THE MAKING OF A MEDICAL GENERALIST

by Steven A. Schroeder

Prologue: *Regardless of what one thinks about the absolute number of physicians needed in the future, there is a clear consensus among experts that something should be done to increase the proportion of primary care physicians in relationship to the number of specialty physicians. In this essay, Steven Schroeder, a professor of medicine and chief of the Division of General Internal Medicine at the University of California, San Francisco, makes the case for increasing the number of generalist physicians. Schroeder says there are four basic reasons why decreasing the relative supply of specialists makes sense: to increase the quality of care; to decrease the cost of care; to increase patient satisfaction; and to increase physician satisfaction. He brings to the subject of health manpower impeccable credentials as the driving force behind a highly successful department of general internal medicine that operates in an environment that places a premium on specialty care. Schroeder, educated at Stanford and Harvard Universities, also has earned a national reputation as a health policy analyst and active participant in a wide variety of issues. Indeed, over the years, Schroeder has demonstrated an uncanny ability to spot emerging issues, including the use of medical technology, physician payment, and high-cost illness, examine them and then write essays which are used as primers by private and public sector participants alike in the ensuing debates. Schroeder is a member of the Prospective Payment Assessment Commission and of the Institute of Medicine. He also was recently elected president of the Society for Research and Education in Primary Care Internal Medicine.*

Concerns about the appropriate numbers and types of physicians have challenged medical educators for at least the past twenty-five years. Perhaps the only constant feature of this debate has been its lack of consensus, especially regarding physician supply. Recently, however, it has seemed easier to achieve consensus about the number of physicians needed than about their proper mix according to specialty. This is an important step, since the physician specialty mix is dependent upon the total number of physicians.

The Graduate Medical Education National Advisory Committee (GMENAC) report predicted a surplus of 70,000 physicians in the United States by the year 1990, and 145,000 by the year 2000.[1] However, compared with such Western European countries as Belgium, West Germany, Sweden, Italy, France, and Denmark, the United States has substantially fewer physicians per population. Furthermore, the United States has an unusually high proportion of foreign physicians (26 percent of all active physicians in 1980), and a lower rate of medical school graduates per population than virtually every Western European country.[2] Nevertheless, a number of measures for reducing physician supply are already in effect, including a quiet but impressive reduction in the size of entering classes at many medical schools, and the imposition of further barriers against practice by foreign-born and American graduates of foreign medical schools.[3]

Although it is important to acknowledge that decisions about numbers of physicians must precede policies about specialty mix, the focus of this paper will not be on numbers, but rather on distribution by specialty. The suspicion that our system of medical education produces too many specialists and not enough generalists has been with us ever since it became apparent that a large and aging cohort of general practitioners was destined not to be replaced. However, because of the complexities involved in identifying generalist physicians, and because of honest disagreement about the boundaries between generalist and specialist practice, there has been no consensus about the proper ratio of generalists to specialists, or even about which physicians should function as generalists.

This paper will focus on the issue of training generalist physicians in the United States, including: (1) defining who are the generalists; (2) reviewing projected needs for generalists; (3) analyzing the determinants of medical specialty choices; (4) describing how economic incentives can influence specialty choice; and (5) outlining policy options that could increase the number of generalists.

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Who Are The Generalists?

Some confusion exists about terminology in general medical care, including the terms primary care, principal care, general care, and generalist physician. For the purpose of this discussion, I will use the definition of primary care provided by Alpert and Charney, who state that the primary care physician serves as the first contact for the patient, assumes longitudinal responsibility for the patient whether or not he is ill, and serves as the "integrationist" in coordinating specialist care.[4] The Institute of Medicine's 1978 report on manpower policy for primary care provides a similar definition: "The five attributes essential to the practice of good primary care are accessibility, comprehensiveness, coordination, continuity, and accountability."[5]

By contrast, principal care refers to continuous care of a regular patient, whereby the physician provides most of the patient's care. For example, a nephrologist may give principal care to a set of patients being treated by hemodialysis for end-stage kidney disease. Principal care does not necessarily include three elements of primary care: first contact, coordination, and comprehensiveness.

I use the term general care to refer to primary care coexisting with a consultative capacity in the office and hospital settings. This broader definition includes some generalist physicians, such as general internists and general pediatricians, who are mainly primary care physicians but may also provide consultative services. It also describes a part of the practice of some specialist physicians who may either combine primary care and specialty practice or provide principal care within a specialty practice. However, I restrict the term "generalist physician" to physicians in four groups who have not subspecialized and who are open to all patients (general and family practitioners), all adults (general internists), or all

Exhibit 1
Physicians Who Provide Generalist Care

Primary care physicians	
General practitioners and family practitioners:	(about 60,000)
General internists:	(about 45,000)
General pediatricians:	(about 25,000)
Specialist physicians	
Specialists who combine primary and subspecialty work:	
Internal medicine subspecialists:	(about 31,000)
Pediatric subspecialists:	(about 5,000)
Gynecologists:	(about 28,000)
Other specialists who provide principal care for patients who fall within their specialty domain	

"General practitioners are a vanishing group of older physicians whose number decreases with each passing year. Their modern-day successors are family practitioners."

children (general pediatricians), without regard to the organ system or type of illness involved.

General and family practice. Exhibit 1 lists the six major groups of physicians who provide some generalist care. General practitioners are a vanishing group of older physicians whose number decreases with each passing year. Their modern-day successors are family practitioners. In 1982, there were about 60,500 active family or general practitioners, constituting about 12 percent of all U.S. physicians. As judged by numbers of residency programs, family medicine was the fastest growing specialty in the 1970s. In July 1984, almost 7,500 medical school graduates were enrolled in family practice residency programs, accounting for about 12 percent of all residency positions. Most of these positions were filled through the National Resident Matching Program (NRMP), and almost all of the available positions (98.7 percent) were ultimately filled.[7] Family medicine residencies, however, are strikingly absent from the major teaching hospitals of most private medical schools, few of which have academic departments of family medicine. The rapid growth of family medicine in the 1970s seems now to have abated, and it is doubtful that many new family practice residency positions will be created. Thus, a change in the proportion of physicians who are family practitioners seems unlikely since family practitioners currently account for about 12 percent of both total physicians and total residents.

