

Physician Assistants/Associates at 6 Decades

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A predominant health policy issue in the 21st century is how the American medical workforce can adjust to the nation's growing health services need. Increased life expectancy and declining birth rates are changing the demographics of America.¹ Now into the third decade of the new century, approximately 52 million people are 65 years or older (16% of the population).² Almost one-third of Americans lack adequate health insurance.³ The Association of American Medical Colleges predicts a shortage of 54,100 to 139,000 physicians by 2033, with primary care physician shortages approaching 55,200 (Figure 1).⁴

This diminishing supply of American doctors has signaled that replacements are needed. The call for physician assistants/associates (PAs) and nurse practitioners (NPs) to help fill workforce shortages gets stronger each year.⁴ As the PA profession spans almost 6 decades of existence (1965-2022), this update is intended to serve as a reference point for policy analysis. Understanding the delineation of the PA in American medicine sets the stage for improved deployment as the health care landscape changes.

Physicians created the idea of the PA in the 1960s as a federal policy response to the shortage and uneven distribution of generalist doctors.^{5,6} The intention was to increase the public's access to health care.⁵ A succession of 18 federal policies and state licensure adoption spanning half a century recognized the growing importance of PAs. It enabled them not only to succeed but also to be integrated into American medicine.⁶

Definition and Legal Status

PAs are licensed to practice medicine with physicians in 50 states, the District of Columbia, and all 5 permanently inhabited territories.⁷ PA scope of practice is determined by their education and experience and the collaborating physician, although this varies according to the employing organization, experience, and state laws.⁸ Qualifications for PA licensure are (1) graduation from an accredited PA program and (2) passage of the Physician Assistant National Certification Examination administered by the independent National Commission on Certification of Physician Assistants.

ABSTRACT

The introduction of the American physician assistant/associate (PA) was predicated on the belief that the nation's health care needs had outpaced the supply of physicians. The notion that the medical experience of veterans could be utilized in the civilian sector was at the forefront of discussion. From 1965 to the third decade of the new century, the PA has become established in this role and has become an integrated part of society. As of 2021, more than 125,000 PAs are in clinical practice; most (76%) are female, with a mean age of 41 years. PAs work in 65 distinct areas of medicine and surgery, with a quarter in the primary care disciplines. The most visible practice settings are family medicine, surgical subspecialties, emergency medicine, and orthopedics. Sites of PA employment include primary care offices, emergency departments, and inpatient settings. PAs work as hospitalists and intensivists, with some skilled in cardiac catheterization and traumatology. Increasingly, PAs are utilized in graduate medical education, supporting the continuity of care across hospital teaching wards. In a wide range of studies, the evidence demonstrates that PAs produce care indistinguishable from that of a physician in general medicine. When care by PAs for patients with complex and chronic diseases is compared with physician care, the outcomes are the same but the labor cost is considerably lower. The economics of PAs favor their employment, and patient satisfaction is the same as that with doctors. In 2021, at least 11,000 PAs graduated from 277 accredited programs. This graduation rate is increasing, with 20 more programs in development. Predictive modeling by the Bureau of Labor Statistics suggests that the employment growth of PAs will continue beyond 2030.

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PAs perform a comprehensive range of diagnostic and therapeutic activities consistent with contemporary medical practice. In primary care, they work collaboratively with family and generalist physicians.⁹ In some rural areas where physicians are in short supply, PAs work semiautonomously, conferring with supervising or collaborative physicians as needed and as required by law.¹⁰

Demographics

In 2021, the Bureau of Labor Statistics estimates that 125,280 PAs were employed in clinical practice.¹¹ About 80% of all PAs are aged less than 55 years, making this among the more youthful health professions (Figure 2¹²). The majority are female (76%), with a median age of 41 years (range, 23-74 years).

The states with the highest employment of PAs are New York (13,270), California (10,890), Texas (8040), Pennsylvania (7200), and Florida (6630). Metropolitan areas have significantly higher levels of PAs compared with rural areas (eAppendix Figure [available at [ajmc.com](#)]).

