Physician Manpower: GMENAC and Afterwards

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THE GRADUATE MEDICAL EDUCATION National Advisory Committee (GMENAC) was established in April 1976 to fulfill a critical role in a national debate. After more than a decade spent in efforts to eradicate a perceived shortage of physicians, including unprecedented medical school expansion and preferential immigration status for foreign physicians, the United States was, in the mid-1970s, preparing to reverse this strategy. Congress had declared that the problem now to be overcome was not an inadequate physician supply but specialty and geographic maldistribution. To correct this maldistribution, the Senate Committee on Labor and Public Welfare proposed strict regional quotas on graduate medical education. During the 2-year debate leading to passage of the Health Professions Educational Assistance Act (Public Law 94-484), it became apparent that rigorous study of the problems and potential solutions of physician maldistribution was imperative. Former Speaker of the House Carl Albert sent a letter to the Secretary of Health, Education, and Welfare, David Mathews, requesting the establishment of a committee to conduct such a study. In chartering GMENAC, Secretary Mathews initiated a massive public-private collaboration in setting physician manpower policy while heading off immediate measures for regulatory control of graduate medical education.

GMENAC's primary goal was to develop specific recommendations on the educational continuum and the financing of graduate physician training. These recommendations were aimed at achieving the Committee's long-range objectives for physician supply. Secondarily, GMENAC aimed to expand the base of knowledge in physician manpower, in general, and graduate medical education (GME), in particular, to

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enhance the formulation of national policy on physician manpower.

The Committee, as originally chartered, consisted of 19 members from the private sector and 3 Federal representatives—1 each from the Department of Health, Education, and Welfare, the Department of Defense, and the Veterans Administration. Although chartered in 1976, because of the change in Administrations and delays in appointments, GMENAC's first meeting took place in July 1977.

During its first year, GMENAC struggled to define the issues it was to study and to develop a new framework for physician manpower modeling. The Committee delineated a multifaceted study and divided itself into five technical panels for modeling research and data, nonphysician providers, financing of GME, geographic distribution of physicians, and the institutional and educational environment. The modeling panel later called on 210 expert consultants to assist in debating the issues and estimating physician manpower requirements for 1990.

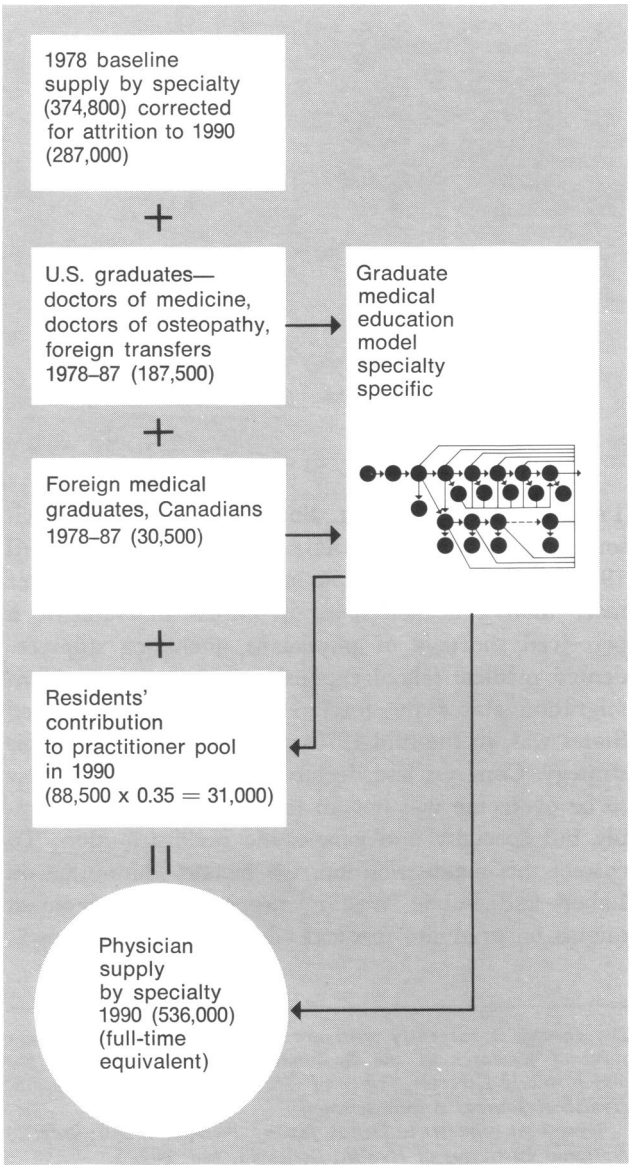
The modeling framework that emerged after much debate enabled GMENAC to examine the balance between physician supply and requirements over time in various specialties. Using this modeling framework, the Committee could identify those specialties in which supply and requirements were not aiming toward a balance and review the factors or parameters that could be manipulated to produce a balance in time.

