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Report to Congressional Requesters

May 2017

PHYSICIAN WORKFORCE

Locations and Types of Graduate Training Were Largely Unchanged, and Federal Efforts May Not Be Sufficient to Meet Needs

Accessible Version

GAO-17-411

GAO Highlights

Highlights of GAO-17-411, a report to congressional requesters

May 2017

PHYSICIAN WORKFORCE

Locations and Types of Graduate Training Were Largely Unchanged, and Federal Efforts May Not Be Sufficient to Meet Needs

Why GAO Did This Study

A well-trained physician workforce adequately distributed across the country is essential for providing Americans with access to quality health care services. While studies have reached different conclusions about the nature and extent of physician shortages, the federal government has reported shortages in rural areas and projects a deficit of over 20,000 primary care physicians by 2025. GME training is a key factor affecting the supply and distribution of physicians. Federal funding for this training is significant, more than $15 billion per year, according to the Institute of Medicine. Given the federal investment and concerns about physician supply, GAO was asked to review aspects of GME training.

This report describes (1) changes in number of residents in GME training by location and type of training from academic years 2005 through 2015, (2) federal efforts intended to increase GME training in rural areas, and (3) federal efforts intended to increase GME training in primary care. To determine changes in the locations and types of residents in GME training, GAO analyzed resident data from the accrediting bodies overseeing GME training. To identify and describe relevant federal efforts, GAO also reviewed federal laws, reports, and data, and interviewed agency officials.

What GAO Recommends

GAO continues to believe that action is needed on a 2015 recommendation for HHS to develop a plan to guide its health care workforce programs. HHS provided technical comments on a draft of this report, which GAO incorporated as appropriate.

View GAO-17-411. For more information, contact Kathleen M. King at 202-512-7114 or KingK@gao.gov.

What GAO Found

The locations and types of physicians in graduate medical education (GME) training—known as residents—generally remained unchanged from 2005 through 2015, but there was notable growth in certain areas. As shown in the table below, residents in GME training remained concentrated in the Northeast. At the same time, the number of residents grew more quickly in other regions, though this was somewhat tempered by regional population growth. Residents also remained concentrated in urban areas, which continued to account for 99 percent of residents, despite some growth in rural areas. From 2005 through 2015, over 80 percent of residents were receiving training in a medical specialty, which is required for initial board certification. In 2015, nearly half of these residents were in a primary care specialty (internal medicine, family medicine, and pediatrics), versus other specialties, such as anesthesiology. While this represented a slight increase from 2010, research has shown that many primary care residents will go on to receive additional GME training in order to subspecialize, rather than practice in primary care. Subspecialty training accounted for less than 20 percent of residents from 2005 through 2015, though the number of residents in subspecialties grew twice as fast as for specialties.

Regional Concentration of Graduate Medical Education (GME) Residents

Region	GME residents, 2015	GME resident growth (2005-2015)	U.S. population growth (2005-2015)	GME residents per 100,000 population	
				2005	2015
Midwest	31,056 (24%)	24%	3%	38	46
Northeast	38,951 (31%)	15%	3%	62	69
South	37,967 (30%)	28%	13%	28	31
West	19,604(15%)	26%	12%	23	26
National	127,578 (100%)	22%	9%	35	40

Source: GAO analysis of data from the Accreditation Council for Graduate Medical Education, the American Osteopathic Association, and Census Bureau. | GAO-17-411

GAO found that the primary federal efforts intended to increase GME training in rural areas were incentives within the Medicare program that can provide hospitals with higher payments for such training. However, hospitals' use of these incentives was often limited, and certain Medicare GME payment requirements could present barriers to greater use.

GAO identified four federal efforts intended to increase primary care GME training. Each effort added new primary care residents and provided funding in areas of the country with disproportionally low numbers of residents or physicians, though to varying degrees. The four efforts accounted for a relatively small percentage of primary care residents and overall federal GME funding, about 3 percent and less than 1 percent, respectively. In addition, the extent to which the residents added by these efforts will be maintained or continue to grow is uncertain, in part because federal funding for some of the efforts has ended. As a result, the efforts may not be sufficient to meet projected primary care workforce needs. Further, GAO recommended in 2015 that the Department of Health and Human Services (HHS) develop a comprehensive and coordinated plan for its health care workforce programs, which is critical to identifying any other efforts necessary to meet these needs, and has not yet been implemented.

Contents

Tables

Figures

Abbreviations

ACGME	Accreditation Council for Graduate Medical Education
AOA	American Osteopathic Association

CMS	Centers for Medicare & Medicaid Services
DGME	direct graduate medical education
FTE	full-time equivalent
GME	graduate medical education
HHS	Department of Health and Human Services
HPSA	Health Professional Shortage Area
HRSA	Health Resources and Services Administration
IME	indirect medical education
PPACA	Patient Protection and Affordable Care Act
VA	Department of Veterans Affairs

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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May 25, 2017

Congressional Requesters,

A well-trained physician workforce that is adequately distributed across the country is essential for providing Americans with access to quality health care services. The federal government has reported physician shortages in some areas of the country, including in rural areas, as well as in the primary care specialties of family medicine, internal medicine, and pediatrics.[1] Additionally, some experts contend that physician shortages could be exacerbated in the future by such factors as an aging population, population growth, and increased access to insurance.[2] At the same time, experts have also noted a number of factors that could mitigate these shortages, including increasing or better targeting the supply of physicians and greater use of nurse practitioners and physician assistants.[3]

While a number of factors affect the supply and distribution of physicians, graduate medical education (GME)—commonly known as residency

[1]See, for example, Health Resources and Services Administration, *Designated Health Professional Shortage Areas Statistics, As of January 1, 2017*, accessed March 8, 2017, https://datawarehouse.hrsa.gov/Tools/HDWReports/Reports.aspx.

For the purposes of this report, we define primary care specialties as including family medicine, internal medicine, and pediatrics. Some federal programs may include additional specialties, such as obstetrics and gynecology, geriatrics, and general psychiatry, in their definition. Other federal programs may exclude some of the specialties in our definition, such as pediatrics. Though the definition of primary care used in this report is limited to certain specialties, physicians in subspecialties may also serve as a primary care physician for certain patients with chronic illnesses. For example, a nephrologist may be the primary care physician for patients with end stage renal disease.

[2]See, for example, U.S. Department of Health and Human Services, *A 21st Century Health Care Workforce for the Nation* (Washington, D.C.: February 2014).

[3]See, for example, T. S. Bodenheimer and M. Smith, "Primary Care: Proposed Solutions to the Physician Shortage without Training More Physicians," *Health Affairs*, vol. 32, no. 11 (2013): 1881-1886 and D. I. Auerbach, P. G. Chen, M. W. Friedberg, R. O. Reid, C. Lau, and A. Mehrotra, "Nurse-Managed Health Centers and Patient-Centered Medical Homes Could Mitigate Expected Primary Care Physician Shortage," *Health Affairs*, vol. 32, no. 11 (2013): 1933–1941.

training—is a significant determinant.[4] Through medical school, students earn a medical degree and become physicians, but they are required to undergo GME training to be able to practice independently. Physicians in GME training are known as residents and must complete a GME program in a specific medical specialty. Specialty GME programs generally last 3 to 5 years, after which physicians are eligible for medical licensure and initial board certification to practice medicine. Some physicians may choose to subspecialize and undergo additional GME training—also referred to as fellowships. The percentage of residents that subspecialize varies by specialty type. For example, family medicine residents are more likely to remain in primary care than internal medicine or pediatric residents, who research has shown tend to subspecialize at greater rates.[5]

GME training is funded through public and private sources. While GME programs are generally established by hospitals or academic institutions that may provide funding, the federal government also spends a significant amount on GME training each year.[6] Specifically, in 2014, the Institute of Medicine reported that federal funding for GME training totaled more than $15 billion per year, most of which was provided by the Department of Health and Human Services (HHS).[7] The vast majority of HHS funding is distributed by the Centers for Medicare & Medicaid Services (CMS), mostly through the Medicare program.[8] Other, smaller sources of federal GME funding include HHS grants, such as from the Health Resources and Services Administration (HRSA), and from GME training that occurs at Department of Veterans Affairs (VA) and Department of Defense medical facilities.

[4]While graduate training may also be required for other health professionals, such as nurse practitioners and physician assistants, for the purposes of this report, GME training refers specifically to physician training.

[5]See E. Salsberg, et al. "US Residency Training Before and After the 1997 Balanced Budget Act," *JAMA*, vol. 300, no 10 (2008):1174-1180.

[6]Estimating total private, federal, and state spending on GME training is challenging, in part because of the difficulty of quantifying spending by hospitals and by certain programs, such as Medicaid. We have ongoing work examining federal spending on GME training.

[7]See Institute of Medicine of the National Academies, *Graduate Medical Education that Meets the Nation's Health Needs* (Washington, DC: National Academies Press, 2014).

[8]Medicare is a federally financed program that provides health insurance coverage to people age 65 and older, certain individuals with disabilities, and those with end-stage renal disease.

Over time, experts have raised a number of concerns about the ability of the current GME system to meet physician workforce needs. For example, some are concerned that the system may not be producing enough primary care physicians. According to one study, while the total number of residents increased by 13.6 percent from 2001 to 2010, the number expected to enter primary care decreased by 6.3 percent.[9] Additionally, Medicare GME funding is generally not targeted to specific areas of workforce need, and the number of slots eligible for Medicare GME funding was capped at 1996 levels for many hospitals by the Balanced Budget Act of 1997.[10] As a result of these and other factors, stakeholders have long raised concerns that there is an uneven distribution of residents across the country, with most concentrating in certain urban centers where GME programs have historically been located. The appropriate distribution of residents is particularly important given evidence that physicians may practice in geographic areas similar to those where they complete their GME training.[11] To address physician shortage concerns, the federal government has undertaken some efforts to better target GME funding, including encouraging the training of physicians in rural areas and in primary care specialties.[12]

Given the significant amount of federal funds spent on GME training, as well as concerns about physician shortages, you asked us to review aspects of this training in the United States. In this report, we describe:

[9]See P. Jolly, C. Erikson, and G. Garrison, "U.S. Graduate Medical Education and Physician Specialty Choice," *Academic Medicine*, vol. 88, no. 4 (April 2013).

[10]Pub. L. No. 105-33, §§ 4621(b), 4623, 111 Stat. 251, 476, 477-478 (1997).

In December 2015, we reported that HHS generally cannot target existing Medicare GME program funds to projected workforce shortage areas—such as primary care and rural areas—because the disbursement of these funds is governed by statutory requirements unrelated to workforce shortages. See GAO, *Health Care Workforce: Comprehensive Planning by HHS Needed to Meet National Needs*, GAO-16-17 (Washington, D.C.: Dec. 11, 2015).

[11]See for example, S.D. Seifer, K. Vranizan, and K. Grumbach, "Graduate Medical Education and Physician Practice Location: Implications for Physician Workforce Policy," *JAMA,* vol. 274, no. 9 (1995): 685-691 and K.J. Quinn, et al., "Influencing Residency Choice and Practice Location through a Longitudinal Rural Pipeline Program," *Academic Medicine*, vol. 86, no. 11 (November 2011):1397-1406.

[12]In this report, references to "federal efforts" include various forms of federal spending for GME training, such as grant programs as well as GME payments to providers participating in federal health care programs.

1. changes in the number of residents in GME training by location and type of training from 2005 through 2015,
2. federal efforts intended to increase GME training in rural areas, and
3. federal efforts intended to increase GME training in primary care.

To describe changes in the number of residents in GME training by location and type of training from 2005 through 2015, we reviewed data on GME programs and residents within the 50 states and the District of Columbia from the two main GME accrediting bodies—the Accreditation Council for Graduate Medical Education (ACGME) and the American Osteopathic Association (AOA).[13] From each, we obtained data for three points in time—2005, 2010, and 2015.[14] We used these data to examine the geographic distribution of residents. To do this, we identified the location of residents by the location of their primary training site and compared these data to Census Bureau geographic regions and population estimates.[15] We also used Rural-Urban Commuting Area codes to identify the location of residents' primary training sites as being either urban or rural.[16] To compare the location of residents' primary

[13]ACGME accredits GME programs focused on allopathic training and AOA accredits GME programs focused on osteopathic training. Some GME programs are accredited by both ACGME and AOA. In our report, we count residents in dually accredited programs as residents in ACGME programs.

[14]In this report, references to years are to academic years unless otherwise noted. For example, 2005 is the academic year that spans from July 1, 2004 through June 30, 2005.

[15]In certain cases, the address for an ACGME program resident's primary training site was not available. In these cases we used the resident's GME program address, which ACGME identified as an appropriate proxy for the primary training site. Residents also may train for more limited periods at participating sites, but data about the number of residents training in these locations were not available.

