

## Value Added: Graduate-Level Education in Physician Assistant Programs

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The Graduate Education Commission was seated in January 2004 by the APAP (now PAEA) Board of Directors, as directed by a charge from the Association's membership. The commission was chaired by **Virginia Joslin, MPH, PA-C**, Emory University, Georgia, and **Patricia Cook, MD, FACP**, UT Southwestern Medical Center, Texas. Members were **Ruth Ballweg, PA-C, MPA**, University of Washington MEDEX; **James F. Cawley, MPH, PA-C**, George Washington University, Washington, DC; **Anthony A. Miller, MEd, PA-C**; Shenandoah University, Virginia; **Donna Sewell, MS, PA-C**, Towson University CCBC Essex, Maryland; **James E. Somers, PA, PhD**, University of Nebraska; and **Daniel Vetrosky, MEd, PA-C**, University of South Alabama.

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### INTRODUCTION

#### Statement of the Problem

For many reasons, physician assistant (PA) educational programs have been moving over the past two decades toward offering exclusively the master's degree, through a variety of curricular models and with a number of different types of master's degrees. This movement has accelerated in recent years. At this writing, more than 90 of the 136 accredited PA programs offer a master's degree or master's option. But there has been little uniformity in how institutions sponsoring PA programs either transitioned existing programs to the graduate level or created new graduate-level programs, because no nationally developed standards or guidelines were available.

In 2003 the membership of the Physician Assistant Education Association (then the Association of Physician Assistant Programs) charged the board of directors to commission a group to define the content and configuration of PA graduate preparation.

The Graduate Education Commission (GEC), composed of senior PA educators and leaders, was charged with examining the emerging structures, content, and patterns of PA graduate education and curricula and with developing recommendations for educational institutions desiring guidance on making the transition to the graduate level.

The specific charges to the group were as follows:

1. Identify the current state of graduate-level PA education (consider both academic and professional graduate degrees).
2. Describe the current trends in graduate-level PA education.
3. Develop the questions that need to be asked and answered regarding issues related to PA graduate education and, to the extent possible, address these.
4. Construct a set of recommendations for PA programs currently offering graduate-level education and for those considering doing the same.
5. Provide such other recommendations as are necessary to help define and foster graduate-level PA education.
6. Provide the APAP board with a report of findings ("white paper") one month in advance of the 2004 APAP Education Forum. [The GEC requested several extensions to the original deadline to assure currency of information as changing trends in professional education occurred.]

#### Environmental Context

The medical and educational landscapes have changed greatly in the nearly 40 years of the PA profession's existence. Over that time, the prac-

tice of medicine has become increasingly complex in three main areas: (1) *new knowledge* (eg, genetics and implications for therapy, bioterrorism); (2) *new skills* (eg, use of information and medical technology, review and analysis of the medical literature and application of the findings to practice; and (3) *professional attitudes*, which are taking on greater importance in ensuring public trust in medical professionals. These increasing complexities have mandated curriculum reform and the development of objective assessment tools to measure student knowledge, skills, and attitudes, as well as the need to prepare students to be self-directed critical thinkers who can adapt to changes in medical practice.

The analytical and critical thinking skills required to negotiate this new medical landscape are traditionally associated with a graduate level of education. These and other considerations—including a more academically qualified applicant pool, competition with other professions, and changing accreditation requirements—have stimulated more PA programs to offer the master’s degree. In many cases, the transition to a graduate-level degree has resulted in significant changes in programs’ curricular content and processes. In other cases, the modifications have been relatively minor, perhaps because programs have already been functioning at or close to the graduate level.

### Methods

The initial task of the commission, which held several face-to-face meetings and conference calls, was to identify the problem and the key questions that needed to be asked as the Association began to grapple with the issue of graduate education. Questions generated fell into two categories: (1) questions that would be

addressed as part of the group’s research and answered within its recommendations, and (2) questions that would be incorporated into the final recommendations that will need to be addressed by the Association after the commission’s work is completed.

The commission began with a review of available literature on graduate education in the PA profession as well as across a broad spectrum of both health and non-health professions. Additional data gathering included a Web-based survey of all PA program directors, and a qualitative survey consisting of interviews with a representative sample of program directors.

In response to the commission’s charges, this report includes a description of the history of the transition to graduate (master’s degree) PA education, an overview of the current trends, results of data collection, a model for PA graduate education, and recommendations to the Association for future study and action.

### WHAT IS GRADUATE EDUCATION?

There is great variation among graduate programs, graduate degrees, and the curricula necessary to complete them. This section will outline the diverse concepts and philosophies of graduate education, the differences between professional and academic graduate degrees, and the educational requirements both types of tracks require. In addition, academic, educational, and social considerations of the professional master’s degree will be discussed.

### Characteristics of Graduate Education

There is no universally accepted definition of “graduate education,” or of the distinctions between professional and academic graduate education. However, the following are character-

istics of graduate education found in the recent literature:

1. Possession of a baccalaureate degree is a minimum criterion for eligibility to undertake most courses of graduate studies. (This applies more extensively for academic programs than professional; many medical doctorate programs, for example, do not require an undergraduate degree, though one is strongly recommended.)
2. Graduate education is considered advanced as it is assumed that the graduate student has acquired general and specific fundamental knowledge at the baccalaureate level, upon which future study can be based.
3. The course of study is focused and allows for the acquisition and development of knowledge and skills beyond the baccalaureate degree.
4. The education is characterized by systematic, in-depth study and experience providing for the development of inquiry and discovery, intense understanding, and scholarly competence.
5. A thesis, dissertation, professional project, or “capstone” experience is required for completion of the course of study.
6. Students are expected not only to make use of the advanced knowledge base in their chosen field but also to contribute to that knowledge base.

Brigham Young University has developed a set of principles of graduate education that are also common to both academic and professional graduate education programs.<sup>1</sup> They are:

1. Mastery of the subject matter
2. Critical thinking skills

3. Theoretical understanding
4. Proficiency in research and/or creative activities
5. Moral integrity
6. Service orientation
7. A wide representation of perspectives within a given discipline

Other descriptions of graduate education may focus narrowly on minimum requirements for the educational program. Typically these are described in terms of credit hours (minimum of 30 and maximum of 60), grade expectations (typically a 3.0 grade point average), prerequisite expectations (bachelor's degree), and faculty qualifications (terminal degree in the field of study or a related one).

### Academic and Professional Graduate Education

Differences between academic and professional graduate education are often rooted in history, tradition, institutional mission and philosophy, or accreditation standards. Master of arts, master of science, and doctor of philosophy degrees are traditionally considered academic degrees, housed in arts and sciences programs. Fields outside of the traditional "arts and sciences" have developed field-specific graduate degrees, such as master of business administration, master of education, master of nursing, master of engineering, doctor of education, and doctor of social work. These degrees tend to be more practical or professional in their educational approach but, depending on the institution granting the degree, can still be considered either professional or academic degrees. Doctor of medicine, doctor of dental surgery, and juris doctor are almost always considered professional graduate degrees.

