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Medicare Graduate Medical Education Funding is Not Addressing the Primary Care Shortage:

We Need a Radically Different Approach

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USC-Brookings Schaeffer Initiative for Health Policy

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Introduction

A growing body of evidence shows that areas with robust primary care systems tend to have better outcomes and lower per capita costs than areas that rely more on specialists.[1] Over the past several decades, the US medical education system has produced an increasingly specialized physician workforce without any strategic direction toward achieving a socially desirable mix of primary care physicians (PCPs) and specialists.[2] At the same time, health care reforms, such as patient-centered medical homes and Accountable Care Organizations (ACOs), rely more on PCPs and other providers who are equipped to coordinate their own care with the care of specialists. Demographic trends signal a growing need for such coordination as the population ages and patients with multiple chronic conditions become more prevalent.[3] Despite these trends, physicians in training tend not to select primary care or related specialties, making it difficult to achieve reforms that rely on an adequate supply of PCPs.

In this paper, we examine the ways Medicare pays for physician and hospital services and subsidizes graduate medical education (GME) in teaching hospitals.[4] Looking at Medicare's role through the lens of the medical education marketplace, we conclude that Medicare's GME subsidies have relatively little effect on specialty mix. Medicare's physician payment policies, however, through their effect on widening the gap between PCPs' and specialists' incomes, skew the choices made by doctors when selecting residency positions and entering into medical practice and are therefore an important determinant of the PCP/specialist mix in the US.

The next section provides an overview of how medical education is structured and financed in the US. We then present an informal model of the market for GME services, followed by an analysis of how the income gap between primary care and specialist doctors affects physician specialty mix in the US. An examination of how Medicare influences the decisions of both consumers and suppliers of GME services is followed by a discussion of policy options and a concluding section that summarizes Medicare's important role in medical specialty determination in the US.

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[1] Starfield, B., Shi, L., Macinko, J. (2005). Contribution of Primary Care to Health Systems and Health. *Milbank Quarterly,* 83(3), 457-502. https://www.ncbi.nlm.nih.gov/pubmed/16202000; Phillips, R. and Bazemore, A. (2010). Primary Care and Why It Matters for U.S. Health System Reform. *Health Affairs*. https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2010.0020; Shi, L. (2012). The Impact of Primary Care: A Focused Review. *Scientifica*, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3820521/pdf/SCIENTIFICA2012-432892.pdf.

[2] IOM (Institute of Medicine). 2014. Graduate medical education that meets the nation's health needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/18754.

[3] Dall, T. et al. (2013). An Aging Population and Growing Disease Burden Will Require A Large and Specialized Health Care Workforce by 2025. *Health Affairs*. https://www.healthaffairs.org/doi/abs/10.1377/hlthaff.2013.0714.

[4] The 4 years of medical school are referred to as "undergraduate medical education." Graduate medical education (GME) consists of residencies and fellowships served in teaching hospitals.

The Structure and Financing of Medical Education in the US

In 2016, 28,283 students enrolled in, and 22,477 graduated from, one of the 178 accredited allopathic or osteopathic medical schools in the US.[5,6] With very few exceptions, students matriculate for 4 years, obtain an MD or DO degree, and then enter a residency program. Average tuition costs plus related fees are substantial, ranging from a median cost of about $240,000 of attending a public medical school for students graduating in 2016 or 2017 to a median cost of about $314,000 for attending a private medical school. Despite the fact that about half of US medical students come from the wealthiest fifth of households, more than 80 percent graduate with debt of $100,000 or more.[7]

Medical education continues when students go through a matching program that determines the specialty and teaching hospital location of the residency.[8] In 2018, 20,418 US allopathic and 5,770 osteopathic seniors and graduates entered a US residency program.[9] These students were augmented by both US and non-US International Medical Graduates (IMGs), raising the total number of entrants into US residency programs by another 7,230.[10] Residency programs vary by specialty and length, and some students may complete more than one residency or enter a fellowship after completing a residency. After at least one accredited residency, doctors may be certified in a specialty and enter into medical practice.[11]

Financing of graduate medical education (GME) is a complex combination of revenues obtained by teaching hospitals for the provision of health care services to patients plus additional payments made in a variety of ways by payers for those services to subsidize the costs of training residents. These costs include stipends paid to residents and residency program expenses including medical faculty salaries.

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[5] Allopathic and osteopathic physicians are both licensed to practice the full scope of medicine – osteopathic physicians tend to put more emphasis on primary care, although these physicians can practice in any specialty. See more at AACOM, https://www.aacom.org/become-a-doctor/us-coms, and AAMC https://www.aamc.org/about/. Note: there are now 185 accredited schools.

[6] Dalen, J., Ryan, K. (2016). United States Medical School Expansion: Impact on Primary Care. *American Journal of Medicine,* Vol 129(1). https://www.amjmed.com/article/S0002-9343(16)30554-X/pdf.

[7] Marcu, et al. (2017). Borrow or Serve? An Economic Analysis of Options for Financing a Medical School Education. *Academic Medicine,* 92(7); 966-97. https://www.ncbi.nlm.nih.gov/pubmed/28121649.

[8] Learn more about the matching program at http://www.nrmp.org/about-nrmp/.

[9] As the system moves to a single match, most osteopathic graduates now match through the NRMP match, while the rest match through the traditional DO AOA Match. NRMP 2018 Residency Match Results, https://mkonrmpcikgb8jxyd19h.kinstacdn.com/wp-content/uploads/2018/04/Main-Match-Result-and-Data-2018.pdf; AOA 2018 Residency Match Results, https://natmatch.com/aoairp/stats/2018prgstats.html.

[10] NRMP. (2018) Main Resident Match by the Numbers. http://www.nrmp.org/wp-content/uploads/2018/03/2018-Match-by-the-Numbers.pdf.

[11] Association of American Medical Colleges (AAMC). The Road to Becoming a Doctor, https://www.aamc.org/download/68806/data/road-doctor.pdf.

The subsidies may be explicit, such as Medicare's subsidies (which will be discussed later), or implicitly included in the health service payments negotiated between private insurers and teaching hospitals.

Differing views of the principal role of the resident in the teaching hospital are somewhat controversial, ranging from; essentially, an advanced student who participates in the care of patients as part of the teaching curriculum to a valuable professional whose contribution to teaching hospital and faculty practice revenues exceeds the costs of his or her training. Without attempting to resolve this issue, we focus in the next section on how specialty training's effect on practice income is a determinant of specialty choice.

