

Physician Assistant Education in the United States

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Abstract

As physician assistant (PA) programs developed in the 1960s, curriculum models emerged around the central themes of physician-dependent practice and competency-based education. By 2007, there were 136 accredited programs in the United States, with 108 (79%) offering a master-degree curriculum. PA program preclinical and clinical curricula are typically evenly divided in length, and the typical U.S. PA program has a full-time attendance curriculum of 26.5 continuous months. In academic year 2005–2006, the typical PA student was a 27-year-old white woman with a 3.4 overall grade point

average and 29 months of prior health care experience who matriculated with a baccalaureate degree into a master-degree PA program. In the 2005 application cycle, the number of applicants per available seat was 2.25 for both allopathic medical schools and PA programs. The transition to a predominately master-degree curriculum resulted in new challenges for PA faculty development, and the number of PA educators with terminal academic degrees continues to lag behind the educational needs of training programs. The topic of PA specialty training and recognition remains controversial.

Although the PA profession has prospered since inception, concerns exist regarding workforce issues such as the appropriate balance of autonomy and supervision, role delineation, and the continuing trend toward specialization. The omission or inaccurate classification of PAs within U.S. health care access and workforce literature projects an incomplete picture, and it is important to consider the contributions PAs have made and will continue to make in addressing the nation's health care needs.

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Editor's Note: A Commentary on this Article appears on page 827.

In this article, I describe what began 40 years ago as a social and health workforce experiment with the introduction of the physician assistant (PA) profession in the United States. To explain how and where PAs fit into the U.S. health care system, I discuss perspectives on accreditation elements and workforce and educational demographics, as well as political and controversial topics.

Historical Background

Beginning in the early 1960s, the decline in general practice physicians in the United States led to commissioned reports encouraging the development of family practice residency programs.¹ During the same period, an additional response was suggested: in a 1961 address to an American Medical Association (AMA) conference on medical education,

Dr. Charles L. Hudson proposed “assistants to doctors” as a new health care provider model to work only with physician supervision and not as independent providers.² This idea was generally met with approval by the medical community, and in 1965 the PA concept materialized when Dr. Eugene Stead of Duke University School of Medicine started the first program. He proposed that PAs “would be trained to assist the doctor . . . in such a way as to facilitate better utilization of available physicians and nurses.”³

By the late 1960s, combat-experienced medical corpsmen were returning from Vietnam with no equivalent civilian career pathway, and the PA profession became a desirable workforce opportunity for veterans with advanced medical skills. Fueled by the increasing public demand for access to health care services, the PA concept continued to evolve.⁴

Commitment to the physician-dependent relationship

While the Duke curriculum was being developed, a ruling was obtained from the office of the North Carolina Attorney General regarding the role PAs would have in relation to the Medical Practice Act. The ruling stated that PA practice would not include independent authority,

and this tenet has continued to serve as a founding principle of the PA profession.⁴ According to the American Academy of Physician Assistants (AAPA), PAs are defined as

health care professionals licensed to practice medicine with physician supervision. PAs employed by the federal government are credentialed to practice. As part of their comprehensive responsibilities, PAs conduct physical exams, diagnose and treat illnesses, order and interpret tests, counsel on preventive health care, assist in surgery, and in virtually all states can write prescriptions. Within the physician–PA relationship, PAs exercise autonomy in medical decision making and provide a broad range of diagnostic and therapeutic services. A PA's practice may also include education, research, and administrative services.⁵

Emergence of PA educational programs

As new PA programs continued to develop through the 1960s, similar curriculum models emerged around the central themes of physician-dependent practice and competency-based education. What began as a student population of predominantly male military veterans became a more diverse mix as the Vietnam era passed. By 1971, there were 16 PA programs, with many based on the Duke model and hosted at university medical centers such as

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those at the University of Alabama at Birmingham, Bowman Gray University, Emory University, George Washington University, University of Oklahoma, Johns Hopkins University, and Yale University.⁶ Federal funding via the Comprehensive Health Manpower Act of 1972 enabled a rapid increase in new PA program development. Designed to help address the growing shortage of primary health care providers in rural and medically underserved communities, this funding supported 43 PA programs between 1972 and 1976.⁴

By the early 1980s, external influences temporarily dimmed workforce prospects for PAs. The report of the Graduate Medical Education National Advisory Committee projected an excess future supply of clinicians and several PA programs closed soon thereafter.⁷ Many PAs left the workforce, and new graduates of PA programs were required to become creative jobseekers. Anecdotally, while I was on active duty in 1985, the then-U.S. Navy Surgeon General was touring military facilities employing large numbers of PAs. While summarizing workforce projections, he told the assembled PAs, "You need to find something else to do."

