



How Many Doctors Will Wisconsin Need? What Should Wisconsin's Medical Schools Be Doing?

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- **No consensus exists** about the need to grow the overall physician supply. Some project significant shortfalls overall. Others argue that the existing number of physicians is adequate, but that the distribution must shift toward more primary care and fewer specialists.
- There is wide agreement about a **shortage of primary care providers** and a poor geographic distribution of physicians (with shortages in rural and central city areas).
- **Projected needs** for physician supply, geographic distribution and specialty balance (between primary care and other specialists) depend on the health care delivery model, along with demographic, financial, and other factors.
- **Varying projections** have significant policy implications: supporting more medical schools, more medical school students, more residency training slots, scope of practice laws, payment policy.
- These policy choices have **substantial impact** on the health care system, the cost trajectory, and models of reform.

Wisconsin needs 100 new physicians per year, asserts a report released last year by the Wisconsin Hospital Association.¹ This report affirms the oft-noted shortage of primary care physicians in rural and central city areas, along with shortages of general surgeons and psychiatrists. The Medical College of Wisconsin, looking forward, will soon be training more physicians through new northern campuses in Green Bay and north-central Wisconsin.

However, projections vary widely about the degree – or even the existence – of emerging physician shortages and how best to address them.² A 2011 research synthesis focused on the geographic mal-distribution of primary care providers, downplaying an overall shortage.³ The Wisconsin Council on Medical Education and Workforce, in its 2008 review of several supply and demand forecasts, estimated a wide range of potential supply scenarios.⁴ Base projections show minimal shortfalls through 2030, but a likely deficit in primary care providers of 8% by 2020, and 14% by 2030. Potential “worst case” estimates show deep shortages of all physicians reaching 44%, and of primary care physicians reaching 57%.

Given this uncertainty, what measures should Wisconsin take to assure an adequate supply of physicians, as insurance coverage changes, the population ages, and health care delivery evolves to address quality and costs? What aspects are within the domain of public policy, medical schools, health care institutions, and health care payers and purchasers?

The National Picture

The Association of American Medical Colleges (AAMC) Center for Workforce Studies estimates a shortage of 46,000 primary care physicians and 41,000 general surgeons by 2025, even after accounting for the supply of international medical graduates. The AAMC, the Council on Graduate Medical Education (COGME), and the American Medical Association, along with 20 physician specialty societies, have released overall shortage projections ranging from 124,000 to 200,000 by 2025. The AAMC in 2006 called for a 30% expansion of U.S. medical school enrollment over 2002 levels, and medical schools are on track to meet that goal by 2016.⁵ Positions for residency training – the years of specialized training required after medical school graduation -- have increased by only 8% in that time period. AAMC continues calls for lifting of the current cap on Medicare funding for graduate medical education.

The federal Patient Protection and Affordable Care Act (PPACA), by expanding insurance coverage, has added to concerns that the existing and future physician workforce is insufficient, particularly in its primary care capacity. Media reports reflect strong concern about access to care,⁶ and hospitals, health systems, and clinics also report persistent difficulties in recruiting physicians in many specialties.⁷

An estimated 125,000 Wisconsin residents, and 32 million people nationally, could gain new health insurance coverage authorized



by the PPACA.⁸ These newly insured persons may increase the demand for physician services, although the net impact is not clear; uninsured persons currently receive some health care services through charity care in physician offices, safety net clinics, hospital emergency rooms and other venues. Nonetheless, some significant increase can be expected, particularly by persons who were formerly uninsurable, with chronic conditions, or other lower income patients with some previously unmet need for health care services.

Workforce and Public Policy

State-level policies influence both the size and composition of the physician workforce in several ways. Regulations on prescriptive authority, scopes of practice, and other practice standards influence workforce capacity and productivity. States are large health care purchasers through their Medicaid and employee coverage programs, and with their payment policies can encourage or discourage physicians from providing primary care.

States, including Wisconsin, directly support physician training by providing general revenue for medical education. State Medicaid programs pay for a portion of graduate medical education (GME) for medical residents. Wisconsin hospitals in 2010 received \$40.1 million from Medicaid direct GME payments, to partially reimburse hospitals for costs directly related to medical education.⁹ Direct GME payments cover salaries and fringe benefits for residents and interns. Wisconsin also directly appropriates funds for family medicine and primary care residencies, and provides a loan repayment program for physicians (and other health professionals) who practice in shortage areas.

The federal-level passage of Medicaid and Medicare in 1965 led to an increased demand for physician services. Federal dollars allocated to the education of medical students then led to a significant expansion of medical schools.¹⁰ By the 1980s, new forecasts came to suggest a physician surplus.

