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## New Directions in Medical School Admissions

by Stephen D. Neeleman

### STATEMENT OF PROBLEM

In 1910, American medicine underwent a thorough review of its practices, policies, and most importantly, its education. The review was conducted by Abraham Flexner, under commission of the Carnegie Foundation. Flexner's task was to determine the uniformity of medical learning throughout the United States, and to develop a systematic approach whereby the nation could improve its overall health training. The subsequent Flexner report changed the face of medical education for decades. Its tenets provoked revolutionary changes in the medical school process that are still in use today. However, some have begun to question facets of the report, and even introduce new ways for teaching medical school principles. These recent changes may make the practice of medicine more appealing to a broader type of student, rather than the traditional science-oriented undergraduate.

An article in the April 24th, 1991 *U.S. News and World Report* focused on reforms in medical schools that are "almost as revolutionary, as those wrought by Flexner himself (Linnow 1991)." *U.S. News* states that one of the problems with current medical education is that "medical schools have become virtually too scientific (Linnow 1991)." Dr. Tom Dean, the president of the Rural Health Association, stated, "What we need is almost a reversal of the Flexner report. Medical education belongs in the university, but we also need to get students back out into the community (Linnow 1991)." *U.S. News* quoted others who had all come to similar conclusions: The preponderance of emphasis on scientific training since the Flexner report has stripped medicine of much of the compassionate foundation which has historically driven the profession. This has resulted in two main problems for the medical community and the nation.

First, our over-scientific medical establishment has become quite adept at treating the illness, but receives generally poor marks in treating the patient. The sub-par bedside manner exhibited by today's physicians has tarnished the profession's reputation, not to mention destroying patient confidence in their doctors. Second, medical schools have excelled at producing students who are primarily interested in the best paying, high profile specialties, rather than in the low prestige, lesser paying, yet more work intensive "primary care" positions. Without the primary care network of family physicians, general practitioners, internists, and pediatricians, rural and inner-city America have recently suffered a dearth of trained doctors which has reached crisis proportions.

Many people involved with medicine in the United States believe that the key to solving these two problems is to follow the advice from Dean and others to return to the "human side" of medicine. Perhaps more human awareness could lead physicians back to the communities that need them, and also return the patient/physician relationship to one of caring and trust. The American medical establishment contends that they encourage students from diverse, non-science backgrounds to seek admission into medical school to "mix up the pot" so to speak. Yet there still seems to be an undercurrent, among the undergraduate pre-med advisors at least, that directs prospective medical school applicants to major in the sciences to improve their chances of matriculation and completion of medical school. This study examines the relationship between undergraduate major and acceptance and performance in medical school. It does this through the use of data from published reports, raw numbers from the American Association of Medical Colleges (AAMC), and from information received through interviews with Millie Peterson, the Acting Dean of admissions at the University of Utah School of Medicine.

### REVIEW OF THE PROBLEM

The medical climate of the United States at the turn of the century was much different than it is today. America was still largely provincial, especially in the American West and in the deep South, and our medical complex reflected the nation's shortcomings. It has been estimated that nearly 400 proprietary medical schools were in operation in the early nineteen hundreds, and most of them functioned more like small businesses than training institutions. Profit was the main goal. There were no existing standards that governed any of these schools, so the overriding criteria for entrance and completion of the medical degree was the ability to pay tuition (Cockerham 1986).

In 1904, the American Medical Association (AMA) organized the Council on Medical Education with the primary purpose of refining medical training. The efforts of the Council came to fruition in 1910, with an investigation of medical schools sponsored by the Carnegie Foundation. The hired gun in this probe was one Abraham Flexner, who toured the nation, studying the programs of every medical school. By using the possibility of funding from the Carnegie Foundation as a carrot, Flexner was able to gain full access to most of the schools. The subsequent report that he filed scorched nearly every program in the



land (Cockerham 1986).

Flexner's report rested upon four main tenants, all of which were aimed at making the practice of medicine more uniform and scientific. He called for a full-time medical faculty. This faculty must instruct in a university on the graduate level. Flexner demanded a hospital setting, and also more stringent standards for prospective students. More demanding premed requirements were central to obtaining a better qualified student body, one which could complete a strong medical school curriculum based in the sciences. At the time of his investigation, Flexner claimed only three schools of the four hundred nationally, were in line with his model. He labeled some institutions as "plague spots," "utterly wretched," "out and out commercial enterprises," and "wholly inadequate (Cockerham 1986)."

The immediate fallout of the Flexner report was the closing of many medical programs throughout the country. The institutions which desired to remain in business, were forced to comply with Flexner's recommendations. The schools which closed their doors, did so under protest, but the Flexner Report had the backing of the AMA, which served as the kiss of death to those which were unable to match Flexner's model.

The long term result of Abraham Flexner's work was mostly positive. American medicine rose quickly from its conspicuous position as the doormat of medical expertise in the industrialized world, to the place of high prominence and world leadership where it resides today. The key to this rise was the new emphasis that the Flexner report placed upon uniform, scientific learning.

