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The Geography of Graduate Medical Education: Imbalances Signal Need for New Distribution Policies

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Abstract

Graduate medical education (GME) defines the overall number, specialty make-up and geographic distribution of the U.S. physician workforce. Medicare GME payments represent the largest single public investment in health workforce development but it is an inflexible system that is drawing scrutiny for its rationale, effectiveness and balance. We analyzed Medicare hospital cost reports for teaching hospitals and found large state level differences in the number of Medicare sponsored residents per population, total Medicare GME payments, payments per person (ranging from \$1.94 to \$103.63 per person in Montana and New York, respectively), and average payments per trainee (ranging from \$63,811 to \$155,135 per trainee in Louisiana and Connecticut, respectively).

Options to address these imbalances include ensuring those states that receive less Medicare GME are prioritized or protected in the case of increases or decreases in funding and the re-examination of the Medicare GME formulas. The state level variation highlights that the GME system badly needs flexibility and the capability to deliberate and make policy about public investments in graduate medical education.

Introduction

Graduate medical education (GME) is the final common pathway into medical practice in the United States. Every state requires one or more years of residency training to be eligible for a medical license and most physicians today complete three or more years of GME to qualify for specialty board certification. The federal government provides more than \$10 billion annually in payments to teaching hospitals in support of GME and, thereby, occupies a central position in the residency programs in the country. This position is a “quiet” one, governed by Medicare GME payment policies that are modified only occasionally; but it is a potent one because the size and rules of the federal contribution mean that federal policy is a dominant force in the nature and location of residency training in the country.

It is the latter issue – the location of federally sponsored GME – that we propose to examine in this paper. It is well known that a great deal of residency training is concentrated in certain urban centers and also that many newly populous and rural states are concerned

about their relative lack of GME. These issues are important not only because of the known association between site of training and locale of practice¹ but because GME has become so dependent on federal support, raising questions about equity in public funding. The geographic imbalance in GME support also presents a challenge to the current Medicare GME system that does not have built in mechanisms for reallocation of positions. We will use the question of geographical imbalances to explore options for re-balancing federal GME support.

This paper will seek to answer the following questions: What is the geography of the current Medicare GME system? Are there state or regional imbalances? Can the case be made for reallocation of positions? If so, how might this be done?

Background

Since its inception, the Medicare program has subsidized teaching hospitals to provide residency and fellowship training to the majority of the nation's doctors. In 2010, Medicare provided \$10.1 billion to nearly 1,200 hospitals to support the training of over 89,000 residents and fellows.² In the same year, there were approximately 110,000 residents in allopathic programs³ and up to an additional 5,700 in osteopathic programs.⁴ The Department of Veterans' Affairs, the Department of Defense, and children's hospitals also sponsor residency programs but with limited Medicare funding.

The original Medicare law, passed in 1965, recognized the value of medical education in health care settings and established the precedent for payments to support GME "until the community undertakes to bear such education costs in some other way".⁵ Between 1965 and 1983, hospitals added their GME costs to their Medicare bills as part of their "usual and customary charges" that were made to Medicare under a retrospective cost-base reimbursement system.

In 1983, Medicare moved to a prospective payment system based on diagnosis-related groups. Since GME costs were not related to diagnoses, the concepts of direct graduate medical education and indirect graduate medical education payments were introduced at this time. Direct payments were based on each teaching hospital's per resident cost, number of residents, and Medicare's share of inpatient days. Per resident costs included salaries and benefits for residents, faculty, and administrative staff, and other explicit costs associated with the residency program.