The Balanced Budget Act of 1997 capped the number of residencies Medicare would subsidize. Nonetheless, residencies and internships continued to increase somewhat as hospitals funded slots to take advantage of the valuable labor residents provided.¹¹ Residencies grew predominantly in subspecialties and non-primary care core specialties. And amidst this growth, there was a net loss of resident slots for family medicine and general internal medicine. Concerns developed that hospitals were using Medicare GME to their own financial benefit over the health care needs of the country.¹²

Questions about the size and composition of the physician workforce expose ongoing debates about how to best promote access, quality, and cost control.

Figuring out the “right” number of doctors thus reflects a much bigger concern: access to quality health care at a sustainable cost. Important public policy decisions, especially whether and where to commit scarce resources, depends upon the quality of forecasts about physician supply, need and demand. Yet, forecasts’ underlying assumptions are highly subject to change, and similar previous forecasts have been wrong.¹³

The workforce forecasts trigger substantial investments, and thus compel a need for accuracy. The training of a physician requires approximately \$1 million in up-front costs.¹⁴ An excess in physician capacity represents a waste of this investment, and may result in further unnecessary costs through supply-generated service provision – the increased ordering of visits, tests or procedures, or services of marginal benefit that occur with available capacity.¹⁵ Beyond financial costs, quality may suffer in that outcomes are linked to volume: In conditions of oversupply, many providers may perform certain procedures — procedures that would better be handled by a few highly trained providers in “centers of excellence.”¹⁶

Shortages? The Debate

Physician supply forecasts over the past century have demonstrated little accuracy.¹⁷ Nonetheless, since 2000, a consensus seems emerging: 18 reports -- from states, medical societies, and hospital associations, and 19 reports from medical organizations -- have concluded that the US has or soon will have a physician shortage.¹⁸ These studies usually reach that conclusion by applying demographic projections to current treatment levels rather than documenting market evidence of a shortage. Models often that assume patients and physicians will continue to behave as they have in the past. But physician supply and utilization patterns will all be affected by system redesign, payment reforms, the use of integrated teams, and other system changes – those that occur, both as a result of PPACA and simply as part of the overall transformations occurring in the health care sector.

Decisions about the size and composition of the workforce will influence the ability of the health care sector to meet its system redesign goals. Changes intended to move the system toward more primary care, medical homes, accountable care organizations, and more efficient management of chronic conditions will require physician and other providers available to provide that model of care.

In this manner, the workforce debate reflects differing perspectives of the role of physicians in an evolving health care delivery environment.¹³ Some call for

expanding the physician workforce overall in anticipation of growth in demand for physician services due to the aging of the population and rising real income.¹⁹ This model discounts the concept that physicians may induce demand for their own services.

Others, however, argue that additional physician services would be low or negative value and favor constraining the growth of the physician workforce. In this view, overall physician productivity will increase with reforms in payment and system reforms to improve rationality and efficiency.²⁰

Physicians: Does More=Better?

A former Dean of the Medical College of Wisconsin, Dr. Richard Cooper, predicts a national shortage of 200,000 doctors, or 20% of the workforce, between 2020 and 2025. Twenty-five new medical schools will be required, Dr. Cooper asserts, to alleviate even one-third of this projected shortage, and more limited policies will be ineffective.¹⁹ Cooper further argues that residencies cannot be increased quickly enough to meet even current demand. And, given the overall shortage of physicians, inducements to increase primary care practitioners will only create greater shortages of specialists.

Cooper also asserts a positive correlation between the quality of care and the number of both specialist and generalist physicians.²¹ In his view of the data, higher total health spending is associated with higher quality.²² He explains regional variation in both spending and the number of physicians by the greater health care needs and opportunities in different places: “more snow plow drivers live where there is snow.”²³ High health care utilization also follows the geography of poverty; it is inextricably linked to the high health care needs associated with poverty, not from waste and inefficiency.²⁴

This analysis, however, has come under significant criticism.^{26, 27} An alternative perspective on physician supply holds that the U.S. does not have an overall shortage of physicians. Rather, the problem lies with the allocation of physicians both geographically and by specialty. This perspective argues that incentives in our current payment and delivery system produces such distortions; Unrestricted GME expansion will only exacerbate the trend toward specialist-oriented care and geographic variation in supply. The conclusion: that only substantial and fundamental delivery system reforms will solve the physician distribution problem, control costs, and improve quality.²⁰

This latter argument rests on three decades of their collective findings. The Dartmouth Atlas of Health Care reports that the regional supply of physicians varies by more than 50% nationally, Medicare patients in high-supply regions do not report higher satisfaction with care or even better perceptions of access, compared to low-supply regions. Nor do more physicians translate to better quality or better outcomes than in low-supply regions. High physician supply does, however, strongly correlate with higher utilization of clinical services and higher spending on health care.^{29,30}

The picture that emerges is uncomplicated and unambiguous... Ultimately, there is no long-term alternative to expanding the output from U.S. medical schools.²⁵
R. Cooper

A large literature documents the contribution to quality that generalist physicians make.³¹ But even the overall supply of primary care physicians does not correlate with the likelihood of receiving an annual exam, evidence-based recommended treatments, or hospitalization -- all of which vary widely geographically.²⁸ These measures, however, do correlate well with the supply of family practice physicians.