Some differences between academic and professional graduate education are:

**Table 1. Characteristics of Academic Versus Professional Master's Degrees**

Academic	Professional
Used for teaching, research	Oriented to practice
Standards developed by department and graduate college of the institution	Standards developed by professions' accreditation system
Does not demonstrate full competence in a given field of study	Ties to the profession make it a prestigious offering in the institution
Consolation prize for those failing to attain the doctoral degree	

Source: Glazer JS. *The Master's Degree: Tradition, Diversity and Innovation*. ASHE-ERIC Higher Education Report No. 6. Washington, DC: Association for the Study of Higher Education; 1986

1. Academic graduate programs prepare students for careers in academia, government, or other related fields, while professional graduate programs prepare the student for careers in the law, medical, or other professions.
2. Academic graduate programs traditionally require a pure research thesis or dissertation as a capstone experience. Although professional graduate programs may require a thesis or dissertation, most require a professional project or other type of capstone experience.
3. Professional graduate degrees are considered a "career stepping stone" while academic graduate degrees are more likely to be considered as the basis for further graduate study or for tenure and promotion, depending upon whether the degree sought is considered terminal or not.
4. Professional graduate education at the master's level typically prepares the student for practice in a given profession rather than for further graduate work.
5. Academic graduate education is typically research oriented and focuses on the "state of knowledge" in a given discipline, whereas professionally oriented graduate education is focused on the "state

of practice" in a given profession.

6. Professional graduate education programs are often subject to additional extra-academic control by professional accrediting groups or state licensing authorities, whereas most academic graduate education programs are not.

Table 1 encapsulates the different characteristics of academic and professional graduate degrees.

#### *The Professional Master's Degree*

The master's degree is usually awarded for postbaccalaureate study of at least one and typically two years and is considered to be the educational midpoint between the baccalaureate and the doctorate degrees. In some professions the master's degree is considered to be the "terminal degree," as opposed to the doctoral degree. For example, the terminal professional degree in civil engineering is the master's degree, requiring a capstone project of advanced design or a practicum. The more academic master of science (MS) in engineering, by contrast, requires an advanced research project.

Degree recognition for professional education has historically been varied. For most professions the achievement of student competency, rather than the degree awarded, is

considered an essential condition of postbaccalaureate professional education. Health professions' educational models are diverse, however. Most typically provide core courses, a concentration in a specialty area, the opportunity to elect additional educational components to enhance knowledge and skills, a supervised practical experience to develop the skills needed for the given health care practice, and a summative project. The variation in length of professional education, degrees awarded, the number of credit hours required, the nature of the practicum experience, and the type of capstone project has generated interest in differentiating the characteristics of a professional master's degree from an academic master's degree.

Department of Education–approved accreditation agencies also provide some guidelines for defining differences between undergraduate programs and graduate professional programs. The Southern Association of Colleges and Schools, for example, expects the institution to define “college level competencies within the general education core for undergraduate programs and provide evidence that graduates have attained these competencies.”<sup>2</sup> The expectations for graduate professional programs are that they are progressively “more advanced in academic content than undergraduate programs, and that graduate instruction and resources foster independent learning, enabling the graduate to contribute to a profession or field of study.”<sup>2</sup> The Western Association of Schools and Colleges accreditation body requires that curricula be “structured to include active involvement with the literature in the field and ongoing student participation in research and or high level professional practice and training experiences.”<sup>3</sup>

In 1993, under the auspices of the Council of Graduate Schools (CGS), Conrad, Haworth, and Miller<sup>4</sup> analyzed the diversity and range of the graduate studies programs in the United States. The authors reached a number of conclusions about master's education that hold significance for and benefit skilled professionals and the society they serve. These included the development of refined analytical skills, broad-based perspectives, enhanced abilities to articulate viewpoints and positions, clearer ability to connect theory to practice, and enhanced skills in a specific profession. This study also demonstrated a strong link between master's education and the workplace in providing individuals with the advanced education they want and need for advancement in their careers and an employer's need for a better prepared and more skilled, knowledgeable, and competent workforce. This volume was followed in 1994 by *Master's Education: A Guide for Faculty and Administrators*, which emphasized the importance of advanced preparation of individuals for professional careers in a multitude of fields. This publication noted that master's programs contribute to the nation's economic, political, educational, and social structure, thus making use of the leadership, management, clinical, and applied research skills gained from graduate programs.

### TRENDS IN HEALTH PROFESSIONS EDUCATION

Over the last decade, several reports from the Institute of Medicine (IOM) have described the need to improve quality of health care and the provision of safe medical care in the United States. In the 2003 IOM report, *Health Professions Education: A Bridge to Quality*,<sup>5</sup> a committee of leaders and experts in health care and

education concluded that students in medical and health professions were not well prepared to address the needs of patients in the current health system. Additionally, they reported a lack of adequate methods to continually assess clinical proficiency. This workgroup recommended that professional accreditation organizations, licensing bodies, and educators should ensure proficiency in the training and maintenance in core areas of professional practice: providing patient-centered care, functioning in an interdisciplinary team, using information technology, practicing evidence-based medical care, and focusing on quality improvement. Partly as a result of this IOM report, the need for educational reform within the health professions to better prepare health care providers and better assess competency became a high priority. The following describes some of the changes that have occurred in the process of reforming medical education.

### Physician Education

In the last few years, both undergraduate and graduate medical education professional groups have worked toward more clearly defining the expected competencies for graduates of medical schools and residency programs. The Accreditation Council for Graduate Medical Education's (ACGME) Outcome Project, the Council on Graduate Medical Education, and the Association of American Medical Colleges' (AAMC) Medical School Objectives Project have developed core competencies and objectives and will require undergraduate and graduate medical education to implement and evaluate core competency education. The ACGME Outcome Project defines six core competencies:

1. Patient care
2. Medical knowledge
3. Practice-based learning and improvement
4. Interpersonal and communication skills
5. Professionalism
6. Systems-based practice

ACGME also developed a Toolbox of Assessment Methods<sup>6</sup> to evaluate learner competencies and has provided evidence-based best evaluation methods for the required skills within each competency.

As most medical schools plan curriculum reform to add the knowledge, skills, and attitudes necessary to prepare physicians to practice successfully in the changing health care environment, the goals of medical education have become less process oriented and are now based more on outcomes. The Medical School Objectives Project produced a series of reports that identify contemporary issues for medical education. They also provide learner objectives in the areas of knowledge, skills, and attitudes in such areas as medical informatics and population-based care, quality of care and patient safety, genetics education, and communication in medical practice. When reviewing and revising current health professions curriculum in the context of the needs of society, it is a logical step to consider whether the enhanced curriculum would be better packaged at the graduate level.

