

HEALTH POLICY REPORT

Grassroots Activism and the Pursuit of an Expanded Physician Supply

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Heading reports from an array of interests that a shortage of physicians looms nationally and already exists in some locales and in many specialties, allopathic and osteopathic schools of medicine have begun to increase the size of their first-year classes, and new schools are being developed to educate more students. As an early result, the total number of students entering U.S. medical and osteopathic schools last September was the largest in their history.

In sharp contrast to this new trend, there is virtually no activity in the centers of federal power — Congress and the Bush administration — that reflects any real concern over the adequacy of the current or future supply of physicians. And much the same can be said for the private health insurance industry. The only major measure of physician supply that Congress tracks closely (as estimated by the adequacy of Medicare payments to doctors) is whether Medicare beneficiaries have ready access to the program's covered services that are delivered by practitioners. In their most recent checks of this measure, the Government Accountability Office and the Medicare Payment Advisory Commission (MedPAC) reported that access remained good for most beneficiaries, although the commission said some enrollees are increasingly having "big problems finding a specialist."^{1,2}

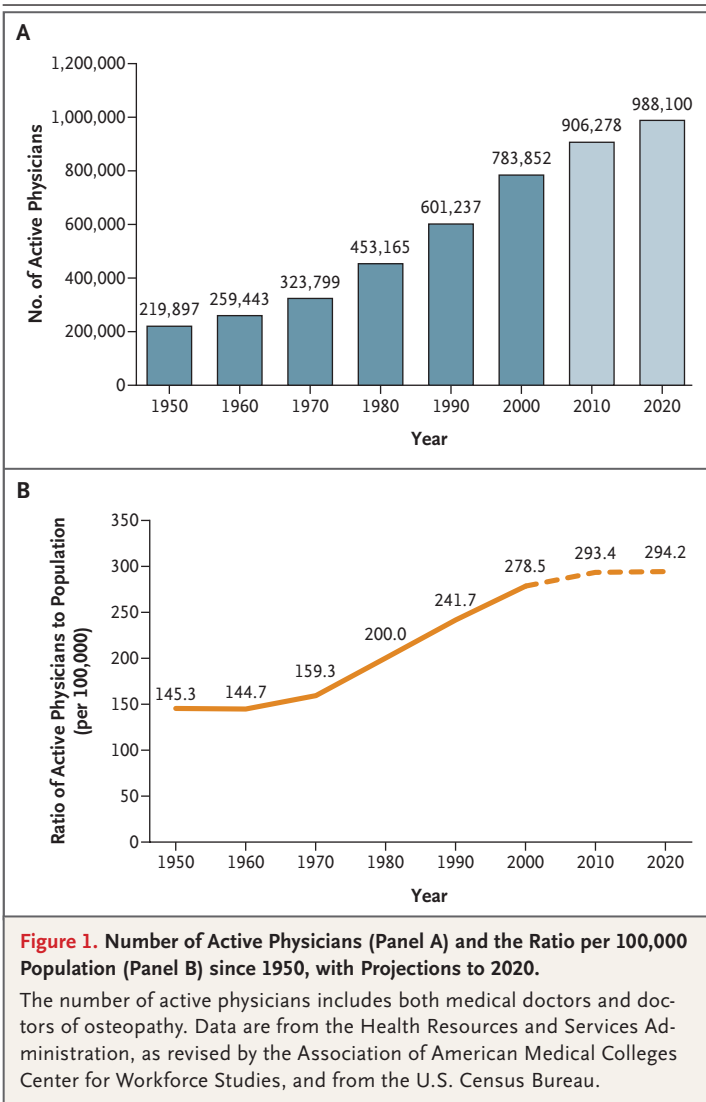
In this article, I will cite the increasing number of physician-supply reports and responses by many medical educators who have expanded their schools and, in some instances, developed new ones. Although there has been no recent national discussion on the question of how many doctors are enough, and thus no consensus on the matter, one cannot dispute the new stirrings that suggest disequilibrium between the supply of physicians and the demand for their services. The actions taken to educate more medical undergraduates are based on state and local deci-

sions with virtually no direct federal involvement or support. Ironically, at a time when policymakers and private interests are once again seriously exploring ways to provide health insurance to many of the 47 million people who lack it, very few of the candidates vying for the presidency have raised the question of whether there will be an adequate number of doctors and nurses to treat patients, should they gain coverage. In Massachusetts, some persons who were newly covered under last year's ambitious insurance-reform law have reported difficulty gaining access to care because of a shortage of primary care physicians.³

THE EVOLUTION OF THINKING ON PHYSICIAN SUPPLY

In 2004, David Blumenthal reported in the *Journal* that "the debate about the physician workforce is back" after more than two decades during which reports by entities considered authoritative had concluded that the United States had a surfeit of doctors.⁴ These reports were prepared by the Graduate Medical Education National Advisory Committee, the Council on Graduate Medical Education (COGME), and the Institute of Medicine.⁵⁻⁷ In 1981, Congress, believing that a surplus of physicians did indeed loom, accepted a recommendation of the Reagan administration to discontinue general federal support to medical schools for the education of their students. Since then, federal support for the training of new physicians has focused on graduate medical education through payments to teaching hospitals by Medicare, which provided \$8.9 billion for this purpose in 2007.