The Supply Model

In developing its model of physician supply, the Committee made use of existing actuarial models. The Office of Graduate Medical Education (OGME), which provided the staff support for GMENAC, was able to obtain data from the American Medical Association, American Osteopathic Association, Commission for Foreign Medical Graduates, and other organizations to use with these models. Projecting the supply based on these models, however, would not have been satisfactory for GMENAC. These actuarial models dealt only with additions and deletions from a given cohort—in this case, the supply of physicians. There was no extant model to describe the intricacies of transit through graduate medical education. The addition of this component to the framework of actuarial models was a unique contribution to the art of physician supply modeling.

In past estimates of physician supply, residents were counted as physicians as soon as they finished predoctoral training. The staff used AMA data to create a model to describe how residents flow through the graduate medical education process. The empirical data were derived from the graduate educational experiences of 160,000 physicians, all of whom were graduated from U.S. medical schools between 1960 and 1977. The model reflects graduate training patterns or pathways chosen by these persons. It incorporates a migration factor, or what we call branching and switching, to show migration across specialty training programs. The GME model for analyzing residents was borrowed from the petroleum industry; as crude oil goes through the refining process, products are pulled out in different stages. If 16,500 persons per year are graduated from medical school now, in succeeding years they will begin

Figure 1. GMENAC supply projection model



to trickle into the pool of practitioners in different specialties.

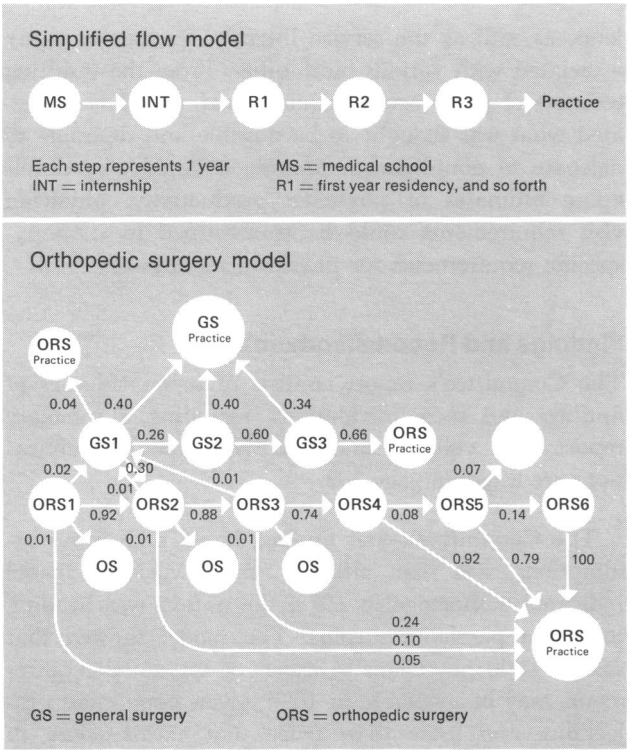
As a result, the model can display how residents are likely to be distributed among specialties at the start of GME, the frequency and stage of training at which residents are likely to migrate between specialties, the individual pathways likely to be followed through residency training, and the probable distribution of specialists upon completion of residency training.