### Other Professions

Educators and researchers in many other health professions disciplines have wrestled with the issue of the appropriate entry-level credential for their graduates. This “degree debate” represents a natural progression in the maturation of many professions.<sup>7</sup> These debates are often discomfiting

and require many years to achieve general consensus within the representative educational programs. For example, as early as 1958, the occupational therapy profession began deliberations on what educational level was best suited for the profession. Not until nearly 30 years later did the American Occupational Therapy Association (AOTA) endorse a gradual shift to the master’s degree as the entry-level degree for its profession.<sup>8</sup>

Similarly, in 1976 the American Physical Therapy Association’s (APTA) Board of Directors appointed a task force to review and evaluate entry-level physical therapist (PT) education. The task force recommended setting the entry-level education at the postbaccalaureate level, which was endorsed in 1979 by the APTA’s House of Delegates. This endorsement eventually led to the announcement in January of 2002 that the Commission on Accreditation of Physical Therapy Education (CAPTE) would no longer accredit baccalaureate-level education programs. It must be stated that much discussion, excitement, confusion, and angst was experienced by the PT profession during the intervening years between the task force’s study and the CAPTE announcement; and it is fair to say that the PT profession’s angst continues as it prepares to transition to an entry-level education set at the doctoral level.<sup>9</sup> In 2000 the APTA’s House of Delegates endorsed a “vision sentence,” which states that by the year 2020 physical therapy will be provided by physical therapists whose entry-level degree will be the doctor of physical therapy degree.

The speech therapy and social work professions have also debated the degree issue. And despite years of debate, nursing continues to offer several career entry points to become

a registered nurse. Several years ago, nursing determined that advanced practice nurses, specifically nurse practitioners (NPs), should be awarded a master’s degree upon completion of their education.<sup>10</sup> In October 2004, the American Association of Colleges of Nursing adopted a position statement that called for the standardization of the graduate degree for advanced practice nursing (clinical nurse specialist, nurse anesthetist, nurse midwife, and nurse practitioner) at the doctoral level, specifically the doctor of nursing practice (DNP), by 2015. This position statement will have significant implications for the PA profession, as the NP profession is considered the PA profession’s major competitor. It is likely that this disparity in educational preparation will work to the advantage of the nursing profession in terms of favorable reimbursement and practice statutes.<sup>11,12</sup>

Many of these professions emphasized the need to award professional (practical) rather than academic (theory-laden) terminal degrees. Many felt that master’s and especially doctoral-level training should accentuate this difference in order to distinguish the practitioner from the researcher. However, almost all professions felt that graduate education should train the practitioner in the critical thinking skills needed in today’s changing health care environment. Issues raised by various health professions (not necessarily by society) as they struggled with redefining their academic credentials include:

1. The need to match the degree to the amount of academic work performed during the educational program
2. The ability to be viewed on an equal footing with similar professions

3. A standardization of the “highest level of training” for entry into the workforce
4. The perception of having achieved a “standardized” quality of practice for third-party payers
5. Recognition as professionals in an arena of specialized practitioners
6. Acknowledgement as autonomous practitioners “of choice” within the health care arena.

## TRENDS IN PHYSICIAN ASSISTANT EDUCATION

### History

Physician assistant educational programs in the United States began in the late 1960s to prepare clinicians for roles to expand physician services. From the beginning, PA programs were sponsored by a wide range of educational institutions and clinical organizations. PA programs emerged in a variety of health institutions, including medical schools, universities, four-year colleges, community colleges, and technical and vocational schools, as well as in teaching hospitals, correctional systems, and federal health care systems.<sup>13</sup> The federal government’s mandate for the PA profession at that time was to train clinicians for practice roles in rural and other medically underserved areas, building on their then-extensive health care backgrounds.<sup>14</sup>

PA programs were designed to be educationally efficient, with a shorter period of education (typically 2 years in length) than standard medical programs. The diversity in sponsoring institutions resulted in a great variety of curriculum models, often incorporating innovative philosophies and approaches. Often, these models were designed to recruit individuals with extensive health care experience and intended to meet specific national, state, and community

needs. One consequence of the varied institutional settings in which PA educational programs evolved was a wide variety in the credentials awarded on completion of training. Early programs awarded a certificate, an associate degree, and sometimes, a bachelor’s degree.<sup>15</sup>

### Competency-Based Education

The educational philosophy of PA education in the United States has traditionally been based on a model of competency. Historically, student performance has been evaluated based on demonstration of a standard level of clinical competency, and PA education as a whole has tended to avoid assigning a specific entry-level academic degree. The competency-based PA educational philosophy holds that proficiency in the clinical skills identified as necessary for competence in primary care/generalist practice would be the “gold standard” of PA educational preparation, rather than adherence to the institutional requirements of a specific academic degree. The competency-based educational model, originating from the military’s utilization of health providers, thus prepared PAs to enter clinical practice on the basis of their training and certification status. State PA practice laws and regulations were fashioned largely on that model: PA practice acts typically did not, and still in most cases do not, require specific academic degrees for PA practice. The fact that the PA clinical role was (and of course still is) inherently tied to physician practice also made the need for early graduates to possess an academic degree less critical.<sup>16</sup>

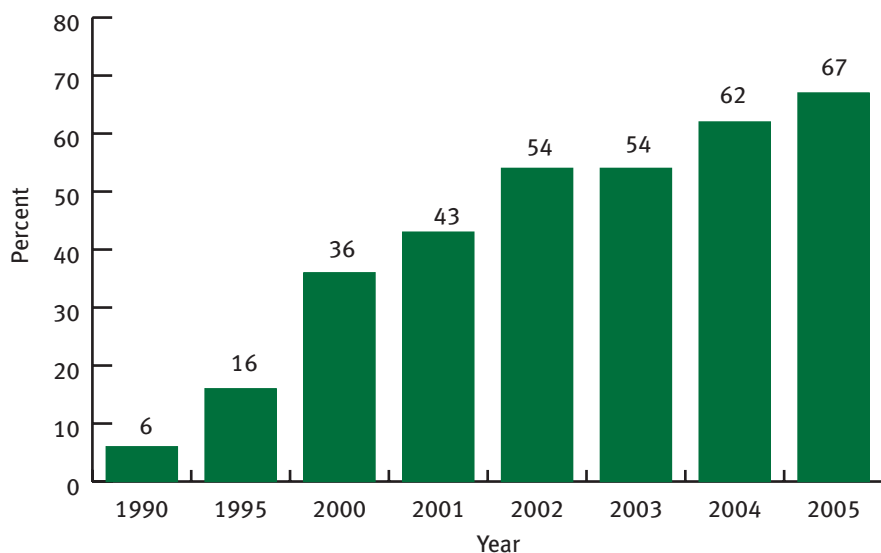
Allowing for variability among PA programs regarding the entry-level degree or certificate awarded was an important element of PA education during its formative years and has proven to be an effective approach in

preparing PA health care professionals to assume a wide range of roles in clinical practice settings and specialties. And while there is no empirical evidence to support this, it is widely believed that this approach has also facilitated the recruitment into PA programs of individuals from ethnic, cultural, and educational backgrounds who are most likely to work in primary care roles in medically needy areas.<sup>17</sup> The competency-based orientation of PA education has proven to be effective in preparing health care professionals to pass the national certifying examination and to meet state licensing board requirements. The generalist philosophy of PA education has produced graduates who have assumed clinical practice roles in a wide range of health care settings and specialties.

