one-third of this output is in place already. Therefore, the incremental growth of NPCs over the next fifteen years was taken to be equivalent to 40 physicians per 100,000 of population (Exhibit 1), which is equal to approximately 15 percent of the physician workforce. Paradoxically, most of this growth will be concentrated in primary care, which has shown relatively stable needs, whereas the greatest growth of demand for physician services is in the non-primary care specialties, to which NPCs can be expected to contribute proportionately less.

Applying The Trend Model

■ Projections. Projections based on the Trend Model build from these separate trends. On the demand side, health care spending has tended to outpace GDP by a ratio of approximately 1.5 to 1.0. If this differential continues, as has been projected, and if real per capita economic growth continues at 1.5–2.0 percent annually, as also has been projected, the fraction of GDP devoted to health care will increase from approximately 14 percent in 2000 to 18 percent in 2020. Based on an increase in physician supply of approximately 0.75 percent for each 1 percent increase in GDP, as discussed above, the Trend Model projects a growth in the demand for physician services of approximately 1.1–1.5 percent annually (Exhibit 1), a rate of increase that is similar to the job opportunities for physicians that have been projected by the Bureau of Labor Statistics.

Comparing this growth in the demand for physician services with the number of active physicians that have been projected reveals a shortfall of substantial magnitude (Exhibit 1). This shortfall widens further when work effort is considered and demand is compared, instead, with the “effective supply” of physicians, but the incremental contributions of NPCs more than compensate for changes due to physician work effort, leaving a projected deficit in 2010 of only 50,000 physicians, less than 6 percent of the projected demand. Some of this is within the margin of error of the trends that were analyzed, and much of it could be accommodated by the elasticity of the health care labor force. However, by 2020 the deficit is projected to exceed 200,000 physicians, an amount that represents more than 20 percent of the projected demand. In percentage terms, this is greater than the shortages that existed during the 1960s.

■ Assumptions. To properly assess these estimates of shortages, they must be interpreted in the context of the errors and uncertainties that are inherent in the Trend Model. The assumption that the number of physicians being trained would remain constant was simply operational, since the purpose of this exercise is to determine whether that number should change. Other assumptions were in the

The Need

These projections would result in a health care system that is able to meet the needs of the population.
The greatest uncertainty rests with the demand for physician services and with the economic growth that underlies it.

direction of overestimating physician supply. Thus, it was assumed that the current rates of attrition would continue, although anecdotal evidence suggests that attrition is increasing. Similarly, in projecting “effective physician supply,” the model assumed decrements in work effort attributable to aging and sex, but it did not consider other, less well defined factors that also have a negative impact on physician work effort. The major error in the population projections was also in the direction of overestimating per capita physician supply (by underestimating population growth), because it was assumed that the rate of immigration would not change, whereas increases seem likely. Subsequent applications of the Trend Model will have to incorporate alternative projections and assumptions as these various issues are clarified.

More ambiguity is associated with estimates of substitution, particularly since any protracted shortages of physicians are likely to cause an expansion in the autonomy and scope of practice of NPCs in those states in which these prerogatives are still limited, thereby increasing NPCs’ ability to provide “physician services.” However, unless new disciplines emerge or existing disciplines vastly expand their scope of activities, substitution is ultimately limited by the range of tasks that NPCs now can reasonably assume. Thus, under most scenarios the supply of physicians plus NPCs is likely to remain relatively unchanged over the next twenty years (Exhibit 1).

The greatest uncertainty rests with the demand for physician services and with the economic growth that underlies it. While there were no indications in our analyses that the trends defining this relationship were changing, it seems inevitable that, at some point, the relative rates of economic growth and the growth of health care services will have to narrow. However, even if that occurs, or if overall economic growth slows, the inevitable divergence between an essentially flat physician supply and the rising demand that any significant economic expansion will induce predicts progressively increasing physician shortages.

The Nation’s Future Physician Supply

These projections are made against a background of concern that health care spending is excessive and that physicians may exacerbate the problem, either by actually inducing demand or by facilitating utilization in a system in which they exert control over most
expenditures, a conclusion that is not supported by contemporary data. Among those who hold this perspective, constraining the growth of physician supply is seen as a means of limiting spending. Canada followed such a policy throughout the 1990s. Physician supply in the United States has remained lower relative to GDP than in most Organization for Economic Cooperation and Development (OECD) countries, and managed care has been used to further limit access. However, as revealed both by the backlash against managed care in the United States and by the recent recognition in both Canada and California that physician shortages are looming, such constraints inevitably conflict with long-term economic trends and with the perceptions of need that flow from them.11

Thus, physicians are at the nexus of a health care system that is shaped in large measure by exogenous trends. Their role is broad. It bridges an expanding universe of medical science and a long tradition of compassion and healing. But are the trends consistent with the continuation of this duality? Faced with the “taut supply” that Eli Ginzberg has advocated, it seems more likely that physicians will be drawn to those complex areas of specialty medicine that demand their attention most and that they will find it increasingly difficult to “lavishly dispense time, sympathy and understanding,” as Francis Peabody urged they should.12 Patients desire the most advanced treatments, but they also seek a caring physician. Ironically, attempts to impede patients’ access to the former have had the unintended consequence of squeezing out the latter.

The sociologist Andrew Abbott has observed that “a profession whose jurisdiction is excessive must increase its productivity or expand its numbers.” Conversely, “when a powerful profession ignores a potential clientele, paraprofessionals appear to provide the needed services.”13 These statements characterize the dilemma that physicians now face. Their ability to increase their productivity is limited by their declining work effort. Their ability to grow their numbers is hostage to the belief that surpluses exist. And organized medicine has embarked on a vigorous campaign to thwart expansion of the NPC disciplines.14 Yet it was shortages in the past that motivated state legislatures to remove the barriers to licensure for NPCs and to enlarge their range of privileges, and it is perceived professional opportunities that stimulated the creation of new disciplines and the expansion of existing ones.

The last debate about physician shortages continued well into the 1960s. Ultimately, the Health Professions Education Assistance Act of 1963 led to a doubling of medical school slots, but it was another fifteen years before appreciably more
physicians were available to the public. It is doubtful that this process could occur any more rapidly today. While the recruitment of additional IMGs could shorten the response time, the wisdom of even our current dependency on IMGs has been questioned. If, instead, the infrastructure of medical education were expanded to alleviate just one-third of the projected shortages, more than twenty-five additional medical schools would be required over the next decade, a formidable undertaking. But to do nothing invites public discontent and forces the profession of medicine to redefine itself in an ever more narrow scientific and technological sphere while other disciplines evolve to fill important gaps. Although the path is uncertain, the choices are clear. We believe that a dialogue regarding these choices is imperative.

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NOTES


13. International data were obtained from OECD Health Data 2000. State data were from the AMA and the Bureau of Economic Analysis, U.S. Department of Commerce.


15. The trend variable was adjusted for time by calculating the partial coefficient of multiple determination, which, in various analyses, ranged from 0.27 to 0.38 (p < .0001); see C.R. Rao, *Linear Statistical Inference and Its Applications* (New York: John Wiley and Sons, 1967), 225.


18. For a critique of the use of Census Bureau projections in workforce analyses, see Cooper, "Perspectives on the Physician Workforce.


23. Kletke, "The Projected Supply of Physicians"; Cooper, "Seeking a Balanced Physician Workforce"; and Bureau of Health Professions, *Forecasting the Future*


25. For a discussion of these factors, see Kletke et al., "The Growing Proportion of Female Physicians"; Kletke, "The Projected Supply of Physicians"; and Merritt, Hawkins, "Summary Report of Physicians 50 Years Old and Older."