Geographic and Specialty Distribution

Wisconsin has 137 federally designated Primary Care Health Professional Shortage Areas (HPSA) in rural areas and in the central city areas, and designated Medical Underserved Populations in Milwaukee, Madison, Beloit, Green Bay, Kenosha, Racine, and Wausau. These widespread shortages exist even though most of Wisconsin’s rural areas have sufficient

population density to sustain primary care physician practices. National benchmarks suggest that about 1,500 patients are needed to sustain a full-time equivalent primary care physician.³² Rural counties generally do not have sufficient population to support a broad distribution of sub-specialty practices

and, in these cases, depend on timely and adequate transportation. Access can also be bolstered through appropriate use of mid-level providers and online technology such as telemedicine or virtual visits.

Central city areas certainly have the needed population density to sustain physician practices. The access barrier facing these communities may not be the actual number or even proximity to physicians, but the supply of physicians willing to accept patients who are uninsured, on Medicaid, or have particular cultural, linguistic or other needs. A Milwaukee County 2008 Primary Care Access Study concluded that Milwaukee County had “more than an adequate supply of clinic based primary

There is no simple relationship between the supply of physicians and access to primary care.²⁸
D. Goodman, S. Brownlee, CH Change, and E. Fisher

care providers.” Yet zip codes with the highest poverty rates had the fewest physicians serving the population.³³ Physicians may be nearby, but not in the areas of greatest need.

Some argue that an increase in supply will promote diffusion of physicians to underserved communities.³⁴ In fact, despite significant growth in medical graduates (including a 45% in primary care physicians between 1979 and 1999), four of five new physicians entered practice in areas where supply was already high.^{20, 35} This suggests that simply training additional physicians will not assure that new graduates will practice in the locations or specialties where they are needed.³⁶

The health care industry has demonstrated an ability to accommodate excess capacity through the provision of “supply-sensitive” services – those provided more frequently in areas with more physicians and hospital beds than in areas with fewer physicians and beds.³⁷ Other investigators argue that the concept of supply-driven services does not adequately account for differences in health status among geographic areas and that, with such adjustments, “differences in the supply of medical resources are neither significant nor quantitatively important.”³⁸

While this debate continues, even the American Association of Medical Colleges -- which is calling for robust expansions of both medical school enrollment and GME capacity -- acknowledges that the “‘market’ for physician services is complex and dynamic . . . This complexity argues eloquently against any claims that the solution is simply to produce more physicians.”³⁹ Leading health care professionals in discussion about expanding the supply of doctors have either opposed the policy or made cautionary remarks.¹⁰

Family Practice Shortage

The primary care doctor — a category that includes family physicians, general internists, and general pediatricians — often provides the first point of contact for patients seeking care and can help prevent costly chronic diseases and emergency room visits. The percentage of medical school graduates choosing family practice residencies has declined 53.7% since 1997.⁴⁰ Fewer than 22% of medical students plan careers in internal medicine. And, of internal medicine residents, only 20 to 25% eventually practice primary care,

down from 54% in 1998, while the rest sub-specialize.⁴¹

This differs for pediatrics, where the proportion of pediatric residents choosing primary care pediatrics has remained stable, at about 40%.⁴² In fact, the overall number of primary care pediatricians increased from 32 to 78 per 100,000 children between 1975 and 2005 and the number of pediatric sub-specialists also increased during this period.

“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. For example, seriously ill Medicare beneficiaries cared for at the UCLA Medical Center 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.”

Goodman, et al. 2008²⁰

Workforce projections generally indicate a greater shortage in adult primary care than in other specialties, in some analyses making up as much as one-third of the total projected shortages.^{43, 44} As a result, some researchers argue that discussion of primary care shortages should focus on adult care.⁴⁵ Here again, even an adequate supply of pediatricians does not solve the problem of geographic distribution. Rural areas in particular, with lower population density and ability to support relatively few provider practices, require providers that can provide care across the age spectrum. The focus in Wisconsin and nationally, thus, often returns to the training and supply of family medicine physicians.

What are UWSMPH and MCW doing?

