



Linking Workforce Policy to Health Care Reform

David C. Goodman, M.D., M.S.

Professor of Pediatrics and Health Policy
Director, Center for Health Policy Research
The Dartmouth Institute for Health Policy and Clinical Practice
Hanover, NH

E-mail: david.goodman@dartmouth.edu

Invited Testimony

The United States Senate Committee on Finance

Hearing on "Workforce Issues in Health Care Reform:
Assessing the Present and Preparing for the Future"

March 12, 2009

Executive Summary

Mr. Chairman and members of the Committee, thank you for the invitation to testify about the health workforce and its relationship to health care reform.

Policy about the health workforce to date has focused nearly exclusively on physician numbers and has assumed that simply adding more physicians will improve accessibility and quality. These policies ignore two truths: One, that current growth rates in health care expenditures are unsustainable and will be worsened by indiscriminate growth in physician numbers. And two, that the workforce we train today will shape, for good or bad, tomorrow's health care system.

What do we know about the physician workforce? In brief, what doctors and nurses do is very important for patient outcomes. Much less important is the number of doctors and nurses providing services in a given region or health care system. Let me explain:

THE SUPPLY OF PHYSICIANS VARIES MARKEDLY AND WITHOUT REGARD TO PATIENT NEEDS OR WANT.

The notion that there is a single, right number of physicians for the U.S. is challenged by the finding that the number of clinically active physicians per capita varies dramatically across regions for every specialty. (Exhibits 1 to 3). This variation in physician supply is not explained by differences in patient illness levels or in population health, but by where doctors prefer to practice and live.

AS PHYSICIAN SUPPLY GROWS, MOST PHYSICIANS SETTLE WHERE SUPPLY IS ALREADY HIGH.

The last twenty years of growth in physician supply has shown that for every physician that settles in a low supply region, four settle in a region with already high per capita supply. These findings mean that lifting the Medicare funding cap on graduate medical education (GME) will perpetuate today's variation as new doctors settle in places with very high numbers.

MORE PHYSICIANS DO NOT LEAD TO HIGHER QUALITY CARE, HIGHER PATIENT SATISFACTION OR IMPROVED HEALTH OUTCOMES.

Multiple studies in a variety of settings find no benefit in a high supply of physicians caring for patients. This is true for the care of ill newborns as well as the care of Medicare patients. Nor is a higher supply of physicians associated with better perceived access to care, better technical quality, or higher satisfaction with the care. (Exhibits 4 to 7).

HOW CAN IT BE THAT MORE PHYSICIANS ARE NOT ALWAYS BETTER?

Much of what we do as physicians directly improves the health and well being of patients. But we know that regions with a higher supply of physicians have problems which can make care worse: greater unnecessary use of the hospital and greater problems with care coordination because care is fragmented over many different physicians. The lesson from places with modest physician supply is that health care systems are very adaptable to different workforce staffing levels.

IF PHYSICIAN SUPPLY IS NOT IMPORTANT, WHAT WORKFORCE POLICIES WILL ADVANCE HEALTH CARE REFORM EFFORTS?

First, invest in improving what doctors and nurses do: We already have the knowledge and the means to improve birth outcomes and lessen the impact of chronic illness. We also know how to better inform and involve patients in treatment decisions through shared decision making. We need to invest more in these activities.

Second, strengthen primary care. We know that medical care provided within health systems dominated by primary care have excellent outcomes at lower costs. Training more primary care physicians and fewer specialists will be necessary, but this does not mean that simply adding more primary care doctors to a region will reform a subspecialist-based fragmented care environment. Although the primary care “medical home” offers promise and demonstrations should be pursued, primary care performs best when other elements of the care system support primary care providers – as in many integrated delivery systems such as Kaiser-Permanente, the Mayo Clinic, the Geisinger Clinic, and the

Cleveland Clinic. Once we train primary care doctors and nurses, we need to keep them from drifting into subspecialties by paying them fairly.

Third, our current GME financing system remains entangled with Medicare and favors hospital-based training. All payers should participate in medical education funding.

Fourth, we need to introduce competition and innovation in GME. The NIH is a model of competitive peer review. I believe that we can improve physician training and increase the number of primary care physicians through the gradual introduction of competition for federal GME funds.

WE NEED A NEW STRUCTURE FOR DEVELOPMENT OF WORKFORCE POLICY

Currently, the most active federal entity in workforce policy is the Council on Graduate Medical Education, but COGME's charter has impaired its effectiveness.

In an editorial published last year in JAMA, I advanced the idea of a permanent health workforce commission to craft evidence-based policy that improves access to care, health outcomes and the quality and affordability of care.

- The membership of the commission should extend beyond physicians and include experts in public health, patient centered care, as well as nurses, consumers, health care systems and payers.
- The commission should consider policy related to the broad health workforce.
- Effective policy requires a dedicated staff that is independent of professional societies and trade associations.

Here is workforce policy that will help not hinder reform: Promote the dissemination of medical care and health systems already shown to be effective and train greater numbers of primary care physicians, but also implement financing reform that encourages the coordinated care that patients want and need.

Linking Workforce Policy to Health Care Reform

Thank you, Mr. Chairman, for the invitation to testify about the health workforce and its relationship to health care reform. For more than twenty years, my colleagues and I at Dartmouth have studied the physician workforce to better understand how we can shape the supply and specialty mix of physicians to improve the quality and affordability of care.