See https://www.census.gov/geo/reference/gtc/gtc_census_divreg.html for the census regions and https://www.census.gov/programs-surveys/popest.html for the census population estimates, last accessed on March 17, 2017. Our analysis of counties includes the District of Columbia and county equivalents, such as the City of Baltimore.

[16]Rural-Urban Commuting Area codes characterize all Census tracts regarding their rural and urban status using Bureau of Census Urbanized Area and Urban Cluster definitions in combination with work commuting information. See http://depts.washington.edu/uwruca/, last accessed on March 14, 2017. There are two current versions of the codes, Version 3.0 for Census tracts and Version 3.1 for zip codes. We used the most recent zip code version, version 3.1, which is based on Census Bureau data from 2010, for all 3 years in our analysis. Addresses we defined as urban and suburban by code were grouped as "urban" and the remainder were grouped as "rural." We obtained additional information on Rural-Urban Commuting Area codes from the University of North Dakota's Center for Rural Health.

training sites with physician workforce needs, we used HRSA designations of areas identified as having a shortage of primary care physicians—known as Health Professional Shortage Areas (HPSAs).[17] A HPSA may be a geographic area with a shortage of primary care physicians (known as a geographic HPSA). Alternatively, an area could be designated as a population HPSA if a population within the area, such as a migrant farmworker population, is found to be underserved by primary care physicians, even if the area as a whole is not underserved.[18] While we previously identified shortcomings with HRSA's methodology for designating HPSAs, we used HPSAs in this analysis because they continue to be a primary way the federal government identifies physician shortage areas.[19] We also examined the distribution of residents across primary care and other specialties, compared with subspecialty training.[20] Some residents train in a GME program called internal medicine-pediatrics that allows them to practice both internal medicine and pediatrics, and we included those residents in our analysis of primary care residents along with internal medicine, family medicine, and

[17]For the purposes of this report, HPSAs refer to primary care HPSAs, though HRSA also designates HPSAs in dental health and mental health. In designating HPSAs, HRSA defines primary care as the specialties of family medicine, internal medicine, pediatrics, and obstetrics and gynecology. Thus, when comparing the location of residents to HPSAs, we included obstetrics and gynecology in addition to our other primary care specialties. Data used for our analysis were last accessed from the HRSA Data Warehouse on March 17, 2017. See https://datawarehouse.hrsa.gov/tools/DataPortalResults.aspx.

[18]HRSA designates HPSAs using several factors, including the number of primary care physicians practicing in an area relative to its total population. Geographic areas that may be designated as a HPSA include counties, Census tracts, and Minor Civil Divisions. Applicants may apply for either a geographic HPSA or a population HPSA, but not both. In addition to these two categories, individual health care providers that treat underserved populations can qualify as facility HPSAs, but these were not included in our analysis.

[19]In 2006, we reported that HRSA was developing a proposal to revise its HPSA designation system, but it had not completed it. We made two recommendations, including that HRSA complete and publish that revised methodology, and the agency concurred with our recommendations. See GAO, *Health Professional Shortage Areas: Problems Remain with Primary Care Shortage Area Designation System,* GAO-07-84 (Washington D.C.: Oct. 24, 2006). However, while HRSA published a proposed revision in the Federal Register in 2008, the agency later made the decision to not finalize it. More recently, section 5602 of the Patient Protection and Affordable Care Act (PPACA) directed the Secretary of HHS to establish through a negotiated rulemaking process a comprehensive methodology and criteria for designating HPSAs. According to agency officials, in the absence of consensus among the negotiated rulemaking committee, HRSA is continuing to examine options for methodological changes to the HPSA designation system.

[20]We grouped GME programs into specialties and subspecialties using ACGME and AOA categories.

pediatrics residents. Finally, we compared the distribution of residents in ACGME-accredited programs with those in AOA-accredited programs. We assessed the reliability of the ACGME, AOA, Census Bureau, and HRSA data by reviewing documentation, discussing the data with knowledgeable officials, and performing data reliability checks, such as examining the data for missing values and obvious errors to test the internal consistency and reliability of the data. The addresses for 52 GME programs accounting for 483 residents ultimately could not be matched to Census data, and, therefore, those programs were excluded from our analysis. Further, our analysis of primary care specialties was limited to 2010 and 2015 because comparable data were not available for 2005.[21] After taking these steps, we determined the data from each of these four sources were sufficiently reliable for the purposes of our reporting objectives.

To describe federal efforts intended to increase GME training in rural areas, we first identified relevant federal efforts. To do this, we reviewed government and nongovernmental reports on funding for health care workforce training, relevant federal laws, and interviewed federal officials. We limited our selection to efforts that provided funding directly to GME programs within the civilian health care system as of January 2016.[22] As such, we excluded efforts that provided payments directly to individual residents, including loan repayment and scholarship programs, as well as efforts funded by the Department of Defense.[23] We also excluded efforts that were not primarily focused on increasing the number of residents in clinical training. For example, we excluded efforts that focused primarily on curriculum enhancement for existing GME programs or GME training for leadership, management, and research skills. Based on our selection criteria, we determined that certain Medicare hospital payment incentives administered by CMS were the primary federal efforts intended to

[21]In 2008, AOA restructured how it classifies specialties, including primary care, within its GME programs.

[22]In addition to efforts with ongoing funding, we included efforts whose budget period had ended prior to January 2016, but whose grantees were still supporting trainees with funding from the effort at that time.

[23]The Department of Defense's funding for GME training is primarily limited to training members of the military at military treatment facilities. The distribution of residents is decided based on military health care needs.

increase GME training in rural areas.[24] Where available, we analyzed Medicare hospital cost report data from fiscal year 2013—the most recent year with reliable data—to determine the extent to which hospitals located within the 50 states and the District of Columbia used these incentives.[25] We assessed the reliability of the cost report data by reviewing documentation, discussing the data with knowledgeable officials, and performing data reliability checks, such as examining the data for missing values and obvious errors to test the internal consistency and reliability of the data. After taking these steps, we determined the data were sufficiently reliable for the purposes of our reporting objectives. To further describe these incentives, we reviewed relevant agency documentation and interviewed CMS officials as well as officials that worked on a HRSA-funded technical assistance program related to one of the incentives.[26]

To describe federal efforts intended to increase GME training in primary care, we first identified the relevant federal efforts using the same selection process as for the rural efforts we identified in our second objective. Based on our selection criteria, we identified four relevant federal efforts—HRSA's Primary Care Residency Expansion program, HRSA's Teaching Health Center GME program, CMS's Medicare GME redistribution, each authorized by the Patient Protection and Affordable Care Act (PPACA), and VA's GME expansion required by the Veterans

[24]The payment incentives were enacted by the Medicare, Medicaid, and SCHIP Balanced Budget Refinement Act of 1999, Pub. L. 106–113, app. F, § 407(b),(c), 113 Stat. 1501A-321, 1501A-374 (1999).

[25]The Medicare cost report is collected annually from all institutional providers that render services to Medicare beneficiaries. Among other things, these reports contain self-reported information on facility characteristics, utilization data, and financial statement data. There is a lag between when data are reported and when these data are sufficiently reliable for analysis.

To obtain hospital addresses, we used the 2013 Provider of Services file, which contains data on characteristics of hospitals and other types of health care facilities, such as the name and address of the facility and the type of Medicare services the facility provides.

[26]One of the incentives allows urban hospitals that establish a separately accredited Rural Training Track in a rural area to receive additional Medicare GME funding for that Rural Training Track. From fiscal year 2010 through fiscal year 2015, HRSA funded the Rural Training Track Technical Assistance cooperative agreement to help rural communities build and sustain Rural Training Tracks and other similar rural residencies.

Access, Choice, and Accountability Act of 2014, as amended.[27] For each effort, we obtained and analyzed available HRSA, CMS, and VA data on funding levels and the number, type, and location of funded residents for recipients located within the 50 states and the District of Columbia.[28] We assessed the reliability of the HRSA, CMS, and VA data by reviewing documentation, discussing the data with knowledgeable officials, and performing data reliability checks, such as examining the data for missing values and obvious errors to test the internal consistency and reliability of the data. After taking these steps, we determined the data from each of these four sources were sufficiently reliable for the purposes of our reporting objectives. For the Medicare GME redistribution, we also analyzed fiscal year 2013 Medicare hospital cost report data previously mentioned. To characterize the location of funded residents, we compared data from the efforts to Census Bureau geographic regions and Rural-Urban Commuting Area codes, as well as to HRSA's HPSA designations, using the same methodology we used for our first research objective.[29] To further describe the efforts, we also reviewed relevant agency documentation, such as HRSA annual reports, and interviewed HRSA, CMS, and VA officials.

We conducted this performance audit from November 2015 to May 2017 in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

[27]In this report, the term "Medicare GME redistribution" refers to adjustments to the statutory full-time equivalent (FTE) caps used to calculate Medicare GME payments for certain providers, as authorized by section 5503 of PPACA. See Pub. L. No. 111-148, § 5503, 124 Stat. 119, 655-59 (2010). For the two HRSA programs authorized by PPACA, see *id.*, §§ 5301, 5508, 124 Stat. at 615-17, 668-70. For the VA GME expansion, see Pub. L. No, 113-146, § 301(b)(2), 128 Stat. 1754, 1785 (2014), as amended by Pub. L. No. 114-315, § 617(a), 113 Stat. 1536, 1577 (2016) (codified at 38 U.S.C. § 7302 note).

[28]As CMS's Medicare GME redistribution distributed FTEs to three recipients in Puerto Rico and VA's GME expansion to one recipient, our numbers may differ slightly from other published figures. Additionally, for the redistribution, we used the 2011 Provider of Services file to obtain hospital addresses, as that was the year the redistribution occurred.

[29]For the Teaching Health Center and Primary Care Residency Expansion programs, resident locations were based on the primary training site reported by awardees. For the Medicare GME redistribution and VA GME expansion, resident locations were based on the hospital or VA medical center awarded new FTEs, respectively, which may not be the primary training site.

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

GME Training

Prior to entering GME training, students complete medical school under one of two broad educational philosophies—allopathic or osteopathic. Allopathic physicians represent the majority of physicians and have a Doctor of Medicine (known as an M.D.). In contrast, osteopathic physicians have a Doctor of Osteopathic Medicine (known as a D.O.). Osteopathic medicine is based on a philosophy that emphasizes a "whole-person approach," and physicians receive specific training in manipulating the musculoskeletal system.

Following medical school, GME provides the clinical training required for a physician to be eligible for licensure and board certification to practice medicine independently in the United States. Residents in GME programs train, usually in a hospital or clinic, under the direct or indirect supervision of physician faculty members. Historically, ACGME has accredited GME programs focused on allopathic training, and they are available to U.S. or Canadian medical school graduates with a M.D., U.S. medical school graduates with a D.O., and international medical graduates with the equivalent of an M.D. degree from foreign medical schools.[30] GME programs focused on osteopathic training are accredited by AOA and available only to U.S. medical school graduates with D.O. degrees. While ACGME and AOA programs are accredited separately, ACGME and AOA may also jointly accredit programs, and the organizations are in the process of establishing a single accreditation system.[31] On June 30, 2020, AOA is to cease accreditation activities and all GME programs are to be accredited by ACGME, and physicians will be able to attend any accredited program regardless of their type of degree.

