Beyond Training the Next Generation of Physicians: The Unmeasured Value Added by Residents to Teaching Hospitals and Communities

Krystal L. Tomei, MD, MPH, Luke V. Selby, MD, MS, Lynne M. Kirk, MD, Jacqueline A. Bello, MD, Nathan S. Nolan, MD, MPH, Surendra K. Varma, MD, Patricia L. Turner, MD, MBA, Victoria Stagg Elliott, MA, and Sarah E. Brotherton, PhD

Abstract

Following medical school, most newly graduated physicians enter residency training. This period of graduate medical education (GME) is critical to creating a physician workforce with the specialized skills needed to care for the population. Completing GME training is also a requirement for obtaining medical licensure in all 50 states. Yet, crucial federal and state funding for GME is capped, creating a bottleneck in training an adequate physician workforce to meet future patient care needs. Thus, additional GME funding is needed to train more physicians.

When considering this additional GME funding, it is imperative to take into account not only the future physician workforce but also the value added by residents to teaching hospitals and communities during their training. Residents positively affect patient care and health care delivery, providing intrinsic and often unmeasured value to patients, the hospital, the local community, the research enterprise, and undergraduate medical education. This added value is often overlooked in decisions regarding GME funding allocation. In this article, the authors underscore the value provided by residents to their training institutions and communities, with a focus on current and recent events, including the global COVID-19 pandemic and teaching hospital closures.

The graduate medical education (GME) system in the United States has trained generations of physicians who have greatly improved the health and longevity of the population.1 In 2014, the Institute of Medicine affirmed the value of the $15 billion in annual funding for GME provided by Medicare, Medicaid, and other public revenue streams but stated that continued funding should be contingent on demonstrated value and contribution to the nation’s health needs.2 Currently, the largest source of GME funding is Medicare, followed by other public and private sources.3,4 Numerous government officials have proposed cuts to the GME funding provided by Medicare, including reallocating GME funding to pay for postgraduate clinical training for physician assistants and nurse practitioners.5

In the United States, the current physician workforce is insufficient to meet the country’s future patient care needs. For example, the 2021 Association of American Medical Colleges’ report on the physician workforce projected a shortage of 37,800 to 124,000 physicians by 2034.6 This includes shortages of 17,800 to 48,000 primary care physicians; 3,800 to 13,400 medical specialists; 15,800 to 30,200 surgical specialists; and 10,300 to 35,600 specialists in pathology, neurology, radiology, and psychiatry, among others.7 To address these shortages, in the last 2 decades, new MD-granting and DO-granting medical schools have opened and overall medical school enrollment has grown, leading to a 52% increase in the number of matriculants (10,179) between 2002 and 2018, an annual increase of more than 3%.7 However, the number of entry-level GME positions, whether Medicare-funded or not, has not kept pace, increasing by 1% annually for many years and only recently increasing by nearly 3% annually.8 A significant barrier to increasing the number of GME positions is the funding mechanism for GME. The Balanced Budget Act of 1997 capped, with some exceptions, the number of residents that most teaching hospitals may count for Medicare payment as the number of full-time residents who were in place in 1996.9 This cap exists despite the growth and aging of the U.S. population. As a result, currently, many GME positions are funded “over the cap” by health systems and hospitals that perceive value in this investment.

Some have used the monetary and abstract benefits of resident education as a rationale for reforming the GME funding system in its entirety, pointing out that residents “pay for themselves” by earning salaries under market rate. However, it is imperative to recognize that residency is a balance of service and education, as both are necessary components of physician training. Therefore, simply considering residents to be willfully underpaid employees would inappropriately minimize the educational requirements and purpose of these training programs as well as ignore the match process by which residents obtain GME positions that does not allow for salary negotiation. Despite this dual nature of residency programs, we firmly assert that it is imperative to increase GME funding and thus train more physicians, and we disagree with any proposals to cut GME funding or reallocate this support to train other nonphysician providers. The full value, both monetary and nonmonetary, provided by residents to their training institutions is critical to incorporate into discussions on the funding of GME.9 In this article, we highlight the benefits of GME both to the maintenance and...
expansion of an adequate physician workforce and to the immediate care of critical patient populations.

