

The Effect of Federal Grants on Medical Schools' Production of Primary Care Physicians

ABSTRACT

Objectives. Title VII of the Health Professions Educational Assistance Act of 1976 was created to encourage the production of primary care physicians. This study explored recent trends in the proportion of US medical school graduates entering primary care in relationship to Title VII funding.

Methods. The American Medical Association Physician Masterfile was used to determine the specialty choice of all students graduating from American medical schools between 1960 and 1985.

Results. The proportion of graduates entering primary care rose from 19.7% in 1967 to 31.1% in 1976 and remained stable for the subsequent decade. The increase occurred before implementation of Title VII. Rural, state-owned medical schools with departments of family medicine tend to produce a greater proportion of primary care physicians than urban private schools without family medicine departments.

Conclusions. The values of American medical schools and the reward structure of American medical practice favor the production of specialists over primary care physicians. Although Title VII helped to encourage and sustain the development of primary care educational programs at both the medical student and graduate levels, an increase in the proportion of primary care physicians will require fundamental changes. (*Am J Public Health.* 1993;83:322-328)

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Introduction

One of the most pervasive and apparently intractable problems confronting the US health care system has been that of specialty maldistribution.^{1,2} Even as the watershed Graduate Medical Education National Advisory Committee report predicted a substantial surplus of physicians in the aggregate, the committee emphasized that shortages of primary care physicians existed and were likely to persist into the future.¹ The tendency of American medical school graduates to choose nonprimary care specialties has been noted for more than 50 years and has been a concern of medical educators and governmental policymakers for much of this century.³⁻⁶

The federal government became directly involved in health personnel policy only relatively recently, with the award of construction grants to medical schools in 1963, followed by capitation grants in 1971. Although the initial objective of the first health manpower legislation was to increase the supply of physicians in the country, by the mid-1970s Congress and others realized that increasing the number of practicing physicians would not in itself improve access to health care unless something was done about specialty and geographic maldistribution.⁷⁻⁹ As a result, Congress totally overhauled its initial approach to health personnel legislation with the passage of the Health Professions Educational Assistance Act of 1976. In addition to trying to link medical school capitation payments to the graduation of primary care physicians, Congress created a spectrum of new grant programs under Title VII of that act designed to support the development of undergraduate

and residency training in family medicine, general internal medicine, and general pediatrics.¹⁰

Although capitation ended in 1980, the Title VII programs survived. These targeted grant programs have continued to invest federal resources in the sustenance and further development of primary care educational programs; about \$50 million in grants was awarded to medical schools annually between 1977 and 1985, with most schools having received some funds under the program. Title VII has by no means been the only mechanism through which the federal government has supported American medical education. The National Institutes of Health have awarded tens of billions of dollars to medical schools over the same period and, as a byproduct, helped to support and shape medical education in this country.¹¹ Medicare has both directly and indirectly supported medical education through its medical education subsidies, and the Veterans Administration also plays a major role.¹² However, only the Title VII programs have focused their attention on the specialty choices of American medical school graduates, attempting through this mechanism to influence the career paths of American physicians.

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This study examined the relationship between Title VII funding and the extent to which medical schools increased the proportion of their graduates who entered primary care disciplines. In addition, the study examined the differences between medical schools that tend to produce primary care physicians and those whose graduates are much more likely to enter specialty disciplines.

Methods

Data Sources

Information on medical school attended, year of graduation, and self-designated specialty for each active physician in the United States was obtained from the September 1990 version of the American Medical Association Physician Masterfile. Physicians who identify themselves as interns, residents, or fellows are considered to be in either primary care or specialty training and are listed separately from those who are currently in practice. The methods used to collect this information have been described elsewhere.¹³

Information regarding capitation payments and primary care grants awarded to each medical school in the country according to the provisions of Title VII, as amended by the Health Professions Educational Assistance Act of 1976, was obtained from the Bureau of Health Professions, Health Resources and Services Administration, Public Health Service. The National Institutes of Health provided information on that agency's school-specific funding.

Information on Medicare Direct Medical Education payments was obtained from the Health Care Financing Administration; data were available only for fiscal year 1985. Funding for this program was relatively stable for the study period, and fiscal year 1985 data are used as a proxy for the entire period. Institutions were identified as academic medical center hospitals according to criteria used by the Council of Teaching Hospitals of the Association of American Medical Colleges.