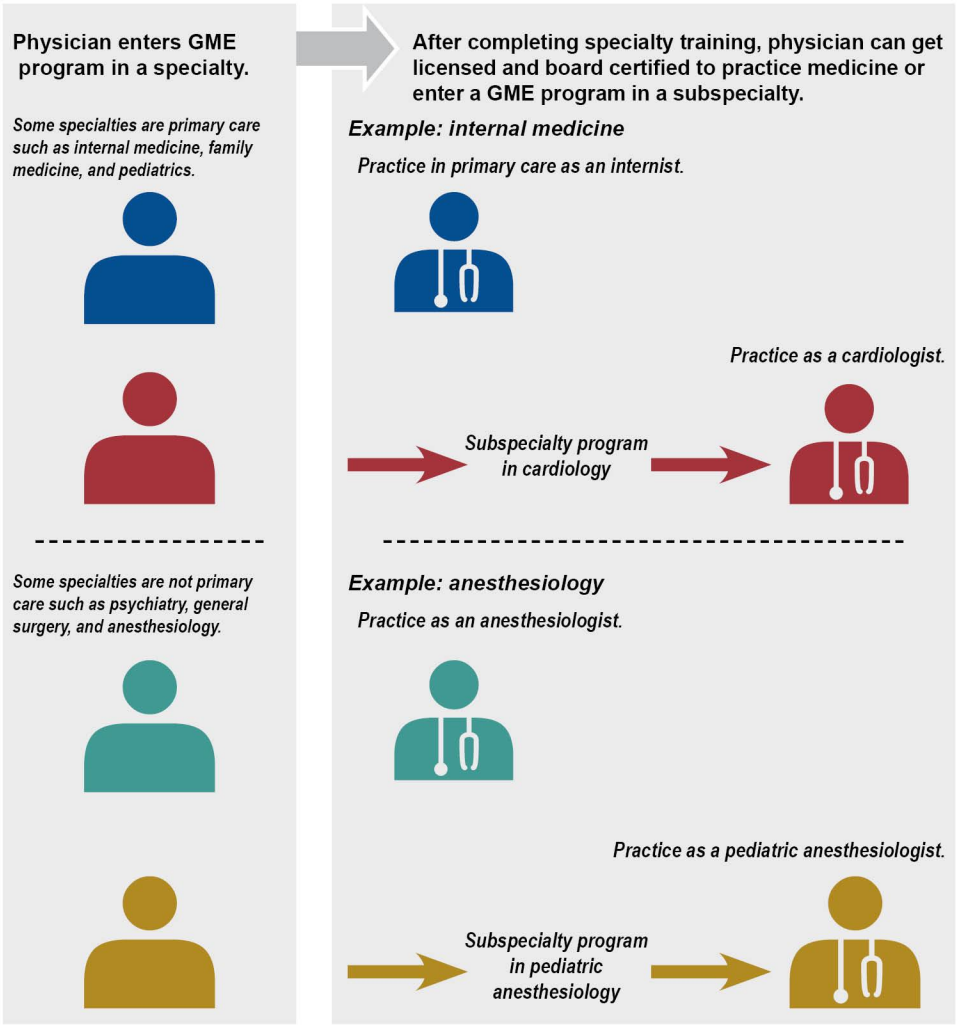
[30]Prior to 2015, no GME programs accredited exclusively by ACGME included training in osteopathic principles; after 2015, ACGME accredited GME programs, at their option, may include training in osteopathic principles.

[31]On February 26, 2014, ACGME, AOA, and the American Association of Colleges of Osteopathic Medicine announced their agreement outlining a single accreditation system.

Whether in ACGME or AOA programs, physicians may pursue GME training within a variety of specialties or subspecialties. Initially, physicians go through GME training for a specialty—such as internal medicine, family medicine, pediatrics, anesthesiology, radiology, or general surgery. Of the specialties, family medicine, internal medicine, and pediatrics are considered primary care specialties, as they provide comprehensive first contact and continuing care for persons with a broad range of health concerns. Completion of training in one of these specialties qualifies a physician to seek initial board certification to practice medicine. Some residents, however, may choose to subspecialize and seek additional GME training. For example, a physician who completed an internal medicine GME program may decide to subspecialize in cardiology. (See fig.1.) The percentage of residents who later subspecialize varies based on specialty type. For example, according to a 2008 study, among the primary care specialties, 5 percent of family medicine residents end up subspecializing, compared with 55 and 39 percent of internal medicine and pediatric residents, respectively.[32] Therefore, a resident training in a primary care specialty may not ultimately practice as a primary care physician.

[32]Salsberg "U.S. Residency Training," 1178.

Figure 1: Progression of Physicians through Graduate Medical Education (GME) Training



Source: GAO analysis of information from the Accreditation Council for Graduate Medical Education. | GAO-17-411

Physician Shortages

Studies of the physician workforce and associated shortages vary in the assumptions they make about physician supply and demand, resulting in

different conclusions about the nature and extent of shortages.[33] However, there continue to be shortages of physicians, such as in primary care, and studies have found that rural areas may be more likely to experience shortages. For example, one study reported that while there are about 80 primary care physicians per 100,000 people in the United States, the average in rural areas is 68 per 100,000.[34]

At the federal level, HRSA monitors the supply of and demand for health care professionals and disseminates data about workforce needs and priorities. With regard to primary care physician shortages, HRSA identified 1,401 geographic and 1,485 population HPSAs across the United States, as of January 2017.[35] While these HPSAs were located in nearly all 50 states and the District of Columbia, the South had the most (42 percent), and the Northeast had the fewest (8 percent). According to HRSA, 8,583 more primary care physicians would be needed to remove these HPSA designations. In a November 2016 report, HRSA also projected that the need for more primary care physicians is likely to continue, with a shortage of up to 23,640 physicians by 2025 (while family medicine and internal medicine had projected shortages, nationally, pediatrics did not).[36] HRSA projected primary care physician shortages in all regions of the country, but noted that the South was expected to have the largest shortage and the Northeast the smallest shortage. In addition to shortages for primary care physicians, HRSA has also recently

[33]For example, estimating physician supply depends on the approach used to count physicians, measure their productivity, and estimate the rate of entrance into and exit from the profession. Similarly, estimating demand for physicians' services can be done using service utilization patterns or by determining an ideal level of care to treat the projected incidence and prevalence of illness among a population.

[34]S.M. Petterson, et al. *Unequal Distribution of the U.S. Primary Care Workforce (2013)*, accessed April 11, 2016, http://www.aafp.org/afp/2013/0601/od1.pdf.

[35]New Jersey was the only state that did not have a primary care geographic or population HPSA. See Health Resources and Services Administration, *Designated Health Professional Shortage Areas Statistics, As of January 1, 2017*, accessed March 8, 2017, https://datawarehouse.hrsa.gov/Tools/HDWReports/Reports.aspx.

[36]HRSA's definition of primary care used in this report includes geriatrics, which our definition does not. See, Health Resources and Services Administration, *National and Regional Projections of Supply and Demand for Primary Care Practitioners: 2013-2025* (Rockville, Md.: November 2016).

projected shortages for other physicians, such as psychiatrists and those in certain surgical specialties and internal medicine subspecialties.[37]

While increasing physician supply through more GME training opportunities is one way to prevent shortages, experts have also suggested other options. For example, federal payment incentives have been used to encourage physicians to practice in underserved areas, and changes to physician payment could also encourage physicians to select certain specialties.[38] In addition, experts have suggested that access to care could be increased through the greater use of telehealth and other technology, as well as changing the pattern of practice, such as by providing more team-based care or by eliminating care that is either unnecessary or of limited value.[39] Particularly with regard to primary care, experts have also suggested that some health care needs may be filled through the greater use of other types of providers, such as nurse practitioners and physician assistants. (See app. I for a summary of selected federal efforts related to nurse practitioner and physician assistant training.)

Federal GME Funding

The federal government invests significantly in GME training. The vast majority of federal funding is distributed by HHS through CMS's Medicare program, although HHS also provides GME funding through other

[37]See, Health Resources and Services Administration, *National and Regional Projections of Supply and Demand for Surgical Specialty Practitioners: 2013-2025* (Rockville, Md.: December 2016); Health Resources and Services Administration, *National and Regional Projections of Supply and Demand for Internal Medicine Subspecialty Practitioners: 2013-2025* (Rockville, Md.: December 2016); and Health Resources and Services Administration, *National Projections of Supply and Demand for Selected Behavioral Health Practitioners: 2013-2025* (Rockville, Md.: November 2016).

[38]For example, Medicare pays physicians a 10 percent bonus above the usual payment amount for services they provide to beneficiaries in geographic HPSAs. Also, HRSA funds the National Health Service Corps and grant and loan support programs for health professions education and training. Most of these programs address three objectives of improving the distribution of health professionals in underserved areas, increasing representation of minorities and individuals from disadvantaged backgrounds in health professions, and increasing the supply of health professionals.

[39]See, for example, T. Bodenheimer and A. Fernandez, "High and Rising Health Care Costs. Part 4: Can Costs be Controlled While Preserving Quality," *Annals of Internal Medicine*, vol. 143, no 1 (2005). For more information on telehealth, see GAO, *Telehealth and Remote Patient Monitoring Use in Medicare and Selected Federal Programs*, GAO-17-365 (Washington, D.C.: Apr. 14, 2017).

programs, such as CMS's Medicaid program and grant programs administered by HRSA.[40] Other sources of federal funding include GME training that occurs at VA and Department of Defense medical facilities.[41]

With regard to Medicare, CMS makes GME payments to different types of institutions, though hospitals paid through the inpatient prospective payment system account for most of these payments.[42] Medicare pays for a hospital's costs associated with GME training through two mechanisms—direct graduate medical education (DGME) and indirect medical education (IME) payments—both of which are formula-based payments set by statute.[43] DGME payments are made to cover the direct costs of GME training, such as residents' salaries. IME payments are made to reflect the higher patient care costs hospitals with GME programs may incur, because, for example, residents in training may order more diagnostic tests and procedures than experienced clinicians and take more time to interpret the results. The Balanced Budget Act of 1997 capped the number of residents that hospitals may count for DGME and IME payment at the number of full-time equivalent (FTE) residents in place in 1996. If a hospital did not have GME training in 1996, its resident FTE caps are set 5 years after it begins training residents in its first new

[40]Medicaid is a joint federal-state program that finances health insurance coverage for certain categories of lower-income individuals. States receive federal matching funds and must follow broad federal rules, but they have flexibility to design their own programs. Historically, most states have used Medicaid to pay for GME training, although there are challenges to calculating Medicaid GME spending. In addition to CMS and HRSA, other agencies within HHS also provide a more limited amount of funding for GME training, including the Centers for Disease Control and Prevention and the National Institutes of Health.

[41]GME funding provided by the Department of Defense is primarily limited to training members of the military at the Department's military treatment facilities. According to the Institute of Medicine, the Department of Defense sponsors about 200 GME programs that train an estimated 3,200 residents annually. See Institute of Medicine, *Graduate Medical Education*.

[42]For the purposes of this report, unless otherwise specified, the term hospital refers to inpatient prospective payment system hospitals. Under the inpatient prospective payment system, hospitals are paid a predetermined amount based on the clinical classification of the discharge from the hospital. CMS calculates these payments through a series of adjustments applied to separate national base payment rates covering operating and capital expenses. Other hospitals also receive Medicare GME payments, such as critical access hospitals—rural hospitals that receive cost-based reimbursement. Additionally, CMS makes Medicare GME payments to other types of providers, such as Rural Health Clinics.

[43]See 42 U.S.C. § 1395ww(d)(5)(B) (IME payment formula) and 42 U.S.C. § 1395ww(h) (DGME payment formula).

program, based in part on the highest number of resident FTEs who train during that fifth year.[44] While hospitals are free to add residents beyond their caps, these generally do not result in additional Medicare payments.

With regard to VA, the agency estimated that in fiscal year 2015, more than 44,000 residents rotated through a VA facility as part of their GME training. Nearly all of the GME programs utilizing VA as a training site are sponsored by an affiliated medical school or teaching hospital, rather than by VA. VA provides payments to its medical centers for GME training and, in turn, medical centers reimburse their academic affiliates for the time residents spend training there.

Over time, a number of federal efforts have been created that provide funding to increase GME training in rural areas and in primary care. For example, the Medicare, Medicaid, and SCHIP Balanced Budget Refinement Act of 1999 included provisions that could expand GME training in rural areas by allowing certain qualified hospitals to increase their resident FTEs above the 1996 caps.[45] PPACA included several provisions intended to increase primary care GME training. This included two grant programs overseen by HRSA—the Teaching Health Center program and Primary Care Residency Expansion program. In addition, PPACA required that Medicare-funded resident FTEs not being used by hospitals be redistributed to other hospitals meeting certain requirements. Similarly, the Veterans Access, Choice, and Accountability Act of 2014 directed VA to expand its GME training, according to certain priorities, including primary care. Some of the efforts focused on expanding primary care also prioritized rural or underserved areas designated as HPSAs. (See table 1 for additional information on these federal rural and primary care efforts.)

Table 1: Federal Efforts Intended to Expand Graduate Medical Education (GME) Training in Rural Areas or in Primary Care

Program	Agency	Description

[44]Prior to 2012, if a hospital did not have GME training in 1996, its cap was set 3 years after it began training residents, based in part on the highest number of resident FTEs that it trained during that third year.

[45]Pub. L. 106–113, app. F, § 407(b),(c), 113 Stat. 1501A-321, 1501A-374 (1999).

