

The Globalization of the Physician Assistant Profession

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The global spread of the physician assistant (PA) profession is a medical workforce phenomenon largely born at the turn of the century. Because this observation comes with little analysis, we used investigative journalism techniques to collect information about the use of PAs outside of the United States. As of 2007, at least seven countries — Australia, Canada, England, the Netherlands, Scotland, South Africa, and Taiwan — are in various stages of expansion of PA-like medical workers that function under the supervision of a doctor. With the exception of Taiwan and South Africa, these countries have American-trained PAs working as expatriates, and most are developing educational programs that produce a health care provider functioning as an addition to the doctor. Each country has made its PA a distinct entity, with cultural and educational influences shaping their roles. Common denominators of these PAs are: they function as semiautonomous clinicians under the direct supervision of a doctor and have roles that tend to complement those of the doctor. Historical observations suggest the development of the PA profession in different countries tends to follow a similar path and that lessons learned from these nations may be useful in further expansion of the profession.

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INTRODUCTION

Due to shortages of doctors (especially in rural areas), rising health care costs, and increases in physician specialization, some countries are looking to the physician assistant (PA) concept as one of many solutions to their medical workforce problems.¹ A global expansion of the contemporary PA profession has been under way since the turn of the century. This paper summarizes this international phenomenon.

Background

Countries around the world have come to perceive a need for the PA profession because of shortages of human capital within the clinical workforce. In the United Kingdom (UK), for example, new European Union rules restructuring the number of hours a doctor can work have had a direct impact on the ability of junior doctors in the UK to see

patients. This has led to more access problems and longer wait times in clinics and emergency departments. At the same time there has been an increased attraction to physician specialization.² As the UK undergoes a reorganization of its health system, workforce planners are exploring new provider roles in health care.³ British National Health Service (NHS) officials see the potential in the PA concept to take some of the pressure off doctors and to benefit patients in general practices and emergency settings, especially those in which patient volume is high relative to the number of doctors available.

Canada not only faces doctor shortages, but health care access problems for many of its citizens. It, too, has looked to PAs as a partial solution.⁴ The Netherlands faces rising numbers of older patients with comorbidities and escalating costs of health care. Introducing the PA pro-

profession was seen as one strategy to improve the provider-to-patient ratio, add hospital-based staff, and reduce the cost of care. Canada and Australia, like the United States, struggle with physician shortages in rural areas and underrepresentation of indigenous health care providers. All of these countries have turned their interests to developing a US-modeled PA practitioner to work closely with the doctor and to improve access to care.

These are just some of the countries that have recently recognized the progress of PAs and have developed their own PA programs. Yet, assistants to doctors and prototypes of PAs are not new.⁵ Eastern European countries such as Russia and the Ukraine; Asian countries such as China and Malaysia; much of Oceania (eg, Australia, New Guinea, Micronesia, Melanesia, and Polynesia); as well as parts of Africa and South America have employed medical aides for decades.^{5,7-9} Even in the United States, the Alaskan Community Health Aides project, inaugurated during World War II and continuing today, produces what can be referred to as prototype PAs.¹⁰

And even the direct exportation of the American PA model is not entirely new. The Medex model of PAs was introduced to 14 countries as long ago as the late 1970s and continues to flourish in countries such as Lesotho (personal communication R Smith, May 25, 2006). As the PA profession expands its international presence, other countries such as Ghana,^{11,12} Germany, and China are showing interest in this new medical role for their citizens.¹³

The American Academy of Physician Assistants (AAPA) and the Physician Assistant Education Association (PAEA) have aided many inquiring countries through their international affairs committees.

These committees continue to serve as a source of information about PA issues outside US borders, especially for those desiring to establish new educational programs abroad.

Purpose and Significance

Because of the fragmentation of information about PA development in different countries, the authors undertook a project to consolidate this information. Through the collection of quantitative and qualitative data, using investigative reporting techniques (which included visiting the countries of interest as well as communicating with knowledgeable informants both in person and through correspondence), the following information is presented. The intent is to establish the presence of PA development outside the United States and to serve as the origins of an international PA registry.