Internal medicine. Internal medicine is the largest generalist specialty. Currently, there are approximately 76,000 practicing internists, accounting for about 16 percent of all practicing physicians. Internal medicine also has the most trainees, accounting for 18,707 residents in 1983, or 26 percent of all residency positions.[8]

Not all internists are generalists. Internal medicine can be subdivided into three broad groups. The general internist is a primary care physician who may also serve as a consultant. In contrast, the pure specialist in internal medicine practices only within a defined subspecialty, although often providing continuing and comprehensive care (that is, "principal care") for that group of patients. One study, for example, showed that more than half of the encounters with patients of oncologists, nephrologists,

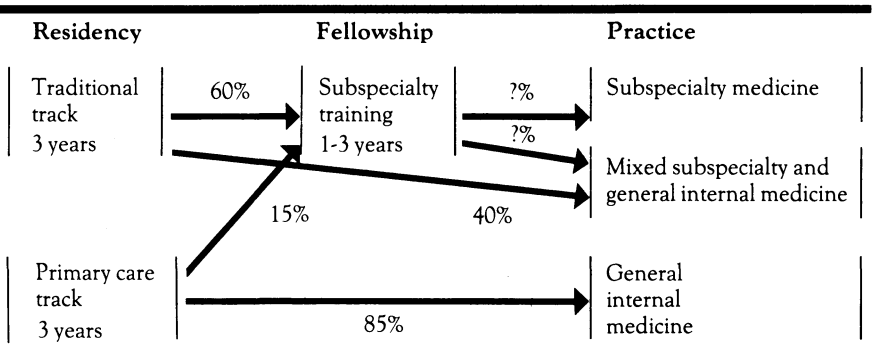
cardiologists, hematologists, and rheumatologists consisted of principal care.[9] A third group of internists practices a mixture of generalist and specialist care, sometimes by choice but often because of insufficient demand for care in their subspecialties.

What proportion of practicing internists are generalists? Of the 53,500 internists in practice in 1976, 69 percent were generalists and only 31 percent were specialists.[10] However, the National Study of Internal Medicine Manpower (NSIMM) showed a sharp increase in subspecialty training in the 1970s, so that by the 1978-79 academic year the ratio of third-year residency positions in internal medicine to first-year subspecialty fellowship positions was 1.5:1. Thus, almost two-thirds of residents finishing internal medicine residency could be expected to enter subspecialty fellowships. From this rapid increase in fellowship positions, Tarlov estimated that the 2:1 ratio of general internists to subspecialty internists in 1976, would be reversed to 1:2 by the 1990s.[11] By the 1982-83 academic year, the ratio of third-year residency to first-year fellowship positions had risen slightly to 1.66:1, so that about 60 percent of internal medicine residents were securing subspecialty training positions.[12]

It is not known exactly what proportion of practicing internists consider themselves generalists. The percentage is undoubtedly less than the 69 percent that existed in 1976, but is probably more than the 40 percent who do not select subspecialty fellowships. By 1990, there will be 130,000 practicing internists, an 81-percent increase from the 72,000 in 1978. Their median age will be less than forty-five, and more than half will be subspecialists.[13]

As shown in Exhibit 2, there are several ways to acquire training in internal medicine. The traditional hospital-based residency accounts for about 95 percent of all residency slots in internal medicine. However, a small but increasing number of residency programs in primary care gen-

Exhibit 2
Choices For Internal Medicine Training



Note: The percentages are estimates of choices of current trainees.

eral internal medicine have existed since the 1970s, suppported initially by The Robert Wood Johnson Foundation and later by federal funds authorized by the Congress and disbursed by the U.S. Bureau of Health Professions. These programs devote a much higher proportion of time to ambulatory care and to noninternal medicine specialties, such as dermatology and office gynecology.[14] The graduates are much more likely to enter general internal medicine practice than are graduates of traditional programs, even when those residents had entered their medicine residency intending to become general internists. For example, at the Boston City Hospital, two-thirds of the would-be generalists entering the traditional track changed their plans to subspecialty training, compared to only 15 percent of those in the primary care track.[15] However, as of 1984, only about 5 percent of all internal medicine residents were in such primary care programs.[16]

Since internal medicine is the largest specialty, accounting for 16 percent of all active physicians and 26 percent of all residency positions, it clearly has the potential to become the most important generalist specialty. Unlike family medicine, internal medicine can be expected to put more physicians into the total pool than are being removed from it for reasons of death and retirement. There is some leakage out of internal medicine residencies, largely because some first-year internal medicine positions are being filled by future ophthalmologists, radiologists, anesthesiologists, dermatologists, and neurologists. This trend is reflected in the drop from 7,118 first-year resident positions to 5,623 second-year positions in the 1982-83 year. However, those residents lost after the first year amount to only 8 percent of the entire internal medicine residency pool. Thus, one can expect the proportion of physicians who are internists to reach or exceed 20 percent in the not-too-distant future. However, the degree to which internal medicine takes seriously its role as a primary care specialty is not yet clear. Some have urged internists to assume more leadership in primary care training, while others have despaired that primary care can ever be comfortably located within the walls of internal medicine.[17] At this point, the jury is still out, although the current leadership of academic internal medicine seems to be, at best, neutral about the idea of training generalists.[18]

Pediatrics. The fourth major type of generalist physician is the general pediatrician. There are about 30,000 active pediatricians in the United States, comprising about 6 percent of all physicians. The choices in pediatric training tend to parallel those for internists, although pediatrics offers fewer subspecialty fellowship opportunities. At present, there are 6,140 pediatric residents in approved U.S. programs, accounting for about 8.4 percent of all residents. Of these positions, 27 percent were filled by foreign medical graduates, a proportion twice as high as for family medicine and 1.25 times as much as internal medicine.[19] It is safe to assume

that more pediatricians than internists become generalists. For example, a survey of physicians who completed residency training in internal medicine and pediatrics in Massachusetts from 1967 to 1972 showed that 56 percent of the pediatricians were devoting more than half of their practice to primary care, as compared to only 28 percent of the internists.[20]

