THE ROLE OF CURRICULUM IN INFLUENCING STUDENTS TO SELECT GENERALIST TRAINING: A 21-YEAR LONGITUDINAL STUDY

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ABSTRACT To determine if specific curricula or backgrounds influence selection of generalist careers, the curricular choices of graduates of Mount Sinai School of Medicine between 1970 and 1990 were reviewed based on admission category. Students were divided into three groups: Group 1, those who started their first year of training at the School of Medicine; Group 2, those accepted with advanced standing into their third year of training from the Sophie Davis School of Biomedical Education, a five-year program developed to select and produce students likely to enter primary care fields; and Group 3, those accepted with advanced standing into the third year who spent the first two years at a foreign medical school. All three groups took the identical last two years of clinical training at the School of Medicine. There were no significant differences with respect to initial choice of generalist training programs among all three groups, with 46% of the total cohort selecting generalist training. Of those students who chose generalist programs, 58% in Group 1, 51% in Group 2, and 41% in Group 3 remained in these fields rather than progressing to fellowship training. This difference was significant only with respect to Group 3. However, when an analysis was performed among those students providing only primary care as compared to only specialty care, there were no significant differences. Analysis by gender revealed women to be more likely to select generalist fields and remain in these fields without taking specialty training ($P < .0001$). Differentiating characteristics with respect to choosing generalist fields were not related to either Part I or Part II scores on National Board Examinations or selection to AOA. However, with respect to those specific specialties considered quite competitive (general surgery, obstetrics and gynecology, and ophthalmology), total test scores on Part I and Part II were significantly higher than those of all other students. The analysis indicated that, despite the diverse characteristics of students entering the third year at the School of Medicine, no one group produced a statistically greater proportion of generalists positions than any other, and academic performance while in medical school did not have a significant influence on whether a student entered a generalist field.

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Over the past 50 years, not only has the proportion of generalist physicians in the US declined steadily, but also, of those physicians currently entering generalist residency training, the proportion of those graduating from schools approved by the Liaison Committee on Medical Education also has diminished markedly.¹⁻³ As a result, there has been a call for medical schools to attempt to have at least 50% of their graduates enter generalist fields. This requirement not only has been accepted and embraced by virtually all professional and educational groups, but also currently is being considered as a mandate in impending health care legislation.

To achieve this goal, a number of studies have been performed to assess ways of attracting students into generalist fields, as well as to determine the reasons why many students consider these specialties less than enthusiastically. Linzer et al.⁴ have observed that preadmission programs can help to identify generalist-oriented students, as can certain characteristics of students admitted to medical school. It also has been suggested that medical schools themselves may not be providing an adequate curriculum or sufficient generalist role models to attract students, emphasizing instead specialty training through education that occurs primarily through inpatient services.² It has been accepted that, were exposure of students to primary care to occur, beginning with the basic science years, more students would enter generalist fields. However, there has been little evidence to support this hypothesis.

The Mount Sinai School of Medicine, until recently, always had admitted with advanced standing a large group of students into its third-year class, increasing the number of graduating students over first-year matriculants by 20%. These students basically had come from two sources: the Sophie Davis School of Biomedical Education (SDBM) of the City College of the City University of New York, and US citizens who had completed their basic science years in foreign medical schools, mostly schools in the Caribbean. The SDBM students had undergone a baccalaureate education integrated with the basic sciences medical curriculum, allowing them to earn a bachelor of science degree in 5 years, as well as to complete all of the required basic science courses. The students then entered the third year of one of seven participating medical schools in New York State. SDBM has had a twofold mission: to expand access to medical careers among inner-city youths, especially under-represented minorities, and to encourage the pursuit of generalist or primary care specialties among its graduates.⁵ As a result, these students have much greater exposure to primary care concepts and community service than is provided by most medical schools.

Those students who had been accepted with advanced standing from foreign

medical schools through the Association of American Medical Colleges' Coordinated Transfer Application System (COTRANS) have had a very diverse experience during their basic science years. A few have been exposed to primary care through work in clinics located in countries where their schools are situated, whereas others have had little or no exposure to either basic research or specialty medicine. On entering the third year at Mount Sinai, however, these two groups of students participated in a curriculum identical to that taken by students entering in the first year. This was, in general, the same that exists today at most medical schools, consisting of core clerkships in the basic clinical departments, in community medicine, in geriatrics, in neurology, and one week each in anesthesiology, ophthalmology, and the surgical specialties. The purpose of this paper is to review the career choices of students from each of these three groups to determine if any differences exist among groups with respect to selection of generalist careers.