I am a physician who has worked as a primary care pediatrician in rural communities and in an academic medical center. Later, I specialized in allergy and served as chief of the Allergy and Clinical Immunology Section at Dartmouth-Hitchcock Medical Center. I still provide care for patients. Most importantly for this hearing, I have studied regional and provider variation in the health workforce, and have led this effort at the Dartmouth Institute for Health Policy and Clinical Practice, where I am the Director for the Center for Health Policy Research. My collaborators are John Wennberg and Elliott Fisher. I am currently the Co-Director of the *Dartmouth Atlas of Health Care*.

The adequacy of our physician labor force and our graduate medical education (GME) pipeline is critical to the success of health care reform. It will be hard to improve access, achieve better health outcomes and decrease health care expenditure growth rates unless we get workforce policy right.

If we want to have a good idea of what our health care system will look like in the future, we can examine the investments that we make today in the health workforce, particularly in physician training. In 2008, the federal government provided close to \$10 billion for GME through Medicare, Medicaid, the VA Health System and children's hospital appropriations. Federal and state monies also fund undergraduate medical education, programs to increase training in primary care, nursing training and training of other health professionals. The immediate cost of these programs are modest compared to the aggregate government expenditures on health care, but the size and professional mix of these training programs can either advance or hinder the quality and affordability of care. The day-by-day decisions of physicians largely determine whether care is effective and

whether it is affordable. In turn, the number and specialty of physicians making those decisions strongly affects the type and cost of care provided.

Policy about the health workforce has focused nearly exclusively on physician numbers and has assumed that simply adding more physicians will improve accessibility and quality. This reflects the rudimentary nature of workforce planning in America. At the federal level it, is almost non-existent compared to Canada, the United Kingdom or Australia, and it is located in a fragmented assortment of advisory bodies that are understaffed and have narrowly defined policy briefs. The Council on Graduate Medical Education is the most visible of these and suffers greatly from its near exclusive attention to physician training, with little committee member expertise in health care delivery or public health. Its primary quantitative planning tools rely on Health Resources and Services Administration supply-and-demand models that assume our primary policy goal is to replicate the current health care system into the future and to train sufficient numbers of physicians to staff that same, but larger, delivery system. These forecasting exercises ignore two truths: First, that current growth rates in health care expenditures are unsustainable. Adding more physicians – especially in non-primary care fields – will further increase health care costs. Conversely, limiting the growth of physician supply could contribute to slowing the growth of health care spending. And second, that the workforce we train today will shape, for good or bad, tomorrow's health care system. In short, we base projections of physician need on the assumption that we want today's delivery system, only bigger, and that is poor policy.

A SKEPTICAL VIEW OF THE CURRENT PHYSICIAN WORKFORCE.

What do we know about the physician workforce? In brief, what doctors and nurses do is very important for patient outcomes, but the number providing services in a given region or health care system has little influence. This is a startling statement given the hue and cry in some quarters about a physician shortage. How could it be that increasing the supply of doctors is not an essential part of improving accessibility and patient outcomes? I am here to present the evidence that supports this assertion, present the reasons why supply has

weak effects, and then outline a workforce policy which we have good reasons to believe will lead to more effective and affordable care.

Three findings about the physician workforce are particularly important for today's discussion. First, the per capita number of physicians varies dramatically across regions in the United States and this variation is not explained by what patients need or want for medical care, but by where physicians like to practice and live. Second, as the workforce grows overall, new physicians settle where supply is already highest. And third, higher physician supply is not associated with better patient health outcomes, quality, or satisfaction.

Despite this somber assessment of the overall current deployment of physicians, there are many places in the U.S. that deliver excellent care to diverse populations with a modest physician supply. The successes of these regions and health care systems can point us toward workforce policies that are very likely to be effective in improving patient care and affordability. The evidence, however, is clear that simply adding more doctors will defeat these aims.

THE SUPPLY OF PHYSICIANS VARIES MARKEDLY AND WITHOUT REGARD TO PATIENT NEEDS OR WANTS.

The number of clinically active physicians per capita varies dramatically across regions for every specialty. As one example, the number of subspecialist (e.g., cardiologists, surgeons and radiologists) physicians per 100,000 population adjusted for differences in age and sex, varies over 200 percent across the nation's 306 hospital referral regions, as defined by the Dartmouth Atlas of Health Care.

Areas with a particularly low supply of specialists include Sioux City, Iowa (84 per 100,000 population), Mesa, Arizona (89), Wichita, Kansas (90) and San Bernardino, California (93). Regions with particularly high supply include White Plains, New York (215), Washington, DC, (195), Salt Lake City, Utah (188) and Boston, Massachusetts (180). (Exhibit 1). The

supply of primary care physicians also varies to a similar degree (Exhibit 2) and, in general, the regions with a high supply of primary care physicians also have a high supply of specialists. (Exhibit 3). More primary care physicians are necessary but not sufficient for well functioning delivery systems.¹