After the discontinuance of general federal support for undergraduate medical education, allopathic schools of medicine imposed a voluntary moratorium on increases in enrollment. The total number of their students remained essen-



tially unchanged between 1980 and 2000 at about 16,000 graduates, whereas the U.S. population grew by about 71 million people. However, the number of licensed physicians increased substantially, because of the doubling of the number of graduates of schools of allopathic medicine before 1981, the robust expansion of colleges of osteopathic medicine, and a continuing flow of international medical graduates (IMGs), most of whom remain in the United States to practice after completion of their advanced training.

The United States was able to maintain an adequate supply of physicians because the number of entry-level allopathic residency positions (24,085 in 2006) greatly exceeded the number of graduates of U.S. medical schools (15,925 in 2006).

Because of this differential, teaching hospitals were able to employ thousands of IMGs each year to fill their advanced-training positions and to provide care to patients. As of 2005, IMGs represented 25.3% of all practicing physicians in the United States.⁸ In total, the number of active physicians grew from 453,165 (200 per 100,000 population) in 1980, to 601,237 (241.7 per 100,000) in 1990, to 783,852 (278.5 per 100,000) in 2000. By 2010, the number of physicians is projected to increase to 906,278 (293.4 per 100,000) and to 988,100 (294.2 per 100,000) by 2020, according to the Health Resources and Services Administration (HRSA) (Fig. 1).

PHYSICIAN-SUPPLY REPORTS ACCUMULATE

Despite this continuing growth in the physician supply, since 2000 an increasing number of reports by the COGME, the HRSA, states, specialty societies, state medical societies, hospital associations, and a physician-researcher have reopened the question of whether the United States has an adequate number of practicing physicians now and whether it will in the future. Although many of these reports concede that on a national basis there is an adequate number of physicians, advocates of educating more doctors emphasize that shortages already exist in some locales and specialties. Moreover, because the length of time it takes to train a doctor is protracted (8 to 15 years, depending on the specialty), they point out that the United States must plan well in advance of 2020 (the year on which the COGME bases its projection of a future physician shortage) to determine how many practitioners will be needed to accommodate the growing population.

Advocates of increasing the supply of physicians also cite other factors, including the growth rate of the U.S. population (25 million persons every decade), the aging of baby boomers with concurrent increases in health care needs, the pending retirement (and increasingly early retirement) of a large cohort of physicians, an increase in the number of female physicians who work on average fewer hours than male doctors, and the increasing emphasis that doctors under the age of 50 years are placing on lifestyle issues (preferring more personal time, fewer weekend responsibilities, and less on-call duty) (Table 1).

There is also concern that the heavy reliance on IMGs to maintain the U.S. medical workforce substantially reduces the supply of doctors in many lower-income countries, which poses an ethical dilemma for the richest nation in the world, not to mention a foreign policy issue.⁹⁻¹² In 2007, some 6600 IMGs entered U.S. graduate medical education programs, and if experience is any indicator, most of them will remain in this country after completing their training.

These factors, plus local circumstances that figure uniquely into every situation, are among the considerations that educators weigh when they decide whether to expand their particular medical school. But educators also must consider the validity of new reports projecting a shortage of physicians by 2020.¹³ In 2005, the COGME — about a decade after it had projected a large surplus of physicians — issued a report that estimated a shortage of 85,000 doctors by 2020, or approximately 10% of the current complement of medical practitioners.¹⁴ In 2006, the HRSA, where the COGME is housed, released a separate report that projected a shortage ranging from 55,000 to 150,000 physicians by 2020, with an acute shortage of specialists representing the largest shortfall.¹⁵

Since 2000, 18 separate reports that were produced or funded by states, medical societies, hospital associations, and research centers have concluded that doctor shortages already exist or soon will in a variety of places and specialties. To date, among the states most active in expanding their capacity to educate physicians are those in the Sun Belt (Arizona, California, Florida, Georgia, and Texas) in which population growth has been rapid but the supply of physicians has not kept pace with growth.¹⁶⁻²⁰ Fourteen other states or medical societies or hospital associations within those jurisdictions (Alaska, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New York [upstate], North Carolina, Oregon, Utah, Virginia, and Wisconsin) have issued reports, all of which conclude that they either have a shortage of doctors or soon will face a scarcity of practitioners.²¹⁻³⁴

In addition to these 18 reports, 19 medical organizations that represent various specialties and disciplines (allergy, anesthesia, cardiology, child and adult psychiatry, critical care, dermatology, emergency medicine, endocrinology, family medicine, general surgery, geriatrics, genetics, neuro-