However, along with this world dominance, many believe that the strong emphasis on technical competence has removed too much humanity from medicine. In many cases, the suffering have been dehumanized, sacrificed by doctors' penchant to achieve scientific advancement, sometimes at the expense of their patients' needs and feelings. In medical school, the sick are seldom referenced by their names, but rather by their illness (Cockerham, 1986). A sick patient has now become the "gall bladder in room three," as doctors have sought to place the disease in a test tube rather than in the patient. Not only have feelings of the individual patients been neglected due to the strong emphasis our medical establishment places upon science, but rural and urban America have suffered as well. We have lost much of medicine's "front line," as family doctors and emergency room physicians have departed for the comforts of suburbia. Inner-city hospitals are closing their doors due to lack of trained personnel and funding. Rural America has been reduced to actively recruiting doctors by offering everything from forgiveness of medical school debts to guaranteed pay and flourishing practices in exchange for stints of service. Many feel these attitudes are the result of neglected humanistic training which is needed to supplement scientific learning (Cockerham 1986).

Hollywood has echoed the woes of under-treated America with some recent material on the subject. A movie entitled **Doc Hollywood** (Warner Bros. 1991), depicts a medical school graduate on his way to his "dream job" as a plastic surgeon in Beverly Hills, when he runs into trouble with the law in a small town. The local magistrate, in tune with his community's dire need for a doctor, employs the services of the young practitioner to work for retribution of his crime. The ensuing plot follows this doctor's struggle between obtaining the wealth and career expectations he developed during medical school, with the obvious needs of this small community and the service he should render according to his pledge to the Hippocratic Oath.

Another Hollywood creation, which also plays on this rural need, resides at the top of prime time television's Nielson Ratings. **Northern Exposure** (CBS Television 1991) is the story of a New York Jewish physician who commits to serve as town doctor for a small Alaskan village in exchange for payment of his medical school debt. This popular sitcom is a huge success and gets most of its laughs from the obvious juxta position of this aspiring high priced doctor being trapped in a backwoods community.

**Doc Hollywood** and **Northern Exposure** are quite entertaining, but the problems with which they identify are serious matters. We simply are not meeting our country's health care needs. Not only are the rural areas suffering, but the inner-cities are in bad shape as well. The lack of trained doctors willing to work in the urban areas, coupled with the lack of money and the increasing burden of serving a largely uninsured populace, have caused many city hospitals to close their doors. It has become common for hospitals to refuse to treat suffering patients due to a fear of non-payment. Ironically, suburban hospitals may be the ones best equipped with personnel and spare rooms to treat the uninsured, but many refer patients to the city hospitals via taxicab. The vows of the Hippocratic Oath have been compromised by monetary concerns.<sup>2</sup> Fortunately, the medical establishment appears to be aware of these two related problems. The lack of interest in primary care and the dehumanization of patients seem to go hand in hand. *U.S. News* claims that at least some medical schools are trying to find solutions to these problems (Linnow 1991). Dr. Louis J. Kettle, vice president for academic affairs at AAMC explains, "In the 1940s and 1950s medicine was too much an art and not enough of a science. Now we have more science that we know what to do with." Therefore, *U.S. News* states, "To put the art back into medicine, many med schools are redrafting the curricula. The primary goals: to discourage rote memorization of scientific facts while encouraging problem solving through case studies and hands-on experience."

As is often the case, Harvard University is a leader in this new outlook toward medical education. Their "New Pathways" program (Nova 1988), begins the patient/

physician relationship much earlier than most other schools. During the first week of school, Harvard's incoming freshmen now spend some time in local clinics. Although untrained in any technical procedures, they are able to associate with patients on a personal level. They see patient ailments first hand, not just in textbooks. By breaking with the traditional medical school curriculum of two years of class work followed by two years of clinical practice, Harvard hopes to produce more complete physicians.

U.S. News also claims that "... the typical medical-student profile is changing, as admissions deans court students with liberal arts backgrounds as assiduously as they once sought science majors (Linnow 1991)." Apparently, medicine feels that the keys to influencing physicians' career choices toward primary care, and to making doctors more humanistic, is to start at the roots of medicine-medical education. Thus, it is incumbent upon medical schools to not only encourage, but to recruit premeds who exhibit more than just a passing interest in the humanities.

Unfortunately, U.S. News offers no real hard evidence to support their claims. They do refer to changes in the Medical College Admissions Test (MCAT), one of the measuring tools for entrance into medical school. They noted the MCAT's structure has been altered to better emphasize reading and writing skills, rather than blatant science knowledge. While the MCAT still demands a thorough knowledge of the basic sciences, it now employs a verbal reasoning section that extends beyond hard science knowledge. Two opened-ended essays are also administered as part of the test. These are supposed to display the applicants' ability to think rationally and to succinctly express their thoughts in writing. Dr. Dona Harris, a former professor at the University of Utah School of Medicine and a scholar in residence for the Council on Graduate Medical Education, told U.S. News, "We need people who read, who recognize what is going on in the world around them and can carry on a conversation that doesn't relate directly to scientific research (Linnow 1991)."