The variation in supply of physicians is not driven by differences in how ill the patients in a region are or the overall population health. The health status of populations is, of course, much worse in some places than others. Consider one example at the beginning of life: Maternal and infant illness levels were much higher in 1995 in New Orleans, Louisiana, where 12 percent had a low birth weight, than San Francisco, California, where the rate was 6.4 percent. While we might hope that there would be many more neonatologists per newborn in New Orleans to care for these greater numbers of premature infants, there were 70 percent more in San Francisco. As seen in Exhibit 4, there is simply no meaningful relationship between low birth weight rates, or any other measure of newborn risk and the supply of neonatologists in neonatal intensive care regions.²

A second example is closer to the end of life. In Exhibit 5, cardiologists per 100,000 population are seen to vary over 300 percent across regions. Cardiovascular risk as measured by the rate of acute myocardial infarctions in Medicare beneficiaries differs by over 200% percent³ But, a higher supply of cardiologists is no more likely to be found in regions with high cardiovascular risk than regions with relatively low risk.

Physicians settle in the same places as other professionals. They settle where income, not illness level, is higher, and they tend to settle close to where they train.

¹ Dartmouth Atlas of Health Care Working Group; AMA Masterfile data.

² Goodman D, Fisher E, Little G, Stukel T, Chang C. Are neonatal intensive care resources located where need is greatest? Regional variation in neonatologists, beds, and low birth weight newborns. *Pediatrics*. 2001;108:426-431.

³ Wennberg DE. *The Dartmouth Atlas of Cardiovascular Health Care*. Hanover, NH: The Center for the Evaluative Clinical Sciences, Dartmouth College; 1999.

An obvious question is whether the extra physicians *within* these regions tend to patients with greater needs? The answer is mostly not. In studies published in *Health Affairs* and the *Dartmouth Atlas*, we examined the number of physicians caring for chronically ill patients in the last six months of life.⁴ (Exhibit 6). Within Manhattan, for example, New York University Medical Center used almost 30 physician clinical full time equivalents (FTEs) per 1,000 decedents, while Beth Israel Hospital used 23 FTEs, Mt Sinai used 20 FTEs, and NY-Presbyterian only 15 FTEs. Patients did not live longer at NYU than NY-Presbyterian; they simply received a lot more care and spent many more days in the hospital, intensive care units and were seen by an extraordinarily high number of different physicians. Similarly within California, patients at Cedar-Sinai Medical Center received 28 FTEs, while patients at UCLA 20 FTEs, and University of California at San Francisco 13 FTEs. There are many hospitals that provide excellent care with a modest number of physicians, including the Cleveland Clinic, Mercy Medical Center in Des Moines, Iowa, the Mayo Clinic (St. Mary's Hospital) in Rochester, Minnesota and the Billings Clinic in Billings, Montana.

Like most things in life, when it comes to doctors, you get what you pay for. Our current reimbursement system perversely rewards a high supply of specialist physicians and high volumes of services, at the same time that it penalizes primary-based care that we know reduces hospitalizations, tests and expensive physician visits. If we want to reshape the workforce to place a greater emphasis on preventive services and chronic disease management, then we must place a higher value on primary care and that will require reimbursement reform.

AS PHYSICIAN SUPPLY GROWS, MOST PHYSICIANS SETTLE WHERE SUPPLY IS ALREADY HIGH.

⁴ Goodman DC, Stukel TA, Chang CH, Wennberg JE. End-of-life care at academic medical centers: implications for future workforce requirements. *Health affairs (Project Hope)*. Mar-Apr 2006;25(2):521-531. Also, see Wennberg J, Fisher E, Goodman D, Skinner J. *Tracking the Care of Patients With Chronic Illness. The Dartmouth Atlas of Health Care 2008*. Hanover, NH: The Dartmouth Institute for Health Policy and Clinical Practice; 2008.

The last twenty years of growth in physician supply has shown that physicians strongly prefer to settle in the regions that already have very high physician supply. For every physician that settles in a low supply region, four settle in a region with already high per capita supply.⁵

These findings mean that merely lifting the Medicare funding cap on GME will perpetuate today's variation in the physician workforce as new doctors settle in the same places that attract doctors today. Given the strong reimbursement incentives for subspecialty care, academic medical centers will largely expand subspecialty training programs.

An unfettered lifting of the GME cap would be good public policy only if adding more in the places that already have a lot of physicians, particularly specialists, improved the health and well being of patients. The research at Dartmouth and other places shows that this is not the case.

MORE PHYSICIANS DO NOT LEAD TO HIGHER QUALITY CARE, HIGHER PATIENT SATISFACTION, OR IMPROVED HEALTH OUTCOMES.

There is very good research that shows that evidence-based patient centered care provided by physicians and nurses leads to longer and better lives. There is a similarly strong set of studies demonstrating that the number of physicians, by itself, is not very important. While patients in regions with a *very low* number of clinicians, particularly primary care physicians and nurses, have worse health outcomes than those with merely a *low* supply, regions with a *medium, high* or *very high* supply do not have better outcomes than those

⁵ Goodman DC. Twenty-year trends in regional variations in the U.S. physician workforce. *Health affairs (Project Hope)*. 2004;Suppl Web Exclusives:VAR90-97.

with a *low* supply. Simply put, while *very low* supply is bad for patients, little is gained with a *high* or *very high* supply.