Table 1. Attitudes of Physicians under the Age of 50 Years Regarding Factors Affecting Satisfaction with Their Career, According to Sex.*

Factor	“Very Important”	
	Men	Women
	<i>percent</i>	
Time for family and personal life	66	82
Flexible scheduling	26	54
No call or limited on call	25	44
Minimal responsibility for practice management	10	18
Practice income	43	33
Long-term income potential	45	36
Opportunity to advance professionally	29	27

* Data are from the Association of American Medical Colleges 2006 Survey of Physicians under 50.

surgery, oncology, pediatric subspecialties, public health, rheumatology, and radiology) have produced studies that report existing or future shortages of doctors in their respective fields.³⁵⁻⁵⁴ In general, the methods that have been used to determine future demand involve assessing current levels of physician service, measuring the effect of changing demographics and other forces that will impinge on the supply of doctors, and then projecting these items forward to arrive at a conclusion. The reports in general assume that the current patterns of new graduates, specialty choice, and practice behavior will continue with little or no change.

During the past decade, Dr. Richard A. Cooper, a former dean of the Medical College of Wisconsin, in collaboration with an economist, Thomas E. Getzen, developed a different model for measuring how many practicing physicians will be needed in the United States by 2020 and beyond. The model factors in the growth of the population and the nation's economy, the work effort by physicians, and the provision of services by nonphysician clinicians as major determinants in calculating how many physicians will be needed in the future. On the basis of this model, Cooper and Getzen conclude that the United States will face a shortage of 200,000 physicians by 2020, with a greater scarcity of specialists than generalists.⁵⁵⁻⁵⁷

Although the work of Cooper and Getzen was one of the factors that influenced the thinking of the Association of American Medical Colleges (AAMC), their conclusions and the findings of

other groups projecting a physician shortage have drawn their share of critics. These critics assert that given the wide geographic variations in patterns of clinical practice, no one can accurately project what would be the appropriate overall ratio of physicians to patients.⁵⁸⁻⁶² They also question the methods used to determine how many doctors are enough⁶³ and assert that efficient care can be delivered with fewer physicians than the AAMC believes is necessary, citing as evidence the physician-to-patient ratio of prepaid medical group practices.⁶⁴ One critic believes that the framework of research into the physician workforce must be extended to the realm of epidemiology, taking into consideration the outcomes of patients as well as forecasting demand on the basis of physician-to-population ratios, the growth of the economy, and other factors (Goodman D: personal communication).

THE AAMC CHANGES ITS COURSE

In spite of such misgivings, the AAMC issued a statement in June 2006 that recommended an increase of 30% in the number of enrollees in schools of allopathic medicine over the number of enrollees in 2002 (16,488), or an additional 4946 students, by 2015.⁶⁵ The statement represented a major change in policy for the AAMC, which had declared in 1996 that the rate at which new doctors were entering the workforce was “clearly excessive”⁶⁶ or had said in 2003 that it was undecided on the question announcing the creation of a Center for Workforce Studies to study the matter.⁶⁷ By way of explanation, the AAMC said that earlier reports predicting a surplus of physicians were “in error, in part because of the assumption that managed care would drastically change the way that health care is organized and delivered.”⁶⁵ The association added: “The AAMC believes that sufficient evidence is at hand to recommend that entry level positions in both U.S. medical schools and GME [graduate medical education] should be increased over the coming decade.” The American Medical Association is also on record as favoring an increase in the capacity of U.S. medical schools to educate doctors.

Completing a training program certified by the U.S. Accreditation Council for Graduate Medical Education is a requirement for all physicians,

be they Americans or IMGs, to become eligible to obtain a license to practice in the United States. Currently, the number of GME positions is constrained by a cap imposed by Congress on the total number of such slots that Medicare will support. Thus, an increase in the number of American medical school graduates — without a commensurate increase in the number of GME positions — may only reduce the number of IMGs who could practice in the United States, rather than expand the overall supply of doctors.

In response to the new AAMC policy that recommends an expansion of capacity and other considerations, many schools of allopathic and osteopathic medicine are increasing their numbers of students, and a handful of new schools are opening or under development. As of 2006, a total of 93 of the nation’s 126 medical schools had increased or were planning to increase enrollment over 2002 levels. On the basis of a 2007 survey of U.S. allopathic medical schools (115 of the 126 schools responded), the AAMC estimates that first-year enrollment will grow to 19,909 in 2012 from 16,488 in 2002, an increase of almost 21%.⁶⁸ As a consequence, the association projects that its goal of a 30% increase in first-year enrollment will be reached by 2017 (Salsberg E: personal communication). Most of this increased enrollment will occur through the expansion of existing medical schools, but the AAMC estimates that as many as 10 new allopathic medical schools will enroll 1080 students by 2015 (Table 2).