The Demand For, And Supply Of, Medical Education Services

Because the number of medical school positions is limited, the application process is very competitive. Undergraduate baccalaureate performance, score on the Medical College Admission Test (MCAT), relevant experience, and other factors determine which applicants are accepted.[12] Once in medical school, the competition shifts to application for desirable residency positions. Performance on medical school exams and general exams, such as the United States Licensing Medical Exam, Step 1, traditionally taken during the second of the four medical school years, relevant experience and other factors determine which graduating students are able to land their preferred residencies in their preferred locations.[13] Taking these preferences into account, and those of the teaching hospitals, the National Resident Matching Program (NRMP) uses a computer algorithm to match students with programs in order to maximize their collective preferences. While not all students who attend school in the United States obtain their top residency choices, nearly all are able to enter a US residency program, with PGY-1 match rate for allopathic graduates being 92-95 percent historically.[14]

Residency may be in primary care or non-primary care specialties. For reasons discussed later, US medical school graduates tend to prefer non-primary care specialties,[15] so a relatively high proportion of primary care residency positions are filled by IMGs from a variety of countries and by US citizens studying abroad, often in "off-shore" medical schools.[16] Counting the four medical school years, the

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[12] Ibid.

[13] Green M. (2009). Selection Criteria for Residency: Results of a National Program Directors Survey. *Academic Medicine,* 84(3):362-7. https://www.ncbi.nlm.nih.gov/pubmed/19240447

[14] NRMP. (2017). Press Release: 2017 NRMP Main Residency Match the Largest Match on Record. http://www.nrmp.org/press-release-2017-nrmp-main-residency-match-the-largest-match-on-record/

[15] The number of students entering primary care residencies, particularly internal medicine, is actually overstated because many intend to specialize once they complete the initial residency.

[16] National Resident Matching Program. (2018). Results and Data: 2018 Main Residency Match. National Resident Matching Program. http://www.nrmp.org/wp-content/uploads/2018/04/Main-Match-Result-and-Data-2018.pdf; GAO (2009). GAO Report: Graduate Medical Education: Trends in Training and Student Debt. https://www.gao.gov/assets/100/96096.pdf . Several organizations representing primary care physicians have recently expressed concern that changing US policy making IMG entry into

total time in training ranges from a minimum of seven to eleven years (or even longer in some cases) before the doctor becomes board certified in a specialty.[17] It is a long and arduous process but medicine continues to be an attractive profession and a sound investment.[18]

Graduating medical students' preferences for residencies in different specialties reflect a number of pecuniary and nonpecuniary factors. Survey data suggest that the match between specialty content and individual interests and skills, achieving a favorable work/life balance, and the influence of mentors rank among the most important stated reasons for selecting a residency in a given specialty.[19] As we discuss later in our section on the income gap, however, we believe that the evidence shows that eventual earnings are a very important determinant of specialty choice.

The supply side in the market for medical education is complicated because educational services and health care services are jointly produced in teaching hospitals and residents are both consumers of educational services and producers (in conjunction with medical school faculty and staff) of health care services.[20] Thus, the way in which Medicare and other payers pay for hospital and physician services performed in teaching hospitals may be a factor in determining what residencies and residency positions are offered to graduating medical students. That is, the contribution of residents to hospital and medical faculty practice plan revenues may vary by specialty and the mix of primary care and non-primary care residents may influence the extent to which residents' outputs contribute to hospital and teaching physicians' revenues.[21]

Because of the joint production phenomenon, teaching hospitals' decisions about which residencies to support, and how many positions in each to offer, is not as simple as responding only to graduating medical students' demands. Decision makers need to balance the costs of training residents in particular residencies against the revenues that residents generate working with teaching physicians and hospital staff.[22] These revenues may devolve to the benefit of the hospital through its various

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US residencies more difficult could disrupt teaching hospitals' provision of care. See letter to L Francis Cissna, Director, US Citizenship and Immigration Services, dated May 30, 2018.

[17] AAMC. The Road to Becoming a Doctor. https://www.aamc.org/download/68806/data/road-doctor.pdf.

[18] Roth, Nicholas. The Costs and Returns to Medical Education. https://www.econ.berkeley.edu/sites/default/files/roth_nicholas.pdf

[19] AAMC. (2017). Graduation Questionnaire. https://www.aamc.org/data/gq/.

[20] MedPAC. (2010). Report to Congress: Aligning Incentives in Medicare. http://www.medpac.gov/docs/default-source/reports/Jun10_EntireReport.pdf

[21] Wynn, B.O., Smalley, R., Cordasco, K.M. (2013).Does it Cost More to Train Residents or to Replace Them? A Look at the Costs and Benefits of Operating Graduate Medical Education Programs. RAND Corporation. https://www.rand.org/pubs/research_reports/RR324.html

[22] IOM (Institute of Medicine). 2014. Graduate medical education that meets the nation's health needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/18754; Council on Graduate Medical Education: Twentieth Report. (2010) Advancing Primary Care. https://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/twentiethreport.pdf; MedPAC

inpatient and outpatient services or to the medical staff through performance of physician and related services, and there may be a variety of arrangements for revenue sharing, including with the larger entity (such as a university) that the hospital and medical staff are a part of.

Just as medical students have different preferences and capabilities affecting specialty choice, teaching hospitals display substantial differences in their preferences for residency programs. In addition to revenue concerns, other factors such as prestige, resident work contribution, and intellectual/academic opportunities also may be influential determinants of residency offerings.[23] In addition, certain teaching hospitals, particularly the smaller ones, appear to have more success in "producing" physicians in primary care specialties that their larger and more urban counterparts.[24]

Specialty Mix and the Income Gap

In 2016, the proportion of practicing physicians in the US was approximately 68 percent specialists and 32 percent PCPs.[25] The Council on Graduate Medical Education (COGME), an organization that periodically reviews the composition and performance of the physician workforce, recommends that the ideal proportion of generalists should be at least 40 percent.[26] Kaiser-Permanente, the large integrated delivery system that employs its physicians, maintains its PCP proportion at 45 percent.[27] Several authorities, including the Association of American Medical Colleges and the Institute of

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(2010). Report to the Congress: Medicare Payment Policy. http://www.medpac.gov/docs/default-source/reports/Mar10_EntireReport.pdf COGME(2010) ; MedPAC(2010)