The University of Wisconsin – Madison School of Medicine and Public Health (UWSMPH) conducts two targeted training programs for medical students: The Wisconsin Academy for Rural Medicine (WARM) and the Training in Urban Medicine and Public Health (TRIUMPH). Student demand exceeds the current capacity of the TRIUMPH program. And the only specifically rural residency program remaining in the state, in St. Clare/Baraboo received 20 applications for its two residency slots.⁴⁶

The Medical College of Wisconsin (MCW) also offers an “urban pathway” emphasizing care for patients in underserved urban communities.⁴⁷ The Center for the Advancement of Underserved Children, a partnership between the MCW and Children’s Hospital of Wisconsin, offers the Community Pediatrics Training Initiative [CPTI], a pediatric residency to train culturally-competent, community-based physicians.⁴⁸ MCW notes that, meanwhile, state-supported capitation rates to MCW to support Wisconsin students have been reduced by approximately 60% since 2003.⁴⁹

The location of a resident's training strongly determines where a physician will practice.⁵⁰ In Wisconsin and nationally, about 38% of physicians practice in the state where they went to medical student, while 47% of physicians practice in the state where they completed their residencies. The retention rate rises substantially for physicians who complete both Undergraduate Medical Education (UME) and Graduate Medical Education (GME) in the same state. In Wisconsin, 70% of physicians who completed UME and GME in state stayed to practice.⁵¹

In 2012, about one-third of Wisconsin medical school graduates will stay in-state to complete their first year residency. It is worth noting that 8 of the 11 graduates the UW WARM program in 2012 are remaining in Wisconsin residency programs.

More WI Residency Positions Needed?

Medical students, after graduating, go on to at least three years of post-graduate training to become a board certified physician. The AAMC's 2012 position statement asserts that the limited availability of residency positions means that graduates of the newly expanded medical schools may not be able to secure residency training. It calls for an annual increase of 4,000 federally-supported GME training positions, with half of the positions targeted to primary care and generalist disciplines. AAMC explicitly rejects attempts to increase primary care by re-allocating from and thereby reducing training in other specialties.⁵

Wisconsin's two medical schools will soon be increasing their graduating class sizes, particularly as MCW opens its new northern campuses. This medical education requires state resources, and Wisconsin residency programs will need to accommodate these graduates. If not, Wisconsin will be funding medical education to produce resident physicians for other states.

The Wisconsin legislature, in 2010, passed Wisconsin Act 190, which provides \$750,000 annually for new rural residency positions and an expanded loan forgiveness program.⁵² The UW Department of Family Medicine administers this residency fund, now titled the Wisconsin Rural Physician Residency Assistance Program (WRPRAP).⁵³ Nearly all of Wisconsin's available residency positions fill each year. The residency matching process, however, leaves vacancies every year in Wisconsin's family medicine residency slots. These slots have later filled after the national residency matching process, by students from Wisconsin's family medicine programs who had themselves not yet found a residency match. This process suggests relative dearth of student interest in the available primary care residency positions.

Wisconsin Medical Residency Positions and Match Rates, 2002-2012 ⁵⁴				
	Family Medicine	Internal Medicine	Pediatrics	General Surgery
2002				
Available	74	81	37	18
Filled	45	73	34	14
% Filled	61%	90%	92%	78%
2008				
Available	64	83	39	23
Filled	58	78	38	22
% Filled	91%	94%	97%	96%
2010				
Available	60	85	38	25
Filled	48	85	38	24
% Filled	80%	100%	100%	96%
2011				
Available	59	86	44	25
Filled	51	84	44	25
% Filled	86%	98%	100%	100%
2012				
Available	63	89	44	28
Filled	59	97	44	27
% Filled	94%	98%	100%	96%

What Could Help?

There may be strategic opportunities to re-allocate within existing funds, given the current state budget challenges.

For example, as noted above, Wisconsin already invests about \$40 million in Medicaid funding to support GME. These funds are not linked to any specific outcomes. Ten other states link some or all of their Medicaid GME payments to specific state policy goals to improve the supply and distribution of physicians. Nine states link the payments specifically to training of primary care physicians. Six states use GME payments to encourage training of physicians in non-hospital and certain other settings such as rural locations and medically underserved communities. And seven states link payments to efforts to increase the supply of health professionals trained to serve Medicaid beneficiaries.⁵⁷

A recent study evaluated U.S. medical school output.⁵⁸ The study reports the UWSMPH produces 35.7% primary care physicians while MCW produces 33.5%. The University of Minnesota medical school, however, sends 45% of its graduates to practice primary care, even while maintaining

Patient Protection and Affordable Care Act (PPACA) Workforce Measures

The PPACA does not specifically aim to increase the overall supply of physicians, but includes provisions designed to expand supply in certain specialties and to improve the geographic distribution of physicians.