Figure 1 is a diagram of the supply model. The model begins with the 1978 supply; the number expected to leave through attrition is then subtracted. The graduate medical education model already described is at the right in the diagram.

Figure 2 shows the flow of residents. At the top is a simple progression model which does not accurately depict the process. Below, the more general model is applied to orthopedic surgery. The graduate medical education model essentially consists of 108 diagrams, at least 1 for each area of medicine or surgery, of the 108 ways that residents can progress through the GME system.

To make predictions about the number and specialty distribution of physicians entering practice over the next 10 years, the models incorporated some assumptions regarding numbers and specialty distribution at entry to GME. In estimating supply, residents were assigned a value of one-third the full-time equivalent of a physician, based upon studies which suggest one-third as a reasonable estimate of a resident's productivity. Since most practitioners expected to be practicing in 1990 are either practicing today or are already at some point in their training, the supply model made possible rather accurate projections of physician supply over at least the coming decade.

Figure 2. Graduate medical education model



SOURCE: Adapted from figs. 1 and 3, page 1048 *In* "Graduate Medical Education. Its Impact on Specialty Distribution," by Itzhak Jacoby. JAMA 245: 1046-1051, March 13, 1981. Copyright 1981, American Medical Association.

The Requirements Model

Conceptual problems complicated the development of a model for physician requirements. Two options were available. One option, a demand-based model, would extrapolate future requirements from current rates of utilizing physicians, taking into consideration expected changes in population and other factors. The second option, a needs-based model, would estimate the number and specialties of physicians needed to care for the amount and kind of morbidity expected in the population, based upon accepted norms of care and data on physician productivity.

The demand-based model carried the disadvantage of projecting future needs from the less than ideal service patterns of the current system of health care delivery. Many experts, including the authors of the preamble to Public Law 94–484, enacted in October 1976, have concluded that the United States already has enough physicians; extrapolating from such utilization patterns would create a self-fulfilling prophecy of sufficiency.

In contrast, the needs-based model would tend to overestimate physician requirements by calling for care when none would normally be sought. The Committee and OGME staff agreed to devise an adjusted needs-based model. This model eliminated from consideration self-limiting conditions that do not require care as well as conditions for which people are not likely to seek care. OGME staff prepared a normative base for physician requirements that GMENAC tentatively accepted as a desirable target for physician manpower planning. This adjusted needs-based model has a wide variance. The Committee relied upon panels of experts to review and comment on this desirable target.

There were 16 panels of experts, 1 for each specialty studied; (6 specialties remain to be studied). These expert panels were involved in making decisions on four parameters. First they examined data from the National

Health Interview Survey relevant to the specialty and increased or decreased the survey's values to estimate the percentage of persons requiring care by health providers. Second, they estimated the share of that group likely to visit a given specialty provider. Third, they estimated service intensity—how often over a year or over the episode of a particular illness or condition a person should be checked. Fourth, they estimated the percentage of the visits that are delegatable to nonphysician providers. This elaborate process was applied within the general internal medicine panel, for example, to some 400 categories of the International Classification of Diseases, Adapted.