The lull in PA program growth was short lived, and passage of the Health Professions Training Assistance Act of

1985 (P.L. 99-129) required federally-funded PA programs to emphasize primary care training and deployment. The next year, passage of the Omnibus Budget Reconciliation Act of 1986 (P.L. 99-509) authorized Medicare reimbursement for PA services in hospitals and other settings.⁸ This landmark decision was followed by a report from the U. S. Congress Office of Technology Assessment stating, "Within the limits of their expertise, PAs provide care that is equivalent in quality to the care provided by physicians."⁹ The combination of these and other factors led to a renewed interest in PA education.

By 2007, there were 136 accredited programs in the United States, with 106 (79%) offering a master-degree curriculum. New York has the greatest concentration of PA programs (19), followed by Pennsylvania (15), California (10), and Texas (8). Fifteen states have one PA program, and six states have none (Figure 1).¹⁰

Current State of PA Education

Program accreditation requirements

The Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA) is the sole accrediting agency responsible for establishing the standards for U.S. PA education and for evaluating programs to ensure

their compliance with the standards. Collaborating member organizations that collectively monitor and assess program compliance are the American Academy of Family Physicians (AAFP), the American Academy of Pediatrics (AAP), the AAPA, the American College of Physicians (ACP), the American College of Surgeons (ACS), the AMA, and the Physician Assistant Education Association (PAEA).¹¹ Although the ARC-PA does not prescribe curriculum length, preclinical and clinical content must include supervised clinical practice experiences, instruction in interpersonal and communication skills, and a number of patient-assessment and patient-management topics. Clinical education is required in a variety of settings to reflect breadth and depth of content, and includes outpatient and inpatient settings as well as emergency and long-term care facilities. This is typically accomplished in academic teaching facility settings, and inpatient clinical rotations are usually conducted in an experiential team format consisting of PA students, medical students, and residents, led by a staff attending physician on a clinical rotation assignment basis. The required content areas of the preclinical curriculum are anatomy, physiology, pathophysiology, pharmacology and pharmacotherapeutics, and genetic and molecular mechanisms of health and disease. In the clinical curriculum, the required areas are emergency medicine, family medicine, general internal medicine, general surgical care (including operative experiences), geriatrics, pediatrics, prenatal care, and women's health.

PA program preclinical and clinical curriculum content is typically evenly divided in length, and the mean U.S. PA program content is administered to full-time students during 26.5 continuous months.¹⁰ In essence, PA education more closely resembles a condensed version of medical school than does any other health professions curriculum.

PA programs and academic health center relationships

During the first five years of PA program accreditation (1972-1976), 32 of 38 programs (84%) were developed within academic health center (AHC) settings with close medical school affiliation or direct sponsorship. Conversely, during the most recent 10-year cycle of



Figure 1 Distribution of physician assistant programs in the United States, by state, 2007.

accreditation, (1998–2007) only 5 of 35 newly-accredited programs (14%) were similarly affiliated.¹¹

Although the ARC-PA standards for accreditation do not mandate AHC or medical school sponsorship, Standard A1.05 states that accredited programs must be established in schools of allopathic or osteopathic medicine, colleges and universities with appropriate clinical teaching facilities, or medical education facilities of the federal government. This sponsorship flexibility has resulted in an increase in the number of newer programs within private and liberal arts universities.