- Provides a 10% Medicare pay bump for certain services provided by primary care physicians and general surgeons who work in health professional shortage areas, effective from 2011 through 2015.
- Increases Medicaid primary care pay to match Medicare levels for primary care physicians in 2013 and 2014.
- Provides \$1.5 billion in mandatory spending for the National Health Service Corps to get more primary care practitioners to health shortage areas.
- Redistributes 1,300 unused Medicare-funded residency slots to programs that agree to train more primary care physicians and general surgeons. Promotes training in outpatient settings where most primary care is delivered.
- Invests in and improves upon grants, scholarships and loan repayment programs in fields such as primary care, dentistry, nursing and mental health.
- Strengthens grant programs for primary care training, especially programs that prioritize training in patient-centered medical homes.
- Establishes a national work force commission to coordinate and implement work force planning and analysis.
- Authorizes a new competitive state health care work force development grant program.

top standing in federally-supported research funding from the National Institutes for Health (NIH). In fact, the study finds four large research institutions -- Universities of Minnesota, Washington, California-San Diego, and Colorado -- among the top for primary care output while maintaining rank in the top quartile for NIH funding.

Medical schools at both the University of Minnesota and the University of Washington run programs focused on producing primary care and rural physicians, and aggressively recruit and support students who are likely to pursue these arenas.^{59, 60} As noted, where students grow up, attend medical school and complete residencies significantly influences where they will eventually settle and practice.⁶¹ Wisconsin's medical schools might look toward existing sources, such as their Blue Cross/Blue Shield Endowment programs, to expand support for

Residency Specialty Choices of Wisconsin Medical School Graduates, 2012⁵⁶

	Family Medicine	Pediatrics	Med/Peds	Internal Medicine	Total "Primary Care"
UWSMPH	10%	11%	1%	23%	45%
MCW	8%	11%	2%	10%	32%

existing state efforts such as new rural residency slots and loan repayment.

Recently, the UWSMPH Dean Robert Golden expressed support for expanding medical school partnerships with community health centers (CHCs).⁶² The federal Affordable Care Act includes funding to support graduate medical education through "teaching health centers." As envisioned, residents would complete their final year of training at CHCs. UWSMPH leaders have noted that this model could rapidly increase the primary care workforce for the underserved but, in their view, the funding mechanism remains a challenge.⁶³ Nonetheless, CHCs have been preparing for such a role, and Wisconsin's medical schools can now demonstrate their commitment to such partnerships.⁶⁴

Policy Implications

States and their health professions training programs have tools available to improve the supply and distribution of physicians. Decisions about medical school, admissions, scholarship and loan repayment programs, and practice incentives, including reimbursement rates, are all within the purview of state-level decision leaders. Programs in Minnesota, Washington, and elsewhere have demonstrated how preferential admissions, targeted residency slots and proper incentives can steer graduates toward under-staffed specialties and underserved areas.

Medical schools can increase their output of graduating students or of students planning primary care careers, but they need appropriately targeted residency slots for them to match. This requires a state and federal investment, and difficult decisions about growing the overall residency numbers or re-allocating among slots for existing specialties.

Beyond physician supply and distribution, other policy options are available to bolster system capacity and productivity. States will continue to explore the potential to expand scopes of practices for other health professionals.^{65, 66} It has been noted that even small increases in physician productivity⁴³ and new care models⁶⁷ would have a greater impact on alleviating the supply/demand gap than any other supply-side change.

Bottom line: medical schools play a substantial role in students' selection of medical specialty and their ultimate

geographic location. These schools, as part of academic medical centers, respond to economic incentives in the market, as do their students and affiliated providers.¹⁰ State government, a large purchaser of health care, can work in partnership with private payers and purchasers to promote change in the way health care is organized and delivered.

States have tools to help move the current payment system toward one that rewards high value health care where it is needed. Today's market rewards procedure-based, episodic care by sub-specialist physicians. A health care purchasing market that pays better for coordinated, accountable care, medical homes, and disease management, promises to attract and retain more primary care providers into that field. The greater benefit: the potential to lower costs, better manage patients care, and improve health outcomes for Wisconsin residents.

Why do forecasts vary?

Different conclusions about the workforce emerge from different forecasting methods and assumptions about health care delivery. Forecasting generally uses three basic methods, with some variation. The Needs-based model relies on historical demand patterns adjusted for demographic changes, such as the impacts of an aging population. It does not account for potential changes in treatment methods or health care delivery. Economic Growth Models estimate physician demand from projections of economic growth.⁶⁸

The model assumes that demand for medical services will continue to rise as they have historically, while the size of the physician workforce relative to population, will need to keep pace. Economic growth rates are very hard to predict however, and workforce projections based on even modestly different rates yield dramatically different outcomes.