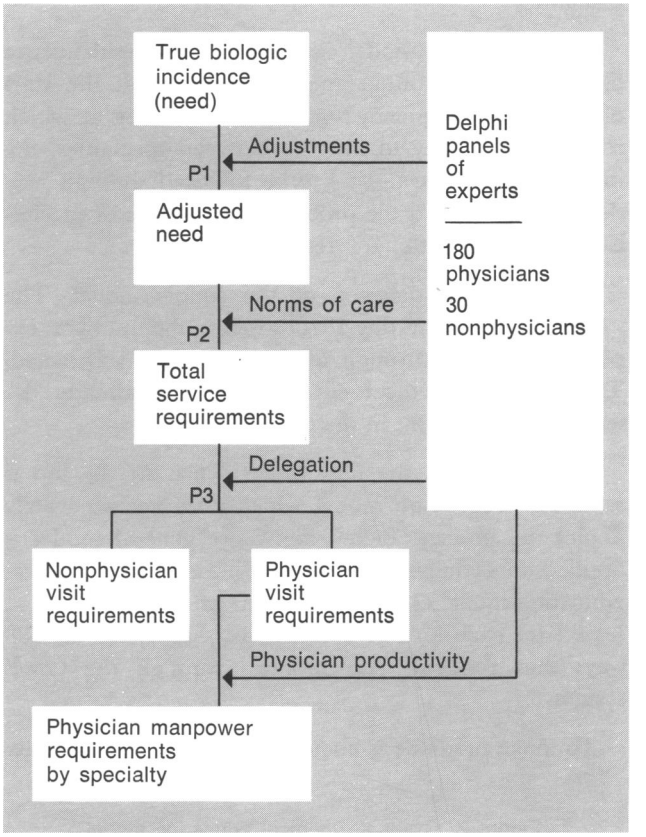
The panels formulated these estimates by using a modified Delphi technique, a group process aimed at reaching a consensus in the absence of empirical evidence. The Delphi panelists were carefully chosen to represent the views of clinicians, practitioners, and academicians. Although specialty-specific, the panels included members from related specialties. Family practitioners and general internists cross-cut many panels. The obstetrics-gynecology panel included a family practitioner, a nurse-midwife, and a consumer. An optometrist and a family practitioner were on the ophthalmology panel. The otolaryngology panel included a plastic surgeon as well as an oral surgeon.

The process for appointing these panels was complex. Nominations of possible panelists to represent the substantive, clinical aspects of their specialties were solicited from a broad constituency. The criteria for panel composition specified regional representation as well as representation of different practice characteristics, such as small, large, and rural practices. Ultimately, the Committee reviewed the nominations and then, according to stated criteria of panel composition, the staff brought the panels together.

After the Delphi panels had taken into account clinical considerations, the GMENAC modeling panel, and ultimately the full Committee, incorporated socioeconomic and political considerations and rendered their judgment on physician requirements desirable for 1990. These Delphi panels, in addition to reviewing a monumental quantity of material and data, were the means for professional societies, in collaboration with the Federal Government, to make a unique contribution to physician manpower planning.

Figure 3 is a simplified diagram of the generic model that was applied to 16 specialties. The expert panels helped to determine the values for decision points indicated as P1, P2, and P3. As mentioned, the expert panels provided estimates of the incidence and prevalence as well as the service intensity (norms of care) associated with various morbidities. From the resulting estimate of total service requirements, panelists delineated what was thought to be possible and desirable to delegate to nonphysician providers. Finally, by developing estimates of physician productivity, physician visit requirements could be transformed to specialty-specific requirements for physician manpower.

Figure 3. Physician requirements model



Findings and Recommendations

The Committee's report consists of seven volumes of findings and recommendations, including a summary report. The volumes and GMENAC-related publications are listed on page 303.

