

# The US Training System for Physicians— Need for Deeper Analysis

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**Training future physicians** is a huge investment with returns measured over decades. The annual cost of training a medical student, including the opportunity cost from lost wages, has been estimated at \$112 000,<sup>1</sup> and annual costs of training for a resident have been estimated at \$158 000.<sup>2</sup> Thus, for a typical 4-year medical school and 3-year residency,



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the cost is nearly an estimated \$1 million. These costs are borne by government, by individuals in society (passed along through insurance rates to companies and individuals), and by trainees. The benefits of these investments, both for society and the individual, are generated over many years, with students entering medical school this year likely still practicing in 2065.

Given the size of the investment and its substantial long-term consequences, it is remarkable how little the US system of training has been scrutinized. While other countries dictate the total number of trainees and distribution of specialty positions, the US relies largely on market forces, and for residency and fellowship positions, also relies on specialties to expand or restrict growth. However, the invisible hand of free markets may not function well in the complex health care system, particularly when course changes are extremely difficult and slow. For instance, if artificial intelligence subsumes many of the functions of a radiologist, can senior physicians be expected to retrain in other areas?

No market can function well without accurate data and careful analysis. Even if government control over the number of medical students and distribution of residency and fellowship slots was excluded as an option, a clear understanding of the current status and possible future status of physician workforce and training programs could allow for a more rational system of physician training. For example, deans of new medical schools could use these data to plan future programs, and government could direct subsidies for residency training to areas of particular need.

Every year the American Medical Association (AMA), Liaison Committee on Medical Education (LCME), and the Association of American Medical Colleges (AAMC) produce updates on undergraduate and graduate medical education in the United States. These data, published in this issue of *JAMA*,<sup>3,4</sup> are interesting and informative on their own but usually are published without analysis or commentary. However, these data begin to address several questions that are critical in planning for the US system of medical education, and they offer opportunities for much richer analysis.

## Are Enough Physicians Being Trained to Meet Future Needs?

The AAMC estimates that by 2030 there will be a shortage of between 42 600 and 121 300 physicians in the United States.<sup>5</sup> The number of physicians entering residency programs has increased by 15% over the last 5 years to 30 050 in 2017-2018.<sup>4</sup> While this is a clear improvement, unless the roles of physicians change, this rate of growth will not meet the projected need. Should the numbers of positions in medical schools, residency programs, or both be increased? Is the distribution of training programs across US regions optimized? Has there been progress in training a physician workforce that reflects the racial-ethnic distribution of the population treated? These are questions that can be readily addressed from available data, and separate studies for each question are certainly justified.

## What Is the Appropriate Role of Graduates From Osteopathic Schools and From Non-US Medical Schools in Addressing Physician Workforce Needs?

The number of graduates from US MD programs has increased by 9% over the last 5 years to 19 750 last year.<sup>3</sup> Given that there are more than 30 000 first-year residency positions,<sup>4</sup> more than a third of slots must be filled by graduates either from osteopathic schools or from other countries. In fact, the number of osteopathic graduates has increased rapidly, now accounting for 12% of all residents compared with 8% 5 years ago.<sup>4</sup> International medical graduates (IMGs) continue to fill approximately a quarter of residency slots, down only slightly compared with 5 years ago.<sup>4</sup> What are the implications of the trend toward more osteopathic physicians? What role do IMGs play in the long term? These sorts of critical questions require further analysis.

## Is There Progress in Training More Primary Care Physicians?

The AAMC has stated that the United States has too few primary care physicians today and that with increasing needs, this deficit is likely to increase.<sup>5</sup> Since 2012-2013, the number of first-year family medicine residents increased by 12% from 3416 to 3833, the number of first-year internal medicine residents increased 14% from 8820 to 10 013, and the number of first-year pediatrics residents increased 6% from 2718 to 2885.<sup>4</sup> Subspecialization in internal medicine and pediatrics was common and essentially unchanged over the most recent 5 years, with the number of first-year subspecialty positions roughly half of first-year positions in each specialty.<sup>6</sup> Residency positions in obstetrics and gynecology also have not substantially increased. Taken together, these

data demonstrate that primary care residency positions are increasing less rapidly than other positions, and the needs in primary care are not being directly addressed. Although studies have examined barriers to physicians choosing careers in primary care,<sup>7</sup> insights have not produced the changes required and more study is needed. How important are the long-term economics for individual physicians making specialization decisions? Should the medical system wait for shortages to drive up reimbursement for primary care?

### Are Osteopathic Physicians or IMGs the Answer to the Shortage of Primary Care Physicians?

Overall, 40% of the 130 545 residents in training last year were in internal medicine, family medicine, pediatrics, or obstetrics-gynecology.<sup>4</sup> Among 15 964 osteopathic physicians in residency programs, 50% were training in these primary care areas, and relatively few were training in subspecialties of medicine and pediatrics. In addition, a quarter of family medicine residency positions were filled by osteopathic physicians. Thus, graduates of osteopathic schools are disproportionately helping to fill the gap in primary care.

The residency training for IMGs is more complex. Although more IMGs are in primary care residency programs (50% of 30 613 IMG residents last year), these physicians subspecialize more frequently.<sup>4</sup> For example, IMGs account for more than 50% of fellows in critical care medicine, interventional cardiology, endocrinology, nephrology, and geriatrics, and more than 40% of those in cardiovascular medicine, hematology-oncology, and infectious disease. Thus, IMGs may not be the solution to the primary care shortage but may fill other important roles.<sup>8,9</sup>

### How Will an Increasingly Female Physician Workforce Change the Profession?

For the first time, more women than men entered US medical schools in 2017-2018, with women accounting for 52% of

first-year medical students.<sup>3</sup> Twenty years ago, women constituted 43% of entering classes. Women are more likely to choose primary care specialties, with 47% of all female residents in family medicine, internal medicine, pediatrics, or obstetrics-gynecology.<sup>4</sup> In 2017-2018, 83% of residents in obstetrics-gynecology, 72% in pediatrics, 54% in family medicine, and 41% in internal medicine were women, and there was no evidence that they were disproportionately subspecializing within these fields.

Even though it is clear that women are helping to fill gaps in important areas of primary care, their distribution in medical specialties may have other consequences. Women were significantly underrepresented in several residencies, including orthopedic surgery (accounting for 15% of residents), neurological surgery (18%), diagnostic radiology (26%), and urology (26%), and in subspecialty fellowships such as cardiovascular disease (23%), interventional cardiology (10%), and critical care medicine (26%).<sup>4</sup> With these including some of the specialty areas with the highest reimbursement<sup>10</sup> (for example, median annual salary for orthopedic surgery is \$497 000, and for cardiology is \$423 000), overall gaps in compensation between men and women physicians are likely to continue.

### Conclusion

The data on undergraduate and graduate medical education in this issue of *JAMA*<sup>3,4</sup> represent a valuable source of data on the US training system for physicians. However, deeper analysis and integration of important data from other sources such as specialty-specific salary, work hours, and career satisfaction, will be necessary to address critical issues about the US physician training system. Only through a more complete understanding and rigorous evaluation of the current state of these training programs will the profession have any hope of exerting influence on the irrational system the United States has come to accept.

#### ARTICLE INFORMATION

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