In 2005, the AAPA, APAP (now PAEA), ARC-PA, and NCCPA approved a jointly developed document, *Competencies for the Physician Assistant Profession*, which includes the kind of analysis, integration, evaluation, and information management skills that have traditionally been considered “graduate level.” This document provides a formal structure to help guide curriculum planners at PA programs and is the first to be endorsed by all of the entities representing the PA profession at a national level.

### The Role of Accreditation

Physician assistant education has traditionally been designed around graduate competency statements derived from a variety of sources and developed by curricular planners at the institutions hosting PA programs, as well as around accreditation standards, practice statutes, and blueprints for the certification examination. The educational standards of the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA) and its

**Figure 1. Percentage of PA Programs Awarding the Master's Degree, by Year**

Source: Annual Reports on Physician Assistant Educational Programs in the United States.

prior entities have provided a framework for curricular content in PA education. Until recently, the Standards have not addressed the educational level at which PA education should be provided. In the Standards released in 2001, the following statement was included: "this version of the Standards reflects the realization that a commonality in the core curriculum of programs has become not only desirable, but also necessary in order to offer curricula of sufficient depth and breadth to prepare PA graduates for practice in a dynamic and competitive health care arena. Additionally, the Standards reflect a graduate level of curricular intensity."<sup>18</sup>

More recently, the ARC-PA Standards that will become effective in September 2006 allow the establishment of new PA programs only at institutions that can award a bachelor's degree or higher. However, at this time, the Standards do not delineate curricular content relative to the credential awarded upon successful completion of the educational program. To remain accredited, a PA

program must demonstrate that it meets the required standards, no matter the degree or certificate awarded.

### Moving to the Master's Degree

The first PA program to award an academic degree was Alderson-Broadus College, in 1970. This small liberal arts college started its PA program with a 4-year model: 2 years of general college work followed by a 2-year professional phase (the so-called 2 + 2 model). Some of the early graduates of the Duke University PA Program, which at that time did not offer an academic degree, obtained their bachelor's degrees from Alderson Broadus. Later, other PA programs, including Duke, began to award the bachelor's degree.

It was not long before programs began to consider the master's degree the appropriate credential for the profession. In 1975, the Child Health Associate Program sponsored by the University of Colorado became the first PA program to award the master's degree for entry-level train-

ing. This program was among the first of the specialty-focus PA programs. Recruits to this program tended not to have a great deal of previous health care experience but did have high academic achievement at the undergraduate level, heralding a trend seen among applicants to PA educational programs many years later.<sup>19</sup>

During the late 1980s, many leading institutions began to award the master's degree for entry-level PA education. These PA programs began to restructure their curricula so that they could award the master's degree or provide a master's option. The PA program at Emory University took this step in 1988 and was followed soon after by other institutions, including Duke University, Baylor University, George Washington University, the University of Iowa, and the University of Nebraska. Some programs, such as the one at Northeastern University, chose to continue to award the bachelor's degree but offered students an option to obtain a master's degree.

The trend among PA programs toward offering the master's took a sharp turn upward beginning in 1999. Before 1999, the number of programs awarding master's degrees increased less than 5 percent annually. Between 2000 and 2005, the percentage of programs offering master's degrees increased from 36 percent to 67 percent, a near doubling over the 5-year period (See Figure 1).

The movement of PA programs toward awarding the master's degree can be characterized in four ways: (1) conversion of the first established programs to graduate-level programs, beginning in the 1980s, (2) a wave of new programs in the mid- and late 1990s that were established from the beginning at the graduate level, (3) continuing conversion of many established programs, and (4) the

**Table 2. Credential Trends Among Programs and Enrollees**

Class Entering	Number of Programs Awarding Master's as Highest Credential (%)		Highest Degree Among Enrollees (%)	
	No degree/ Associate degree	Bachelor's degree	No degree/ Associate degree	Bachelor's degree
1990	5/55	(9.1%)	50.0	44.4
1995	15/80	(18.75%)	38.2	52.7
1999	43/120	(35.83%)	31.5	61.2
2000	54/126	(42.86%)	29.3	64.2
2001	70/130	(53.85%)	27.6	66.5
2002	71/132	(53.79%)	26.1	67.4
2003	82/133	(61.65%)	19.1	74.2
2004	90/134	(67.16%)	17.5	75.9

Source: Annual Reports on Physician Assistant Educational Programs in the United States, numbers 6, 12, 16, 17, 18, 19, 20.

establishment of master's options by programs that also continued to award other credentials.

The number and percentage of PA programs awarding master's degrees and the percentage of enrollees who held a baccalaureate degree as their highest credential has continued to rise into the 21st century. In 1999, 61 percent of enrollees held a bachelor's degree as their highest degree; by 2003 this had risen to 74 percent. Conversely, the percentage of enrollees who hold an associate degree, a certificate, or no degree has continued to drop, from 31.5 percent in 1999 to 19.1 in 2003. Table 2 illustrates this trend.

**Reasons for Moving to Master's**

There were a number of factors that led PA educational programs to move to award the master's degree, beginning in the early 1980s. These include:

1. The growing number of individuals applying to PA programs who already possessed bachelor's degrees. For these students a master's degree was preferable to a second bachelor's degree. As the population of ex-Vietnam military medical corpsmen began to

shrink, many PA programs began to see an applicant pool with less health care experience but better academic preparation than in the 1970s. These newer applicants tended for the most part to have bachelor's degrees and sought out programs that awarded the master's.

2. Financial aid issues. Financial aid was typically limited for students who already had a bachelor's degree, but was more readily available for graduate study.
3. The realization that the level of academic work required by PA programs was typically much higher than that required for a bachelor's degree. Programs wanted to provide appropriate academic recognition for the work done in a PA program. As the APAP Degree Task Force said in its final report in 2000: "A master's degree most accurately reflects the rigor of the PA curriculum and the evolution of the profession."<sup>20</sup>
4. Changes in other health professions. Allied health professions like the nurse practitioner profession, physical therapy, and occupational therapy were undergoing

their own transitions toward the master's degree. In particular, most NP programs began to award the MSN degree in the mid-1980s. As PAs were often directly in competition with NPs in the primary care medical marketplace, the perception was that it became important for graduating PAs to hold similar levels of academic credentials.