Colleges of osteopathic medicine have been on an aggressive growth path for almost 20 years, expanding in a more entrepreneurial fashion than most allopathic schools. For example, a number of the new osteopathic colleges were developed by existing colleges but are located in communities far removed from the sponsoring school. Since 1990, the number of colleges of osteopathic medicine has expanded from 15 to 25, with three additional branch campuses, and their total enrollments have more than doubled, from 6892 students in 1990 to 15,586 students in 2007. In 2008, these colleges estimate they will graduate 3463 students, and by 2015, the American Osteopathic Association projects that the number of osteopathic physicians will exceed 90,000⁶⁹ (Table 3).

Beyond addressing the supply of physicians,

Table 2. The Emergence of New Schools of Allopathic Medicine in the United States.*

Institution	Location	Enrollment per Year	
		First Year	Projected number (year)
Paul L. Foster School of Medicine†	El Paso, TX	40 (2009)	80 (2016)
Florida International University College of Medicine†	Miami	40 (2009)	120 (2016)
University of Central Florida College of Medicine†	Orlando, FL	40 (2009)	120 (2016)
Touro University College of Medicine‡	Hackensack, NJ	40 (2009)	120 (2016)
Oakland University College of Medicine§	Rochester, MI	50 (2010)	100 (2016)
Commonwealth Medical College§	Scranton, PA	60 (2009)	120 (2016)
Hofstra University§	Hempstead, NY	30 (2010)	100 (2016)
Scripps School of Medicine§	La Jolla, CA	NA	NA
Virginia Tech–Carilion School of Medicine§	Roanoke, VA	40 (2009)	40 (2016)
University of California, Riverside¶	Riverside, CA	50 (2012)	100 (2016)
University of California, Merced¶	Merced, CA	32 (2013)	100 (2016)
Idaho State University¶	Pocatello, ID	NA	NA
University of Houston¶	Houston	NA	NA

* NA denotes not available.

† This school has received preliminary accreditation by the Liaison Committee on Medical Education (LCME).

‡ This school is a candidate for accreditation by the LCME.

§ This school has applied for accreditation by the LCME.

¶ The development of this school is under discussion.

other factors weigh into decisions by states, medical schools, and others to expand the capacity to educate physicians. The strongest factor seems to be a belief that medical schools hold the potential to be engines of local economic development by attracting research dollars, creating new jobs, and bolstering the image of a university and its surrounding community.⁷⁰⁻⁷² In part on the basis of this rationale, former Florida Governor Jeb Bush became a strong advocate of developing a new public medical school at the University of Central Florida in Orlando and surrounding it with a large biomedical research enterprise. This belief also persuaded the city of Scranton, Pennsylvania, to support the development of a free-standing medical school (Commonwealth Medical College) as a way to bolster its challenged economy. Raymond S. Angeli, president of Lackawanna College, where the new school will be housed temporarily, told a local newspaper, “I think it [the development of a medical school] would be the largest thing to hit the city of Scranton since coal left.”⁷³

FEDERAL PRIORITIES AND ISSUES OF PHYSICIAN SUPPLY

Blumenthal noted in his 2004 report that “questions about the supply of physicians are simply off the radar screens of most federal policymakers.”⁷⁴ Now, almost 4 years later, the characterization remains apt, although a survey of 151 congressional staff members that was conducted in 2006 indicated that Congress is not oblivious to efforts to expand the supply of physicians in some of the districts and states that its members represent.⁷⁴ In response to a question as to whether the number of physicians in the United States during the next decade would be too high, too low, or just about right, 70% of the respondents said too low. A more telling measure of the low priority in which programs that focus on the health care workforce are held by the administration and, to a lesser extent, by Congress is the sharp reduction in the budgets of a variety of programs that the HRSA administers to expand the supply of primary care doctors and to en-

Table 3. The Emergence of New Schools of Osteopathic Medicine in the United States.*

Institution	Location	Enrollment per Year	
		First Year	Projected number (year)
A.T. Still University School of Osteopathic Medicine†	Mesa, AZ	107 (2007)	NA
Rocky Vista University College of Osteopathic Medicine‡	Parker, CO	150 (2008)	NA
Georgia Campus, Philadelphia College of Osteopathic Medicine§	Suwanee, GA	80 (2007)	NA
Touro University College of Osteopathic Medicine†	New York	125 (2007)	NA
Lincoln Memorial University–DeBusk College of Osteopathic Medicine†	Harrogate, TN	150 (2007)	NA
Pacific Northwest University of Health Sciences College of Osteopathic Medicine‡	Yakima, WA	70 (2008)	NA
Edward Via Virginia College of Osteopathic Medicine§	Blacksburg, VA	160 (2007)	NA
Bradenton Branch Campus, Lake Erie College of Osteopathic Medicine§	Bradenton, FL	170 (2007)	NA
Nevada Branch Campus, Touro University College of Osteopathic Medicine§	Las Vegas	134 (2007)	NA
Lake Erie College of Osteopathic Medicine¶	Erie, PA	NA	NA
Western University of Health Sciences¶	Lebanon, OR	NA	NA
William Carey University¶	Hattiesburg, MS	NA	NA

* Data are from the American Association of Colleges of Osteopathic Medicine and the Association of American Medical Colleges. NA denotes not available.