[23] Sivey, P., Scott, A., Joyce, C., Humphreys, J. (2012). Junior Doctors' Preferences for Specialty Choice. J. Health Econ. 2012 Dec; 31(6):813-23. https://www.ncbi.nlm.nih.gov/pubmed/22940638

[24] Chen,C., Petterson, S., Phillips, R., et al. (2013). Toward Graduate Medical Education (GME) Accountability: Measuring the Outcomes of GME Institutions. *Academic Medicine*. September 2013. Volume 88 (9):1267-80. https://journals.lww.com/academicmedicine/Fulltext/2013/09000/Toward_Graduate_Medical_Education__GME_.31.aspx

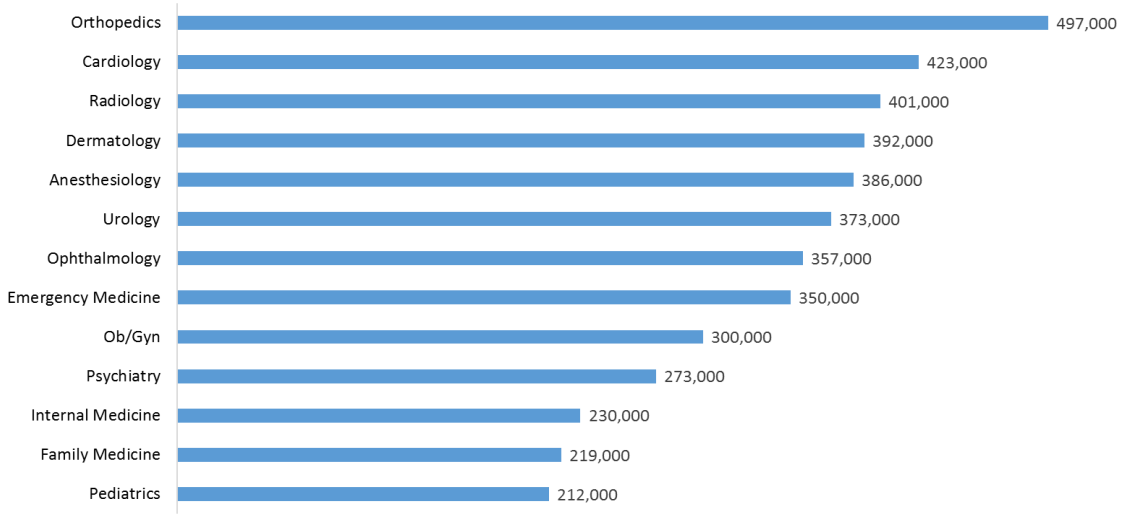
[25] AAMC (2018). The Complexities of Physician Supply and Demand: Projections from 2016 to 2030. https://aamc-black.global.ssl.fastly.net/production/media/filer_public/85/d7/85d7b689-f417-4ef0-97fb-ecc129836829/aamc_2018_workforce_projections_update_april_11_2018.pdf. Note: The 32% includes primary-care trained hospitalists, which make up 4% of the workforce.

[26] Council on Graduate Medical Education: Twentieth Report. (2010) Advancing Primary Care. https://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/twentiethreport.pdf;. The issue of specialist/PCP imbalance is not confined to the US. The World Health Organization (WHO), noting that the ratio of PCPs to specialist in the European Union (EU) is 1:3.2, recently issued a call for increasing PCP slots in the EU. See http://www.euro,who.int/health-topics/Health-systems/health-workforce/data-and-statistics

[27] Reinke, T. (2009). Are health plans responding to primary care shortage? Managed Care Magazine. https://www.managedcaremag.com/archives/2009/2/are-health-plans-responding-primary-care-shortage. The Kaiser Permanente proportion may be a bit overstated owing to the fact that some specialty services furnished to its beneficiaries are outsourced to specialists in the community.

Medicine, have asserted that the PCP/specialist imbalance is due to a shortage of PCPs in the US.[28] Some analysts have suggested that nurse practitioners (NPs) and Physician Assistants (PAs), who currently supply approximately one-fourth of primary care services in the US, may be increasingly relied upon in areas where PCPs are in short supply.[29] Recent evidence indicates, however, that NPs and PAs have a tendency to devote their services increasingly in specialty, as opposed to primary care, practices.[30] While it is true that the growing number of PAs and NPs relieves some of the pressure of underproducing PCPs, because of state scope of practice laws and intrinsic limitations, the extent to which PAs and NPs can substitute for PCPs is uncertain.[31] Many NPs and PAs are compensated under the same Medicare fee schedule as physicians and are subject to the same incentives facing physicians making specialty decisions discussed in the next section.

Exhibit 1
Average Annual Physician Compensation, Selected Specialties, 2018



Adapted from: Medscape Physician Compensation Report 2018

A potentially important element in the demand for education in a primary care versus a non-primary care specialty is the so-called "income gap," that is, the extent to which the income of MDs in many

[28] AAMC. 2018 Update: The Complexities of Physician Supply and Demand: Projections from 2016 to 2030. https://aamc-black.global.ssl.fastly.net/production/media/filer_public/85/d7/85d7b689-f417-4ef0-97fb-ecc129836829/aamc_2018_workforce_projections_update_april_11_2018.pdf

[29] IOM (Institute of Medicine). 2014. Graduate medical education that meets the nation's health needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/18754.

[30] Medical Bag. (2014). More PAs Choosing Specialties over Primary Care. https://www.medicalbag.com/physician-assistants/more-pas-choosing-specialties-over-primary-care/article/472697/ ; Coombs, L. (2015) The Growing Nurse Practitioner Workforce in Specialty Care. *Journal for Nurse Practitioners*, Vol 11(9):907-909 https://www.sciencedirect.com/science/article/pii/S1555415515007096

[31] See Salsberg (2018) for a discussion of how the increasing supply of NPs and PAs is expanding access to primary care services.

specialties exceeds that of a PCP. In this sense, the demand for residency positions is derived, in part, from the eventual income earned after completing education and entering into medical practice. In the US, average compensation does vary substantially by specialty, as indicated in Exhibit 1. The primary care specialties of Pediatrics, Family Medicine, and Internal Medicine tend to be at the low end of the compensation distribution.[32] That there is an income gap is not surprising because specialty residencies (as well as fellowship training for subspecialties, such as cardiology) tend to be longer with mastery of additional procedure-based skills required as part of successful training. A typical primary care residency is approximately three years in duration while a typical specialty residence, such as orthopedic surgery, approximately five years. There are gaps in earnings across the spectrum of specialties and, as stated above, there are many other factors influencing specialty choice. However, the primary care vs specialist gap in the US seems exceptionally high in relation to the extra time invested; the magnitude of the gap is not seen elsewhere, for instance, in most European countries.[33]

