adherence to guidelines, but they may also force doctors to give "standard" rather than "customized" care.

These problems, we believe, will only worsen, for even as we are pressed to see more patients per hour and to work with greater "efficiency," we must respond to demands for detailed documentation to justify our billing and protect ourselves from lawsuits. Though the electronic medical record serves these exigencies, it simultaneously risks compromising care by fostering a generic approach to diagnosis and treatment.

We are not Luddites, opposed to all technological interventions; we can see that electronic medical records have many benefits. Mountains of paper are replaced by the computer screen, with rapid access to complete and organized information, with risks such as dangerous drug interactions automatically flagged. But we need to learn how to use this powerful tool in the way that is best for patient care, regardless of whether it's the most "efficient" way.

We should instruct house staff that they must create independent, personal notes by talking to the patient and verifying the medical history themselves. We should discuss with payers what constitutes real documentation of time and effort rather than sleight of hand. We should use electronic formats that require us to select and insert specific, relevant laboratory results.

Perhaps most important, we should be cautious in using templates that constrain creative clinical thinking and promote automaticity. We must be attentive to the shift in focus demanded by electronic medical records, which can lead clinicians to suspend thinking, blindly accept diagnoses, and fail to talk to patients in a way that allows deep, independent probing. The computer should not become a barrier between physician and patient; as medicine incorporates new technology, its focus should remain on interaction between the sick and the healer. Practicing "thinking" medicine takes time, and electronic records will not change that. We need to make this technology work for us, rather than allowing ourselves to work for it.

Drs. Hartzband and Groopman report holding stock in Microsoft and Google.

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Physician Workforce Crisis? Wrong Diagnosis, Wrong Prescription

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Related article, page 1741

Despite the fact that there are now more physicians per capita in the United States than there have been for at least 50 years, the Council on Graduate Medical Education (COGME) recently predicted a 10% shortfall of physicians by 2020. Public concern about access to care, reports of difficulties in recruiting physicians in many specialties, and discussion of the looming collapse of primary care all contribute to the sense of crisis. The Association of American Medical Colleges has responded with calls for a 30% expansion of U.S. medical schools and a lifting of the current cap on Medicare funding for graduate medical education so that federal dollars can support the expansion of the workforce.

Before acting on these recommendations, we should carefully consider the accuracy of the diagnosis and the likely consequences of the prescription. Three observations should give policymakers pause (see Table 1).

Physician supply varies dramatically by region of the country. COGME is concerned about a 10% shortfall at a time when the regional supply of physicians varies by more than 50% (see Table 1). An analysis of the country's hospital-referral regions (regional markets for tertiary care) in which regions are categorized into quintiles on the basis of their per-capita supply of physicians reveals that the ratio of the supply in the highest-quintile regions to that in the lowest-quintile regions is 1.56 for primary care, 1.89 for medical specialists, and 1.43 for surgical specialists.

But the presence of more phy-

Table 1. Supply of Physicians in U.S. Hospital-Referral Regions and Associated Quality of and Access to Care, 2005.*

Variable	Regions in Lowest Quintile of Supply	Regions in Middle Quintile of Supply	Regions in Highest Quintile of Supply	Ratio of Lowest to Highest
Total number of physicians per capita (per 100,000 population, adjusted for age and sex)	169.4	204.8	271.8	1.60
Primary care	61.5	72.7	95.7	1.56
Medical specialists	34.1	44.3	64.3	1.89
Surgical specialists	37.4	43.2	53.4	1.43
Hospital-based specialists	23.8	26.1	28.7	1.21
Medicare composite quality scores				
Acute myocardial infarction	91.0	91.7	93.1	1.02
Congestive heart failure	84.1	85.9	88.6	1.05
Pneumonia	79.5	78.8	79.2	1.00
Medicare access and satisfaction				
Ever had a problem and didn't see a doctor? (% responding no)	91.7	92.8	93.2	1.02
Do you have a particular place for medical care? (% responding yes)	95.0	94.8	95.5	1.01
Satisfied with ease of getting to the doctor? (% responding yes)	94.9	93.5	94.7	1.00
Satisfied with doctor's concern for overall health? (% responding yes)	95.5	94.2	95.7	1.00
Satisfied with quality of medical care? (% responding yes)	96.7	96.3	97.0	1.00