Education

In 2021 there were 277 accredited PA programs, a number that has grown rapidly over the past decade (Figure 3).¹³ The number of PAs is growing; in 2019, there were 10,121 graduates of PA educational programs.¹⁴

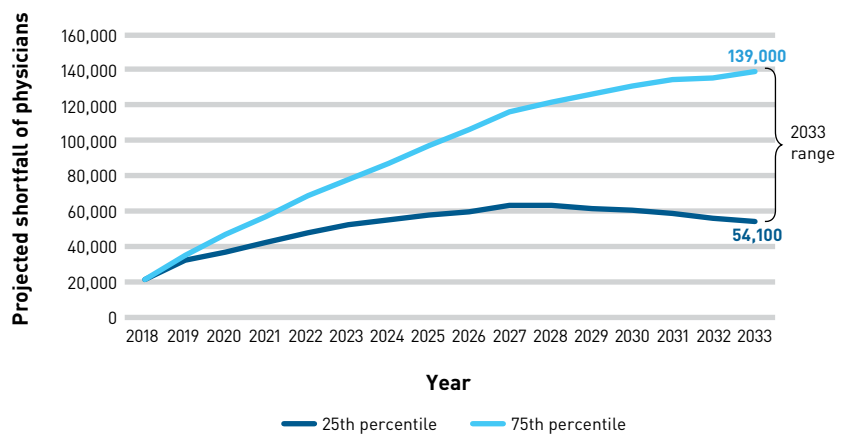
PA education is at the master's level, and the mean program length is 27 months (range, 24-36 months). Programs operate year-round and consist of one year of classroom and laboratory instruction and the second year of clinical experience. Two-thirds of matriculates are female and the median age at graduation is 29 years (range, 23-55 years).¹⁴ Accredited PA programs have demonstrated compliance with national standards and offer the master's degree as the minimum academic credential.¹³ The curriculum is modeled after American medical education, with clinical rotations following introductory sciences courses. Students complete an average of 107 academic credit hours in more than 2000 hours of supervised clinical practice, and the average length of clinical clerkships is 52 weeks.¹⁴

PA education is federally supported through Public Health Title VII, section 747, which provides incentives for diverse student

TAKEAWAY POINTS

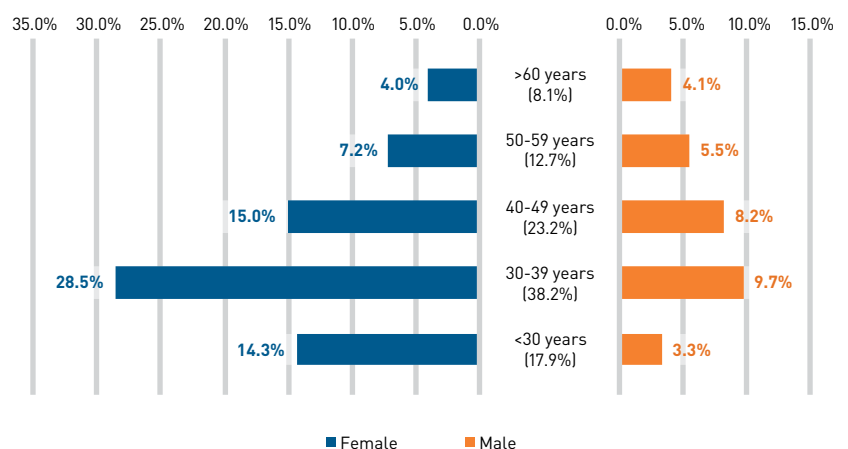
- ▶ There is little summary information in the health services research literature that provides an update on the status, performance characteristics, and medical care contributions of the American physician assistant/associate (PA) profession.
- ▶ This report provides recent information on the status of the PA profession and their educational, licensure, and regulatory aspects and economic characteristics; reviews the health services literature related to their clinical utilization patterns; highlights new trends in their practice contributions; comments on their relationships with other health professionals; and discusses future professional issues.
- ▶ The information update is of use to health services researchers, health policy researchers, health economists, and workforce scholars to gauge the contributions of this component of the health care workforce to medical care delivery. The overview is a health policy assessment of innovation created more than 50 years ago and offers a perspective of the profession's evolution, contributions, and maturation.