Fifteen years ago, Reinhardt and Anderson showed that a sufficient explanation for why health care spending per capita is so much higher in the US than in most of Europe is because we pay our providers and manufacturers – hospitals, doctors, drug companies, etc. – much more in the US than elsewhere.[34] OECD data indicate that this trend persists. Not only is the gap between PCPs and specialists higher in the US, it is mainly because US specialists' compensation exceeds other countries' specialist compensation more than US PCP compensation exceeds other countries' PCP compensation. With few exceptions, the proportion of physicians who are PCPs is much lower in the US than in other countries.[35, 36]

But how important is the income gap to this process compared to all the other factors that could affect specialty preferences outlined in the previous section? Some studies have shown that expectation of future income is an important determinant of students' choice of specialty, as opposed to primary care,

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[32] One study estimated that a PCP would have to receive a bonus of $1.1 million upon completion of medical school for that PCP's lifetime earnings to equal those of a cardiologist. See Vaughn et al. (2010). https://aspe.hhs.gov/report/health-practitioner-bonuses-and-their-impact-availability-and-utilization-primary-care-services/1-effects-earnings-specialty-choice-physicians

[33] Laugesen, M.J., Glied, S.A. (2011). Higher Fees Paid to US Physicians Drive Higher Spending for Physician Services Compared to Other Countries. *Health Affairs*, Vol 30(9). https://www.healthaffairs.org/doi/10.1377/hlthaff.2010.0204; Conover, Chris. (2013). Are U.S. Doctors Paid too Much? Forbes. https://www.forbes.com/sites/theapothecary/2013/05/28/are-u-s-doctors-paid-too-much/#3c8df023d525 (See Table 2)

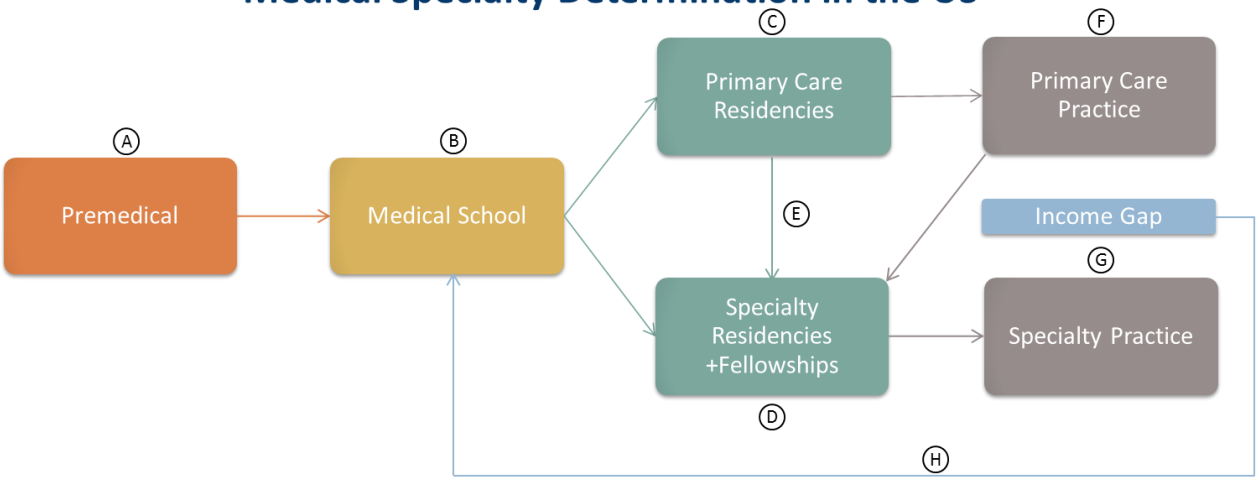
[34] Anderson, G., Reinhardt, U., Hussey, P., Petrosyan, V. (2003). It's the Prices, Stupid: Why the United States is so Different from Other Countries. Health Affairs Vol 22(3). https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.22.3.89 OECD (2017). Health at Glance 2017: OECD Indicators. https://www.health.gov.il/publicationsfiles/healthataglance2017.pdf

[35] OECD (2017). Health at a Glance 2017: OECD Indicators. https://www.health.gov.il/publicationsfiles/healthataglance2017.pdf

[36] Recent survey data from the Medical Group Management Association show that the cumulative increases in PCP and specialist compensation in the US were about 10 and 5 percent, respectively, over the past 5 years. (MGMA press release, May 16, 2018.) While this is an encouraging trend, it is insufficient to reduce the dollar income gap between PCPs and specialists.

residencies.[37] This evidence includes the propensity of residents in Internal Medicine to pursue subspecialty fellowships, thereby moving out of primary care into specialty practice.[38] In 2014, the Office of the Assistant Secretary of Health and Human Services reviewed five studies presenting relevant evidence on the matter.[39] Except for one study that attempted to estimate the effect of consultation fees on propensity to enter general practice in Canada, the implied elasticities of the other studies, which focused on earnings differences, were quite large. That is, according to these studies, a one percentage point reduction in the income gap between PCP and specialist physicians would lead, as a crude approximation, to about a one percentage point, or more, increase in the PCP proportion.

Exhibit 2
Medical Specialty Determination in the US



A. Medicine is still an attractive profession. (59% of those who applied did not get into medical school) with no shortage of potential entrants
B. Almost all medical students become physicians and then they compete for the most desirable residencies based on income, lifestyle, and other considerations
C. US medical students entering into primary care residencies are supplemented by IMGs
D. Specialty residents and fellows are most valuable as producers of health care services at teaching hospitals
E. Some primary care residents transition into specialty residencies including the large number of internal medicine residents who transition into specialty fellowships such as cardiology.
F. Evidence suggest areas with robust primary care have good outcomes and lower per capita costs; demographic and policy trends suggest rising need for PCPs
G. Specialists earn more than PCPs – the income gap tends to be higher in the US than OECD countries
H. The income gap is a factor in medical students' preferences for primary care vs specialty residencies

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[37] Ebell, Mark H. (1989). Choice of Specialty: It's Money that Matters in the USA. JAMA. 1989; 262(12):1630. https://jamanetwork.com/journals/jama/article-abstract/1725027 (1989), Ebell, Mark H. (2008). Future Salary and US Residency Fill Rate Revisited. JAMA 2008 Sep 10:300(10):1131-2. https://jamanetwork.com/journals/jama/article-abstract/182526