Except for the information regarding the new MCAT, and the statements from Doctors Kettle and Harris, U.S. News failed to empirically substantiate its claims that medical schools are actually changing their historical bent toward science majors. And as any premed student can attest, his or her advisor is usually housed in either the biology or chemistry department, and will more often than not direct premeds to major in the sciences as the "safest" way to make it to medical school. This is evident by the disproportionate numbers of science majors who apply. Over 70% of all of the applicants to medical school in 1991 majored in either the biological or physical sciences. At the same time they comprised a much smaller percentage of undergraduate student bodies.<sup>3</sup>

## RESEARCH PROCEDURES

Does it make a difference whether a premed student majors in the hard sciences in addition to completing all of the basic science requirements for entrance into medical school? This question was examined using existing statistics on the ratios of medical school matriculants to applicants, subdivided by their undergraduate college majors. Also of interest was the performance of non-science majors after reaching medical school. This research was conducted using academic journals at the USU Merrill Library and the University of Utah Eccles Health Science Library. Statistics were also used from AAMC's **Trends in Medical School Applicants and Matriculants 1982-1991**. Millie Peterson, Acting Dean of the University of Utah School of Medicine, provided data from AAMC as well as local information regarding the ratios of matriculants and applicants at the University of Utah. Her personal perceptions of changes in medical school applicants also helped guide some of the research.

## PERFORMANCE OF NON-SCIENCE MAJORS

Studies from the early and mid 1980s describe some of the pressures to seek more diversity in medical school student bodies. An article in the June, 1982 **Journal of Medical Education** questioned "the need for extensive science requirements for admission into medical school," as well as "the desirability of providing medical education to more students with a broad undergraduate background." (Yens and Stimmel 1982) The article cited reports by H.G. Gough and the team of M. Thomae-Forgues and J. Erdmann. Gough investigated the relationship between science performance and personality traits considered conducive to success as a physician. He found that students who had lower grades in the sciences, and who were more inclined to have lower MCAT scores, had "warmer" personality traits (e.g. "easy going", "relaxed" and "progressive"). Thomae-Forgues and Erdmann, on the other hand, found that humanities students comprised only 2.8 percent of the national applicants for the 1978-79 entering medical school class. Gough felt that admission committees needed to recognize the strengths of non-science majors, or as R.H. Weingartner said in the same article, "...every applicant (should) give evidence of a broad undergraduate education, either by having majored in a subject other than biology, biochemistry, or chemistry, or by having taken a significant number of courses in the humanities and social sciences...."

While the views of Weingartner and Gough broke with tradition, their advocacy of requiring premeds to display some training in the humanities does seem to provide greater breadth in the preparation for becoming a physician. Dr. E.D. Pellegrino pointed out that medicine is very diverse, and "to make a right decision for a particular patient calls on additional modes of thinking more properly derived from the liberal arts and the humanities (Zelevnik, Hojat, and Veloski 1983)." L. Thomas, quoted in a



January, 1983 issue of *Journal of Medical Education*, echoed these same sentiments. Thomas "attacked vigorously the science-oriented premedical curriculum, suggesting that more time should be devoted to the social sciences, humanities, and liberal arts." "Less emphasis", he wrote, "should be given to the narrow concern of biological and natural sciences in the premedical curriculum, since for most physicians the undergraduate years are the last opportunity to pursue in depth a non-science subject."

The January, 1983 article which reported the findings of Pellegrino and Thomas was entitled "Baccalaureate Preparation for Medical School: Does Type of Degree Make a Difference? (Pellegrino 1979)." Along with arguing for a broad undergraduate education, this article also studied the success of students with non-science undergraduate majors in medical schools. The report cited evidence showing a significant correlation between the number of undergraduate science courses taken and success during the first two years of medical school. However, the report found no significant relationship between the preclinical grades and success in the clinical rotations. Furthermore, the clinical performance proved to be a better indicator for predicting success as a physician than any of the preclinical years.

Other researchers cited in the same report "did not find a significant difference in the levels of clinical competence between science and non-science premedical majors," and they suggested that "the two groups had adequate science preparation for medical school despite different types of baccalaureate degrees (McGaghie 1987)." Researcher Davis Johnson asserts, "Of the approximately 50 per cent of applicants who are admitted, about 95 percent in recent years have obtained the MD degree; of the degree holders, almost 100 percent who seek licensure to practice medicine, succeed in doing so."

Johnson also contends that even the undergraduate science GPA is not a strong indicator of medical school graduation. His findings show that a screening threshold of B (3.00), would still result in medical school graduation rates of 97 per cent under current medical school curricula. The article thus concludes, "for nearly all physicians, the decision to admit them to medical school is tantamount to a decision to grant them a license."