Study Design

For the purposes of this study, primary care was defined as family practice and general practice, general internal medicine, and general pediatrics. The American Medical Association uses 86 self-designated codes to define specialties; any physician with a specialty designation other than one of the four primary care

Career Choice	1976–1980			1981–1985		
	Graduates, %		No. of Graduates	Graduates, %		No. of Graduates
	Practice	Training		Practice	Training	
Family medicine	12.6	0.3	8 597	11.9	1.1	9 605
General internal medicine	12.2	0.7	8 591	11.9	2.6	10 672
General pediatrics	5.7	0.3	3 962	5.3	1.2	4 755
Total	30.5	1.3	21 150	29.1	4.9	25 032

codes specified above was considered to be a specialist in the analyses that follow. Family and general practitioners were combined into one group called family practice.

The specialty choices of the graduates of 121 US medical schools were analyzed for this study. Six additional schools contained within the American Medical Association database were eliminated: the 3 medical schools in Puerto Rico, the Uniformed Services Health Science University, and Mercer Medical School (which had no graduates until 1986). The graduates of Duluth Medical School, a 2-year branch campus of the University of Minnesota, were assigned to the parent school.

Designation of Study Periods

The first grants awarded under the Title VII authority were received by medical schools and teaching hospitals in 1977, although the program did not reach substantial levels until the 1978 fiscal year. Because implementation of the programs funded by Title VII required several years, we consider it unlikely that Title VII programs per se had much effect on students graduating in 1980 or earlier. For this reason, we have designated the 5-year period from 1976 to 1980 as the baseline period for the purpose of this study.

The subsequent 5-year period—from 1981 to 1985 inclusive—is classified as the impact period. The Title VII program had been fully operational for 4 years by 1981, and students graduating from 1981 onward would be expected to have been exposed to programs in their medical school funded by these grant sources. Although some of the Title VII funds were awarded to individual teaching hospitals rather than the medical schools themselves, we attribute these awards to the medical schools with which these teaching hospitals are affiliated. Because awards to primary care res-

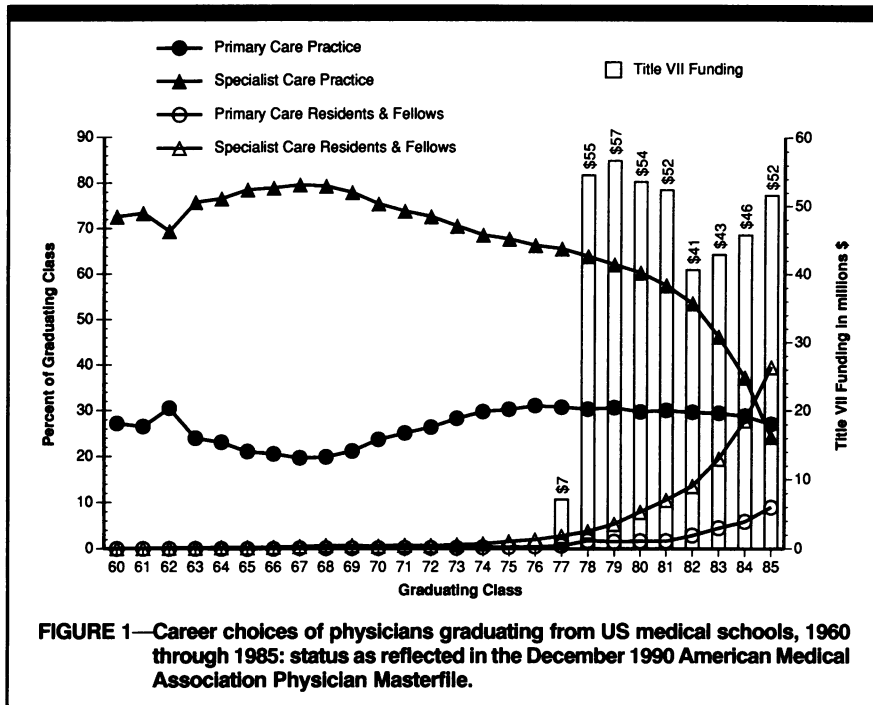
idency programs affiliated with medical schools theoretically should enhance the primary care educational environment for medical students attached to these schools, it seems reasonable to aggregate the funds in this manner.