5. The rise of pre-PA tracks. Many graduate educational institutions recognized that they could also increase enrollment in their undergraduate programs by establishing preprofessional "feeder" programs. Many institutions began to establish pre-PA tracks similar to the premed programs found in medical schools.

During the 1990s and into the 21st century, the momentum grew to award the master's degree for entry-level PA education. Most programs felt that PA curricula were reflective of a graduate (postbaccalaureate degree) level of academic intensity and required graduates to master graduate-level knowledge and skills.

**DIFFERENT APPROACHES TO PA GRADUATE EDUCATION**

This section discusses facets of current and historical educational development as well as the public, institutional, governmental, and professional forces that are guiding the transition to graduate education for the PA profession. In the movement toward the master's degree, PA programs continue to face a number of critical decisions. In the GEC's interviews with directors of a sample of PA programs, some of these critical decision points were assessed by asking questions about the following:

- The type and title of the degree

- Curriculum content
- The expected level of student performance and higher level of cognitive skills
- Prerequisites
- Types of capstone projects and whether they are conducted individually or in groups
- The duration of the program
- The hiring and retaining of the required number of faculty with the appropriate educational preparation and skill mix to teach and support the graduate-level program
- The potential for decreasing enrollment to adequately provide the higher level of support needed by graduate students
- The expectation of the institution's administration that faculty will have higher credentials
- The effect on the applicant pool of offering a higher level of education at a potentially higher tuition to cover the higher cost
- The potential for additional courses or topic coverage to negatively impact the students' focus on clinical core knowledge and skills.

### Differences in Degrees Awarded

As large numbers of PA programs have converted to or started at the graduate level in the late 1990s and early 2000s, it has become apparent that there are major differences in the content and approaches used by various institutions. For example, there is no consensus on whether or not graduate programs should require a thesis, traditionally a component of master's degree preparation. There has also emerged considerable variation in the type of master's degree that institutions award. Among the degrees awarded are the master of health science [MHS], the master of science [MS], the master of physician assistant studies [MPAS],

and the master of medical science [MMSc].

In the GEC survey, five different degrees were specified by respondents, with MPAS and MS being the most frequent — at 39.4% and 30.3%, respectively. “Other” was reported by 15.2%, followed by MHS (6.1%) and MMS (4.5%). It is interesting to note that 20 respondents indicated that an MS degree, considered by most authorities to be a traditional academic degree, was offered at their institution, while only eight of these indicated that they considered the degree “academic.” More than 86% of the master's degree program respondents to the GEC survey indicated that they considered the degrees offered upon completion of their programs to be “professional,” while about 12% indicated the orientation to be “academic.”

In 1998, the Association commissioned the APAP Degree Task Force to develop recommendations on the issue of the entry-level degree for the PA profession, including “what the generally accepted entry-level credential for the PA profession should be.”<sup>20</sup> The task force agreed that:

- A consensus statement regarding the appropriate entry-level degree was long overdue and would greatly benefit the profession.
- Standardization of the entry-level degree would engender a greater understanding of PA education and the profession by lay members of the community and policy makers.
- Standardization of the entry-level degree would better define the educational standard for PAs while PA education continued using the competency-based model.
- Standardization at the master's level would establish degree equity with other professions with a similar level of responsibility in health care.

- A master's degree most accurately reflected the rigor of the PA curriculum and the evolution of the profession.
- Graduate-level education would provide additional avenues of career diversification for physician assistants.

The task force went on to state that it “elected not to specify a traditional academic degree versus a professional type degree at that time, thereby allowing colleges and universities to determine the best fit in relationship to their institutional missions.”<sup>20</sup> Although there was agreement that a standard degree at the graduate level—such as the MSN in nursing—might be desirable, the task force recognized that the culture of the PA profession was deeply rooted in diversity of approaches to the educational processes and end point credential, as long as graduates met the expected competencies.

### Curriculum Content

While the basic framework for PA education is provided by the ARC-PA Standards, expectations of graduates (as outlined in the competency statements), and the blueprint for the certification examination, individual programs have leeway to vary some specific content areas and approaches. The variability among programs may be influenced by institutional mission, state practice statutes, expected population(s) to be served, and federal mandates. PA educational programs' curricula are regularly changing and adapting as medical knowledge evolves and new approaches to education and health care are endorsed. Many of the changes over the past 30 years were the result of shifting priorities and incentives related to federal training grant support to PA programs. For example, funding has been awarded

to programs incorporating substance abuse, geriatrics, and cultural awareness topics into the curriculum. Examples of published studies relating to PA curriculum content describe specific new pedagogical techniques (problem-based learning) or components such as the use of standardized patients,<sup>21</sup> service learning,<sup>22</sup> domestic violence education,<sup>23</sup> literature in medicine,<sup>24</sup> women's health,<sup>25</sup> and cultural competency.<sup>26</sup>

In moving to award a master's degree, many programs adjusted their curricula to include additional courses in research-related subjects such as biostatistics, research methodology, and data analysis. In the GEC survey, programs converting to master's were asked which course(s) were added to the curricula. The answers most frequently given were research methods—epidemiology (20%) and research methods—statistics (11%), followed by a long list of research/quantitative types of courses. When converting PA programs were asked whether the transition necessitated a change in their mission and goals, 34% indicated that it did and 21% indicated that it did not. In terms of whether or not changing to the master's degree caused them to lengthen the program, 32.6% indicated that it did, and 22.5% indicated that it did not.

### Prerequisites

The type and number of prerequisite undergraduate courses required for matriculation into any given graduate PA program vary greatly. These prerequisite courses can be determined by the sponsoring institution's conditions for graduate admission as well as the PA program's curricular needs and structure and content requirements. Since more and more is being required of the PA curriculum, such as research methods, cross-cultural issues, and the workings of health care organizations, some of the tradi-

tional courses previously included in the didactic curriculum are being moved to the prerequisite category. For example, medical terminology, a course that used to be a didactic component of most PA curricula, is being shifted to a prerequisite course requirement by many programs. As a result of differing institutional and PA program curricular needs, a variety of approaches for determining the requirements for entry can be found.

### Capstone Projects

An integral component of a graduate degree curriculum is what is often termed a "capstone" project. The aim of capstone projects is to require students to apply the knowledge and skills obtained during their graduate work to a specific research or practical, experience-oriented activity. The specific skills developed can include critical evaluation of the medical literature, an in-depth comprehension of the research process, and an awareness of potential research questions related to clinical practice. Often, capstone projects are the culminating experience for students in graduate programs.