A Brief Overview of GME Funding

Before World War II, hospitals covered GME costs via direct patient billing. The postwar GI Bill provided federal funding to hospitals with servicemen and women in GME positions in the form of subsidized costs and support for a living allowance for these residents. The growth in GME positions between 1940 and 1960 was sixfold. When Medicare was established in 1965, GME positions were not capped, and GME costs were explicitly approved for inclusion in the calculation of "reasonable costs," which allowed Medicare payments to partially cover salaries and benefits for residents and administrative and faculty costs for training programs.10

Currently, the Centers for Medicare and Medicaid Services pays for GME through 2 payment streams: direct medical education and indirect medical education. Direct medical education funds cover costs such as resident salaries and benefits, supervisory physician teaching stipends, and administrative support costs. Indirect medical education funds are intended to cover the increased associated costs of educating residents in patient care, such as higher numbers of lab orders or tests and the provision of more intense care. Indirect medical education costs have been the main driver of growth in Medicare GME payments as expanded mandates for training programs (including work hour requirements, educational experience, and faculty development requirements) have increased their administrative burden, amounting to approximately three-fourths of total GME spending.11-13

Additionally, the federal government supports GME through the Veterans Administration (VA), the Department of Defense, the National Institutes of Health, and other federal agencies.3 The VA supports 9,000 full-time residents and hosts more than 30,000 additional residents who rotate through VA facilities yearly. The Department of Defense trains approximately 3,000 residents for the uniformed services. State Medicaid programs also contribute an estimated $3 billion annually to fund GME nationwide.4

The Value of Patient Care Provided by Residents

Although the Institute of Medicine advocated strategies for increasing the value of the investment in GME, it did not assess the full value to patient care that current GME funding provides. At teaching hospitals, residents perform the initial evaluation of patients, provide emergency care, and operate under the supervision of an attending physician. Residents also provide a substantial portion of care, including primary care, for underserved, uninsured, Medicaid, and Medicare populations in hospitals and in free community clinics. Though only 6% of U.S. hospitals offer formal GME training, residents treat more than 20% of all teaching hospital inpatients in the country, 28% of Medicaid hospital admissions, 40% of all hospital-based charity care (amounting to roughly $9.9 billion annually), 40% of high-acuity patient transfers, 62% of pediatric intensive care unit care, and 80% of level 1 trauma care. More teaching hospitals (89%) than nonteaching hospitals (16%) offer community outreach ambulatory services, improving access to preventive care. Moreover, free community clinics staffed by residents provide continuity in care for community health.15

As the largest provider of medical training at all levels, the VA system is host to 30% of U.S. residents at some point in their training, often sponsored through academic affiliations between VA hospitals and residents' sponsoring teaching hospitals. The Veterans Access Choice and Accountability Act of 2014 added to the 10,300 GME positions in the VA system, which includes more than 2,600 residency programs in 83 different specialties.16 While roughly 33% of residents consider VA employment before their rotation, more than 77% consider it afterward, providing a pathway for physicians to the VA system. However, new restrictions on GME payments for time spent rotating through VA hospitals may reduce GME funding for residents who are not at a VA hospital full-time, which may further strain GME funding at sponsoring teaching hospitals.

Events in recent history have highlighted the critical importance that residency programs play in providing access and care to local communities. In April 2010, St. Vincent's Hospital in New York City closed due to financial hardship. St. Vincent's had received patients who survived the Titanic sinking, played a major role in providing care during the HIV/AIDS crisis in New York City, and triaged survivors of the 9/11 attacks. Despite this storied history, the hospital could not overcome a mounting debt of more than $1 billion and, despite declaring bankruptcy, was unable to recover. St. Vincent's closure displaced 253 residents and 104 fellows; at the time, it was the largest known closure of a house staff program. Due to rules governing the allocation of GME funding that allow residents and fellows to "bring" their funding to new programs after an institution closes, all but 2 trainees transferred to other programs with their funding intact. Following St. Vincent's closure, 65% of its patients had more difficulty obtaining care, with a disproportionate negative effect on patients with existing medical problems.19

The June 2019 closure of Hahnemann University Hospital in Philadelphia and the resulting sudden displacement of more than 550 residents and fellows across 35 individual residency programs is now the largest ever closure of a GME program. Though all "orphanned" residents were able to secure alternate positions, the bankruptcy proceedings of this closure created significantly more hurdles compared with those of St. Vincent's. An attempted auction for Hahnemann's GME funding, valued at $55 million, provoked legal action from the Centers for Medicare and Medicaid Services and consternation from the GME community at large, because these GME positions were treated as financial assets.20 In an attempt to keep the funding local, a combined bid by 6 Philadelphia-area institutions was put forward, yet the sale did not go through. The impact of Hahnemann's closure was felt by neighboring hospitals, who reported an increase in emergency department visits in the subsequent months.21 The close proximity of this closure to the onset of the COVID-19 pandemic potentially exacerbated the devastating effects of COVID-19 on an already underserved population, the impact of which may not be measurable for quite some time. While there is no way to quantify the value provided by specific residents at these institutions, both hospital closures highlight the impact of teaching hospitals on their local communities, in large part due to the care residents provide.

