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Health Workforce Needs: Projections Complicated by Practice and Technology Changes

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OVERVIEW — *As population growth and the aging of the overall population increase demand for health care, policymakers and analysts posit whether sufficient health care providers will be able to meet that demand. Some argue there are too few providers already; others say our current supply-demand problems lie with efficiency. But suppose both are correct? Perhaps the real challenge is to understand how physician practices are changing in response to market forces such as payment changes, provider distributions, and technology innovations. This issue brief reviews what is known about evolving practice organizations, professional mixes, information technology support, and the implications of these and other factors for public workforce policies.*

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Population growth and aging are expected to steadily increase demand for health services in coming years. Leaders in the medical profession, among others, worry about current shortages in the health care workforce, especially in certain specialties and geographic areas. They believe that as demand grows, such shortages will worsen. The Association of American Medical Colleges predicts that by 2020 there will be 45,000 too few primary care physicians in the United States and 46,000 too few surgeons and medical specialists.[1]

At the same time, in the face of unsustainable increases in health spending, other observers argue that health services are often overused, that correlations can often be shown between spending and an above-average supply of providers and above-average use of services, that efficient organizations can provide good care at lower-than-average cost, and that doctors perform many tasks that can be delegated safely to others.

But asking whether there are too many doctors or too few might be the wrong question. An unresolved tension between these two points of view has contributed to a lack of consensus among health system stakeholders, including government, about health workforce policy and planning. In fact, both shortages and surpluses coexist in today's health system. There are too many specialists in many affluent areas and too few primary care providers in poor and rural communities. Payer and provider organizations are experimenting with team-based care and financial incentives that reward providers for efficient use of resources. Clinical innovation and information technology may increase the productivity of the existing workforce and change the mix of professionals to deliver needed care. Averting potential future shortages, and correcting maldistribution, means investing and acting soon: It takes 11 years or more to make a doctor, and five or more to make a nurse practitioner (NP) or physician assistant. Reducing overuse and inefficiency would require strenuous efforts across a broad front to change the way care is organized, delivered, and is paid.[2]

Whether market forces or policy interventions can correct specialty and geographic maldistribution, organizational fragmentation, misdirected incentives, and other ills remains to be seen. For national policymakers, who are responsible for developing strategies to ensure the overall adequacy of the health workforce going forward, the most difficult problem will be understanding the pace and scope of changes in payment, provider organization, and technology, as well as the effect of those changes on future workforce needs.

BACKGROUND

Less than 20 years ago, leaders in the field of medical education were predicting that an overall surplus of physicians loomed and that federal subsidies for graduate medical education (GME) should be trimmed. Their projections were predicated on the assumption that the tightly managed care that was in the ascendant in the mid-1990s would soon dominate the health system.[3] Managed care took many forms, but was generally modeled on integrated health maintenance organizations like Kaiser Permanente that typically used fewer expensive specialists than the health system in general and carefully coordinated services among different practitioners.

Congress followed the 1994 recommendation of the Council on Graduate Medical Education (COGME) to cap Medicare-subsidized residencies in 1997 as part of the Balanced Budget Act (BBA). No sooner had the cap been established than a backlash against managed care ensued, and spending and service use resumed their headlong climb. Within a few years, workforce projections by COGME and others swung decisively from an expected surplus to a likely shortage.[4]

Projected shortages are often premised on historical physician-to-population ratios, and the belief persisted among many policy analysts that a more efficiently organized health system could provide quality care and adequate access with a leaner physician workforce.[5] Uncertainty about progress toward a more efficient system has rendered temporarily moot questions about the present and future adequacy of the overall supply of physicians. Many policymakers are now more concerned about the supply of primary care physicians relative to other medical specialties and subspecialties, as the supply of the former continues to lag significantly behind the latter. There are important exceptions, however, such as an apparent shortage of general surgeons in many rural areas.[6]

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Many are also concerned about imbalances in physician supply between affluent urban and suburban areas compared with rural and disadvantaged communities. Moreover, recent research increasingly has focused attention on the geographic variability of population health needs.[7] But policy solutions have been difficult to identify because the optimal level and mix of specialties—let alone the mix of professionals—is not known, and because few constraints exist on physicians' and prospective physicians' freedom to choose what kind of medicine they wish to practice and where they will practice it.