We also examined the effect on the results of choosing other baseline periods. Specifically, we repeated all of the analyses presented in this paper using the years 1971 through 1975 as the baseline, a 5-year period prior to the passage of the legislation whose impact is being assessed. We also calculated the percentage of primary care and specialty physicians who emerged from every graduating school class from 1960 to 1985 in order to display trends over time, separating those in active practice from those still in training as defined above. We restricted ourselves to these years because of the large attrition from practice for physicians graduating before 1960 and the fact that over 50% of medical students graduating after 1985 were still in residency or fellowship training at the time the 1990 Physician Masterfile was created.

Results

The Specialty Choices of American Medical Students

From 1976 to 1985, the average yearly number of graduates of American medical schools expanded by 11%, from 13 281 to 14 772. Although approximately 776 more physicians from classes graduating during the impact period were in primary care practice or training as compared with the baseline years (about six more graduates per year per school), most of this increase was due to the expansion in medical school class size. As seen in Table 1, there was little difference in the percentage of medical students in the latter period who chose primary care disciplines.



Of the physician graduates from the baseline period, 30.5% were in primary care practice in 1990, as compared with 29.1% of the physicians in the impact period. It is likely that the percentage practicing in primary care fields will rise slightly as some of the graduates currently in primary care residency and fellowship training enter practice. It is difficult, however, to determine the ultimate primary care yield. For many students in internal medicine and pediatrics, residency and fellowship training is an intermediate step on the way to further subspecialty differentiation.¹⁴ If half of the sample in training in each time period ultimately enters primary care practice, then the proportions of primary care practitioners produced during the baseline and impact period would be 31.2% and 31.6%, respectively.

The decade from 1976 to 1985 was a period of relative stability with respect to the choice of primary care careers, as seen in Figure 1. The proportion of medical school graduates from the study years in primary care practice who entered primary care practice is remarkably constant at about 30% throughout the period. The percentage in nonprimary care practice declines at a fairly steady rate beginning in 1967, as a result of an increase in the proportion of physicians entering primary care practice and an increase in the proportion of graduates in residency or fellowship training, mostly in a specialty area. The large number of physicians still in specialty training reflects longer residencies and fellowships for certain spe-

cialties and physicians who leave practice to obtain additional training.

Although there appears to be little difference in the proportion of physicians entering primary care careers between 1976 and 1985, the graph demonstrates a fairly dramatic rise in primary care choices in the preceding decade. While only 19.7% of the graduating class of 1967 were practicing in a primary care discipline in 1990, that proportion had risen to 31.1% of the graduates emerging from medical school in 1976, a 56% increase. It appears that most, if not all, of the increase in primary care production occurred before medical schools began to absorb the funds provided through the Title VII program.

Did Title VII Grants Lead to More Students Entering Primary Care?

Between 1977 and 1985, the federal government awarded \$461 million in Title VII grant funds, \$325 million of which supported programs in family medicine training and \$136 million of which was directed to training in general internal medicine and general pediatrics. The sizes of the annual awards are depicted in Figure 1. Unlike the earlier capitation monies, these funds were designed explicitly to encourage medical schools to augment training in the primary care specialties and were awarded only to those schools that successfully competed for the funds. Most US medical schools received at least one grant under this program. There was substantial variation in the amount of money awarded to these

schools; over \$7.5 million was awarded to Michigan State University, whereas 15 medical schools received no funds.

There is little relationship between the amount of Title VII funding received and the likelihood that a specific medical school increased the output of primary care graduates over the study interval, as seen in the scatterplot in Figure 2. Although some schools had substantial increases in their production of primary care specialists, they were not necessarily the same schools that received large amounts of Title VII funding. This same pattern persists for each of the primary care specialties individually and is not altered if the change in the number of primary care graduates is substituted for the percentage change.

This result is not biased by the size of the graduating classes in the medical schools studied. We calculated the amount of Title VII funds received per graduating student at each of the medical schools in our sample. There was no relationship between this variable and the change in the percentage of primary care graduates produced by schools over the study period. Nor is the relationship altered if one substitutes the 5 years from 1971 to 1975 as the baseline period, years preceding the award of the first Title VII funds. The amount of Title VII funds provided to individual medical schools does not appear to have systematically led to increases in the proportion of primary care graduates that these medical schools produced. As will be seen in the next section, schools with more primary care graduates received more Title VII funds, but this relative predilection for primary care existed before the introduction of the Title VII program.