In 1984, 12 percent of all pediatric residents were in primary care programs, more than twice as much as for internal medicine. This may be appropriate since the traditional pediatric residency program with its heavy emphasis on hospitalized patients, especially infants in neonatal intensive care units, children with severe chronic diseases such as leukemia and cystic fibrosis, and children with congenital anomalies, may ill prepare residents for subsequent office practice. Charney has speculated that the residency experience in pediatrics may be more unlike subsequent practice than the residency experience in any other specialty.[21]

Other providers of general care. General care is not limited to physicians in the four primary care categories in Exhibit 1. As mentioned, a considerable portion of the practice of subspecialty internists and pediatricians may consist of generalist care, and as much as 75 percent of the practice of gynecology may be considered principal care. (Gynecologists, like pediatricians, account for about 6 percent of the U.S. physician population.)

In addition, there exists what Walsh McDermott called "the hidden system of general care." "What it amounts to, in this 'hidden system,' is that the physician, in effect, assumes responsibility, or at least exercises responsibility, for the primary care of a group called 'his patients.' The difficulty is that 'his patients' represent a sort of club to which entrance is obtained by something other than the mere request for primary care; for example, a referral from another physician, a cholecystectomy, or being the mother of a child who is the physician's patient, and so forth. Moreover, at any time—almost dependent on his mood—the physician is free to retreat into his specialist skill and say, 'You know I don't handle that sort of thing. Why don't you call Dr. so-and-so?' "[22]

Aiken et al., defining primary care as principal care, analyzed 400,000 patient encounters by 10,000 physicians to determine what proportion could be considered primary care. By this definition, one of every five Americans receives general medical care from a specialist, including subspecialists in internal medicine as well as dermatologists, ENT specialists, and so on.[23] This general care from the "hidden system" translates into additional generalist physician equivalents; precisely how many this amounts to is unknown, but it is certainly many thousands.

How Many Generalists Are Needed?

The amount of general medical care available to a population is a function of: (1) the absolute number of physicians, (2) the number of general-

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ist physicians, (3) the proportion of general care given by specialists, and (4) the organization and financing of medical care.

The proportion of generalist care that is provided by specialists is greater in the United States than in almost any other Western country. If we include as general care all care provided by general and family practitioners, 75 percent of care provided by pediatricians, and 65 percent of care provided by internists, then approximately 27 percent of U.S. physicians are functioning as generalists. If principal care by gynecologists is added, then the figure rises to about 30 percent. By contrast, 73 percent of physicians in the United Kingdom, over 50 percent of Belgian and West German physicians, and 38 percent of Dutch physicians who have completed training and are in practice, are general practitioners, not to mention the general care provided by internists and pediatricians in those countries.[24] Thus, the United States has a much smaller proportion of generalists than other Western countries, and consequently assigns a large proportion of generalist care to subspecialists. This is consistent with the Aiken data described above.[25]

Within closed systems of care in the United States, such as health maintenance organizations (HMOs), the ratio of generalists to specialists is about 6:4, although it varies with the extent to which specialists provide general care.[26] In HMOs, as in many European countries, generalists function as gatekeepers, controlling access to subspecialists. By contrast, U.S. fee-for-service medicine encourages self-referral by patients to subspecialists.

Many observers in the United States feel that the current ratio of generalists to specialists serves us well. They point to the high level of provision of sophisticated medical services, a public that wishes direct access to highly specialized services, impressive improvements in health status, and a medical-legal system that encourages referrals to experts. A growing body of observers, however, holds that we are moving toward an excess of specialists, if we are not there already. The most detailed articulation of this opinion is the GMENAC report, which forecasts an oversupply of physicians by the year 1990 in virtually every specialty except child and general psychiatry, emergency medicine, preventive medicine, hematology/oncology, and possibly anesthesiology.[27]

The arguments for having fewer specialists and more generalists are

separate but interrelated. There are four basic reasons to advocate decreasing the relative supply of specialists: (1) to increase the quality of care; (2) to decrease costs of care; (3) to increase patient satisfaction; and (4) to increase physician satisfaction. Quality of care suffers when surgeons and other procedure-oriented specialists have insufficient patient volume to hone their skills and judgment. Abundant anecdotal and statistical evidence suggests that many specialists, especially those in large metropolitan areas, have a very low frequency of performing the "bread and butter" procedures in their specialty. Quality is also impaired when specialists are forced to do general care to take up slack time, if their temperament or education is not suited to care outside their specialty. It may not be coincidental that the United States has both the highest ratio of certain specialties per population and the first or second most expensive medical care system in the world. The high rates of operations and procedures in the United States certainly include some that are unnecessary and whose costs contribute to high medical bills. There is essentially no waiting period for surgery (at least for insured patients), except for those awaiting organ transplantation. Thus, to the extent that physicians can induce demand by performing procedures that may not be indicated, reducing the numbers of specialists might both decrease costs and enhance quality of care. In addition, the patient's satisfaction is related to interactions with his physician, and it seems reasonable that these interactions might be more pleasant if the physician providing general care had chosen to do so, rather than being forced to do so for economic reasons. For the same reasons, physicians are probably most satisfied with their work when they are doing what they had chosen to do in the first place.

The arguments for increasing the number of generalists depend upon what happens to overall physician supply. If overall supply is reduced by selectively decreasing the number of specialists being trained, then a change in generalist concentration may not be needed. However, if physician supply is to remain constant, then a decrease in specialists must be accompanied by a compensatory increase in generalists. There now appears to be a consensus that the physician supply should not be expanded, and that perhaps it should be decreased slightly by restricting the immigration of foreign medical graduates and by decreasing medical school enrollment. Given the strong demand for admission to medical schools by U.S. students, as well as the recent restriction in immigration of foreign doctors, it is unlikely that major reductions in physician supply can occur. Thus, a reduction in the number of specialists will probably have to be coupled with an increase in number of generalists.