The rapid and dangerous spread of COVID-19 highlighted the critical role of...
residents in providing patient care. Across the country, residency programs quickly adapted in anticipation of potential patient surges from COVID-19 outbreaks. In these areas, the Accreditation Council for Graduate Medical Education (ACGME) permitted residency programs to declare a temporary Pandemic Emergency Status, so programs could deploy residents and fellows to the pandemic response workforce. By late spring 2020, there were 151 ACGME-accredited sponsoring institutions in 26 states with self-declared Pandemic Emergency Status, representing 31% of accredited programs and 33% of all residents and fellows.25 Much of the critical patient care delivered in areas hard hit by the initial wave of the COVID-19 pandemic would not have been possible had residents not been allowed to practice in areas of need. This need continued as the pandemic evolved. Residents were redeployed to alternate settings, and fellows spent time as acting attendings in their primary specialties.26

In certain areas, otolaryngology residents redeployed to testing centers, using their skill set in nasopharyngeal anatomy to perform COVID-19 swabs or voluntarily creating a surge COVID intensive care unit in one of the hardest hit areas of the country.24,25 In fields such as neurosurgery, where critical care training is integrated into residency, residents served in intensive care units to ensure a healthy and abundant workforce.26

The Role of Residents in Quality Improvement

Teaching hospitals, in part due to ACGME Clinical Learning Environment Review requirements, play a critical role in quality improvement and patient safety in health care. Teaching hospitals have been compared with nonteaching hospitals and services on several parameters, including quality of care, health care outcomes, time spent on procedures, costs, and health care inequities.7,23-30 Kupersmith reviewed 23 studies published between 1985 and 2004, the majority of which showed improved quality of care and patient outcomes in teaching hospitals with risk adjustment. Several additional studies demonstrated no difference in quality or outcomes between teaching and nonteaching hospitals. For example, operative procedures involving residents have been shown to take more time but not have significant differences in morbidity compared with procedures without residents.31 One study found a decrease in racial inequities in visit duration in teaching versus nonteaching emergency departments.32 In studies of cost efficiency comparing internal medicine inpatient teaching teams with internists and hospitalists, the teaching teams reduced length of stay and overall costs, without a difference in mortality or 30-day readmission rates.33-37 Surgical and nonsurgical patients treated at teaching hospitals have lower mortality than matched patients at nonteaching hospitals, with marginally higher costs. GME funding is negatively correlated with mortality from myocardial infarction, heart failure, pneumonia, chronic obstructive pulmonary disease, and stroke, even though that same funding does not improve teaching hospitals’ financial standing.40

Residents’ Contributions to Teaching and Research

Teaching hospitals serve to contribute value in both GME and undergraduate medical education. Residents serve a vital role during medical students’ clinical training.41-43 In the apprenticeship style of medical education, residents help students apply their preclinical knowledge to problem-based applications during clinical rotations and assist students in navigating the complex hospital social structure.41 Students rate resident teaching higher than that of attending physicians,45 likely because residents do more to facilitate student participation in patient care, which stands out as the best learning tool in models of experiential learning.46

Teaching hospitals also serve to contribute value through research into highly subspecialized care that is largely relegated to quaternary institutions. ACGME-accredited programs must engage residents in scholarly activities. As of academic year 2021–2022, more than 42% of residency programs require research rotations, and another 39% have optional research rotations.47 Despite the impact of duty hours restrictions, residents have been able to continue publishing research and, in some cases, their publication rate has increased,48 although there can be associated costs in terms of decreased clinical activities.49 This concurrently increases faculty involvement in research, thus contributing to the overall scholarly mission of the institution.50

