

**ROSTER OF PA PROGRAM SPOKESPERSONS AVAILABLE TO RESPOND TO
QUESTIONS AT THE ACADEMIC AFFAIRS MEETING AT 3:00 PM ON APRIL 19**

	<u>Topic</u>
1. George C. Fuller, PhD, Dean College of Pharmacy and Allied Health Professions	Administration
2. Henry Wormser, PhD, Interim Director Physician Assistant Studies Program	Administration
3. Mohamed Siddique, M.D. Medical Director, PA Program	Training site issues
4. Robert Frank, MD, Assistant Dean for Curriculum, SOM	SOM Collaboration Quality of care issues
5. Barbara Wolk, PA-C, President of Michigan Academy of PA	State manpower issues
6. Robert Mack, MD, Assistant Dean for Clinical Affairs, SOM and Vice President Clinical Services for Detroit Medical Center	DMC manpower issues
7. Brian Trojniak, PA-C, Manager Allied Health Education Henry Ford Hospital	HFH manpower and training site issues
8. Kathleen Flannigan, PA-C Director Physician Assistants Grace Hospital, Former Full time Faculty U of D Mercy	DMC training site issues and curriculum
9. Harold Tyler, PA-C VA Hospital	VA training site issues
10. Stephanie Gilkey, PA-C Henry Ford Hospital	HFH training site issues
11. Ron Stavale, PA-C Coordinator, Medicine PA Service Harper Hospital	DMC training site issues

**Briefing Document on Key Issues
Related to a WSU Physician Assistant Program**

The proposal to create a new WSU Master of Science in Physician Assistant Studies is a market driven initiative based on the growing need for physician assistants in a changing health care system. The curriculum consists of multidisciplinary courses developed in collaboration with the School of Medicine. The Detroit Medical Center and Henry Ford Health System are partners in the program through direct financial support and as the initial base for experiential training. Supporting letters from The School of Medicine, The University of Detroit/Mercy, St. John Hospital, Providence Hospital and Macomb Hospital are appended.

Enclosed are two recent publications on the importance of physician assistants in a reforming health care system (JAMA 271:1266-1272, 1994) and the comparative numbers of physician assistants and compared to nurse practitioners (NEJM-331:1266-1271, 1994).

The following paragraphs are responses to frequently asked questions about the physician assistant program.

I. WHAT ARE PHYSICIAN ASSISTANTS?

Physician assistants are licensed health professionals who provide medical care under the direction and supervision of a physician. Physician assistants perform diagnostic, therapeutic, preventative and health maintenance services in any setting in which the supervising physician renders care. The services a physician assistant may provide are restricted to those delegated by the supervising physician and by the state licensure laws. Since physician assistants cannot practice independently of a supervising physician, they function as practice extenders for physicians.

II. WHERE ARE PHYSICIAN ASSISTANTS TRAINED?

Physician assistants were first educated at Duke University beginning in 1961 for students derived from the military medical corpsmen model. By 1993, there were 59 accredited physician assistant programs in the U.S. with an additional 4 programs in review. There are currently two physician assistant educational programs in Michigan: the University of Detroit/Mercy and Western Michigan University, both of which started physician assistant programs in 1972. Grand Valley State University plans to open a program in Fall, 1995, and Central Michigan University reports plans to open a program in Spring/Summer, 1996. Physician Assistants usually spend 12 months in an intensive didactic program and 12 months in supervised clinical rotations. The clinical rotations are required to include primary care, internal medicine, obstetrics and gynecology, surgery, pediatrics, emergency care, and psychiatry.

III. HOW DO PHYSICIAN ASSISTANTS DIFFER FROM NURSE PRACTITIONERS?

The practice of physician assistants and nurse practitioners differs philosophically. To oversimplify, physician assistants are educated for "dependent" practice relationships with a supervising physician, and nurse practitioners are educated to be independent practitioners whose licensure provides the opportunity to practice without physician supervision within their scope of practice. However, the tasks and activities of physician assistants and nurse practitioners overlap extensively.

IV. WHAT IS THE IMPACT ON LOCAL TRAINING ENVIRONMENT (SITES)?

The proposed physician assistant program will prepare entry level practitioners. To comply with accreditation standards, all students must rotate through specified clerkships with the intent that career focus and specialization will develop after graduation.

The experiential component of the physician assistant program consists of required clerkships with student placements made in groups of physician/physician assistant providers using the teaching rounds format in place at the academic medical centers. Nurse practitioner training programs are post graduate specialty master degree tracks preceptored through one-on-one relationships by nurse clinicians.

The difference in training structure and philosophy minimizes competition between physician assistant and nurse practitioners programs for training sites. The scope of the proposed program was developed using enrollment targets that avoid adverse impact on University of Detroit/Mercy training sites in Detroit Medical Center hospitals.

V. WHERE DO PHYSICIAN ASSISTANTS PRACTICE?

In 1993 approximately 46% to 53% of physician assistants practiced in primary care settings. The recent growing influence of managed care resulted in increased utilization of physician assistant in the outpatient setting. About 35% of physician assistants were employed in private physician practices and 28% practiced in hospitals. In recent years, the demand for physician assistants in specialty practices has also grown significantly.

VI. WHAT IS THE IMPACT OF PHYSICIAN ASSISTANTS ON ACCESS AND QUALITY OF HEALTH CARE?

Increased numbers of physician assistants and other primary care practitioners are generally viewed as an important cost-effective tactic for increasing access to health care. Although most quality assurance studies on patient outcomes are limited in scope, within their area of competence, "...physician assistant's have been shown to provide care indistinguishable in quality from care provided by physicians." (JAMA 371:1266-1271, 1994).

VII. ARE PHYSICIAN ASSISTANTS COST EFFECTIVE?

In 1993, the national average annual salary for physician assistants in all practice settings was \$53,500. Starting salaries in Michigan reportedly are in the range of \$45,000 to \$50,000 per year for both physician assistants and nurse practitioners.

Both physician assistants and nurse practitioners working in group practice settings have been found to improve the productivity of the medical practice.

VIII. WHAT IS THE NEED FOR PHYSICIAN ASSISTANTS?

A 1993 report by the Advisory Group on Physician Assistants in the Workforce, commissioned by the Council on Graduate Medical Education estimates that the nationwide demand for physician assistants will be between 55,000 and 60,000 in the year 2000. The projected supply of physician assistants, given current training programs, for the year 2000 was 37,000 to 42,000 practitioners, leaving a projected shortage of 13,000 to 23,000 physician assistants.

IX. HOW MANY PHYSICIAN ASSISTANTS ARE THERE IN THE U. S. AND IN MICHIGAN?

In 1993, there were approximately 27,400 graduates of physician assistants programs in the U.S., of which about 85% (23,000) were in active practice. There are 941 licensed physician assistants in Michigan (Table 1 Attached).

X. WHAT IS THE STUDENT INTEREST LEVEL?

Representatives of the two existing physician assistant programs in Michigan have indicated large numbers of applicants for admission. Western Michigan University reports approximately 700 applications for the 35 positions in each entering class of its baccalaureate program. University of Detroit/Mercy reports approximately 400 applicants for 45 positions in its Masters degree program. Nationally, there are approximately 7.5 applicants for each position.

The college of Pharmacy and Allied Health Professions has received over 300 requests for application to the proposed program without public announcement of the effort to secure approval of the program.