METHODS

Graduates from the School of Medicine between 1970 and 1990 were divided into three main groups: Group 1, students who started Mount Sinai in their first year of medical training (MSSM 1); Group 2, students SDBM with advanced standing accepted into their third year; and Group 3, students who had spent their first two years at a foreign medical school (COTRANS) accepted with advanced standing into their third year. Those students accepted with advanced standing from American schools, although proportionately few, were deleted from the analysis, as were those students enrolled in the School of Medicine's Medical Scientist Training Program.

Career choices were grouped by those students who (1) entered and remained solely in generalist fields (family medicine, general internal medicine, and general pediatrics); (2) entered a generalist field, but completed additional specialty training; and (3) entered specialty fields. Classification was based on information obtained from the American Medical Association's Master Physician Data Base. In an attempt to define whether academic performance among students in these groups played any role in selection of generalist versus specialist training, aggregate data pertaining to Part I and Part II performance on the National Board Examinations were reviewed. Since the School of Medicine has a pass/fail grading system during the first 2 years and an honors/pass/fail grading system during the last 2 years, it is not possible to provide aggregate objective data with respect to a student's undergraduate performance and career choice based on actual grades. However, the School of Medicine does have a chapter of Alpha Omega

Alpha (AOA), the national honor society for medical students. For the years that data were available, a comparison analysis was performed on the career choices of students selected into AOA.

RESULTS

A total of 1,659 students were available for the data analysis, with the exception of students selected into AOA. For this data set, only 526 students were able to be screened. The majority of students entered their first year at Mount Sinai (80.1%), with 11.8% comprising the COTRANS group and 7.3% from SDBM (Table I). The distribution of generalist residency programs (family practice, internal medicine, and pediatrics) compared to specialty programs did not reveal any significant differences with respect to initial choice of generalist training programs, with 46% of the total cohort selecting generalist training. Of these, 66% were in internal medicine, 24% in pediatrics, and 10% in family practice.

The analysis of graduates who initially chose generalist training programs and then proceeded to either fellowships or other specialties is described in Table II. Of the MSSM 1 students, 58% remained generalists compared to 41% of the COTRANS group and 51% of the SDBM group. When one analyzes the differences among the major three outcome categories (generalist fields only, generalists who proceeded to subspecialties, and specialists), a significant difference does exist by cohort ($P < .03$) only with respect to COTRANS, with 42% of MSSM 1 students and 49% of SDBM students moving from generalist residencies to subspecialty training compared to 59% of COTRANS students. However, an analysis of differences among entry groups between those providing only primary care and those providing specialty care did not reveal any significant differences ($P = .47$). Of the total cohort, only 424 (26%) did not seek advanced training.

TABLE I Career Choices of Graduates, Classes of 1970–1990

	Generalist		Specialty		Total	
	No.	(%)	No.	(%)	No.	(%)
MSSM	616	(45.0)	726	(54.1)	1342	(80.1)
SDBM	57	(47.1)	64	(52.9)	121	(7.3)
COTRANS	95	(48.5)	101	(51.5)	196	(11.8)
Total	768	(46.3)	891	(53.7)	1659	(100)

MSSM = students starting Mount Sinai at Year 1; SDBM = students accepted with advanced standing into the third-year class from the Sophie Davis School of Biomedical Education; COTRANS = students accepted with advanced standing into the third-year class from foreign medical schools.

$X^2 = 0.49$; $P = .78$.

TABLE II Graduates in Generalist Fields Providing Only Primary Care Versus Those in Subspecialties, Classes of 1970–1990

	Primary Care Only			Generalists with Subspecialties			Specialties	
	No.	(%)*	(%)†	No.	(%)*	(%)†	No.	(%)†
MSSM 1	356	(57.8)	(26.5)	260	(42.2)	(19.4)	726	(54.1)
SDBM	29	(50.9)	(24.0)	28	(49.1)	(23.1)	64	(52.9)
COTRANS	39	(41.1)	(19.9)	56	(58.9)	(28.6)	101	(51.5)

MSSM = students starting Mount Sinai at Year 1; SDBM = students accepted with advanced standing into the third-year class from the Sophie Davis School of Biomedical Education; COTRANS = students accepted with advanced standing into the third-year class from foreign medical schools.

*Percentage within cohort's generalist category.

†Percentage within entire cohort.

Differences among all groups: $X^2 = 10.6$; $P = .03$.

Differences among all practice types, excluding foreign: $X^2 = 1.1$; $P = .58$.

Differences among cohorts between primary care only and specialties: $X^2 = 1.50$; $P = .47$.