	Program	Agency	Description
Rural efforts	Medicare payment incentives to increase GME training in rural areas	CMS	• Intended to incentivize hospitals to expand GME training in rural areas by: • Setting resident full-time equivalent (FTE) caps for rural hospitals at 130 percent of their 1996 training levels. • Allowing rural hospitals to increase their resident FTE caps for the purposes of adding new GME programs. • Allowing an urban hospital that establishes a separately accredited Rural Training Track in a rural area to receive a specific resident FTE cap adjustment for that Rural Training Track.
Primary care efforts	Teaching Health Center Graduate Medical Education program	HRSA	• Intended to increase the number of primary care physicians and dentists trained in community-based settings; funded positions are for the costs of resident FTEs in a newly established teaching health center or an expanded number of resident FTEs in an established teaching health center.
	Primary Care Residency Expansion program	HRSA	• Intended to increase the number of primary care physicians by expanding enrollment in primary care GME programs over a 5-year period; funded positions were required to be in addition to the number already being trained.
	Medicare GME redistribution	CMS	• Reduced resident FTE caps in certain hospitals not using their full cap amounts and redistributed the FTEs effective July 1, 2011. • Hospitals in states with the lowest resident-to-population ratios were to receive 70 percent of the redistributed FTEs to increase their cap amounts and hospitals in rural areas and those located in states, the District of Columbia, and U.S. territories with high proportions of their populations in Health Professional Shortage Areas were to receive 30 percent of the FTEs. • Hospitals receiving redistributed FTEs were, for a 5-year period, required to use 75 percent for primary care or general surgery residents in new or expanding programs and were required to ensure that the number of primary care FTEs the hospital trained in the current year was not less than the average number of primary care FTEs the hospital trained from the three cost reports ending prior to March 2010 (referred to as the 3-year primary care average).
	VA GME Expansion	VA	• Intended to expand GME training by "up to 1,500 positions" within 10 years beginning 1 year after signing. Set funding priorities as primary care, mental health, or other specialties "the Secretary deems appropriate." • Positions awarded to VA medical centers, prioritizing those with a shortage of physicians, with no prior GME training, in Health Profession Shortage Areas, or in areas with a high concentration of veterans.[a]

Source: GAO review of information from the Centers for Medicare & Medicaid Services (CMS), the Health Resources and Services Administration (HRSA), and the Department of Veterans Affairs (VA). | GAO-17-411

[a]VA does not generally sponsor its own GME programs, but rather partners with academic affiliates whose residents rotate through VA as part of their training.

Locations and Types of GME Training Were Largely Unchanged from 2005 through 2015, but Growth Was Notable in Certain Areas

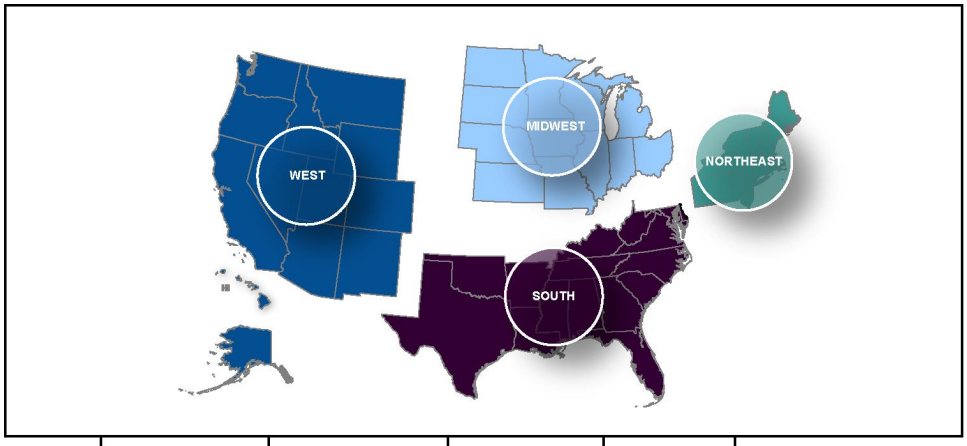
Residents Remained Concentrated in Urban Areas and in the Northeast, Despite Growth in Other Parts of the Country

From 2005 through 2015, 99 percent of residents in GME programs trained in urban areas, despite some growth in rural areas.[46] Overall, during this period, the number of residents grew by 22 percent—from 104,330 to 127,578. While there was growth in rural areas, urban areas added a greater number of residents—almost 23,000 (from 103,526 to 126,355), compared with 419 for rural areas (from 804 to 1,223).

Residents in GME training were also concentrated in the Northeast, although their rate of growth was higher in other regions of the country. From 2005 through 2015, the largest percentage of residents (about 30 percent) trained in the Northeast, which also had the smallest percentage of the U.S. population (about 18 percent). In 2015, the Northeast had 69 residents per 100,000 people. In comparison, the South also had about 30 percent of residents in 2015, but because it was the region with the largest population (about 38 percent), it had only 31 residents per 100,000 people. While the Northeast maintained the highest concentration of residents from 2005 through 2015, the resident growth rate was higher in the other regions. Specifically, the number of residents increased by 15 percent in the Northeast, compared with 24 percent or more in each of the other regions. However, resident growth in the South and West was somewhat tempered by the fact that these regions also experienced higher population growth over the period, resulting in smaller increases in the number of residents per 100,000 people compared with the Midwest and Northeast. (See fig. 2.)

[46]Residents in suburban areas, which are included in our definition of urban, make up less than 1 percent of all residents.

Figure 2: Changes in the Concentration of Graduate Medical Education (GME) Residents from Academic Year 2005 through 2015, by Region



Region	GME residents (2015)	Total population (2015)	GME resident growth (2005-2015)	Population growth (2005-2015)	GME residents per 100,000 population	
					2005	2015
Midwest	31,056 (24%)	67,907,403 (21%)	24%	3%	38	46
Northeast	38,951 (31%)	56,283,891 (18%)	15%	3%	62	69
South	37,967 (30%)	121,182,847 (38%)	28%	13%	28	31
West	19,604 (15%)	76,044,679 (24%)	26%	12%	23	26
National	127,578 (100%)	321,418,820 (100%)	22%	9%	35	40

Sources: GAO analysis of data from the Accreditation Council for Graduate Medical Education, the American Osteopathic Association, and Census Bureau (data); Map Resources (map). | GAO-17-411

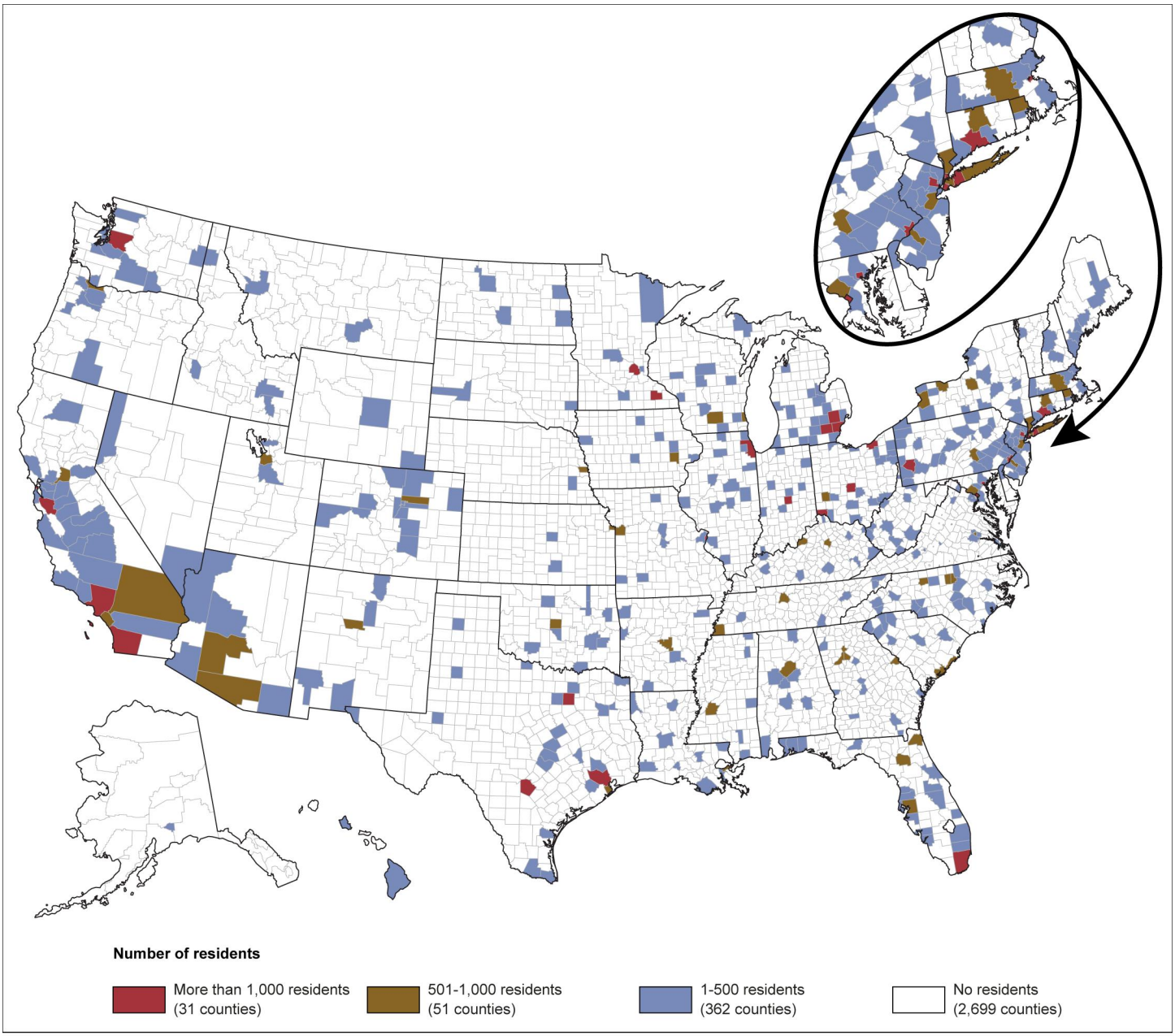
Note: Total population percentages do not add to 100 due to rounding.

Within these broad regions, residents in GME training were further concentrated in specific counties. Of the 3,143 counties in the United States, in 2015, residents were located in 444 counties. However, about half of residents were located in 31 counties.[47] (See fig. 3.) These counties accounted for 18 percent of the U.S. population and were located in each of the four regions. In the Midwest, for example, 65 percent of the residents in that region trained in 11 counties. From 2005 through 2015, the overall number of counties with residents increased by 15 percent (387 to 444). While residents were no longer in 18 counties,

[47]These 31 counties were located in 17 states.

75 new counties gained residents. Of these 75 new counties, most were located in the South (36) and the West (19).

Figure 3: Distribution of Graduate Medical Education Residents in their Primary Training Sites, Academic Year 2015



Source: GAO analysis of data from the Accreditation Council for Graduate Medical Education, the American Osteopathic Association, and Census Bureau. | GAO-17-411

GME training for some residents also occurred in HPSAs—areas of the country designated as having a shortage of primary care physicians. For example, in 2015, 33 percent (17,360) of all primary care residents trained in a HPSA. The South had the highest percentage of its residents in HPSAs (39 percent of 15,385 residents), and the Midwest and West had the lowest (28 percent of 12,738 residents for the Midwest, and 28 percent of 8,348 residents for the West). In addition, 89 percent of the residents in a HPSA trained in a population HPSA—an area designated as having a shortage for a specific population—compared with 11 percent who trained in a HPSA with a shortage in the entire geographic area.[48] Though many primary care residents trained in a HPSA, these residents were located in less than 8 percent of the 2,685 HPSAs nationwide.

The trends presented here generally represent the location of GME primary training sites and may not fully account for the clinical experiences residents receive during their training. According to ACGME officials, GME training must be based in areas that can support requirements for accreditation, including adequate patient volume and teaching quality. As a result, it tends to be primarily located in certain areas, such as urban areas. However, officials said that residents training in urban areas may rotate to participating sites in rural areas or treat patients from surrounding rural areas at urban training sites. We were not able capture such experiences, in part because neither ACGME nor AOA collect data on the extent to which residents train at participating sites.