FIGURE 1. Total Projected Physician Shortfall Range, 2018-2033⁴



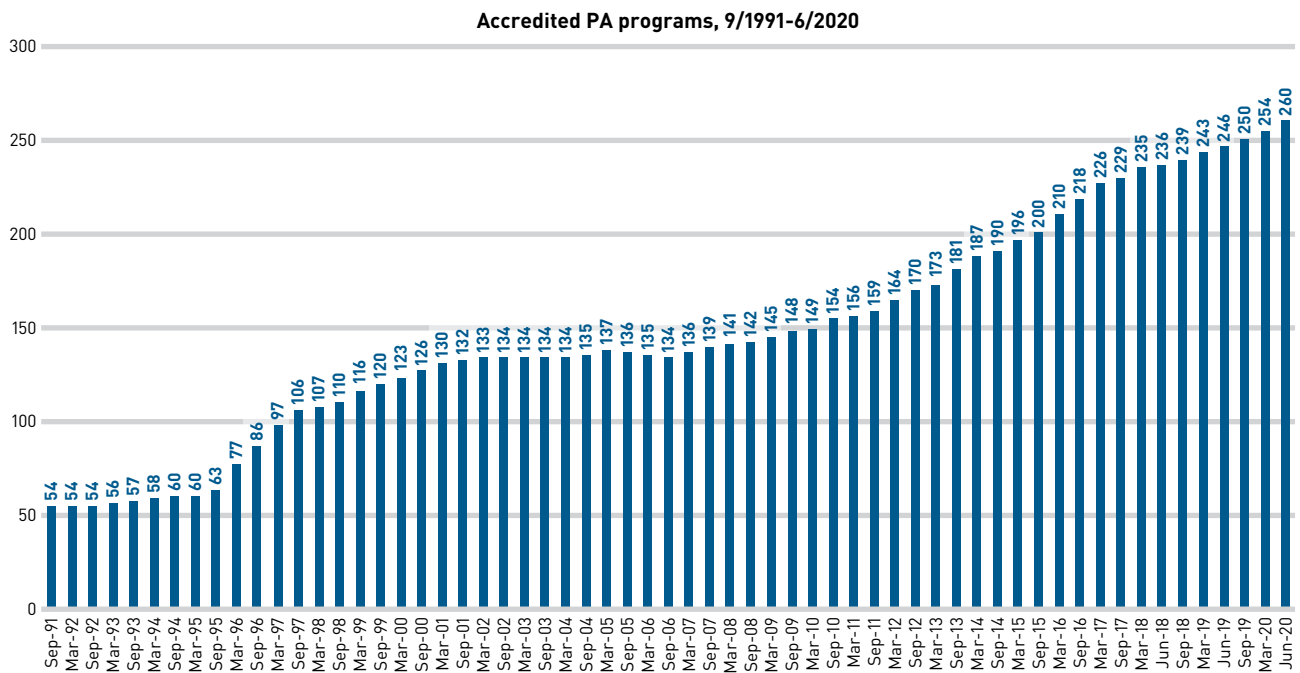
Source: American Association of Medical Colleges (2020).⁴

FIGURE 2. Population Pyramid of US Physician Assistants, 2019¹²



Source: National Commission on Certification of Physician Assistants (2020).¹²

FIGURE 3. Trend in PA Program Growth¹³



PA, physician assistant/associate.