† This school opened in 2007.

‡ This school is scheduled to open in 2008.

§ This school opened between 2001 and 2006 and had students enrolled in 2007.

¶ The development of this school is under discussion.

courage students in racial and ethnic minorities to enroll in medical school.⁷⁵ The item in the HRSA's budget to support the collection and analysis of data on the health care workforce, which totaled \$716,000 in fiscal 2005, was eliminated in 2006 and remains unfunded in the agency's 2008 appropriation. Historically, private philanthropic foundations funded a number of important studies that influenced thinking around physician-supply issues. However, since with very few exceptions they no longer support such work,^{30,76,77} very few researchers are pursuing these questions.

When it comes to the adequacy of the nation's physician workforce, the question on which the mind of Congress is concentrated is whether Medicare's payment rates to doctors are adequate to ensure beneficiary access to care. Reflecting this concern, Congress took action in December to repeal the reduction of 10% in Medicare payments to physicians, which was scheduled to take effect January 1, 2008. Because MedPAC does not

know how many of the program's beneficiaries each physician treats, it must rely on information gleaned from surveys of patients and doctors to determine whether beneficiaries have adequate access to practitioners.

In its March 2007 report, MedPAC noted the results of several surveys of beneficiaries and physicians that it had sponsored between 2004 and 2006.² The commission funded surveys that canvassed both Medicare beneficiaries and privately insured persons to determine whether potential access problems were unique to the Medicare population. The report said: "Results from several surveys conducted from 2003 to 2006 show that [Medicare] beneficiaries appear to have steady access to physicians, with most reporting few or no problems. . . . The 2006 survey found that most Medicare beneficiaries and privately insured people did not have to delay getting an appointment because of scheduling issues." However, the report also noted that "the share of Medicare beneficiaries indicating that

they experienced big problems accessing a primary care physician grew slightly in both 2005 and 2006” and that “the share of beneficiaries reporting big problems finding a specialist significantly increased between 2004 and 2006.” Its report also said that MedPAC would monitor these trends closely and that it planned to examine physician-workforce issues more closely in the future, “especially with respect to the supply of primary care providers. . . . Among the workforce issues to consider will be the factors that influence the choices medical students and residents make about their career specialty.”

To determine whether private insurers agreed with the conclusions of the MedPAC report, I contacted several commercial carriers. Their spokespersons largely concurred with MedPAC’s findings, although they noted that there are certainly exceptions to any generalization that access is adequate, particularly stemming from the erosion of primary care and occasional shortages of some specialists. Private insurers operate on a much shorter time horizon than do medical educators. Therefore, when it comes to physicians, carriers are focused on maintaining adequate provider networks in the face of efforts by some doctors to create single-specialty groups to bolster their leverage with third-party payers or go it alone outside a network. In any case, some insurance executives look at physician-supply estimates with a skeptical eye because they believe physicians are able to create their own demand. Another concern is the accuracy of reports that foresee a serious shortage of physicians ahead. Dr. Troyen A. Brennan, chief medical officer of Aetna, said in a telephone interview: “I think the prudent approach would be to have the federal government undertake or sponsor a comprehensive study of the adequacy of the current physician workforce and projected future needs. Policy decisions of this magnitude should be based on the best possible evidence, and one has to be concerned about the existing studies that report shortages, because most of them were undertaken by organizations or individuals with a specific interest in the debate.”

Given that Medicare beneficiaries and persons with private insurance are reported to have, in general, ready access to care, who currently has or will have the most trouble securing a doctor’s appointment or recruiting a physician? Not surprisingly, it is people without insurance

who have a difficult time finding a physician, as do persons covered through Medicaid,⁷⁸ which pays doctors very low fees for their services, and the 20% of Americans who live in areas that are federally designated as “medically underserved.”⁷⁹ Recruiting and retaining physicians presents a challenge for community health centers,⁸⁰⁻⁸² the medical operations of the Departments of Defense and Veterans Affairs,^{83,84} community hospitals, and even group medical practices.