Table 1

Non-Physician Providers in Michigan

Figures obtained from Michigan Department of Commerce 10/26/94

<u>Professional Group</u>	<u># Reside in MI</u>	<u>#Reside Out/State</u>	<u>Total</u>
Certified Nurse Midwives	111	26	137
Certified Nurse Practitioners	659	49	708
Certified Reg. Nurse Anesthetists	1164	439	1603
Physician Assistants	852	89	941
Physician Assistant (temporary*)	50	5	55
TOTALS	2836	608	3444

* temporary status indicates these individuals are licensed to practice, but in a waiting period prior to board certification.

SUPPORTING LETTERS



Wayne State University

School of Medicine

Office of the Dean

Gordon Scott Hall of
Basic Medical Sciences
540 E. Canfield
Detroit, MI 48201
313.577.1335



September 14, 1994

George C. Fuller, Dean
College of Pharmacy and Allied Health Professions
Wayne State University
Office of the Dean
105 Shapero Hall
CAMPUS

RE: Support For Physician Assistant Programs

Dear George:

The purpose of this letter is to document my strongest support for your proposed Physician Assistant Program. We have met about this program repeatedly. I certainly believe that the School of Medicine, including a number of individuals other than myself, have had major input into the design of this excellent program.

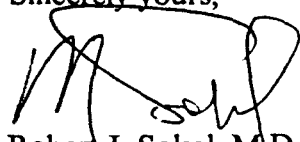
First let me point out that there is a real need for an additional Physician Assistant Program. There is only one in the local area, and the number of individuals who have graduated does not begin to meet local needs for the region, but more specifically for our own academic health system. Physician Assistants are widely used in support of both primary and sub-specialty care in the greater Detroit area.

The planned Clinical Medicine Didactic Course will be a team taught course coordinated by faculty in the PA Department. This will be done in a manner similar to our existing Pathophysiology courses, with the contents appropriately structured for School of Medicine faculty to lecture in their own specialty areas. We are also working out collaborative arrangements to include our Physical Diagnosis course. We hope to be able to include Physician Assistants in the course with our medical students using School of Medicine faculty and PA faculty as instructors. This would be coordinated in part, via our Department of Internal Medicine. I am aware that Dr. Richard Santen, our Chairman of Medicine, has appointed the Medical Director from his department who will be responsible for organizing your clerkships. This will be carried out with the other chairs of the Medical School clinical departments and with our DMC hospitals.

It has seemed to me from your very first proposal concerning this program that it fits the mission of the University extraordinarily well. There is a shortage of these individuals here in Detroit so that your program will help meet an acute work force shortfall. It will also help solve recruiting and retention problems for Physician Assistants in the Detroit Medical Center. Further, it seems clear to me that the Program is very consistent with the University's urban mission.

I certainly hope that it will be possible for your Program to be moved through the approval process without delay. There is certainly a need for your potential graduates.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'R. Sokol', written over a horizontal line.

Robert J. Sokol, M.D.
Dean, School of Medicine
Professor of Obstetrics and Gynecology

RJS/vmd



Post-it® Fax Note	7671	Date	4/13	# of pages	1
To	H. Woemser	From	Suzanne Warnimont		
Co./Dept.		Co.	PA Program		
Phone #		Phone #	966-1750		
Fax #		Fax #			

College of Health Sciences
Physician Assistant Program

April 13, 1995

Mohamed Siddique, M.D.
Medical Director
Wayne State University
Physician Assistant Program
Dept. of Medicine
Grace Hospital
6071 W. Outer Drive
Detroit, MI 48235

Dear Dr. Siddique;

On behalf of the University of Detroit Mercy Physician Assistant Program I wish to express my support of cooperative interactions with the Wayne State University Physician Assistant Program. The program faculty are excited about the possibilities of collaborating on expansion of educational resources, faculty development and future research projects. Many communities in Detroit and the state of Michigan lack access to health care providers. By working together, we will increase the impact Physician Assistants have on the communities most in need.

We look forward to working with you as your program develops and is implemented.

Sincerely;

Suzanne Warnimont, PA-C, MPH
Director, Physician Assistant Program

P.O. Box 19900
Detroit, Michigan 48219-0900
313-993-6057



**Macomb
Hospital Center**

11800 East Twelve Mile Road
Warren, Michigan 48093-3494
Office: (810) 573-5100
FAX: (810) 573-5541

**George P. Caralis
Administrator**

December 14, 1994

**Mohamed S. Saddique, M.D.
Medical Director
Wayne State University
Physician's Assistant Masters Degree Program
6071 West Outer Drive
Detroit, MI 48235**

Dear Dr. Saddique:

Macomb Hospital Center is pleased to support the clinical rotations in the second year of the WSU P.A. Masters Degree Program. Macomb Hospital Center could provide clinical rotations in the areas of Obstetrics & Gynecology, Family Medicine, Emergency Medicine, and General Surgery.

We look forward to working with you as this program is developed in the near future.

Sincerely,

**George P. Caralis
Administrator**

GPC:kh



Hospital and Medical Center

22101 Moross Road
Detroit, Michigan 48236-2172
(313) 343-4000

December 6, 1994

Mohamed S. Siddique, M.D.
Department of Internal Medicine
6071 West Outer Drive,
Detroit, Michigan 48235

Dear Dr. Siddique:

Please use this letter as verification of St. John Hospital and Medical Center's willingness to participate with Wayne State University for the purpose of providing selected clinical rotations for Physician Assistant students.

St. John Hospital and Medical Center can provide clinical rotations in the areas of Pediatrics, Internal Medicine, General Surgery, and Emergency Medicine. The potential exists for other select rotations to occur with the appropriate agreeance of both the school and the physician/department involved.

Sincerely,

A handwritten signature in cursive script that reads "Steven E. Minnick".

Steven E. Minnick, M.D.
Director, Medical Education

SEM/kfg

PROVIDENCE

Providence Hospital and
Medical Centers

16001 West Nine Mile Road
P.O. Box 2043
Southfield, Michigan 48037
(313) 424-3000

December 1, 1994


Mohamed S. Siddique, M.D.
Medical Director
WSU, PA Masters Degree Program
6071 West Outer Drive
Detroit, MI 48235

Dear Dr. Siddique,

Providence Hospital will support the clinical rotations in the second year for the PA Masters Degree Program. We will also be willing to jointly sponsor the PA Masters Degree Program with Wayne State University and other teaching hospitals.

If there is any other information that you need, please contact me.

Sincerely,


Thomas C. Gentile, Jr.
Assistant Director, Medical Affairs

TG/rer



Member of DAUGHTERS OF CHARITY NATIONAL HEALTH SYSTEM

PUBLICATIONS

Physician Assistants and Health System Reform

Clinical Capabilities, Practice Activities, and Potential Roles

P. Eugene Jones, PhD, PA-C, James F. Cawley, MPH, PA-C

NATIONAL efforts to reform the health care system will likely result in changes in the roles and responsibilities, practice combinations, and distribution of health professionals, including midlevel providers such as physician assistants (PAs), nurse practitioners (NPs), and certified nurse-midwives. Although recent studies have addressed differing scenarios of the projected roles of midlevel providers,^{1,4} implementation of initiatives that involve PAs may be influenced by an overall shortage of PAs, existing barriers to PA practice, and the need for commitment to physician-dependent practice relationships in a team-oriented health care delivery system. This article reviews the history, academic preparation, clinical capabilities, distribution, and practice activities of PAs and discusses the potential roles of PAs in the changing health system environment.