Some recent Medicare reimbursement changes seek to address the perceived imbalance between the supply of specialists and primary care physicians. From 2006 to 2011, Medicare increased payment rates for primary care services by 22.5 percent, primarily by reweighting relative values for evaluation and management services.[8] The Patient Protection and Affordable Care Act of 2010 (ACA) added a 10 percent increase to primary care clinician payments under Medicare Part B until 2016.[9] But policymakers are caught between conflicting assumptions about how the future health care workforce should, or is likely to, evolve. They also face the staggering complexity in which local variables in patient health needs, socioeconomic conditions, insurance coverage, provider supply, specialty distribution, and other factors may be arrayed, defying generalization.

Changing Practice Organization and Professional Mix

Gathering reliable evidence about how practice changes currently under way might affect workforce needs is difficult. In response to the ACA and private payer initiatives, many providers are experimenting with patient-centered medical homes, accountable care organizations, and other innovations that prioritize team-based care in which some services ordinarily performed by physicians are delegated to others. But most of these efforts are just now in the process of developing and have yet to leave a robust data trail for researchers to follow. Their prevalence and staying power are significant unknowns.

Established integrated care organizations with a history of using care teams and coordinated patient management can provide some evidence of the potential implications of practice change for the workforce. A 2004 study found that three such organizations—Kaiser Permanente, Group Health Cooperative, and HealthPartners—employed 144, 166, and 176 physicians, respectively, per 100,000 patients, well

below the U.S. average of 229.[10] A subsequent study at Group Health found that care teams in a new medical home program increased physician productivity and reduced hospitalizations, but entailed substantial costs for additional staff and information technology.[11]

A recent study from Columbia University estimated that small groups of doctors could, by means of pooling their visit schedules, substituting for each other, and smoothing out the randomness of patient appointment requests, increase physician productivity by reducing their down time while also providing same-day or short-wait scheduling for patients. When combined with increased use of nurse practitioners, physician assistants, and others, and increased use of information technology, the ratio of physicians needed could be still further reduced, the study said. As compared to the study's typical patient-to-primary care physician ratio, or panel size, of 2,500, one organization using "open scheduling" reported panel sizes of 3,200. Projected shortages disappeared in some of the study's simulations.[12] But critics doubted that physicians would be likely to accept an increase in their daily workload to 28 appointments, as called for in the study's most aggressive scenario.[13]

Another study, from the University of California at San Francisco (UCSF), used published estimates of adult primary care physician workloads to model the effects of increased delegation of preventive and chronic care services to nurse practitioners, physician assistants, and other qualified non-physicians. Without delegation, the average physician needs about two hours per patient per year to deliver all recommended preventive, chronic, and acute care services to the average patient, the authors estimated. If the physician works the average 43 hours per week, he or she could provide fully adequate services to a patient panel of 983.[14] It is one measure of stress on the primary care physician workforce that the actual U.S. average panel size was 2,300 in a 2005 survey. Even with smaller panel sizes found in other estimates, physician burn-out and patient access problems are sometimes observed. Another logical inference from these data, consistent with other research, is that recommended care is frequently not delivered.[15]

The UCSF authors modeled three levels of delegation. The most ambitious model assigned to non-physicians 77 percent of the time needed for preventive services, and 47 percent of the time needed for chronic care, while physicians delivered all acute care services.

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Under that scenario, only one hour per patient per year of physician time is needed to provide all recommended care, and the viable panel size doubles to 1,947. Proportionately less dramatic effects are observed at lower levels of delegation. The authors concluded that, in general, recommended care can be delivered "with panel sizes that are achievable with the available primary care workforce."