THE CHALLENGES THAT LIE AHEAD

Almost 50 years ago — the last time the federal government invested heavily in expanding the U.S. capacity to educate medical students — its policymakers moved cautiously before taking action.^{4,85} There is no expectation that Congress will wade into this complicated issue any more rapidly this time. The most immediate challenge for the AAMC and its allies is stepping up their efforts to persuade Congress to remove the cap on the number of GME positions that are supported by Medicare. The cap was imposed by the Balanced Budget Act of 1997 after a recommendation by six medical organizations (the AAMC, American Medical Association, American Association of Colleges of Osteopathic Medicine, American Osteopathic Association, Association of Academic Health Centers, and National Medical Association) that signed the 1996 “consensus statement” that Congress should “reduce the number of GME positions funded by the federal government to a number close to that of the graduates of U.S. allopathic medical schools.”⁸⁶ If the cap on Medicare-funded GME positions had not been imposed and the number of slots had been allowed to grow without constraint, “the physician shortages that are developing today would not exist,” Dr. Richard Cooper wrote recently.⁸⁶

If Congress considers the recommendation of the AAMC to remove the cap on GME positions, legislators may well want to explore a larger question: What are Medicare beneficiaries and taxpayers deriving in return for the program’s large investment in GME? MedPAC hinted it would pursue this question in relation to the supply of primary care physicians and the specialty choices that residents have made in recent years. Removal of the cap on Medicare-supported GME positions has never been regarded

as an easily achievable policy goal, but it became an even more difficult challenge when the administration proposed in its 2009 budget to sharply reduce the overall growth of Medicare spending. The budget was released on February 4, 2008, and partisan politics will play a leading role in its disposition during election year 2008.

No potential conflict of interest relevant to this article was reported.

Mr. Iglehart is a national correspondent for the *Journal*.

1. Medicare physician services: use of services increasing nationwide and relatively few beneficiaries report major access problems. Washington, DC: Government Accountability Office, July 2006. (GAO-06-704.)
2. Report to the Congress: Medicare payment policy. Washington, DC: Medicare Payment Advisory Commission, March 2007.
3. Seward ZM. Doctor shortage hurts a coverage-for-all plan. *Wall Street Journal*. July 25, 2007:B1.
4. Blumenthal D. New steam from an old cauldron — the physician supply debate. *N Engl J Med* 2004;350:1780-7.
5. Graduate Medical Education National Advisory Committee. Summary report of the Graduate Medical Education National Advisory Committee to the Secretary, Department of Health and Human Services. Vol. 1. Washington, DC: Government Printing Office, April 1981. (DHHS publication no. (HRA) 81-651.)
6. Recommendation to improve access to health care through physician workforce reform. Fourth report. Rockville, MD: Council on Graduate Medical Education, January 1994.
7. Committee on the U.S. Physician Supply. The nation's physician workforce: options for balancing supply and requirements. Washington, DC: National Academy Press, 1996.
8. International medical graduates in the U.S. workforce: a discussion paper. Chicago: American Medical Association, October 2007.
9. Mullan F. The case for more U.S. medical students. *N Engl J Med* 2000;343:213-7.
10. Ahmad OB. Managing medical migration from poor countries. *BMJ* 2005;331:43-5.
11. Mullan F. The metrics of the physician brain drain. *N Engl J Med* 2005;353:1810-8.
12. The world health report 2006: working together for health. Geneva: World Health Organization, 2006.
13. Merritt J, Hawkins J, Miller P. Will the last physician in America please turn off the lights? A look at America's looming doctor shortage. Independence, MO: Practice Support Resources, 2004.
14. Council on Graduate Medical Education. Physician workforce policy guidelines for the United States, 2000-2020. Sixteenth report. Washington, DC: Health Resources and Services Administration, January 2005.
15. Bureau of Health Professions. Physician supply and demand: projections in 2020. Washington, DC: Health Resources and Services Administration, October 2006.