[38] Halvorsen, Andrew J., Kolars, Joseph C., McDonald, Furman S. (2010) Gender and Future Salary: Disparate Trends in Internal Medicine Residents. Am J Med. Vol 123(5):470-75. https://www.amjmed.com/article/S0002-9343(10)00063-X/abstract

[39] ASPE. (2014). Health Practitioner Bonuses and their Impact on the Availability and Utilization of Primary Care Services. 1. Effects of Earnings on Specialty Choice by Physicians. https://aspe.hhs.gov/report/health-practitioner-bonuses-and-their-impact-availability-and-utilization-primary-care-services/1-effects-earnings-specialty-choice-physicians

Exhibit 2 illustrates the pathways of decision-making at various stages of medical training. By the time medical students approach graduation, they are aware of the income gap and the relationship between residency specialty and practice specialty, and express their preferences through the residency matching program. These preferences are further expressed when residents enter specialty and sub-specialty residencies and fellowships.

Exhibit 3
2018 Residency Matches

	Number of Positions	Positions Filled	U.S. Allopathic	U.S. Osteopathic	Percent Filled by U.S. applicants
Anesthesiology	1700	1668	1107	281	83.2
Dermatology	451	443	409	13	95.3
Emergency Medicine	2278	2265	1672	484	95.2
Radiology-Diagnostic	1069	1064	805	137	88.5
Orthopedic Surgery	742	738	720	5	98.2
OB/GYN	1336	1330	1070	156	92.2
Ophthalmology	475	475	446	12	96.4
Thoracic Surgery	36	36	32	0	88.9
Family Medicine	3629	3510	1749	696	69.7
Internal Medicine	7542	7363	3303	875	56.7
Psychiatry	1556	1540	1025	251	82.9
Pediatrics	2768	2711	1775	403	80.3

Source: Results and Data 2018 Main Residency Match
Note: U.S. Allopathic refers to a senior student or previous graduate of U.S. allopathic medical school. U.S. Osteopathic refers to a senior student or previous graduate of osteopathic medical school. All specialties except anesthesiology, dermatology, radiology-diagnostic, and ophthalmology show match results from first-year post-graduate (PGY-1) positions. Anesthesiology, dermatology, radiology-diagnostic, and ophthalmology show aggregate match results from PGY-1 and PGY-2 positions.

That students' preferences are different for specialist and generalist residencies can be inferred from the proportions of resident positions filled by graduates of US allopathic medical schools. When considering alternative specialty choices, medical students are sometimes advised to follow the EROAD.[40] That is, the specialties of Emergency Medicine, Radiology, Ophthalmology, Anesthesiology, and Dermatology are singled out as specialties that offer both substantial income and favorable lifestyle balance that many students would find personally rewarding, especially compared to primary care specialties, when entering medical practice.[41] Exhibit 3 contrasts the relatively high US medical school graduate fill rates for the EROAD specialties with the lower fill rates for primary care residencies, particularly in family medicine and internal medicine.[42] It's also important to note that approximately 81 percent of internal medicine residents will subspecialize, along with 41 percent of pediatric residents, decreasing the number of residents who enter into primary care practice.[43]

It's important to recognize that the income gap and its effect on specialty choice is a demand-side phenomenon. While this may seem self-evident, a number of policy solutions to the specialty imbalance, particularly in the context of Medicare payment policy, focus on supply-side issues of financing medical education in teaching hospitals. However, there may be ways to make the incentives of doctors in training and teaching hospitals more closely aligned, as suggested in the following sections.

How Medicare Influences Medical Specialty Determination

After Congress changed Medicare's inpatient hospital reimbursement from a cost-based system to a Prospective Payment System (PPS) of paying for Diagnosis-Related Groups (DRGs) in 1983, a unique system of subsidizing the costs of training residents in teaching hospitals was added to the payment formula.[44] The formula called for Medicare to pay its share of the direct costs of Graduate Medical Education (DGME), such as residents' stipends and teaching physicians' salaries, and a portion of the

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[40] Weida, Phillips, Bazemore et al. (2010). Loss of Primary Care Residency Positions Amidst Growth in Other Specialties. Robert Graham Center. https://www.graham-center.org/rgc/publications-reports/publications/one-pagers/loss-of-primary-care-residencies-2010.html

[41] Blair, Jenny. Taking the E-ROAD. Yale Medicine Magazine. http://ymm.yale.edu/autumn2007/features/feature/51534/ ; Rayburn, William F. & Schulkin, Jay. (2011). Changing Landscape of Academic Women's Health Care in the United States. Springer. https://books.google.com/books?id=0O4eQte2zG0C&pg=PA34&lpg=PA34&dq=e-road+specialties&source=bl&ots=hjKhQR9PzF&sig=Nl6sXU0RZJmiE04uOlMZCgVb71k&hl=en&sa=X&ved=0ahUKEwiKvpejnt3ZAhWpneAKHdmEAKw4ChDoAQhXMAk#v=onepage&q=e-road%20specialties&f=false

[42] More broadly, the correlation between average practice compensation in 14 specialties and the percent of residency positions in those specialties filled by US medical school graduates is strongly positive ($R=0.71$, $p < .01$).

[43] Dalen, J., Ryan, K. (2016). United States Medical School Expansion: Impact on Primary Care. American Journal of Medicine, V129(1). https://www.amjmed.com/article/S0002-9343(16)30554-X/pdf.

[44] The Medicare GME subsidy was initiated in 1985. See https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/DGME.html

Indirect Cost of Graduate Medical Education (IME), such as higher inpatient costs owing to residents ordering extra tests and generally reducing the efficiency of hospital operations.[45]

In 1992, Congress changed the method of reimbursing physicians for their services to Medicare patients from a system based on individual physicians' historical charges to one based on the "relative values" of the thousands of services physicians charge Medicare for – the Resource-Based Relative Value Scale (RBRVS) fee schedule. As discussed below, the ways in which Medicare fees for the services performed by PGPs and specialists are determined and updated are an important determinant of inter-specialty differences in incomes.