Most master's-level PA programs require a capstone project. Stoehr and Essary conducted a national survey of master's-level PA education and core competencies. Of the 33 master's programs that responded to their survey, 32 (94.1%) required a final capstone project, which could take the form of a thesis, original research, or a portfolio of master's-level clinical experiences.<sup>27</sup>

The content and requirements for capstone experiences vary considerably in PA education and are mostly determined by where the PA program resides within its sponsoring institution. Students are typically required to produce a clinical review paper based on original data gathering or a paper based on a secondary analysis

of data. In a survey by Zellmer and Hadley, a research paper was the most commonly required outcome of a capstone project (83%), followed by a formal oral presentation (56%), poster presentation (31%), and community service (11%).<sup>28</sup> They also found that the typical capstone project requires a formal proposal, takes 12 months to complete, and does not require institutional IRB approval.

According to the program directors interviewed by the GEC, some programs have students conduct and present capstone projects in groups. A few programs require successful completion of a comprehensive written exam. Most research-related capstone projects are evaluated by master's or doctorally prepared faculty with majors in public health, research, or education. Because many programs continue to be challenged by the need to increase the number of faculty with expertise in research and publications, graduate PA program faculty reported that student capstone projects and journal club activities were often supported by PhD-prepared basic scientists, psychologists, or faculty with doctorates in education.

### Additional Findings

#### *Qualitative Survey*

The commission conducted phone interviews with a sampling of PA programs reflecting a variety of educational settings and degrees awarded to obtain better qualitative descriptions of the programs' curriculum content beyond typical PA core training, such as medical informatics, research methods and design, epidemiology, biostatistics, population-based health, public health, and health policy and systems. The graduate-level skills that would be expected as a result of these courses include, according to the programs interviewed, the ability to conduct an

**Table 3. A Comparison of PA Educational Curricula from Three Different Periods**

Curricular Topic	1994-95 (N=57)		1998-99 (N=77)		2002-03 (N=82)	
	No. Programs	Mean Hours	No. Programs	Mean Hours	No. Programs	Mean Hours
Research methods	30	15.8	54	17.7	63	21.3
Medical lit review	42	10.2	65	17.1	63	17.1
Statistics	26	12.8	47	18.1	46	13.2
Epidemiology	5		4		4	
Health promotion/ disease prevention	47	20.0	66	19.5	73	20.0
Health care organization	26	13.3	55	12.9	71	13.5
Cross-cultural issues	20	10.4	55	9.3	70	11.8

Source: Association of Physician Assistant Programs. Eleventh (1994-1995), Fifteenth (1998-1999), and Nineteenth (2002-2003) Annual Reports on Physician Assistant Educational Programs in the United States.

effective search of the medical literature, to critically analyze an article to determine the strength of the evidence, to discuss the relevancy of the conclusions to clinical practice, and to contribute to the body of medical knowledge. Few programs provide education in technical writing. Some programs have added prerequisite course work in such areas as statistics to allow new topic coverage.

#### Quantitative Data

GEC also looked at data from several issues of the *Annual Report on Physician Assistant Educational Programs in the United States* in an attempt to examine whether course and curricular changes occurring with the conversion to the master's degree was reflected in these surveys. Periodically, the report has provided a detailed breakdown of PA educational curricula specifying the types and hours of courses taught in the didactic phase of PA educational programs. Data were examined drawing from three of these reports. Excerpts are presented in Table 3. As might be expected, the number of curriculum hours and the number of programs offering courses increased from 1994-95 to 2002-03 for research

methods, medical literature review, and statistics.

However, in looking at the data in Table 3, it is difficult to come to any firm conclusions regarding the evolution of graduate education for physician assistants. The mean number of hours devoted to "research-related" subjects actually declined from 1998-99 to 2002-03, a trend difficult to explain in view of the perception that many PA programs were in transition to graduate-level education during this time. This may be due to the inclusion of statistics and research methods in PA programs' prerequisites.

### A MODEL FOR PA GRADUATE EDUCATION

To ensure that the quality of graduate education for the PA profession is reflected in the curriculum and to reflect the added skills beyond those expected of PA graduates prepared in an undergraduate program, the following guidelines are offered as a model for PA programs awarding a master's degree. These guidelines and the proposed model, distilled through the research conducted by the GEC, are meant to provide guidance to member programs and not

meant to be prescriptive.

A program's mission and vision statement, course goals and objectives, and evaluation instruments should point toward and document proficiency of the higher level skills. All programs, whether graduate or undergraduate, should use the recently published *Competencies for the Physician Assistant Profession* to guide curriculum reform to best prepare graduates to succeed in a changing medical environment. PAs will be expected to demonstrate high standards in their ability to use information technology and to search and critically analyze the medical literature to provide the highest quality care according to current best practices.

PA education offered at the graduate level should meet the minimum criteria outlined above and offer value-added component(s) that justify the additional education and expense for students and that fulfill the general expectations for graduate education as broadly accepted by higher education institutions throughout the United States. With this in mind, the Graduate Education Commission proposes the following definition of PA graduate education and components of a model program.

#### Model PA Program

##### Definition

Physician assistant graduate-level education provides value-added components to the basic education typically found within undergraduate curricula and mandated by the ARC-PA Standards. Value-added components may include advanced study in specific areas: a research-oriented capstone project; higher level learning objectives, including critical thinking, analysis, and communication. A graduate-level education focuses on increased student responsibility for learning.

*Faculty*

- Ideally, all core faculty should have a graduate degree in a relevant field. At minimum, all faculty responsible for curriculum development, course coordination, and advising students on research or capstone projects should have a master's degree.
- Core faculty who teach clinical preparatory science courses should have appropriate clinical experience and should be role models for lifelong learning; therefore, they should maintain their certification and active clinical practice.
- Faculty should meet or exceed the competencies in the Competencies for the PA Profession document.
- Faculty should engage in scholarly activity.
- Faculty should model leadership and service.

*Students*

- Students should have a bachelor's degree and an appropriate science foundation.
- Students should have excellent written and verbal communications skills.
- Students should have demonstrated a capacity for graduate-level work and for taking responsibility for their own learning.

*Administration*

- Admissions policies and processes should consider applicant maturity, interpersonal skills, life experience, and potential for professionalism.
- Academic standards should be as rigorous as those in other comparable graduate programs.
- Student/faculty ratios should allow for individual mentorship and advising.
- Programs should encourage and provide opportunities for clinical practice for faculty.

- Institutions should provide appropriate support and resources for the operation of a graduate degree program.
- Faculty should be provided the necessary support for continuing faculty development to support their roles in graduate programs.