Tuition and expenses

In academic year 2002–2003, the total projected expenses incurred by PA students (including tuition, books, equipment, and fees) for the duration of the program was \$36,154 for residents and \$43,628 for nonresidents, or 41% of the same projected expenses incurred by medical students.^{10,12}

PA student demographics

In academic year 2005–2006, the typical PA student was a 27-year-old white woman with a 3.4 overall grade point average and 29 months of prior health care experience who matriculated with a baccalaureate degree into a full-time master-degree PA program. From 1987 to 2004, the number of international medical graduates enrolled as PA students ranged from 0.2 to 1.64 per program, with an 18-year mean of 0.6 per year, or 1.7% of enrolled students. From 1983 to 2005, the percentage of nonwhite enrollees was 20.2%, with a low of 13.1% in 1983 and a high of 24.4% in 2004.¹⁰ According to the Central Application Service for Physician Assistants (CASPA), a comparison of the grade point averages (GPAs) of PA and allopathic medical school applicants reveals that the GPAs of allopathic applicants were 0.3 higher in science, 0.225 higher in nonscience, and 0.275 higher overall, aggregated over application years 2002–2005. In the 2005 application cycle, the number of applicants per available seat was 2.25 for allopathic medical schools and PA programs.¹³ When comparing allopathic medical student matriculant data from the Association of American Medical Colleges (AAMC) with CASPA and PAEA annual report matriculant data

from 2002 to 2006, PA students are older, less ethnically diverse, and disproportionately represented by women.

For academic year 2006–2007, there were approximately 5,700 available first-year PA student seats with an expected 5,300 new graduates (assuming a 7% academic attrition rate), for an expected average first-year enrollment of 42 students per program.¹⁴ According to the 2006 AAPA census, 70,612 individuals were eligible to practice as PAs. This number assumes 15% workforce attrition and includes all PA graduates.¹⁵

Clinical practice eligibility requirements

To attain state licensure and eligibility for clinical practice, PAs must graduate from an ARC-PA-accredited program and pass the Physician Assistant National Certifying Exam, administered by the National Commission on Certification of Physician Assistants (NCCPA). PAs must document 100 hours of continuing medical education every two years and successfully complete a comprehensive written recertification examination every six years to maintain certification. NCCPA is the sole PA certifying body in the United States, and all states, the District of Columbia, and the U.S. territories require NCCPA certification for PA licensure or regulation. Professional standards are developed and monitored by appointed representatives of the AAFP, AAP, AAPA, American College of Emergency Physicians, ACP, ACS, American Hospital Association, AMA, American Osteopathic Association, AAMC, PAEA, Federation of State Medical Boards, U.S. Department of Defense, and the U.S. Department of Veterans Affairs, as well as by PA and nonmedical public directors-at-large.¹⁶

PA competencies

Four national PA organizations—the AAPA, ARC-PA, NCCPA, and PAEA—collaborated to define PA competencies in an attempt to address public demand for higher quality and greater accountability in health care. Based on the Accreditation Council for Graduation Medical Education list of general competencies for medical residents, the PA competencies are medical knowledge, interpersonal and communication skills, patient care, professionalism, practice-based learning and improvement, and system-based practice.^{17,18}

PA workforce distribution

Although the original concept of the PA model was to help alleviate the shortage of primary care clinicians in medically underserved communities, in reality the patterns of PA distribution have more closely resembled a microcosm of physician distribution. For example, the distribution of PAs in the primary care settings of family medicine, general internal medicine, and general pediatrics was 50.8% in 1996. By 2006, only 36.1% were reportedly practicing in these settings (Figure 2).¹⁵ Although a higher proportion of PAs than physicians continue to work in primary care practice settings, the data suggest that PAs also tend to follow the specialization trends of the supervising physician employment pool.

Postgraduate PA education

The topic of PA specialty training and recognition, whether by credential or certification, is very controversial among practicing PAs, educators, and leaders of the major PA professional organizations. In a May 2006 address to the AAPA House of Delegates, the chairman of the NCCPA Board of Directors stated that “the public, including our patients, have an expectation about the care being delivered by PAs practicing in specialty settings. Patients have a right to expect that their PA has the training, knowledge and skills to deliver the specialty care they are receiving. Unfortunately, at this point, no set standard exists for PAs practicing in specialty areas.”¹⁹ At the same session, the AAPA president voiced strong opposition: “We will do everything we can to defend the flexibility of this profession—to move from specialty to specialty—while at the same time protecting the patient.” This debate has contributed to a renewed interest in the content, delivery, and recognition of postgraduate PA education.