Medicare influences the income gap primarily through its physician fee schedule (PFS). For many reasons, which have been written about extensively, the process of updating the fee schedule (which consists of modifying existing fees and establishing fees for new procedures) has benefitted procedure-oriented specialties at the expense of cognitive specialties.[46] Fees for existing services have increased very little over the past several years, but high payments for new services coupled with substantial increases in the volume of expensive diagnostic and other procedures, have contributed to Medicare's share of the income gap.[47] Physicians in procedure-oriented specialties have opportunities to harness changes in medical technology to increase their incomes while primary care physicians and others in cognitive specialties are constrained by the fact that their services are largely a function of, and therefore limited by, their own time.[48] Other payers do not necessarily pay the same rates as Medicare for the same services, but they tend to use the Medicare RVS as a starting point, which preserves the substantial difference in payments between procedural and cognitive services.[49]

If the income gap is a product of the way that Medicare and other payers reimburse physicians for their services, what is the role of teaching hospitals in the determination of specialty mix? Numerous studies have concluded that Medicare's subsidization of medical education, particularly the IME add-on to inpatient DRG payments in teaching hospitals, might be an important factor. For example, in 2012 the

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[45] Heisler, E.J., Janse, D.J., Mitchell, A., Viranga Panangala, S., Talaga, S.R. (2016). Federal Support for Graduate Medical Education: An Overview. Congressional Research Service. https://fas.org/sgp/crs/misc/R44376.pdf.

[46] GAO (2015). Report to Congressional Committees. Medicare Physician Payment Rates: Better Data and Greater Transparency Could Improve Accuracy. https://www.gao.gov/assets/680/670366.pdf

[47] USC-Brookings Schaeffer Initiative for Health Policy (2017). The Medicare Physician Fee Schedule Likely to Serve as Foundation for Alternative Payment Models. The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2017/08/medicare-pfs-conference-brief-event-summary.pdf

[48] Steinwald AB. (2008). Primary care professionals: recent supply trends, projections, and valuation of services. Testimony before the Committee on Health, Education, Labor and Pensions, U.S. Senate (GAO-08-472T). Washington, DC: Government Accountability Office, February 12, 2008. https://www.gao.gov/new.items/d08472t.pdf?source=ra

[49] Maeda, J. L, Nelson, L. (2017). An Analysis of Hospital Prices for Commercial and Medicare Advantage Plans. Presentation. Congressional Budget Office (CBO). https://www.cbo.gov/system/files/115th-congress-2017-2018/presentation/52819-presentation.pdf

Institute of Medicine (IOM) convened a blue ribbon panel, chaired by two former Medicare program administrators, to examine GME financing and recommend changes in the public interest.[50] In its 2014 report, the IOM panel identified a mismatch (i.e., an overproduction of specialist and an underproduction of generalist physicians) between the health needs of the population and specialty makeup of the physician workforce as one of the deficiencies of Medicare's GME financing.[51] The report recommended several significant changes to Medicare's GME financing system but it did not identify the Medicare PFS contribution to the income gap as a key factor in the PCP/specialist imbalance.

The trend in residency positions and composition over the years indicates residents' valuable contributions to teaching hospitals' revenues. Through the Balanced Budget Act of 1997 (BBA), Congress placed a cap on Medicare GME funding and various stakeholders, including the Association of American Medical Colleges (AAMC) which represents teaching hospitals, have argued that the cap should be lifted in order to assure an adequate supply of physicians to meet the needs of an aging population. The IOM report, however, noted that an increase in GME funding was unnecessary to the production of more physicians.[52] Enrollment in US medical schools during the current millennium increased considerably despite the fact that most of the new residency positions over this period were subject to the cap and did not generate additional Medicare GME revenues. Moreover, the specialist residency FTEs increased by a larger percentage than PCP residency FTEs over the post-BBA period.[53]

Of course, Medicare is not the only source of financing GME. Medicaid, other HHS programs, the Veterans Administration (VA), and private insurers pay as well, although it is often difficult to determine how much. But, in terms of level of expenditure, Medicare dominates other payers' influences. As indicated in Exhibit 5, for example, the annual Medicare spending on DGME and IME exceeds $11.3 billion, far more than any other targeted subsidies to channel medical education in socially desirable directions. MedPAC analysis has shown that the IME adjustment is approximately twice what can be justified based on the costs of training residents.[54]

As suggested in our discussion of the market for medical education services, because residents support the provision of services in their specialty areas, teaching hospitals must consider the effects of

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[50] IOM (Institute of Medicine). 2014. Graduate medical education that meets the nation's health needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/18754.

[51] The report states, "Hospitals' control over the allocation of GME funds may also encourage the overproduction of specialists in disciplines that generate financial benefits for an individual institution rather than for the health care system overall." P. 101

[52] IOM (Institute of Medicine). 2014. Graduate medical education that meets the nation's health needs. Washington, DC: The National Academies Press. https://doi.org/10.17226/18754.

[53] At various times the US Congress enacted additional adjustments to Medicare GME payments to encourage primary care but, like the GME payment cap, they did not materially affect the specialist/PCP imbalance.

[54] Miller, M. E. (2015). Hospital Policy Issues. MedPAC. http://www.medpac.gov/docs/default-source/congressional-testimony/testimony-hospital-policy-issues-ways-and-means-.pdf?sfvrsn=0

residency offerings on the profitability or unprofitability of hospital care to Medicare patients. In general, surgical cases tend to be more profitable than nonsurgical cases,[55] and the IME adjustment tends to exacerbate this phenomenon. For example, the IME add-on for a relatively less expensive case, such as pneumonia, might add about $30 to the DRG payment, while the add-on for a more complex case, such as bypass surgery, might add ten times as much to the DRG payment. In addition, there are no add-on payments for care provided in the outpatient setting where much of the work of primary care residents and PCPs is conducted.