Geisinger Health System in eastern Pennsylvania has had similar results. Even with the use of a simple system of delegation to assistive personnel for nursing, counseling, and social service tasks, Geisinger found that the largest patient panel a single primary care physician could be responsible for was 2,000. But with the use of teams that include nurses, social workers, health coaches, and with chronically ill patients who are encouraged to take an active role in managing their own health, panel sizes for a single physician may grow to 2,500 to 5,000 patients.[16]

Worth noting also is one further organizational innovation with the potential of stretching the health system's primary care capacity. The number of nurse-managed convenience clinics in drug stores and other retail settings has risen rapidly, with 1,425 operating in 39 states in early 2013, according to trade reports.[17] Data in peer-reviewed studies is somewhat dated and inconsistent, but retail clinics reported about 6 million visits in 2009, a fourfold increase from the period 2007 to 2009.[18]

Many visits occurred during weekends and evenings. Preventive care such as flu shots accounted for nearly half the visits, but Walgreen's recently announced plans to expand the scope of services at their clinics to include diagnosis and treatment, a step criticized by the American Academy of Family Physicians.[19] The clinics apparently do not serve a disproportionate number of low-income or disadvantaged patients. While their share of overall outpatient encounters is minuscule, retail clinic visits account for an appreciable percentage of primary care visits for certain conditions.[20]

As in the delegation model described above, nurse-managed clinics can be multipliers for physician productivity. State scope-of-practice laws vary, but many states allow off-site supervision of three or four nurse practitioners by a single physician. Others set no specific limit. Seventeen states allow independent practice for NPs.[21] Quantitative estimates of the potential effect of convenience and workplace clinics on primary care physician workforce needs have not appeared, but

effects analogous to those observed in UCSF's delegation modeling may be possible to the extent that more clinics continue to open.

Information technology (IT): A Workforce Multiplier

Kaiser Permanente reported preliminary evidence on the potential effect of information technology on physician workforce needs in its report on the introduction of a comprehensive electronic health record system in Hawaii, including a multi-purpose patient interface, or portal. Patients had access to their lab results, e-prescribing, and e-mail to providers, among other functions. The organization reported a 25 percent reduction in office visits from 2004 to 2007.[22] Such information systems are costly, take years to develop, and can add value much more readily in an integrated organization like Kaiser Permanente than in the larger environment where care is much more loosely organized.

The problem of protecting access to care when physician supply is limited can also be addressed with information technology. For example, telemedicine has helped the University of New Mexico (UNM) Health Sciences Center meet the needs of the state's rural population, most of which lives in medically underserved areas. The project began as an effort by the University's gastroenterology department to tackle the rapidly rising incidence of hepatitis C in the state. In collaboration with community clinics, the state health and corrections departments, and the Indian Health Service (IHS), UNM has conducted hundreds of telehealth clinics for thousands of patients all over the state, has trained community health workers, and has begun to expand the program to address asthma, cardiopulmonary disease, diabetes, addiction, and mental health disorders.[23]

The IHS provides another example of how information technology can be used to compensate for an acute shortage of both specialist and primary care physicians in remote and sparsely populated rural areas with an unusually heavy population disease burden. As it does elsewhere, health IT helps the IHS with patient education, quality improvement, and disease registries, which are among the tools that have increased life expectancy and improved diabetes and cholesterol management among the agency's patients. Moreover, telemedicine enables asynchronous and live tele- and video-conferencing with patients as far away as Alaska. The agency also partners

with Brigham and Women's Hospital in Boston for remote specialty consultations, another critical IHS need.[24]

Clinical innovation and changes in demand for services

Technological innovation and changes in clinical practice also influence demand, pushing it downward in some instances. Ulcer surgery, for example, has all but disappeared since discovery of the role of *H. pylori* bacteria. Seat belts and air bags have reduced the average severity of car crash injuries, with their attendant trauma care needs. Improved imaging technologies often eliminate the need for exploratory surgery.