One final note: When the term “physician assistant” is used internationally, it has some ambiguity. In many Commonwealth countries (former British colonies), the term “physician” is reserved for internal medicine specialists (eg, rheumatologist). Precise definitions for PAs are in flux since the role of PAs in these countries may lack some of the defining characteristics of their American counterparts (established legislation, ability to prescribe, order laboratory or imaging studies, work semi-autonomously, etc). For the purposes of this report, the PA is defined as a health professional authorized to work under doctor supervision who provides medical care in a delegated role. We purposely avoid framing definitions in American terms but choose instead to examine the similarities of international PA professions by observing the main areas of history, practice, and education.

METHODS

Research Design

Visiting each country, conducting interviews, and corresponding with host country officials and colleagues were the main methods used for this project. The research design was cross-sectional, using exploratory research techniques, and the research was conducted from January 2005 through July 2007. Information was categorized according to number of PAs, educational level, and credentialing. Some variables were obtained through published data from the Organisation for Economic Co-operation and Development (OECD) and the World Health Organization (WHO).

Samples and Sampling Method

The target sample consisted of countries that are developing or have developed PA programs similar to that of the US model.

Inclusion Criteria

The countries included in this exploratory undertaking were found, in the “international PA development” portion of the AAPA Web site, to have PA-related activity in one or more of the following ways:

- PAs currently in practice
- Existing PA program or a training program in development
- Medical professionals with scope of practice similar to that of American-trained PAs. This includes taking medical histories, conducting physical exams, diagnosing and treating illnesses, ordering and interpreting tests, counseling on preventive care, assisting in surgery, and writing prescriptions.⁵

Literature discussing PA activity internationally in English was searched using PubMed, OVID, CINAHL, and MedLine to identify countries with current or developing PA activity through July 2007.

RESULTS

Australia

Australia is about the size of the continental United States in landmass but has a population of only 20 million (less than Texas). It is the largest importer of doctors per capita in the world.¹⁴ With rich natural resources but vast distances between towns in the interior, the six states and one territory within Australia have had to rely on dispersed medical resources. Aboriginal health workers, about 400, provide some of the care; but the number of doctors serving the rural and indigenous populations is considered insufficient.¹⁵ Introducing PAs in Australia has been discussed since 1999.

In 2005, 2006, and 2007, a series of medical workforce conferences in Queensland focused on using PAs to expand the delegation of medical care garnered the interest of workforce planners. Australian visitors to the AAPA annual conference in 2003, 2006, and 2007 firmed up the conviction that this was a worthwhile undertaking. Queensland Health, the state government health agency, intends to fund a pilot project in 2008 to introduce PAs into its medical services. This funding initiative, part of a pilot project to assess the utility of PAs, coincides with the development of two PA programs: one at the University of Queensland in Brisbane and another at James Cook University in Townsville. Both programs will enroll students in 2009. Two American expatriates are involved with PA development in Queensland.

Canada

The PA profession was first introduced in Canada with the establishment of a military PA program in 1984. The Canadian Medical Association (CMA) accredited the Canadian Forces Medical Services PA Program at Base Borden, in 2004. This intra-military program serves as the main producer of Canadian PAs and has graduated more than 200 since the year 2000.⁴ Many military PA retirees have taken up careers in the civilian Canadian health industry, though few are working with the title "PA," because no registry of these graduates yet exists.

The province of Manitoba passed legislation in 1999 to enable experiments in delegated medical care and called the resulting health care workers registered clinical assistants (RCAs). The minister of health for Manitoba stated specifically that US-trained PAs were welcome to the province.¹⁶ This initiative has allowed American PAs to officially practice in this province, which they have done since 2004. The University of Manitoba will start a PA education class in 2008.

In May 2005, Manitoba adopted the Canadian Association of Physician Assistants (CAPA) Scope of Practice and Competency Profile for civilian PAs, which is similar to the NHS Competence and Curriculum Framework for the Medical Care Practitioner (MCP) created for the UK model. Both were modeled after the American PA scope of practice. In Ontario, the minister of health announced that civilian PAs would work within its health care system in 2007.¹⁷ The HealthForceOntario Pilot Project introduced PAs into the Ontario health care system in emergency departments in 2007, and will introduce them into hospitals and primary care sites by 2008. By estab-



lishing demonstration sites to observe the PA model, the pilot program will allow Ontario to examine the best way to design an expanded health care system.