Of the total cohort, 522 (32%) were women and 1,137 (68%) men. A gender analysis by group (Table III) revealed COTRANS graduates to have a significantly smaller proportion of women ($P < .01$). Across groups, 262 (50%) women entered generalist fields compared to 596 (52%) men. This was also true in comparing the proportion of women entering generalist fields who later obtained specialty training (24% of women vs. 47% of men) ($P < .0001$).

An analysis of performance on Part I and Part II of the National Board Examinations is presented in Table IV. Although the mean in the Part I Examination was slightly higher among those who chose specialty training, as well as among those who proceeded to fellowship training from a generalist training

TABLE III Gender Analysis by Group

	Women		Men		Total
	No.	(%)	No.	(%)	
MSSM	456	(34)	886	(66)	1342
SDBM	42	(35)	79	(65)	121
COTRANS	24	(12)	172	(88)	196
Total	522	(32)	1137	(68)	1659

MSSM = students starting Mount Sinai at Year 1; SDBM = students accepted with advanced standing into the third-year class from the Sophie Davis School of Biomedical Education; COTRANS = students accepted with advanced standing into the third-year class from foreign medical schools.

TABLE IV National Board Performance, by Career Choice

	Part I		Part II	
	Mean	SD	Mean	SD
Primary care	501.96	91.32	463.28	91.42
Generalist with subspecialty	507.27	82.78	476.82	88.24
Specialty	511.25	90.25	467.61	100.01

SD, standard deviation.

Analysis of variance: Part I: $F = 0.673$, $P = .51$; Part II: $F = 0.20$, $P = .82$.

program, these differences were not significant. Similarly, with respect to performance on the Part II Examination, no significant differences were detected among the three outcome groups. Data available on 526 students with respect to selection to AOA similarly did not reveal any differences between those selected to AOA and outcome with respect to generalist compared to specialty training. Since it commonly is accepted that certain specialties rely more on standardized objective measurements of performance than do others, total test scores on Parts I and II of the National Board Examinations of those students who entered residencies in general surgery, obstetrics and gynecology, ophthalmology, and the surgical specialties were analyzed. Significant differences were found between these graduates and all others ($P = .05$).

DISCUSSION

Many explanations have been provided as to why medical school graduates do not enter generalist training fields or remain in these fields to provide primary care. Much of the criticism has focused on the existing curriculum not providing sufficient primary care experiences or sufficient role models to allow students to consider generalist careers as exciting and stimulating as careers in the specialty fields. Prior to entering a discussion of the results of this study, it should be stated at the onset that it is exceptionally important to provide appropriate training in primary care to students by both developing exciting curricula and having sufficient generalists on the faculty to serve as role models. Similarly, the demographic changes that have occurred among hospitalized patients require an expansion of educational activities to the ambulatory care setting compared to inpatient care.

However, the data presented here suggest that merely changing the undergraduate curriculum may not influence students' selection of generalist training programs significantly. Although the School of Medicine is located in the East Harlem community and all students spend considerable amounts of time caring

for inner-city residents, rotate through a municipal hospital as part of required clinical rotations, and have available a wide range of community-oriented electives during the basic science and clinical years, only 26% of this cohort chose to remain in a generalist field and not to proceed to fellowship or specialty training. This proportion is not significantly different from those SDBM students who completed a five-year curriculum specifically geared to providing students with community and primary care experiences prior to their entry into the third year of a participating medical school. Selecting generalist residencies and remaining in generalist fields did differ, however, by gender, with women being significantly more likely to do so than men.

Although one might argue that the one clinical year at the School of Medicine might have changed their ultimate career goals significantly, it is difficult to conceive how this could have had such an effect because, during this year, the students were exposed to clerkships on the general medical services, with little time devoted to the surgical specialties, and no time devoted to radiology, a field that, until recently, has been popular among all students. These findings were corroborated by Martini et al.⁶ in a review of data from a national survey of medical schools and primary care physicians. These authors found that neither providing admission preference to inner-city residents nor giving primary care experiences during the basic science years was associated with a greater tendency for students to become primary care physicians.

Similarly, the students accepted with advanced standing from foreign medical schools, although spending most of their first two years in schools located in underserved areas in the Caribbean, as well as in smaller hospitals in this country, which provide primary rather than secondary or tertiary medical care, had the smallest proportion remaining in generalist fields. This finding differs from the outcome seen with students who spent all four years at a foreign medical school and then completed a year of supervised clinical training at any American medical school (Fifth Pathway students).⁷ Of these students, 85% entered generalist fields. However, information was not available as to how many proceeded to fellowship training.

