Cite this article as:
S Gamliel, R M Politzer, M L Rivo and F Mullan  
Managed care on the march: will physicians meet the challenge?  
*Health Affairs* 14, no.2 (1995):131-142  
doi: 10.1377/hlthaff.14.2.131

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Prologue: For several years analysts of U.S. physician supply have predicted a coming surplus of physicians by the end of this century. Several trends in the health care marketplace have exacerbated this situation since the Council on Graduate Medical Education released its Third Report in 1992 warning of oversupply. Probably the most striking trend is the growing prevalence of managed care. Managed care plans have been found to use a higher proportion of generalist physicians and fewer specialists, which has led to several recent studies that reexamine the nation’s physician supply needs. In a recent editorial in the Journal of the American Medical Association, Steven A. Schroeder wrote, “[W]e may soon enter an era in which the market may force emerging specialists into careers that only faintly resemble what they had hoped for. Such an occurrence would be unfortunate for these physicians, for their patients, and for the nation.” This paper offers a fresh perspective on physician supply needs in a health care system dominated by managed care from a team of authors from the Bureau of Health Professions. Sandy Gamliel, deputy chief of the Workforce Analysis and Research Branch, holds a degree in economics from the University of Maryland. Robert Politzer is chief of the branch and holds a doctorate in health services research from The Johns Hopkins University School of Hygiene and Public Health. Marc Rivo directs the bureau’s Division of Medicine; he holds a medical degree from the University of California, San Francisco, and is on the medical teaching staffs of George Washington and Georgetown Universities in Washington, D.C. Fitzhugh Mullan is the bureau’s director and serves as an assistant surgeon general in the U.S. Public Health Service. He holds a medical degree from the University of Chicago.
Abstract: The health care delivery system in the United States is in transition. Increasingly managed care plans are gaining in predominance. The proliferation of managed care systems will have an impact on the demand and requirements for physicians. This paper attempts to project and estimate requirements for physicians in 2000 and 2020, assuming that the health care system will continue to be dominated by managed care. The projections are then compared to forecasts of physician supply under two separate physician production scenarios. The authors discuss the adequacy of the future physician workforce to provide services required by a health care system dominated by managed care.

Managed care has expanded rapidly in recent years, as a market response to containing health care costs and in anticipation of legislative initiatives at the state and federal levels. The details of these expansions vary, yet all plans seek to manage costs by decreasing the use of specialist physicians and increasing the role of generalist/primary care providers. Although only about 20 percent of the population is now enrolled in such managed care arrangements, that percentage is likely to increase greatly as anticipated market and state-level legislative reform efforts take place. Future growth may reflect the recent popularity of network-model plans and individual practice associations (IPAs) or open-panel health maintenance organizations (HMOs). Historically, staff- and group-model HMOs have managed health services most intensely by setting physician and hospital bed supply ratios. To remain competitive and contain costs, other types of managed care plans will need to adopt stricter utilization controls.

Studies have found that use of various health care services, including those of physicians overall and among specialists, differs between staff- and group-model HMOs and fee-for-service plans. HMOs use fewer physicians and a higher proportion of generalist physicians. Thus, growth in HMOs will lead to the recruitment of physicians who are able to provide clinical preventive services and longitudinal care—those trained in family medicine, general pediatrics, and general internal medicine—while the demand for specialists will decline.

A recent study by Jonathan Weiner estimates the effects of an expansion of managed care networks on physician workforce requirements. Weiner extrapolates current patterns of staffing within managed care plans, by type of arrangement, to a reshaped health care system in 2000. Of particular note are Weiner’s adjustments to current staffing patterns if enrollment is extended to patients and physicians who are not now part of HMOs. He also adjusts for differences in physician productivity between staff- and group-model HMOs and other network arrangements, and for enrollees’ use of out-of-plan services.

This paper expands upon this work. We employ some of the adjustments used by Weiner yet make a different assumption about physician productivity—a critical component of the estimates of physician workforce require-
ments. We use a baseline ratio of physicians per 100,000 enrollees and a specialty distribution that are different from Weiner’s but that reflect current data. We then extend these staffing requirement estimates from 2000 to 2020, under the assumption that HMOs with strong utilization controls will dominate the health care system, and we match these requirements with forecasts for future physician supply.