Characteristics of Medical Schools with Relatively Large Numbers of Primary Care Graduates, 1976 through 1985

Although Title VII funding was not associated with an increase in the number or percentage of primary care students graduated by given schools, this does not mean that all medical schools are alike in their production of primary care physicians or that the Title VII funding did not make a contribution to the training of medical generalists. To the contrary, American medical schools differ systematically in the propensity of their graduates to enter primary care careers, as seen in Table 2. For example, 46% of the 1976 through 1985 graduates of the University of Minnesota and 45% of the graduates of the University of Washington chose primary

care careers, more than double the 22% of primary care physicians emerging from Johns Hopkins or the 21% graduating from Columbia.

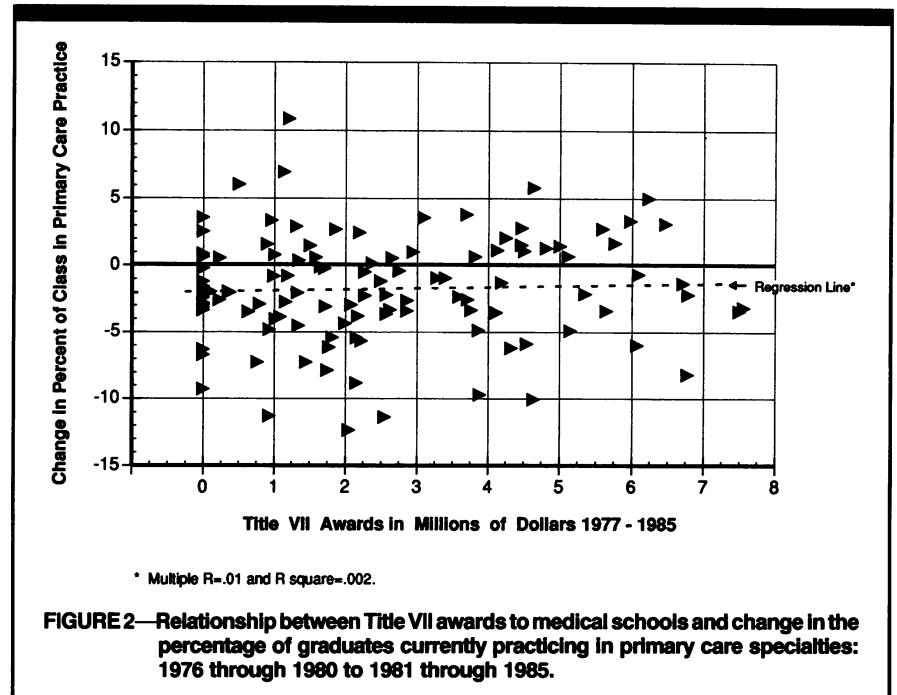
Several patterns emerge from an inspection of Table 2. Schools with more primary care graduates were more likely to be publicly owned, relatively new, and located in states with proportionately larger rural populations; to have formal departments of family medicine; and to receive more Title VII funding for their primary care programs. By contrast, schools with more specialty graduates tended to receive more federal funding through the National Institutes of Health and from Medicare's direct teaching subsidies.

It is worth noting the difference in the amount of funds received from the three federal programs for which we have accurate school-specific data. The average American medical school received less than \$4 million in Title VII funds during the study decade, and schools with higher percentages of primary care graduates tended to receive more money. The total amount of direct Medicare educational subsidies was about as large as the amount provided through Title VII, but the pattern was reversed; schools with a greater proportion of specialty graduates received larger Medicare subsidies. National Institutes of Health funding dwarfed both of these other sources, even for those schools with relatively large numbers of primary care graduates.

Although we are not testing a causal model, it is instructive to observe the association between the medical school characteristics in Table 2 when they are entered into a linear multiple regression with the percentage of graduates entering primary care careers as the dependent variable. The model, presented in Table 3, is quite strong, with 42% of the variance in the dependent variable associated with the independent variables.

It should be noted that there is substantial multiple collinearity among the independent variables entered into the equation in that many of these variables are intercorrelated and all have significant bivariate correlations with the dependent variable. However, all of the regression coefficients are in the same direction as the correlation coefficients; thus, the regression results displayed in Table 3 do not distort the underlying relationships among variables.