Source: Accreditation Review Commission on Education for the Physician Assistant.¹³

selection, a primary care training focus, and deployment to rural and underserved settings.⁶ The development of the PA arose from federal health policy initiatives, and the results gained broad support in the public and medical sectors.⁶ Federal funding of about \$10 million supports about 30 programs to a small degree.¹⁵

About a quarter (27%) of PA programs are within an academic health center.¹⁶ An average start-up cost of a PA program is approximately \$2.5 million (direct cost in 2010 US\$) spread over the first 5 years.¹⁷ Tuition costs of a PA education average \$65,000 (2018 US\$; 28 months).¹⁴ For the majority of recent PA program graduates (56%), debt attributable to their PA education ranged from \$74,999 to \$174,999 in 2019.¹⁸

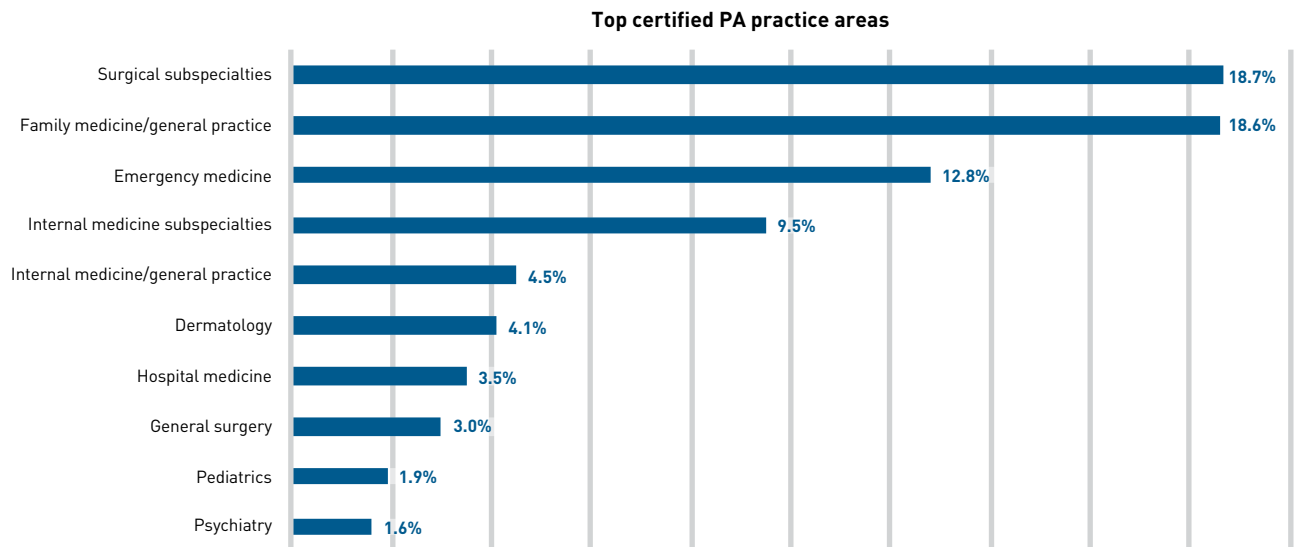
Interprofessional Practice

Team-based care is a hallmark of PAs as the demand for services increases.⁹ Collaborative practice is mentioned frequently by family medicine practitioners as they face a growing demand for their services.⁹ It has been shown that PAs in health maintenance organizations improve the outcomes of chronic diseases in the elderly. At the same time, patient satisfaction with care was higher than it was for physician-only care.¹⁹ Results of a Department of Veterans Affairs (VA) study demonstrated that outcomes of care for patients with a broad range of chronic diseases managed by physicians, PAs, and NPs were similar regardless of the complexity

of the patient and the type of service.²⁰ In this VA example, panels of patients were equally assigned to physicians, PAs, and NPs. All had similar panel sizes with homelessness, cardiac disease, diabetes, disability, and depression as leading diagnoses.²⁰