CAPA was established in 1999, with a grant from the Canadian Department of National Defence, to serve as a unifying body encompassing both military and civilian PA sectors.²⁰ CAPA developed a civilian PA profile in November 2001 that the Canadian Forces adopted.¹⁸ There are 10 Canadian provinces and 2 territories, each with separate regulations and registration. Only Manitoba has enabling legislation for PAs, but Ontario is expected to have legislation by 2008. CAPA is the national agency that governs PA certification in Canada and functions in a role similar to that of the Royal College of Physicians and Surgeons of Canada (the national organization responsible for setting and maintaining standards for postgraduate education and certification of specialists physicians).

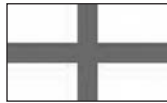
Candidates for certification must be graduates of a PA training program accredited by the CMA, must have previously been practicing as a Canadian PA, or must be certified by the National Commission on Certification of Physician Assistants (NCCPA). New graduates from a CMA-accredited institution must hold CAPA membership and pass the certification exam before they may practice. PAs who have previously practiced in Canada must be graduates of a pre-accreditation Canadian Forces program, hold CAPA membership, have 100 hours of continuing medical education (CME) in the past 3 years, have held direct patient care responsibility in the past 5 years, and have successfully completed the certification exam. The proposed certification period is 3 years, commencing June 1, 2006.

American-trained PAs seeking

certification in Canada must have graduated from a PA program accredited by the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA), must hold CAPA membership and a currently valid NCCPA certificate, and must have successfully completed the Canadian certification exam.²⁸ Most were recruited to work in emergency medicine and family practice.

Because of the initiatives taken by Manitoba and Ontario, other provinces such as British Columbia and Nova Scotia are looking into the feasibility of PAs being formally recognized.

England



England initiated a pilot program in 2002 to test the applicability of American PAs to its health care system. The Tipton Care Organization, near Birmingham, recruited two PAs from the United States that year for the pilot program; the number of PAs in this project has now expanded to 14. The success of the pilot program influenced PA-modeled curricula at the University of Birmingham in the West Midlands. The University of Hertfordshire started a similar program in 2005.¹⁹ The imported PAs were initially titled medical care practitioners (MCPs). This title and others have added some confusion to terminology. Other PA activity has occurred in the country, both public and private, and, as of 2007, the number of PAs in the country was approximately 50. The intent of the initial MCP/PA demonstration project was to reduce average waiting time in the emergency department to less than 4 hours and to reduce length of stay in hospitals.²⁰

A problem in the UK medical system has been the separate development of various practitioner programs, each with its own governing

body. To resolve this issue, the UK brought the various groups together to ensure consistency and national transferability of practitioner roles at assistant, senior, and advanced levels. The UK National Health Service (NHS) created the National Practitioner Program. Since the term “physician” refers specifically to an internist rather than a general practitioner or a specialty practitioner, the use of “physician assistant” suggests more of an associate doctor than an “assistant.”²¹ Earlier this year, the UK Department of Health replaced the working title of MCP with “physician assistant” after a positive response from public surveys indicating that the “PA” title was appropriate. The title MCP will remain a working title until the profession is fully established and the regulatory body approves the appropriate protected title.

The University of Hertfordshire; St. George’s, University of London; London South Bank University; the University of Surrey; Wolverhampton University; and the University of Birmingham, all with medical schools, have established PA programs. However, as of August 2007, some are on hold due to financial issues.

PA programs in England are 3 years in length, with the exception of the Kingston University/St. George’s, University of London pilot program, for which the program structure consists of 70% work-based learning in a range of clinical settings, supervised by senior doctors or attending physicians, and 30% didactic work, including such courses as the nature of physical assessment and clinical decision-making. Each program is competency-based. Since publication of the Department of Health curriculum framework, additional knowledge building and other learning activities have been incorporated into

the program.

National registration of PAs begins in 2007, with PAs practicing under article 46, the delegation and referral clause of the General Medical Council’s Handbook for Good Medical Practice:

Delegation involves asking a nurse, doctor, medical student or other health care worker to provide treatment or care on your behalf. When you delegate care or treatment, you must be sure that the person you delegate to is competent to carry out the procedure or provide the therapy involved. You will still be responsible for the overall management of the patient.²²

The framework gives educational institutions the option to use the national exam for either graduation or registration; any further assessment is left to the discretion of each institution. National recertification will also be required every 6 years, just as it is in the United States. Continuing professional development is also proposed, in a manner similar to the US model of continuing medical education, to complete the professional education requirement of the PA.

