



Review Article

Incorporation of Nurse Practitioners and Physician Assistants into patient care teams – Focus on infectious diseases

Jennifer Bingen, Rebecca Krueger, Annie Lakatos, Julie Raaum, Michael Kron*

Division of Infectious Diseases, Department of Medicine, Froedtert and the Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, Wisconsin, 53226, United States of America

* Corresponding author: mkron@mcw.edu

ABSTRACT

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There is a global shortage of health care providers needed to address all levels of primary and specialty care. The recent COVID-19 pandemic also highlights the importance and added value of health professionals with specialty training in infectious diseases. In the United States, advanced practice providers (APPs) are being engaged to meet the expanding demand for generalist and specialist patient care. The history and development of advanced practice registered nurses (APRNs) and physician assistants (PAs), are discussed as collaborative healthcare providers to promote better understanding of the ways they can be incorporated into a healthcare system. An example of how APPs are utilized to provide both inpatient and outpatient care of persons with infectious diseases is illustrated at our midwestern United States regional medical center. Especially relevant for regions of the world where both nurses and physicians are in short supply, this paper identifies ways that healthcare leaders can support, develop and strategically utilize APPs to provide critically necessary functions and achieve excellent outcomes. Challenges to future healthcare administration are articulated and compared with World Health Organization roadmap objectives for nursing that can be expanded to better utilize all APPs as valuable healthcare professionals.

Introduction

There is a global shortage of health care providers needed to address all levels of primary and specialty care in an effort to meet the Millennium Development Goals (1). The recent COVID-19 pandemic also highlighted the importance of health professional with subspecialty training in infectious diseases. The American Association of Medical Colleges reported in its sixth annual study entitled “The complexities of Physician Supply and Demand” that by the year 2033 the USA will face a physician shortfall in almost all areas, including primary care, surgical and medical specialties,

totaling more than 100,000 providers (2). The World Health Organization (WHO) drafted a roadmap document in 2020 providing up to date evidence on the first “State of the Worlds Nursing Report: Investing in education, jobs and leadership” for consideration as a strategy to achieve Millennium Development goals for universal health care (3). Key elements of this roadmap document were developed using a wealth of data from 191 countries representing all WHO world regions, providing context and examples of: nursing in health priorities, the role of nursing in the 21st century, policy strategies to enable the workforce (4-5). The seventy second World

Health Assembly designated the year 2020 as “The International Year of the Nurse and Midwife” in recognition of their pivotal roles in healthcare and alluded to the capacity of these providers to further expand their roles in modern patient care (6). However, physician and nursing shortages are reported by virtually all countries around the world. Global maps indicating regions with the greatest shortages of physicians and nurses demonstrate almost complete overlap. Therefore, new approaches to growing and sustaining the healthcare workforce are needed (2,7).

A powerful but underutilized strategy to address healthcare provider shortages is the assimilation of physician assistants and advanced practice registered nurse practitioners (collectively referred to as APPs, or Advanced Practice Providers) within a healthcare system. Therefore, the purpose of this paper is threefold: (1) to review definitions and key elements in the history of APP evolution, (2) provide specific examples of how APPs are incorporated into patient care at our midwestern United States regional medical center, highlighting APPs in treatment of persons with infectious diseases, and (3) provide a framework to challenge healthcare administrations globally to better utilize APPs in new iterations of future healthcare delivery infrastructures.

General background and global workforce of APPs

Data in the Global Regulatory Atlas suggest there are at least 144 distinct titles of nurses around the world, ranging from 10 titles in the South-East Asia Region to over 30 in the Region of the Americas and Europe (8). The role of a nurse in one country may be different from the role of a nurse with the same title in another country and ambiguity in titles can contribute to misperceptions of the important skills and academic backgrounds for various APPs (9). In the USA, advanced practice registered nurses (APRNs) have both a bachelors degree as well as a master’s or a doctorate degree that reflect specific skill sets and levels of academic achievement (10-14). There are over 270,000 APRNs in the United States alone, practicing in many settings and in multiple functional capacities (15). In mid 2020, it was estimated that the USA contained an estimated 120,000 physician assistants (PA), the largest census of physician assistants among eighteen countries surveyed globally. The country with the next largest PA census was the United Kingdom with 2,000. Only 53% of countries responding to the 2020 WHO survey reported having advanced practice roles for nurses, and fewer still had roles for PAs (16-17).