Exhibit 4

Federal Spending on Graduate Medical Education (GME) Training, 2015

Program	Total GME spending (dollars in millions)	Percent of total spending (percent)
HHS programs		
Medicare	10,335	71
Medicaid (federal share)	2,351	16
Children's Hospital GME Payment Program	249	2
Teaching Health Center GME Program	76	1
VA program	1,499	10
Total	**14,509**	**100**

Source: GAO analysis of Departments of Health and Human Services (HHS) and Veterans Affairs (VA) data; and GAO web-based survey administered to state Medicaid agencies. | GAO-18-240

Because of the amount of money involved and the lack of accountability on how teaching hospitals spend it, it is not surprising that the IOM study, MedPAC, and other authorities have suggested that Medicare should reprogram the DGME and IME subsidies in the public interest. While such proposals may have merit, it is hard to understand how they might reverse the incentives associated with the income gap. Moreover, while the way that Medicare subsidizes medical education in teaching hospitals is not a determinant of the income gap, it does appear that teaching hospitals may have an interest in maintaining the status quo in preserving the specialist-oriented mix of residency positions.[56]

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[55] Koch, E., Becker, S. (2004). MedPAC Study – A Review of Findings Released October 28-29, 2004. MedPAC. https://www.beckershospitalreview.com/pdfs/articles/MedPac.pdf; Shi, L., Sing, D.A. (2011) The Nation's Health. Jones & Bartlett Learning. https://books.google.com/books?id=ttJIwRGuDPcC&pg=PA558&lpg=PA558&dq=are+some+DRGS+more+profitable+than+others+specialties+medicare&source=bl&ots=L3ViZcrC2I&sig=e_-%20XbIrXIFLmf5Cz5BpP2xlFjeA&hl=en&sa=X&ved=0ahUKEwj79JDxscvZAhXjUN8KHXRmCfUQ6AEIKzAA#v=onepage&q=are%20some%20DRGS%20more%20profitable%20than%20others%20specialties%20medicare&f=false

[56] Weida et al. (2010). Loss of Primary Care Residency Positions Amidst Growth in Other Specialties. Robert Graham Center. https://www.graham-center.org/rgc/publications-reports/publications/one-pagers/loss-of-primary-care-residencies-2010.html

Policy Implications

Our analysis indicates that, if we want to raise the proportion of doctors who are PCPs in the US, we can't afford to ignore the income gap. In light of the apparent oversupply of specialists relative to PCPs in the US, it may seem surprising that the prices paid to specialists remain so stubbornly high. The reason that the market doesn't reduce the gap organically is due to the artificial way that different services are priced in the US, particularly through the Medicare relative value scale and its adoption by other payers. Raising prices for services that PCPs perform without lowering prices for tests, imaging, and services that specialists perform would reduce the gap but increase Medicare spending substantially. Lowering the prices of services that specialists perform would also reduce the gap, but the history of Medicare payment policy shows that payment reductions, however, sensible, are difficult to achieve. Nonetheless, Medicare's contribution to the gap, and the harm that results from it, would suggest that fundamental changes are warranted.

At various times, the US Congress enacted adjustments to Medicare GME payments to encourage primary care. For example, Congress placed a two-year freeze on increases in the per-resident subsidy for non-primary care residents, and applied a weighting factor to adjust direct GME payments in favor of primary care residents. None of these changes had a substantial effect on Medicare payments and, like the GME payment cap discussed above, they did not materially affect the specialist/PCP imbalance.[57]

Since Medicare's contribution to the gap operates through the PFS, less reliance on the PFS to compensate PCPs might narrow the gap. In 2015, for example, MedPAC recommended augmenting PCP compensation with per-beneficiary payments to supplement per-service payments.[58] More recently MedPAC has explored changes to the fee schedule, such as raising the fees for evaluation and management services provided in the outpatient setting, services that furnish the bulk of Medicare income to PCPs, and reducing payment for other services such that the net effect is budget-neutral. Not only would this reduce the PCP/specialist income gap somewhat, it would also benefit physicians in cognitive specialties who, like PCPs, rely on patient visits to generate Medicare income.[59]

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[57] See https://www.aamc.org/advocacy/gme/71152/gme_gme0001.html for an explanation of Medicare GME subsidy payments and adjustments over time.

[58] MedPAC (2015). Report to the Congress: Medicare Payment Policy. http://www.medpac.gov/docs/default-source/reports/mar2015_entirereport_revised.pdf. While we focus here on the PFS, growth of Alternative Payment Models (APMs) is another important mechanism for disconnecting PCP compensation from the per-service PCP/specialist payment differences driven by the RBRVS.

[59] Winter, A., Hayes, K. (2018). Medicare accountable care organization models: Recent performance and long-term issues. MedPAC. http://www.medpac.gov/docs/default-source/default-document-library/rebalancing-fee-schedule-towards-e-m_jan-2018_public.pdf?sfvrsn=0

Thus, our principal recommendation for Medicare to reduce the income gap is to alter relative payments under the PFS, but what about GME financing policy? Are there any changes there that could also favorably influence the PCP/specialist mix? Our analysis would suggest that just focusing on the supply side, such as forcing teaching hospitals to increase PCP residencies in order to maintain their GME subsidies, would be unlikely to result in more PCPs in practice. However, there may be policies that focus directly on physicians in training that might have some effect on specialty choice.

We should recognize that the income stream of a physician begins with four years of expense and foregone earnings during medical school, followed by three or more years of modest earnings during residency and fellowship,[60] before the physician enters practice and begins to realize a return on investment in medical education. Because of the time value of money and difficulties and expense of long-term borrowing by these individuals, policies that address a dollar of relative expense and income during these early years should have a disproportionate effect on specialty choice compared to a dollar of income years later in medical practice. Subsidies that are paid directly to doctors in training rather than to teaching hospitals would reduce the effect of the income gap and therefore be a potential tool to modify the effect of the income gap.

In a 2016 report, the Congressional Research Service summarized 25 federal loan repayment and forgiveness programs for health care and public health professions.[61] The most well-known of these are National Health Service Corps programs operated by the Health Resources and Services Administration, one of which is designed to encourage primary care physicians to practice in health professional shortage areas. However, no programs exist solely to encourage doctors in training to select primary care practice over specialization without geographical strings attached. A loan forgiveness program that subsidizes medical school tuition and expenses in return for some minimum number of years practicing in a primary care specialty (say, one year of practice for every year of subsidy) could have a considerable effect on specialty choice.

In a 2017 article, Marcu, et al. provided data and analysis suitable for estimating the effect of a loan forgiveness program in reducing the income gap between PCPs and specialists.[62] Forgiving loans totaling $180,000 (the median level of debt for students entering medical school in 2013) for the 4 years of medical school, in return for entering and remaining in a primary care specialty, would have the effect of substantially reducing the net present value (NPV) difference in income streams of PCPs compared to specialists who would borrow the same amount but repay the loans over a 10-year period

[60] Resident and fellow salaries are determined largely by their year of training rather than the specialty they are in.