Multiple studies conducted by us at Dartmouth and by others have shown in a variety of settings that there is no benefit in a high supply of physicians. These include a high supply of neonatologists caring for ill newborns.⁶ Studies have also found that a high supply of specialists, and even primary care physicians, does not lead to lower overall mortality in Medicare patients, or in those with serious illness such as acute myocardial infarctions.⁷ The weak relationship between supply and outcomes is further supported by the studies I have already described in which the supply of physicians varies substantially across hospitals when holding outcomes constant in the groups of end-of-life patients.

Nor is a higher supply of physicians associated with better perceived access to care—and higher satisfaction with the care provided in Medicare beneficiaries. Neither is technical quality (physicians and nurses providing evidence-based care to the right patient) better. (Exhibit 7).⁸

It should be noted that while *high* or *very high* physician supply provides little benefits, there continues to be a pressing need for physicians to care for underserved areas and populations. These populations are harmed from *very low* physician supply. We have the means to address the problem of underservice through the continued development of the National Health Service Corps, rural health clinics and community health centers. The

⁶ Goodman DC, Fisher ES, Little GA, Stukel TA, Chang CH, Schoendorf KS. The relation between the availability of neonatal intensive care and neonatal mortality. *The New England Journal of Medicine*. May 16 2002; 346(20):1538-1544.

⁷ Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 1: the content, quality, and accessibility of care. *Annals of Internal Medicine*. Feb 18 2003;138(4):273-287

Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 2: health outcomes and satisfaction with care. *Annals of Internal Medicine*. Feb 18 2003;138(4):288-298.

⁸ Goodman DC, Fisher ES. Physician workforce crisis? Wrong diagnosis, wrong prescription. *The New England Journal of Medicine*. Apr 17 2008;358(16):1658-1661.

American Recovery and Reinvestment Act of 2009 (PL-111-05) has made an important down payment in remediating medical underservice by adding funds for these programs.

HOW CAN IT BE THAT MORE PHYSICIANS ARE NOT ALWAYS BETTER?

Much of what we do as physicians directly improves the health and well being of patients. But there is a large proportion of diagnostic tests and treatments where benefits are uncertain or even harmful. But we know that regions with a higher supply of physicians have problems which can make care worse: greater unnecessary use of the hospital and greater problems with care coordination because care is fragmented over many different physicians. The overuse of specialists can focus care on individual organs without the coordination that could be provided by approaches such as a patient-centered medical home, or even traditional primary care.

The lesson from regions and hospitals with modest physician supply is that health care systems are very adaptable to different workforce staffing levels. Health care systems are tremendously different in their organization of care including the use of electronic medical records; the integration of primary care and specialist physicians; the staffing of advanced practice nurses and physician assistants; and their relative investment in hospital beds, intensive care units and imaging equipment. In our current financing environment, very different organizational styles can all generate comfortable returns on investment. But, quality and costs of care range from excellent to poor. Physicians are the most expensive clinicians and decide on most of the care provided. Health care systems that have become dependent on high physician staffing levels may do well financially but they also drain Medicare, Medicaid and employer-based insurance of money that could be better invested in the many types of care known to be effective.

IF PHYSICIAN SUPPLY IS NOT IMPORTANT, WHAT IS IMPORTANT?

There is so much that works well in health care, including specific treatments and certain types of organization of care, that a complete list would, in fact does, fill libraries. We have the knowledge and the means to improve birth outcomes and lessen the impact of cancer, asthma, diabetes and congestive heart failure. We also know how to inform patients of treatment options and to ascertain decisions from patients that reflect the values and wants of patients, not physicians. Yet even with recent gains in quality of care, clinicians and health care systems fall short in providing care that is technically excellent and patient-centered. Our country has led the world in learning what works in medical care. But our poor record in health care delivery reflects our system of paying for any care, beyond malfeasance, irrespective of quality, patient centeredness or outcomes.

We know that medical care provided within systems dominated by primary care have excellent outcomes at lower costs. This does not mean that simply adding more primary care doctors to a region will reform a specialist-based fragmented care environment. Primary care performs best when well integrated in comprehensive systems of care. Examples range from Kaiser-Permanente and Group Health Cooperative of Puget Sound to integrated delivery systems operating in largely fee-for-service environments. Notable examples are the Mayo Clinic, the Geisinger Clinic, the Cleveland Clinic, and my own organization, Dartmouth-Hitchcock Medical Center.

HOW CAN WORKFORCE POLICY ADVANCE HEALTH CARE REFORM EFFORTS?

Most of the sound and fury about workforce policy today originates from HRSA type models that project today's utilization into the future and finds that we will be 10-15 percent short of physicians 15-20 years from now. Accepting that this is a "crisis" warranting additional tens of billions of further spending on GME requires ignoring the 200 percent differences in physician supply that I have already described. It also requires an uncritical faith that the invisible hand of the marketplace will guide new physicians to specialize in primary care and to settle where they are needed. Where can we better spend federal dollars?

