The Future of Physician Assistant Education
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Physician assistant (PA) education must be responsive to the ever-changing needs of society in order to produce well-qualified practitioners who will be viewed as assets by their employers and the health care system. Because the future is difficult to predict, educational leaders must monitor economic, demographic, technologic, and other changes that are occurring at a rapid pace and adapt their curricula accordingly. This article reviews the profession’s history of future-oriented thinking and explores issues and trends that are likely to affect the profession and PA education in the future, in order to stimulate thinking about emerging changes on the horizon.

INTRODUCTION
Building foresight about the future is a critical component of planning for growth in any profession. As an essential arm of the profession, physician assistant (PA) education programs prepare competent and qualified practitioners to meet the evolving needs of the US health care system and to an increasing extent, global health care needs. Therefore it is incumbent upon PA educators and their representative organizations to monitor emerging trends, forces, and other factors in the education, health care industry, and clinical medicine arenas that that could potentially affect future health care and the PA profession. The short lag time between the beginning of a student’s education and clinical practice, combined with the speed and amount of change occurring in the many areas that affect health care, challenge faculty to stay ahead of the curve to ensure the relevance of the curriculum. Because it is nearly impossible to predict the future of health care, the key to operating successful programs will be the ability of PA education leadership, equipped with vision and flexibility, to efficiently and rapidly implement the changes required to respond to the needs of students and society.

This paper will explore the impact of emerging trends and forces that may affect PA education. Rather than attempt to predict specific outcomes, we present potential opportunities and challenges for PA programs and faculty. The intent is to sensitize PA educators to impending issues and forces and to reinforce our belief that as educators we have an obligation to continually monitor the global and national health care environments in order to prepare practitioners for the future and not just the present.

BACKGROUND/HISTORY
The future of PA education has been pondered by individuals and groups in the profession since the inception of the first educational program at Duke Medical Center four decades ago. The first formal national review of PA education occurred in 1986, initiated by the Association of Physician Assistant Programs (APAP or Association) under the direction of then-president Jack Liskin. Six work groups were convened to develop recommendations relevant to PA practice and education for the year 2000. Many of these recommenda-
tions are now commonplace in educational programs (e.g., integration of didactic and clinical components, problem-based educational methods, and increased use of PA clinical educators). \(^1\)

This was followed by another Association study, supported by a federal contract designed to engage leadership and members in future visioning. A panel of 10 experts developed “white papers” and then presented and discussed these with leaders of the profession at a meeting in 1996 in Alexandria, Virginia.

Important conclusions from this project included the following: “Changes are unfolding so rapidly that it is difficult for anyone to accurately describe the health care system even six months ahead,” and “PAs of the future need to be flexible, to be responsive to the needs of the community and employers, culturally sensitive, technologically adept, and be able to function in teams.” \(^2\) Two years later, under another federal contract, the American Academy of Physician Assistants (AAPA) convened a planning group to strategically examine major market issues related to the future of health care services, the PA role, and PA education. The strategic planning group reiterated the need for a competency-based and primary care foundation for PA education but also noted that PAs will continue to have multiple roles in health care and that flexibility should be preserved. \(^3\)

The Association also commissioned two task forces with a focus on the future — specific to the PA educational degree. The APAP Degree Task Force was commissioned in 1998 to make recommendations regarding the appropriate degree for PA education, and the Graduate Education Commission (GEC) was formed in 2004 to examine issues and make recommendations related to graduate-level PA education. The GEC concluded that PAs with advanced academic preparation have the potential “to make contributions to health care beyond their clinical identities.” \(^4\)

In 2002, the *Journal of American Academy of Physician Assistants* published a special issue consisting of articles by PA leaders analyzing trends that would shape the future of the profession. \(^5\) In 2005, the National Association of Advisors for the Health Professions journal, *The Advisor*, published a special theme issue on PAs, including two articles that provided a futurist perspective. In one of the articles, 15 future nontraditional roles for PAs — in such areas as research, public health, and administration — were identified by Strand. \(^6\) In “PA Education in an Evolving Health Care System,” Glicken noted that changes in medicine and education had created opportunities to redefine PA education in a new context, through reviewing emerging education models and skill sets designed to address future needs.