The structure of the health care reimbursement system, which shields consumers from the costs of care and rewards providers for performing procedures, and the medical training environment, which responds to inpatient hospital service demands, produce a physician workforce that does not necessarily match the nation’s health care needs. For this reason, workforce policies must be formulated and put in place to assure a balanced physician workforce in the future. The importance of this issue has motivated us to undertake this exercise in estimation, despite the lack of definitive data on the specialty-specific staffing patterns of HMOs. We compare the estimated requirements with anticipated physician supply under two separate supply scenarios: The first forecasts current trends in graduate medical education (GME); the second forecasts the impact of a restructuring of GME based on recommendations of the federal Council on Graduate Medical Education (COGME).

COGME recommended that the nation reduce the projected rate of increase in the physician supply by greatly reducing the number of filled residency positions. It also recommended that the nation move toward a system in which half of all physicians practice as generalists-family/general practice, general internal medicine, and general pediatrics. The essence of these recommendations has been supported by other organizations, including the Physician Payment Review Commission (PPRC), the Josiah Macy Jr. Foundation, and the Pew Health Professions Commission, and by past legislative reforms.

### Study Methodology

Estimating physician requirements. We made seven basic assumptions in formulating physician workforce requirements.

**Assumption one.** Two-thirds of the U.S. population will be enrolled in a managed care plan with strong physician utilization guidelines by 2000. This percentage will rise to 80 percent by 2020.

**Rationale.** Managed care premium increases were half those for traditional indemnity plans in 1991. Smaller premium increases will continue to move businesses toward managed care and will motivate insurers to develop more effective systems. As various forms of managed care become more acceptable, the greater cost savings likely will attract more employers
and government entities. With about 80 percent of the U.S. population now concentrated in metropolitan areas, in which managed care proliferates, and with that percentage expected to increase, our assumption is within reason.

**Assumption two.** The ratio of physicians per 100,000 population for HMO enrollees ranges from 120 to 138.\(^\text{11}\) We used the upper bound of 138.

**Rationale.** The most recent estimates of aggregate staffing in large, established, closed-panel plans place the overall ratio in a narrower 130-138 range, higher than the 120 estimate used by Weiner.\(^\text{12}\) We used the upper limit of this range to conservatively estimate the impact of managed care on physician workforce requirements and minimize the impact on the physician workforce of the transition from the current fee-for-service-dominated system to a system dominated by managed care with staffing patterns similar to those of group- and staff-model HMOs. Estimates of staffing requirements are highly sensitive to the baseline staffing ratio selected.

**Assumption three.** HMO enrollment of nontraditional HMO populations will increase, thereby increasing the level of physician services required. Thus, we inflated the current physician-to-population ratio for HMO enrollees by an estimated 25 percent, to 172.5.

**Rationale.** HMO enrollees tend to be younger and in better health than the U.S. population as a whole.\(^\text{13}\) As the fraction of the population enrolled in managed care plans increases, HMOs likely will use more physician services as a result of expansion of services to underserved populations, coupled with changes in the characteristics of enrollees-specifically, a higher percentage of sicker and elderly patients.\(^\text{14}\) In addition, current staffing ratios do not account for out-of-plan use of physician services by enrollees. Weiner estimated that a 21 percent inflation factor would account for these differences in utilization.\(^\text{15}\) We further inflated the Weiner estimate to 25 percent to account for the increased demand for both generalist and specialist physician services that likely will occur because of the overall aging of the population. The number of persons age eighty-five and older is expected to double between 1993 and 2020, and the median population age is projected to rise from 33.4 to 37.7 during that period.\(^\text{16}\)

**Assumption four.** Physician productivity does not vary by sector. Therefore, we held physician productivity constant.

**Rationale.** Based on the average number of hours worked per week and the number of weeks worked per year, Weiner made a downward adjustment to staffing ratios in IPA arrangements. According to output measures of productivity such as number of patient visits, staff- and group-model HMO physicians on average are as productive as physicians in other arrangements.\(^\text{17}\) Perhaps the organizational structure of staff- and group-model HMOs permits more efficient use of physician time, or HMO physi-
Physicians may spend more time delivering patient care while in the office. Thus, we did not adjust for alleged productivity differences.