Even in the best of times, forecasting national health manpower needs is hazardous. In today's circumstances, with major changes occurring in the organization and financing of medical care and with long-standing arrangements for the funding of graduate medical education under attack,

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such predictions are even more difficult.

The increasing adoption of competition as a strategy for cost-containment will almost certainly result in the continued growth of prepaid health plans, such as HMOs, and a parallel decrease in the number of persons who use the fee-for-service system. Since the fee-for-service system and HMOs have very different physician staffing patterns, this shift will have important implications for health manpower planning. Currently, the United States has about one doctor for every 500 persons, while in HMOs, the ratio is about one per 1,000. In the country as a whole, specialists outnumber generalists by almost three to one, while in HMOs there are estimated to be two specialists for every three generalists. Extrapolating from these figures, it would seem that further growth of HMOs would probably affect manpower needs by requiring some decrease in the absolute number of physicians and major decreases in the number of specialists. How the increasing proportions of women among physicians will change these calculations is not well understood. The higher proportion of family time spent by women physicians may mean that their clinical effort will be relatively less than male physicians. On the other hand, the greater longevity enjoyed by women means that women physicians can expect a longer career in practice.

Another probable major change is in the financing of graduate medical education. Support for residency training has, until now, been provided by those who pay for hospital care, with the cost being regarded as an inherent part of the teaching hospital budget. Price competition among hospitals and prospective payment for medical care have brought two changes. First, the higher price of patient care at teaching hospitals makes them less attractive to purchasers of care. Second, the greater visibility of the costs of graduate medical education, as with direct and indirect payments under the Medicare prospective payment system, is prompting debate about who should bear those costs.

The interplay among these various forces has produced an interesting and somewhat paradoxical situation. It appears that we may have too many doctors and almost certainly are producing too many specialists. We may be moving into an era of health care organizations that will need more generalists. Yet, as will be discussed later, we have a physician reimbursement system that creates financial incentives to specialize. At the same time, as the sponsoring hospitals assume more responsibility for the

costs of graduate medical education, they will have to scrutinize more carefully the economic returns of their graduate medical education programs. In terms of return, it is clear that surgical residency programs, for example, are a much better investment for hospitals than are programs in family practice or general internal medicine. This is because surgical residents are a more efficient investment for hospitals attempting to fill empty beds than are programs that emphasize training in the ambulatory setting. From the hospital's viewpoint, marginal dollars are better spent in programs such as neurosurgery than in family practice. In addition, it is hard to find much enthusiasm among leaders of academic medicine for training generalists. Thus, as long as dollars for graduate medical education continue to flow through hospitals, it is unrealistic to expect new investment in graduate training in generalist fields.

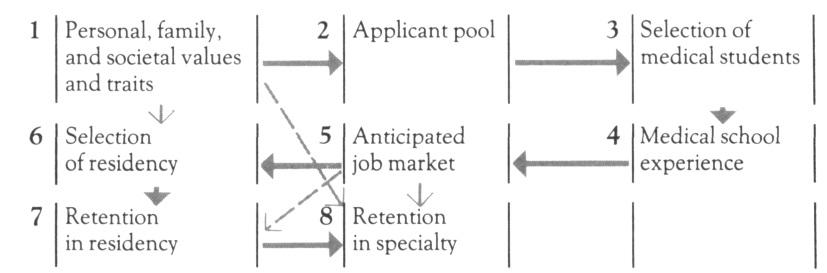
For these reasons, it appears that the United States needs to consider strategies that would, at the very least, increase the proportion of generalists, and that would possibly increase their numbers. Before assessing such strategies, we should first review what is known about the determinants of specialty choice.

Determinants Of Medical Specialty Choices

Exhibit 3 shows many of the determinants of medical specialty choice. Unfortunately, most of the studies analyzing the choice of a particular specialty have been limited to a single time, a single setting, and a small number of possible determinants. Two notable exceptions are the work by Funkenstein that spanned a decade and a half, and the National Study of Internal Medicine Manpower (NSIMM) headed by Tarlov.

The Funkenstein study. Perhaps the longest investigation of medical specialty choice was carried out by Funkenstein.[28] The bulk of his data was collected from medical students at Harvard between 1958 and 1976. These data were supplemented by material collected in 1973 from the matriculating and graduating classes of the University of Michigan School

Exhibit 3
Determinants Of Specialty Choices Of Physicians



of Medicine, and in 1975 from a national sample of medical students.

During the period studied, Funkenstein identified six distinct eras of medical specialty choice: (1) the general practice era, 1910-1939; (2) the specialty era, 1940-1958; (3) the scientific era, 1959-1968; (4) the student-activism era, 1969-1970; (5) the doldrums era, 1971-1974; (6) the primary care and increasing government control era, 1975 until the end of the observation period (1978).

The highlights of his study were:

(1) Evidence that changes in societal values are reflected in attitudes towards specialties. For example, at the beginning of the scientific era, premedical students in all four college years began to take more science classes. In 1968, simultaneous national changes in curricular choices occurred, only this time they were away from the natural sciences and toward the social and behavioral sciences. Career choices of medical students in the scientific era moved away from primary care and toward subspecialty medicine, and in the student activism era toward primary care and public health and away from subspecialty practice.

(2) Evidence that eventual career choices can be predicted at the time of admission to medical school. Funkenstein divided students into probable bioscience and biosocial specialists. The bioscientists considered themselves scientifically oriented at the time of matriculation, had high quantitative scores on the MCAT, had considered careers in science as alternatives to medicine, and placed a high value on monetary rewards. Compared to biosocial students, the bioscientists were more often male; came from families with higher incomes; more often had science majors and had better science grades in college; gave a higher priority to status, income, and scientific research; were more likely to predict that the medical school clinical years would be harder than the preclinical years; had more conservative attitudes about change; and scored higher on all parts of the National Board of Medical Examination except for psychiatry.