Indirect payments were designed to compensate teaching hospitals for the fact that teaching hospitals were, on average, more expensive than non-teaching hospitals. It was argued that teaching hospitals cost more for a number of reasons, including the undocumented additional costs associated with teaching residents, severity of illness of their patients and maintenance of specialized services and treatment programs.⁶ Analyses at the time found teaching hospitals to cost more than non-teaching hospitals by 5.69% for every 10% increase in intern-and-resident-to-bed ratio of the hospital.⁷ Congress doubled that adjustment to an 11.59% add-on in launching the new payment system.⁸

These direct and indirect payment formulas made Medicare GME support explicit and visible. While annual GME expenditures have been relatively small in the overall calculus of Medicare, from 1983 onward Medicare GME has been by far the largest single federal investment in health workforce development. The indirect payment formulas have been adjusted downward over time, however, the numbers of residents and fellows grew steadily from 1983. By 1997, amidst concerns that the U.S. had an oversupply of physicians, Congress chose a blunt instrument to modify Medicare GME support. The Balanced Budget Act of 1997 "capped" the number of residency slots at each hospital for which Medicare

would reimburse. Hospitals are at liberty to train any type and number of specialties it sees fit, but it will only be compensated for its allocated cap. This policy, with minor exceptions, has remained in place since that time. It should be noted, the Medicare cap is not a cap on the number of GME positions teaching hospitals can train and, in fact, almost 15,300 new positions have been added to the system since 1997^{3,9} - evidence that hospitals can and have added GME positions without additional Medicare funding.

The formulaic nature of the payments and the historical methods for setting per resident amounts and resident caps, have created a wooden system which is not amenable to changes to match GME funding with current local, regional and national needs. Efforts have been made to reform the system to reduce inequities in payments between hospitals and incentivize training in select specialties and geographic locations. In order to reduce variations in payment levels, the Benefits Improvement and Protection Act of 2000 established a ceiling and floor for all hospitals' per resident amounts, which are used to calculate direct payments. However, significant variation in overall payments persists related to the indirect payment formula.¹⁰ Indirect payments are calculated as a percent add-on to the inpatient prospective payment system - based on each hospital's intern- and resident-to-bed ratio. Hospitals that have higher resident caps, which were set at the level of training in 1997, can achieve higher ratios that result in higher indirect payments.

In addition to the number of residents, direct and indirect GME payments to hospitals can vary based on a number of hospital and health system characteristics. As noted previously, the direct payment formula is calculated based on each hospital's Medicare share of inpatient days. Therefore, a hospital that cares for relatively more Medicare patients will receive a relatively higher direct GME payment. As the indirect payment is calculated as an add-on to Medicare inpatient reimbursements, hospitals that provide more inpatient service will also receive more total indirect GME payments. In light of recent studies demonstrating significant geographic variations in Medicare spending, with higher spending associated with more inpatient and specialist-oriented patterns of practice,¹¹ the indirect add-on inflates the cost of care for teaching hospitals in higher spending regions.

Under the Medicare resident cap policy, Congress has also acted twice to redistribute unused cap positions, in the Medicare Modernization Act of 2003 and again in the Patient Protection and Affordable Care Act of 2010. In both cases, Congress and the Administration prioritized residency programs in rural and underserved areas and in primary care to receive redistributed positions. However, evaluation of the 2003 redistribution suggests these efforts failed with little gains in these areas.¹² Health care reform and deficit reduction efforts in recent years have brought Medicare GME under increasing scrutiny from a number of sources -- including the Medicare Payment Advisory Commission¹³, the Council on Graduate Medical Education¹⁴, the National Commission on Fiscal Responsibility and Reform¹⁵, and the President's 2013 and 2014 budgets^{16,17}. In contrast, medical educators and political leaders from states with new medical schools want additional federal support for residency positions to accommodate their new graduates. Others want expansion of Medicare cap to fund those positions that hospitals have added since 1997^{18,19}.

The prospective payment system launched in 1983 and the Balanced Budget Act of 1997 have put in place a program that has grown up with certain characteristics and a specific geography. The positions that were initially funded in 1983 and those that were added in the period from 1983 to 1997 are effectively "owned" by the hospitals to which they are assigned and Medicare funds flow to them based on the direct and indirect GME formulas.

Study Data and Methods

Data Sources

We used the Centers for Medicare and Medicaid Services Healthcare Cost Report Information System's submitted Medicare cost reports for hospitals in FY 2008–2010. All teaching hospitals requesting Medicare GME payments report their number of resident cap (the maximum number of residents who qualify for Medicare GME payments), total number of residents trained, and level of payment for direct GME. Teaching hospitals also report a separate resident cap, total number of residents trained, and level of payment for indirect GME. State population data is from the U.S. Census Bureau 2010 Census. Hospital cost reports also provided hospital state information.