Assimilation of APPs into mainstream healthcare delivery systems is sometimes complicated by the fact that the regulation of nursing and physician assistant educational tracks is not harmonized broadly around the world. Nonetheless, the United Nations Sustainable Development Agenda for 2030 challenges all to achieve health and wellbeing for all, inclusive and equitable education, gender equality, and promoting sustainable economic growth (18-21). Therefore, our perspective is that WHO and United Nations supported strategies originally developed to solely advance nursing leadership priorities can at the same time support investment in continued medical education, harmonization of credentials and certification, jobs and capacity building throughout the full spectrum of APPs (3).

Physicians in the United States have benefited from working collaboratively with APPs over the last fifty plus years. APP professions exist in an evolving landscape of APP practice change and increasing scope of practice. Key changes in the USA for APPs include prescriptive authority and becoming national health insurance (Medicare) providers in 1998. Multiple studies demonstrate that in primary care as well as specialty care, patient outcomes of individuals cared for by APP are comparable to patient outcomes under the care of physicians and that patients, physicians, and APPs all benefit (22-29). One study, looking at utilization and costs for complex patients in care at a Veterans Affairs setting found that both were lower for patients managed by APPs when compared to their physician colleagues (22). This held true in both an ambulatory setting and inpatient setting for this study cohort. Another large study examined participants receiving care in federally qualified health care settings. This study analyzed five years of data representing approximately thirty million visits in the US to estimate the impact of receiving NP or PA care versus physician delivered care. Of the nine outcomes studied, seven outcomes showed no statistical differences between APP delivered care and physicians. In the remaining two outcomes, both showed that patients treated by APPs received more lifestyle and health related counseling than did those seen by physicians. One large cancer center in Texas described their inclusion of the PA role into the delivery of infectious disease care to cancer patients (23). They first utilized the PA in the inpatient setting subsequently adding additional PAs to expand to the outpatient setting, antimicrobial stewardship and finally to weekend coverage. Results reported an overall increase in departmental productivity, broadened patient care coverage, and ID physician satisfaction

Advanced practice nurses

The role of advanced practice nurses originally evolved in the United States of America at the time of the US Civil War (1861-1865) when nurses were called upon to administer simple anesthesia to soldiers (11). Nurses filled a need which eventually evolved, over many years, into the Certified Nurse Anesthetists practice that is seen today. Midwives, not all of whom are nurses, and clinical nurse specialists emerged and developed discrete practices to help address other patient care needs not fully addressed by the league of physicians available. In a similar way, nurse practitioners, who fulfill clinical roles within primary care and other subspecialties, emerged in response to patients who had little access to care by physicians.

Advanced practice registered nurses (APRN) in the USA are registered nurses educated at master’s degree level or other post graduate level training in a specific role and patient population. Types of advanced practice nurses include certified nurse practitioners (CNP), clinical nurse specialists (CNS), certified registered nurse anesthetist (CRNA) and certified nurse-midwife (CNM). CNPs provide independent care and are accountable for health promotion, disease prevention, health education as well as the diagnosis and manage of acute or chronic disease. The settings in which they practice are usually in family practice, pediatrics, internal medicine, geriatrics and women’s health. In addition, primary care

and acute care CNPs have distinct certifications and expanded practice environments. The scope of the clinical nurse specialist (CNS) differs slightly in that they are not direct patient care providers, but instead focus on improving nursing practice, healthcare organizations and systems. Certified registered nurse anesthetists (CRNAs) provide the full spectrum of anesthesia care for all levels of acute or chronic disease. Certified nurse-midwives (CNM) provides primary health care services including gynecologic care, family planning services, pre-and post-partum care, childbirth and newborn care. While each advanced practice nurse education tract is slightly different, they generally require 2-4 years of post-graduate education, a standardized amount of direct patient care practicum hours, and require state licensure as well as nationally recognized board certification.

Seven core competencies have been described for APRNs to clarify the fundamentals of the discipline. These include direct clinical practice, guidance and coaching, consultation, evidence-based practice, leadership, collaboration, and ethical decision making (11). This helps differentiate the work of APRNs as compared to other registered nurses. Core competencies are utilized by nursing schools to complete the academic mission of preparing APRNs. From a patient perspective, APRNs may serve as the primary care provider for a panel of patients or as part of a team that provides acute and chronic disease management. Patients may encounter an APRN at every level of care, demonstrating that APRNs are prepared to provide this type of care based on their education, experience, and training (29,30).