The origin of the PA can be traced to the new health practitioner movement of the 1960s, during which the PA concept emerged from a combination of events. As experienced hospital corpsmen and combat medics returned from service in Vietnam, there were no civilian job equivalents or suitable health career pathways in the United States. Simultaneously, a new health care provider model proposed in 1961⁶ resulted in the development of the first PA program at Duke University School of Medicine. According to this concept, PAs "would be trained to assist the doctor . . . in such a way as to facilitate better utilization of available physicians and nurses."⁷ These circumstances eventually resulted in the matriculation of sub-

stantial numbers of military veterans into newly developing PA programs. Subsequently, more PA programs were developed to train providers who would (1) augment the capabilities of primary care physicians by increasing access to basic medical care services, (2) fill service gaps resulting from geographic and specialty maldistribution of physicians, and (3) help control health care costs.^{8,9}

PA EDUCATION

By 1993, there were 58 accredited PA programs in 29 states and the District of Columbia and 27 403 program graduates.^{10,11} With the exception of a few hospital-, military-, and community college-based programs, the majority of PA programs are affiliated with academic health centers (AHCs), medical schools, or 4-year colleges and universities, 26% of which are classified as category I research universities by the Carnegie Foundation for the Advancement of Teaching.¹² Thirty-five PA programs (60%) offer a baccalaureate degree or degree option, 12 (21%) offer master's degrees, and the remainder grant an associate degree or a certificate of completion.

Essentials for PA Education

The "Essentials of an Approved Educational Program for the Assistant to the Primary Care Physician" were initially adopted in 1971 by the American Medical Association in collaboration with the American Academy of Family Physicians, the American College of Physicians, the American Academy of Pediatrics, and the American Society of Internal Medicine.¹³ Following the organization of the Committee on Allied Health Education and Accreditation in 1977, the Essentials were revised in 1978, 1985, and 1990. The Essentials establish minimum standards of quality to which accredited programs are held accountable. After the Essentials initially were adopted, federal funding acts supported the expansion of PA educational pro-

grams' emphasis on a primary care orientation for preparing generalist PAs.¹⁴

According to the current Essentials of the Committee on Allied Health Education and Accreditation, PAs are "academically and clinically prepared to provide health care services with the direction and responsible supervision of a doctor of medicine or osteopathy. The functions of the physician assistant include performing diagnostic, therapeutic, preventive and health maintenance services in any setting in which the physician renders care, in order to allow more effective and focused application of the physician's particular knowledge and skills."^{15(p8)}

Clinical services performed by PAs are described by the Essentials in the following six categories^{15(pp6-7)}: (1) evaluation—initially approaching a patient of any age group in any setting to elicit a detailed and accurate history, perform an appropriate physical examination, delineate problems, and record and present the data; (2) monitoring—assisting the physician in conducting rounds in acute and long-term inpatient care settings, developing and implementing patient management plans, recording progress notes, and assisting in the provision of continuity of care in office-based and other ambulatory care settings; (3) diagnostics—performing and/or interpreting, at least to the point of recognizing deviations from the norm, common laboratory, radiological, cardiographic, and other routine diagnostic procedures used to identify pathophysiological processes; (4) therapeutics—performing routine procedures such as injections, immunizations, suturing and wound care, management of simple conditions produced by infection or trauma, and assistance in the management of more complex illness and injury, which may include assisting surgeons in the conduct of operations and taking initiative in performing evaluation and therapeutic procedures in response to life-threatening situations; (5) counseling—instruction

From the Physician Assistant Program, Department of Health Care Sciences, University of Texas Southwestern Medical Center at Dallas (Dr Jones), and the Physician Assistant Program, Department of Health Care Sciences, The George Washington University, Washington, DC (Mr Cawley).

Reprint requests to University of Texas Southwestern Medical Center at Dallas, 5323 Harry Hines Blvd, Dallas, TX 75235-9090 (Dr Jones).

and counseling of patients regarding compliance with prescribed therapeutic regimens, normal growth and development, family planning, emotional problems of daily living, and health maintenance; and (6) *referral*—facilitating the referral of patients to community health and social service agencies when appropriate.

Curriculum Content

Prior to matriculation, the typical PA program requires the student to have completed the equivalent of 2 years of undergraduate-level biological, social, and behavioral science prerequisites. The first 9 to 12 months of PA education are devoted to preclinical didactic studies and include courses in anatomy, physiology, microbiology, pharmacology, psychology, clinical medicine, physical diagnosis, preventive medicine, and clinical laboratory procedures.¹⁶ Courses in the basic medical sciences account for 77% of the didactic component of PA education, with the remainder devoted to behavioral and social sciences. Educational programs for PAs average more than 1004 contact hours of didactic instruction.¹⁷ These courses are typically followed by 9 to 15 months of physician-supervised clinical education in both inpatient and outpatient settings in urban, inner-city, and rural communities.

In some AHCs, didactic PA education and medical student education is conducted with shared classes and resources, and PA students typically are educated in a clinical setting by residents, attending physicians, and graduate PAs. Most programs include supervised clinical educational experiences for PA students in rural or medically underserved areas. In addition, several hospital- and university-based postgraduate courses of instruction exist in medical and surgical specialties such as neonatology, pediatrics, emergency medicine, occupational medicine, and surgery.

Primary Care Deployment Models

A number of PA programs have developed specialized curricula designed to promote primary care practice in underserved communities, including content on substance abuse education for health professionals, geriatrics, mental health, health care for the homeless, women's health initiatives, environmental/occupational medicine, medical Spanish, and a general orientation toward prevention in the delivery of health care.¹⁴ Many programs have successfully placed graduates in chronically underserved areas via decentralized educational projects.^{12,13} For example, participants in the Stanford University Primary Care Associate Program were twice as likely to be employed

in rural communities (<10 000 population) as nonparticipants (33% vs 16%).¹⁸ A 1992 survey of participants in the University of Nebraska PA Program's Rural Health Opportunities Project revealed a similar graduate employment rate (33.4%) in communities with fewer than 10 000 population.²¹ More recently, a satellite educational project developed by the University of Washington—MEDEX Northwest Physician Assistant Program provides on-site didactic and clinical education for rural and Native Alaskan matriculants in Sitka, Alaska, and additional MEDEX Northwest projects link the University of Nevada and Boise State University with area health education centers for rural PA deployment.

Several PA programs have developed master's degree majors for PAs who will serve underserved populations and areas of special need. Graduate PA programs in rural health are offered at Alderson-Broaddus College in Philippi, WV, and the University of Nebraska—Omaha. Public health education is offered in combined PA/MPH programs at The George Washington University, Washington, DC, and the University of Oklahoma in Oklahoma City, and a combined PA/MS degree in preventive medicine is offered at the University of Iowa in Iowa City.

AHC-Affiliated PA Programs

Of the 58 accredited primary care PA programs, 27 (47%) are sponsored by AHCs. Twice as many AHC-based PA programs receive federal grant support as non-AHC-based programs, and at a 12% greater dollar amount than non-AHC-based PA programs. Because federal PA training grants are tied to demonstrated success in primary care education and graduate placement in health professional shortage areas, it follows that AHC-sponsored PA students spend more time in primary care-based clinical education and are employed in primary care settings at a greater rate than non-AHC-sponsored students.²² Consequently, AHC-based PA programs may be better positioned than non-AHC-based programs to contribute to the goals of the Health of the Public Program²³ by providing interdisciplinary didactic and clinical education in population-based competencies, by continuing emphasis on health promotion and disease prevention activities,²⁴ and through PA faculty service and student rotations that augment community access to health care services.