Most Residents Trained in Specialties, of Which Nearly Half Were in Primary Care, but Growth Was More than Twice as Fast for Residents in Subspecialties

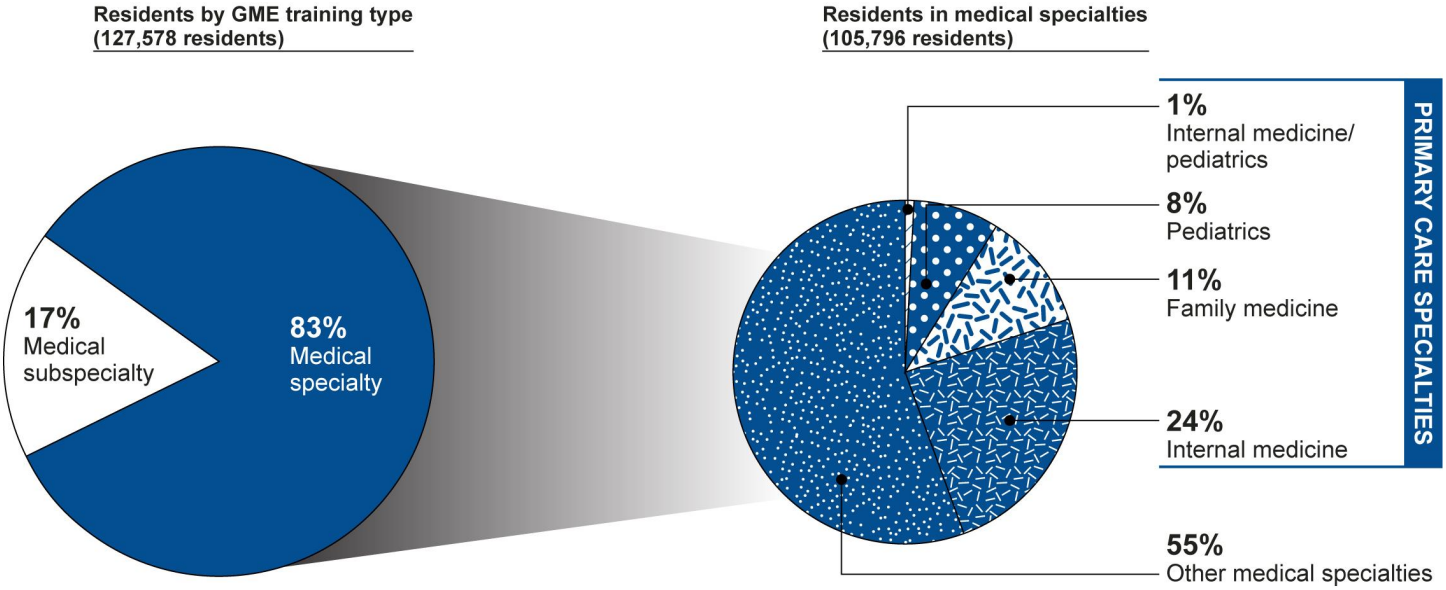
From 2005 through 2015, most residents in GME programs were training in one of the specialties that all residents are required to complete before

[48]Population HPSAs may be designated for areas in which there is a shortage of physicians for a specific population group, such as migrant farmworkers, or a low income population in an urban area that may otherwise have available physicians. We were not able to determine from our data the extent to which residents training in these population HPSAs were serving the population to which the shortage was designated.

Although most residents training in HPSAs were in a population HPSA, there were states in the South (Delaware, Texas, and Virginia) and Midwest (Indiana, Ohio, and Wisconsin) in which greater numbers trained in a geographic HPSA.

choosing whether to practice or subspecialize.[49] For example, in 2015, over 80 percent of all residents were training in a specialty, with the remaining residents training in a subspecialty. Of the residents training in a specialty, 45 percent trained in one of the primary care specialties. More than half of these primary care residents trained in internal medicine. As previously noted, research has shown that many primary care residents who trained in internal medicine go on to subspecialize rather than practice in primary care.[50] (See fig. 4.)

Figure 4: Graduate Medical Education (GME) Specialty and Subspecialty Residents, Academic Year 2015



Source: GAO analysis of resident data from the Accreditation Council for Graduate Medical Education and the American Osteopathic Association. | GAO-17-411

Notes: Initially, physicians go through GME training in a specialty—such as internal medicine, anesthesiology, or general surgery—and completion allows them to seek licensure and initial board certification to practice medicine. Some residents, however, may choose to subspecialize and seek additional GME training. For example, after completing an internal medicine program, a physician may decide to subspecialize in cardiovascular disease.

Medical specialty percentages do not add to 100 due to rounding.

Growth occurred for residents in GME specialty programs, but their percentage of overall residents went down slightly (from 85 to 83

[49]The resident data we reviewed for 2005, 2010, and 2015 capture a point-in-time, and we were therefore unable to determine the extent to which residents in a specialty go on to subspecialize in a later year.

[50]Salsberg "U.S. Residency Training," 1178.

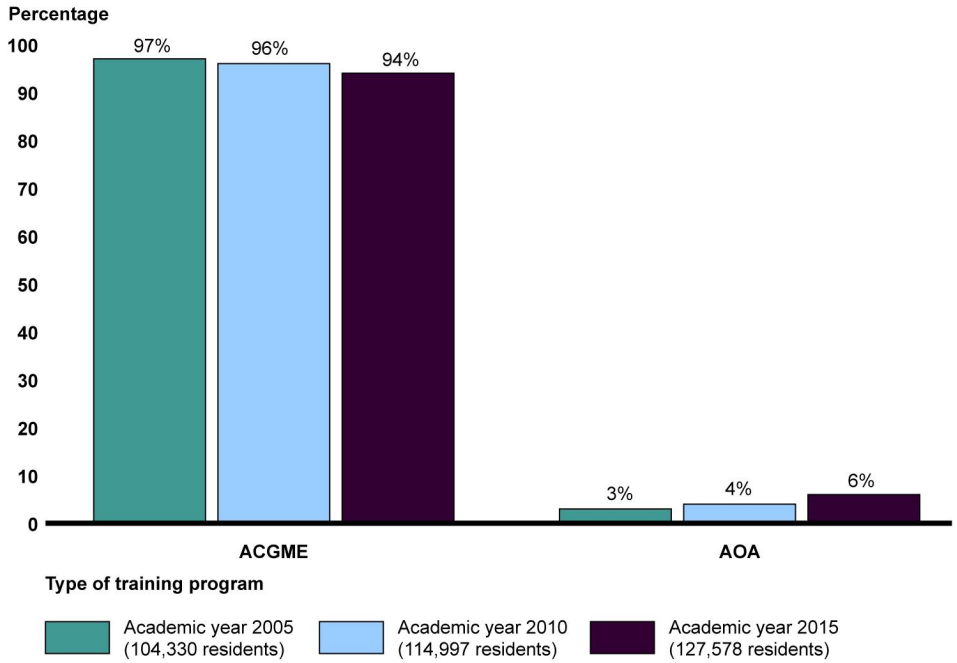
percent), as subspecialty growth was more than twice as fast. Specifically, from 2005 through 2015, the number of residents in a specialty grew by 19 percent (from 88,976 to 105,796) compared with 42 percent (from 15,354 to 21,782) for subspecialties. For both specialties and subspecialties, the number of residents grew more in urban areas than in rural areas, but the rate of growth was higher in rural areas, particularly for specialties (53 percent compared with 19 percent for specialties, and 47 percent compared with 42 percent for subspecialties). In 2015, residents in specialties accounted for about 90 percent (or 1,116) of the 1,223 residents training in rural areas. The regional distribution of residents in medical specialties and subspecialties reflected overall trends, with both concentrated in the Northeast, but growing faster in other regions from 2005 through 2015.

When looking at primary care specialties specifically, from 2010 through 2015, the years for which we had comparable data, the number of residents in a GME primary care specialty program increased slightly more than all other specialties (11 percent vs. 9 percent). Among the primary care specialties, residents in family medicine grew by 15 percent (from 10,120 to 11,686), compared with 10 percent for internal medicine (from 22,990 to 25,354) and 9 percent for pediatrics (from 8,106 to 8,814).

Most Residents Trained in ACGME Programs, but Residents in AOA Programs Increased Faster and Accounted for Most of the Growth in Rural Areas

The vast majority of residents trained in GME programs accredited by ACGME, accounting for more than 90 percent of all residents from 2005 through 2015. As a result, residents in ACGME programs accounted for 84 percent of the growth in the number of residents over the time period. However, there was a higher rate of growth for residents in AOA programs. Specifically, the number of residents in ACGME programs increased by 19 percent, from 100,918 to 120,497. In comparison, the number of residents in AOA programs increased by 108 percent, from 3,412 to 7,081. As a result, the percentage of all residents in AOA programs grew from 3 percent to 6 percent. (See fig. 5.)

Figure 5: Percent of Graduate Medical Education Residents in ACGME or AOA Training Programs, Academic Years 2005, 2010, and 2015

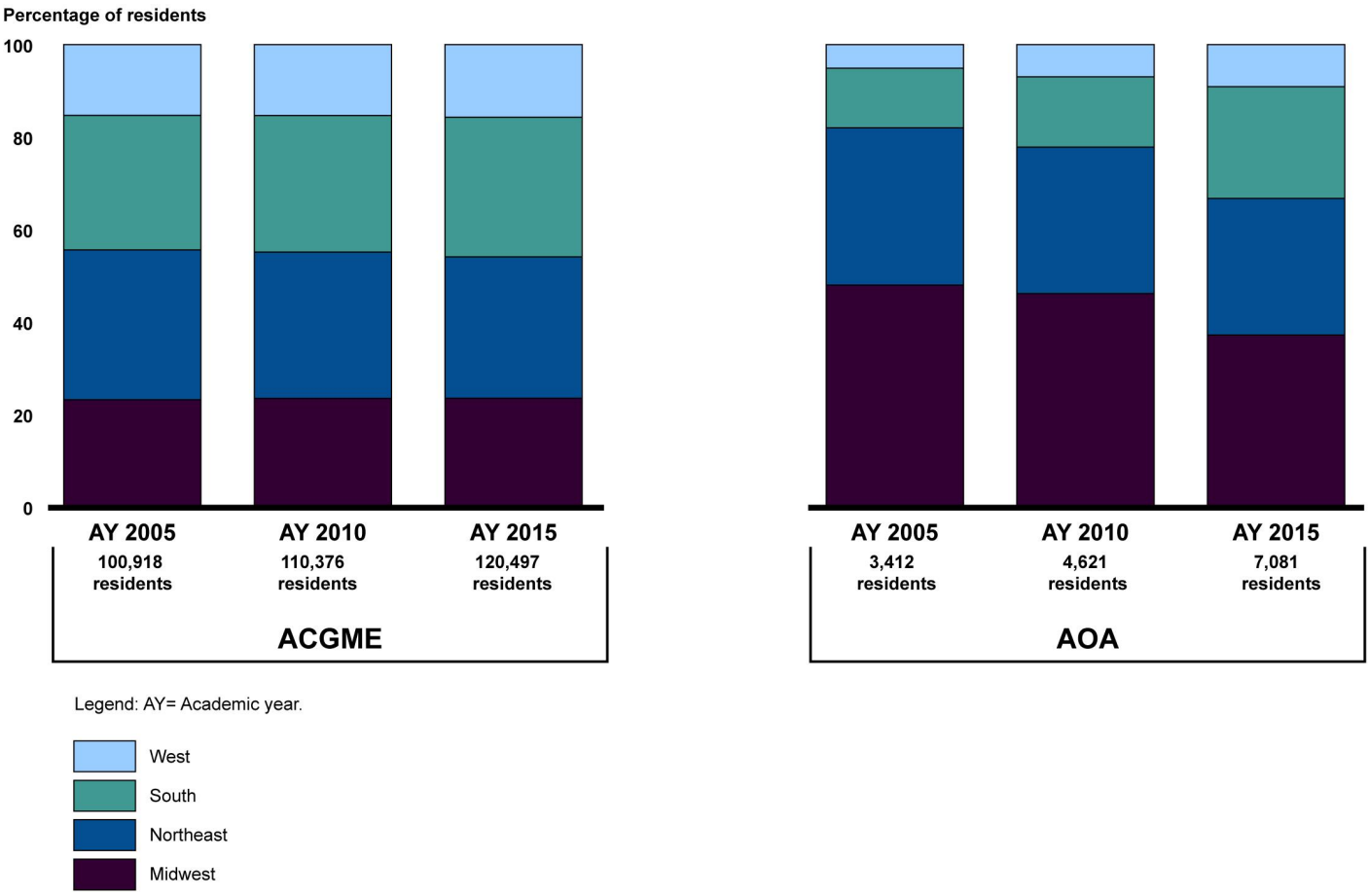


Source: GAO analysis of resident data from the Accreditation Council for Graduate Medical Education (ACGME) and the American Osteopathic Association (AOA). | GAO-17-411

Residents in ACGME and AOA programs both experienced growth in areas with historically less GME training, though residents in AOA programs were responsible for most of the growth in rural areas, as summarized below.

- While the largest number of residents in ACGME programs trained in the Northeast from 2005 through 2015, the largest number of residents in AOA programs trained in the Midwest. (See fig. 6.) However, the South had the highest percentage of growth in residents in ACGME programs over the time period, and the West had the highest growth in residents in AOA programs.
- From 2005 through 2015, almost all residents in ACGME and AOA programs trained in urban areas, although both types of residents experienced growth in rural areas. Despite their smaller number, residents in AOA programs accounted for 70 percent of this growth. Specifically, the number of residents in AOA programs in rural areas increased by 291 (from 100 to 391), while number of residents in ACGME programs increased by 128 (from 704 to 832).