Millie Peterson at Utah corroborated these findings in a more anecdotal way. She indicating that first and second year students, when interviewed, felt that during their first year, the science majors had an advantage over the non-science majors in areas of terminology and vocabulary. But by the second year, the non-science majors had caught up, as both groups were learning new information.

Other journal articles also address our current health care crises by recommending changes in the premedical curriculum. One recent article (Clawson 1990), points out that approximately \$550 billion per year, or 12% of America's GNP, is spent on health. Yet again, the rural

areas and inner cities are suffering from shortage of physicians and the lack of funds. Dr. Kay Clawson argues in this commentary that perhaps our narrow focus in specialized research is sapping the funding needed to achieve the broader goals of "health promotion and disease prevention." He believes that criteria other than good science grades and exceptional MCAT scores should be used to evaluate applicants' ability to succeed as a physician. Clawson states, "...a student who has taken time to develop another profession or who has excelled at a particular interest outside of premedical studies, while perhaps having a lower science GPA, may ultimately be more caring and compassionate and a better doctor." Dr. Clawson's concerns seem to restate those previously noted. Medical schools must focus on compassion and caring at least as much as they focus on science aptitude and ability.

In summary, a review of the literature shows that once admitted to medical school, even an average undergraduate student can perform well enough to graduate. Furthermore, performance in the premed and medical school science courses is not the best indicator of eventual success as a practicing physician.

#### MEDICAL SCHOOL ADMISSIONS

The second question examined in this study was whether premeds who had majored in the humanities, liberal arts, or social sciences were less likely to be accepted to medical school? This question it is much more difficult to answer than the first. The reason is that since Flexner, there have been some built in controls to weed out prospective students who were unable to demonstrate a high level of mastery in the sciences. More recently, the situation has changed to include mastery in the non-science areas. For example, before 1991, the MCAT consisted of six sections, four of which tested on the basic sciences (eg. Biology Knowledge, Chemistry Knowledge, Physics Knowledge, and Science Problems). The other two sections tested on reading and math skills. All sections were administered as multiple choice exams, with the obvious weight of the test being carried by the sciences and math, representing five of the six sections.

Beginning in 1991, AAMC made what many felt were dramatic changes in the MCAT format (AAMC 1991). The four science sections were combined and reduced to form two sections entitled Physical Sciences and Biological Sciences. The reading section was incorporated into a stronger section known as Verbal Reasoning. It was completely devoid of any particular science knowledge. The MCAT better accommodated the non-science majors by introducing a writing section, which traded the historical multiple choice format for two essays written in response to a trigger sentence provided by the test. Many applauded AAMC for adopting this broader format because it allowed students with more diverse backgrounds to demonstrate different abilities while taking the formidable science-based test.

The change in the MCAT seems to reflect an evolution of attitudes within AAMC. Apparently, American medical schools have accepted the validity of the criticisms challenging their long standing preference for students saturated in the hard sciences. In a previously quoted article (Zelevnik, Hojat, and Veloski 1983), researchers evaluated the success of non-science majors on the old MCAT. They reported, "The findings indicated that those who held a B.A. degree in humanities had significantly lower scores on quantitative scales of the SAT and the MCAT." Therefore, while it may be difficult to quantitatively determine whether acceptance committees in the early eighties were prejudiced against non-science majors, with all other things being equal, the committees were definitely prejudiced against the lower scores which were obtained on average by those majoring in the humanities. Yet, with the change in the MCAT, medical schools seem to be giving more consideration to non-science majors. Perhaps medical schools are trying to provide an atmosphere where the best applicants, whether or not they focused extensively in the sciences during their undergraduate years, will be fairly evaluated.

Although changes have been made, there are still those who argue that the pendulum has not swung far enough. Just prior to the MCAT changes, Dr. William C. McGaghie, a professor in the Office of Educational Development, at UNC chapel Hill, blasted admission committees for giving "lip service to the importance of personal and social traits (McGaghie 1990)." McGaghie studied the correlation between premed scientific aptitude and acceptance and completion of medical school. McGaghie echoed the findings of Davis Johnson about the graduation rates of medical school matriculants. Again, nearly all matriculants eventually obtain an MD degree, and McGaghie points out that this is independent of the student's undergraduate major. McGaghie also pointed out there is some difference between the actual class composition of medical schools and the official AAMC stated intention. The AAMC's "Medical School Admission Requirements" 1986-87 (AAMC 1986-87) states:

There is a universal feeling that medicine demands superior personal attributes of its students and practitioners. Integrity and responsibility assume major importance in the research laboratory as well as in relationships with patients and colleagues. Medical schools also look for evidence of other traits such as leadership, social maturity, purpose, motivation, initiative, curiosity, common sense, perseverance, and breadth of interest.