Funding Sources

In 1993, 33 PA programs received a total of \$6.65 million in federal training support under Title VII authorization

through the Health Resources and Services Administration Grants Program for Physician Assistants of the Public Health Service, administered by the Division of Medicine. In the same year, the mean PA program budget was \$457 000 and the average Title VII grant award was \$143 000, which accounted for 28% of program operating costs.²² Fiscal year 1995 authorization is \$9 million.

Title VII funding preferences and priorities for PA program education grants have traditionally emphasized primary care education and deployment, affiliation with graduate programs in family medicine, and strategies for increased enrollment and retention of underrepresented minorities. Funding preferences and priorities for the fiscal year 1994 application cycle address medically underserved community practice, generalist specialty practice, and increased enrollment of minorities or low-income applicants.

From the inception of PA educational programs, internal support from sponsoring institutions has increased steadily while external (primarily federal) support has remained at about one third of total program revenues. This trend reflects increasing self-sufficiency on the part of PA programs, because the level of federal support during the past 7 years has remained relatively constant.

The overall cost of PA education remains relatively low. The average total cost for educating a PA student is approximately \$8029 per year at AHC-sponsored programs and \$7546 per year at non-AHC-sponsored programs.²²

Response to Federal Initiatives

Educational programs for PAs have responded to federal grant initiatives by specifically targeting curriculum content toward primary care for medically needy populations. This includes special focus on topics such as the acquired immunodeficiency syndrome, substance abuse, adolescent pregnancy, childhood immunizations, risks of cancer and heart disease, and reduction of infant mortality. More than half of all PA programs have developed specific educational content to address the health and medical problems of inner-city populations. Most PA programs have developed strong linkages with area health education centers, community education centers, rural health clinics, community/migrant health centers, and other primary health care agencies and settings. Fellowships for PAs in migrant health centers are jointly sponsored by the Health Resources and Service Administration, National Rural Health Association, American Academy of Physician Assistants, and Association of Physician Assistant



Table 1.—Physician Assistant Specialty Distribution, by Percentage, 1974 Through 1993*

Specialty	1974 N=939	1978 N=3416	1981 N=4312	1984 N=6552	1987 N=10 692	1993 N=14 746
Family practice	43.6	52.0	49.1	42.5	38.7	34.5
General internal medicine	20.0	12.0	8.9	9.2	9.5	9.5
General pediatrics	6.2	3.3	3.4	4.1	4.0	2.3
General surgery	12.1	5.5	4.6	5.1	8.8	6.4
Surgical specialties	6.8	6.2	7.7	12.5	13.8	20.6
Medical specialties	3.9	6.3	2.7	4.8	7.1	6.0
Emergency medicine	1.3	4.9	4.5	6.4	6.5	8.2
Occupational medicine	1.8	2.7	3.1	4.1	4.1	3.1
Other†	4.3	7.1	18.0	11.3	7.5	9.4

*Sources of data are references 10 and 29.

†Other includes pediatric specialties, physical and rehabilitation medicine, psychiatry, public health, and radiology (all <1%); 3.3% were not identified.

Programs to promote PA practice in migrant health settings.

Faculty

Educational programs for PAs experience difficulty in identifying, recruiting, educating, and retaining sufficient numbers of qualified faculty members. The combination of an enlarging applicant pool, pressure to increase the number of PAs trained per program, and an increasing number of clinical employment opportunities has resulted in an "academic hourglass" effect, further complicated by an already insufficient supply of experienced PA educators. Because of the disparity between academic and clinical income potential, faculty positions designed as joint teaching-practicing clinician positions are commonplace means of income supplementation. Sixty-nine percent of PA faculty are concurrently engaged in part-time clinical practice, averaging 10 hours per week, earning an average wage of \$26.29 per hour.²⁵

As with most professional schools, no formal pathway exists for PA-specific educator training. Clinically experienced PAs are typically self-referred or recruited into PA education, usually with little or no formal preparation in the foundations of educational theory and practice.²⁶ Of the PA program personnel identified as faculty in 1993, 13.6% held doctorate degrees, 35.2% held master's degrees, and 49.2% held bachelor's degrees. The remaining 2% held associate degrees (1%) or were not reported.²²

Applicants and Students

As with other health professions, interest in PA education continues to increase. In 1988, PA programs averaged 86.1 applicants for 25.9 seats. By 1992, the number of applications increased to an average of 203 per PA program (an increase of 136%), and the number of enrolled students increased to 35 per program.²² Preliminary reports of the 1994 applicant pool indicate that many programs have nearly twice the number of applicants compared with 1993.

The typical student entering PA training is a 26-year-old white woman with a 3.1 grade point average and more than 4 years of previous health care experience. Since 1984, women have constituted more than 60% of enrolled PA students, and since 1987, ethnic minorities have represented about 20% of matriculants. Most students enter PA education with either a baccalaureate degree or substantial course work in the premedical sciences. An increasing number of matriculants (7.2% in 1993) hold master's or doctoral degrees.²⁵

CLINICAL SERVICES AND SETTINGS

At present, approximately 23 350 PAs are employed in clinical practice in 49 states and the District of Columbia. Trends in practice patterns of recent PA program graduates reveal increased numbers in inpatient and institutionally based settings and, until recently, fewer entering primary care practice. In 1993, 44% of PAs were employed in primary care settings, defined as family or general practice, general internal medicine, or general pediatrics (Table 1). The largest share, 34.5%, worked in family or general practice.¹⁰ The 28% of PAs employed by hospitals included more than 6% in outpatient clinic practice (Table 2).

The distribution of PA practice settings is geographically disproportionate. Fewer recent graduates of PA programs in eastern states entered primary care practice settings (54.4%) compared with graduates in central (73.8%) and western states (70%). Seventeen percent of PAs practice in communities with a population of fewer than 10 000, and 34% practice in communities with a population of fewer than 50 000. More than 86% of all graduate PAs remain in full-time clinical practice.¹⁰

Changing Profiles

The demographic profile of PAs has changed markedly since the profession's inception. Although it remains a relatively young profession (the mean age of PAs is 40 years), the proportion of women

PAs is now more than 42%, increasing from less than 10% in the 1970s. Almost 10% of PAs are ethnic minorities, and more than 32% are military veterans.¹⁰

Nearly 35% of all PAs are employed in private physicians' practices (either solo or group) and 28.5% practice in hospitals, with other PAs distributed in health care settings such as managed care organizations (7.3%), the military (4.6%), rural clinics (4.7%), Department of Veterans Affairs facilities (4.2%), and correctional facilities (2.5%). The remainder practice in nursing homes, inner-city clinics, and other clinical settings. Notable employment trends reveal fewer PAs in family medicine and more PAs in medical and surgical subspecialties (Table 1). The proportion of PAs employed in hospital settings reflects a relatively stable distribution over the past decade (Table 2).²⁷

While PA practice settings continue to diversify, the largest percentage remain employed in primary care. A number of the same socioeconomic factors that discourage physicians from practicing primary care may influence PA employment decisions as well.⁸ Despite the fact that most PAs are in primary care practice, it is clear that specialty and institutional employers are competing for PA services, and the patterns of diversification and specialization of PA employment further complicate an imbalanced educational supply and occupational demand mismatch.²⁸