In addition to the 136 entry-level PA programs in the United States, there are 41 operational postgraduate training programs recognized by the Association of Postgraduate Physician Assistant Programs in 17 medical and surgical specialties (see Table 1). The typical program is 12 months in length, based on a didactic and clinical curriculum similar to that of physician residency programs, and offers a certificate of specialty

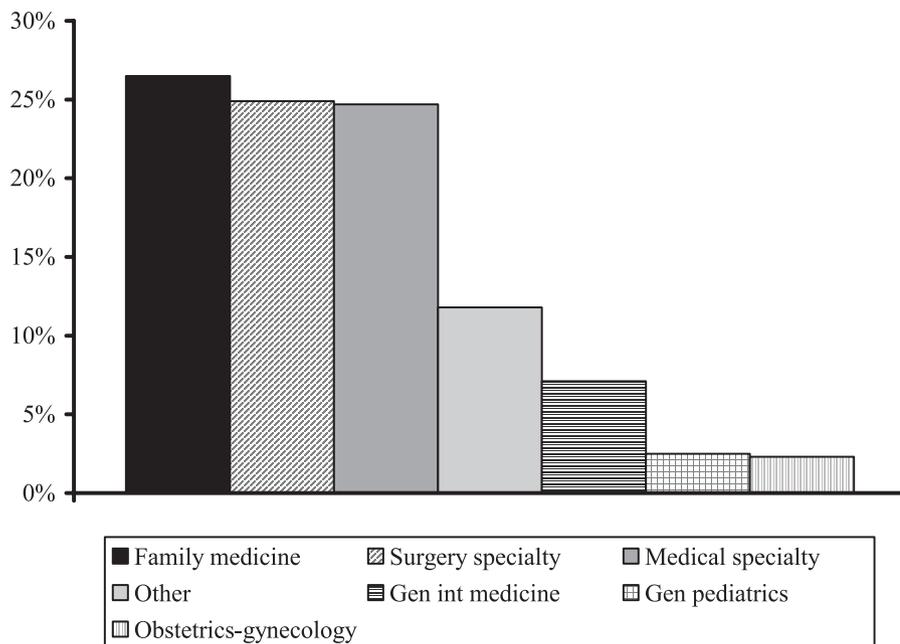


Figure 2 Percentages of U.S. physician assistants practicing in various specialties, 2006.

training. Although interest in these programs is at an all-time high, current production from all postgraduate programs combined is limited by enrollment to approximately 110 graduates per year.²⁰

Future Directions and Controversies

Although the PA profession has prospered since inception, controversies remain regarding workforce issues such as the appropriate balance of autonomy and supervision, role delineation, and the continuing trend toward specialization.²¹ The division of medical workforce labor in the United States has undergone substantial change in recent years, and AHCs have accommodated resident work restrictions in part by increasing the use of PAs in hospital settings. There is growing evidence that residency programs may be incorporating PAs in a variety of ways to transfer tasks previously accomplished by residents.^{14,22} Additionally, other nations are considering or have already incorporated the use of PA models as a means to help increase access to health care. In the United Kingdom, nonphysician “medical care practitioners” are reported to be “an effective strategy for increasing medical capacity, without jeopardizing quality in frontline clinical services,” and their deployment “may offer advantages over

increasing the number of doctors or taking nurses out of nursing roles.”²³

Degree creep and the clinical doctorate issue

The recent profession-wide transition to a predominantly master-degree curriculum resulted in new challenges for PA faculty development. The number of doctorate-prepared PA educators continues to lag behind the educational needs of training programs. With the majority of programs now at the master-degree level, a recent faculty pipeline study projected the availability of just one doctorate-prepared PA faculty member per U.S. program by 2010.²⁴ In addition to the need for more PA faculty with doctorate degrees to prepare master-degree-level students, emerging and controversial educational issues include PA specialty training and recognition, postgraduate training program accreditation, and the potential introduction of clinical doctoral degrees as an entry-level credential for PA practice.²⁵