Figure 6: Regional Distribution of Graduate Medical Education Residents in ACGME or AOA Training Programs, Academic Years 2005, 2010, and 2015



Source: GAO analysis of resident data from the Accreditation Council for Graduate Medical Education (ACGME), the American Osteopathic Association (AOA), and the Census Bureau. | GAO-17-411

From 2010 through 2015, the years for which we had comparable data, the number of residents in primary care GME programs increased for both ACGME and AOA. The number of residents in ACGME primary care programs increased from 41,386 residents in 2010 to 44,563 residents in 2015. For residents in AOA primary care programs, the number increased from 1,235 residents in 2010 to 2,747 residents in 2015.

Use of Federal Efforts Intended to Increase GME Training in Rural Areas Was Often Limited, and Officials Reported Challenges

Hospitals' use of three Medicare payment incentives—the primary federal efforts we identified intended to increase GME training in rural areas—was often limited. In part, this is because relatively few rural hospitals reported having GME training—49 (7 percent) compared with 1,144 (26 percent) hospitals overall, in fiscal year 2013.[51] For those rural hospitals that did have GME training, there are two incentives that allow them to expand the number of resident FTEs they can count for Medicare payments, compared with what is allowed for urban hospitals. The first incentive sets resident FTE caps for rural hospitals that had GME training in 1996 at 130 percent of the resident FTEs at the hospital that year. Data indicate that, where applicable, rural hospitals are likely to use this incentive, as most of the 49 rural hospitals reported resident FTEs close to or above their resident FTE caps. However, use of the second incentive was more limited. Specifically, less than half of the 49 hospitals reported data indicating that they used the incentive that allows them to increase their resident FTE caps if they have a GME program in one specialty, for example, family medicine, but start a new GME program in another specialty, for example, internal medicine.

The third incentive encourages urban hospitals to start Rural Training Track programs—where residents spend a portion of their GME training in a rural area—by allowing a specific resident FTE cap adjustment for that Rural Training Track if the program meets certain requirements.[52] While CMS was not able to provide information on the number of

[51]Hospitals that report having GME training may not be running full training programs. For example, the number of IME or DGME FTEs reported by rural hospitals ranged widely, from less than 1 to over 300, indicating that some are likely serving only as a rotational site for a GME program that is primarily located at another hospital.

Rural hospitals not paid through the inpatient prospective payment system also reported limited involvement in GME training. Specifically, while critical access hospitals are not subject to caps on Medicare GME funding, in fiscal year 2013, only 9 of the over 1,000 critical access hospitals reported having GME training.

[52]For example, in order for an urban hospital to qualify for a resident FTE cap increase, Rural Training Track programs must be separately accredited and residents must train in a rural setting for more than one-half of their training.

hospitals that have used the incentive, evidence suggests it may be limited. Specifically, one outside expert we spoke with said that based on communications with Rural Training Track programs, only two urban hospitals claimed an increase to their resident FTE caps for starting such programs from 2000 through 2010.

In addition to the general challenges associated with offering GME training in rural areas, CMS officials reported a number of challenges with using Medicare funding to support rural GME training. For example, officials told us that the way a hospital's resident FTE caps are established, as well as the amount it is paid per-resident for DGME, may make rural hospitals hesitant to partner with urban hospitals to provide GME training.[53] Officials said some rural hospitals had their caps or per-resident amount set at low amounts because they served as a rotational site for an urban hospital for a small amount of GME training, and then later faced challenges in starting a full GME program, which is likely more costly.[54] CMS officials also identified challenges for urban hospitals wanting to use the Medicare payment incentive for starting Rural Training Track programs. For example, some urban hospitals have formed a GME training program with rural hospitals that mirrors the structure of Rural Training Track programs, but the program does not meet all the statutory requirements for the Medicare payment incentive, such as being separately accredited. Other urban hospitals have faced challenges if they have started a Rural Training Track program with one rural site and later wanted to expand the program to another rural site, as they are not eligible to receive an additional increase to their caps for the expansion to the second site.

Federal Efforts Intended to Increase Primary Care GME Training Were Relatively Small, and

[53]In general, DGME payments are a product of a hospital's per resident amount, weighted number of resident FTEs, and Medicare patient load.

[54]CMS officials told us that if a rural hospital serves as a rotational site for a GME program at another hospital, its resident caps are triggered only if the residents are training in a new GME program. However, the per-resident amount is calculated based on either the first or second cost reporting period in which the rural hospital first trains residents in either an existing or a new GME program. Thus, if, for example, a hospital has one resident rotate through in a year, the per-resident amount would be set on costs associated with one resident, which is likely much less than the costs associated with starting a full GME program.

the Number of New Residents Added May Not Be Sustained

Efforts Funded Residents in Primary Care and Other Specialties, Many of Whom Trained in Underserved Areas

We identified four federal efforts intended to increase primary care GME training. While all these efforts funded new primary care residents, some also funded residents in other specialties or subspecialties, as summarized below. (See table 2 for additional information on residents funded by the four efforts.)

- Residents funded under the Teaching Health Center program—which provided GME payments to primary care medical and dental GME programs in community-based settings—grew from 76 in 2012 to 600 in 2015.[55] While the program included other specialties in its definition of primary care, in a given year, about 90 percent of funded residents were in family medicine, internal medicine and pediatrics.[56] As of the end of 2016, 384 residents funded through the program had completed their GME training.
- Residents under the Primary Care Residency Expansion program—which provided grants to primary care GME programs—increased from 168 in 2012 to 500 in 2015. As of the end of 2016, 489 residents funded through the program had completed their GME training.
- The VA GME expansion—which aims to increase VA GME training by up to 1,500 positions over 10 years—distributed 366 FTEs for new residents to VA medical centers for 2016 and 2017. Of these, 163 were in primary care.[57]

[55]According to HRSA, the number of awarded resident FTEs was 690 in 2016, indicating that residents funded through the program are continuing to increase. However, as the number of these FTEs that was actually used to fund residents was not available at the time of our analysis, we relied on 2015 resident counts.

[56]The remaining residents were in obstetrics and gynecology, geriatrics, psychiatry, and general dentistry, which were all specialties included in the Teaching Health Center program's definition of primary care.

[57]Our analysis was limited to recipients in the 50 states and the District of Columbia and thus, excludes resident FTEs from one recipient located in Puerto Rico.

- The Medicare GME redistribution transferred 599 unused IME and 692 unused DGME resident FTEs to other hospitals, effective July 1, 2011.[58] Hospitals that received increases to their resident FTE caps were, for a 5-year period, required to use 75 percent of the redistributed FTEs to support new primary care or general surgery residents as well as meet a 3-year primary care average. In fiscal year 2013, data from 40 of the 55 hospitals that received cap increases indicate that over 85 percent of the redistributed FTEs used were for either primary care or general surgery residents.[59]

Table 2: Recipient Organizations and Residents Funded by Four Federal Primary Care Graduate Medical Education (GME) Efforts

Federal effort	Year(s) of data	Recipients	Funded residents/resident FTEs			
			Total	Minimum	Average	Maximum
Teaching Health Center Graduate Medical Education program	Academic year 2015	39 organizations	600 residents	3 residents	15 residents	127 residents
Primary Care Residency Expansion program	Academic year 2015	65 organizations	500 residents	1 resident	8 residents	22 residents
Medicare GME redistribution (IME)	July 2011	51 hospitals[a]	599 FTEs	<1 FTE	12 FTEs	50 FTEs
Medicare GME redistribution (DGME)	July 2011	51 hospitals[a]	692 FTEs	<1 FTE	14 FTEs	50 FTEs

The VA GME expansion uses a different definition of primary care than we used for the purposes of our analysis, as it includes internal medicine, family medicine, and geriatrics, but excludes pediatrics. Residents in geriatrics accounted for about 3 additional FTEs.

[58]Our analysis was limited to recipients in the 50 states and the District of Columbia and thus, excludes resident FTEs from three recipients located in Puerto Rico.

IME and DGME FTEs may represent separate counts of the same resident. As hospitals count resident time differently for the purpose of calculating DGME and IME payments, DGME and IME FTE totals may not be the same for the same hospital.

[59]Hospitals receiving increases to their resident FTE caps are required to report to CMS the total number of redistributed FTEs used and the number that were not used for primary care or general surgery residents. Of the 40 hospitals that reported such data, we determined that 290 of their redistributed IME and 292 of their redistributed DGME FTEs used were for either primary care or general surgery residents in fiscal year 2013. It is likely that many of these FTEs went to primary care residents, as the 40 hospitals separately reported increasing primary care FTEs compared with before the redistribution by a total of 251 IME and 251 DGME FTEs. As data from fiscal year 2013 was only about 2 years after the redistribution occurred, and it can take time to start new or expand GME programs, more hospitals may report using additional redistributed FTEs for primary care or general surgery in future years.

Federal effort	Year(s) of data	Recipients	Funded residents/resident FTEs			
			Total	Minimum	Average	Maximum
VA GME expansion	Academic years 2016 and 2017	74 VA medical centers	366 FTEs	<1 FTE	5 FTEs	21 FTEs

Source: GAO analysis of Health Resources and Services Administration (HRSA), Centers for Medicare & Medicaid Services (CMS), and Department of Veterans Affairs (VA) data. | GAO-17-411

Notes: Because comparable data were not available across all efforts, data presented are for different timeframes and for either funded residents or full-time equivalent (FTE) residents. A resident FTE may be used for more than one resident.

Our analysis was limited to recipients in the 50 states and the District of Columbia and thus, excludes data from three recipients in the Medicare GME redistribution and one in the VA GME expansion that were located in Puerto Rico.

Within a given organization, hospital, or medical center, multiple GME programs may have received funding. For example, the Teaching Health Center program and the Primary Care Residency Expansion program funded 59 and 78 GME programs, respectively, and the VA GME expansion, 185. We defined organization as awardees with the same name or address.

[a]55 hospitals received either an increase to their indirect medical education (IME) or direct graduate medical education (DGME) resident FTE caps, while 47 received both.

The four federal efforts varied in the extent to which they funded family medicine residents versus residents in other primary care specialties. This could affect how many of the residents trained ultimately practice in primary care, as family medicine residents are less likely to subspecialize. In particular, while about half of the primary care residents funded through the Teaching Health Center and Primary Care Residency Expansion programs in 2015 were in family medicine, family medicine residents accounted for 7 percent of the FTEs distributed through the VA GME expansion in 2016 and 2017. VA officials told us that family medicine GME programs have tended to focus their training in non-VA settings, in part, because the VA has no pediatric patients and has historically provided very little women's health care, which is not aligned with some of family medicine's GME training requirements. However, VA is working to build partnerships with family medicine programs as part of the GME expansion.

To varying degrees, the four federal efforts funded residents in regions of the country that have disproportionally low numbers of residents relative to the population. All four efforts added residents outside of the Northeast—where the resident-to-population ratios are the highest. However, while the Medicare GME redistribution and VA GME expansion efforts added over 90 percent of their FTEs to regions outside of the Northeast, the regional distribution of residents funded by the Teaching Health Center and Primary Care Residency Expansion programs in 2015 reflected national trends, with the most funded residents in the Northeast. (See table 3.)

Table 3: Regional Distribution of Residents Funded by Four Federal Primary Care Graduate Medical Education (GME) Efforts

Federal effort	Year(s) of data	Funded residents/ resident FTEs	Region			
			Northeast (%)	Midwest (%)	South (%)	West (%)
Teaching Health Center Graduate Medical Education program	Academic year 2015	557 residents [a]	33	21	23	23
Primary Care Residency Expansion program	Academic year 2015	500 residents	37	16	29	18
Medicare GME redistribution (IME)	July 2011	599 FTEs	<1	22	56	22
Medicare GME redistribution (DGME)	July 2011	692 FTEs	0	18	64	18
VA GME expansion	Academic years 2016 and 2017	366 FTEs	8	17	50	25
Residents, nationally	Academic year 2015	127,578	31	24	30	15
U.S. population	2015	321,418,820	18	21	38	24

Source: GAO analysis of data from the Health Resources and Services Administration, Centers for Medicare & Medicaid Services, Department of Veterans Affairs (VA), Accreditation Council for Graduate Medical Education, American Osteopathic Association, and the Census Bureau. | GAO-17-411

Notes: Because comparable data were not available across all efforts, data presented are for different timeframes and for either funded residents or full-time equivalent (FTE) residents. A resident FTE may be used for more than one resident.

Our analysis was limited to recipients in the 50 states and the District of Columbia and thus, excludes data from three recipients in the Medicare GME redistribution and one in the VA GME expansion that were located in Puerto Rico.

Percentages may not add to 100 due to rounding.

[a]Excludes data from one recipient that was located in all four regions as it was not possible to assign residents to a region. This recipient accounted for 43 (7 percent) of all residents funded through the program in academic year 2015.