Income

As demand for PA services has grown, salaries in both primary care and specialty settings have increased accordingly. In 1993, the mean annual salary for PAs in all practice settings and specialties was \$53 500, excluding fringe benefits and part-time income. Those employed in surgical specialties earned an average of \$60 800 per year.²⁹ In a 1991 study of 6228 PAs, with the exception of those in practice less than 1 year, salaries among men were approximately \$5000 greater than among women, even after controlling for clinical specialty, number of years in practice, number of patient visits per week, and number of hours worked per week.³⁰

PA Productivity and Cost-effectiveness

The potential roles to be assumed by PAs in health system reform will likely correlate with their productivity and cost-effectiveness. Outcomes will differ from practice to practice, depending on variables such as the specialty, setting, and barriers to employment. The productivity and cost-effectiveness of PAs have been described and measured by the time spent per visit, average num-

Table 2.—Trends in Physician Assistant Practice Settings, by Percentage, 1981 Through 1993*

Practice Setting	1981 N=4312	1984 N=6552	1987 N=3309	1993 N=14 746
Private office†	35.8	34.5	33.2	34.6
Hospital	29.5	31.3	28.6	28.5
Ambulatory clinic‡	24.9	17.7	17.0	20.4
Health maintenance organization	NA§	NA	6.9	7.3
Military	9.4	7.3	7.6	4.6
Other¶	0.4	9.2	6.7	4.6

*Sources of data are references 10 and 29. Data for 1987 are from reference 29 only.

†Either solo or group practice.

‡Includes community-based public, privately sponsored, inner-city, substance abuse, student health, correctional medicine, and rural health clinics.

§NA indicates not available.

¶Other includes Veterans Affairs (4.2%) and nursing homes (0.4%).

ber of visits per unit of time, number of office visits or procedures, charges generated, overhead reduction, and increased physician activity.⁴²¹⁻²⁴ In 1993, outpatient-based PAs saw an average of 22.1 patients per day, compared with an average of 15.7 patients per day for inpatient-based PAs.¹⁰ Although many variables are influenced by the actual practice setting, the evidence suggests that physicians can increase their practices' output by employing PAs, and PAs "are capable of carrying substantial proportions of the workloads of primary-care physicians."^{44(p43)}

Quality of Care

Indicators of the quality of care provided by PAs have been measured by comparing processes and outcomes between physician- and PA-provided care with regard to functions performed by both. Within their areas of competence, PAs have been shown to provide care indistinguishable in quality from care provided by physicians.⁴⁵ Indirect indicators of quality, such as physician acceptance and patient satisfaction, have also been favorable.^{36,37} However, existing quality-of-care studies of midlevel providers have recently been criticized for being dated and methodologically flawed.³⁸ The need for current data derived by rigorous health services research methods is clearly indicated.

Responsibility and Accountability

State legislation governing PA scope of practice exempts PAs from the unlicensed practice of medicine with the stipulation that they function under the supervision of a licensed physician. Legally, the physician-PA relationship is one of *respondent superior*, wherein the physician is liable for exercising care in the selection and supervision of the PA, has the right of control of the assistant, and is "liable for the negligent acts of employees performed within the scope of the employment relationship."^{39(p102)} Although the supervising physician retains "vicarious liability," PA practice accountability has progressed from a delegatory

model achieved by amending medical practice acts to a regulatory/authority model, wherein state licensing boards are authorized to govern PA practice. These amendments and exemptions establish PAs as the agents of their supervising physicians, and PAs maintain direct liability for the services they render to patients. Supervising physicians, who define the standard to which PA services are held, are vicariously liable for services performed by their PAs under the doctrine of *respondent superior*.

COMPARING PAs AND NURSE PRACTITIONERS

A recent study estimated there are 27 226 NPs, distinguished from other registered nurses by state boards of nursing data. Exact numbers are unknown because of overlapping NP titles, specialty practice roles, and differing state requirements for NP education and accreditation.⁴⁰ The majority of NP practice settings were reported in family and adult medicine, pediatrics, and women's health.

A 1993 study of 51 midlevel provider educational programs (22 NP, 20 PA, two combined PA/NP, and seven certified nurse-midwife programs) compared legal, professional, and political differences between PAs and NPs.¹⁹ Although varying degrees of differences and similarities were reported between PA and NP educational programs, the main distinction in their orientation to health care is that NP programs are typically set within schools of nursing, with education provided in the nursing model. In contrast, PA programs are typically affiliated with medical schools, with education provided primarily by physicians. However, these differences are less distinct in some regards; physicians contribute to NP education, and NP and PA educators often "cross-teach" between and among programs. In California, two programs jointly train PAs and NPs within the same department, and approximately one third of California PAs are also nurses.⁴¹

Although PA and NP clinical roles within managed care organizations and

ambulatory settings are often regarded as interchangeable, reports comparing PA and NP productivity have differed in their findings. One study reported that both groups saw similar numbers of ambulatory adult patients in a large managed care setting,⁴² whereas another reported that PAs had more direct patient encounters and generated twice the gross dollar income per day when compared with NPs.⁴³ These differences were not fully accounted for but were partially attributed to the tendency for NPs to spend more time providing counseling services. Debate continues on the practice productivity advantages and disadvantages between PAs and NPs, but researchers appear to agree that the potential for increased productivity for both groups is greater in larger practices and managed care settings. Nevertheless, both PAs and NPs directly reflect physician levels of task delegation in their clinical productivity.⁴

The practice of PAs is regulated under states' Medical Practice Act provisions and is based on physician supervision and task delegation, whereas NPs practice under nursing licensure provisions of Nurse Practice Acts. Research evidence clearly shows that the tasks described and roles performed by PAs and NPs are more similar than different in many ambulatory practice settings, but two major issues serve to differentiate the professions: (1) their general orientation to health care and (2) the desire for independent (NPs) vs dependent (PAs) practice relationships with physicians.⁴⁴ This divergence may have important implications for both professions if health reform measures include greater roles for PAs and NPs in private practices, managed care systems, and institutional settings.

POTENTIAL ROLES OF PAs

Under federal aegis, increasing attention is now focused on a generalist-provider-oriented system of health care. However, the projected roles of PAs in such a system are still undetermined. According to the US Public Health Service, PAs "have become firmly established as a provider group well suited to address problems of maldistribution of physicians and enhancing cost-effectiveness of care," and increasing demand for PA services was attributed to the revitalization of the National Health Service Corps, liberalization of authority to prescribe, and the increased use of PAs in hospital-based settings as a means of cost-control.^{45(p7)} What remains to be seen is the level of demand and the clinical practice settings in which PA services will be required.

The federal government reinforces the

primary care focus of PA program curricula by awarding Title VII training grants for programs demonstrating a record of successfully meeting primary care-oriented funding preferences and priorities. However, the possible redistribution of medical and surgical subspecialty residency educational positions recently recommended to Congress by the Physician Payment Review Commission (PPRC) and the Council on Graduate Medical Education may result in increased use of PAs and other midlevel providers in inpatient specialty settings. This may occur as a result of a PPRC-projected loss of 11 000 residency slots.⁴⁶ Among the PPRC recommendations was a call for increased funding for specialty-trained PAs and other midlevel providers to maintain levels of inpatient care previously provided by residents. Another report reinforced this proposal, suggesting a need to determine "the extent to which nurse practitioners and physician assistants can substitute for and enhance both generalists and specialists. . . ." (p.1073)

The PA profession realizes increasing opportunities in medical and surgical specialty practice, and the 77% of PA programs that are federally funded are obligated to maintain generalist-based curricula. Although many newly graduated entry-level PAs are initially employed in specialty settings, the more plausible solution to the potential demand for more specialty-trained PAs may be to increase the number of postgraduate and master's level specialty programs. The projected number of PAs who will graduate in 1994 is 2100. If Title VII educational grants increase as projected, approximately 3300 PAs would graduate in 1996, followed by 3800 graduates in 1997. The annual PA graduation rate would increase to approximately 4000 by the year 2000, resulting in a total of approximately 41 000 PAs in practice. This number includes the assumption of a 1% to 3% attrition rate and the remaining years of expected practice, given the mean PA age of 40 years.⁴⁷ However, the distribution of PA practice settings will likely be influenced by a combination of market forces and reform initiatives.