* Data are for hospital-referral regions according to quintile of beneficiary-weighted total number of physicians per capita for 2005. Total numbers of physicians include the number of full-time clinical postgraduate physicians and 0.35 times the number of residents and fellows. For acute myocardial infarction, the Medicare composite quality scores are the averages of scores for the use of aspirin within 24 hours before or after admission and at discharge, the use of a beta-blocker within 24 hours before or after admission, and the use of an angiotensin-converting–enzyme (ACE) inhibitor for left ventricular systolic dysfunction; for congestive heart failure, composite scores are the averages of scores for assessment of left ventricular function and the use of an ACE inhibitor for left ventricular dysfunction; for pneumonia, composite scores are the averages of scores for the timing of initial antibiotic therapy, the presence or absence of pneumococcal vaccination, and assessment of oxygenation. The percentages for Medicare access and satisfaction are calculated from responses to the Medicare Current Beneficiary Survey. Data are from the Dartmouth Atlas of Health Care Project.

sicians doesn't translate into better care. Medicare beneficiaries' satisfaction with their care and perceptions of access are no better in high-supply regions than in low-supply regions. Nor does more physicians generally mean better care for hospitalized patients (see Table 1). Physicians in high-supply regions are more likely to report concerns about inadequate continuity of care, inadequate communication among physicians, and greater difficulty providing high-quality care.[1] And certainly most important, patient outcomes are not better in regions with a very large supply of physicians.[2,3]

Having more physicians does, however, mean more spending on health care — a strong correlation that should not be surprising.[3] Physicians' incomes are an important component of medical spending, and physicians order most clinical services.

Taken together, these analyses contradict the notion that health care systems have inflexible physician requirements and call into question the significance of a 10% national "shortfall." They should also lead us to question the diagnosis of a crisis in the physician workforce.

What about the prescription? As we see it, increasing the number of physicians will make our health care system worse, not better.

First, unfettered growth is likely to exacerbate regional inequities in supply and spending. Research at our center has shown that physicians do not preferentially practice where the need is greatest. On the contrary, between 1979 and 1999, the physician sup-

ply per capita grew by 45% in primary care, 118% among medical specialists, and 21% among surgical specialists, yet four of every five new physicians settled in regions where the supply was already high.[4] Any plan to increase the supply should be crafted to reduce, not exacerbate, regional disparities.

Second, unrestricted expansion of graduate medical education (as would occur if the funding cap on residency positions were removed) would probably further undermine primary care and reinforce trends toward a fragmented, specialist-oriented health care system. Current reimbursement systems strongly favor procedure-oriented specialties, and training programs would almost certainly respond to these incentives, which would lead to a relative increase in subspecialty care that inefficiently disperses patients' care among multiple specialists. The flexibility of the workforce will diminish as more physicians learn narrower skill sets. In the absence of reform, expansion of specialist training risks further marginalizing primary care in medical education and limits our capacity for building patient-centered delivery systems.

Third, workforce expansion will be expensive. Although no formal estimates of the marginal costs have been offered by proponents of expanding training, we estimate that the additional costs of training the physicians who would expand the workforce by 30% would be $5 billion to $10 billion per year, depending on the proportion of subspecialists trained. Once these physicians are in practice, the costs will be many times greater. If outcomes and patients' perception of access improved as supply increased, then we could debate whether an expansion of training offers better value than investments in preventive care, disease management, or broader insurance coverage, which have known benefits. Instead, the costs of expansion will limit the resources available for necessary reform efforts without any evidence-based promise of a benefit.