In contrast, students with biosocial incliniations considered themselves "people oriented" at matriculation, scored lower on the quantitative part of the MCAT, had considered law or psychology as alternatives to medicine, were planning to specialize in family practice or public health, and placed a lower value on monetary rewards.

These two groups had very different career choices. Of 148 predicted future bioscientists from Harvard and Michigan in the early 1970s, 82 percent chose bioscientific residencies, while 68 percent of the 102 predicted future biosocial physicians chose biosocial careers. These highly statistically significant differences ($p < .001$) highlight the important role of admissions criteria in determining career choice within medicine.

(3) Choice of medical specialty is determined much more by medical school admissions policies than by students' medical school experience. Funkenstein emphasizes the importance of the scientific orientation of

faculty sitting on medical school admissions committees, combined with the increasing emphasis on science grades and scientific knowledge on the MCAT, in selecting students who are likely to choose careers in the medical specialties. In the 1975 national sample, 71 to 78 percent of students admitted to various medical schools had bioscientific profiles, while only 22 to 29 percent of students had biosocial profiles.

The study notes: "The data collected in this study do not support the commonly held belief that a medical school is important in the career choices of the students. One of the most cherished ideas of the faculty has been their influence as role models on the career choices of their students. No data were found to suggest this."[29]

(4) Evidence that the characteristics of primary care physicians changed during the different eras. As perceived societal pressures to provide primary care mounted during the primary care era, and as perceived opportunities for research declined, many bioscientific students chose primary care careers. Earlier, in the specialty era, many biosocial students selected careers in subspecialty practice, and in the scientific era what few biosocial students there were chose careers in subspecialty practice or psychiatry.

The National Study of Internal Medicine Manpower. The National Study of Internal Medicine Manpower (NSIMM) was established in 1975 "to provide the necessary data to facilitate the creation of a national policy on the training of general internists and subspecialists to meet the needs of the country most effectively."[30] Its fifth and sixth reports address the determinants of specialist versus generalist careers within internal medicine.

The data for the NSIMM fifth report came from a randomized national survey of internal medicine residents and fellows in 1977.[31] Of the 803 respondents, the report studied 468 U.S. citizens who were at least "fairly certain" of their intent to pursue careers as specialists or generalists. Of these, 36 percent intended to practice only general internal medicine, 17 percent only a subspecialty, and 51 percent a mixture of the two.

The authors identified several areas that distinguished future generalists from future specialists. Jews were twice as likely to become subspecialists, while Protestants were one and one-half times as likely to become generalists. Future subspecialists were more likely to have attended medical schools outside their home states, to have participated in original laboratory research, and to have been members of college and medical school honor societies, and they more often identified faculty role models as influential in their career decisions. Subspecialists and generalists also differed in reasons for selecting their future careers. Generalists placed a higher value on control over important practice variables and on enduring patient relationships, and they expected their practice to have a higher proportion of ambulatory patients with common problems than did subspecialists. By contrast, subspecialists were more likely to expect a role as consultant, the frequent use of technical procedures, and an oppor-

tunity to do research. They also expected greater incomes than generalists.

The NSIMM sixth report was a multivariate analysis of a subset of 340 of the 468 residents studied in the fifth report.[32] The authors concluded that the most important identifiable predictors of a generalist career within internal medicine were personal variables, especially the desire for autonomy in the work setting. The second most important predictor was the type of medical school attended. However, it should be cautioned that the variables which were analyzed, when taken together, only explained 19 percent of the variation of the primary care model, meaning that more than 80 percent of the reasons for selecting general internal medicine could not be identified.

Other research. Much of the older literature on the determinants of specialty choice has dubious relevance to current health manpower policy. I will not summarize the remainder of this literature, much of which is well reviewed in the NSIMM articles.[33] Rather, I will review three smaller studies that emphasize certain policy implications of the model of determinants of specialty choice in Exhibit 3.

In 1978, Phillips et al. described the impact of a strong new family physician pathway on career choice of medical students at the University of Washington. Approximately half the second-year students selected the family physician pathway and about one-third of the graduates chose family practice, with an additional one-third choosing internal medicine and 8 percent selecting pediatrics. Student interest in family practice was much greater than in previous years and was considerably greater than at such comparable schools as the University of Colorado and the State University of New York at Syracuse.[34]

Ramsdell surveyed 155 graduates of the internal medicine residency program at the University of California, San Diego, who were trained between 1969 and 1979. He found increasing proportions of generalists (0 percent of all residents in 1970, 1971 and 1972, climbing to 65 percent in 1979) and a decreasing proportion of subspecialists. A surprisingly large percentage (41 percent) made their decisions about generalism versus subspecialism during the residency period. Important variables listed by these residents included the hospital experience, peer interactions, and the influence of faculty role models.[35]

In 1973, Schroeder and Schliftman questioned fourth-year students at the George Washington University Medical School about their career intentions. Seventy-two percent had entered medical school with a defined specialty preference. Of these, 54 percent had retained that preference through the selection of a residency program. Thus, in effect the specialty choices of 39 percent (0.72 x 0.54) of the graduating class could have been foretold on admission. Even those who defected from their original specialty choice tended to move to a similar field. For example, each of the nine students who defected from surgery chose either obstetrics-

gynecology or one of the other surgical subspecialties.[36]

Each of these three "case reports" illustrates the importance of the steps in Exhibit 3. The Schroeder and Schliftman article reinforces Funkenstein's claim, and that of the NSIMM, that the way in which medical students are selected may be the most important determinant of specialty choice. However, the articles by Phillips and Ramsdell attest to the potential influence of the medical school and residency experiences.

Debt And Income Potential: Emerging Determinants Of Specialty Choice?