First, we need to train more primary care doctors and nurses, and then keep them from drifting into subspecialties by paying them fairly for their work in primary care. A recent survey by Hauer and colleagues of senior medical students in 11 medical schools found that only 2 percent planned a career in primary care internal medicine.⁹ In our own analyses at Dartmouth, we have found that many physicians trained in primary care are now practicing as hospitalists and emergency room physicians. Robust funding of Title VII and Title VIII will help to reinvigorate primary care training, but teaching hospitals are likely to expand subspecialty training programs at the expense of primary care unless we pay teaching sites higher amounts per primary care resident. The imperative of training more primary care doctors would best be accomplished by redirecting some of current GME dollars. This strategy would encourage greater efficiency in medical care and would spare funds for other proven strategies of improving patient care. Attracting medical students to primary care and curbing the current financial temptations of specialty medicine will also require developing reimbursement systems that favor the care of defined populations, not higher volume of services.

Second, our current GME financing system remains entangled with Medicare and favors hospital-based training. Medicare GME funding is complex, nearly impossible to justify or explain, and works best for maintaining the status quo. It discourages innovation, leaving much of GME trapped in past successes. All payers should participate in medical education funding. Any health care organization, not just "teaching hospitals" should have the opportunity to compete for training funds.

Third, we need to introduce competition and innovation in graduate medical education. For a model, we can look to our outstanding national program of biomedical research, which makes no assumptions about who has the best ideas. The NIH is an example of how a

⁹ Hauer KE, Durning SJ, Kernan WN, et al. Factors associated with medical students' career choices regarding internal medicine. *JAMA*. 2008;300:1154-1164.

competitive peer review process can drive benefits far outweighing the costs. Similarly, I believe that we can improve physician training and increase the number of primary care physicians through the gradual introduction of competition for federal GME funds. The applicants for GME funding could be scored for factors such as training in evidence-based medicine, in chronic illness management, and in shared patient decision-making. It is also to our advantage to have more physician training occur in highly efficient delivery systems and in underserved areas. Applicant scores could be weighted to reflect these societal needs. And just as the NIH targets certain money for cancer research, we could prospectively allocate certain sums to primary care, in particular adult primary care or other high priority specialties.

WE NEED A BETTER STRUCTURE FOR DEVELOPMENT OF WORKFORCE POLICY

I have outlined an ambitious policy agenda that couples the workforce with health care reform. Still missing in these initiatives is a central commission that can broadly advise Congress and the public on health workforce policy. Currently, the most active federal entity is the Council on Graduate Medical Education, but COGME's charter has impaired its effectiveness. COGME is principally concerned with physician education, specifically graduate medical education. Its members are all physicians, and most are academic physicians. Although the current Chair of COGME, Dr. Robert Robertson, has done an impressive job at broadening its deliberations, COGME does not have the expertise, funding, or legislative authority to adequately link workforce policy to the delivery of health care.

In an editorial published last year in *JAMA*, I advanced the idea of permanent health workforce commission.¹⁰ The basic goal of the commission would be to establish public accountability for the public funds that we invest in health workforce training. I believe

¹⁰ Paraphrased from: Goodman DC. Improving accountability for the public investment in health profession education: it's time to try health workforce planning. *JAMA*. 2008;300:1205-1207.

that five principles should guide the commission's charter. First, the public interest in the workforce should be articulated. What should we expect from the national investment in the health workforce? The specific aims should be to craft evidence-based policy that improves access to care, health outcomes, and the quality and affordability of care. Second, the membership of the commission should extend beyond physicians and include experts in public health, patient-centered care, and epidemiology, as well as clinicians, consumers, innovative and efficient health systems, payers, and medical educators. Third, the commission should consider policy related to not just physicians but also nurses, physical and occupational therapists and other clinicians. Fourth, an evidence-based approach to workforce policy formulation requires a dedicated staff to develop the expertise for evaluating the workforce and the likely effect of policy recommendations. This staff needs to engage with health services researchers who are independent of professional societies and trade associations that are potentially conflicted by changes in workforce policy. Fifth, Congress should provide the commission with an increasing degree of regulatory responsibility that insulates reform from the self-interests of training programs and clinicians.

SUMMING UP

If we could improve health care by simply training more physicians, we would be left with simple, albeit expensive, workforce policy guided by the training decisions of academic medical centers. A quick survey of the variation in physician supply and associated delivery systems shows that quality and lower costs are already found together in many hospitals and delivery systems. The key to health care reform is to promote the dissemination of these already effective models coupled with training greater numbers of primary care physicians, and financing reform that pays for the care that patients want and need.

Exhibit 1. The primary care physician workforce per 100,000 population, age-sex adjusted, by Dartmouth Atlas Hospital Referral Regions, 2006. Shown is the marked variation in primary care physician supply. This variation is not explained by differences in urban-rural, socio-economic, or health status, but by physician preferences in where they want to live and work. (Source: Dartmouth Atlas of Health Care Working Group; AMA Masterfile data.)