Not all clinical innovation reduces demand.

One of the more dramatic and consequential examples of demand reduction has been for heart bypass surgeries, the annual number of which fell by more than one-third from 2001 to 2008. The use of stents and angioplasty also fell slightly during this period, suggesting that it was not only the substitution of a less invasive procedure that caused the drop in bypass surgery.[25] A broad array of contributing factors have been cited, most under the heading of secondary prevention for at-risk patients, including smoking cessation and improved medical management of high cholesterol, hypertension, and diabetes.[26] Coronary revascularization is one of the largest single categories of Medicare spending. It reached $6.7 billion in 2006 but has declined since then.

Another common procedure, hysterectomy, has also been declining substantially for many years, but is still overused according to critics of the procedure. In the past three decades, annual hysterectomy rates have fallen from 71 per 10,000 women to 38,[27] although one in three women still has had the surgery by the age of 60.[28] Because alternative treatments are now available for many conditions formerly treated by hysterectomy, including less invasive surgery, some believe that many hysterectomies are unnecessarily performed. Debate also persists about evidence of overtreatment for other serious and high-prevalence conditions including breast and prostate cancer.

However, not all clinical innovation reduces demand. Laparoscopic gallbladder surgery, for example, is much less painful, invasive, and costly than the formerly preferred open surgery. But these improvements seem to have fueled a powerful increase in demand. Various studies have documented a rapid rise in frequency, nearing a

50 percent increase in just the first few years after introduction in the mid-1980s. In 1990, 10 percent of gallbladder surgeries were performed laparoscopically. Five years later, the rate was 80 percent. By 2008, the annual volume of gallbladder removal surgeries reached 750,000, and 90 percent were laparoscopic.[29] Costs per procedure dropped but overall spending went up because of increased volume. Similarly, joint replacement has quickly risen to become one of the most common and costly of U.S. surgeries, particularly for the aging population. The frequency of hip and knee replacement in the United States doubled from 2000 to 2009, when volume reached 184,000.[30]

THE POLICY PICTURE

Simply enlarging the supply of physicians could alleviate shortage fears, and medical school capacity has been expanding. But a critical bottleneck still exists in Medicare's cap on residency training payments. The Affordable Care Act added 300 residency positions to Medicare's current authorized total of 115,000, far fewer than the 4,000 new positions per year that the Association of American Medical Colleges says are needed to avert future shortages. Although hospitals have created residencies without Medicare funding since the imposition of the BBA cap, their interest and ability to create enough residencies—and in the correct specialties to satisfy some expectations—is very uncertain. A few states require private insurers to make GME contributions, and private payers also note that they often reimburse teaching hospitals at higher rates than others. But in the meantime, teaching hospitals are also struggling to fend off cuts in Medicare GME funds as recommended in some recent budget proposals.

Compounding budgetary constraints is continued ambivalence about shortage-versus-surplus issues. Coherent policy is impeded also by measurement difficulties on both the supply and demand sides. U.S. Department of Health and Human Services Secretary Kathleen Sebelius told members of Congress in 2012 that creating a national workforce plan has been delayed by the difficulties of tracking the supply of health professionals and shifting patterns of demand for services.[31]

But despite policy ambivalence and physician resistance to task delegation, practice change marches onward. A study by the RAND

State scope-of-practice laws vary widely and have created obstacles to task delegation in many areas.