The financial aspects of medical practice have always been potential determinants of specialty choice, and, as shown in the NSIMM reports, they may have influenced decisions about specializing within internal medicine.[37] Moreover, the recent increase in medical student indebtedness and the widening gap in income potential between generalists and specialists may cause students to pay more attention to the relative financial handicaps associated with generalist practice.

Rising tuition costs and indebtedness. Along with inflation in the rest of the economy, tuition fees for medical schools have risen during the past decade. Several private schools now have tuitions over $20,000 per year, and the costs for first-year medical students in 1983-1984 were high in both the private and the public sectors. For students at private schools, mean expenses for tuition and other expenditures were $19,000 per year. For those at public schools, mean expenses were $10,400 for residents of that state and $14,100 for nonresidents. These figures, when adjusted for further inflation, mean that expenses for all four years of medical school will soon average about $45,000 and may be as high as $90,000.[38]

Not surprisingly, increases in medical student indebtedness have risen in parallel with tuition and other expenditure data. According to 1984 figures reported by the Association of American Medical Colleges, 57 percent of current medical students have debts in excess of $20,000, and the mean debt of indebted respondents is $25,000.[39] Although students could secure loans through agencies such as the Health Education Assistance Loan Program, the high interest rates (currently estimated at about 15 percent per year) mean that a typical student will face average annual payments of $16,000 to $32,000 per year over twenty-five years (at 15-percent interest per year), or even more if the debt is repaid over ten years.[40]

Specialists have greater income potential than generalists. The amount of income generated by a physician is a function of hours worked and hourly earnings. As shown in Exhibit 4, the various specialties differ little in the mean number of weeks worked per year. Some differences do exist in the number of hours worked per week, with psychiatrists and

Exhibit 4
Estimates Of Work Activity By Speciality, 1983

Specialty	Mean number of weeks practiced per year	Mean number of hours in professional activities per week	Mean number of patient care activities per week
Radiology	45.2	57.7	52.0
Surgery	46.9	55.7	50.3
Anesthesiology	45.5	57.8	54.6
Obstetrics/gynecology	47.2	60.1	55.5
Pathology	48.1	50.5	40.9
Internal medicine	46.8	59.6	53.1
Psychiatry	47.1	50.1	43.4
Pediatrics	47.3	57.0	51.0
General practice/family practice	47.3	57.8	53.6
All physicians	46.8	56.6	41.0

Source: *1984 AMA Socioeconomic System Core Survey*, AMA Center for Health Policy Research; and *1st-4th Quarter 1983 Socioeconomic Monitoring System Surveys.*

pathologists working somewhat fewer, and obstetricians/gynecologists and internists working somewhat more hours per week. The mean numbers of patient care activities are remarkably similar among the specialties, except again for pathology and psychiatry, where they are considerably lower.

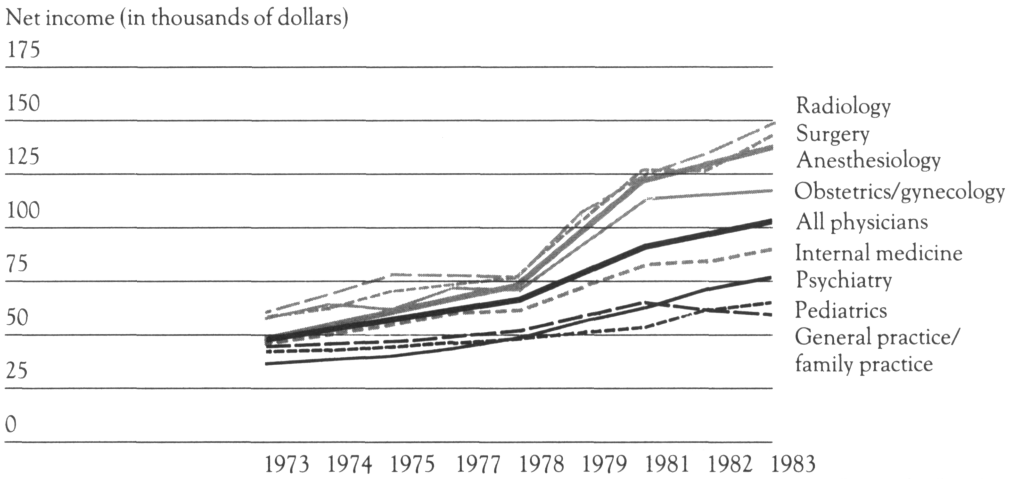
Given the rather similar work loads, the differences in net income by specialty are impressive (Exhibit 5). Of the nine major specialties listed, general and family practice has the lowest income, with pediatrics and psychiatry not much higher, and internal medicine just above them. Preliminary data from the American Medical Association's Socioeconomic Monitoring System show that within internal medicine, the income of specialists such as cardiologists ($114,000) resembles that of gynecologists, while the income of general internists ($87,000) is less than for inter-

Exhibit 5
Mean Physician Net Income After Expenses Before Taxes, 1983

Specialty	Income
Radiology	$148,000
Surgery	145,500
Anesthesiology	144,700
Obstetrics/gynecology	119,900
Pathology	117,700
Internal medicine	93,300
Psychiatry	80,000
Pediatrics	70,700
General practice/family practice	68,500
All physicians	106,300

Source: *1984 AMA Socioeconomic System Core Survey.*

Exhibit 6
Mean Physician Net Income After Expenses Before Taxes, 1973-83



Source: *1981-83, AMA Socioeconomic Monitoring System Care Surveys;* and *1973-79, AMA Periodic Surveys of Physicians.*

nists as a group.[41] As shown in Exhibit 6, the gap between the better and lesser paid specialties has widened considerably during the past decade, even though their relative clinical activities have not. Although this gap has widened during a period when physicians' incomes in general have been rising faster then incomes in the general population (Exhibit 7), the differences may still be impressive to students faced with large debt payments.

