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Where Are the Doctors? Primary Care Physician Shortage in the United States

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Executive Summary

The United States is experiencing a trend that may leave many Americans without primary care services. Medical students prefer entering specialties instead of primary care. Combined with previously set primary care residency caps, this trend has created a shortage of primary care physicians (PCPs).

This analysis addresses the issues medical students have with primary care, which include limited availability of primary care residencies. PCPs receive a lower salary than specialists, making it difficult to pay off student loans. For various reasons, medical students perceive the lifestyle of primary care to be unpleasant and prefer entering a specialty field. Our focus is on attracting more medical students into primary care and retaining PCPs so that Americans have greater access to primary care services.

This analysis provides four alternatives to the status quo. Our recommendation is to increase mandatory funding to the National Health Service Corps and to adopt two office models (mixed-office and satellite) for PCPs. This recommendation provides incentive for medical students to pay off student loans quicker and provides Americans with greater access to primary care services.

This analysis provides solutions that are easily implemented and effectively increase the number of practicing PCPs.

Acronyms

PCP	Primary Care Physician
AAFP	American Academy of Family Physicians
AMA	American Medical Association
AAMC	Association of American Medical Colleges
OECD	Organization for Economic Co-operation and Development
NPP	Non-physician Practitioners
NHSC	National Health Service Corps
PA	Physician Assistant
NP	Nurse Practitioner

1. Introduction to Problem

The American Academy of Family Physicians (AAFP) estimates a shortage of 40,000 primary care physicians (PCPs) by the year 2020, a 51 percent shortage. [1] By 2025, the shortage is expected to grow to 44,000 – 46,000.[2]

PCPs are physicians trained in the area of primary care, which includes family medicine practitioners, medical internists and pediatricians.[3] PCPs are the first point of contact for patients with undiagnosed illnesses and they provide referrals for patients to see specialists.[4]

PCPs lower the cost of health care through preventative treatments. If the shortage continues, health care costs will continue to rise.[5] This analysis serves to provide options for addressing the PCP shortage, which the AAFP can advocate at the federal and state levels.

1.1. Causes

In the 1980s, many health care experts believed there would be an oversupply of physicians (primary and specialists) by 1990; consequent measures were taken to reduce the supply. The American Medical Association (AMA) warned of a surplus and encouraged medical schools to freeze enrollment.[6] Regardless of whether the cause was because of incorrect surplus projections or overly aggressive reduction measures, the policies of the past two decades have played a major role in the current PCP shortage.

A PCP's annual salary is significantly lower than a specialist's salary. In addition to the salary difference, there is an impression among medical students that PCPs have unpleasant careers, which contributes to the PCP shortage.[7] According to the Robert Graham Center, there is a $135,000 yearly salary difference between PCPs and specialists. [8] This salary difference can total $3.5 million over the course of a career spanning thirty-five to forty years.[9]

The high cost of medical school is another cause of the PCP shortage. Lower salaries make it more difficult for newly graduated PCPs to repay medical school loans. The median cost to attend medical school in 2009-2010 rose 7 percent for public medical schools, increasing to $47,720 a year.[10] During the same period, the median cost to attend private medical schools rose 4 percent to $65,673 a year.[11] 87 percent of the 2009 medical school class graduated with student loan debt. Appendix B illustrates the educational debt for the graduating class of 2009. As a result, medical students prefer specialties to primary care.

In general, higher education tuition is expensive. One reason for expensive tuition is the increasing demand for higher education coupled with a fairly unchanging supply.[12] There is evidence this applies to medical schools. The Association of American Medical Colleges (AAMC) concluded that medical schools are having a difficult time expanding class sizes to meet rising demand because of limited financial resources and limited physical space.[13] While physical space constraints will likely prevent attempts to increase the number of doctors, it is possible to increase the number of PCPs through incentives to practice primary care.

1.2. The Vicious Cycle

Of the 33 member countries of the Organization for Economic Co-operation and Development (OECD),[14] the United States spends the most on health care but is still one of the least healthy developed nations.[15] With inadequate primary care, people develop advanced conditions that are harder and more expensive to treat, resulting in higher health care costs. The rise in an unhealthy population increases demand for specialists, drawing doctors away from primary care. The resulting decline in primary care physicians results in more unhealthy people, and this cycle repeats. In order to break the vicious cycle, intervention is required.