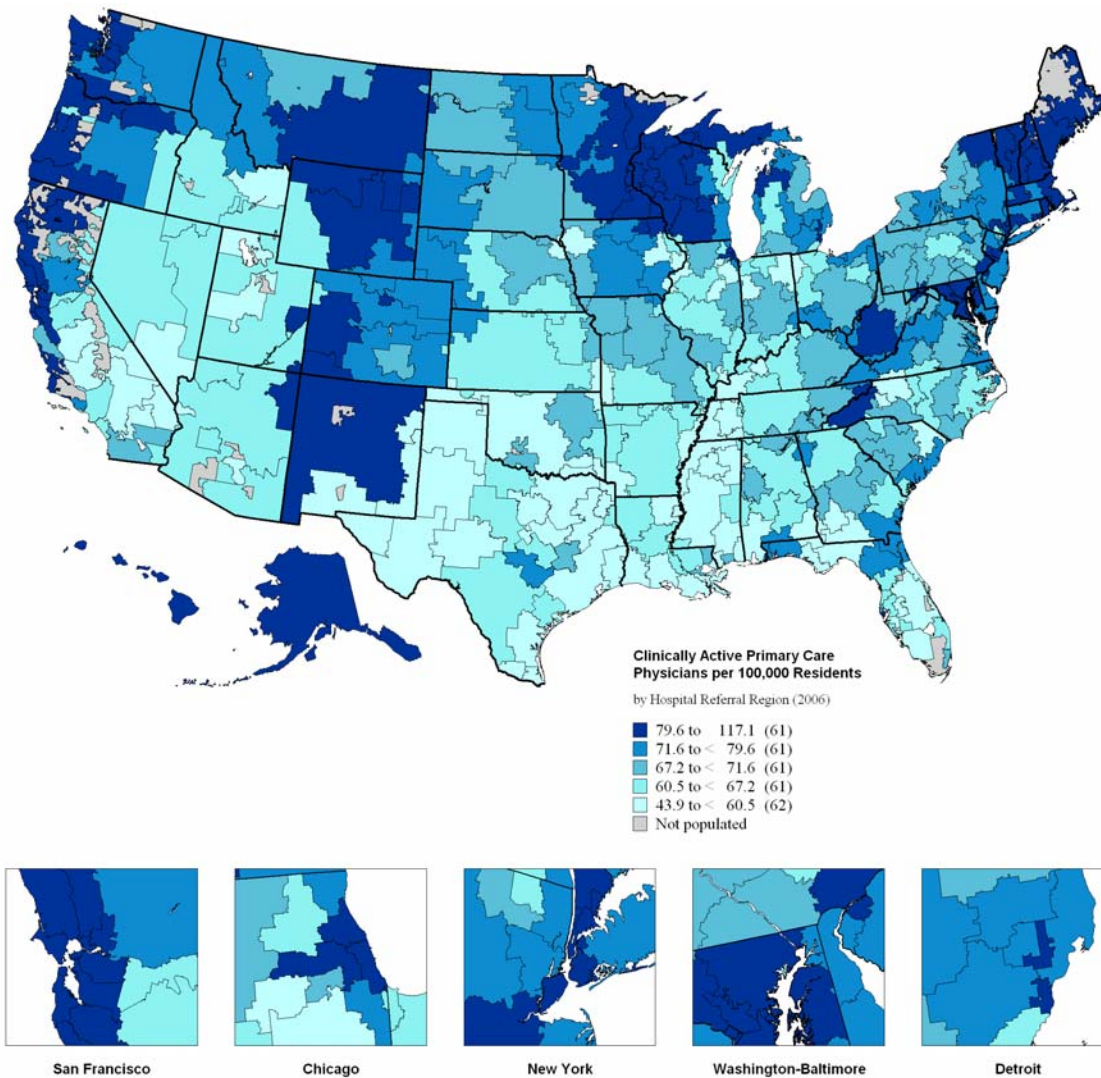


Exhibit 2. The specialist physician workforce per 100,000 population, age-sex adjusted, by Dartmouth Atlas Hospital Referral Regions, 2006. Shown is the marked variation in specialist physician supply. This variation is not explained by differences in urban-rural, socio-economic, or health status, but by physician preferences in where they want to live and work. (Source: Dartmouth Atlas of Health Care Working Group; AMA Masterfile data.)