Primary Care

The pattern of primary care services is to staff with PAs and/or NPs.^{9,21,22} Care managed by PAs/NPs in ambulatory settings increased from 10% in 2001 to 15% in 2009.²³ PA employment varied by location; 36% of visits were in nonmetropolitan centers. At the same time, the size of the hospital correlated with the increased use of PAs or NPs; the smaller the hospital, the more likely it is that PAs/NPs were present. PAs and NPs tended to provide more care in clinics associated with nonteaching hospitals. They handled a higher percentage of Medicaid-insured, Children’s Health Insurance Program–insured, uninsured, and younger patients.^{24,25} Also, PAs and NPs saw a higher percentage of patients with preventive care visits (17%) than visits for a common chronic condition or pre-/postsurgical care.^{9,26} Clinic visit analyses suggest that PAs and NPs are used to a greater degree in smaller facilities located in nonurban areas to serve populations who may be otherwise medically underserved. PAs and NPs provide a “critical health care function” by serving in medically underserved communities as a national safety net. The role of federally qualified community health centers is among

FIGURE 4. Distribution of PAs in Practice Areas¹²

PA, physician assistant/associate.

Source: National Commission on Certification of Physician Assistants (2020).¹²

initiatives to improve access in medically underserved areas (MUAs) and is dependent on the utilization of PAs and advanced practice registered nurses (APRNs).^{23,27} In these settings, PAs and APRNs provide more prevention-oriented care than do physicians and are proportionally more likely than physicians to see patients without private insurance.^{24,27,28}

Specialization and Setting

Although the foundation of PA education is focused on primary care, two-thirds of PAs are employed in non-primary care roles. Surgery, orthopedics, and emergency medicine are areas of solid demand and utilization.¹² PAs remain an essential component of primary care, and this specialty for PA practice is the largest (Figure 4). About 60% of family physician practices, as well as many outpatient clinics, ambulatory centers, and community health centers employ either a PA or an NP.²⁹

One-fourth (24%) of PAs work in single-specialty group practices; the most significant single practice setting for PAs is multispecialty group practices. Types of employment settings with the most important proportions of PAs include single-specialty and multispecialty group practices, solo practice physician offices, hospital operating rooms, emergency departments, and inpatient and outpatient units of hospitals.¹²

Quality of Care and Liability

The liability of PAs in the United States is considerably less than that of physicians in comparable roles, as measured by medical

insurance premiums and malpractice cases.³⁰ PAs have less than 1% of all medical malpractice payment reports. Thirty studies have shown that the quality of care provided by PAs is at the level of that by physicians in comparable situations, with high levels of patient satisfaction.³¹

In primary care practices, PAs handle common patient complaints, follow-up visits, and patient counseling. Their use permits routine problems to be addressed effectively with the collaboration of an available physician if needed.

Economics

More than 40 investigations, studies, and government reports spanning half a century have demonstrated that PAs are cost-effective in the settings studied.^{20,32} Their use of resources or liability does not negate their cost benefit.^{30,33} Not only are PAs cost beneficial to health care organizations but their cost-utility matches that of physicians.³⁴ PAs receive less compensation than physicians, with wages differing across specialties and employment settings.³⁵ Larger wage differentials occur in cardiology, dermatology, emergency medicine, neurology, cardiovascular surgery, and orthopedics.¹² The employing organization, duration of a PA career, contract arrangements, return on revenue, and benefits will affect overall compensation.⁷ In the entrepreneurial setting, the labor input of PAs can generate multiples of their salary in revenue received.^{36,37} The organizational aspect of PA employment strongly influences how they are used—either as substitutes or complements—to improve productivity. By any measure, PAs are productive and would not

be employed if they were not so. Their annual compensation-to-production ratio (as measured by revenue) is among the highest in the health professions industry.³⁷