Though funding GME training in HPSAs and in rural areas was not a priority across the four federal efforts, they did provide funding for residents in such areas, and at greater rates than was the case for where

residents train overall.[60] However, this varied depending on the effort, as outlined below.[61]

- The percentage of residents funded in a HPSA ranged from 34 percent of all primary care FTEs distributed through the VA GME expansion to nearly 60 percent of all FTEs transferred through the Medicare GME redistribution; compared with the 33 percent of all primary care residents that trained in a HPSA in 2015.[62] Similar to primary care GME training overall, residents funded by the efforts were far more likely to train in a population HPSA than in a geographic HPSA.
- The percentage of residents funded in rural areas ranged from just over 2 percent of residents funded through the Primary Care Residency Expansion program to just over 5 percent of the residents funded through the Teaching Health Center program, which was higher than the 1 percent of all residents that trained in rural areas in 2015.[63] The small number of funded residents training in rural areas could in part be due to the number of rural GME programs or

[60]While most of the redistributed FTEs were slotted for applicants in states with low resident-to-population ratios, the Medicare GME redistribution also prioritized applicants in states with high proportions of their populations in HPSAs and those in rural areas. The VA GME expansion prioritized applicants in HPSAs, and facilities with no prior GME training, which, according to VA officials, are predominantly located in rural areas. The Primary Care Residency Expansion program gave priority to applicants where 6 months or more of residents' training was to occur in specified community-based underserved sites, including those in rural areas. The Teaching Health Center program eligibility criteria did not require applicants to be located in HPSAs or in rural areas.

[61]HPSA and rural percentages for the Teaching Health Center and Primary Care Residency Expansion programs are based off of the number of funded residents in 2015, while data for the Medicare GME redistribution and the VA GME expansion are based off of the total number of awarded FTEs.

For the Teaching Health Center and Primary Care Residency Expansion programs, we focused our analysis on the primary training sites identified by awardees, and residents were counted as training in a HPSA or a rural area if at least one primary training site was located in such an area.

[62]For the Teaching Health Center program, the Primary Care Residency Expansion program, and the VA GME expansion, our analysis was limited to residents funded in primary care and obstetrics and gynecology, but we were not able to similarly limit our analysis for the Medicare GME redistribution.

[63]According to HRSA, when accounting for all participating sites, the percent of residents that trained in a rural area at some point in the year was 22 percent for the Teaching Health Center program in 2014 and 13 percent for the Primary Care Residency Expansion program.

providers that applied for funding. For example, based on our analysis, just 3 rural hospitals applied for the Medicare GME redistribution, each of which received new FTEs. Officials from CMS, HRSA, and VA cited the challenges of increasing GME training in rural areas. For example, HRSA officials said that rural areas may have difficulty meeting accreditation requirements for certified faculty members or volume of services, and CMS officials noted they may face challenges attracting residents. HRSA officials also noted that it may be hard for rural hospitals to fund the significant costs associated with building infrastructure to start or expand GME training. VA officials said that, partially in response to this challenge, the agency awarded separate planning and infrastructure grants through the GME expansion to help sites with very little or no prior GME training. Officials noted that as the expansion is only in the first few years of its 10-year timeline, these grants are just being awarded and new partnerships are just being formed. As a result, officials said that it will take time for such investments to pay off and for new VA GME programs to be built in rural and underserved areas.

While the four federal efforts are not all planning to report on whether residents funded ultimately practice in primary care, or in a rural or underserved area after completing GME training, evidence from the Teaching Health Center and Primary Care Residency Expansion programs suggests that many of their residents will. According to HRSA, of the 47 Teaching Health Center residents completing training in 2014, over 80 percent were practicing in primary care, 44 percent in a medically underserved area, and 15 percent in a rural area. Additionally, among the 156 Primary Care Residency Expansion residents who completed training in 2014, 67 percent intended to practice in a primary care setting, 46 percent intended to practice in a medically underserved area, and 17 percent intended to practice in a rural setting.

Efforts Represent a Relatively Small Investment in Primary Care GME Training, and New Positions May Not Continue in the Future

Despite increasing the number of primary care residents, the four federal efforts still represent a relatively small investment in primary care GME training when compared with overall federal GME spending and the number of primary care residents nationally. Specifically, average annual funding for the Teaching Health Center program, the Primary Care Residency Expansion program, and the VA GME expansion accounted for less than 1 percent of the more than $15 billion in estimated annual

federal spending on GME training, and the Medicare GME redistribution accounted for less than 1 percent of the approximately 79,000 IME and 83,000 DGME FTEs that hospitals reported being able to claim for Medicare payment in fiscal year 2013.[64] In addition, we estimate that the residents added through these efforts so far would have represented about 3 percent of the nearly 50,000 primary care residents trained across the country in 2015.[65]

Moreover, some of the new primary care GME training added through the federal efforts may not continue, in part because the Primary Care Residency Expansion program and the Medicare GME redistribution were one-time efforts that have ended. According to HRSA officials, just over 70 percent of the 74 Primary Care Residency Expansion awardees responding to a request for information (a 96 percent response rate) reported that they would continue to support all of the added primary care resident positions after the grant period, and an additional 7 percent planned to sustain at least some of the positions.[66] However, for a variety of reasons, including lack of funding, 19 percent of awardees planned to revert to their prior number of residents and 3 percent were unsure of their plans. IME and DGME FTEs received through the redistribution became a permanent part of a hospital's resident FTE caps. However, as the requirement to use 75 percent of the redistributed FTEs for new primary care or general care surgery residents expired in June 2016, hospitals that added primary care residents as a result of the redistribution may not continue to do so.[67]

[64]See Institute of Medicine, *Graduate Medical Education*.

[65]Due to data limitations, we were not able to determine the exact number of new primary care residents added through these efforts. Our estimate is based on the number of primary care residents reported for the Teaching Health Center and Primary Care Residency Expansion programs in 2015, the number of primary care FTEs distributed through the VA GME expansion in 2016 and 2017, and the number of redistributed Medicare DGME FTEs hospitals reported using for primary care or general surgery residents in fiscal year 2013. To the extent the latter two over count the number of FTEs actually used for primary care, this percentage could be slightly lower.

[66]According to HRSA, one Primary Care Residency Expansion program awardee was not included in the request because it had closed out its award early knowing it would be unable to sustain the new resident positions beyond the end of the funding period.

[67]CMS officials said that hospitals were unlikely to stop using the redistributed FTEs for primary care because they likely updated their accreditation numbers in applying for them; however, CMS does not plan to study these trends.

In addition, while the Teaching Health Center program and the VA GME Expansion are ongoing, they may face challenges in sustaining funded residents or adding more primary care GME training. Without reauthorization, funding for the Teaching Health Center program will end in fiscal year 2017. HRSA officials said that Teaching Health Center awardees may have difficulty sustaining residents added without continuation of the grant program, in a large part because they are community health centers that do not have other revenue lines to support GME training. For example, they said that a recent decrease in Teaching Health Center funding resulted in awardees training fewer residents than they originally projected, and some awardees reported they may not be able to continue GME programs.[68] For VA's GME expansion, as of June 2016, about 12 percent of the 163 primary care FTEs distributed to VA medical centers remained unoccupied, which VA officials said could be because, for example, the GME training programs were not ready to use them. Further, the percentage of primary care FTEs distributed through the expansion fell from 51 in 2016 to 37 in 2017. VA officials said that the drop could be because of pent-up demand in the first year of funding, but also reported challenges forming new partnerships with academic affiliates in primary care specialties, such as those in family medicine. However, VA officials also noted that they are actively pursuing such partnerships, and it could take 5 to 7 more years to determine the extent to which they are successful at producing new resident positions.

Given that these four federal efforts represent a relatively small investment in primary care GME training, and that most other federal funding cannot be targeted to primary care, the efforts may not be sufficient to meet projected primary care physician shortages. In November 2016, HRSA projected a shortage of up to 23,640 primary care physicians by 2025—although it indicated that changes in health care delivery, such as greater use of nurse practitioners and physician

[68]The Teaching Health Center program was appropriated $230 million for fiscal years 2011 through 2015 under PPACA and appropriated $60 million for fiscal years 2016 and 2017 by the Medicare and CHIP Reauthorization Act of 2015. As a result of this reduction, HRSA officials said the agency decreased its payment per FTE from $150,000 to $95,000 in fiscal year 2016. However, because there were fewer residents to support than previously projected, HRSA was able to increase the per FTE payment to $110,000 in fiscal year 2017. A recent study estimated that the median net cost of training a resident in a teaching health center in fiscal year 2017 would be $157,602. See M. Regenstein, et al., "The Cost of Residency Training in Teaching Health Centers," *New England Journal of Medicine*, vol. 375, no. 7 (Aug. 18, 2016): 612-614.

assistants, could affect the extent of that shortage.[69] It also noted substantial regional variation, with the South facing the largest shortage and the Northeast having almost no shortage.[70] HRSA officials told us their projections did not account for the primary care efforts we identified. When asked the extent to which the efforts might mitigate the shortages, officials said that the efforts could help to lessen them, particularly if the ongoing efforts are fully supported with sustainable, long-term funding. For example, they said that if the Teaching Health Center program were able to continue to support the same number of resident FTEs as are currently approved, it would produce approximately 3,000 new primary care physicians by 2025. However, officials acknowledged that the efforts account for a small percentage of overall primary care residents being added to the physician workforce. As most other federal GME funding comes from Medicare, which HHS generally distributes according to statutory formulas unrelated to workforce needs, it is unlikely that other federal funding sources will add the additional primary care positions needed to fill the gap.

In a 2015 report, we recommended that, to ensure that HHS workforce efforts meet national needs, HHS should develop a comprehensive and coordinated planning approach to guide its health care workforce development programs.[71] In making this recommendation we noted that, without such planning, HHS cannot fully identify the gaps between existing programs and national needs as well as the actions needed to address these gaps. In response, HHS concurred with our recommendation and, among other things, noted that it could convene an interagency group to assess such things as gaps in workforce programs and potential requests to the Congress for modified or expanded

[69]See Health Resources and Services Administration, *National and Regional Projections of Supply and Demand for Primary Care Practitioners*. For the projection report, HRSA's definition of primary care included those practicing in general and family medicine, general pediatrics, general internal medicine, and geriatrics. Our report used a similar definition, but we did not include geriatrics.

[70]In its shortage projections for 2025, HRSA also identified variation among primary care specialties within these regions. For example, it reported that the Northeast has a large surplus of internal medicine physicians, but a large shortage for general and family medicine, while the Midwest has a very small shortage in general and family medicine, but a large shortage for internal medicine. Further, specialty variation may vary between states in a region. For example, within the Northeast region, HRSA reported that New Jersey and Pennsylvania had shortages of primary care physicians, while Massachusetts had a surplus.

[71]GAO-16-17.

legislative authority. As of December 2016, HHS officials indicated that the agency had not taken steps to convene this group, but said that it is still considering doing so in the future. In light of the limited nature of current federal efforts to increase primary care GME training, we continue to believe that our recommendation should be implemented and agree that an interagency group like the one proposed by HHS is an important first step toward ensuring a more comprehensive and coordinated approach to workforce planning.

Agency Comments and Our Evaluation

We provided a draft of this report to HHS and VA for comment. HHS provided technical comments, which we incorporated as appropriate. We also received emailed comments from VA through an analyst in its Office of Congressional and Legislative Affairs that reiterated our findings on the number of GME primary care positions added under the Veterans Access, Choice, and Accountability Act of 2014.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of Health and Human Services and other interested parties. In addition, the report will be available at no charge on GAO's website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-7114 or at kingk@gao.gov. Contact points for our Office of Congressional Relations and Office of Public Affairs can be found on the last page of this report. Other major contributors to this report are listed in appendix II.

Kathleen M. King
Director, Health Care

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Chairman
Committee on Energy and Commerce
House of Representatives

The Honorable Kevin Brady
Chairman
Committee on Ways and Means
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The Honorable Todd Young
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The Honorable Gus Bilirakis
House of Representatives

The Honorable Diane Black
House of Representatives

The Honorable Marsha Blackburn
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The Honorable Vern Buchanan
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The Honorable Pat Tiberi
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The Honorable Fred Upton
House of Representatives

Appendix I: Federal Efforts to Increase Nurse Practitioner and Physician Assistant Trainees in Primary Care or Rural Areas

With the projected shortage of primary care physicians and challenges of recruiting physicians to rural areas, some experts have suggested that providers other than physicians could help address gaps in care. Nurse practitioners—one type of advanced practice registered nurse—and physician assistants are two examples of such providers. Both have completed graduate-level education and, depending on the specialty they choose, are trained to deliver a wide range of care, including primary care. While nurse practitioners and physician assistants can furnish some of the care provided by physicians, the extent to which they can provide this care independently varies based on state laws. For example, according to information from the American Association of Nurse Practitioners, state laws differ in how much they allow nurse practitioners to provide patient services independently, with 22 states and the District of Columbia allowing them to practice completely independently, and the remaining 28 states imposing varying restrictions, such as supervision by physicians when performing certain services.[1] Physician assistants traditionally practice under the supervision of physicians to some degree, but according to a National Governors Association study, while most states allow physicians to determine the medical tasks they delegate to physician assistants and the appropriate level of supervision, some have more explicit requirements.[2]

[1]Information accessed on March 27, 2017 from https://www.aanp.org/legislation-regulation/state-legislation/state-practice-environment/66-legislation-regulation/state-practice-environment/1380-state-practice-by-type.