The Netherlands



The Netherlands’ four programs have curricula modeled to some extent after the American PA educational design, with the inclusion of a mandatory master’s research project.²⁴ In 2002, the first class of PA students in the Netherlands entered the 3-year program at the Academie Gezondheidszorg in Utrecht. Following the success of that program, in 2003, the University of Arnhem/Nijmegen opened a second 3-year PA program, which graduated

its first class in the spring of 2006. A national curriculum was developed by the Netherlands-Flemish Accreditation Organization, which also accredited both programs soon after, in 2003. The Department of Education, Culture and Science in the Netherlands now recognizes the programs. Two more programs were established, at University of Groningen and University Amsterdam/Diemen, in September 2005. As of 2007, almost 100 PAs have graduated. The Netherlands has also established its own national organization and governing body for PAs, the Netherlands Academy of PAs (NAPA).

The curriculum design in the Netherlands is oriented toward the clinical environment, and students spend approximately half of the week in school and the other half performing services in clinical settings. Unlike in US PA programs, students receive a government stipend during their clinical training. Students are required to have 2 years of direct patient contact experience before entering. Therefore, all students are qualified to perform services in at least their previous area of expertise, during their training. Within the PA programs, students discuss self-study topics assigned by faculty and focus on lecture material. Students are also expected to solve a specific scientific problem (comparable to a case study) that has been assigned prior to the seminar and that directly correlates with classroom material. The material is covered in systems or block format, much like that of American PA programs; however, didactic and clinical portions occur simultaneously. During the course of the program, students prepare a master's project, the purpose of which is to teach the importance of testing the validity of medical research, interpreting the medical literature, and identifying

the strengths and weaknesses of medical research. Toward the end of their training, they present an oral defense of their research and are encouraged to publish their work.

There is neither a formal certification system nor licensure in the Netherlands for PAs. PAs who graduate from these Universities of Applied Sciences are fully qualified to enter their profession without further study, licensing, or registration. Instead, the focus has been placed on accreditation. The Ministry of Health, Welfare, and Sport created an agency to oversee various health professions, which is known by the Dutch acronym, BIG. This organization sets rules for all health care professionals concerning patient protection and quality of care.²⁴ The BIG also includes a registry of all health care professionals (the BIG-register), under which graduates of the Netherlands' health professions programs are registered to practice such as pharmacists, physicians, physiotherapists, healthcare psychologists, psychotherapists, dentists, midwives, nurses, and now PAs. Listed in this register are the legally protected titles belonging to certain health professions. Under Dutch law a set of excluded procedures (such as surgical procedures) limits the practice to only those professions designated to carry out certain procedures.²⁴ While PAs are authorized to perform select procedures, such as suturing, they have not been authorized to prescribe medication.

At the same time PAs are working, they also remain registered as either RNs or PTs, depending on their previous area of expertise.²⁴ Proposals have been made to include both the PA and the NP titles in the Law on Prescription of Medicines (Dutch acronym, WOG) to grant PAs the authority to prescribe, as well as for protection of the title. This will allow

them to work solely as PAs. Securing this legal position requires (1) a demonstrable and adequate teaching process for relevant skills in an area of expertise or specialization, (2) strict selection criteria for the quality of individual professionals (PAs) and, (3) guaranteed reliable supervision by a physician. Currently, the government provides ample flexibility to the PA profession, understanding that it is an evolving one. As of late 2007, there are almost 200 PA graduates in the Netherlands. In addition, there is an American-trained PA in general practice filling the role previously filled by a doctor. The doctor employing the American PA reports no problems in practice and she has been subject to the same restrictions as Dutch-educated PAs. As long as the Dutch government recognizes the program of study in the United States, then US-trained PAs may qualify for registration.²⁴

Scotland

Scotland has a population of 5 million and has 4.5 medical universities (St. Andrews students complete the second half of their education in Manchester). For over a century it has been a major exporter of doctors. Scotland also has an inverted population pyramid, with an increasingly aged populace, fewer young people to educate, fertility rates decreasing, and an escalating demand for health care services. Medical training has resulted in few generalists and a relative excess of specialists, presenting challenges to the flexibility of delivery. NHS Scotland believes care should be provided as locally as possible, but also as centrally as needed, moving health care out of hospitals and into communities — requiring workforce capacity and capability. While Scotland remains part of the UK, it is assuming more of a role in



governance and the welfare of its citizens, as the UK government decentralizes. This also extends to the NHS, in which NHS Scotland is part of the UK NHS, but is to some extent managed separately.