PAs are employed in high ratios to physicians in vertically integrated systems including the Veterans Health Administration (VHA), Kaiser Permanente, Geisinger Medical Group, Department of Defense, and Mayo Clinic.³⁹ Their output compares favorably with physicians when they are employed in specialties such as emergency medicine, family medicine, and dermatology (although patients can be differentiated for select PA services to improve system throughputs).²⁰ PAs in family medicine see a broad range of patients with diagnoses that make up 85% to 90% of the content of a family medicine physician.^{9,26} As more physicians join integrated organizations, PAs and NPs follow.³⁸

In terms of utilization, the federal government is the largest single employer of PAs.³⁹ The VHA could not meet the needs of its growing and aging population in 150 medical centers and 900 community-based outpatient clinics without a large cadre of PAs and NPs.^{20,40} The military is a significant employer of PAs and prepares them for multiple roles, such as battlefield traumatologists, family medicine clinicians in military treatment facilities, public health officers in refugee situations, and occupational medicine officers in barracks as battalion surgeons.³⁹ The uniformed branch of the US Public Health Service has PAs working in tribal health centers and MUAs.

PA Roles in Graduate Medical Education

The 2004 Accreditation Council for Graduate Medical Education resident work hour restrictions accelerated the use of PAs in graduate medical education (GME) in place of and with medical and surgical residents. GME programs report positive experiences in major centers when PAs are used to provide inpatient services.⁴¹ Such utilization allows in-house coverage of patients, protects the educational integrity of the postgraduate programs by allowing time for residents' conferences, maintains clinic continuity, and acquaints residents with multidisciplinary teams.⁴² In some instances, PAs perform advanced and highly technical procedures such as cardiac catheterization and provide this skill as safely and effectively as cardiology residents.⁴³

The "bottlenecking" of postgraduate medical and surgical programs along with the migration of trainees to outpatient settings has created an increased need to maximize residents' educational experiences and maintain standards of hospital care. The safety and efficacy of using PAs as resident substitutes in teaching hospital settings are growing.^{44,45} A significant reason most academic health centers cited for employing PAs and NPs were resident duty hour restrictions (27%). Secondary reasons for employing PAs/NPs include increasing patient throughput (88%), increasing patient access (77%), improving patient safety and quality of care (77%), reducing the length of stay (73%), and improving continuity of care (73%). At the same time, 69% of academic health centers report that they have not successfully documented the financial impact or outcomes associated with individual PA or NP care.⁴⁶ The most significant concentration of care resides in the 4750 acute care hospitals in the

nation, with a bed census approaching 1 million. In these settings, new roles for PAs are as hospitalists and intensivists to offset the increasing demand for hospital-based physician services.⁴⁷ At no time was this critical and adaptive care skill more put to use than during the COVID-19 pandemic of 2020-2022.

The increasing demand for surgical specialty house officers has required substitutions for traditional trauma care providers.⁴⁸ For example, the use of PAs in a large community hospital's level III trauma center resulted in decreases in transfer time to the operating room (43%), decreased transfer time to the intensive care unit (51%), reduced length of stay for new admissions (13%), and reduced length of stay for neurotrauma intensive care unit patients (33%).⁴⁹

Concurrently, with Congress declining to finance more physician training in 1997, GME costs have risen. Physician postgraduate training is estimated roughly at \$100,000 per resident per year in 2015 US\$.^{50,51} If the average residency is 4 years in length, then the estimated cost is \$400,000 to train the typical doctor after medical school (doctors are graduating from medical school with an average of \$201,490 of debt in 2018).⁵² At the same time, PAs are providing many of the same tasks (especially in primary care) at an equal level of quality but without the expense of protracted education. Finding the right proportion of PAs and doctors could provide a ready-made mechanism for overall cost savings.