Tables 2 and 3 suggest that medical schools have a tendency to fall on a continuum with respect to primary care production that has two quite different ex-



amples. At one end are the prestigious, long-established private medical schools. Virtually all of these schools are in large metropolitan areas, receive substantial amounts of external research funding, are the recipients of relatively large amounts of Medicare educational funding, and produce students who predominantly choose specialty careers. The other end of the continuum is occupied by a group of relatively new state-supported schools, most of which are located in areas with proportionately larger rural populations. Virtually all of these schools have formal departments of family medicine, receive relatively little National Institutes of Health funding, and tend to have larger proportions of students entering primary care careers. This latter group of schools did tend to attract more Title VII funds. It is important to note, however, that in every medical school in the United States, no matter its structure or mission, the majority of students graduating between 1976 and 1985 chose specialty careers.

Discussion

One of the most pervasive refrains in medical education over the last 3 decades has been that the mix of physicians emerging from America's medical schools is badly skewed.^{15,16} Robert Petersdorf, MD, president of the Association of American Medical Colleges, put it succinctly: "The issue is not whether the country has a sufficient supply of physicians but whether the physicians that our

academic medical centers produce are congruent with our country's health needs. We aren't educating the kind of physicians needed by society."¹⁷ Although there are dissenters,^{18,19} most observers conclude that there are severe deficiencies in the production of primary care doctors, deficiencies that increase medical care costs and impair access for large portions of the population to routine medical care.^{6,20}

This interpretation was embraced by the US Congress in the landmark Health Professions Educational Assistance Act of 1976, the culmination of 2 years of heated debate about the legitimate role of the federal government in health professional education. The major tool for addressing the problem of specialty maldistribution was the primary care grant programs introduced as part of Title VII of that legislation. Those framing the legislation had the clear expectation that expansion of the number of primary care practitioners would also lead to more physicians practicing in rural and other medically underserved areas of the country.¹⁰

Impact of Primary Grant Programs on Specialty Choice

This study demonstrates that the Title VII primary care grant programs did not lead to the changes in the composition of the physician work force desired by Congress. During the period examined in the study, about one third of American medical school graduates entered the three primary care disciplines of family

TABLE 2—Characteristics of Medical Schools with Differing Proportions of Primary Care Graduates: 1976 through 1985

Quartile ^a (Range of Medical School Graduates Currently in Primary Care Fields)	Graduates Entering Primary Care, Average %	Size of Graduating Class, Average No.	Public Schools, %	New Schools (1960 to Present), %	Schools with Family Medicine Department, %	Funds per School (millions)			Rural Population of State, Average %
						Title VII	National Institutes of Health	Direct Medicare ^b	
First (36.4–49.9)	40.5	103	86.2	37.9	93.1	3.8	92.6	2.3	33.1
Second (33.5–36.3)	34.9	130	64.3	28.6	96.4	2.0	69.3	2.7	26.0
Third (30.1–33.5)	32.0	122	64.3	28.6	89.3	2.6	104.8	3.0	17.6
Fourth (21.3–29.2)	26.0	138	17.9	3.6	42.9	2.1	204.9	6.9	18.8

Note. Schools are arranged by quartile, according to percentage of graduates in primary care fields in 1990. We omitted 8 schools with no graduates during 1976–1980.
^aThe numbers of medical schools in the quartiles in order are 29, 28, 28, and 28.
^bDirect Medicare funds awarded to affiliated academic medical center hospitals only.

TABLE 3—Regression Results: Factors Affecting the Proportion of Medical School Graduates Selecting Primary Care Careers: 1976 through 1985

Independent Variable	Standardized Regression Coefficient	P
Title VII funding per school (in millions of dollars)	0.789	.002
Rural population of state, %	0.058	.026
Presence of department of family medicine	2.688	.053
School established after 1960 ^a	2.084	.054
Public school ^b	1.742	.112
Medicare direct education funds (in millions of dollars)	−0.041	.528
National Institutes of Health funds (in millions of dollars)	−0.013	.005
Constant	27.858	.000

Note. Adjusted $R^2 = 42.1$; mean of dependent variable = 33.4; overall $F = 0.0000$; no. of medical schools = 121.
^aCompared with 1960 or before.
^bCompared with private school.

medicine, general internal medicine, and general pediatrics. Schools that received substantial amounts of Title VII grant funds had higher percentages of primary care graduates but were no more likely to increase the proportion of graduates entering primary care over time than schools that received little or no funding.