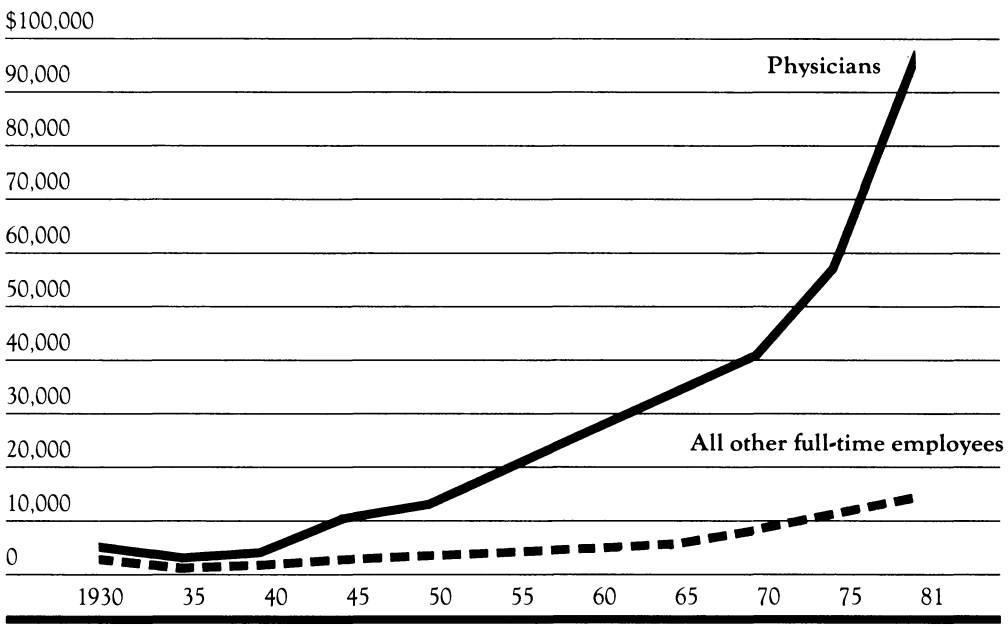
How can specialists such as radiologists, surgeons, and anesthesiologists earn so much more than other physicians despite working comparable hours? The answer, of course, is that the fee-for-service reimbursement system pays a physician much more for technological than for non-technological services.[42]

Thus, given the probable future surplus of physicians, the large indebtedness faced by many medical students, and the wide income disparities among specialties, it is not unreasonable to assume that some potential generalists may come to choose a specialty out of economic necessity.

Resolving The Dilemma: How To Increase The Number Of Generalist Physicians

Assuming that the bulk of generalist care should be given by those who are appropriately trained for that role, what can be done to increase the proportion and quality of generalists? It is obvious from the educational system portrayed in Exhibit 3 that several strategies are possible and that no one strategy is likely to be successful on its own.

Exhibit 7
Mean Annual Net Income For Physicians And All Full-Time Employees, 1930-1981



Source: American Medical Association.

Step one: the society. To the extent that our society features increasingly specialized technology, preserving the role and enhancing the status of the generalist is a problem not limited to medicine. One important signal of societal value is financial reward. It is probably unrealistic to expect that general medical care will be perceived as equivalent to specialist care, unless it is paid comparably. Equity in reimbursement for primary care physicians was a major recommendation of the Institute of Medicine's 1978 report on primary care.[43] Narrowing the gap between generalist and specialist income would also have an impact on steps five (anticipated market), six (selection of residency), seven (retention in residency), and eight (retention in specialty).

How to change the way doctors are paid has become a major concern of the Health Care Financing Administration, the Congress' Office of Technology Assessment, the Institute of Medicine, and the Congressional Budget Office. Other health care organizations, most notably the American Society of Internal Medicine, have called for reform of the physician payment system. Although it is too early to know what will result, it seems likely that congressional legislation calling for changes in Medicare's payment of physicians will be offered during during 1985 or 1986.

Noneconomic societal incentives, such as reports of national commissions and pronouncements by national leaders that would enhance the

"There is growing concern that our process of preparing and selecting students to enter medical education may be overemphasizing scientific preparation and ability at the expense of humanistic qualities."

prestige and visibility of generalist care might also promote the production of generalists.

Steps two and three: entry to medical school. There is growing concern that our process of preparing and selecting students to enter medical education may be overemphasizing scientific preparation and ability at the expense of humanistic qualities. The research of Funkenstein, along with the NSIMM and other studies, has shown that the criteria for selection of medical students affect specialty choice. Students with broader interests and educational backgrounds could be expected to be more attracted to generalist care careers than are those who have concentrated on scientific areas.

In this regard, the recent report, *Physicians for the Twenty-First Century*, suggests several reforms that are aimed at broadening the applicant pool and modifying the criteria for medical school admission.[44] However, insofar as the faculty controls admission, these reforms must depend on faculty support, the extent of which is uncertain.

Step four: the medical school experience. Studies have shown that few medical students who select generalist careers have been influenced by faculty role models. One must presume that this absence of influence reflects the paucity of full-time generalists on the faculties of medical schools. There are many reasons for this, including the location of most full-time faculty at specialized tertiary-care hospitals, the historic referral function of most academic teaching centers, and the extent to which faculties derive support from research grants from the National Institutes of Health. Over the past decade, the numbers of generalist faculty members have increased considerably, especially in departments of family medicine. However, because most university family practice programs are located outside the medical school proper, the faculty has limited opportunity to function as role models for medical students. Faculty members in general internal medicine and general pediatric programs are often more visible to medical students than family medicine faculty, but still remain a distinct minority within their departments. Thus, it seems reasonable to conclude that efforts to increase the number and visibility of generalist faculty and generalist education, such as required clerkships in primary care, might favor the production of generalists.

In addition, changing the content and decreasing the importance of the National Board of Medical Examiners tests could create opportunities for more learning of the process skills and psychosocial content so important for generalist care but so undervalued by current board exams.

Step five: the job market. Medical students have surprisingly little information on which to base their important decisions about career pathways. If they knew, for example, that job opportunities were more favorable for generalists than for specialists, more of them might elect generalist careers. Many observers feel that we are moving toward an era where medicine will be practiced in corporate settings such as HMOs, for-profit chains, academic institutions, large group practices, and federal and county hospitals. These future employers have an obligation to communicate their expected manpower needs to the medical students, and perhaps also to contribute to the educational process.