Yet, McGaghie counters with the accusation that medical school classes continue to maintain the almost uniform ratios of 70% majors from the biological and physical sciences, 10% from the humanities and behavioral

sciences, and the remainder from other professional and mixed disciplines. McGaghie finished his article by supporting what he terms "subjective judgement" in medical school admissions. McGaghie believes that although grading applicants on their social and personal traits is far less quantitative than on their MCAT scores and science grades, it can be justified on ethical grounds and should be used to qualitatively assess matriculants.

The debate concerning medical schools' "real" preferences when evaluating applicants could continue for the next decade. The question of interest is whether actual admissions data reveals any inequities in the process. Upon interviewing Millie Peterson at Utah, she disclosed the national statistics in her copy of **Trends in Medical School Applicants and Matriculants, 1982-1991**. This largely statistical report was prepared by the AAMC.

The report is a compilation of ratios of applicants compared to matriculants grouped by many different categories. The AAMC keeps ratios on everything from ethnicity and race to marital status and father's occupation. Most interesting to this research were the ratios on undergraduate majors (See Table 1). AAMC broke down the majors as: biological sciences, physical sciences, social sciences, humanities, mathematical sciences, health sciences, other, and unknown. Four years were listed (1982, 1986, 1990 and 1991) to show changes over the past decade. During the ten year period, the ratios of applicants remained fairly constant for all of the majors. In 1982, for example, biological science comprised roughly 55% of the applicants. In 1991 it was 56.2%. Physical science applicants did decrease throughout the decade from 18.2% to 13.9%; social sciences increased from 8.0% in 1982 to 10.6% in 1991. The other classifications fluctuated less than 1% in their ratios of applicants throughout the decade.

A comparison of the matriculant ratios to applicant ratios for the period is informative. There is no significant discrepancy in the percentage of a certain major that applied versus the percentage that matriculated. Instead the ratios are extremely close. Of the 55% biology majors that applied in 1982, 54% matriculated. In 1991, 56.2% of the total applicants were from biology, and 54.7% matriculated. The physical sciences had a slightly higher ratio of matriculants to applicants. Social sciences relatively mirrored biology, while humanities followed physical sciences with a higher percentage matriculants to applicants. The other classifications also had close ratios.

These numbers were surprising, because it was expected that medical schools would admit a higher relative percentage of science majors than non-science majors, especially before the recent changes. Yet the numbers show that non-science undergraduate majors have roughly the same proportionate chance of being admitted relative to the numbers in their group, as do the science hard science majors. The data suggests a slight bias in favor of non-science majors, but differences are small. While humanities fielded only 3.6% of the applicants in



1991, they placed 4.1% of the matriculants. Furthermore, humanities majors tended to have lower scores than the science majors. So it could be argued that non-science majors have a slightly better chance for admission into medical school than science majors with comparable MCAT scores. This argument would provide some corroboration for the claims previously quoted in U.S. **News and World Report**.

There is additional evidence of a slight trend towards diversity in medical school admissions. Table 2 shows the breakdown of majors who applied and were accepted at the University of Utah in the 1992-93 entering class. The greatest number of the first 100 acceptances were definitely from biology and zoology. However, Utah also offered positions to students from twenty-eight other majors ranging from anthropology to sociology. In fact, the third highest number of acceptances were offered not to students in chemistry or some other "hard" science, but in foreign language. This may be due to the applicants who had learned foreign languages while serving as missionaries overseas for the L.D.S. church. Other majors with strong showings were English, electrical engineering, and psychology (See Table 3). Another interesting finding at Utah was that 75% of the music majors that applied were matriculated (three of four).

Utah also provided information regarding Utah residents and their undergraduate majors for the 1992-93 entering class (See Table 4). These numbers are far from being a true sample, but they do reflect a diverse student body. Philosophy scored well among the Utah residents, with two-thirds of the applicants being accepted.

Table 5 shows Utah's total applicants and matriculants for the past decade. Utah's students are fairly more diverse than the national average, with only 46.5% of the 1991 applicants coming from the biological sciences compared to 56.2% nationwide. Utah was slightly higher in the number of physical science applicants than the rest of the nation in 1991. It was also higher in social sciences, humanities, and health science majors. From 1986 through 1991, it was somewhat more profitable to major in the humanities than any other major, as the ratio of matriculants outnumbered the applicants by an average of 2.6% for the three years studied. These differences, however, are small. Much like the national statistics, there appears to be no strong bias for or against any particular major.

The most recurring pattern between national numbers and the statistics prepared by the University of Utah is that biological and physical sciences are the overwhelming favorite of students who choose a premed major. Majors seem to be favored by medical school admission committees roughly proportionate to the numbers who apply from each type of major. In summary, no undergraduate major is clearly preferred over another as long as the student has acquired the adequate science training in the required classes to score well on the MCAT.