The data with respect to the SDBM students differ from a recent publication describing a much larger cohort of all the students passing through this program.⁵ There may be several explanations for this difference. First, during the study, Mount Sinai was only one of the institutions accepting SDBM students with advanced standing. It is possible that those students who knew they potentially were interested in specializing selectively were matched with Mount Sinai. However, since virtually all of the medical schools had strong specialty programs,

this is not a likely explanation. It also is possible that, during admission interviews, faculty at Mount Sinai ranked students who had prior research experience or who expressed an interest in specializing more highly than others. This is even a less likely explanation as all interviewers were aware and supportive of the goals of the SDBM program. Most likely is the observation that the data in Roman and McGanney's study⁵ described graduates who had chosen generalist specialties without focusing on whether they had remained in these specialties or pursued fellowship training. If one assumes that the entire cohort of students from SDBM described in this publication entered fellowship training at the same rate as that seen with the 130 students who completed their training at the School of Medicine, then the proportion of students choosing primary care would probably be no different from the nationwide average.

Since, until recently, the generalist fields have not matched well in the National Resident Matching Program (Table V), it had been suggested that those students who select to remain in generalist training programs may be those who have not performed as well during their basic science years (as reflected by Part I National Board scores) or during their third year of clinical training and, therefore, are not as competitive as others. The data presented here suggest that mean scores on both Part I and Part II of the National Board Examinations were the same regardless of whether students chose to be generalists. Similarly, with respect to selection to AOA, which at the School of Medicine is not related to National Board performance, on the basis of a much smaller cohort, no significant differences were found between students elected to AOA and entry into specialist training fields. However, when the exceptionally competitive specialty fields are viewed as a separate group, significant differences in both Part I and Part II scores exist, suggesting that, despite the intentions of the National Board of

TABLE V Percentage of Generalist Positions Filled Through the National Resident Matching Program

	1991		1994		1998	
	US	Total	US	Total	US	Total
Anesthesiology	70	82	55	64	34	71
Family practice	56	65	67	83	66	86
Internal medicine	57	81	54	89	62	94
Pediatrics	65	79	70	92	82	99
Physical medicine	71	74	56	71	37	82
Radiology	79	98	78	95	57	75

Source: Data taken from NRMP Data Tables 1994 and 1998, National Resident Matching Program, Washington, D.C.

Medical Examiners, in these fields National Board scores are used as important selection parameters.

Data pertaining to level of indebtedness and entry into specialty, compared to primary care fields, have been somewhat conflicting. Several studies have been unable to document a clear relationship between indebtedness and entry into specialist training programs. However, Berg et al.,⁸ surveying house staff of internal medicine residency programs, found that 38% of residents with debts less than \$40,000 chose a career in primary care, compared with 10% with debts greater than \$40,000. Of the latter group of students, 59% stated that financial conditions had a moderate to marked impact on their career decision making. If these findings are correct, it is not difficult to understand how one can be influenced easily in the decision to choose fellowships rather than primary care internal medicine.

Although specific financial data on all students were not available for analysis, in general, those students from SDBM had considerably smaller levels of indebtedness than either those students who entered the School of Medicine in their first year or had attended foreign medical schools as City University of New York provided MSSM 1 students the first two years of basic sciences essentially without charge. Yet, the selection of generalist fields was not considerably greater than those of other students. It should be observed that most recently the level of indebtedness has increased dramatically. The considerable differences in income between specialty and generalist fields can have only a detrimental effect on a student's enthusiasm toward generalist practice.

It should be noted that, over the last 2 years, the proportion of US graduates entering generalist fields has been increasing consistently (Table V), with this increase occurring prior to major curricular changes initiated by many schools. This, however, may be more reflective of the medical marketplace as it becomes apparent that certain specialties clearly are oversupplied. Examples of this are anesthesiology, diagnostic radiology, and physical medicine, which have become progressively less attractive as career choices.

CONCLUSION

Despite the diverse characteristics of the curriculum of three groups of students entering the third year at the School of Medicine, including a group who had spent 5 years in a program specifically designed to produce generalist physicians, no one group produced a significantly greater proportion of generalists than any other. Academic performance while in medical school also appeared to have little influence on whether a student selected generalist versus specialty training.

However, for the competitive surgical specialties, performance on Part I and Part II of the National Board Examinations was a significant differentiation.

The need to alter the curriculum to allow students to obtain more exposure to generalist physicians as role models and to de-emphasize inpatient training is unquestionable. It is important not only to expose students to the excitement of generalist medicine, but also to allow all students, regardless of ultimate career choice, to be trained appropriately in the face of the changing patterns of the provision of health care. However, to assume that curricular changes alone will influence markedly the number of graduates entering primary care fields, without addressing issues of concern expressed by students who chose other fields or the increasing influence of the medical marketplace, seems less than reasonable.

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