PA Supply

The Affordable Care Act (ACA) of 2010 set out to strengthen primary care, and along the way, opportunities for PAs and NPs expanded.⁶ By 2015, the lengthened insurance coverage under the ACA brought in an additional 25 million newly insured Americans.³ In response, the cadre of PAs and NPs grew. However, expanding the number of enrolled students is limited by the shortage of qualified faculty and available clinical training sites. Medical schools and PA and NP programs compete for similar clinical training slots.⁵³ The supply of PAs is growing, and the Bureau of Labor Statistics expects that employment from 2020 to 2030 will, at minimum, support 169,000 clinically active PAs.¹¹

Clinical Flexibility

A unique aspect of the PA role is clinical flexibility: the opportunity to change specialties throughout their career. Because PAs are prepared as medical generalists, they can adapt to the clinical practice setting of the physician. PAs might work in an emergency department for a decade, switch to orthopedics for a few years, and then settle into a rural health practice in family medicine. In the course of a career, at least half of PAs have changed specialties at least once.⁵⁴ During the COVID-19 pandemic, PAs have been able to switch roles to be where they were needed most, such as in hospitals, acute care settings, and surgery.⁵⁵ Military medical reserve components staffed by doctors, PAs, nurses, and corpsmen were called up in various cities to assist with many medical tasks. This role flexibility is believed to contribute to a high degree of job satisfaction and the retention of PAs in clinical medicine.⁵⁶

The demand for physician services will continue to exceed supply by large margins, and the ratio of physicians to population will shrink for the foreseeable future.^{4,44} Although a growing cadre of PAs and NPs offsets this quotient to some extent, the balance remains off and a demand that increases annually will not be met.

The confluence of the changing lifestyle of physicians, scaling back the house officer work week, more complex technology, and greater intensity of services has affected annual productivity.⁵⁷ Other drivers of this excess demand are the growing number of accountable care organizations, patient-centered medical homes, and internists limiting their panels of patients in concierge medicine arrangements.⁵⁸ To augment physician shortages, policy makers have suggested boosting the supply of PAs/NPs.⁴⁴ To bolster the primary care practitioner workforce through scholarships, loans, and loan repayment programs, as well as through the creation and expansion of training opportunities, a sum of \$1.5 billion was made available for the National Health Service Corps for scholarships and loan repayment for primary care physicians, PAs, and APRNs. PA students can qualify for the Primary Care Loan Program and will benefit from the limited-service obligation, decreased penalties for noncompliance, and exclusion of parental financial status when determining need.

International Expansion

There is a PA presence in 18 countries, and their numbers are growing.⁵⁹ This concept of a PA is not new. Throughout Africa, Asia, and South America, there are many names for formally trained health personnel who produce medical services without a doctor.^{60,61} These health professionals tend to function in a wide variety of settings, provide primary care services, and contribute to the community's health.⁶⁰ The idea of a PA or a PA analogue has been around for a long time. The premise is that the 2400 or so medical schools worldwide will never produce enough physicians for a planet of 7.5 billion people.

Future

The employment of PAs is projected to grow 31% from 2020 to 2030, much faster than the average for all health occupations.¹¹ The predictions of demand for health care services continue to grow.⁶² By most accounts, PAs will be needed to provide care to patients at increasing rates.⁴

Conclusions

The PA movement in America began in the 1960s, developed and molded by American physicians, and has flourished for more than half a century. Consumer acceptance of PAs is as high as that of physicians. The educational preparation of PAs is modeled after contemporary medical education and prepares graduates for medical service in most health care environments. PAs work in collaboration with a physician in a negotiated role of autonomy. They are permitted to prescribe and obtain reimbursement in all 57 federal jurisdictions. As a youthful profession in a growth phase, the number of clinically active American PAs will likely exceed

169,000 by 2029. Their utilization spans public and private domains across medical and surgical specialties and includes psychiatry, pathology, and radiology. They are increasingly incorporated in the federal government, traumatology centers, critical care settings, and disaster response teams and are emulated across 18 countries on 4 continents. PAs best serve the American system as adaptable health professionals who can move into areas of greatest need as the market dictates. ■