The Integrated Workforce Model considers the possibility that nurse practitioners (NP), physician assistants (PA), or other allied health care workers increase provider productivity and the health care workforce. Forecasts using this model result in, less dire predictions of shortages than in the other models, or even show surpluses.¹⁰ From a policy perspective, states then must grapple with the degree to which they are willing to modify scopes of practice to expand the responsibilities and autonomy of Advanced Practice providers.

Any of these models may miscount the primary care workforce, as many specialists offer what could be considered primary care, while many primary care physicians have areas of sub-specialty.⁶⁹

References

1. Wisconsin Hospital Association. (2011) 100 New Physicians a Year: An Imperative for Wisconsin. Madison, WI. Retrieved from <http://www.wha.org/Data/Sites/1/pubarchive/reports/2011physicianreport.pdf>
2. Nicholson S. & Propper C. (2011) Medical Workforce. In MV Pauly, GB McGuire, & Barros PP, Eds. Handbook of Health Economics Vol2 (874-925). Elsevier B.V.
3. Goodell S, Dower C, O'Neil E. (2011) Primary care workforce in the United States. The Synthesis Project. Policy Brief No. 22. Princeton, NJ: Robert Wood Johnson Foundation. Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2011/rwjf70613
4. Wisconsin Council on Medical Education and Workforce. (2008) Who Will Care For Our Patients? 2008 Update: Taking Action to Fight a Growing Physician Shortage in Wisconsin. Retrieved from http://www.wha.org/pubArchive/special_reports/2008PhysicianReport.pdf
5. American Association of Medical Colleges. (2012) AAMC Physician Workforce Policy Recommendations. Retrieved from <https://www.aamc.org/download/304026/data/2012aamcworkforcepolicyrecommendations.pdf>
6. Lowry A, Pear R. (2012, July 28) Doctor Shortage Likely to Worsen with Health Law. The New York Times. Page 1.
7. Cooper RA, Stoflet SJ, Wartman SA. (2003) Perceptions of physician supply: the views of medical school deans and state medical societies. JAMA. 290:2992-2995. And Cooper RA. It's Time to Address the Problem of Physician Shortages: Graduate Medical Education is the Key. (2007) Annals of Surgery 246(4).
8. Wisconsin Office of Health Care Reform. <http://www.healthcarereform.wisconsin.gov/>
9. Henderson TM. (2010) Medicaid Direct and Indirect Graduate Medical Education Payments: A 50-State Survey. American Association of Medical Colleges.
10. Scheffler RM. (2008) Is There a Doctor in the House? Market Signals and Tomorrow's Supply of Doctors. Stanford, CA: Stanford University Press.
11. Ginzberg E, Minogiannis P. (2004) U.S. Healthcare and the Future Supply of Physicians. New Brunswick, NJ: Transaction Publishers.
12. Weida NA, et al. (2010) Loss of Primary Care Care Residency Positions Amidst Growth in Other Specialties. Am Fam Physician, 82(2):121.
13. Blumenthal D. (2004) New Steam from an Old Cauldron — The Physician-Supply Debate. N Engl J Med, 350,1780-1787.
14. Scheffler RM. (2008) Is There a Doctor in the House? Market Signals and Tomorrow's Supply of Doctors. Stanford, CA: Stanford University Press. See p.40 and Appendix A.
15. Reinhardt UE. (1985) The Theory of Physician-Induced Demand: Reflections after a Decade. Journal of Health Economics, 2, 187-193.
16. Flood AB, Scott WR, Ewy W. (1984) Does Practice Make Perfect? Part II: The Relation Between Volume and Outcomes and Other Hospital Characteristics. Medical Care, 22(2), 115-125.
17. Nicholson, S. (2009). Will the United States have a shortage of physicians in 10 years? Princeton, NJ. Changes in Health Care Financing & Organization.
18. Iglehart, J. K. (2008). Grassroots activism and the pursuit of an expanded physician supply. New England Journal of Medicine, 358(16), 1741-1749.
19. Cooper RA, Getzen TE, McKee HJ, Laud P. (2002) Economic And Demographic Trends Signal An Impending Physician Shortage. Health Affairs, 21(1), 140-154..
20. Goodman DC and Fisher ES. 2008. Physician Workforce Crisis? Wrong Diagnosis, Wrong Prescription. New England Journal of Medicine, 358,1658-1661. .
21. Cooper RA. (2009) States with More Physicians Have Better-Quality Health Care. Health Affairs, 28(1), w91-102.
22. Cooper RA. (2009) States With More Health Care Spending Have Better-Quality Health Care: Lessons About Medicare. Health Affairs 28(1), w103-w115.
23. Cooper RA. (2010, Spring) Expanding Physician Supply—An Imperative for Health Care Reform. The Pharos.
24. Cooper RA. (2010). Health, Poverty and Health Care Spending: Geographic differences in health status and health care spending reflect geographic differences in wealth and poverty. Handout to the Wisconsin Legislative Council Special Committee on Health Care Access, August 24, 2010. Retrieved from http://www.legis.state.wi.us/lc/committees/study/2010/ACCESS/files/aug24_cooper_health.pdf
25. Cooper RA. (2004) Weighing the Evidence for Expanding Physician Supply. Annals of Internal Medicine, 141(9), 711.
26. Starfield B, Shie L, Macinko J. (2009). Physicians and Quality: Answering the Wrong Question. Health Affairs 28(2), 596-597.
27. Baicker K, Chandra A. (2009) Cooper's Analysis is Incorrect. Health Affairs, 28(1): w116-w118.
28. Goodman DC, Brownlee S, Chang CH, Fisher ES. (2010). Regional and Racial Variation in Primary Care and the Quality of Care among Medicare Beneficiaries. A Report of the Dartmouth Atlas Project. Retrieved from. <http://www.rwjf.org/files/research/68508.pdf>
29. Baicker K, Chandra A. (2004) Medicare Spending, the Physician Workforce, and Beneficiaries' Quality of Care. Health Affairs, 23, w184-197, Retrieved from <http://content.healthaffairs.org/cgi/content/full/hlthaff.w4.184v1/DC1>
30. Skinner J, Chandra A, Goodman D, Fisher ES. (2009). The Elusive Connection Between Health Care Spending And Quality. Health Affairs, 28(1), w119-w123.
31. Sandy LG, Bodenheimer T, Pawlson LG, Starfield B. (2009). The Political Economy of U.S. Primary Care. Health Affairs. 28(4), 1136-1145.
32. National Association of Community Health Centers, The George Washington School of Public Health and Health Services, and The Robert Graham Center. (2008) Access Transformed: Building a Primary Care Workforce for the 21st Century. p. 7 and Appendix B. Retrieved from <http://www.nachc.org/client/documents/ACCESS%20Transformed%20full%20report.pdf>
33. Guidian Healthcare Consulting. (2008) Milwaukee Health Care Partnership, Primary Care Access Study. Retrieved from <http://www.mkchcp.org/wp-content/uploads/2011/08/MHCP-Primary-Care-Access-Study-2008.pdf>