Although Title VII was not associated with an increase in students selecting primary care careers, one cannot conclude that the federal investment had no effect. This was not a controlled experiment; many simultaneous changes both in medical education and in the structure of medical practice affected student career choice.

The data demonstrate that there was a substantial increase in the proportion of primary care graduates in the years immediately preceding the Title VII program, a period marked by the creation of the new discipline of family medicine and the estab-

lishment of medical school and residency training in this new primary care discipline. Other studies have shown that Title VII was extremely important in allowing these programs to gain an academic foothold^{21,22}; had Title VII not existed, the more recent decline in interest in primary care careers may have begun earlier.²³

There are also limitations inherent in both the data and the study design that could impede our ability to detect an impact. First, we arbitrarily designated the period from 1976 through 1980 as the baseline period, and the subsequent 5-year cohort as the impact period, but reality is not quite so precise. Some of the earlier primary care grants may have affected students in the baseline period. However, the similarity of the results when 1971 through 1975 is used as the baseline makes it unlikely that major effects have been obscured.

Second, the reliance on the 1990 masterfile means that some of the students had been out of medical school for only 5 years at the time we ascertained their careers and locations. It is likely that some of the physicians that we listed as primary care physicians will ultimately specialize; career changes are more likely to occur with age. If true, however, this would further strengthen the conclusions of our study, since the most recent graduates are those most likely to still have been in training or in some transitional practice setting at the time of the study, leading us to overstate any impact from the funding intervention.

It is also possible—although highly unlikely—that there will be an upturn in the production of primary care physicians graduating from medical schools after 1985 that is attributable to Title VII funding. Since 1987, there has been a dramatic drop in the number of American medical students matching in primary care residencies, a drop that will almost certainly lead to a decline in both the number and percentage of primary care physicians.²³ It is likely that Title VII support prevented the decline from being even steeper, but it seems safe to conclude that despite the methodological limitations of this study, the Health Professions Educational Assistance Act of 1976 did not lead to any major increase in the proportion of American medical school graduates choosing primary care careers.

Why Do American Medical Schools Produce So Few Primary Care Physicians?

American medical schools differ substantially in the specialty choices of their graduates. There was a more than twofold

variation in the percentage of primary care graduates across America's medical schools, and a considerable amount of this variance is associated with a few measures that describe some of the structural characteristics of these schools. It is very likely that the mission and culture of the medical school determine to a large extent the type of students who apply to the institution and are ultimately selected by it, and thus influence the career choices of those students it graduates. With few exceptions, large, long-established, private, urban, research-intensive medical schools have not embraced primary care as part of their mission, and the presence or absence of a handful of relatively modest grants for primary care training is unlikely to induce them to change their course. Newer state-supported schools—particularly those in rural states—are more likely to graduate students who enter primary care careers, and in these schools Title VII funding is of relatively greater importance in sustaining educational programs.

The structure of the Title VII program may also have limited the extent to which grant recipients could use the funds to leverage change within their institutions. Title VII funds were, for the most part, awarded directly to primary care departments to enable them to accomplish internal goals; they were not, in general, used to change the curricular content or thrust of the sponsoring medical school. Grant applications were reviewed by appointed peer-review panels according to criteria established by the funding agency, criteria that changed over time to reflect the current emphases within the Public Health Service. Institutions were not held strictly accountable for accomplishing the objectives specified within the grants. While Title VII had a major impact on the primary care departments that received the funds, it is unlikely that the program was successful in shaping admission policies, faculty composition, or the broad curricular design of medical schools. Given the size of the awards, it is difficult to imagine that the program could have been expected to achieve these aims.

It is important to note just how small the Title VII grants are in relation to other sources of medical school funding.²⁴ In addition to the National Institutes of Health and Medicare direct educational subsidies that we documented, schools receive substantial funds from Medicare indirect educational adjustments, fees for clinical care, state budgets, and other governmental and private funding organizations. The average American medical

school received less than \$400 000 per year in Title VII primary care grants during the period of this study, an amount that has changed little since the program's inception, while Medicare direct medical education adjustments have increased substantially. Given that a substantial amount of Title VII funds were awarded to residency programs with little or no direct affiliation with medical schools, the impact on the medical schools themselves was further diminished. Although these funds were undoubtedly of enormous importance in sustaining the individual training programs that received the support, they probably barely penetrated into the awareness of many of the leaders of America's academic medical centers.