Physician Assistants

The American Association of Physician Assistants (AAPA) defines the role of PA as medical professionals who diagnose illness, develop and manage treatment plans, prescribe medications, and often serve as a patient's principal healthcare provider (30). The AAPA was established in 1968 with its mission statement "to ensure the professional growth, personal excellence, and recognition of physician assistants, and to support their efforts to enable them to improve the quality, accessibility, and cost-effectiveness of patient-centered health care." In 1965 Dr. Eugene Stead founded the first 2-year PA program at Duke University Medical Center and the program curriculum was modeled on the fast-track training of doctors needed during World War II. The National Commission on Certification of Physician Assistants (NCCPA) was established in 1975. The PA profession experienced a very rapid growth and at present there are 123 accredited PA programs who have 47,180 PA graduates.

PAs are versatile and collaborative. PAs practice in every state in the USA and in every medical setting and specialty, improving healthcare access and quality. Presently there are more than 277 highly competitive PA programs in the USA, requiring a bachelor's degree and completion of classroom courses and more than 2,000 hours of clinical rotations over a three-year academic program. A bachelor's degree is required for acceptance into a PA program after which students receive a special master's degree. To obtain a license, PAs must graduate from an accredited PA program, pass a national certification exam. To maintain their certification, PAs must complete 100 hours of CME every two years and take a recertification exam every 10 years.

Some healthcare administrators and physician groups are concerned about the quality of patient care delivered by APPs compared to physicians. However, these theoretical concerns have not proven to be justified in a number of studies directly comparing physician and APP care. Data concluded that there were minimal differences in quality of care and patient satisfaction (23-29). Both groups of healthcare providers improved their performance with measurement and ongoing assessments and guidelines for their respective continuing medical education goals. However as stated earlier, data collected to address this specific question concludes that with proper education, training, and collaboration the outcomes for APPs and physicians are the same. Lastly, a financial advantage for those considering a career in healthcare as an APP, is that there are significantly lower educational expenses (and thus lower potential educational debt) to train as an APP vs as a physician.

Global perspectives

Globally, PAs can practice in Canada, UK, The Netherlands, Liberia, India, Ghana, South Africa, Australia, Saudi Arabia, Germany, New Zealand, Afghanistan, Israel, Bulgaria, Ireland, Kenya. Each country has its own unique training program, certification, prescription rights, and salary. In 2000, all 50 US states authorized PA practice. PAs work in a wide variety of healthcare settings: hospitals (38.3%), 45.5% outpatient/clinics (45%), Urgent Care (6%), University (2.5%) and other settings (7%). PAs in the USA can pursue specialized accreditation in surgical subspecialties, primary care, Internal medicine subspecialties, Emergency Medicine and pediatrics.

In the rapidly aging Japanese society, a program was established in 2014 that enabled nurses to independently operate community-based home care centers (31). In Australia, indigenous people have voiced their desire to increase care from peer indigenous practitioners, at any or all levels (32). In Thailand, the Program of Higher Nursing Education Development was established in 1994 (33). This program focuses on training master and doctoral level nurse educators qualified to teach in Thai nursing programs as well as in various programs across 10 other countries in East and Southeast Asia. Nursing capacity in Africa and the Middle East has been strengthened by incorporating advanced teaching methodologies and curriculum development in such a way to ensure Rwandan ownership and "cultural humility" (34,35).

APPs at the Wisconsin Regional Medical Center, Milwaukee, Wisconsin, USA.

At our regional medical center in Milwaukee, Wisconsin, USA, APPs are utilized in almost all service lines and areas of patient care, including outpatient, inpatient, critical care, operating room, and procedural areas with current numbers approaching 700 total APPs. There is a wide variety of work that is done and with various levels of autonomy and collaboration within this academic medical institution. In this medical center, there is frequent rotation of physicians in the inpatient setting due to outpatient demands, academic requirements for physicians in training, research, and teaching responsibilities. APPs are heavily relied upon for the continuity of care they provide as predictable and regular medical providers. In the outpatient setting, APPs are valuable to improve access to care and decrease wait times for outpatient clinics. Critical care settings have recognized the immense value of staffing APPs 24 hours per day, 7 days per week, in order to improve patient care as

patient populations become more complex and resident trainees work hours become more restricted per educational policies. Many consult services providing specialty care to these complex patients have also recognized the utility of expanding their provider workforce with APPs.

APPs in Infectious Diseases

The need for specialty care of patients with infectious diseases differs greatly around the world. Data in the USA clearly demonstrates the added value of specialists trained in infectious diseases. Metrics for patients hospitalized with serious infectious diseases show that input provided by infection specialists decrease the length of hospital stays and improve outcomes of patients, especially with those suffering from bacteremia and gram-negative sepsis (36-42). The stresses placed on all healthcare institutions by the COVID pandemic underscored the need for specialized training in the treatment or prevention of infectious diseases.