Assumption five. The physician specialty distribution within HMOs is divided equally between generalist and specialist physicians.\(^\text{18}\)

Rationale. With an increase in managed care market share over the past decade, the percentage of generalists in managed care arrangements appears to have dropped somewhat. Managed care plans have had to compete in markets dominated by fee-for-service arrangements and have had to offer more specialty services to meet the expectations and needs of consumers. We assumed that in future years, when managed care predominates, greater competition among plans, coupled with a need to contain costs, will drive plans to use fewer specialist services and to hire more generalists.\(^\text{19}\)

Assumption six. One-third of the U.S. population in 2000 and one-fifth in 2020 will remain in fee-for-service systems with a patient care physician-to-population ratio (excluding physicians in residency positions) equal to the weighted average of the prevailing ratios in metropolitan (225) and nonmetropolitan (104) areas-about 174 patient care physicians per 100,000 population.\(^\text{20}\)

Rationale. It is difficult to specify the exact urban/rural composition of this non-HMO population, but it is reasonable to anticipate that it will comprise the most affluent residents in metropolitan areas along with residents of nonmetropolitan areas who may find HMOs inaccessible. The current estimate of supply in nonmetropolitan areas is thought to be low for future requirements.

Assumption seven. The physician specialty distribution in the fee-for-service sector is 34 percent generalists and 66 percent specialists.

Rationale. The current physician specialty distribution in the fee-for-service sector will continue to prevail and reflects current physician distribution patterns.\(^\text{21}\)

Total requirements for patient care physicians were calculated by applying the adjusted ratio of physicians to HMO enrollees of 172.5 to the two-thirds of the nation’s total population assumed to be enrolled in HMOs in 2000 and to the four-fifths assumed to be enrolled in 2020.\(^\text{22}\) Requirements for the remaining one-third and one-fifth of the population not in HMOs, respectively, were calculated based on the “averaged” urban/rural patient care physician-to-population ratio of 174 discussed above. Patient care physician requirements in HMOs then were added to requirements in the non-HMO settings in each respective year to obtain the total requirements for patient care physicians in 2000 and 2020.

We estimated generalist and specialist requirements by applying the fifty/fifty proportion to the total requirement estimates for the HMO-enrolled population and the thirty-four/sixty-six proportion to the total
requirement estimates for the non-HMO population. The generalist and specialist requirements for each sector then were combined for each forecasting year.

**Estimating physician supply.** Projections of the number of allopathic and osteopathic patient care physicians (excluding residents and fellows) were calculated based on overall supply projections from the Bureau of Health Professions’ physician supply model. Two separate supply scenarios were formulated based on the percentage of current and future graduates entering primary care fields and the sizes of future residency classes. Supply Scenario A provides supply projections based on the number of U.S. and international medical school graduates now entering residency training (about 24,000 in 1992). The ultimate specialty distribution of these graduates reflects the specialty choices of the most recent graduating medical school seniors. Only about 20 percent of medical school graduates now indicate an intention to practice as generalists.

Supply Scenario B produces projections based on the COGME proposals limiting filled first-year residency positions to 10 percent more than the number of 1993 U.S. medical school graduates (about 17,500) and producing 50 percent generalists annually.

**Study Results**

Comparing the supply of patient care physicians under Scenario A (the “20 percent scenario”) with the requirements calculated on the basis of two-thirds of the population in managed care in 2000 and four-fifths in 2020 produces an excess supply of about 73,000 physicians in 2000, which grows to 111,000 by 2020, an increase of about 50 percent. This excess supply is fueled by a faster-growing supply of specialists and is mitigated by an increasing shortage of generalists, which will reach nearly 40,000 by 2000 and grow to about 85,000 by 2020 (Exhibit 1).