[61] Hegji, A., Smole, D.P., Heisler, E. (2016). Federal Student Loan Forgiveness and Loan Repayment Programs. Congressional Research Service. https://fas.org/sgp/crs/misc/R43571.pdf

[62] Marcu, et al. (2017). Borrow or Serve? An Economic Analysis of Options for Financing a Medical School Education. *Academic Medicine,* 92(7); 966-97. https://www.ncbi.nlm.nih.gov/pubmed/28121649.

after residency.[63] For example, this subsidy would raise the NPV of going into General Internal Medicine in Washington, DC, from $1,456,000 (total loan repayment) to $1,835,000 (no loan repayment), a NPV that would exceed that of the ophthalmology NPV (total loan repayment) of $1,573,000.[64]

Of course, a subsidy program of this nature would be expensive, in large part because students who would enter primary care without financial incentives would receive the same subsidy as those who were induced to enter primary care by the loan forgiveness program. As a crude approximation, if all students entering family medicine or general internal medicine residencies took the loan with the intention of having it forgiven, the annual cost would be about $2 billion.

This cost could be reduced if the amount of the subsidy were linked to medical school performance, such as score on the Step 1 exam and other performance metrics. In addition, making the subsidy performance based would encourage high-performing students to enter primary care and reduce the free-rider problem. It could be especially important to encourage high performing students to enter primary care practice as many trends in payment reform are relying on PCPs to "captain the ship" in team-based medicine where many physician and non-physician providers are members of the care team. In addition, this approach might also reduce the negative impression that some students have that primary care is a refuge for low-performing or unambitious students.[65]

Another mechanism to reduce such debt burden is to eliminate tuition for medical students; most recently New York University (NYU) School of Medicine announced that they would provide grants to cover tuition for all of their medical students, regardless of need.[66] Tuition burden reduction could provide an upstream incentive of some significance that could influence specialty choice, but the income gap may be too powerful to overcome through just the elimination of medical school tuition. Subsidizing all students' educational expenses would actually preserve the income gap differences between PCPs and specialists. If one wants to encourage students to elect primary care, it would be much more effective and efficient to subsidize only PCPs' educational costs.

We acknowledge that there are many programs in effect to raise access to primary care services. It is beyond the scope of this analysis to evaluate these programs individually but we note that the amount of funding of such programs is small relative to the magnitude of the specialty mix problem and to the

[63] Marcu et al's analysis includes a Federal Stafford loan interest rate of 6.21 percent and current estimates of resident salaries and annual incomes in various specialties over a 30-year career. Marcu et al did not analyze a full subsidy loan program but they did analyze a no-strings scholarship program, which we regard as computationally equivalent to a full subsidy loan program.

[64] Ophthalmology was selected as an example because it is one of the EROAD specialties; however, the gap would remain large in some specialties, such as orthopedic surgery.

[65] Insight provided by 3d year medical student at Tulane University Medical School, class of 2020.

[66] Chen, D.W. (2018). Surprise Gift: Free Tuition for All N.Y.U. Medical Schools. *The New York Times*. https://www.nytimes.com/2018/08/16/nyregion/nyu-free-tuition-medical-school.html

subsidies Medicare pays to teaching hospitals to train residents.[67] If the IME adjustment to inpatients DRG payments were halved, as MedPAC has recommended, over $3 billion would be made available annually.[68] To improve the availability of primary care services some of these funds could be deployed in a direct subsidy program of the type outlined above, which we believe would be more effective than the supply-side reforms recommended by the IOM. If a reduction in Medicare GME payments were to be the source of funding this program, there should be a requirement that a PCP who receives the loan-forgiveness subsidy should see a minimum number of Medicare and Medicaid patients. Including Medicaid patients in the minimum requirement would have the advantage of encouraging pediatricians to participate in the program.

A loan-forgiveness program would be a useful complement to reforms of the Medicare RBRVS. The subsidy program would work more quickly and students could have more confidence in its long-term impact for them. The specialty mix problem is enormous and our track record in reforming the RBRVS (it is done infrequently and the gains have been eroded over time) is spotty, which means that while RBRVS reform is the ultimate policy to address the issue, we should not hesitate to pursue this additional tool.

[67] Edmunds M., Sloan F.A., and Steinwald, A.B. (2012). Geographic Adjustment in Medicare Payment: Phase II: Implications for Access, Quality, and Efficiency. Institute of Medicine of the National Academies, National Academy Press, 2012.

[68] In fairness to MedPAC its recommendations have been more oriented to redeploying GME payments in hospitals to be more accountable for achieving policy objectives rather than removing the subsidy dollars from hospitals. Nevertheless, redirecting some of these dollars to reducing the income gap would, in a large sense, retain the money within the medical education system. See MedPAC's June 2010 for a summary of its recommendations for reprogramming GME payments.

Conclusion

The principal findings of the preceding analysis may be summarized as follows:

- The mix of physicians in the US has too few PCPs and too many specialists.
- The income gap between PCPs and specialists is a major determinant of the PCP/specialty mix.
- Medicare physician payment policy is a major contributor to the income gap.
- While Medicare GME payment policies do not appear to be a potent force in specialty determination, they also do not provide a counterforce to the influence of the gap.
- Changes in GME payment to hospitals to favor training of primary care physicians have little potential to make a meaningful difference because other incentives affecting physicians-in-training and teaching hospitals are too powerful. Redirecting these resources towards loan forgiveness for those medical students who pursue careers in primary care appears more promising.
- But none of the approaches focused on medical education are likely to be fully successful unless the Medicare relative value scale is also revamped so that it contributes less to the income gap.[69]

We acknowledge that the income gap and specialty imbalance is part of a larger need to examine the health care workforce in the US and related policy issues such as access to care in underserved areas.[70] Nevertheless, the influence of Medicare on the US health care system as a whole provides an opportunity to use Medicare payment policy to achieve broad social objectives such as influencing the specialty choices made by doctors in training when they decide in what field to practice medicine.

[69] In addition to the analysis above, our informal interviews of hospital executives and health policy experts support our view that the incentives embodied in the Medicare fee schedule tend to overwhelm all other incentives, such as government funded workforce programs and Medicare subsidies to teaching hospitals.

[70] The Affordable Care Act of 2010 required the Comptroller General to appoint a 15 member National Health Care Workforce Commission but, because the Commission was never funded, it has never met.

The USC-Brookings Schaeffer Initiative for Health Policy is a partnership between the Center for Health Policy at Brookings and the USC Schaeffer Center for Health Policy & Economics and aims to inform the national health care debate with rigorous, evidence-based analysis leading to practical recommendations using the collaborative strengths of USC and Brookings.

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