Hospital-Based PAs

As the proportion of PAs working in primary care practices declined during the 1980s, the proportion of hospital-based PAs remained relatively stable. However, the distribution of PAs within hospital settings has changed, from fewer PAs in hospital-based outpatient clinics to more PAs in inpatient service roles. While PAs employed in the surgical subspecialties increased from 7.7%

in 1981 to 21.7% in 1993, PAs employed in hospital settings ranged between 28% and 31.3% (Table 2). By 1992, 48.6% of practicing PAs indicated at least some inpatient care responsibility.⁴⁸ In many teaching hospitals, a combination of residency program retrenching, curtailed availability of international medical graduates, and cost-control measures has contributed to expanded inpatient roles for PAs. As a result, PA use in inpatient care roles in a wide variety of hospital settings has become commonplace.

A recent study of 1690 hospital-based PAs revealed that 45% held the job title of or were identified as "house officers." More than 90% had formal medical staff privileges and were credentialed under hospital bylaws. Their practice distribution included 19.4% in surgical subspecialties, 18.6% in medical specialties, 14.8% in emergency medicine, and 9.5% in general surgery.⁴⁸ Although the study was inconclusive in determining the levels of resident physician/house officer substitution performed by hospital-based PAs, the authors recognized the need for additional PA education in liability protection and risk management and additional research in levels of responsibility, outcomes, and privileging issues.

PAs and Managed Care

The increasing management by for-profit corporations and the economies of scale realized by capitated managed care organizations require careful cost-benefit considerations in provider ratio and distribution decisions. However, many variables contribute to differing levels of PA role and distribution settings within managed care organizations. Although managed care PAs assume a range of duties in a variety of clinical settings, it appears that physician attitudes toward PAs play a major role in staffing decisions; thus, midlevel provider distribution among similar settings within the same organization can differ significantly.⁴⁹

In ambulatory managed care settings, PAs have been shown to be capable of handling approximately 80% of the health care services required to manage patient problems at physician-equivalent levels of patient satisfaction and quality of care.⁴⁹ This finding is consistent with observations made in rural private practices, urban ambulatory care clinics, and geriatric settings.¹⁹ In a large group-model health maintenance organization, physicians and PAs were found to see a similar number and type of adult ambulatory patients on an hourly, daily, and annual basis, and PAs were employed at approximately 50% of physician costs.⁴⁹ However, additional and more recent data are needed to determine frequency and appropriateness of

PA consultation and referral activities, prescribing habits, rate and frequency of patient return visits, comparable degrees and mix of patient difficulty, and the amount of "nonbillable" physician time spent in consultation and supervision of PAs within such settings. In the absence of these data, the evidence indicates that, in organized ambulatory care practices where team approaches and structured division of staffing are present, PA clinical productivity compares favorably with that of physicians.⁴⁹

BARRIERS TO PA PRACTICE

In 1993, PAs were recognized as health care providers by the medical licensing boards of 49 states and the District of Columbia; Mississippi is the only state that does not recognize PAs. State legislative and regulatory agencies maintain control over the patterns of utilization of PAs through their authority to license and regulate the profession. Barriers to enhancing the use of nonphysician health care providers were recently reported as professional territorialism, licensure restrictions, educational isolation, physician resistance, and institutional inertia.³ These barriers vary geographically, as well as between and among differing nonphysician provider professions. As a means of reducing these barriers and encouraging change in health care delivery, the Office of the Inspector General called for an increased emphasis on supervisory and management skills in curricula for health care educational institutions and the development of cooperative practice models among different health care professions. A combination of population demographics and regulatory and reimbursement policies appears to have the greatest influence on PA practice favorability, particularly in states with disproportionate rural or medically underserved communities. However, current data that more clearly define regional and national barriers to PA practice are needed if health system reform plans include an increased use of PAs.

PA Supervision

The physician-PA employment relationship has been and is intended to remain a dependent one. The fundamental elements of PA practice (use of a referral system, frequent consultation, and periodic review) are said to be synonymous with a well-designed health system.⁵⁰ The PA's ability to consult with and refer to the supervising physician is the key factor to a successful workplace relationship, and studies suggest that the task delegation and supervision behaviors of the physician have the greatest influence on PA clinical productivity.⁵¹ Geographic practice isolation in rural and frontier

residents to the roles, functions, and capabilities of the physician-PA team in educational settings might reduce the existing degree of reluctance to "work together in well-integrated teams to enhance the quality and availability of cost-effective patient care," as called for by the American Boards of Family Practice and Internal Medicine.^{56(p115)}

While the PA profession acknowledges

the importance of working closely with physicians, the trend of increasing specialty practice of PAs is a topic of ongoing debate between generalist and specialty PAs.⁵⁶⁻⁶⁰ Some generalist PAs are critical of the splintering effect of professional alignment with specialty groups, whereas some specialty PAs berate their reluctance to expand with the job market. Notwithstanding the specialty vs pri-

mary care rift within the PA profession, national health system reform measures will help determine whether PAs will continue to gain acceptance and legitimacy. Although the PA profession is faced with several obstacles to growth and expanded provider roles, success or failure in a changing environment will be measured by the profession's ability to meet the needs of the medical marketplace.

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SPECIAL ARTICLE

STATE PRACTICE ENVIRONMENTS AND THE SUPPLY OF PHYSICIAN ASSISTANTS, NURSE PRACTITIONERS, AND CERTIFIED NURSE-MIDWIVES

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Abstract Background. Most proposals to increase access to primary care in the United States emphasize increasing the proportion of generalist physicians. Another approach is to increase the number of physician assistants, nurse practitioners, and certified nurse-midwives.

Methods. We analyzed variations in the regulation of nurse practitioners, physician assistants, and certified nurse-midwives in all 50 states and the District of Columbia. Using a 100-point scoring system, we assigned numerical values to specific characteristics of the practice environment in each state for each group of practitioners, awarding a maximum of 20 points for legal status, 40 points for reimbursement for services, and 40 points for the authority to write prescriptions. We calculated coefficients for the correlation of summary measures of these values within states with estimates of the supply of practitioners per 100,000 population.

Results. There was wide variation among states in both practice-environment scores and practitioner-to-population ratios for all three groups of practitioners. We found

positive correlations within states between the supply of physician assistants, nurse practitioners, and certified nurse-midwives and the practice-environment score for the state (Spearman rank-correlation coefficients, 0.63 [$P < 0.001$], 0.41 [$P = 0.003$], and 0.51 [$P < 0.001$], respectively). Positive associations were also found in the states between the supply of generalist physicians and the supply of physician assistants ($r = 0.54$, $P < 0.001$) and nurse practitioners ($r = 0.35$, $P = 0.014$). Nevertheless, in the 17 states with the greatest shortages of primary care physicians, favorable practice-environment scores were still associated with higher practitioner-to-population ratios for physician assistants ($r = 0.68$, $P = 0.003$), nurse practitioners ($r = 0.54$, $P = 0.026$), and certified nurse-midwives ($r = 0.42$, $P = 0.09$).