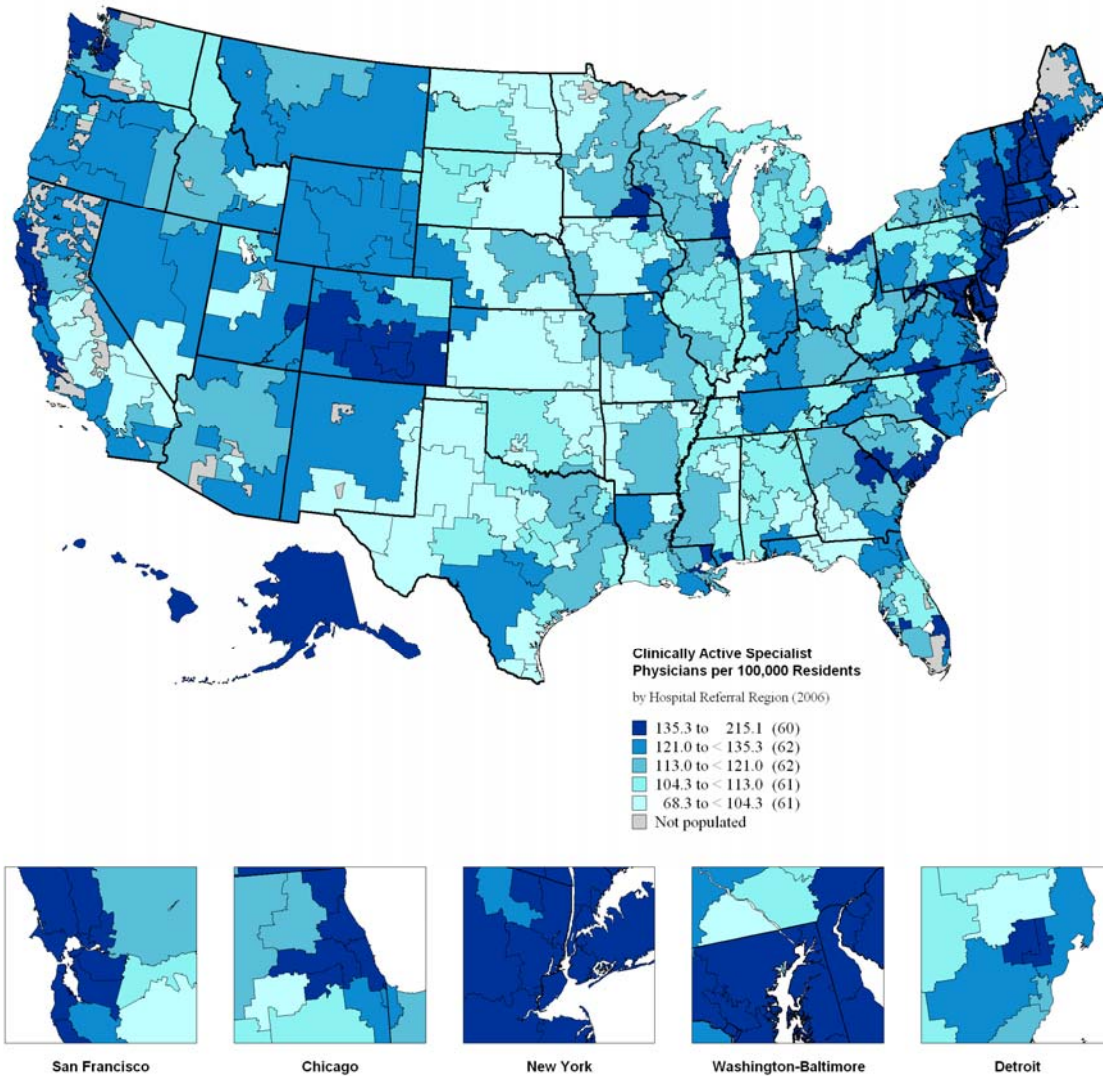


Exhibit 3. The relationship between the per capita supply of primary care and specialist physicians, 2006. This figure shows that there is little substitution at a regional level of primary care physicians for specialist physicians. Physicians have strong preferences for practicing in the same area. (Source: Dartmouth Atlas of Health Care Working Group; AMA Masterfile data.)

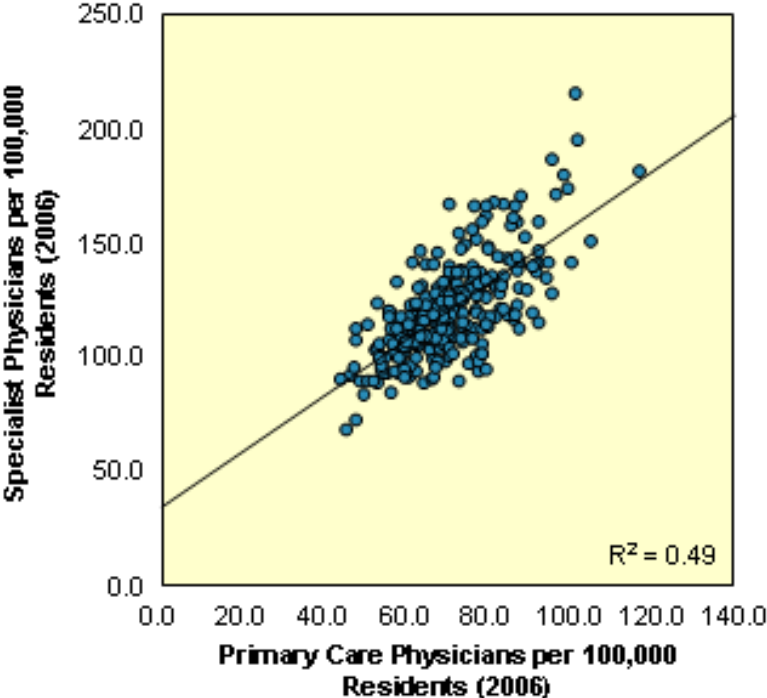


Exhibit 4. Neonatologists and percent low birth weight by neonatal intensive care regions.

The percent of low birth weight births (<2500 grams) versus the number of clinically active neonatologists per 10000 live births across neonatal intensive care regions, 1995. There is no meaningful relationship between the two. In other words, neonatologists are not more likely to practice where maternal-infant risk is higher. (Source: Goodman D, Fisher E, Little G, Stukel T, Chang C. Are neonatal intensive care resources located where need is greatest? Regional variation in neonatologists, beds, and low birth weight newborns. *Pediatrics*. 2001; 108: 426-431.)



Exhibit 5. Cardiologists and acute myocardial infarction rates. The rate of acute myocardial infarctions per 1000 Medicare fee-for-service beneficiary versus the number of clinically active cardiologists per 100,000 population. There is no meaningful relationship between the two. Just like neonatologists, cardiologists do not practice where patients have higher need for their services. (Source: Wennberg DE. *The Dartmouth Atlas of Cardiovascular Health Care*. Hanover, NH: The Center for the Evaluative Clinical Sciences, Dartmouth College; 1999.)