**DEMOGRAPHIC INFLUENCES**

Demographic trends in both the patient and provider populations will affect health care over the remainder of the 21st century. It is expected that the baby boomer population will soon access the health care system at a much greater frequency than previously. Patients over 65 years of age average twice as many physician ambulatory visits as those younger than 65. \(^8\) Combined with the fact that the average life span is increasing, the number of years that this and subsequent generations will require access to the health care system will also dramatically increase. PAs will be key to ensuring access to health care for the elderly, particularly if medical and osteopathic schools are unable to respond with sufficient graduates to meet this anticipated need.

In addition to the influences of the baby-boomer demographic, there continues to be a significant increase in the non-white population of the United States. The Hispanic population continues to be one of the fastest growing segments of the US population and has become the majority in some states. In four states and the District of Columbia, whites are now the minority. \(^7\) Already some PA programs are responding by instituting medical Spanish as a required or elective curricular component. PA programs will continue to be challenged to provide the cultural and linguistic skills needed by their graduates to meet the evolving face of society.

There are also significant changes specifically affecting physicians and PAs. Recent studies have documented trends in early retirement and decreased work hours in the physician workforce. Some medical specialties will be affected by shortages more than others. For example, the number of family medicine residency slots has dropped annually since 1998. \(^9\) If physicians continue to move away from primary care towards the specialties, PAs may become the default primary care provider for the nation, even as employment opportunities grow in subspecialties.

Although there has been moderate growth in PA graduate output, the PA profession is likely to experience the same phenomena as medicine, as new graduates begin to favor lifestyle issues over salary and prestige, resulting in decreased productivity and decreased longevity in clinical practice. One significant difference between PAs and physicians is that there is a greater percentage of female PAs in both the educational pipeline and in practice. \(^10\) Among practicing PAs, 62% are female. \(^11\) There has been little attention paid in the PA literature, however, to the potential
impact of an increasingly feminine workforce on employment trends, including attrition (temporary or permanent).

Experts have predicted that the factors described above will likely lead to a shortage of health care providers by 2020 unless dramatic increases are made in medical school enrollment.13 The Association of American Medical Colleges (AAMC) has responded to this concern by recommending a 30% increase in the number of US medical school graduates over the next 10 years.14 Similarly, the Council on Graduate Medical Education has recommended increasing the number of physicians entering residency training. A related issue is that almost 25% of these slots are filled by international medical graduates (IMGs), with the US relying on undeveloped donor countries to provide most of this workforce — a workforce that could potentially be staffed by PAs.13

Increasing production of PAs as a solution to the emerging health care crisis has, however, received recent attention from PA organizations. The AAPA House of Delegates passed a resolution in May of 2006 supporting “efforts that promote and foster creative solutions to health care shortages that include expansion and access to physician-PA teams to meet anticipated requirements for health care services.” This was followed in the fall of 2006 by a Physician Assistant Education Association (PAEA) study of program expansion plans. With 88% of programs responding to the survey, this study revealed that as many as 59% of programs may expand enrollments, yielding a projected increase of 530 (11% of total enrollment for programs responding to the survey) students over the next 5 years. In addition, respondents identified nine new programs under development.15 While it is clear that the projected shortage may represent an opportunity for the PA profession, the study also identified ongoing challenges related to limited clinical training sites and preceptor availability, which continue to limit growth and the potential for PAs to have a major impact on this looming crisis.

Finally, as the PA profession emerges as a global phenomenon, the impact of potential PA immigration and emigration patterns needs to be explored. Several nations have been actively recruiting US PAs in recent years, including England, Scotland, Australia, and Canada. If a significant number of PAs are recruited for employment outside of the United States, the program expansion identified above will have little or no impact on the projected shortage of health care providers in this country.

ECONOMIC INFLUENCES

Despite the passage of Medicare Part D by Congress a few years ago, health insurance concerns and disparities continue to plague the nation. Recent cuts to Title VII funding for PA and other health care provider training is likely to exacerbate the problem of equal access to health care. Already some states have tired of waiting for a federal response and have passed (Massachusetts) or are considering (California) legislation to provide universal health care coverage.16 Many PAs will recall the dramatic increase in demand for their services once Medicare began to reimburse for them. It is likely that any legislative initiatives that increase access to health care for individuals who are uninsured or underinsured will increase the need for additional providers, including PAs.