Requisite intervention was not achieved with the passage of the Patient Protection and Affordable Health Care Act in 2010. The increase in insured individuals will not lead to a healthier population unless people have access to primary care. Giandomenico Majone's policy space concept describes how a change in one policy (insured Americans) impacts other policies (number of primary care physicians) within a shared policy space.[16] The newly insured will make the lack of PCPs an even greater problem, feeding back into the conditions for a continued PCP shortage.

1.3. Approach (Methods of Intervention)

The status quo is the cause of this vicious cycle. We will analyze methods for government intervention and discuss how the market can lead to a solution. The government and the market will have to work together in order to find a solution that will benefit the overall health of the country and use the taxpayers' money in the most cost effective manner.

2. Stakeholders

Any policy changes will affect many aspects of the medical industry. The stakeholders include: primary care physicians, medical specialists, medical schools, non-physician practitioners (NPPs) and taxpayers. Following is an explanation of the core issues facing each of these stakeholders.

2.1. Primary Care Physicians

PCPs will be given an opportunity to reduce medical school debt. The analysis will look at policies to increase the opportunities available for medical students to find a primary care residency. However, by introducing new office models, PCPs must be willing to relinquish more responsibilities to NPPs, which will reserve PCPs for patients that NPPs are unable to treat.

2.2. Medical Specialists

Will more PCPs lead to fewer job opportunities for specialists? If the salaries of primary care physicians rise, will the salaries of specialists decline? Is there a need for specialists in medical centers or underserved areas? These important questions require further research that we were unable to cover in this report.

2.3. Medical Schools

For more PCPs to enter into primary care, opportunities must be available for students to study the field. This analysis will explain the current status of medical schools and how enrollment and medical school costs are affected by an influx of new medical students.

2.4. Non-physician Practitioners (Physician Assistants and Nurse Practitioners)

PCPs must allow Physician Assistants (PAs) and Nurse Practitioners (NPs) to gain more responsibilities in the field of primary care. In the mixed-office and satellite model sections, we will discuss the integral role PAs and NPs will fill.

2.5. Taxpayers

The cost of health care and health care policy reform is a hot button issue and numerous Americans voiced their opinions during the recently passed Patient Protection and Affordable Health Care Act debate. Educating the taxpayers on the benefits of a heath care system based on primary care is vital to the success of this proposal.

A twenty-year study performed by the Robert Graham Center provides evidence that a health care system based on primary care benefits people's health and lessens the economic impact on the taxpayers. The following are some effects the study found:

1. Less use of emergency departments and hospitals
2. Reduced all-cause mortality and mortality caused by cardiovascular and pulmonary diseases

3. Better preventative care
4. Better detection of breast cancer and reduced incidence and mortality caused by colon and cervical cancer
5. Fewer tests, higher patient satisfaction, less medication use, and lower care-related costs
6. Reduced health disparities, particularly for areas with the highest income inequality, including: improved vision, more complete immunization, better blood pressure control, and better oral health.[17]

3. Evaluation of Criteria

In order to find the best solutions, the proposed policy alternatives were measured against the following criteria:

1. Legality: Is the proposed policy legal? Will the policy require changing statutes?
2. Political Feasibility: Will Congress, federal agencies, and state legislators be willing to approve and implement the policy? Will interest groups strongly oppose the policy?
3. The Commons: Will this policy serve the community in its entirety and make life better for more people?
4. Cost Effectiveness: Will the taxpayers receive the best "bang for the buck"?
5. Unintended Consequences: Will the implementation of this policy cause an inadvertent result that will outweigh the benefits of the policy's implementation?