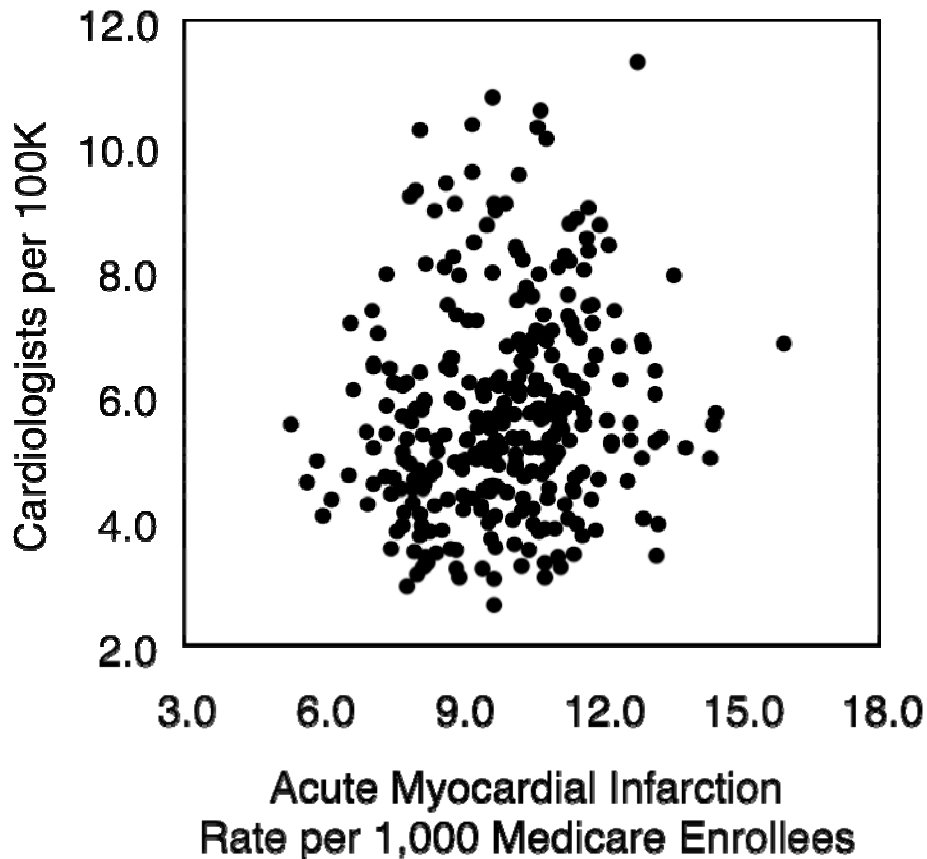


Exhibit 6. Physician full time equivalents caring for chronically ill Medicare patients in the last six months of life assigned to the primary hospital providing care, 2001-2005. Rates are adjusted for differences in age, sex, race, and mixture of chronic illness. The table shows that even within the same city or state, the number of physicians providing care for very similar patient populations differs by more than 2-fold. Benchmarks of physician care efficiency are also shown, and include hospitals in Ohio, Iowa, Minnesota, and Montana. (Source: Wennberg J, Fisher E, Goodman D, Skinner J. *Tracking the Care of Patients With Chronic Illness. The Dartmouth Atlas of Health Care 2008*. Hanover, NH: The Dartmouth Institute for Health Policy and Clinical Practice; 2008.)

Hospital Name	City, State	Number of Deaths	Physician full time equivalents in last 6 months of life per 1,000 decedents		
			Total	Medical Specialists	Primary Care
New York University Medical Center	New York, NY	2,534	27.8	17.6	6.8
Beth Israel Medical Center	New York, NY	4,108	23.4	10.4	10.2
Mount Sinai Hospital	New York, NY	4,985	19.6	8.5	8.6
New York-Presbyterian Hospital	New York, NY	6,061	15.4	6.9	6.1
Cedars-Sinai Medical Center	Los Angeles, CA	4,385	27.7	16.7	7.7
UCLA Medical Center	Los Angeles, CA	1,657	20.0	11.8	5.0
UCSF Medical Center	San Francisco, CA	1,420	13.3	4.6	6.0
Cleveland Clinic Foundation	Cleveland, OH	2,864	14.0	6.0	4.7
Mercy Medical Center	Des Moines, IA	4,583	12.2	6.5	4.2
May Clinic (St. Mary's Hospital)	Rochester, MN	4,236	9.8	4.4	3.3
Billings Clinic	Billings, MT	1,797	7.9	3.9	2.3

Exhibit 7. The supply of physicians in U.S. Hospital-Referral Regions and associated quality of and access to care, 2005. This table shows that in regions with 20% to 89% higher physician supply, the quality of care is not better for acute myocardial infarction, congestive heart failure, and pneumonia. Also, in high physician supply regions Medicare beneficiaries do not perceive access to be higher, or care to be better. (Source: Adapted from Goodman DC, Fisher ES. Physician workforce crisis? Wrong diagnosis, wrong prescription. *The New England Journal of Medicine*. 2008; 358: 1658-1661.)

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 (age- and sex-adjusted per 100,000 population)	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