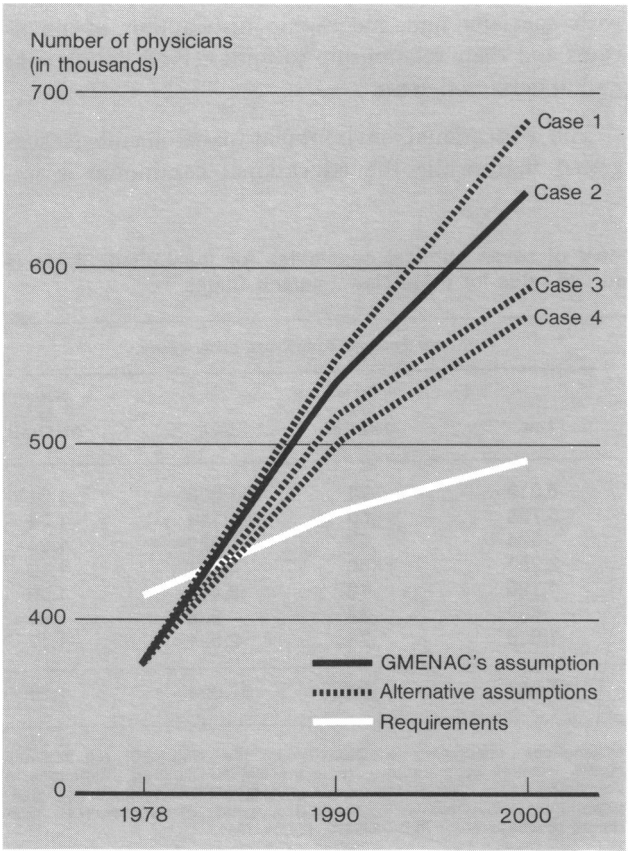
The Committee's first finding, based on various assumptions, was that, although the GMENAC model indicated a shortage in 1978, the nation was heading toward a physician surplus. The model showed that some 70,000 physicians in excess of estimated requirements may be available in 1990, given population projections, and more than twice that excess—close to 150,000 too many—in the year 2000. Following are the GMENAC projections:

Year	*Number*
1990	
Supply	535,750
Requirements	466,000
2000	
Supply	642,950
Requirements	498,250

Increased enrollment in medical schools—the result of Federal and State incentives and a magnificent response by the medical schools—was identified as being partly responsible for the predicted excess by 1990. Another important component of this surplus is expected to be the group of U.S. nationals who are studying or will opt to study medicine abroad. They will be entering the United States at the rate of at least 2,500 per year beginning in 1983. A relatively small number of alien physicians will also be entering the U.S. practice system during this period.

Figure 4 shows physician supply projections under four different assumptions concerning enrollment in U.S. medical schools and the rate of arrival of foreign-trained physicians. An important point is how little

Figure 4. Aggregate physician supply and requirements under four assumptions 1978, 1990, 2000



can be done about the supply of physicians for 1990, because most of the people who will practice in 1990 are either practicing today or are already in training. With different policies, however, it is possible to have a greater impact on supply by the year 2000.

In table 1 the utilization rates for surgical procedures in the 10 largest hospital service areas of 3 New England States are compared with the GMENAC-generated estimates for 1990. Between 18,000 and 38,000 surgical specialists, depending on whether one uses the low or the high utilization rate, would be required. When the GMENAC norms for morbidity and service intensity are applied, close to 30,000 surgeons are required.

The Committee's recommendations were to reduce sharply enrollment in U.S. medical schools, the number of U.S. citizens studying medicine abroad, and the number of alien physicians entering the United States. The GMENAC report cautioned, however, that "although the number of medical students should be reduced, care should be taken to assure that programs to increase the representation of minority groups in medicine are not thwarted." (Report of the Graduate Medical Education National Advisory Committee—Volume 1: Summary Report, page 24).

The second major finding had to do with imbalances in specialties; these are listed in table 2. There were surpluses in most surgical specialties, obstetrics-gynecology, and the subspecialties of medicine. The primary care specialties, as well as otolaryngology and dermatology, are expected to be near balance. Because of the variance in the model GMENAC adopted and statistical conventions, any supply between 80 to 120 percent of requirements can be considered near balance.

The analysis indicated that shortages could be expected in psychiatry, emergency medicine, and some of the other specialties. Pediatrics subspecialties were combined with pediatrics owing to lack of data on supply, and this specialty appeared to stay near balance. Shortages should be viewed in the context of current reality, however. For example, GMENAC members agreed that there is a shortage of formally trained emergency medicine physicians. The Committee also recognized that the existing system of moonlighters and physicians in other specialties who function in emergency medicine are expected to offset to some extent the need for these physicians. Therefore, the Committee did not recommend a massive increase in training opportunities for emergency physicians. In psychiatry, in contrast, unmet needs do exist. The Committee recognized, though, that there is a lack of priority for such services among consumers and a lack of adequate financing for desired

psychiatric services. GMENAC therefore does not believe that it will be feasible to employ gainfully the number of psychiatrists that the Committee has indicated is needed.