The Community Benefit of GME Training

Residency programs provide additional benefit to the communities in which they are located by providing care to neighborhood residents and by potentially increasing diversity in the local health care workforce. For example, many non-U.S.-citizen international medical graduates who train in the United States settle here, providing patient care in inner city and rural health professional shortage areas.51 The J-1 exchange visitor visa program permits waivers allowing physicians to stay in the United States following GME if they work in underserved or shortage areas for 3 years. Since its initiation in 1994, more than 10,000 international medical graduates have been granted waivers to serve patients who otherwise would have limited or no access to a physician.52 At the end of 2005, the estimated number of physicians practicing in underserved areas through J-1 visa waivers exceeded the number practicing through the National Health Service Corps, the primary mechanism used by the Department of Health and Human Services to address physician shortages.53

Physicians tend to practice near the community in which they trained. This tendency to remain local reduces recruitment costs for hospitals and practices, helps retain physicians, and positively affects local health care practices by enhancing relationships between hospitals and the communities in which they are located.54 This cycle in turn is self-perpetuating as the community becomes attractive to medical students who are considering options for their own residency training.55,56 Similarly, physicians may find a community with a teaching hospital an attractive place for relocation, as the opportunities provided by these institutions create a setting that enriches practice and enhances health care.57 The economic value of a practicing physician to a community includes supporting 17.1 jobs and more than $1.4 million in wages and benefits, as well as more than $126,000 in local and state tax revenues.58

The Monetary Value of Resident Services

Teaching hospitals do not bill for services provided directly by residents, including for consultations and admissions...
occurring during an overnight call period, procedures done with indirect supervision by an attending physician, and assistance during surgery that would otherwise generate an assistant surgeon bill. Multiple studies have calculated the value of this un billed care, with estimates ranging from $232,726 for the care provided by general surgery residents to $368,486 for that provided by plastic surgery residents. This un billed care is not relegated to procedural specialties, as a comparison of hospitalist-resident teams with teams of hospitalists and advanced practice providers found a cost savings of $617 per patient with a shorter length of stay associated with hospitalist-resident team care. Another quantifiable measure of the monetary and productive value of residents was highlighted in an assessment of the impact of the closure of a neurological residency program at the University of New Mexico. Following the program’s closure and the loss of 10 residents spanning a 7-year training program, the hospital hired 23 physician assistants and nurse practitioners “to handle the workload of the departing residents” and planned to hire more neurosurgeons.

Conclusion

Although residency training is a requirement in a physician’s evolution from medical student to board-certified practicing physician, the period of GME provides both educational value to trainees and multifac torial value to their training institutions and the patients they serve. The presence of residents at an institution improves patient care, provides increased access to care for underserved populations, enhances the teaching of medical students, and improves the scholarly output of teaching hospitals and residency programs. Specific opportunities in the United States for non-U.S.-citizen international medical graduates after GME can also lead to increased access to care for underserved populations. More study of the magnitude of residents’ contributions to the institutions and communities they serve is warranted to help improve planning, physician workforce development, resource allocation, innovation, and quality for the local community. The unmeasured value of residency programs is rarely accounted for in discussions about the “expense” of GME, yet it is imperative to consider the value added by residents in discussions involving GME funding allocation.

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K.L. Tomei is associate professor of pediatric neurosurgery, Rainbow Babies & Children’s Hospital, Case Western Reserve University School of Medicine, Cleveland, Ohio.

L.V. Selby is assistant professor of surgery, Department of Surgery, Division of Colorectal and Oncologic Surgery, University of Kansas Medical Center, Kansas City, Kansas; ORCID: https://orcid.org/0000-0002-0202-9646.

L.M. Kirk is chief of accreditation and recognition, Accreditation Council for Graduate Medical Education, Chicago, Illinois.

J.A. Bello is director of neuroradiology and professor of radiology and neurosurgery, Montefiore Medical Center and the Albert Einstein College of Medicine, Bronx, New York.

N.S. Nolan is medical education fellow and infectious disease physician, Washington University Hospital, St. Louis, Missouri.

S.K. Varma is executive associate dean for graduate medical education and resident affairs, university distinguished professor, and vice chair, Department of Pediatrics, Texas Tech University Health Sciences Center School of Medicine, Lubbock, Texas.

P.L. Turner is executive director, American College of Surgeons, and clinical associate professor of surgery, University of Chicago Medicine, Chicago, Illinois.

V.S. Elliott is a technical writer, Medical Education Outcomes, American Medical Association, Chicago, Illinois; ORCID: https://orcid.org/0000-0003-1223-0084.

S.E. Brotherton is director, Data Acquisition Services, American Medical Association, Chicago, Illinois.

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