34. Newhouse JP et al. (1982) Does the Geographical Distribution of Physicians Reflect Market Failure? Bell Journal of Economics, 13(2), 493-505; and Rosenthal MB, Zaslawsky A, Newhouse JP. (2005) The Geographic Distribution of Physicians Revisited. Health Services Research 40(6), 1931-1952.
35. Goodman D C. (2004) Twenty-Year Trends in Regional Variations in the U.S. Physician Workforce. Health Affairs, web exclusive. Retrieved from <http://content.healthaffairs.org/content/early/2004/10/07/hlthaff.var.90.short>
36. Goodman DC. (2008) Efforts to Expand the Physician Supply Deserve Scrutiny. Health Services Research, 43(4), 1121-1127.
37. Goodman DC. Supply-Sensitive Care: Dartmouth Atlas Project Brief. Retrieved from <http://www.dartmouthatlas.org/keyissues/issue.aspx?con=2937>
38. Zuckerman S, Waidmann T, Berenson R, Hadley J. (2010). Clarifying Sources of Geographic Differences in Medicare Spending. N Engl J Med 363,54-62.
39. AAMC Center for Workforce Studies (2008) The Complexities of Physician Supply and Demand: Projections Through 2025. Page 29. Retrieved from <http://www.aamc.org/workforce>
40. Pugno, P, et. al. (2009) Results of the 2009 National Resident Matching Program: Family Medicine. Family Medicine, 41(8),567-77.
41. American College of Physicians. (2009) Residency Match Results Demonstrate Need to Address National Primary Care Workforce Goals. Retrieved from http://www.acponline.org/pressroom/09_match.htm
42. Freed G. (2009) Oversimplifying Primary Care Supply Shortages. JAMA, 301(18), 1920-1922.
43. AAMC Center for Workforce Studies. (2008) The Complexities of Physician Supply and Demand: Projections Through 2025. P. 46. Retrieved from <http://www.aamc.org/workforce>
44. Colwill, JM, Cultice JM, Kruse RL. (2008). Will Generalist Physician Supply Meet Demands of an Increasing And Aging Population? Health Affairs 27(3),w232-241
45. AAMC Center for Workforce Studies. (2010) The Impact of Health Care Reform on the Future Supply and Demand for Physicians Updated Projections Through 2025. Retrieved from <http://www.aamc.org/workforce/impactofhrconprojections.pdf>
46. Anderson S. Remarks at Wisconsin Legislative Council Special Committee on Health Care Access, Madison, WI, August 24, 2010. Retrieved from http://www.wiseye.org/wisEye_programming/ARCHIVES-com_special.html#
47. David, A. 2010. Medical College of Wisconsin Family Medicine Primary Care Education: Access, Quality and Cost Effective Investment. Testimony to the Wisconsin Legislative Council Special Committee on Health Care Access. October 22, 2010. Retrieved from http://legis.wisconsin.gov/lc/committees/study/2010/ACCESS/files/oct22MCW%20FAM%20Med_001.pdf
48. <http://www.mcw.edu/cauc.htm>
49. Simons KB. (2010). MCW Perspective on Relevance of Reduced Student Capitation Funding on Wisconsin Physician Workforce, Testimony to Wisconsin Legislative Council Special Committee on Health Care Access, August 24, 2010.
50. Seifer SD, Vranizan K, Grumbach K. (1995) Graduate medical education and physician practice location. Implications for physician workforce policy. JAMA, 274(9):1068-74.
51. AAMC. (2011) State Physician Workforce Data Book. Retrieved from <https://www.aamc.org/download/263512/data/statedata2011.pdf>
52. http://www.fammed.wisc.edu/sites/default/files/webfm-uploads/documents/outreach/rural/wisconsin_act_190_section_36.pdf