The orchestration of smoothly operating teams of infectious disease specialists is considered essential to quality medical care, patient and student clinical education, prevention of infectious diseases and patient satisfaction. Within the Infectious Diseases subspecialty, our current structure has APPs working in both outpatient and inpatient settings. Figure 1 summarizes how APPs in infectious diseases are strategically utilized at Froedtert and Medical College of Wisconsin Regional Medical Center in Milwaukee, Wisconsin, USA.

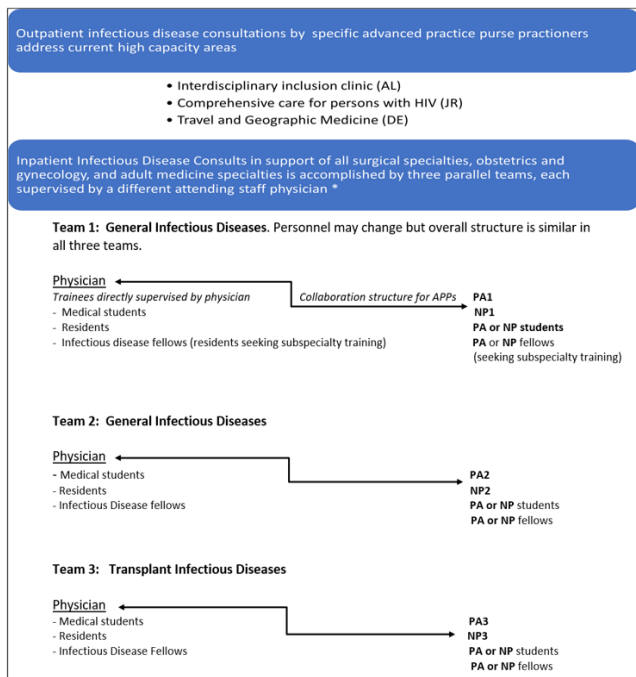


Figure 1. Infectious Disease team and collaboration structure*
 * All pediatric infectious disease consultations are made by separate pediatrics-infectious disease staff.

Inpatient infectious disease teams are comprised of physicians, medical students, resident trainees, infectious disease “fellows” (residents choosing to pursue additional training in infectious diseases), nurse practitioners and physician assistants, and corresponding NP/PA students and fellows. On the inpatient infectious disease consultative team, PAs and NPs work as peers

without any functional difference in day-to day responsibilities or tasks despite having different titles and educational training backgrounds. This is the case in most healthcare institutions within the US, as there are more similarities than differences when it comes to utilization of APRNs and PAs.

Conclusion

The complexity of healthcare challenges all leaders and stakeholders to respond through innovative, patient-centered approaches. The theoretical concerns about quality of care provided by APPs vs physicians have not proven to be justified in a number of studies. As the healthcare landscape evolves, the role of multidisciplinary teams including APPs has become vital to sustainable models of care. Appropriate integration of APPs within the clinical culture must come from policy makers and top-level leaders who are able to influence large groups and organizations (Figure 2). Leaders and policy makers must acknowledge both the relevance and the importance of having APPs to contribute to patient care and coordinate care as they have been trained to do (10). Wisur-Hokkanen et al. (2015) found that leaders who were less familiar with the role of APRNs and what they could offer to the healthcare provision process were less likely to support the APRN role (8). Policy makers and other high-level leaders are called to empower APPs through structural, legal and regulatory support, specifically pertaining to licensing and clinical practice. Tailored to specific needs within a clinical practice, available resources and cultural expectations of patients, APPs can play a critically important role in providing excellent health outcomes and continuity of care.

- Objective 1**
Optimize APP performance structure, quality benchmarks, skill mix, retention incentives and remedy for inefficiencies along with unequal distribution of services to facilitate universal health coverage.
- Objective 2**
Invest in APP human resources aligned to population health, labor market dynamics, educational policies, provider shortages and unequal distribution of workforce. Use of Incentives to slow workforce migration, continuing education flexibility and retention incentives for underserved communities.
- Objective 3**
Build capacity of institutions for effective public policy management of APPs as essential members of healthcare workforce. Include APPs in governance structure to maximize roles in patient care.
- Objective 4**
Improved data collection for human resource management. Inclusion of APP stakeholders in governance. Data collection for monitoring and accountability to include engagement of intersectoral stakeholders (e.g. consumers) along with leaders and APP voices.

Figure 2. Proposed expansion of the WHO nursing roadmap global strategy on human resources for health to include all advanced practice providers (APPs.) Adapted from the WHO Roadmap for Nursing (6).

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