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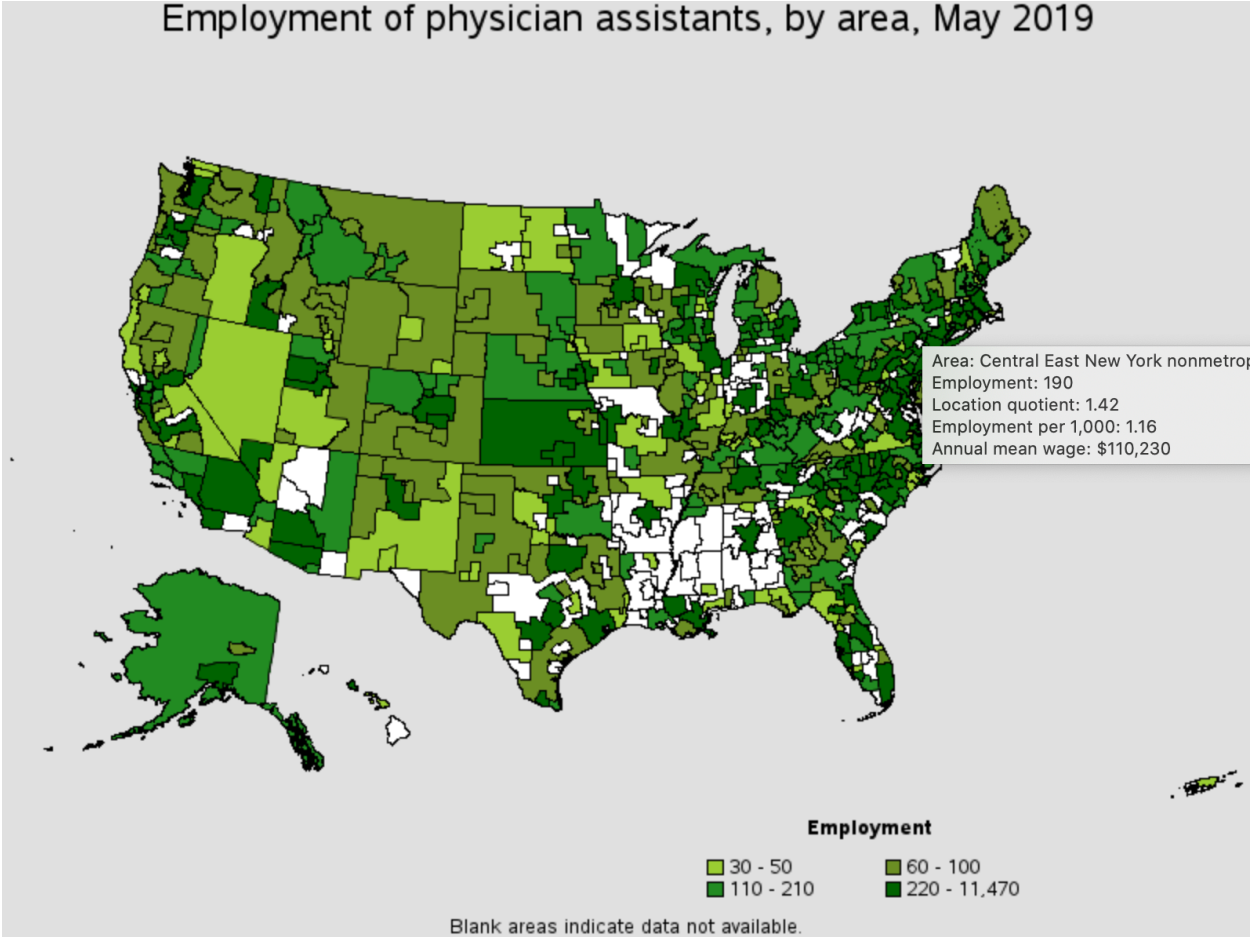
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eAppendix Figure. Map of Physician Assistants by Location, 2019



Source: BLS 2020.