*Curriculum*

- Programs that do not require health care experience are encouraged to provide opportunities for clinical exposure early in the program.
- Goals, objectives, and evaluation methods should require students to function at a higher cognitive level.
- A capstone project should be required and should demonstrate students' ability to independently conduct research, critically analyze data, synthesize information, and present germane findings.
- Graduate-level PA programs should provide additional educational activities beyond those expected of undergraduate programs and should document competency through a final capstone project that demonstrates students' higher functional skills.
- The course of study should be focused and allow for the acquisition and development of knowledge and skills beyond the baccalaureate degree.
- The education should be characterized by systematic, in-depth study and experience that provides for the development of inquiry and discovery, intense understanding, and scholarly competence.
- Elements of graduate education added to the program should be additive to the curriculum and should not supplant full-time clinical rotations.
- To better address the *Healthy People 2010: Goals for the Nation*, graduate

students should be provided with skills in leadership, population-based health concepts, using electronic technology to research literature or data, and communicating their findings in peer-reviewed professional forums.

*Evaluation and Outcomes*

- Regular evaluation and outcomes assessment should be conducted for the graduate components of the program.
- Programs awarding a graduate degree should document that the educational program provided graduate-level education and that each student successfully demonstrated value-added skills as described above in the definition of graduate-level PA education.

**RECOMMENDATIONS**

The commission divided its recommendations into two sets: general recommendations for PA programs and specific recommendations for the Association.

**General Recommendations**

The PAEA Graduate Education Commission recommends that all programs adopt the Model for PA Graduate Education outlined in the previous section. At a minimum, all programs that offer the master's degree should adopt it. In addition, the following specific recommendations are offered for PA programs that award a graduate degree:

- Possession of a baccalaureate degree should be a minimum criterion for eligibility to undertake most courses of graduate studies. (This is more true for academic programs than professional; many medical doctorate programs, for example, do not require an undergraduate degree, though one is strongly recommended.) Graduate education is considered advanced as it is

assumed that the graduate student has acquired general and specific fundamental knowledge at the baccalaureate level, upon which future study can be based.

- The course of study should be focused and allow for the acquisition and development of knowledge and skills beyond the baccalaureate degree.
- The education should be characterized by systematic, in-depth study and experience that provides for the development of inquiry and discovery, intense understanding, and scholarly competence.
- A thesis, dissertation, professional project, or some type of “capstone” experience is required for completion of the course of study.
- Students should be expected not only to make use of the advanced knowledge base in their chosen field but also to contribute to that knowledge base.
- Students should develop refined analytical skills, broad-based perspectives, enhanced abilities to articulate view points and positions, the ability to connect theory to practice, and enhanced skills in teaching, leadership, research, public health policy, systems analysis, administration, quality assurance, and risk management.
- The content of the curriculum must be focused on PA practice.
- The curriculum should include a minimum of 30 semester credit hours beyond the baccalaureate level.

### Recommendations to PAEA

As the PAEA Graduate Education Commission completed its work for this paper, the members were impressed with the changing and evolving nature of the concepts, procedures, and practices in the area of graduate education and indicated that

additional research and analysis over an extended time period would be required to address the charges from the PAEA board. Members agreed that PAEA should monitor this continuing evolution and felt there was a need for a group to continue the commission’s work on a permanent and ongoing basis. The functions of such a body would be to monitor, assess, and report on the movements and changes within higher education and their implications for PA education. The members of the commission concluded that it would be appropriate, therefore, to make the following additional recommendations:

PAEA should:

1. Create a permanent body to monitor and formally address the crucial issues identified in these recommendations, including the expansion of the annual report to incorporate student learning outcomes, such as authorship of a scholarly paper that demonstrates skills in searching and critical analysis of the literature.
2. Study the issues related to the terminal degree for PA faculty and its impact on eligibility for promotion and tenure within their institutions and make recommendations as appropriate.
3. Develop model competencies for PA educators.
4. Monitor the potential impact of degree inflation among other health professions on PA education and the profession.
5. Monitor doctoral degree programs for physician assistants and formulate a policy statement regarding development of entry-level doctoral degree PA programs.

6. Initiate discussion with PAEA members on standardization of the type of master’s degree for PAs.
7. Monitor the changing health care environment and responsibility of PAs to society and revise model competencies accordingly.
8. Ensure that the effect of graduate training of PAs on PA employment demographics and trends is monitored and studied.
9. Develop a needs assessment tool for faculty development requirements and sponsor faculty development opportunities to prepare PA faculty to teach the PA competencies recently developed by the four PA organizations.
10. Develop a systematic approach to implement a master’s degree program that would include discussion of institutional support and approval, curriculum changes, and identification and ways to overcome barriers.
11. Encourage ARC-PA to develop jointly with PAEA data collection instruments and a database of curricular content, required level of cognitive function (Bloom’s taxonomy), and why and how these levels were attained, in order to be able to generate a summary report describing the current level of PA education. This information could be obtained from reaccreditation applications, reports, and ARC-PA site visits to programs. Review PAEA survey tools, including the annual report survey instrument, and collaborate with ARC to collect, analyze, and publish data on PA education.
12. Create a document that will guide developing master’s degree programs or those transitioning to a master’s program as they address

challenges and establish a curriculum to prepare and evaluate students for the higher level skills expected of a graduate level program.

### CONCLUSION

As the legal, financial, and organizational structures of the health care environment and systems continue to change, health care providers will be expected to improve the delivery of care to improve health outcomes for both their patients and the community of practice. PAs can accomplish this by using the most current evidence-based practices; monitoring practice patterns for quality, cost effectiveness, and time efficiency; successfully participating in a functional health care team; enhancing patient satisfaction; and reviewing and critically analyzing the medical literature for improving care and service delivery—in short, through applying the skills gained in a thorough course of graduate study.

PAs' advanced academic preparation also has the potential to help them continue to make contributions to health care beyond their clinical identities. PAs are now administrators in health care delivery systems, researchers, medical educators, participants in the formulation and implementation of health policy, and leaders in their communities. These roles can be seen as “the next step” in carrying forth the original mission of the PA profession—improving health care access.

PAs in the future will likely want and need to obtain graduate degrees that will provide them with specific value-added skills. One premise behind the PA “master’s degree movement” is that PAs with graduate degrees will be better prepared and have the appropriate credentials to more quickly move into leadership roles. In doing so, they will increase

the visibility of the PA profession and promote the PA agenda of more accessible and more available health care.

Medical educators will need to continually and carefully evaluate their curriculum contents, their goals and objectives, instructional methods, and methods of evaluation to ensure the necessary competencies in those they graduate. Additionally, medical educators will need to continually improve their own knowledge and skills to be able to prepare their students. Faculty in graduate-level medical education programs must not only teach knowledge and skills and ensure practice-based competencies, but should also model these skills and provide educational opportunities to develop leaders in health care, medical education, and research.