16. Johnson WG, Rimsza ME, Garcy T, Grossman M. The Arizona workforce study. Part 1. The numbers of practicing physicians 1992-2004. Tempe: Arizona State University, 2005.
17. Center for Health Workforce Studies. California physician workforce: supply and demand through 2015. Rensselaer: State University of New York, 2004.
18. President Hitt asks state board to establish UCF med school. Orlando: University of Central Florida, 2005. (Accessed March 28, 2008, at <http://news.ucf.edu/UCFnews/index?page=article&id=002400419c2cc5e01078f908310007ce9>.)
19. Physician supply and demand indicators in Georgia. Atlanta: Georgia Board for Physician Workforce, 2005.
20. Texas Higher Education Coordinating Board. Projecting the need for medical education in Texas. July 2002. (Accessed March 28, 2008, at <http://www.thechb.state.tx.us/reports/pdf/0494.pdf>.)
21. Mandsager R, Johnston H. Securing an adequate number of physicians for Alaska's needs: report of the Alaska physician supply task force. Anchorage: University of Alaska, 2006.
22. University of Iowa Task Force. Report on Iowa physician workforce. 2007. (Accessed March 28, 2008, at <http://www.healthcare.uiowa.edu/CCOM/Administration/IowaPhysicianWorkforce.pdf>.)
23. Comprehensive statewide physician workforce study: task force report. Lexington: Kentucky Institute of Medicine, 2007.
24. Maryland State Medical Society. Maryland physician workforce study. Elkridge: Maryland Hospital Association, 2007.
25. Physician workforce study. Waltham: Massachusetts Medical Society, June 2007.
26. The future supply and demand for physicians in Michigan. East Lansing: Michigan State Medical Society, June 2005.
27. Cossman JS. Mississippi's physician labor force: current status and future challenges. *J Miss State Med Assoc* 2004;45:8-31.
28. University of Nevada school of medicine proposes new health sciences concept to board of regents. News release of the University of Nevada School of Medicine, Reno, March 17, 2006.
29. Armstrong DP, Moore J, Forte GJ. Physician recruitment and retention in upstate New York. Findings from the Iroquois Healthcare Alliance member survey of physician recruitment and retention. Center for Health Workforce Studies. Albany: State University of New York, 2007.
30. NCIOM Task Force on Primary Care and Specialty Supply. Providers in demand: North Carolina's primary care and specialty supply. Durham: North Carolina Institute of Medicine, June 2007.
31. Center for Rural Health. Physician workforce in Oregon: a snapshot. Salem: Oregon Health and Science University, 2004.
32. Utah's physician workforce: a study of the supply and distribution of physicians in Utah. Salt Lake City: Utah Medical Education Council, 2006.
33. Roadmap for Virginia's health: a report of the Governor's Health Reform Commission. Final report. Richmond, VA: Governor's Health Reform Commission, September 2007.
34. Wisconsin Hospital Association. Who will care for our patients? Wisconsin takes action to fight a growing physician shortage. Madison: Wisconsin Medical Society, March 2004.
35. Center for Health Workforce Studies. A/1 physician workforce report prepared for the American Academy of Allergy, Asthma, and Immunology. Albany: State University of New York, 2000.
36. Schubert A, Eckhout G Jr, Tremper K. An updated view of the national anesthesia personnel shortfall. *Anesth Analg* 2003;96:207-14.
37. Fye WB. Cardiology's workforce shortage: implications for patient care and research. *Circulation* 2004;109:813-6.
38. Scully JH, Wilk JE. Selected characteristics and data of psychiatrists in the United States, 2001-2002. *Acad Psychiatry* 2003;27:247-51.
39. Kim WJ. Child and adolescent psychiatry workforce: a critical shortage and national challenge. *Acad Psychiatry* 2003;27:277-82.
40. Angus DC, Kelley MA, Schmitz RJ, White A, Popovich J Jr. Current and projected workforce requirements for care of the critically ill and patients with pulmonary disease: can we meet the requirements of an aging population? *JAMA* 2000;284:2762-70.
41. Ewart GW, Marcus L, Gaba MM, Bradner RH, Medina JL, Chandler EB. The critical care medicine crisis: a call for federal action: a white paper from the critical care professional societies. *Chest* 2004;125:1518-21.
42. Resneck J Jr, Kimball AB. The dermatology workforce shortage. *J Am Acad Dermatol* 2004;50:50-4.
43. Lee C. On-call specialists at emergency rooms harder to find, keep. *Washington Post*. December 21, 2007:A1.