Analysis

We determined each hospital's numbers of resident cap and residents trained, using 2010 hospital cost reports and backfilling with 2009 then 2008 reports as needed for missing data. We preferentially used data reported for direct over indirect GME payments. The difference between resident cap and residents trained was calculated to determine "over cap" training. A total GME payment was calculated as the sum of each hospital's direct and indirect GME payments.

For each state, we generated a total state resident cap by summing each hospital's reported resident caps in the state. A state total number of residents trained and total GME payments were generated as the sum of each reported measures for all hospitals in each state. In Wyoming, only two hospitals were identified as teaching hospitals receiving GME payments. Hospitals may affiliate with other hospitals for GME training and receive Medicare payments under the affiliate hospital's resident cap. Neither hospital in Wyoming reported a resident cap in their cost reports. Total state resident cap was generated for these two hospitals based on their Accreditation Council for Graduate Medical Education resident positions and rotation months in these hospitals.²⁰ This cap was not included in the total national cap.

State population data was used to calculate a state level resident cap per 100,000 people and GME payment per population. A national resident cap per 100,000 people was calculated from the total cap in all states. A state average GME payment per resident was calculated as the state total GME payments divided by the number of residents qualifying for Medicare payments in a state. Number of residents qualifying for Medicare payments for each state was generated as the sum of the lesser of each hospital's resident cap or number of residents trained. A national GME payment per resident was calculated as the total GME payments in all states divided by the total number of residents qualifying for Medicare payments in all states.

Limitations

Hospitals report full time equivalents of resident time spent in the hospital. These counts likely underrepresent the number of individuals in training due to time spent in activities that don't qualify for Medicare GME payments or for time spent training outside of the hospital. These counts also don't include resident positions supported through other GME payment programs, such as Children's Hospital GME program, and Department of Veteran's Affairs and Department of Defense GME.

Study Results

There were large differences in states' total Medicare residents funded, residents per population, total GME payments, GME payments per population, and average GME payment per resident trainee (Exhibit 1). State total resident caps ranged from 16.09 in Montana to 14,945.91 in New York. Resident cap per population ranged from 1.63 per 100,000 people in Montana to 202.87 per 100,000 people in the District of Columbia. The next highest state cap per population was 77.13 per 100,000 people in New York. The national cap per population was 29.31 per 100,000 people. Median state cap per population was 19.36 (California).

Total GME payments per state ranged from \$1.64 million in Wyoming to \$2 billion in New York. GME payments per person ranged from \$1.94 in Montana to \$172.85 in the District of Columbia. The next highest state GME payment per population was \$103.63 in New York. National GME payment per population were \$32.31. Median state GME payment per population was \$18.32 (Kansas).

State average GME payment per resident trainee ranged from \$38,294 in Puerto Rico to \$155,135 in Connecticut. The national average GME payment per resident was \$112,642. Median state average GME payment per resident was \$102,382 (South Dakota). Out of 1,220 total teaching hospitals reporting to Medicare, 666 teaching hospitals (54.6%) reported training numbers above their Medicare resident cap for a total of 12,253 residents training over cap.

Of note, while some states have relatively high resident caps per population, they receive lower average GME payments per resident. For example, Louisiana is the 10th densest state in terms of Medicare funded residents per population. However, the state received, on average, \$63,811 per resident. Only two states and Puerto Rico receive smaller average GME payments per resident than Louisiana.

States in the Northeast generally have higher cap per population (Exhibit 2) and receive higher levels of GME payments per populations (Exhibit 3). Southern states appear to receive generally lower average GME payments per resident trainee (Exhibit 4).

Discussion

These findings document considerable variability in the “geography” of Medicare GME. This variability can be seen in Medicare GME funds received per state, the number of Medicare sponsored residents per population, Medicare GME funds per person in each state, and Medicare GME payments per trainee in each state.