GMENAC's recommendations for changes in the distribution of residencies do not exceed a 20 percent increase or decrease in any specialty. The Committee realized that such change would not produce a balance by 1990. In sum, little can be done today, given the rigidity of the system, to achieve balance in 1990 if the GMENAC assumptions are accepted.

The role of nonphysician health care providers was a difficult issue. During an era of physician surplus there is a spectrum of possible functions for these providers. On one side are those who say that, since nonphysician providers are cost-efficient, we should flood the medical care market with them despite a surplus of physicians because, ultimately, they will gain their share of the market. Others say that the nation is fortunate to have a large (or greater) portion of its health services rendered by physicians. According to these people, the nonphysician providers emerged in the early 1970s because of a perceived shortage of physicians and an expectation of cost efficiency through the use of more nonphysician providers and, since neither premise has been borne out, the movement ought to be doomed.

These two positions are the extremes in a broad range of opinions. GMENAC took a middle position, saying that it recognizes the contributions and the additional dimensions of care that these providers bring to the system. In some circumstances, they are the providers of choice; in some places, no physician can usually be available. Therefore, GMENAC is on record as advising that these providers continue to be trained at the current rate. Nevertheless, how they ought to be functioning in a physician surplus era should be determined soon.

In the geographic concerns arena, the most important finding was the uneven rates of use of providers. It was difficult to understand why the variability was so great. It is not meaningful to say that higher use rates mean better health status, or that lower use rates are bad. What we know is that, given the uneven utilization rates, increasing the supply will not correct the maldistribution of physicians—there is a lag time in this rigid system, and an increased supply of physicians alone cannot alleviate the geographic maldistribution.

The geographic panel endorsed the National Health Service Corps and the Area Health Education Centers (AHECs). The panel also looked at reimbursement issues, how they affect geographic distribution, and the need to provide residency experience in underserved areas. The panel called upon the private sector and the GME program directors, in particular, to consider making changes. Finally, the geographic panel dealt with specialty and geographic distribution of physicians and their relationship to underserved populations and underserved areas.

The educational environment panel members suggested that, while the educational continuum is im-

Table 1. Manpower requirements for the surgical care component of seven surgical specialties for the United States in 1990: GMENAC estimates compared with observed use rates for three New England States [1]

Specialty	GMENAC's estimate	New England States' use experiences			
		Low	Ratio to GMENAC	High	Ratio to GMENAC
General surgery	8,422	6,019	.71	11,005	1.31
Obstetrics-gynecology	11,334	5,705	.50	11,118	1.34
Ophthalmology	840	394	.47	872	1.04
Orthopedic surgery	4,126	2,290	.56	4,921	1.19
Otolaryngology	1,532	1,126	.73	2,449	1.60
Plastic surgery	1,548	602	.39	938	.61
Urology	2,156	1,626	.75	2,521	1.17
Total physicians	29,958	17,762	.59	37,824	1.26

[1] For the 10 largest hospital service areas in Maine, Rhode Island, and Vermont, rates for surgical procedures by specialty were obtained for a 3-year period. Denominator populations in the 10 areas ranged from 62,595 to 179,596. For each category of procedure, rates from areas exhibiting the highest and lowest utilization rates for these procedures were used to estimate manpower requirements in accordance with the assumptions concerning productivity in the GMENAC requirements model. Detailed computations are in the GMENAC paper, "Variations in Population-Based Use Rates and Expenditures: Implications for Manpower Policy" by Codman Research Group, Inc., of Hanover, N.H. Final report, purchase order PLD 7249379, March 1981.

portant, it alone is an insufficient mechanism to bring about a significant change in specialty distribution. Students bring predispositions with them to medical education. They know about the reimbursement system; also, characteristics of the spouse affect what specialty the physician will choose. The educational environment panel's recommendation was to emphasize general practice, both in the undegraduate and graduate arenas, and to introduce diversity in medical education.