53. <http://www.fammed.wisc.edu/wi-rural-physician-program>
54. National Residency Matching Program. Match Results by State, Specialty, and Applicant Type. Retrieved from <http://www.nrmp.org/data/>
55. American College of Physicians. (2012) Internal Medicine Residency Match Virtually Unchanged from 2011. Retrieved from http://www.acponline.org/pressroom/match_day_2012.htm
56. Medical College of Wisconsin. "Match Day" Reveals Future Plans for New Doctors. Retrieved from <http://www.mcw.edu/Releases/2012-Releases/-Match-Day-Reveals-Future-Plan.htm>; University of Wisconsin-Madison. Match Day 2012 Includes Largest Class of Rural Medicine Students. Retrieved from <http://www.med.wisc.edu/news-events/match-day-2012-includes-largest-class-of-rural-medicine-students/36887>
57. Henderson TM. (2010) Medicaid Direct and Indirect Graduate Medical Education Payments: A 50-State Survey. American Association of Medical Colleges.
58. Mullan F, Chen C, Petterson S, Gretchen K, Spagnola M. (2010). The Social Mission of Medical Education: Ranking the Schools. Annals of Internal Medicine, 152(12), 804-811.
59. Minnesota Medical Foundation. (2010) Duluth's specialty: Educating primary-care physicians. Retrieved from http://www.mmf.umn.edu/bulletin/2010/spring/research_knocks/duluth.cfm
60. Hunt DD, Norris T, Ballweg R. (1995) The University of Washington WAMI Program: 25 Years of Experiences with Manpower Shortages in Rural Areas. Australian Journal of Rural Health, 3(4), 152-158.
61. Colorado Health Institute. (2008) Rural Physician Literature Review. Retrieved from http://www.coloradohealthinstitute.org/~media/Documents/workforce/RuralPhysLit_review.ashx
62. Rieselbach RE and Golden RN. (2010) Expand primary care and community health centers. Madison, WI: The Capital Times. Retrieved from http://host.madison.com/ct/news/opinion/column/article_5e6ac948-7258-50cf-82ce-d2cf9ac68be4.html
63. Rieselbach R, Crouse, B, Frohna, J. (2010) Teaching Primary Care in Community Health Centers: Addressing the Workforce Crisis for the Underserved. Annals of Internal Medicine, J152(2),118-122.
64. <http://www.nachc.org/clientTeachingCommunityHealthCentersAGuideNACHC1995.pdf>
65. National Council of State Boards of Nursing. (2009) Changes In Healthcare Professions' Scope of Practice: Legislative Considerations. Chicago, IL. Retrieved from <https://www.ncsbn.org/ScopeofPractice.pdf>
66. Christian S, Dower C. (2008) Scope of Practice Laws in Health Care: Exploring New Approaches for California. California Healthcare Foundation. Retrieved from <http://www.chcf.org/publications/2008/03/scope-of-practice-laws-in-health-care-exploring-new-approaches-for-california>
67. Goodell S, Dower C, O'Neil E. (2011) Primary care workforce in the United States. The Synthesis Project. Policy Brief No. 22. Princeton, NJ: The Robert Wood Johnson Foundation. Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2011/rwjf70613
68. Cooper RA, Getzen TE, Laud P. (2003) Economic Expansion is a Major Determinant of Physician Supply and Utilization. Health Services Research, 38(2). 675-96.
69. AAMC Center for Workforce Studies. (2008) The Complexities of Physician Supply and Demand: Projections Through 2025. pp. 27-30.

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