Using the estimated physician-to-enrollee ratio of 172.5 per 100,000 HMO enrollees while restricting first-year residency positions to 110 percent of the U.S. medical school graduating class, and changing the percentage of all graduates entering primary care to 50 percent (the “50 percent scenario,” or Scenario B), produces quite different results. By the year 2000, despite a similar overall excess supply of physicians of about 70,000, the nation would still experience a shortage of generalist physicians and a surplus of specialists, although at reduced levels of about 25,000 and 95,000, respectively. However, the shortage of generalists would be reversed by 2020, when supply and requirements would be approximately in balance. A surplus of specialists would remain but would be reduced by about 40 percent from the excess in 2000 (Exhibit 2).
Exhibit 1
Projected Physician Requirements Compared With Projected Supply Under Current Production Scenario (Scenario A), 2000 And 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirements</th>
<th>Supply</th>
<th>Supply minus requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Ratio per 100,000</td>
<td>Number</td>
</tr>
<tr>
<td>2000</td>
<td>Total patient care</td>
<td>479,000</td>
<td>173</td>
</tr>
<tr>
<td></td>
<td>Generalists</td>
<td>213,000</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Specialists</td>
<td>266,000</td>
<td>96</td>
</tr>
<tr>
<td>2020</td>
<td>Total patient care</td>
<td>563,000</td>
<td>173</td>
</tr>
<tr>
<td></td>
<td>Generalists</td>
<td>263,000</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>Specialists</td>
<td>300,000</td>
<td>92</td>
</tr>
</tbody>
</table>

Source: Bureau of Health Professions’ managed care analysis forecast.

The distribution between generalist and specialist physicians under Scenario A is out of balance with requirements for patient care physicians in 2000 and 2020 based on the presumed prominence of HMOs in those years. By comparison, Scenario B produces a mix of physicians that is much more compatible with a health care marketplace dominated by managed care by 2020. However, at least for the next two decades a shortage of generalists will persist but will be outweighed by an excess of specialists and subspecialists, so that overall supply will exceed requirements.

Exhibit 2
Projected Physician Requirements Compared With Projected Supply Under COGME Recommended Production Scenario (Scenario B), 2000 And 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirements</th>
<th>Supply</th>
<th>Supply minus requirements</th>
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</tr>
</tbody>
</table>

Source: Bureau of Health Professions’ managed care analysis forecast.
Discussion

The forecasts presented here are not definitive. They are based on limited data about the staffing patterns in managed care arrangements, particularly the use of nonphysician providers and specialty services provided to enrollees outside of their managed care plan. They also are limited by the basic underlying assumptions about the dominance of managed care and the balance of generalists and specialists within such arrangements.

The results rest on the underlying assumption that the structure and staffing of tomorrow’s managed care arrangements will be similar to those of today’s group- and staff-model HMOs. It is clear that other managed care delivery systems, such as networks and IPAs, are increasing rapidly. These systems employ physicians and other staff in different configurations, which affects overall physician use, the mix of generalists and specialists, physician productivity, and provision of care. However, with continued market demand and state legislative reform initiatives, we assumed that future networks and IPAs will adopt strict utilization controls to compete with current staff- and group-model HMOs and thus will use personnel similarly. In the remaining fee-for-service sector, we assumed that utilization patterns would remain relatively unchanged.

The ratio of patient care physicians per 100,000 population used for estimating physician requirements in the managed care sector, after adjustment (172.5), is similar to the weighted urban/rural ratio for the remaining fee-for-service sector (174). Thus, the discriminating factor that governs the difference in physician requirements between sectors is the generalist/specialist distribution. The striking similarity between the two ratios is coincidental, since they were derived by different processes. The weighted ratio for the fee-for-service sector is the product of two very disparate figures: the ratio of physicians per 100,000 population in rural areas and in urban areas. The managed care ratio is an inflated estimate of current staffing in group- and staff-model HMOs. The proximity of these ratios could mislead the reader to infer that there is not a measurable difference in overall physician use in a managed care setting adjusted for the enrollment of nontraditional populations versus the fee-for-service setting. This conclusion is inappropriate. HMOs generally are located in metropolitan areas where the comparable fee-for-service physician-to-population ratio exceeds 200 per 100,000, considerably higher than the adjusted HMO level of 172.5.