With nonphysician clinical doctorates now available for audiologists, nurse practitioners, occupational therapists, pharmacists, and physical therapists, the topic of a clinical doctorate for PAs has emerged as a polarizing subject of intense debate among PA educators, many of whom feel that such a degree pathway already exists at allopathic or osteopathic

medical schools.²⁵ Some propose that a clinical PA doctoral degree would elevate and enhance the profession and that employers and patients would have a higher level of confidence in PAs with such degrees.²⁶ Although this position suggests that the degree, rather than the profession, earns recognition, nonphysician clinical doctorates have reportedly had minimal influence on status, compensation, and reimbursement, and the pharmacy doctorate has reportedly led to growing job dissatisfaction when health care expectations clash with reality.²⁷ Despite concerns that the PA profession may eventually become marginalized if a clinical doctorate fails to materialize, educational researchers have not defined a unique body of PA knowledge, skills, or attributes that differ enough from that of medical education to justify the existence of a clinical doctoral degree for PAs.^{25,28}

Health workforce data omissions

Health workforce supply-and-demand models that exclude PA clinical productivity estimates fall short of providing accurate projections, and the dearth of data on PA estimates has been previously reported.²⁹ Data from a national study of PA productivity patterns report that PAs produced 83% of outpatient visits compared with the output produced by one physician full-time equivalent (FTE), with some variation between differing specialties.³⁰ When family medicine PAs were compared with family medicine physicians, the estimate was 84% of physician productivity for PAs. If extrapolated to the estimated 70,612 PAs eligible for clinical practice, 26.5% of whom work in family medicine settings, the PA productivity estimate represents the equivalent output of over 15,700 FTE family medicine physicians, or over 15% of active family medicine/general practice physicians in the United States.^{31,32}

Although PAs have been included in some health workforce studies, such as the trend model proposed by Cooper et al,³³ other reports have failed to include PAs or have grouped them along with nurse practitioners and nurse midwives into nonphysician clinician productivity models.^{34,35} PAs are frequently classified in the ill-defined *allied health provider* category that typically includes other clinicians such as chiropractors and

Table 1
Distribution and Enrollment of Postgraduate Physician Assistant Training Programs in 16 Medical and Surgical Specialties, 2007*

Specialty	No. of programs	Total annual enrollment
Cardiothoracic surgery	3	3–5
Critical care	1	2–5
Dermatology	1	2
Emergency medicine	5	10–15
Hospitalist	2	13
Neonatology	1	2
Neurology	1	2
Neuroradiology and sleep medicine	1	1–2
Neurosurgery	1	1
Obstetrics–gynecology	1	4–6
Oncology	1	2
Orthopedic surgery	5	10–16
Psychiatry	2	5
Rheumatology	1	1–2
Surgery	12	44–48
Trauma	2	3
Urology	1	2
Total	41	106–116

* The 34 programs listed in the table are in addition to the 136 entry-level physician assistant programs in the United States. The table's programs are recognized by the Association of Postgraduate Physician Assistant Programs.

acupuncturists. These inaccurate classifications fail to adequately account for the physician-like services provided by PAs in clinical settings.

Discussion

Most recent workforce predictions point to an increasing shortage of physicians, and the AAMC responded in 2006 with a call to increase medical school enrollment by 30% during the next decade.³⁴ This action has been met with a similar call for increased PA program enrollment.^{36,37} The representation of minorities in health professions training programs continues to fall short of reflecting the national distribution of minorities, and their representation among PAs is also inadequate and falls below that of allopathic physicians. This discrepancy must be addressed, given the increasing diversity of the population. Additionally, the increasing feminization of the PA profession may lead to changes in workforce productivity if similar practice patterns for female physicians are found with female PAs.³⁸

Health workforce supply-and-demand models are constructed using many

variables, with some models including services provided by an assortment of differing nonphysician clinicians. However, the omission or inaccurate classification of PAs in much of the U.S. health care access and workforce literature projects an incomplete picture, and it is important to consider the contributions PAs have made and will continue to make in addressing the nation's health care needs. Given the workforce distribution and productivity comparisons between physicians and PAs, the educational and clinical cost-effectiveness of PAs should be regularly included in discussions on the division of medical labor. Additionally, the content, duration, and academic host affiliations of PA educational programs should be continually reassessed to determine whether the current accreditation model, which allows location, length, and content flexibility, is in the best interests of patient care.³⁹

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Did You Know?

In 1945, doctors at Joan & Sanford I. Weill Medical College of Cornell University were the first to use streptomycin in the treatment of tuberculosis in humans.

For other important milestones in medical knowledge and practice credited to academic medical centers, visit the "Discoveries and Innovations in Patient Care and Research Database" at (www.aamc.org/innovations).