## CONCLUSIONS

There is no doubt that the changes wrought by the Flexnerian revolution account for much of what is good about the technical accomplishments of modern American medicine. We have led the world in discovery and treatment of most maladies because of, and not in spite of, our scientific achievement. There is some doubt as to how much responsibility the Flexner changes truly bear for the current woes of American medicine, but the fact remains that there are holes in our system. Far too many Americans, for one reason or another, are unprotected when it comes to medical treatment. The number of uninsured patients continues to rise at unacceptable levels. The key to future success is to not look backward for causes of our problems, but to look forward for solutions. As a new executive administration moves into the White House this winter, some of their battle cries have been "change" and "diversity." Their vow to fill the national leadership with people that reflect the essence of the country could well be one that American medicine is also trying to obtain. The best way to fill the gaps in medicine may be to bring together many people from all different backgrounds, both socially and academically, to collectively attack the shortages in personnel and money. This strategy may also remove the attitudes that stop medicine from reaching greater heights.

## PERSONAL REFLECTIONS

Recently, I began my personal medical school application process. At times I wondered if all of the countless hours of writing and rewriting essays, completing endless applications, and the torment of waiting for replies from the acceptance committees, was worth the reward I would receive in the end by becoming a physician. Yet, I am always reassured by reflecting on the dream that I have held for over two-thirds of my life to become a doctor. My first interview was with the University of Utah. Among other things, the interviewers discussed my undergraduate major and the perspectives that I had gained throughout my college experience. I felt comfortable as I discussed my desire to become a physician; even though I am not as scientifically qualified as many of the other applicants. I realize that the first few years may be tougher for me than for a student with similar intellect who has majored in the sciences. But I also feel that some of the experiences I have had in my fields of study may better qualify me to deal with the personal side of medicine. For the most part, I have felt at ease in my interviews because my research for this thesis has helped me realize that my choice to major in the humanities can do nothing but positively affect my application. Both of the interviewers at Utah questioned me on the conclusions of my thesis. Upon communicating my beliefs, both seemed to agree. My second interviewer, Dr. Chase Peterson, went further than I did in his assessment. When I told him there seemed to be very little bias for or against any particular major, he told



me that he thought those majoring in the humanities or in the social sciences may indeed hold preference among acceptance committees who tire of the regular stream of science majors.

My thesis objective was to determine the veracity of the claims made by U.S. News and others that medical schools had new interest in accepting premeds with backgrounds different from the traditional sciences. It was difficult to determine statistically any recent jump in national or even local preference for any particular major. There was some obvious preferences towards diversity in most of the literature I reviewed. There was also statistics that showed, without a doubt, that most majors are viewed at least equally when it comes to evaluation before the medical school acceptance committees.

My recommendation is that undergraduate students should study the fields that they enjoy, even if it limits the time they can spend in science classes and labs to the minimum requirements. Every premed, whether majoring in the sciences or in some other field of study, should understand that unless he or she performs well enough in the basic sciences to be competitive on the MCAT, his or her chance to be accepted to medical school is greatly limited.

<sup>1</sup> Early in my undergraduate career, I enrolled in a class entitled "Medical Sociology," taught by Dr. Reed Geertsen. Geertsen lectured about the Flexner report, and the profound effect it had upon medical education.

<sup>2</sup> In my own family, I've realized that on few occasions when we've had to seek medical care, the preliminary questions have dealt not with the nature of the discomfort, but with the form of payment.

<sup>3</sup> At Utah State University, only 4% of the student body is represented by biology majors, and only 1% majors in chemistry. Source: U.S.U. Institutional Research.

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TABLE 1  
Proportion and Number of Applicants and Matriculants  
for Selected Years by Demographic Variables

		Undergraduate Major			
		1982	1986	1990	1991
		% (n)	% (n)	% (n)	% (n)
Biological Sciences	Applicants	55.8 (119,638)	56.8 (117,542)	55.7 (116,280)	56.2 (116,727)
	Matriculants	54.0 (8,543)	54.7 (8,841)	55.3 (8,841)	54.7 (8,888)
Physical Sciences	Applicants	18.2 (6,496)	17.6 (5,510)	14.6 (4,279)	13.9 (4,645)
	Matriculants	20.3 (3,365)	19.8 (3,181)	15.7 (2,517)	15.4 (2,490)
Social Sciences	Applicants	8.6 (2,874)	8.6 (2,679)	10.9 (2,910)	10.6 (3,544)
	Matriculants	7.8 (1,285)	8.1 (1,302)	9.6 (1,543)	10.8 (1,746)
Humanities	Applicants	2.9 (1,032)	3.5 (1,091)	3.6 (1,041)	3.6 (1,192)
	Matriculants	3.2 (1,528)	3.8 (1,615)	3.9 (1,617)	4.1 (1,721)
Mathematics	Applicants	1.1 (380)	1.1 (336)	1.0 (294)	1.0 (328)
	Matriculants	1.1 (183)	1.1 (182)	1.1 (182)	1.0 (157)
Health Sciences	Applicants	6.9 (2,483)	5.7 (1,783)	5.9 (1,739)	5.6 (1,849)
	Matriculants	5.7 (1,941)	4.8 (1,701)	5.0 (1,803)	4.4 (1,720)
Other	Applicants	6.4 (2,286)	6.2 (1,938)	7.7 (2,259)	7.6 (2,538)
	Matriculants	7.0 (1,164)	6.7 (1,077)	8.1 (1,300)	8.3 (1,346)
Unknown	Applicants	1.5 (541)	1.4 (441)	1.5 (441)	1.4 (480)
	Matriculants	1.0 (158)	1.0 (161)	1.2 (195)	1.3 (212)
Total	Applicants	-- (35,730)	-- (31,323)	-- (29,243)	-- (33,301)
	Matriculants	-- (16,567)	-- (16,103)	-- (15,998)	-- (16,211)