Emphasis on scholarships and loans to the disadvantaged may remove the financial barriers to medical education, but these levers do not lessen the importance of having minority faculty members who will serve as role models to encourage applicants in the future.

The financing of graduate medical education was recognized as a key issue. There is no medical education without actual training experiences, and those who pay for the medical services are reluctant to pay more simply to provide these training experiences.

Studies have been attempted to measure how much it costs to provide GME opportunities for physicians. There is no method to do so. The GMENAC recommendations call for the continuation of existing systems of reimbursement for GME with the understanding that we need to devise uniform mechanisms to measure the cost of providing this training.

Finally, GMENAC looked at the way we pay for medical services and the evolution of the reimbursement system over the years. The group acknowledged that reimbursement policies and manpower policies are not likely to be formulated in concert in the near future. Manpower policies essentially are reactions to symptoms that are brought about by the reimbursement system. The Committee regarded reimbursement policies as the major issue and called for exploratory studies of the impact of reimbursement practices on physician supply and distribution. Yet, it was extremely difficult to estimate when we would be able to introduce changes in manpower vis-a-vis reimbursement. Committee recommendations on this subject follow:

- Terminate unrestricted capitation grants.
- Maintain present GME financing system; adopt a uniform cost reporting system.
- Foster cost-sharing with States with funding programs aimed at alleviating geographic maldistribution of physicians.
- Introduce some changes in reimbursement policy and practices.
- Promote the principle of shared risk between providers and consumers in reimbursing for services—as in HMOs.

Table 2. Ratio of projected supply of specialists to estimated requirements, 1990

Specialty	Requirements	Surplus or shortage [1]	Percent difference
Shortages			
Child psychiatry	9,000	*4,900*	45
Emergency medicine	13,500	*4,250*	70
Preventive medicine	7,300	*1,750*	75
General psychiatry	38,500	*8,000*	80
Near balance			
Hematology, oncology, internal medicine	9,000	*700*	90
Dermatology	6,950	400	105
Gastroenterology, internal medicine	6,500	400	105
Osteopathic general practice	22,000	1,150	105
Family practice	61,300	3,100	105
General internal medicine	70,250	3,550	105
Otolaryngology	8,000	500	105
General pediatrics and subspecialties	36,400	4,950	115
Surpluses			
Urology	7,700	1,650	120
Orthopedic surgery	15,100	5,000	135
Ophthalmology	11,600	4,700	140
Thoracic surgery	2,050	850	140
Infectious diseases, internal medicine	2,250	1,000	145
Obstetrics-gynecology	24,000	10,450	145
Plastic surgery	2,700	1,200	145
Allergy, immunology, internal medicine	2,050	1,000	150
General surgery	23,500	11,800	150
Nephrology, internal medicine	2,750	2,100	175
Rheumatology, internal medicine	1,700	1,300	175
Cardiology, internal medicine	7,750	7,150	190
Endocrinology, internal medicine	2,050	1,800	190
Neurosurgery	2,650	2,450	190
Pulmonary, internal medicine	3,600	3,350	195
Crude estimates [2]			
Physical medicine and rehabilitation	3,200	*800*	75
Anesthesiology	21,000	*1,550*	95
Nuclear medicine	4,000	NA	NA
Pathology	13,500	3,350	125
Radiology	18,000	9,800	155
Neurology	5,500	3,150	160

[1] Numbers in italics are shortages.

[2] The requirements in these 6 specialties were estimated crudely after a review of the literature. They should be considered as very rough approximations. The full GMENAC modeling methodology will be applied to them in 1980–81.

Comparison of GMENAC and SOAR Models

Besides the physician manpower modeling activity created for GMENAC, other physician manpower models have been developed. Notable among these are the Supply Output and Requirements (SOAR) Program of the Bureau of Health Professions, Health Resources Administration.