4. Alternatives

4.1. Residency Cap

The United States government does not regulate the medical field or practice location of its physician workforce. Instead, U.S. doctors are free to choose what type of medicine to practice and where to practice. This market approach to the physician workforce resulted in a

disproportionate distribution of doctors in medical fields.[18] As noted earlier, inadequate access to primary care leads to unhealthier populations and a more expensive and burdensome health care system. The PCP shortage constitutes a market failure despite the private success of physicians in high-paying specialties. As pointed out by Charles Lindblom in *The Market System*, some market structures are not efficient from a social perspective.[19]

The current trend toward a specialized physician workforce has limited access to primary care across the country. In the United States, an estimated 30 percent of physicians are choosing primary care, leaving 70 percent in specialties.[20]

Medical schools are increasing enrollment in response to the need for more doctors. The number of medical student enrollees grew from 16,488 in 2002 to 18,390 in 2009.[21] By 2014, it is anticipated that the number of medical student enrollees will grow to 20,291 (see Appendix C).[22] However, the Association of American Medical Colleges (AAMC) Workforce Studies Director, Ed Salsberg, is concerned with a future "bottleneck in the system holding back medical school graduates from getting the residency training they need."[23] Although medical student enrollments are increasing, the number of residency slots is not keeping pace.

The Balanced Budget Act of 1997 imposed a residency cap on teaching hospitals that receive Medicare reimbursement. Lawmakers placed a cap on the number of medical residencies in order to contain costs under Medicare, which funds approximately 100,000 slots nationwide.[24] Medicare allocates $9.1 billion a year to pay for resident salaries and direct teaching costs.

To increase the number of primary care physicians, new graduate students must be attracted to the field. One method to attract recent medical school graduates to the primary care field is to increase the number of subsidized residency slots. These new slots should only receive funding if the funds go to primary care residencies. In 2010, though most other programs filled to

100 percent, family medicine residency programs only filled 91.3 percent of their residency slots, demonstrating physicians' lack of desire to enter the PCP field.[25]

Even though medical schools are attempting to address the PCP shortage, this does not ensure people access to primary care. The Patient Protection and Affordable Health Care Act did address this issue by authorizing workforce programs to stop the current trend toward an increasingly specialized physician workforce. The act provides $168 million in funding between 2010 and 2014 for the Primary Care Residency Expansion program.[26] The act also includes the following other workforce measures:

1. A ten percent Medicare pay increase for certain services provided by primary care physicians and general surgeons who work in health professional shortage areas, effective in 2011-2015.
2. An increase in Medicaid primary care payments to match Medicare levels in 2013 and 2014.
3. $1.5 billion in mandatory spending for the National Health Service Corps to place more primary care practitioners in counties and cities with a primary health care access shortage.
4. A redistribution of unused Medicare-funded residency slots to programs that agree to train more primary care physicians and general surgeons, which promotes training in outpatient settings where most primary care is delivered. However, the proposed 15,000-residency slot increase was not included.[27]

4.2. Debt Forgiveness

As discussed in the beginning of this report, the financial cost to attend medical school and the salary discrepancy between PCPs and specialists put students that enter the primary care physician field at a severe disadvantage.

There is a general negative notion of incurring debt that arises from the psychology of debt. While we were unable to find a study on the psychological effects of debt on medical students, a report from the Robert Graham Center referenced a study on the psychological effects of debt on law students. Although further study is needed on the effects of debt on medical students, this report offers a glimpse into a similar profession that pays a lower salary for lawyers in public interest law. The report explains:

> A recent, important study on debt was done with law students. In the study, potential students were randomized to one of two financial aid packages of equivalent monetary value prior to enrollment: one offered loan repayment to graduates who pursued public interest law; the second offered full tuition scholarships contingent upon students working in public interest law. Randomization was announced prior to enrollment and tuition assistance students were twice as likely to enroll in law school as loan repayment students. Tuition assistance recipients were 36-45 percent more likely to work in public interest law than were students with loan repayment options. This study was exceptionally well done and suggests that the risk of incurring debt is a psychological deterrent to enrollment for some students, and to choosing non-service careers for graduates. It is difficult to say how well this generalizes to medical students, but it is an important contribution to research on the effects of debt.[28]