In late 2006, 12 experienced American PAs began working in Scotland as part of a 2-year demonstration project. NHS Scotland will evaluate these first recruits in terms of the roles they fulfill, the impact they make, and how receptive the health system is to PA employment. The creation of a PA training program in Scotland could have a significant effect on the delivery of patient care, cutting costs, efficiency, teamwork, use of referrals, and patient waiting times.²⁰

The Accreditation of Prior and Experiential Learning (APEL) system facilitates the accreditation of nurses and other health care workers in Scotland. Those practitioners who are accredited could potentially transfer their accreditation or registration should they choose to make a career change to become a PA. Regulation of the PA role has been something of an obstacle for the NHS. NHS Scotland officials realize that it is difficult to guarantee that regulation and legislation support the boundaries and goals of a new role without the education, competencies, accountability, and the role itself being well developed. Thus, there is a paradoxical situation in that there is a great deal of work to do to establish a regulatory mechanism, but it is difficult to create new roles without the reassurance of having regulatory standards already in place.

NHS Scotland has developed an evaluating committee for the pilot project, composed of two groups. The steering committee consists of medical professionals from both primary and acute care, headed by key members from the NHS Education



A PA working in the emergency room of the Taiwan National Hospital, Taipei.

for Scotland, and an independent chairman. The second group — the Physician Assistant Strategy Group — serves a more strategic role. This group ensures national consistency of policy and establishes a forum for reconciliation and coordination of other new medical role development in Scotland. The two committees are working together through the 2-year evaluation of the US PA pilot project to record any logistical or other issues arising, including social issues related to relocation, lifestyle adjustment, and workplace adjustment. The committee is also examining what resources are needed to establish a formal credentialing system.

Taiwan, Republic of China



In the mid-1990s Taiwan became the first Asian country to enact universal health care for its citizens. With this, a flood of pent-up demand for care was unleashed. Shortly afterward, a group of nurses was allowed to increase their scope of practice in order to help with this surge in medical

demand. Doctors who had trained in the United States (and knew something about PAs) created hospital-based, semiformal education programs for the nurses enabling them to function with greater autonomy and to assume some traditional doctor roles. At first, the education process was on-the-job training, and each large medical center acted as its own education institution. This advanced training earned the nurses the title of physician assistant or nurse specialist, depending on the center where they worked.

Efforts to formalize PA education in Taiwan began in 2003 with the development of a PA program at Fooyin University. This program provides a postgraduate-type education for nurses that allows them to graduate as a PA equivalent. The program is 3 years in length and staffs campuses in three parts of the country. Unlike in most PA programs, didactic and clinical learning are integrated. Students spend 2 days per week in the hospital setting and 3 days per week in the classroom. Half of the clinical experience is spent in

Table 1. Population Statistics and Numbers of Doctors and PAs for Nations Developing PA Programs, 2007^{17, 18, 19}

	Population	# of PAs	Number of doctors	Dr./pop ratio
Australia	20,264,082	2	47,875	2.6/1000
Canada	33,098,932	170	66,583	2.1/1000
United Kingdom	60,609,153	26	133,641	2.3/1000
Netherlands	16,491,461	75	50,854	3.2/1000
Scotland	5,062,011	12	12,738	2.5/1000
South Africa	47,391,900	0	30,740	0.7/1000
Taiwan	23,036,087	1,400	24,418	1.1/1000
United States	301,000,000	65,000	650,000	2.1/1000

Table 2. Rural/Urban Demographics of Selected Nations with Developing PA Programs^{18,19}

	Percent rural population	Percent urban population
Australia	7%	93%
Canada	19%	81%
United Kingdom	11%	89%
Netherlands	33%	67%
Scotland	20%	80%
South Africa	22%	78%
Taiwan	32%	68%
United States	14%	86%

the student's "current specialty," acquired prior to entrance into Fooyin's PA program.