In contrast to GMENAC's supply model, SOAR's model of supply does not explicitly account for the process of graduate medical education and the interspecialty branching and switching activities of residents during and after graduate medical education. Further, SOAR counts a resident as the equivalent of a full-time practicing physician, rather than 34 percent of a physician as counted by GMENAC. In the aggregate, SOAR-GMENAC estimates of physician supply are close to each other, once the major difference in counting of residents have been accounted for. The specialty-specific supply estimates, however, differ substantially—even after comparable residency adjustments have been made. For example, the SOAR estimate of the supply of general internal medicine practitioners is 25 percent higher than the adjusted GMENAC estimate but, for the internal medicine subspecialties, it is 48.8 percent lower.

In contrast to the GMENAC's normatively based physician requirements model, SOAR's physician requirements are based on a demand-utilization model. Utilization rates for each of 20 health services categories as of 1975 are extrapolated to 1990 based on changes in population, age, income, general price levels, and insurance coverage, as well as through nondollar utilization trends. GMENAC estimates of the total number of physicians required in 1990 are 19 percent less than SOAR requirements. Most of GMENAC's specialty-specific requirements are also less than those of SOAR, with particular differences noted for ophthalmologists, obstetrician-gynecologists, surgeons, and the noncare specialties.

Conclusions

Since the GMENAC report was published, reaction to it has been substantial. The main concern among lay consumers has been that constricting the supply of physicians will serve only to restrict access. These persons believe that the nation cannot have too many physicians and that more physicians will mean better care and a more even geographic distribution of physicians' services. Unfortunately, these beliefs have not been borne out by experience. Unneeded growth of physician supply has been shown to hold the potential for many adverse consequences; not the least of these are increased expenditures and unnecessary utilization. The implications of a surplus, as projected by the GMENAC analysis over the next 10 years, resulting from a 35 percent increase in the supply of physicians compared with an 8 percent growth in population, should be cause for some concern.

Among health policy analysts and provider organizations, the reaction to the report has focused on a few key issues.

The first issue has to do with the rationale for a GMENAC-like process rather than letting the forces of the free market shape physician supply and specialty distribution. Those who object most to such a process argue that it will ultimately lead to regulatory action. Although this sounds like a legitimate concern, the GMENAC process was conceived of as an alternative to regulation. In its recommendations the Committee has advocated decreased government involvement in physican manpower education in favor of voluntary action. The fears of adverse consequences have not yet been justified, although the potential benefits of public and private sector collaboration are yet to be realized.

Those in favor of a GMENAC-like process point out that health care services are widely regarded as a social right; governments consequently pay almost 40 percent of total health care costs. Further, free market balances do not operate in a system where utilization is often not directly linked to out-of-pocket expenses. In these people's view, it is to everyone's benefit to encourage rational, open debate on improving a system that expends a great deal of scarce resources.

Another issue raised relates to the methodology that the Committee used to derive requirements estimates. Objectors challenge the use of expert opinion in the absence of empirical evidence. Even if this opinion is justified, it only serves to underscore the Committee's call for improved data systems. When better data are available, it will be possible to substitute computer analysis for expert judgment.

Further study is also needed on the role of nonphysician providers, particularly nurse practitioners and physician assistants, in a physician surplus era.

Reactors to the GMENAC report also questioned:

- the ability of medical schools to reduce enrollment after having recently expanded rapidly,
- the rationale for reducing class size in U.S. medical schools in order to enable American citizens to return to practice in the United States after receiving medical training abroad,

• the likelihood of reducing medical school enrollment without a disproportionately adverse impact on opportunities for minority and disadvantaged students.

Finally, the Committee has raised the point that manpower policies deal with problems created to some extent by reimbursement strategies. Yet, we are probably a long way from a time when reimbursement and manpower strategies will be acted upon in concert. Perhaps within two decades, with further public debate, reimbursement patterns will be changed so that separate manpower strategies will not be needed.

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U.S. Department of Health and Human Services, Health Resources Administration, Office of Graduate Medical Education: Physician requirements—1990: for dermatology.

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