In high-density residency training states such as New York, Massachusetts, and Rhode Island, Medicare supports twice as many residents per population as the national average of residents per population. New York alone has more residents than 31 states combined. The amount of Medicare GME funds received per state varies from New York which gets 19.89% of all Medicare GME funding to 29 states which receive less than 1%. The average per resident payment, which is driven by the payment formulas, results in a four-fold variation in the state average per resident amount received. As a result of these differences, Medicare GME contributes \$103.63 per person in New York state but only \$19.99 per person in Iowa and \$1.94 per person in Montana.

These data document a substantial imbalance favoring the northeastern part of the country with large industrial states, such as New York, Massachusetts, and Pennsylvania having a marked advantage in terms of the Medicare sponsored residents per population, Medicare

GME funds received per state, and Medicare GME funds per person. Some of these differences are related to the payment formulas and characteristics of hospitals and the health systems in which they reside. However, a large portion of the differences are caused by the historical development of graduate medical education in the first half of the 20th century, which was largely a phenomenon of the northeast, that was then frozen in place by the Medicare GME position cap in 1997.

Since 1997, the country has grown and moved westward and southward with implications for GME. For example, during the decade from 2000 to 2010, the populations of the resident poor states of California, Florida, and Texas grew 10%, 17.6% and 20.6 % respectively whereas the residency rich states of New York, Massachusetts, and Pennsylvania grew at the much more constrained levels of 2.1%, 3.1% and 3.4% respectively²¹. Medical schools entered a period of expansion in the 2000s with most schools having increased their class sizes and 26 new allopathic and osteopathic medical schools opened since 2000,^{22,23} many in southern and western states. Governors and legislators, in particular, who knew little about Medicare GME are now aware that their investments in new or expanded medical schools face a substantial barrier in that their residency programs are underbuilt and unable to expand rapidly, guaranteeing that many of their new graduates will have to leave the state to find residency positions.

The absence of increased federal subsidies for GME positions has generated legislative proposals to increase the number of Medicare funded residencies by 15,000 at a cost over \$1 billion per year^{18,19}. Despite prominent advocates, the Congress has ignored the calls for more GME funding in the Patient Protection and Affordable Care Act and subsequently. The agitation for further federal assistance is likely to become more pronounced in future years as the number of U.S. medical school graduates continues to increase at a rate faster than hospitals add residency positions.

What are the implications of the geographic disparities in Medicare GME subsidization? Analysis by the Association of American Medical Colleges suggests about 50% of residents will locate in the state of their residency training. If a resident also went to medical school in the same state, the likelihood of remaining in state for practice rises to 66%²⁴. While these figures attest to the mobility of young physicians, a state is clearly advantaged in developing its physician workforce if it can train its own residents.

Policy Implications

The geographic variability of GME inevitably raises questions about balance and rebalance. If the current pattern of distribution is seen to be inequitable or contrary to the demographic trends in the country, what can be done about it? The position of academic medicine has largely been to call for more federally subsidized positions. The call for increased cap, however, raises the question of distribution of additional positions -- which institutions would receive the new subsidies? This question was not part of the pre-1997 world of GME where institutions could add positions as a matter of entitlement. An allocation of new cap at this time would require specific decision making on the part of the Congress or the Administration. Any expansion of publicly funded GME positions should consider the geography of GME demonstrated here and ensure expansion of resident positions in states and communities that are physician and resident poor as compared to the nation as a whole.

The realities of the current fiscal environment, however, make expansion of Medicare GME in the near future seem unlikely. As noted above, a number of important policy voices, are calling for cutbacks in the Medicare GME subsidy¹⁵⁻¹⁷. If Medicare GME is downsized by Congressional action, the geography of GME should again be taken into account. Any cuts

should limit the negative impacts on states and localities that have historically received less federal support for GME or have lower physician-to-population ratios.