		Highest Degree			
		1982	1986	1990	1991
		% (n)	% (n)	% (n)	% (n)
Bachelor's	Applicants	84.5 (30,186)	86.6 (27,128)	88.2 (25,779)	87.9 (29,265)
	Matriculants	87.5 (14,500)	89.7 (14,277)	90.1 (14,413)	89.8 (14,563)
Master's	Applicants	9.2 (3,272)	8.3 (2,615)	6.9 (2,017)	6.9 (2,313)
	Matriculants	7.1 (1,175)	7.3 (1,183)	6.2 (1,998)	6.0 (1,973)
Doctorate	Applicants	3.2 (1,160)	2.7 (861)	2.4 (700)	2.4 (789)
	Matriculants	2.6 (437)	2.2 (352)	1.8 (282)	1.9 (300)
Other	Applicants	1.6 (568)	0.8 (259)	0.9 (266)	1.2 (498)
	Matriculants	1.8 (296)	0.8 (126)	0.6 (89)	0.9 (147)
Unknown	Applicants	1.5 (544)	1.5 (460)	1.6 (481)	1.6 (526)
	Matriculants	1.0 (159)	1.0 (165)	1.4 (216)	1.4 (228)
Total	Applicants	-- (35,730)	-- (31,323)	-- (29,243)	-- (33,301)
	Matriculants	-- (16,567)	-- (16,103)	-- (15,998)	-- (16,211)



TABLE 2

1 APRIL 1992 FIRST 100 FRESHMEN  
1992-93 ENTERING CLASS  
Page two

HIGHEST DEGREE ACHIEVED AT MATRICULATION:

1 WILL NOT HAVE AN UNDERGRADUATE DEGREE  
93 BACHELORS  
3 MASTERS  
1 PHDS  
2 DRS DEGREE

UNDERGRADUATE MAJORS:

1 Anthropology	1 Humanities
5 Biochemistry	2 Mathematics
25 Biology	3 Microbiology
1 Business	3 Music
6 Chemistry	1 Nursing
1 Classics	1 Nutrition
1 Communication	2 Other
1 Dbl Maj Non-Sci	2 Philosophy
1 Dbl Maj Science	1 Physics
3 Dbl Maj Sci/Non-sci	1 Political Science
1 Education	5 Psychology
5 Electrical Engineering	1 Science, General
1 Engineering	1 Sci Other Biology
4 English	1 Sociology
8 Foreign Language	11 Zoology

TABLE 3

University of Utah School of Medicine  
ADMISSIONS DATA

UNDERGRADUATE MAJORS  
1992-93 Entering Class

MAJOR	POOL	ACP	PCT	NAME	POOL	ACP	PCT	NAME	POOL	ACP	PCT
Accounting	1	0		Electric Engr	10	5	50%	Pharmacology	1	0	
Aerospace Engr	1	0		Engineering	3	1	33%	Pharmacy	8	0	
Agriculture	3	0		English	12	4	25%	Philosophy	3	2	67%
Anthropology	3	1	33%	Foreign Lang	21	8	38%	Physical Therapy	4	0	
Art	2	0		General Studies	1	0		Physical Educ	5	0	
Biochemistry	40	6	15%	Genetics	2	0		Physica	9	2	22%
Biology	264	35	13%	Geology	1	0		Physiology	11	0	
Biomed Engr	3	0		History	5	0		Political Science	8	1	13%
Biomed Sci	5	0		Home Economics	2	0		Pre-Medicine	10	0	
Biophysics	1	0		Human Biology	3	2	67%	Pre-Professional	2	0	
Botany	1	0		Humanities	3	1	33%	Psychobiology	11	0	
Business	16	1	6%	Interdisciplinary	3	0		Psychology	50	7	14%
Chem & Biol	4	0		Internatl Rel	1	0		Public Health	2	0	
Chemical Engr	4	0		Literature	1	0		Radiology	1	0	
Chemistry	40	6	15%	Mathematics	5	2	40%	Science General	3	1	33%
Civil Engr	1	0		Mechanic Engr	3	0		Sci Cthr Biology	6	2	33%
Classics	1	1	100%	Medical Tech	9	1	11%	Social Science	1	0	
Communications	2	1	50%	Microbiology	39	4	10%	Sociology	2	1	50%
Computer Sci	1	0		Music	4	3	75%	Speech	1	0	
Dbl Maj Nonsci	3	1	33%	Natural Science	5	0		Theatre Arts	1	0	
Dbl Maj Sci	14	1	7%	Neuro Science	1	0		Zoology	86	15	17%
Dbl Sci/Nonsci	18	3	17%	Nursing	5	1	20%	TOTAL	827	124	15%
Economics	8	1	13%	Nutrition	2	1	50%				
Education	5	1	20%	Other	20	2	10%				