As of 2007, the Taiwan government has made no formal recognition of the PA profession in the country. However the PA-like professionals, trained on the job, can be found in a variety of settings in Taiwan. A 2004 survey by Kao-Lo identified a total of 1,419 PAs who were employed at the 111 responding hospitals.²⁵ The majority of PAs work in surgery (39%) or internal medicine (37%), with the rest in obstetrics, pediatrics, and emergency medicine. Twenty-four percent of these practicing PAs have a bachelor's or master's degree. The remainder hold associate degrees.

Currently, students graduating from Fooyin University are receiving a bachelor's of science in nursing and a PA document (a certificate has not been granted). The PA document recognizes graduation from the established PA program at Fooyin, but it is not recognized by the government. Promoters of the PA profession, such as Dr. Kao-Lo, are working with the Ministry of Health in Taiwan in order to get formal recognition of PAs, as well as with the Ministry of Education for formal recognition of the PA degree.

Common Denominators

Excluding the Netherlands, every country falls short of the desired 3/1,000 doctor-to-population ratio

that is recommended by the World Health Organization (WHO).²⁶ All use English in the classroom, although for Taiwan and the Netherlands, English is a secondary language. Table 1 shows the population and doctor-to-population ratios of these countries, as well as those of the United States for comparison.

Canada, Australia, South Africa, and Scotland have remote and/or widely separated and sparse populations. In some countries, the size or dispersal of rural populations present formidable challenges to health care delivery (Table 2). These observations are consistent with the WHO estimates, as of 2005, that 75-80% of the world's doctors practice in urban localities.

Although each country defines rural and remote differently, most have comparatively low doctor-to-rural population ratios. Many countries, like the United States, Canada and Australia, have difficulty enticing physicians to rural and remote areas, which provides additional impetus to develop PA enabling policies that may help alleviate the maldistribution of medical care professionals. Providing health care access to indigenous populations, who often live in rural areas, is also a policy driver for some countries.

The third common denominator for many of the countries is the need to reduce the work hours of doctors in training, partly by introducing assistants with advanced skills in medicine.

Educational Development

Education programs have developed in different ways and by different means in the nations described here. The established PA programs in these countries range from 2 to 3 years in length, with a didactic component followed by a clinical component (Table 3). The Canadian military PA

Table 3. Characteristics of Physician Assistant Education Programs in Selected Countries

Country	No. of Programs	Year and Location	Length of Program	Didactic	Clinical
Australia	2	2009 University of Queensland	24 mo.	12 mo.	12 mo.
		2009 James Cook University	24 mo.	12 mo.	12 mo.
Canada	4	2002 Canadian Armed Forces	24 mo.	12 mo.	12 mo.
		2007 University of Manitoba in Winnipeg	24 mo.	11 mo.	13 mo.
		2008 McMaster University	24 mo.	12 mo.	12 mo.
		2008 University of Toronto	24 mo.	12 mo.	12 mo.
England (UK)	7	2002 Kingston University (pilot program)	24mo.		
		2004 St George's, University of London (pilot program)	36 mo.	24 mo.	12 mo.
		2004 University of Wolverhampton	36 mo.	24 mo.	12 mo.
		2005 University of Hertfordshire	36 mo.	24 mo.	12 mo.
		2008 London South Bank University	36 mo.	24 mo.	12 mo.
		2008 University of Surrey	36 mo.	24 mo.	12 mo.
Netherlands	4	2001 Academie Gezondheidszorg in Utrecht	30 mo.	6 mo.	24 mo.
		2003 University of Arnhem/Nijmegen	30 mo.	6 mo.	24 mo.
		2005 University of Groningen	30 mo.	6 mo.	24 mo.
		2005 University of Leiden	30 mo.	6 mo.	24 mo.
Scotland	0	No educational program established		—	—
South Africa	1	University of Witwatersrand	24 mo.	12 mo.	12 mo.
Taiwan	1	2004 Fooyin University	36 mo.	24 mo.	12 mo.

program in Borden, Ontario, is structured similarly to the US educational programs and the newer Canadian programs are following suit.

Entry criteria for PA education rely on prerequisites with a high school education on one end and a bachelor's degree and at least 2 years of direct patient care experience at the other. Each country has chosen its prerequisites based on the availability of qualified applicants locally. Attracting indigenous health workers, paramedics, and military corpsmen as

applicants may require different criteria than for a physical therapist or biomedical technician.

DISCUSSION

The expansion of the American-type PA model has been under way in various forms and countries for over two decades. A timeline demonstrates this in chronological order of development (Table 4).