As with any medical education program, PA programs will be challenged to maintain the clinical focus of training as they reform the educational program to prepare competent clinicians. Those programs providing graduate-level training and documenting higher-level skills will be expected to produce PAs with skills beyond those expected of undergraduate program graduates. To meet the needs of an increasing number of PA programs for experienced faculty to teach and administer, PAEA will need to ensure the availability of consistent advanced faculty development opportunities to prepare competent clinicians and leaders. Curriculum reform in the medical and health professions should be an interdisciplinary process that removes the walls of the silos and allows different programs to share resources and educational successes and effectively achieve the necessary curriculum reform goals.

PAEA, through the formation of the Graduate Education Commission, has taken the initial

steps to evaluate the current status of PA education and to be proactive in guiding PA faculty toward preparing program graduates with the additional skills to provide the highest quality care and improve its delivery. Members of PAEA must remain active in the Association to better understand the educational challenges they face and the resources available to meet them, while remaining true to the roots of the profession. The series of Institute of Medicine reports on quality of care, *Healthy People 2010: Goals for the Nation*, and reports with similar goals from NIH institutes and the RAND Corporation help to provide the vision for better health for all people. As PA educators, we must seek to be leaders to ensure that future PA providers are equal partners in achieving these goals, as well as to prepare a cadre of PA graduates who will serve as agents of change for a better system of health care and add their contributions to the body of knowledge in medicine, in improved delivery of care, and in PA education.

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### REFERENCES

1. Office of Graduate Studies, Brigham Young University. Principles and Characteristics of Graduate Education. Provo, Utah: Brigham Young University, no date.
2. Southern Association of Colleges and Schools. Principles of Accreditation: Foundation for Quality Enhancement. Available at: <http://www.sacscoc.org/principles.asp>.
3. Western Association of Schools and Colleges. 2001 Handbook of Accreditation. Available at:

- [http://www.wascenior.org/wasc/Doc\\_Lib/2001%20Handbook.pdf](http://www.wascenior.org/wasc/Doc_Lib/2001%20Handbook.pdf).
4. Conrad CF, Haworth JG, Miller SB. *A Silent Success: Master's Education in the United States*. Baltimore, Md: The Johns Hopkins University Press; 1993.
  5. Greiner A, Kneble E, eds. *Health Professions Education: A Bridge to Quality*. Washington, DC: National Academies Press; 2003.
  6. Accreditation Council for Graduate Medical Education. *Toolbox of Assessment Methods*. Available at: <http://www.acgme.org/outcome/assess/toolbox.asp>. Accessed March 5, 2006.
  7. Office of Graduate Studies, Brigham Young University. *Principles and Characteristics of Graduate Education*. Provo, Utah: Brigham Young University; no date.
  8. Wood W, Neilson C, Humphry R, Coppola S, Baranek G, Rourk J. A Curricular Renaissance: Graduate Education Centered on Occupation. *Am J Occup Ther*. 2000;54:586-597.
  9. Woods EN. The DPT: what it means for the profession. *PT Magazine*. May 2001:36-43.
  10. AACN Task Force on the Essentials of Master's Education for Advanced Practice Nursing. *The Essentials of Master's Education for Advanced Practice Nursing*. Washington, DC: American Association of Colleges of Nursing; 1996.
  11. AACN Position Statement on the Practice Doctorate in Nursing. Washington, DC: American Association of Colleges of Nursing; October 2004.
  12. American Association of Colleges of Nursing. AACN Adopts a New Vision for the Future of Nursing Education and Practice. Washington, DC: AACN; October 27, 2004. Available at: <http://www.aacn.nche.edu/Media/NewsReleases/DNPRElease.htm>. Accessed February 24, 2006.
  13. Sadler AS, Sadler BL, Bliss AA. *Physician Assistants: Today and Tomorrow*. Cambridge: Ballinger Publishers; 1972.
  14. Hooker R, Cawley JF. *Physician Assistants in American Medicine*. New York: Churchill Livingstone; 1997.
  15. Bliss AA, Cohen E, eds. *The New Health Professionals – Nurse Practitioners and Physician Assistants*. Germantown, Md: Aspen Systems Corporation; 1977.
  16. Ballweg R, Stolberg S, Sullivan E. *Physician Assistants: A Guide to Clinical Practice*. 3rd ed. Philadelphia: Elsevier; 2004.
  17. Cawley JF, Ballweg R, Day G, Estes EH, Fichandler B, Fowkes V, Gara N, Marylander S, Mays H, Reed J. *Physician Assistants in the Health Workforce, 1994*. Final Report of the Advisory Committee on Physician Assistants and the Workforce. Rockville, Md: Council on Graduate Medical Education, Bureau of Health Professions, Division of Medicine; 1995.
  18. Accreditation Review Commission on Education for the Physician Assistant. *Accreditation Standards for Physician Assistant Education*. 2nd ed. Available at: [http://www.arc-pa.org/Standards/STANDARDScurrantapproved2ndeditionl\\_3\\_02.pdf](http://www.arc-pa.org/Standards/STANDARDScurrantapproved2ndeditionl_3_02.pdf).
  19. Hooker RS, Cawley JF. *Physician Assistants in American Medicine*. 2nd ed. Philadelphia: Churchill Livingstone; 2003.
  20. Miller AA, Allison L, Asprey D, Ellwood L, Galloway S, Huey-Voorhees J, Johnson R, Fitzpatrick Lepp E, Ruback TJ, Scott T, Sewell D, Skillings J. Association of Physician Assistant Programs Degree Task Force Final Paper, September 28, 2000. *Perspective on Physician Assistant Education*. 2001;11:169-177.
  21. Whitman NA, Pedersen D. The use of standardized patients to evaluate a physician assistant program curriculum. *Perspective on Physician Assistant Education*. 1998;9:93-96.
  22. Fahringer D, Assell R, Harrington N, Maschio G, Stone L. Integrating service-learning as a course into a university curriculum. *Perspective on Physician Assistant Education*. 2000;11:161-164.
  23. Phelps PP, Lyons GG. Emphasizing domestic violence prevention in the physician assistant curriculum. *Perspective on Physician Assistant Education*. 2000;11:43-44.
  24. Corso T. A literature and medicine course in the physician assistant studies curriculum. *Perspective on Physician Assistant Education*. 2000;11:43-44.
  25. Russell EL, Gorney B, Self B, Gillespie T. Women's health curriculum in PA education: results of a national study. *Perspective on Physician Assistant Education*. 2002;13:11-16.
  26. Jacques P. Cultural competency curriculum: components for inclusion in physician assistant education. *Perspective on Physician Assistant Education*. 2004;15:102-105.
  27. Stoehr J, Essary A. A national survey of physician assistant master's education and graduate-level core competencies. *Perspective on Physician Assistant Education*. 2005;16:68-72.
  28. Zellmer M, Hadley R. A descriptive analysis of capstone project requirements in physician assistant academic and professional master's degree programs. *Perspective on Physician Assistant Education*. 2004;15:82-87.