Some patients are beginning to travel overseas to seek more affordable health care. Bumrungrad International, a 554-bed hospital in Bangkok, Thailand, boasts that it is able to provide health care at one-eighth to one-tenth the cost of similar care in the United States. Last year, the medical staff, which includes 200 US board-certified physicians and 58 interpreters, provided care for over 430,000 international patients; 65,000 were American.17 Given the ease of travel and the continued spiraling health care costs in the United States, “medical outsourcing” is expected to grow. In fact, some US health insurance companies are considering coverage for health care obtained out-of-country.18 If facilities like Bumrungrad continue to expand, PAs, either locally trained or imported from the United States, may be key to expanding these low-cost alternatives overseas.

EPIDEMIOLOGIC INFLUENCES

The ease of international travel also poses the additional risk of facilitating the spread of communicable diseases that at one time were contained by geographical borders and slower mechanisms for transportation. Today, individuals in the prodrome phase of an infectious disease can complete their travel before the manifestation of signs and symptoms. This was graphically illustrated by the outbreak of Sudden Acute Respiratory Syndrome (SARS) in 2002/2003 and more recently by the tuberculosis scare in late May 2007.19 Public health officials will need to continue their vigilance and health care providers will need to expand their knowledge about disease entities that were once thought to be endemic only outside of the United States. Therefore, PA educators will need to continually monitor the literature for emerging diseases.

Globalization will affect more than just the distribution of disease and its “importability” (or “exportability”). There have been recent...
reports of tainted drugs and concerns regarding quality of food imports—all which can have serious impact on health care. For example, at least 365 deaths in Panama were blamed on a substitution of diethylene glycol for glycerine. Increased imports from around the world and the rapid development of new pharmaceuticals have taxed the Food and Drug Administration’s (FDA) ability to protect the public from unsafe food and drug products; it has been reported that FDA food safety testing is one-half the level of what it was in 2003. This means that health care providers will be increasingly challenged to be on the lookout for diseases, side effects, and poisoning from agents that are not typically addressed in educational programs.

EDUCATIONAL INFLUENCES

Of particular interest to PA educators are the emerging issues that will affect educational practices and the collegiate environment over the next decade. Just as medicine has been challenged to improve quality and clinical outcomes through landmark reports such as the Institute of Medicine’s Crossing the Quality Chasm, there are new calls for more accountability in higher education. The 2006 release of the so-called Spelling’s Report is one example. In response to global pressures, technological advances, and public financing and structural issues, this controversial report calls for major changes “to make higher education more accessible, more affordable, and more accountable, while maintaining world-class quality.” Likewise, Congress has begun to re-examine federal student scholarship and loan programs in the context of relative costs versus overall benefit. And there is growing concern among federal legislators and the public that higher education is becoming unaffordable and therefore inaccessible to some segments of the population. Outcome-based data are needed to inform policy leaders who are responsible for making decisions about medical education and patient safety, and PA educators and graduates will have roles in ensuring that appropriate data are collected as part of their regular responsibilities.

An ongoing challenge for PA education remains the lack of an adequate number of faculty to educate the next generation of students. There is a growing need for a specialized group of “clinician educators” who are valued by their institutions and provided with appropriate recognition and compensation. Educators must not only possess expertise in a PA practice but also have perfected skills in teaching, evaluating, supervising, and mentoring students. These educator competencies require time to develop and master. We may see more interdisciplinary teaching as seasoned “clinician educators” across the health professions are called upon to train junior colleagues recruited directly from practice.

Educators will continue to examine the utility of current paradigms of education. The effectiveness of the “talking head” (lecture) format of delivering education continues to be called into question. The former approach has been labeled as “lecture” by at least one author. Brown refers to the lecture approach as “supply-push” mode of building an inventory of knowledge in students’ heads (called “learning about”), and proposes a shift to a “demand-pull” approach, which taps into the natural curiosity of students (called “learning to be”). Learning to be has a independent, future-oriented perspective based on what is or what was.