Steps six and seven: the residency. Many Western countries control their generalist-to-specialist ratio by regulating the available residency positions.[45] By contrast, the United States has an entirely voluntary system of residency program accreditation that works in unofficial and variable collaboration with a voluntary certification system. Attempts to reduce the number of residency positions must be based on issues such as education in order to avoid antitrust statutes.

The proportion of generalists might be increased by actions that increase the proportion or absolute number of generalist residency positions. For example, within internal medicine and pediatrics, the number of positions in primary care tracks could be increased at the expense of positions in traditional tracks. There would also have to be decreases in subspecialty fellowships. The difficulties in changing the distribution of residency positions, however, cannot be overstated. Since the publication of the GMENAC report in 1980, which predicted substantial surpluses in virtually every specialty and subspecialty by 1990, there have been essentially no coordinated efforts at changing the specialty mix of residents. However, the proposed new funding arrangements for graduate education afford an opportunity to restructure the numbers and types of residency positions, and, specifically, to increase the opportunities for training in ambulatory sites.

In addition, changes in the content of internal medicine and pediatrics certifying examinations to emphasize content and skill areas important for the generalist would send an important signal to those residents about the legitimacy of a generalist career.

Step eight: career satisfaction. Whether physicians remain within a specialty depends on many factors, including personal and societal values, market conditions, and the residency experience, as well as the quality of practice in that specialty. Options to act on each of these factors have already been discussed.

Policy Options For Foundations And Government

It is important to acknowledge the major role that several foundations have played during the past decade in promoting generalist medical care. The Robert Wood Johnson Foundation's support of residency training in general internal medicine and general pediatrics was the first effort of its kind in the United States, and paved the way for subsequent federal support for those programs. The Johnson Foundation's faculty development programs in family practice and general pediatrics and its support of group practice programs in general internal medicine in teaching hospitals have helped to develop faculty in the three primary care specialties. Its Clinical Scholar program, which was initiated by the Carnegie and Commonwealth Funds, has also aided this effort. The Henry J. Kaiser Family Foundation has generously supported the development of academic general internal medicine, both with fellowship support and faculty development awards. In addition, many foundations have supported demonstration programs and research efforts of the kind that generalist faculty are likely to undertake.

It is obvious that the opportunities for promoting the production of generalists far exceed the resources available to most foundations. Nevertheless, there are several discrete areas where even modest foundation support could exert great leverage.

Leadership. From my perspective of fourteen years in academic medicine, I am very impressed with the ability of foundations to set policy agendas, to highlight priority areas, and even to change the conventional wisdom. For example, they can support national commissions, such as the Kaiser Foundation's support of the GPEP Report, the Commonwealth Fund's Task Force on Academic Health Centers, and the Johnson and Kellogg Foundations' support of the Institute of Medicine Report on Primary Care.[46] By their choice of which issues to emphasize and which to leave alone, foundations can influence societal attitudes, and decision makers in government and health care institutions.

Specific incentives. In addition to influencing societal attitudes, foundations can provide rewards that may have effects far beyond their monetary value. For example, at our institution, winning the Kaiser Teaching Award is one of the few ways in which a generalist faculty member tangibly can demonstrate excellence in teaching. This may assist in academic advancement. Here is an example of how small seed grants to schools for recognition of teaching efforts in humanism, primary care, family practice, general internal medicine, general pediatrics, and so on, might yield an impressive harvest in institutional change.

Scholarships and loans for selected groups, especially students from minority groups or rural areas, and for potential generalist physicians, might help to change the nature of the applicant pool and prevent

would-be generalists fom having to specialize because of financial indebtedness.

Filling in the research gaps. There is still much that we do not know about the production of physicians, and funds for educational research are in short supply. What correlation, if any, exists between the college grades of a premedical student and the quality of subsequent medical practice? Between MCAT scores and subsequent performance? What factors best predict which college and medical students will become generalists? Can generalist faculty role models influence the career decisions of medical students? What are the optimal sites for undergraduate and graduate medical education in primary care? Do the career choices and practice patterns of women medical students differ substantially from those of men? How will teaching hospitals change their residency mix in response to the new financial realities of graduate medical education? Within internal medicine, is there any evidence that specialists who deliver general medical care do it any worse or any more expensively than generalists? Are there detectable differences in patient or physician satisfaction resulting from the "hidden system" of generalist care? Does the "hidden system" of generalist care have any other disadvantages? The answer to these and other questions could help us to formulate a more responsible health manpower policy.

Options for federal and state governments. The imminent changes in the funding of graduate medical education provide important opportunities to stimulate the production of generalists. Current payments favor hospital-based training over experiences in ambulatory settings. By making the funding neutral as to site of training, or by providing incentives for ambulatory teaching, educators might be more encouraged to develop and expand residencies for generalists.

In addition, categorical federal and state support for family medicine, general internal medicine, and general pediatrics could be continued and even expanded. While some might protest the use of tax dollars to support a profession perceived as overpaid and oversupplied, the fact remains that without such support there are few incentives to educate generalists.

Improving relative payment of generalists as compared to specialists would both enhance generalist careers as well as provide further stimulation for generalist training. Finally, scholarships or loans for deserving future generalists might permit medical students from financially disadvantaged families to consider a career as generalist.

In summary, this paper has reviewed the factors involved in producing generalist physicians, including uncertainty over the definition of a generalist, the multiplicity of providers who function as generalists, various factors that might stimulate the production of generalists, and areas where philanthropic foundations and federal and state governments might exert influence. The consideration of these issues comes at a time when the

U.S. health care system appears to be in transition from one of plentitude to one of constrained resources, and when some of the basic assumptions of graduate medical education are being challenged more vigorously than at any time in the past seventy-five years. It is therefore a time of great opportunity for those who wish to make a difference.

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