POOL = ALL APPLICANTS // ACP = ACCEPTED STUDENTS TO DATE // PCT = ACCEPTED PERCENTAGE  
07/09/92

TABLE 4

University of Utah School of Medicine  
ADMISSIONS DATA  
UNDERGRADUATE MAJORS BY CATEGORY

		1982		1986		1990		1991	
BIOLOGICAL SCIENCES	Applicants	127	47.4%	120	47.8%	91	45.3%	133	46.5%
	Matriculants	37	44.6%	38	48.7%	43	51.8%	39	48.1%
PHYSICAL SCIENCES	Applicants	67	21.3%	48	19.1%	23	11.5%	54	18.9%
	Matriculants	30	36.1%	16	20.5%	9	10.8%	14	17.3%
SOCIAL SCIENCES	Applicants	28	10.4%	31	12.4%	29	14.5%	41	14.3%
	Matriculants	2	2.4%	11	14.1%	11	13.3%	10	12.3%
HUMANITIES	Applicants	11	4.1%	17	6.8%	13	6.5%	21	7.3%
	Matriculants	3	3.6%	7	9.0%	7	8.4%	9	11.1%
MATH & STATISTICS	Applicants	5	1.9%	5	2.0%	1	0.5%	4	1.4%
	Matriculants	1	1.2%	0	0.0%	1	1.2%	0	0.0%
SPEC HEALTH SCIENCES	Applicants	20	7.5%	14	5.6%	23	11.5%	19	6.6%
	Matriculants	2	2.4%	2	2.6%	9	10.8%	2	2.5%
OTHER	Applicants	19	7.1%	16	6.4%	20	10.0%	14	4.9%
	Matriculants	8	9.6%	4	5.1%	4	4.8%	7	8.6%
TOTALS	Applicants	268		251		200		286	
	Matriculants	33		78		83		81	

TABLE 5

University of Utah School of Medicine  
ADMISSIONS DATA  
UTAH APPLICANTS' UNDERGRADUATE MAJORS  
1992-93 Entering Class

MAJOR	POOL	ACP	PCT	NAME	POOL	ACP	PCT	NAME	POOL	ACP	PCT
Accounting	1	0		Electric Engr	6	5	83%	Pharmacology	0	0	
Aerospace Engr	0	0		Engineering	2	1	50%	Pharmacy	1	0	
Agriculture	0	0		English	7	3	43%	Philosophy	2	1	50%
Anthropology	1	1	100%	Foreign Lang	12	4	33%	Physical Therapy	2	0	
Art	1	0		General Studies	0	0		Physical Educ	3	0	
Biochemistry	6	1	17%	Genetics	0	0		Physics	3	2	67%
Biology	77	29	38%	Geology	1	0		Physiology	3	0	
Biomed Engr	1	0		History	2	0		Political Science	6	1	17%
Biomed Sci	0	0		Home Economics	2	0		Pre-Medicine	3	0	
Biophysics	0	0		Human Biology	2	1	50%	Pre-Professional	1	0	
Botany	1	0		Humanities	2	0		Psychobiology	0	0	
Business	5	1	20%	Interdisciplinary	0	0		Psychology	19	7	37%
Chem & Biol	1	0		Internatl Rel	0	0		Public Health	1	0	
Chemical Engr	0	0		Literature	0	0		Radiology	1	0	
Chemistry	22	6	27%	Mathematics	3	2	67%	Science General	0	0	33%
Civil Engr	0	0		Mechanic Engr	1	0		Sci Othr Biology	1	1	100%
Classics	1	1	100%	Medical Tech	6	1	17%	Social Science	1	0	
Communications	1	1	100%	Microbiology	13	2	15%	Sociology	1	1	100%
Computer Sci	0	0		Music	3	2	67%	Speech	0	0	
Dbi Maj Nonsci	2	1	50%	Natural Science	1	0		Theatre Arts	0	0	
Dbi Maj Sci	2	0		Neuro Science	0	0		Zoology	44	11	25%
Dbi Sci/Nonaci	4	2	50%	Nursing	2	1	50%	TOTAL	294	95	32%
Economics	1	1	100%	Nutrition	2	1	50%				
Education	1	0		Other	7	2	29%				

.....  
POOL = ALL APPLICANTS // ACP = ACCEPTED STUDENTS TO DATE // PCT = ACCEPTED PERCENTAGE  
07/09/92