The seven countries featured in this article are addressing the health care needs of their societies using PAs, for similar reasons. At the heart

of this expansion is the need to improve access, address doctor shortages, and expand delivery systems.

With the exception of Manitoba, innovation has preceded legislation in every instance — an observation documented in the US movement as well. In the case of the Netherlands, there was top-down government policy to start a new profession, over the objections of the Royal Dutch College of General Practitioners. In England, Australia, and Scotland, the initiative was more of a bottom-up undertaking, through public debate, medical conferences, and the willingness of a few well-respected doctors to take the lead. Pilot programs are being used to introduce PAs in Canada, England, Scotland, and Australia. Canada is undertaking a demonstration project with US-trained PAs, at the same time recognizing it has Canadian PAs in place. While demonstration projects have yet to be proven as a tested strategy in gaining approval officially, anecdotes abound about the ready acceptance expatriate PAs receive in the adopted communities where they work.^{19,21,27-31} Most PA programs outside the United States are in medical schools, suggesting this activity may be sanctioned by academic medical educators — a needed endorsement for PA education to be initiated in some countries.

Finally, the recruitment of experienced, American-trained PAs to these countries is a useful strategy to showcase what they are capable of providing clinically. To the leaders of the demonstration projects, these PAs may be useful to serve as medical role models. However, we also suggest that their roles as ambassadors of good will and pioneers in novel health care delivery may be just as valuable.

As each country defines the role and level of autonomy that the PA has or will have, we anticipate modifica-

Table 4. Timeline of Physician Assistant Development Globally

1967	United States	Graduates first formally trained PAs
1984	Canada	Canadian military retroactively designates "Med A" personnel as PAs
1997	Taiwan (Republic of China)	Enacts universal health care. Converts nurses to PAs in large medical centers through advanced training and on-the-job training.
1999	Canada	Manitoba enacts legislation enabling PAs to work in the civilian sector
2002	Taiwan	Fooyin University begins first PA program.
2002	The Netherlands	Begins training PAs primarily for inpatient service.
2002	England	First PAs recruited to work in England.
2004	Canada	The Canadian Medical Association accredits the Canadian Forces PA Program.
2006	Scotland	First PAs recruited to work in Scotland
2007	Canada	Ontario recruits PAs for emergency medicine, hospital services, and primary care.
2007	Australia	First PAs recruited in Queensland.
2007	United States	The Physician Assistant Education Association invites non-US PA programs to attend its Annual Education Forum and celebration of profession's 40th anniversary.

tions and departures from the American version. Despite obvious similarities and differences in PAs from country to country, it is apparent that the concept is making a worldwide impact on how health care delivery will be constructed in the next decade. Every country incorporating the PA profession into the existing health care system must endeavor to gain public awareness and acceptance of the new profession.

There are limitations to this research as there are in all forms of social research and investigative journalism. The particular people a researcher interacts with in each country may subtly shape the researcher's perceptions, which may then differ from those of other observers. While each country was visited and hosted by research and academic colleagues, probing for detailed information was not always possible. Although we used triangulation techniques throughout to vali-

date the reliability of information, this is still considered a work in progress. Space limitations constrain full details on all country activities, and changes will quickly make this report outdated. However, we have reported the most current information on the status and the progress of the PA concept overseas, obtained from firsthand sources involved in the training and establishment of the PA profession in each country, as of September 2007.

A recommendation to researchers interested in furthering this work is to systematically acquire historical documents and archive all items of chronological importance in established institutions that make information of this type readily accessible for analysis. We suggest an update to the existing body of knowledge be undertaken each year.

CONCLUSION

The PA concept of the 21st century

has expanded beyond the borders of North America. Many American PAs are involved in this expansion, as are academics, PAEA leaders, AAPA staff, researchers, and government officials. Work of this type is not undertaken in a vacuum and it is a testimony to the power of networking that enables development of the PA concept to go forward.

From these experiments in international health care delivery, we anticipate improved understanding in organizational productivity by seeing how other countries and institutions make use of their new labor force. Because these systems are educating and using PAs in new and different ways we look for these experiments to provide new insight in efficient patient services and knowledge of social behaviors that transcend culture. Additional comparative research is sought in how these new providers work, the efficiencies they bring to different societies, and the patients they benefit.

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