Conclusions. State regulation of physician assistants, nurse practitioners, and certified nurse-midwives varies widely. Favorable practice environments are strongly associated with a larger supply of these practitioners. (N Engl J Med 1994;331:1266-71.)

MOST proposals to increase access to primary care in the United States emphasize increasing the proportion of generalist physicians.¹⁻⁵ Another approach is to increase the number of other practitioners — specifically, physician assistants, nurse practitioners, and certified nurse-midwives.⁶⁻⁹ Within their areas of competency, and with appropriate training and supervision, these practitioners may provide medical care similar in quality to that of physicians and at less cost.¹⁰⁻¹⁵ These practitioners may be especially valuable in areas where there are shortages of primary care physicians. Yet state legislation and regulation may discourage or prevent them from seeking employment, even when jobs would otherwise be available. To understand the relation between states' practice environments and the supply of these practitioners, we analyzed variation in the regulation of nurse practitioners, physician assistants, and certified nurse-midwives in all 50 states and the District of Columbia (which, for the purposes of this analysis, we considered a state).

Although the education, licensure, and regulation of nurse practitioners and physician assistants differ, many have similar job descriptions.¹⁶ They diagnose illness, perform physical examinations, order and in-

terpret laboratory tests, establish and carry out treatment plans, suture wounds, and provide preventive health services. Each profession is about 25 years old in the United States. Physician assistants are salaried employees who by law must work under the supervision of a physician. Of the 22,300 physician assistants practicing in 1992, 44 percent worked in primary care specialties, and another 8 percent were in emergency medicine. The majority were educated in two-year training programs. About 34 percent of physician assistants worked in rural areas.¹⁷

In some states, nurse practitioners can establish independent practices and be reimbursed directly for their services. Because the states have no common definition of nurse practitioners, estimates of their number vary widely. Through 1992, about 42,600 employed registered nurses had received formal training as nurse practitioners beyond their professional education as nurses¹⁸; estimates of the number practicing as nurse practitioners ranged from 21,900¹⁹ to 27,200.²⁰ The majority were educated in certificate programs averaging about one year in length; 4 of every 10 had master's degrees. About three quarters were in primary care. Eighteen percent of nurse practitioners worked outside metropolitan areas in 1992.¹⁹

Certified nurse-midwives are registered nurses with advanced education in the provision of prenatal, perinatal, postpartum, newborn, and routine gynecologic care. About 61 percent had master's degrees in 1991.²¹ Since 1971, national certification as a nurse-midwife has required graduation from an accredited program for nurse-midwifery and the passing of an

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examination administered by the American College of Nurse-Midwives. In 1992, 43 states recognized certified nurse-midwives in their statutes or regulations.²² About half of all states allowed direct reimbursement for the services of a certified nurse-midwife. In 1992, between 3500 and 4300 certified nurse-midwives were eligible to practice in private offices, community health centers, free-standing birthing centers, and other health care settings²³ (and unpublished data). Certified nurse-midwives attended 4.1 percent of all deliveries in the United States in 1991.²⁴ Between 11 and 22 percent practiced in rural areas.^{13,24}

METHODS

Practice environments in the states were assessed by reviewing journal articles and legislation and by consulting with researchers, legal scholars, and professional organizations. In all jurisdictions, information was sought about conditions in 1992. Specific criteria are shown in Table 1.

A 100-point scoring system was constructed for each group; a maximum of 20 points was allocated if practitioners had legal status as professionals, 40 points if reimbursement for their services was required, and 40 points if they had the authority to write prescriptions. More weight was given to the second and third categories because the simple recognition of professional identity entailed in the conferring of legal status alone was considered less important; however, when equal weight was given to each of the three major categories, the results did not change substantially. Points were allocated within each category and then totaled. A score of 100 represented the most favorable environment, and a score of 0 the least favorable. The assessment was performed consistently for all the states in a given discipline, but the actual criteria for the disciplines varied because of professional and regulatory differences. Thus, comparison of scores between states is more appropriate within a discipline than between disciplines.

The practice environments for physician assistants were quantified primarily on the basis of information from the American Academy of Physician Assistants²⁵ and other published studies.^{8,26} The practice environments for nurse practitioners were quantified on the basis of information from published studies.^{15,27} The practice environments for certified nurse-midwives were quantified on the basis of information from the American College of Nurse-Midwives^{23,28} and a survey by the Office of the Inspector General of the Department of Health and Human Services.²¹ Supplemental information on all three groups of practitioners was obtained from the 1993 annual report of the Physician Payment Review Commission.⁴

Estimates of the supply of nonphysician practitioners in each

state were obtained from various sources (Table 2). The estimates of 27,200 practicing nurse practitioners and 4300 certified nurse-midwives were the only available estimates that provided state-specific figures. The estimates of the number of physician assistants do not include federal employees. The supply of generalist physicians was estimated as the total number of nonfederal allopathic physicians actively involved in patient care who designated themselves as being in general practice, family practice, general internal medicine, or general pediatrics in the 1992 Area Resource File.²⁹ Practice-environment scores and estimates of the supply of practitioners were calculated independently. Data from the Bureau of the Census on state populations in 1992 were obtained from the American Medical Association.³⁰ Estimates of the percentage of each state's population that was living in areas designated as having a shortage of primary care were obtained from the Bureau of Primary Health Care of the Department of Health and Human Services.³¹

Because the practice-environment scores we developed had non-normal distributions, they were analyzed with nonparametric methods. States were ranked according to their practice-environment scores and the number of practitioners per 100,000 population (practitioner-to-population ratios). Rank-correlation coefficients were derived for pairs of individual practitioner-to-population ratios and practice-environment scores, according to the method of Spearman.³²

We calculated partial correlation coefficients that compared the supply of nonphysician practitioners with that of generalist physicians, with control for the state population.³³ All P values are based on two-tailed tests.

RESULTS

There was wide variation in both state practice-environment scores and practitioner-to-population ratios for all the groups of practitioners (Table 2, Fig. 1). For physician assistants, the practice-environment scores ranged from a high of 100 in the state of Washington to 0 in Mississippi. Twenty states had scores of 90 or higher; 14 had scores below 50. Practitioner-to-population ratios varied from a high of 24.6 physician assistants per 100,000 population in Maine to a low of 0.2 in Mississippi. Twenty-one states had 10 or more physician assistants for every 100,000 people, whereas 13 states had 5 or fewer.

Practice-environment scores for nurse practitioners ranged from 100 in Oregon to 14 in Ohio and Illinois. Twelve states scored 86 or above; 19 had scores below 50. The ratios of the number of nurse practitioners

Table 1. Scoring System Used to Quantify the Practice Environment in States in Regard to Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives.