Although Congress committed itself in 1976 to addressing the problem of specialty maldistribution, the strategy that it adopted was insufficient to the challenge. While the Title VII funds were substantial in the aggregate—and extremely important to the new primary care training programs they supported—they represent a very small amount of the money used to support medical education. Even though Title VII funds are intended to promote the production of primary care graduates, virtually all other federal policies have the opposite effect. Medicare tends to perpetuate the status quo through both its direct and indirect medical education subsidies. By supporting a portion of the costs of residency training—and providing differentially more resources to institutions with a higher complexity of care and greater numbers of residents—the program provides the bulk of its educational resources to tertiary care institutions with a preponderance of subspecialty training programs. Also, despite the redistributive goals of the recently adopted resource-based relative value scales payment schemes,²⁵ Medicare continues—as do most third-party payers—to pay more per hour for procedural than for cognitive services. The highly focused biomedical endeavors supported by the National Institutes of Health and many private foundations tend to foster an intellectual environment in academic medical centers that is, at best, indifferent to the creation of physician generalists. The increasing dependence of academic medical centers on clinical income generated through highly complex inpatient programs is not likely to nourish the creation or education of future primary care physicians. And, of course, the much larger incomes of specialists have a major effect unrelated to the academic milieu.

To the extent that increasing the proportion of primary care physicians remains a national goal, this study suggests that it is naive to rely on a strategy that depends primarily on voluntary efforts by the nation's medical schools. Although Title VII funds have been important in fostering the creation and sustenance of primary care programs in the nation's medical schools and residencies, these federal investments are not in themselves adequate to the task of changing the strongly embedded values of academic medical centers or countering the trend toward increasing specialization among recent cohorts of medical students. Unless the objectives embodied in the Health Professions Educational Assistance Act are reinforced by other direct and indirect actions of governmental agencies, academic medical centers, and third-party payers—or the Title VII program is expanded greatly—relatively small grants awarded to primary care departments will not, of themselves, have much effect on the specialty mix of physicians emerging from the nation's medical schools. □

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Commentary: Primary Care—Medical Students' Unpopular Choice

Robert G. Petersdorf, MD

ABSTRACT

Title VII funding to medical schools has not succeeded in correcting the shortage of primary care physicians. Although it is generally true that there is an inverse relationship between the amount of research funds awarded to a school and its success in producing primary care physicians, there are many exceptions. Neither Title VII, the amount of research funding, or Medicare's Direct Medical Education payments has had a substantial effect on the production of primary care physicians. These factors are comparatively insignificant when considered in the light of strong external incentives to specialize. Medical education cannot remedy the specialty imbalance unless the external environment becomes more friendly to generalists. (*Am J Public Health*. 1993;83:328-330)

In "The Effect of Federal Grants on Medical Schools' Production of Primary Care Physicians,"¹ Rosenblatt and colleagues contend that American medical schools need to increase their production of primary care physicians. I agree with the authors, but I would like to point out that their analysis of the data bearing on this point is subject to serious misinterpretation. I shall comment briefly on the use of the American Medical Association Physician Masterfile to assess the availability of physician manpower in internal medicine; consider the contribution of federal grants and the Direct Medical Education payment to the production of primary care physicians; and estimate the effectiveness of Title VII funding.

The Use of the Physician Masterfile

The authors point out one shortcoming of the Masterfile, that is, that it does not account for individuals in training. A much more serious flaw is that until recently, some specialist internists were misclassified as general internists. During the period studied, only the specialties that had specialty boards prior to 1970—cardiovascular

disease, gastroenterology, pulmonary disease, and allergy/immunology—were counted as specialties of internal medicine in the Masterfile. Thus, practitioners specializing in nephrology, endocrinology and metabolism, hematology, oncology, infectious disease, and rheumatology were counted as internists. For this reason, the number of primary care physicians was probably lower than the number used by the authors. For the medical cohort graduating in 1987, I estimate that the percentage of primary care physicians was 26%.²

Production of Primary Care Physicians and Amount of Research Funds

It is generally true that the schools that are the top producers of primary care physicians do not have distinguished records in attracting research funds.³ However, among the top 20 producers of pri-

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