[2]National Governors Association, *The Role of Physician Assistants in Health Care Delivery* (Washington, D.C.: September 2014).

In November 2016, the Department of Health and Human Services' Health Resources and Services Administration (HRSA) reported that although it projects a shortage of primary care physicians by 2025, under current utilization rates, the national supply of primary care nurse practitioners and physician assistants is expected to outpace demand. HRSA also projected that these trends will vary by region, and it expects an oversupply of these providers to be greatest in some of the regions facing a shortage of primary care physicians, such as the South. HRSA noted that more effective integration of nurse practitioners and physician assistants into health care delivery could help mitigate physician shortages in primary care.[3]

Similar to how we identified and described federal efforts to increase graduate medical education in primary care or rural areas, we also identified federal efforts to increase the number of nurse practitioner and physician assistant trainees in primary care—which we defined as family medicine, internal medicine, and pediatrics—or in rural areas. Specifically, we reviewed government and nongovernmental reports on funding for health care workforce training and interviewed officials from the Department of Health and Human Services and the Department of Veterans Affairs (VA). We limited our selection to efforts that provided funding directly to training programs within the civilian health care system and that were ongoing as of January 2016.[4] As such, we excluded efforts that provided payments directly to individual trainees, including loan repayment and scholarship programs. We also excluded efforts that were not primarily focused on increasing the number of trainees in clinical training. For example, we excluded efforts that focused primarily on curriculum enhancement for existing training programs or training for leadership, management, and research skills.

[3]Health Resources and Services Administration, *National and Regional Projections of Supply and Demand for Primary Care Practitioners: 2013-2025* (Rockville, Md.: November 2016).

HRSA also projected state-level estimates and found that while no states would have a shortage of nurse practitioners in 2025, nine states were projected to have a shortage of physician assistants. See, Health Resources and Services Administration, *State-Level Projections of Supply and Demand for Primary Care Practitioners: 2013-2025* (Rockville, Md.: November 2016).

[4]In addition to efforts with ongoing funding, we included efforts whose budget period had ended prior to January 2016, but whose grantees were still supporting trainees with funding from the effort at that time.

Through this review, we identified three efforts within HRSA that met our criteria.[5] One of these efforts was focused on physician assistants and the other two focused on nurse practitioners. (See table 4.) For each effort, we obtained and analyzed HRSA data to determine funding and trainee levels. To determine the reliability of the data we reviewed, we interviewed agency officials and checked for outliers and obvious errors to test the internal consistency and reliability of the data. After taking these steps, we determined that the data were sufficiently reliable for the purposes of our reporting objectives. We also interviewed HRSA officials and reviewed agency annual reports for further information about the efforts. In this appendix, references to years are to academic years unless otherwise noted.[6]

Table 4: Federal Efforts Intended to Increase the Number of Nurse Practitioner and Physician Assistant Trainees in Primary Care or in Rural Areas

Program	Description	Eligible Entities	Timeframe
Expansion of Physician Assistant Training	Intended to increase student enrollment in primary care physician assistant programs, as well as graduates of these programs who intend to practice in primary care specialties.	Public or private academically affiliated physician assistant training programs that have as their objective the education of individuals who will be qualified to provide primary care medical services with the supervision of a physician.	Budget period from fiscal year 2010 to fiscal year 2014, but HRSA reported it supported trainees through academic year 2016.
Advanced Nursing Education Expansion	Intended to increase the number of students enrolled in full time primary care nurse practitioner and nurse midwifery programs and to accelerate the graduation of part-time students by encouraging full-time enrollment.	Collegiate schools of nursing, academic health centers, and other private or public entities that offer accredited primary care nurse practitioner and nurse-midwifery programs.	Budget period from fiscal year 2010 to fiscal year 2014, but HRSA reported it supported trainees through academic year 2016.
Advanced Education Nursing Traineeship	Intended to increase the number of advanced practice nurses prepared to provide primary care services in rural and underserved communities.	Education programs that provide registered nurses with nurse practitioner and nurse-midwife education.	Fiscal year 2010 to present.

Source: GAO review of Health Resources and Services Administration (HRSA) documents. | GAO-17-411

[5]While we identified other federal efforts related to nurse practitioner and physician assistant training, they were not primarily focused on increasing the number of trainees in primary care or rural areas. For example, VA has a number of funding opportunities for nurse practitioner and physician assistant trainees, some of which fund primary care training. However rather than increasing the number of trainees, these efforts were focused on other aspects of training, such as enhancing training for existing nurse practitioners or physician assistants. Additionally, VA funds a number of physician assistant traineeships on an ongoing basis—369 in fiscal year 2016—which officials said were intended to prepare trainees for work in a primary care setting.

[6]For example, 2013 is the academic year that spans July 1, 2012 through June 30, 2013.

Overall, we found that the amount of funding and trainees funded per awardee varied across the efforts. For example, the Expansion of Physician Assistant Training and the Advanced Nursing Education Expansion had a smaller number of applicants awarded funding and trainees funded and a larger average amount of funding per awardee than the Advanced Education Nurse Traineeship. (See table 5.) According to HRSA, while the median traineeship award for the Expansion of Physician Assistant Training and the Advanced Nursing Education Expansion during 2014 was $22,000, the median award for the Advanced Education Nursing Traineeship was $7,390.[7]

Table 5: Awardees, Funding, and Trainee Information for Federal Efforts Intended to Increase the Number of Nurse Practitioner and Physician Assistant Trainees in Primary Care or in Rural Areas

	Total awardees	Total funding[a]	Average funding per awardee	Average trainees funded per year[b]
Expansion of Physician Assistant Training	28	$30,118,081	$1,075,646	329
Advanced Nursing Education Expansion	26	$31,044,256	$1,194,010	353
Advanced Education Nursing Traineeship[c]	593	$134,977,899	$227,619	2,652

Source: GAO analysis of Health Resources and Services Administration (HRSA) data. | GAO-17-411

[a]Funding amounts were from fiscal years 2010 through 2014 for the Expansion of Physician Assistant Training and the Advanced Nursing Education Expansion and from fiscal years 2010 through 2015 for the Advanced Education Nursing Traineeship.

[b]Trainee numbers were from academic years 2012 through 2015 for the Expansion of Physician Assistant Training and the Advanced Nursing Education Expansion and from academic years 2013 through 2015 for the Advanced Education Nursing Traineeship.

[c]According to agency officials, in fiscal year 2012, HRSA changed this program from a formula program, whereby all eligible applicants received funding, to a competitive grant program with a $350,000 maximum award. As a result, the number of awardees dropped significantly from fiscal year 2011 to fiscal year 2012, from around 350 to 69, while the average funding per awardee increased from about $45,000 to over $300,000. Additionally, while HRSA provided funding data from fiscal years 2010 through 2015, it only had data on funded trainees from fiscal year 2012, meaning that these data are not included for awardees that stopped receiving funding in fiscal year 2011.

[7]While Expansion of Physician Assistant Training grantees were awarded exactly $22,000 per student, Advanced Nursing Education Expansion awards per student ranged from $1,833 to $22,000 in 2014. Advanced Education Nursing Traineeship awards per student ranged from $126 to $22,000.

As part of its annual reporting, HRSA examined the extent to which graduates of these programs practiced in primary care, rural areas, or medically underserved areas after completing their training. According these reports, though the number of 2013 Expansion of Physician Assistant Training graduates was smaller, they were more likely than 2013 graduates of the two nurse practitioner programs to be practicing in primary care or rural or medically underserved areas one year after graduating. (See table 6.)

Table 6: Percentages of Academic Year 2013 Federal Efforts Graduates Practicing in Primary Care, Rural Areas, or Underserved Areas One Year after Graduating

	Graduates reporting data[a]	Primary care (%)	Rural areas (%)	Medically underserved areas (%)
Expansion of Physician Assistant Training	17	71	53	59
Advanced Nursing Education Expansion	97	19	2	36
Advanced Education Nursing Traineeship	478	25	4	42

Source: Health Resources and Services Administration Annual Reports. | GAO-17-411

[a]From academic year 2013, there were a total of 27 Expansion of Physician Assistant Training graduates and 63 percent had data available; a total of 146 Advanced Nursing Education Expansion graduates and 66 percent had data available; and a total of 619 Advanced Education Nursing Traineeship graduates and 77 percent had data available.

HRSA reported that funding for trainees in the Expansion of Physician Assistant Training and the Advanced Nursing Education Expansion ended in 2016, while the Advanced Education Nursing Traineeship was ongoing at the time of our review. When asked about the sustainability of the efforts without federal funding, HRSA officials referenced a recent study, which found that of 22 Expansion of Physician Assistant Training grantees responding to a survey, 82 percent planned on maintaining all expanded positions; 4 percent intended to maintain a portion of the expanded positions; and 14 percent intended to revert to their previous training levels.[8] HRSA officials said that they would anticipate similar levels of sustainability for the Advanced Nursing Education Expansion.

[8]J. Rolls and D. Keahey, "Durability of Expanded Physician Assistant Training Positions Following the End of Health Resources and Services Administration Expansion of Physician Assistant Training Funding," *Journal of Physician Assistant Education*, vol. 27, no.3 (2016).

Appendix II: GAO Contact and Staff Acknowledgments

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Acknowledgments

In addition to the contact named above, William Hadley, Assistant Director; Rachel Svoboda, Analyst-in-Charge; Toni Harrison; and Daniel Lee made key contributions to this report. Also contributing were Samuel Amrhein, Emily Flores, Vikki Porter, and Jennifer Whitworth.

Appendix III: Accessible Data

Data Tables

Accessible Data for Figure 2: Changes in the Concentration of Graduate Medical Education (GME) Residents from Academic Year 2005 through 2015, by Region

Region	GME residents, 2015	Total population, 2015	GME resident growth (2005-2015)	Population growth (2005-2015)	GME residents per 100,000 population	
					2005	2015
Midwest	31,056 (24%)	67,907,403 (21%)	24%	3%	38	46
Northeast	38,951 (31%)	56,283,891 (18%)	15%	3%	62	69
South	37,967 (30%)	121,182,847 (38%)	28%	13%	28	31
West	19,604(15%)	76,044,679 (24%)	26%	12%	23	26
National	127,578 (100%)	321,418,820 (100%)	22%	9%	35	40

Accessible Data for Figure 3: Distribution of Graduate Medical Education Residents in their Primary Training Sites, Academic Year 2015

Number of residents	Number of Counties
More than 1000	31
501 - 1000	51
1 - 500	362
No Residents	2699

Accessible Data for Figure 4: Graduate Medical Education (GME) Specialty and Subspecialty Residents, Academic Year 2015

For total number of residents:

Residents by GME training type (i.e., residents in medical specialties and subspecialties combined)	127,578
Residents in medical specialties	105,796

For 'Residents by GME training type':

GME training type	Percentage of residents in academic year 2015
Medical specialty	83
Medical subspecialty	17

For 'Residents in medical specialties':

Medical specialty	Percentage of residents in academic year 2015

Medical specialty		Percentage of residents in academic year 2015
Primary care specialties	Family medicine	11.05%
	Internal medicine	23.96%
	Internal medicine/pediatrics	1.38%
	Pediatrics	8.33%
Other medical specialties		55.28%

Accessible Data for Figure 5: Percent of Graduate Medical Education Residents in ACGME or AOA Training Programs, Academic Years 2005, 2010, and 2015

	Total number of residents (i.e., total number of AOA and ACGME residents combined)
Academic year 2005	104,330
Academic year 2010	114,997
Academic year 2015	127,578

	Academic year 2005	Academic year 2010	Academic year 2015
Percentage of all residents in ACGME programs	97	96	94
Percentage of all residents in AOA programs	3	4	6

Accessible Data for Figure 6: Regional Distribution of Graduate Medical Education Residents in ACGME or AOA Training Programs, Academic Years 2005, 2010, and 2015

Census region	ACGME percentage (rounded to the nearest whole percentage in the figure)			AOA percentage (see formula) rounded to the nearest whole percentage		
Academic year (total number of residents by training program each academic year)	2005 (100,918)	2010 (110,376)	2015 (120,497)	2005 (3,412)	2010 (4,621)	2015 (7,081)
Midwest	23	24	24	48	46	37
Northeast	32	32	31	35	31	29
South	29	29	30	13	15	24
West	15	15	16	5	7	9
Nation	100	100	100	100	100	100

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