Weiner’s forecasts of generalist and specialist requirements vary from those presented here as a result of different assumptions regarding the initial physician/enrollee ratio, physician productivity in various settings, the fraction of the population enrolled in various types of managed care ar-
rangements, use and productivity of nonphysician providers, and the mix of generalists and specialists within those arrangements. Weiner's analysis produces a ratio of fifty-nine generalists and eighty-five specialists per 100,000 HMO enrollees by 2000. We estimate requirements for generalists at seventy-seven in 2000, which will rise to eighty-one in 2020, and specialists at ninety-six in 2000, which will decline to ninety-two in 2020.

Although we used a slightly higher percentage of generalists required in managed care settings and did not adjust down for alleged productivity differences of physicians across managed care arrangements, the higher baseline staffing ratio is primarily responsible for the differing generalist and specialist requirements. The higher generalist ratio, once adjusted, produces a shortage by 2000. In contrast, Weiner concludes that generalist supply will be in relative balance. In both analyses the estimated requirements for specialists differ, but the overall conclusion about a considerable specialty surplus is the same.

According to our estimates, current generalist production levels will not meet requirements in 2000. Only an increased production of generalists has any chance of meeting requirements in 2020 with a downsizing of GME. If generalist output cannot sustain its current approximate 30 percent production, as evidenced in recent specialty choice data from the Association of American Medical Colleges and the American Osteopathic Association, the generalist supply will lose ground and drop well below even Weiner's requirement estimate.

A forecasted shortage of generalist physicians could be somewhat ameliorated by a full deployment of nurse practitioners, physician assistants, and certified nurse midwives. Although current use of nonphysician providers by HMOs implicitly has been incorporated into these forecasts, as reflected in current patient care physician-to-population ratios, these utilization levels vary widely and may change in a system that demands more primary and preventive care. While nonphysician providers may help to narrow the gap between requirements and supply for generalists, the problems associated with continued excess production of specialists likely will remain, even under the 50 percent scenario, for the next twenty-five years. John Wennberg an colleagues, using unadjusted specialty-specific ratios from one large HMO, reached this same conclusion about specialty surpluses. Such excesses will be problematic for efforts to contain health care costs and improve access to basic primary and preventive services. Among several options suggested by Wennberg and colleagues, strategies to help specialists retrain for practice as generalists not only would increase the supply of generalists more rapidly, but also would address the specialty surplus.

If managed care, with its greater emphasis on the control of physician
practices, becomes a more prevalent force in health care, the personnel requirements will be markedly different from those of the current system. To avoid the surpluses and shortages that our projections suggest, broad initiatives should be considered to produce a more balanced physician workforce. These strategies include educational and practice incentives that favor primary care as well as limitations in the immediate future on the number of specialty physicians trained at the residency level. Without such strategies, it seems likely that the U.S. physician workforce will be significantly and increasingly out of balance with the health care delivery system in the near future.

The views expressed in this paper are strictly those of the authors. No official endorsement by the U.S. Department of Health and Human Services or any of its components is intended or should be inferred. The authors extend their appreciation to James Cultice and B. Jerald McClendon of the Office of Research and Planning, Bureau of Health Professions, for their thoughtful contributions to this manuscript. They also acknowledge Carolyn Smith of the American Medical Student Association for her assistance in the development of this manuscript.

NOTES


15. Weiner, “Forecasting the Effects of Health Reform on US. Physician Workforce Requirements.”
et al., “A Comparison of the Requirements for Primary Care Physicians in HMOs;” and Weiner, “Forecasting the Effects of Health Reform on U.S. Physician Workforce Requirements.”


21. Ibid.

22. Population projections of U.S. residents were obtained from the Bureau of the Census, Department of Commerce.


27. COGME, Recommendations to Improve Access to Health Care through Physician Workforce Reform.
