighted toward the natural sciences. Some of the potential disadvantages of investigating only one kind of college in one part of the country are clear—students attending small colleges are self-selected and may not have representative needs or views; the strengths and weakness of instruction in various disciplines may vary widely from one kind of institution to another; the practice of medicine may vary importantly by undergraduate institution and region. Still, given the general quality of these three colleges, the experience of their graduates may be relevant to an understanding of the value of the best liberal arts education.

Because a liberal arts undergraduate education is not intended to be "premedical" in a narrow sense, one might expect distinct differences between the skills fostered in college and those required in the profession of medicine. However, the particular pattern of differences—unmet needs and unused skills—is instructive as we consider changes that might be encouraged in undergraduate study or in the practice of medicine. The greatest unmet need was reported to be "skill with people," although that phrase is not well defined. One can speculate about the importance of learning to listen to what others are saying (and why they are saying it), to offer advice convincingly, to convey criticism or bad news in a constructive and supportive way, and to orga-

nize cooperative ventures. Although these may be skills that come only with maturity, the study of the humanities might be expected to help the process of maturation. But also, undergraduate education might do more than it often does to foster skill with people by emphasizing cooperative forms of learning rather than the individual tour de force. The small seminar may help in this way, if each student takes on the responsibility of helping the others master one portion of the assigned work, as occurs in Swarthmore's External Examination Program. Peer tutoring and peer counseling programs may help students move more smoothly between roles of teacher and learner. In regard to commitment to service and moral development—both areas that seem to be important to the practice of medicine—the three colleges varied widely in reported success in educating the students studied. This may indicate the need for more emphasis on certain parts of the curriculum at some colleges. Alternatively, such customs as Haverford College's honor system, which for more than 30 years has focused student attention on the responsibilities of the individual to society, may deserve renewed consideration.

The fact that the physicians reported basic science knowledge to be one of the most unused skills developed in college is consistent with their wish that they had studied more of the humanities. It also suggests that even though the scientific basis of medicine has become much firmer in the past five decades, the daily practice of medicine, in most cases, does not require immense scientific sophistication. This discrepancy between training and need suggests that medical schools should go further than they have in limiting the required (or "recommended") undergraduate science courses to a minimum. This limit need not inhibit the student deeply interested in science from achieving great proficiency—a proficiency that often is achieved at good liberal arts colleges⁸ and may be helpful for a person headed toward

some careers in biomedical research⁹—but it may help avoid distortions of other students' choices of undergraduate studies.

The other prominent unused skill—willingness to be different—may say much about both the practice of medicine and liberal arts education. The latter is founded on the principle that the individual should take responsibility for his or her own learning: challenging assumptions, drawing conclusions, and constructing arguments. It emphasizes originality of thought and independence of judgment. But apparently medicine does not use these skills to the degree that good colleges develop them. The basic science curriculum in medical school typically emphasizes mastery of an immense body of knowledge rather than independent thinking.¹⁰ Physicians-in-training are intensively exposed to a narrow range of role models in the basic science and clinical faculty. Once in clinical practice, physicians may perceive pressure from patients, colleagues, or financial circumstances to continue in this area despite dissatisfaction, or they may be little exposed to potentially attractive alternatives. Indeed, it was those physicians who found that their college educations did foster willingness

to be different who tended to choose less typical medical careers.

Drawing on the experience of at least this sample of liberally educated physicians, the authors are tempted to conclude that those who would study medicine should devote more of their undergraduate study to the humanities than has been the case over the last 30 years. It is not that the natural sciences cannot be taught as liberal arts.¹¹ Rather, with four years of science-based medical school education to be followed by a lifetime of personal and professional life that will place heavy demands on their full development as people, physicians-to-be would do well in college to become educated in the wisdom and joys of art, history, literature, and music. The value of that opportunity is clearly confirmed by the reflections of the physicians in this study who sampled it as undergraduates.

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