44. Committee on the Future of Emergency Care in the United States Health System. Hospital-based emergency care: at the breaking point. Washington, DC: National Academies Press, 2007.
45. Rizza RA, Vigersky RA, Rodbard HW, et al. A model to determine workforce needs for endocrinologists in the United States until 2020. *Endocr Pract* 2003;9:210-9.
46. American Academy of Family Physicians. Family physician workforce reform. 2006. (Accessed March 28, 2008, at <http://www.aafp.org/online/en/home/policy/policies/w/workforce.html>.)
47. Sheldon GF. Surgical workforce since the 1975 study of surgical services in the United States: an update. *Ann Surg* 2007;246:541-5.
48. Association of Directors of Geriatric Academic Programs. Geriatric medicine: a clinical imperative for an aging population. New York: American Geriatrics Society, 2004.
49. Korf BR, Feldman G, Wiesner GL. Report of Banbury Summit Meeting on training of physicians in medical genetics, October 20-22, 2004. *Genet Med* 2005;7:433-8.
50. Gottfried ON, Rovit RL, Popp AJ, Kraus KL, Simon AS, Couldwell WT. Neurosurgical workforce trends in the United States. *J Neurosurg* 2005;102:202-8.
51. Erikson C, Salsberg E, Forte G, Bruinooge S, Goldstein M. Future supply and demand for oncologists: challenges to assuring access to oncology services. *J Oncol Pract* 2007;3:79-86.
52. Deal CL, Hooker R, Harrington R, et al. The United States rheumatology workforce: supply and demand, 2005-2025. *Arthritis Rheum* 2007;56:722-9.
53. Hernandez LM, Munthali AW, eds. Training physicians for public health careers. Washington, DC: National Academies Press, 2007.
54. Sunshine JH, Maynard CD, Paros J, Forman HP. Update on the diagnostic radiologist shortage. *AJR Am J Roentgenol* 2004;182:301-5.
55. Cooper RA. Perspectives on the physician workforce to the year 2020. *JAMA* 1995;274:1534-43.
56. Cooper RA, Getzen TE, McKee HJ, Laud P. Economic and demographic trends signal an impending physician shortage. *Health Aff (Millwood)* 2002;21(1):140-54.
57. Cooper RA. Weighing the evidence for expanding physician supply. *Ann Intern Med* 2004;141:705-14.
58. Wennberg JE, Goodman DC, Nease RF, Keller RB. Finding equilibrium in U.S. physician supply. *Health Aff (Millwood)* 1993;12(2):89-103.
59. Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. 1. The content, quality, and accessibility of care. *Ann Intern Med* 2003;138:273-87.
60. *Idem*. The implications of regional variations in Medicare spending. 2. Health outcomes and satisfaction with care. *Ann Intern Med* 2003;138:288-98.
61. Goodman DC. Twenty-year trends in regional variations in the U.S. physician workforce. *Health Aff (Millwood)* 2004;Suppl Web Exclusives:VAR90-VAR97.
62. Goodman DC, Stukel TA, Chang CH, Wennberg JE. End-of-life care at academic medical centers: implications for future workforce requirements. *Health Aff (Millwood)* 2006;25:521-31.
63. Goodman DC, Grumbach K. Does having more physicians lead to better health system performance? *JAMA* 2008;299:335-7.
64. Weiner JP. Forecasting the effects of health reform on US physician workforce requirement: evidence from HMO staffing patterns. *JAMA* 1994;272:222-30.
65. Association of American Medical Colleges. AAMC statement on the physician workforce. June 2006. (Accessed March 28, 2008, at <http://www.aamc.org/workforce/workforceposition.pdf>.)
66. Consensus statement on the physician workforce. Washington, DC: Association of American Medical Colleges, 1996.
67. AAMC establishes new unit to study physician supply: health workforce expert Edward Salsberg to lead effort. Press release of the Association of American Medical Colleges, Washington, DC, December 17, 2003.
68. 2007 Survey of medical schools. Washington, DC: Association of American Medical Colleges, 2008.
69. Perkins B, American Osteopathic Association. Testimony delivered March 28, 2007, before the Senate Health, Education, Labor and Pensions Committee. Washington, DC. (Accessed March 28, 2008, at http://help.senate.gov/Hearings/2007_02_20/Perkins.pdf.)
70. Leonhardt D. Health care as main engine: is that so bad? *New York Times*. November 11, 2001:BU3.
71. The economic impact of AAMC-member medical schools and teaching hospitals. Washington, DC: Association of American Medical Colleges, 2005.
72. Schneider K. Grand Rapids lays foundations for a health mecca. *New York Times*. July 11, 2007:C6.
73. Sonderman J. \$35M set aside for medical school in Scranton. *Times Tribune*. June 29, 2006:1.
74. McInturff B, Harrington E. Congressional omnibus: data from a survey of 151 hill staffers conducted September 22-October 5, 2006, on behalf of Association of American Medical Colleges. Alexandria, VA: Public Opinion Strategies, 2006.
75. Grumbach K, Mendoza R. Disparities in human resources: addressing the lack of diversity in the health professions. *Health Aff (Millwood)* 2008;27:413-22.
76. Future of medical education to be examined in epoch of expansion. News release of George Washington University, Washington, DC, May 23, 2007.
77. Cooper RA. Scarce physicians encounter scarce foundations: a call for action. *Health Aff (Millwood)* 2004;23(6):243-9.
78. Fuhrmans V. Note to Medicaid patients: the doctor won't see you. *Wall Street Journal*. July 19, 2007:A1.
79. Talbot C. Shortage of doctors affects rural U.S. *Washington Post*. July 22, 2007:A1.
80. Rosenblatt RA, Andrilla CHA, Curtin T, Hart LG. Shortages of medical personnel at community health centers: implications for planned expansion. *JAMA* 2006;295:1042-9.
81. Lee C. Community health clinics flourish, but doctors are few. *Washington Post*. June 19, 2007:A2.
82. Cook NL, Hicks LS, O'Malley AJ, Keegan T, Guadagnoli E, Landon BE. Access to specialty care and medical services in community health centers. *Health Aff (Millwood)* 2007;26:1459-68.
83. Spotswood S. VA physician recruitment, retention still a struggle. *U.S. Medicine*. Vol. 43. No. 11. November 2007:1. (Accessed March 28, 2008, at <http://www.usmedicine.com/article.cfm?articleID=1647&issueID=104>.)
84. Pendleton JH, Bertoni D. Preliminary observations on efforts to improve health care and disability evaluations for returning service members. Testimony on behalf of Government Accountability Office before the House Oversight and Government Reform Subcommittee on National Security and Foreign Affairs, September 26, 2007. Washington, DC: Government Accountability Office, 2007.
85. Mallon WT. Medical school expansion: déjà vu all over again. *Acad Med* 2007;82:1121-5.
86. Cooper RA. It's time to address the problem of physician shortages: graduate medical education is the key. *Ann Surg* 2007;246:527-34.

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