The federal government has attempted numerous programs over the past thirty years to encourage primary care physicians to enter the workforce.[29] The National Health Service Corps (NHSC) is one of the most influential programs created by Congress to address the primary care shortage.[30] The NHSC was initiated in 1972 to address the health care crisis of the 1950s and 1960s. During this period, there were an overwhelming number of physicians retiring from rural areas, leaving many parts of the country without essential health care services.[31] Today, the NHSC provides scholarships and loan repayment programs to increase primary care service. The scholarships provide medical students an opportunity to pay tuition, fees and receive a living stipend. After graduating, the recipients are required to work between two and four years in a high-need Health Professional Shortage Area as a primary care provider.[32] The loan repayment program allows current practicing PCPs to receive $60,000 to repay student loans in exchange for two years of service in a high-need Health Professional Shortage Area.[33] The loan recipient is allowed to apply for additional years, yielding $60,000 after two years, $175,000 after five years, and total debt forgiveness after six or more years.[34]

The NHSC has been successful in bringing more medical students into the field of primary care. A Robert Graham Center report explains that the likelihood of a medical student choosing a primary care career is seven times greater if the student is accepted into the NHSC loan repayment program and four times greater if the student is accepted into the NHSC scholarship program.[35] However, the report also says the NHSC programs are only available to three to four percent of physicians despite the large applicant pool.[36]

In 2011, the Senate Appropriations Committee only recommended $141 million for the NHSC, a large reduction from its current levels. NHSC currently has an elevated budget as a result of the 2009 American Recovery and Reinvestment Act, which provided an additional $300

million to support the scholarship and loan repayment programs through 2011.[37] This additional money will provide 114 new scholarships and 3,300 new loan repayment awards.[38]

Given the previous study on law students and the conclusion that debt does affect the career path of a student, an increase in funding for the NHSC should become mandatory. Only providing two years of additional funding will not alleviate the PCP shortage.

4.3. Time-Balanced Mixed Office Model

Some offices are already mixed offices and utilize NPPs, such as NPs and PAs, as independent practitioners. However, our time-balanced model encourages larger NPP-to-PCP ratios. While NPPs are able to provide most primary care services, there are instances that require the NPP to consult with a PCP or for the PCP to treat the patient. This model attempts to maximize the use of NPPs without overloading the PCP with patients (time-balancing).

Based on various studies reporting on the independent operating capacity of NPPs, the ideal time-balanced ratio is two to six NPPs for every PCP.[39] Depending on the office size and the chosen ratio, this allows patient volume to increase by 200 to 600 percent. This model places NPPs and PCPs in the same office so minimal changes to state legislation would be required, making it fairly easy and feasible to implement.

The potential for the unintended consequence of NPPs crowding PCPs out of the market is variable, as the ideal ratio is a range from two to six NPPs per PCP. However, as this is limited to one office, the potential for unintended consequences is likely lower than the satellite model.

4.4. Satellite Model

PAs and NPs are cost effective options for increasing access to quality primary care. NP and PA programs require a total of eight years in an undergraduate and master's program. However, for a PCP to practice medicine, at least twelve years of education are required.

Accordingly, the median salary for a PCP is $174,000 compared to about $90,000 for PAs and NPs.[40] Since NPs and PAs spend less time in a training program they are able to serve the community quicker than PCPs and with less student loan debt.

The scope of practice for a PA and a NP is similar, and includes: performing physical examinations, diagnosing and treating illness, writing prescriptions, administering immunizations, managing chronic problems, and ordering laboratory tests.[41] The primary difference between an NP and a PA is their education requirements. PAs take many of the same courses as physicians, while an NP is taught more bedside nursing procedures.

State legislatures dictate the authority of practice for both NPs and PAs. Depending on the legislature, a PA or NP may practice without direct physician supervision. In some states, NPs are authorized to practice independently.[42] PAs are always required to practice under PCP supervision; however, the PCP does not have to be on-site.