The demand-pull mode of learning (learning to be) is best illustrated by examining the utilization of Web 2.0 tools, which many PA students regularly access. These include Wikis, blogs, and Webeasts—which hold tremendous promise for collaborative clinical practice and education. These new tools require careful use, however, since virtually anyone with minimal tech-savvy can publish a blog or establish a personal Web site. (To the dismay of educators, these resources often find their way to student papers and are cited with the same authority as a peer-reviewed article in the New England Journal of Medicine.)

In an effort to promote lifelong, evidence-based learning, courses utilizing problem-based learning (PBL) and evidence-based medicine (EBM) have become standard in many PA curricula. PBL, which focuses on the development of cognitive problem-solving skills through student-directed learning activities, represents a shift from traditional instructor-led, disease-focused education. A few PA programs use the PBL approach exclusively (eg, Chatham College), whereas most use a hybrid approach. A related strategy is the clinical presentation approach, adopted at the medical school of the University of Calgary. The curriculum is organized around 120 clinical presentations, each with an expert scheme, which provides a rubric for the categorization of knowledge and the way understanding is organized around a complex situation. This approach has been associated with increased odds of diagnostic success, and is similar to a diagnostic algorithm.

Emerging research on clinical reasoning and assessment will also challenge our traditional models of instruction and evaluation. Empirical evidence appears to document that...
reliability is not dependent upon objectivity and standardization, as previously thought. Recent studies have shown that reliability can be achieved with more subjective and less standardized assessments, if the sampling is selected appropriately. This has significant implications for our current assessment tools and strategies, which have been progressively based on standardized and objective evaluations. Similarly, recent literature has challenged the way we think about clinical reasoning.

While educators agree that clinical reasoning is a critical component of clinical competence reflected in many of our objectives, competencies, and standards, determining exactly what clinical reasoning is, how it is developed, or how it should be measured is a complex and difficult task. Research attempting to understand clinical reasoning is limited, and although progress is being made, the literature is confusing and conflicted. Recent trends appear to document that strategies for using knowledge vary with experience and context, and that both the novice and expert may use different processing strategies to come to similar solutions. Current thinking suggests that providing students with multiple problems, appropriately sequenced, may be the best way to enhance learning and knowledge transfer. Student-centered learning (individual and collaborative) that is focused on the development of reasoning skills is likely to be embraced by educators who wish to engage students and teach them to become lifelong learners.

Finally, just when the master’s degree controversy appeared to die down in the PA education circles, nursing may have fanned the fires. Recently, the American Association of Colleges of Nursing declared that advanced practice nursing educational programs will award a doctoral degree (doctor of nursing practice, DNP) by 2015. To date, the PA profession and the Physician Assistant Education Association have not taken a position on the DNP. However, it remains to be seen whether the “credential creep” in nursing will work to their advantage in the health care workplace, in terms of increased job opportunities, favorable reimbursement, or enhanced autonomy through legislative initiatives.

SCIENCE AND TECHNOLOGY INFLUENCES
Perhaps some of the greatest forces driving change over the next 10 years will be related to rapid advances in science and technology, both in and out of the classroom. Communications is perhaps the fastest area of developing technology. The Internet, cell phones, and other digital technologies will continue to have a significant impact on PA education and the practice of medicine, as they will on many other aspects of life. Advances in these areas have enhanced the ability to deliver education remotely. In PA education, high-speed Internet has allowed the proliferation of distance education in the form of satellite campuses, such as those associated with the University of Washington MEDEX program, and nontraditional doctoral programs like Nova Southeastern University’s doctor of health science (DHS) program. Web-based course delivery systems, such as Blackboard and WebCT, and Web-enabled data tracking software (eg, Typhon) allow PA programs to collect and efficiently analyze student didactic and clinical experience data, facilitating tracking and evaluation of student performance. “Smart classrooms” enable students and faculty to use the Internet as an in-class resource, with students answering questions posed by the instructor in seconds through a quick search on the World Wide Web. In addition, the Internet has dramatically changed the face of program marketing and admissions (eg, the Web-based Central Application Service for Physician Assistants has made applying to multiple PA programs much easier). The use of Internet tools for learning, assessment, and PA program administration is likely to increase dramatically as new software is developed, hardware becomes less expensive, and technology-savvy students and faculty invent new approaches.