In a steady state scenario, where funding levels are unchanged, the question persists; should the current imbalanced system remain frozen in perpetuity? The Medicare Payment Advisory Commission has long found that the indirect payment rate is set at nearly twice empirically justified costs. Their June 2010 Report to Congress recommended reducing indirect payments and redistributing the funds back into a new standards-based GME system. This principle (re-purposing of unjustified payments) could be used for geographical redistribution, creating new positions without increasing the overall Medicare funding for GME.

Finally, it is time to re-evaluate the GME payment formulas to determine if the wide variation in both direct and indirect payments is achieving the goals desired by policymakers and the public. In light of regional variations in Medicare spending related to heavier reliance on inpatient and specialty-oriented care and of innovations in payment policies, such as Accountable Care Organizations, is it time to uncouple the indirect payment from the inpatient prospective payment system?

In distinction to the pre-1997 world, the future of Medicare GME is one that will call for GME policies to be clearly articulated and implemented. Whether the program is expanded, contracted, or held at steady state, decisions will need to be made about priorities and the potential movement of resources from one locale to another. Formula-driven GME combined with blunt reforms that capped individual hospitals at their 1997 training levels have created a very irregular geography and, effectively, robbed current policy makers of the ability to make strategic judgments about this \$10 billion provided annually to teaching hospitals in the name of graduate medical education.

The current geography of GME serves to remind us that the GME system badly needs a central capability to deliberate and make policy about public investments in graduate medical education. This central capability will need to be coordinated to account for federal, state, and local workforce needs and policies. Deliberation and policy making will, in turn, need an implementation capability to go with it. These reforms will be essential to transforming our system of medical education to meet the needs of a growing and more fully insured American population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Exhibit 2.

State Medicare Graduate Medical Education Position Cap Per Population

Exhibit 3.

State Medicare Graduate Medical Education Payment Per Population

Exhibit 4.

State Medicare Graduate Medical Education Average Payment Per Resident

Exhibit 1

Top and Bottom State Medicare Graduate Medical Education Cap and Payments by Cap per 100,000 Population *

State	Resident Cap per 100,000 population	Resident cap	Medicare GME payments	Medicare GME payment per population	Medicare GME average payment per resident
1. NY	77.13	14,945.91	\$2,008,212,352	\$103.63	\$139,126
2. MA	66.08	4,326.75	\$559,342,464	\$85.43	\$131,456
3. RI	61.48	647.12	\$85,505,264	\$81.23	\$133,615
4. PA	54.48	6,919.73	\$906,942,080	\$71.40	\$133,879
5. MI	53.05	5,242.82	\$738,040,256	\$74.67	\$141,126
6. CT	49.65	1,774.65	\$266,880,096	\$74.67	\$155,135
7. OH	42.62	4,917.05	\$557,152,512	\$48.29	\$115,074
8. VT	40.28	252.02	\$30,480,536	\$48.71	\$120,945
9. LA	38.48	1,744.31	\$92,605,816	\$20.43	\$63,811
10. IL	38.46	4,935.30	\$501,300,640	\$39.07	\$103,944
41. HI	13.84	188.26	\$17,672,158	\$12.99	\$97,744
42. OR	12.86	492.63	\$64,324,804	\$16.79	\$130,678
43. ND	11.52	77.47	\$10,222,957	\$15.20	\$137,111
44. MS	11.25	333.84	\$22,162,972	\$7.47	\$67,527
45. NV	9.10	245.73	\$25,842,044	\$9.57	\$109,514
46. SD	8.84	71.96	\$7,367,380	\$9.05	\$102,382
47. WY**	6.64	37.40	\$1,642,154	\$2.91	\$43,908
48. AK	3.15	22.40	\$2,253,992	\$3.17	\$100,625
49. ID	2.24	35.18	\$3,936,231	\$2.51	\$111,888
50. MT	1.63	16.09	\$1,917,594	\$1.94	\$129,392
US Total	29.31	91,559.05	\$10,094,758,522	\$32.31	\$112,642

* Full State results are available in the Technical Appendix. To access the Appendix, click on the Appendix link in the box to the right of the article online.

** In WY two hospitals reported GME payments but reported no resident cap or numbers in training. The total cap was determined based on ACGME program information.