Our focus is on PAs and NPs that are able to practice without direct PCP supervision. NPs and PAs will be able to establish smaller offices or clinics throughout a region, and will receive PCP supervision via telemedicine. Telemedicine is the use of medical information that is exchanged via email or phone.[43] Considering that 78 percent of all PCPs have a solo practice or work with no more than five other PCPs, supervising smaller practices is ideal to continue the office size preferred by PCPs.[44] PCPs will be able to monitor multiple NPs and PAs throughout a region, and remain available for acute or complex conditions that are out of the PA's or NP's scope of practice. These smaller practices, or "satellite clinics," have their own office teams that perform administrative tasks so the medical professionals can focus on patients. PCPs have more time to focus on community health education, attend to acute illness, and serve more patients.

PAs and NPs will increase the number of patients seen, increasing efficiency and offsetting costs. More residents will be persuaded to become a PCP because of the flexibility of the satellite offices, which will reduce the PCP workload and increase their income. Also, since acute patients are delegated to PCPs, the PAs and NPs are able to spend more time with other patients and improve diagnosis accuracy. This attention to patients also improves patient compliance and satisfaction.[45]

5. Recommendation

After reviewing the suggested alternatives and comparing them to the criteria, the best three options are providing additional funding to NHSC and the two model options. This combination will attract more PCPs into the field and will retain PCPs in primary care after receiving debt forgiveness.

5.1. Residency Cap

Although increasing the medical residency cap is a promising way to increase the number of PCPs, this type of workforce expansion will be expensive. The Dartmouth Institute for Health Policy and Clinical Practice estimates that the additional costs of training the physicians to expand the workforce by 30 percent would be between $5 billion and $10 billion per year.[46] The current economic situation and focus to decrease the federal budget deficit make it difficult to increase spending on entitlement programs like Medicare. Maximizing the current physician workforce through primary care-based office models using NPs and PAs is more cost-effective.

5.2. Additional NHSC Funding

Since the NHSC programs attract more students into the primary care field, our recommendation is to reclassify the additional $300 million provided by the American Recovery and Reinvestment Act as mandatory funding. Additionally, this funding should be indexed to

inflation for a minimum of ten years. This would make the annual average funding for the NHSC $441 million. The additional money would provide 2,140 scholarships and 40,000 loan repayments. This will attract more PCPs into the field and benefit the overall health of the country, while giving the taxpayers the best "bang for their buck."

The Robert Graham Center's twenty-year study provides evidence that a health care system, based on primary care, benefits the general public's health and reduces economic impacts on the taxpayer.[47] We anticipate the request for additional funding will receive pushback from Republicans, since Republicans want to reduce the national debt. The ten-year limit will allow us to compare the shortage in ten years to the current projected shortage of 40,000 and analyze the impact of the policy.

5.3. Office Models

The two proposed office models, mixed-office and satellite clinic, place a heavy emphasis on PAs and NPs. This emphasis may encourage excessive growth of PAs and NPs, hindering future growth of PCPs.

However, the mixed-office model and the satellite clinic model offer the best opportunity for the most people to have access to primary care. Our recommendation is for the market to dictate which model works best for a certain area. In a more rural area a satellite clinic may provide the best care to a less populated area. The mixed office model may be best in a more densely populated area. If a state determines the satellite clinic would best serve that state, then that state may need to pass legislation allowing PAs and NPs to provide primary care without a PCP on-site. Given the rural and urban/suburban distinction, we do not anticipate there would be political pushback on legislation for the satellite model, and there is no legal question regarding the use of the mixed-office model.

Evaluation Matrix

	Cost Effectiveness	The Commons	Unintended Consequences	Legality	Political Feasibility
Residency Cap	-	+	0	+	-
Debt Forgiveness	+	+	0	+	+
Mixed Office Model	++	++	- -	+	-
Satellite Model	+++	+++	- - -	-	- -

The matrix qualitatively evaluates each alternative under the five criteria. Plus signs (+) indicate desirability. Minus signs (-) indicate undesirability. Increasing number of signs indicate increasing desirability/undesirability. Zero (0) is neutral.