Perhaps the most dramatic influences will occur in the area of clinical practice, which will affect both curriculum content and design. In the short 40-year history of the PA profession, desktop computers, personal digital assistants (PDAs), the Internet, MRIs, SPECT scans, and endoscopic surgery have all become commonplace. Today, technology exists to permit fusion of images from multiple modalities and to create geometrically and functionally accurate representations of the body and body parts. Technological advances are occurring so rapidly that they challenge even the most progressive educators to stay ahead of the curve.

In 2006, the FDA approved 97 new drugs and 32 original medical devices. In addition, there were 535 abbreviated approvals (generally for generics) and 3,217 approvals for medical devices based upon already known technology. Emerging technologies that will certainly influence PA practice and education include manipulation of cellular biology (eg, neuron switches), robotics (surgical applications – local and remote), synthetic characters or avatars (training applications), wearable computers for
continual patient monitoring (eg, smart socks for diabetics and smart bandages to detect bacteria), and nanotechnology (direct drug delivery to cells and diagnostics by nanobots).³³,³⁴ The electronic medical record, including “e-prescriptions,” is being implemented in nearly every clinical setting. Combined with the advances in communications described above, much patient monitoring and care will be able to be delivered remote from the typical hospital and clinic settings commonplace today — perhaps from the patient’s own home via cable/Internet connections already used for entertainment purposes. Technological advances are also contributing to rapid progress in genomic science, which has the potential to yield perhaps the greatest changes in medical science. Genomic medicine, based on understanding the impact of our entire genome and environmental factors on health and disease, is offering new insight into group and individual predictors of disease and potential therapeutic responsiveness. These have all influenced, and will continue to affect, not only PA practice but the educational programs that prepare PAs for the workforce.

Another factor is that technologysavvy patients are increasingly becoming more proactive, influencing and in some cases driving clinical practice. Because of the ease of access to the Internet, patients have become “pro-amateurs,” bringing printed pages and URLs to the clinical encounter with sophisticated questions or even suggestions for their management plan. Direct-to-consumer marketing by the pharmaceutical industry has also contributed to this relatively new-found sense of patient autonomy. This phenomenon is likely to continue to challenge PAs and other health care providers to stay current and be able to discern which resources brought by patients are valid and based on good medical practice standards. Finally, patient decision making may be increasingly driven by the accessibility of information related to the safety and performance outcomes of their providers, leading to a need for additional PA training in quality improvement and outcomes measurement.

VISIONING AND RESOURCES
This paper describes historical perspectives and emerging issues that may underpin future trends in health care and medical education, specifically as they relate to PAs. Some authors are calling for a major overhaul of medical education similar to the revolution that resulted from the 1910 Flexner Report.³⁵ Because PA education is based on the “medical model,” it is likely that any major shifts in medical education will also have an impact on PA education. However, at least one commentary, appearing in the New England Journal of Medicine, challenged the medical profession to learn from the PA educational model.³⁶ It may be that the PA profession has already emerged from its adolescence as a leader in curricular innovation and health care policy development.

New medicines, devices, and technologies will undoubtedly emerge over the next few decades. There will also be new diseases, or the reemergence of old diseases (some with increased virulence), that will also challenge the health care providers’ knowledge base. One only need reflect on health care and the general landscape of the mid-1960s and the beginning of the PA profession to recognize how quickly change occurs. A PA graduate at that time could not have imagined the significant advances that have occurred over the
past 40 years. Successful educators and providers will be those that commit to lifelong learning and who can apply critical thinking skills to address the challenges of the ever-changing environment. The old adage that “the only constant in life is change” remains true today. The key to responding to the future lies not in our ability to predict but in our ability to adapt. The PA profession has demonstrated its ability to be nimble and responsive to society’s health care needs. The key to our future is to be able to do the same in the next 40 years.

REFERENCES


16. Keller M, Lin II, Rong-Gong. One size does not fit all in debate over healthcare; The large number of uninsured may keep California from adopting Massachusetts’ ambitious model for universal coverage. Los Angeles Times. May 6, 2006.


28. Van Der Vleuten CPM, Schuwirth