The situation in Massachusetts reflects the problem with focusing narrowly on the physician workforce. Massachusetts has seen its supply of physicians per capita more than double since 1976, and it now has the highest physician-to-population ratio of any state, in primary care as well as overall. Yet the Massachusetts Medical Society has issued several annual reports asserting that there is a severe physician shortage, and patients report that the availability of primary care continues to decline.[5]

We believe that the perception of a physician shortage, both nationally and in Massachusetts, is just one symptom of the underlying problems in our health care system. The current delivery and payment systems often make it more "efficient" for primary care physicians to see patients they already know (diminishing others' access to primary care) and for all physicians to narrow their scope of practice (increasing referrals to specialists) and to admit patients to the hospital (where hospitalists manage their care). Data showing that physicians in high-supply regions are more likely to report difficulty gaining both hospital admissions and specialist referrals are consistent with this hypothesis.[1] In the absence of reform of the delivery system, additional growth will lead to further fragmentation of care that will exacerbate the problem of access and worsen the apparent scarcity it is intended to remedy.

Rather than treat the symptoms, we should focus on the underlying disease — a largely disorganized and fragmented delivery system characterized by lack of coordination, incomplete patient information, poor communication, uneven quality, and rising costs. Pilot projects intended to address these problems are under way in both the private and public sectors, with growing interest in primary care–based medical homes, enhanced care coordination, programs for chronic-disease management, and payment reform.

Policymakers therefore face a choice: respond to pressure to increase funding for medical education — and risk making things worse — or accept the evidence that the apparent shortage is but one symptom of the underlying problems with our health care system. We would offer three recommendations: do not remove the Medicare cap on funding for graduate medical education; find the best way of reallocating current medical education funding toward programs (such as primary care residencies and geriatric and palliative care fellowships) that could lead to improved care coordination and chronic-disease management; and accelerate efforts to reform payment systems so that they foster integration, coordination, and efficient care.

Physicians have a financial stake in this debate. Pressure to constrain costs is increasing. Growth of the physician workforce will make it harder to preserve individual physicians' incomes. And given the income

Table 2. Average Number of Physicians (Full-Time Equivalents) Caring for Chronically Ill Medicare Beneficiaries in the Last 6 Months of Life at Five Top U.S. Hospitals, 1999–2003.*

Variable	Johns Hopkins	Mayo Clinic	UCLA Medical Center	Cleveland Clinic	Massachusetts General Hospital
Rank according to *U.S. News and World Report*	1	2	3	4	5
No. of clinical physicians (full-time equivalents) per 1000 patients					
Total	12.2	8.9	16.9	12.7	15.3
Primary care	5.0	3.0	3.5	4.3	6.3
Medical specialists	3.9	3.9	10.1	5.5	5.5
Surgical specialists	1.1	0.8	1.4	1.5	1.1
Hospital-based specialists	1.4	1.0	1.5	1.2	1.7
No. of days in the hospital	17.1	12.9	19.2	14.6	17.7
No. of days in intensive care	4.3	3.9	11.4	3.5	2.8

* Hospitals were ranked "top honor roll hospitals" by *U.S. News and World Report*.

disparities between procedural and cognitive specialties and the high costs of procedures, disproportionate growth in the specialist workforce will exacerbate the pressure on incomes.

Academic medicine, for its part, faces a challenge and an opportunity. The dramatic differences in practice — and spending — observed among major academic medical centers challenge the assumption that their care is somehow uniformly scientific or evidence-based (see Table 2). Seriously ill Medicare beneficiaries cared for at the UCLA Medical Center, for example, spend many more days in the hospital and receive many more physician services than those cared for at the Mayo Clinic; as a consequence, UCLA patients require almost twice as many physicians (16.9 vs. 8.9 full-time–equivalent physicians per 1000 patients), a difference largely explained by greater use of specialists. But these differences also highlight an opportunity for academic medicine — to acknowledge the lack of an adequate scientific basis for current workforce policy and take the lead in organizing research to determine how best to deliver high-quality, affordable care. After all, why should the best medical care in the world require twice as many physicians as the best medical care in the world?

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