APPENDIX

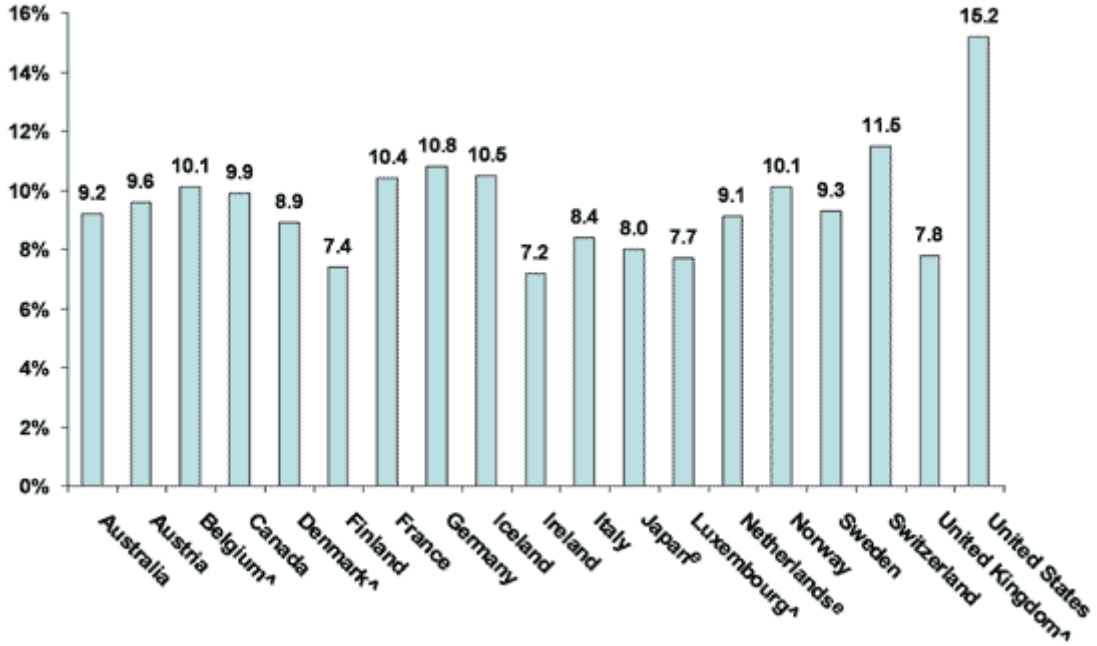
Appendix A – Problem Background

A-1. Estimate of Shortage Percentage

The AAFP estimates a shortage of 40,000 PCPs by 2020.[48]
It is estimated an additional 200,000 physician (of all types) will be needed by 2020.[49]
PCPs currently make up about 39 percent of total doctors.[50]
Therefore, about 78,000 additional PCPs are necessary. A 40,000 shortage is 51.2 percent.

200,000 * 0.39 = 78,000
40,000 / 78,000 = 0.512

A-2. Total Health Expenditures as a Share of GDP, U.S. and Selected Countries, 2003[51]



Source: Organization for Economic Co-operation and Development. OECD Health Data 2006, from the OECD Internet subscription database updated October 10, 2006. Copyright OECD 2006, http://www.oecd.org/health/healthdata.