Corporation predicts that the number of nurse practitioners will grow from 128,000 in 2008 to 244,000 in 2025.[32] The number of physician assistants grew from 40,000 in 2000 to 83,000 in 2010, and the National Center for Health Statistics estimated in 2011 that 49 percent of office-based physicians used nurse practitioners, physician assistants, and/or nurse midwives.[33] Eighty percent of practices with more than 11 physicians used nonphysician clinicians, compared with 37 percent of practices with one or two physicians.[34]

Many factors may advance or retard the pace of practice change. Increasing task delegation involves hiring personnel, disrupting established procedures, and investing in information technology. Public and private payers are experimenting with incentive payments for team-based care and shared savings programs, but early research on these ventures has shown equivocal results.[35]

State scope-of-practice laws vary widely and have created obstacles to task delegation in many areas. Currently only 17 states and the District of Columbia allow fully independent practice by nurse practitioners. State medical societies frequently oppose scope-of-practice expansions, and payers often limit reimbursement for services not delivered by physicians. Inconsistencies in state regulation complicate the training, credentialing, and employment of non-physician clinicians.[36] Training of new advanced practice professionals is also constrained by faculty shortages at many schools of nursing. Interprofessional education programs to prepare clinicians for team-based care have been slow to take root.[37]

Notably, many rural states, including Idaho, Montana, Wyoming, Utah, Colorado, Arizona, New Mexico, and Iowa, have the least restrictive scope-of-practice regulations. These states are large, sparsely populated, and medically underserved, and they need to use every possible resource to bring adequate care to their population.[38] As another example of need-driven strategies to compensate for low physician supply, physician practices receiving a relatively large share of their revenues from Medicaid are more likely than others to work with nurse practitioners, nurse midwives, and physician assistants.[39] Innovation is difficult, and the force of circumstance may ultimately be its strongest driver.

Efforts to redress specialty and geographic maldistribution of physicians and other providers are of long standing, especially to bolster the supply of primary care clinicians in underserved areas.

Medicare has taken a few small steps toward rebalancing large compensation gaps between primary and specialty care. The ACA increased funding for the National Health Service Corps (NHSC), which subsidizes training for physicians who agree to practice in underserved areas. The Act also authorizes new funding for primary care training centers, teaching health centers, rural training, nurse and primary care physician training, direct care worker training, and assorted other workforce supports. It also offers workforce planning grants to states.

Funding for these programs, however, is subject to budgetary constraints, and is thinly spread across 42 workforce provisions in the ACA. While the NHSC supports close to 8,000 providers, the number falls short of the projected need in designated health professional shortage areas.[40] Medicare has offered teaching hospitals the option of reallocating GME payments to primary care residency programs, but uptake by students has been slight. The states support many training programs in the health professions and are sensitive to supply shortages, but most states possess limited resources to intervene.

CONCLUSION

It seems possible that a false dichotomy distorts debate over health care workforce projections. Using one set of assumptions, a crisis looms, whereas other scenarios emphasize opportunities to transform the health system. If in fact it is not possible to increase physician supply fast enough to satisfy assumptions that point to dire shortages, or to change the system fast enough to forestall that threat, then more focus is needed on intermediate measures.

The uneven distribution of health care workforce assets in the United States represents a paradox of excess and deprivation. Public policymakers have little authority to dictate where or how a future doctor will practice, except with tightly hedged payment incentives in public programs and in state credentialing policies. Even if it were possible to increase the supply of physicians rapidly, relentless pressure to control spending will ratchet down doctors' incomes as their collective student debt increases. As one observer notes, physicians "can maintain their traditional role, payment methods, and scope of practice, or their income, but not both."[41]

Taking the employment of nurse practitioners, midwives, and physician assistants as an indicator of practice change, current trends display an interesting bimodal distribution. Better-endowed and more sophisticated organizations, such as large medical groups and multispecialty practices, are much more likely than smaller organizations to use non-physician clinicians. Similarly, convenience clinics tend to locate in comfortable communities rather than medically underserved, low-income neighborhoods. On the other hand, as noted above, innovation may be driven by need, as in rural telemedicine initiatives, use of non-physicians in Medicaid-oriented practices, or liberal scope-of-practice regulation in some rural states.

To the extent that increases in demand create or exacerbate provider shortages, practice change seems likely to accelerate. Policy levers may facilitate change, but exigent circumstances seem more likely than any other factor to motivate action, making a virtue of necessity. Given their many uncertainties, projections about future workforce supply and demand will have to be viewed as conditional.

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