Appendix B – Percentage of Debt for Medical Students in 2009

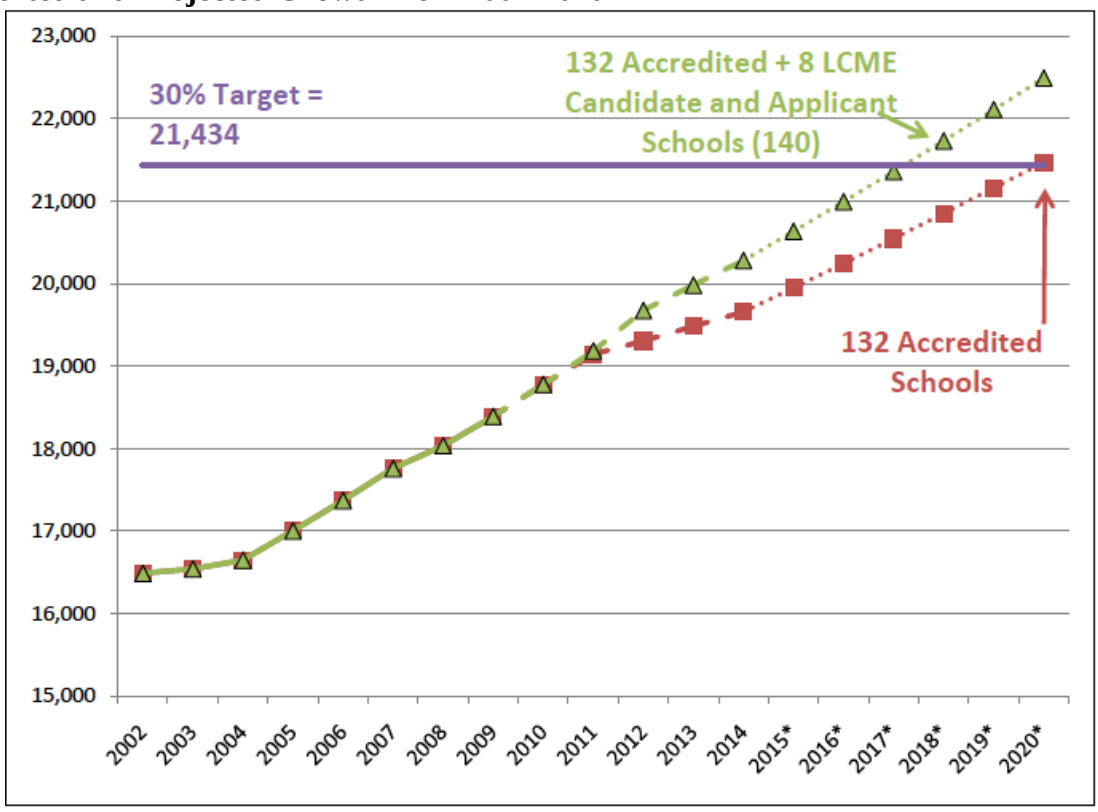
	Public	Private	All
$100,000 or more	78 percent	80 percent	79 percent
$150,000 or more	54 percent	65 percent	58 percent
$200,000 or more	22 percent	41 percent	29 percent
$250,000 or more	8 percent	17 percent	11 percent
Graduates with Debt	89 percent	84 percent	87 percent

Source: "Medical Student Education: Cost, Debt, and Resident Stipend Facts." Association of American Medical Colleges, March 2008. http://www.aamc.org/programs/first/debtfactcard.pdf

This table illustrates the percentage and amount of medical school debt incurred by medical students.

Appendix C – Projected Enrollment Growth of Medical Schools

C-1. Reported and Projected Growth from 2002-2020



*the data from these years reflects projections based on historical growth

Source: Association of American Medical Colleges, "Results of the 2009 Medical School Enrollment Survey," (March 2010): 7.

Appendix D – Office Models

D-1. Timing Balancing of NPPs and PCPs

David Barrett (President and CEO of Lahey Clinic) says a MD is not necessary for a routine checkup or for providing primary care.[52]

- A 1970's trial study showed NPs were able to independently handle 67 percent of their patients (with same quality care as PCP).[53]
- A 1986 policy analysis by the U.S. government cites a study claiming that NPs and PAs can handle 60-80 percent of normal PCP tasks without consultation.[54] The study also claims NPs and PAs are viable alternatives for primary care.
- In 1995, a British Medical Journal study concluded that NPs independently managed 86 percent of patients in the study.[55]
- A commentary article discusses the Texas law of NPs/PAs operating under PCPs. Under their system, PCPs can write protocols for assessment and treatment of commonly encountered conditions in a primary care
- An article discussing the Texas system cites that NPs/PAs with written protocols can deliver 80 percent of common PCP services.[56]

Based on these numbers (60-86 percent), a mixed office desiring full time balance would use a ratio of 1.5-6.14 NPs/PAs to 1 PCP. As 1.5 persons are not possible, and the studies skew toward the higher end, rounding up is reasonable.

Fully time-balanced ratio: 2-6 NPPs to 1 PCP.

Appendix E – State Physician Assistant Regulation

States have individual laws for how a physician assistant should be supervised and their scope of practice. We recommend satellite model legislation modeled after the following Connecticut law, but New Jersey regulation is also provided as a comparison.

CONNECTICUT

Scope of practice: Medical functions delegated by supervising physician that are within the normal scope of the physician's practice and in accordance with written protocols.

Prescribing/dispensing: PA may be delegated the authority to prescribe and administer drugs, including controlled substances, in all settings. Supervising physician must document physician's approval of order for Schedule II or III drugs within one calendar day. Each prescription must include the name, license number, and address of the supervising physician and physician assistant.

Supervision: Includes but is not limited to the continuous availability of direct communication between PA and physician either in person or by radio, telephone, or telecommunication; at least weekly personal review of PA's practice, and face-to-face meetings between supervising physician and PA in non-hospital settings; regular chart review with documentation of review to be kept at practice site; existence of predetermined plan for emergency situations; and designation of an alternate physician in absence of supervisor.[57]

NEW JERSEY

Scope of practice: Delegated tasks such as histories and physicals, assisting at

surgery, patient education, determining and implementing therapeutic plans.

Prescribing/dispensing: PAs may prescribe non-controlled drugs as delegated by supervising physician. PAs may order or prescribe controlled medications in Schedules II-V if authorized by supervising physician and controlled drug is to continue or reissue order or prescription of controlled drug issued by supervising physician; adjust dose of controlled drug prescribed by physician with prior consultation; initiate order or prescription for controlled drug with prior consultation with supervising physician; or initiate order or prescription for controlled drug as part of treatment plan for patient with terminal illness.

Supervision: Constant availability through electronic communication; intermittent physical presence; regular review of records. Required 24 hour countersignature of inpatient medical orders, outpatient chart countersignature in seven days, and 48 hours if chart has medication order or prescription.[58]

NOTES

[1] Robert Woods Johnson Foundation, "AAFP Projects PCP Shortage Could Reach 40,000 By 2020"; see also Appendix A-1.

[2] "Physician Shortage Could Grow Under New Health Law."

[3] "AAFP - Policy & Advocacy - AAFP Policies - Primary Care."

[4] Ibid.

[5] Mary Carmichael, "The Doctor Won't See You Now."

[6] "Physician Shortages and the Medically Underserved"; John T. Tierney, William J. Waters, and Donald C. Williams, "Controlling Physician Oversupply Through Certificate of Need."

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[9] Ibid., vii.

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[30] Ibid.

[31] "National Health Service Corps - About - History."

[32] "National Health Service Corps - About the NHSC."

[33] Ibid.

[34] "Loan Repayment - National Health Service Corps."

[35] Robert Phillips et al., "Specialty and Geographic Distribution of the Physician Workforce: What Influences Medical Student & Resident Choices?," 19.

[36] Ibid., viii.

[37] Matthew Shick, "FY 2011 National Health Service Corps (NHSC) Funding"; "National Health Service Corps - About - History."

[38] US Department of Health and Human Services, "Key Facts About the National Health Service Corps (NHSC)."

[39] See Appendix D-1.

[40] US Department of Labor, "Physician Assistants"; Shelly K. Schwartz, "Understanding Scope of Practice - Physicians Practice."

[41] US Government Accountability Office, *Primary Care Professionals: Recent Supply Trends, Projections, and Valuation of Services*, 1.

[42] See Appendix E.

[43] Merriam-Webster Dictionary, "Telemedicine - Definition."

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[45] Beverly A. Kimball and Walter S. Rothwell, "Physician Assistance Practice in Minnesota."

[46] David C. Goodman and Elliott S. Fisher, "Physician Workforce Crisis? Wrong Diagnosis, Wrong Prescription," 1660.

[47] Robert L. Phillips, Jr. and Barbara Starfield, "Why Does a U.S. Primary Care Physician Workforce Crisis Matter?"

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[49] Shaheen E. Lakhan and Cyndi Laird, "Addressing the primary care physician shortage in an evolving medical workforce"; "Physician Shortages and the Medically Underserved."

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[51] "Snapshots: Health Care Spending in the United States and OECD Countries" Exhibit 4.

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