SCORING CATEGORY	PHYSICIAN ASSISTANTS	NURSE PRACTITIONERS	CERTIFIED NURSE-MIDWIVES
Legal status (20 points)	License recognition, 5 points; scope of practice regulations, 0-5 points more; practice under physician's indirect supervision, additional 0-10 points.	License or title recognition, 6 points; scope of practice defined by board of nursing alone, 7 more points; no required supervision by physician, another 7 points.	License or title recognition, 10 points; regulation by board of nursing alone, additional 10 points.
Reimbursement (40 points)	Mandated payment, 30 points; payment for services under indirect supervision, 10 points more unless payment was less than that paid to physician, then percentage multiplied by 10, for 0-10 points.	Mandated payment, 20 points; services covered, another 0-10 points; percentage of physician fees paid by Medicaid (times 10), 0-10 points more.	Mandated payment, 20 points; types of maternity, perinatal, or family-planning services covered, additional 0-20 points.
Authority to prescribe (40 points)	Any authority to write prescriptions, 20 points; 0-20 more points based on absence of specific restrictions. (Limited authority to order medications in inpatient settings, 0-10 points.)	Continuum of points based on level of independence: no authority, 0 points; full authority without physician oversight, 40 points.	Three categories: no authority, 0 points; limited or restricted authority, 20 points; full authority, 40 points.

to members of the population also varied widely, from 37.2 per 100,000 in the District of Columbia to 2.7 per 100,000 in Nebraska. Twenty-six states had ratios of more than 10, including 10 above 20. In contrast, five states had ratios of 5 or fewer.

Table 2. Practitioner-to-Population Ratios and Practice-Environment Scores for Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives According to State, 1992.*

STATE	PHYSICIAN ASSISTANTS†		NURSE PRACTITIONERS‡		CERTIFIED NURSE-MIDWIVES§	
	RATIO	SCORE	RATIO	SCORE	RATIO	SCORE
Alabama	2.7	39	6.3	33	0.9	32
Alaska	20.8	90	30.5	93	6.4	84
Arizona	8.9	99	23.3	86	2.8	76
Arkansas	1.2	54	28.9	48	0.4	35
California	5.1	58	12.9	30	1.7	80
Colorado	11.0	80	16.2	59	3.2	50
Connecticut	15.3	87	20.1	58	3.2	93
Delaware	7.7	55	20.4	60	2.1	60
District of Columbia	5.9	92	37.2	53	4.7	60
Florida	8.2	48	14.9	68	2.3	98
Georgia	9.0	59	7.8	32	2.7	70
Hawaii	4.6	38	9.4	27	1.8	42
Idaho	5.7	89	8.1	46	0.8	54
Illinois	2.1	59	7.0	14	1.4	31
Indiana	2.4	37	7.4	34	0.4	25
Iowa	9.3	99	8.3	73	0.5	55
Kansas	10.6	87	7.4	52	0.4	68
Kentucky	6.2	42	6.0	78	1.4	68
Louisiana	2.2	37	3.8	20	0.4	37
Maine	24.6	94	21.5	42	2.6	90
Maryland	13.9	49	11.8	93	3.1	69
Massachusetts	8.9	83	18.3	68	3.5	57
Michigan	10.4	89	4.5	45	1.3	70
Minnesota	7.1	83	9.7	68	2.3	100
Mississippi	0.2	0	4.8	72	1.1	59
Missouri	2.0	39	9.6	63	0.5	27
Montana	7.3	98	16.0	98	1.2	98
Nebraska	13.0	93	2.7	46	0.1	50
Nevada	6.2	98	8.2	73	0.8	30
New Hampshire	12.7	95	22.9	95	4.0	70
New Jersey	2.3	37	5.0	65	2.1	54
New Mexico	10.4	94	17.0	62	4.6	78
New York	12.3	98	11.7	93	2.3	67
North Carolina	15.5	92	7.2	43	1.2	90
North Dakota	18.2	87	12.3	98	1.1	55
Ohio	4.5	51	7.8	14	0.9	60
Oklahoma	5.0	46	7.1	40	0.5	54
Oregon	5.3	99	21.3	100	4.1	80
Pennsylvania	11.5	86	10.8	66	1.5	34
Rhode Island	10.5	93	19.7	50	2.5	84
South Carolina	2.1	37	9.1	41	2.6	59
South Dakota	19.5	94	10.1	65	1.1	70
Tennessee	5.7	42	7.2	27	0.9	56
Texas	4.8	77	6.5	42	1.0	54
Utah	9.1	93	10.7	91	3.2	73
Vermont	12.7	86	17.3	68	5.1	57
Virginia	4.6	42	15.4	38	1.3	47
Washington	11.4	100	21.4	90	2.8	70
West Virginia	10.1	96	7.7	89	1.2	47
Wisconsin	12.3	95	7.5	67	1.0	62
Wyoming	12.5	97	11.0	94	0.7	80
Mean	8.7	72.8	12.7	60.2	2.0	62.1
Median	8.9	86.0	10.1	62.0	1.4	60.0
Standard deviation	5.3	25.3	7.4	23.8	1.4	19.2

*Practitioner-to-population ratios for each group of practitioners are based on estimates of the total supply of practitioners per 100,000 population in each state.

†Estimates of the supply of practicing nonfederal physician assistants were obtained from the American Academy of Physician Assistants,¹⁷ with extrapolations for nonmembers. Federal employees are not included.

‡Estimates of the supply of practicing nurse practitioners were obtained from the study by Morgan.²⁰

§Estimates of the supply of practicing certified nurse-midwives were calculated by the Bureau of Health Professions on the basis of data from the American

Practice-environment scores for certified nurse-midwives ranged from 100 in Minnesota to 25 in Indiana. Six states had scores of 90 or higher; 13 had scores of 50 or less. The number of certified nurse-midwives per 100,000 population was low in all the states, ranging from a high of 6.4 in Alaska to a low of 0.1 in Nebraska. Six states had practitioner-to-population ratios of 4 or above, and 14 had fewer than 1 certified nurse-midwife per 100,000 population.

With a few exceptions, states that had favorable practice-environment scores for one group of practitioners also had favorable scores for the other two groups. States with more favorable practice-environment scores were clustered in the West and Northwest; several states with less favorable scores were in the Southeast.

Among states with generally unfavorable practice environments, the lack of authority to write prescriptions was an important contributor to low scores for all groups. For example, 16 of the 17 states with the lowest practice-environment scores for physician assistants prohibited these practitioners from writing prescriptions, as did 11 of the 17 states with the lowest scores for certified nurse-midwives and 9 of the 17 with the lowest scores for nurse practitioners.

Reimbursement was an important factor in the practice-environment scores for nurse practitioners, but it was somewhat less important for physician assistants, who, as salaried employees, are not reimbursed directly for their services, and for certified nurse-midwives. Of the 17 states with the least favorable practice environments for nurse practitioners, 4 had a score of 0 on the reimbursement scale, and none scored higher than 20 out of a possible 40 points.

Correlations among Groups of Practitioners

We found significant positive correlations for all three groups of practitioners between favorable state practice-environment scores and higher practitioner-to-population ratios (Table 3). Positive associations were also found in the states between the supply of physician assistants and the practice-environment score of nurse practitioners and between the supply of nurse practitioners and the practice-environment score of physician assistants (Table 3). This suggests that in most instances a greater supply of practitioners in one group was not associated with barriers to practice for the other. We examined the possibility that the supply of physician assistants, nurse practitioners, and certified nurse-midwives in a particular state depends on educational opportunities for these practitioners. We analyzed the supply of each group of practitioners in relation to the number of accredited schools in the states in 1992. The results were inconclusive (data not shown). Although several states with schools had a higher-than-average supply of practitioners of the discipline in question, no overall correlation was found between the state-specific supply of practitioners and the number of accredited schools for any group.

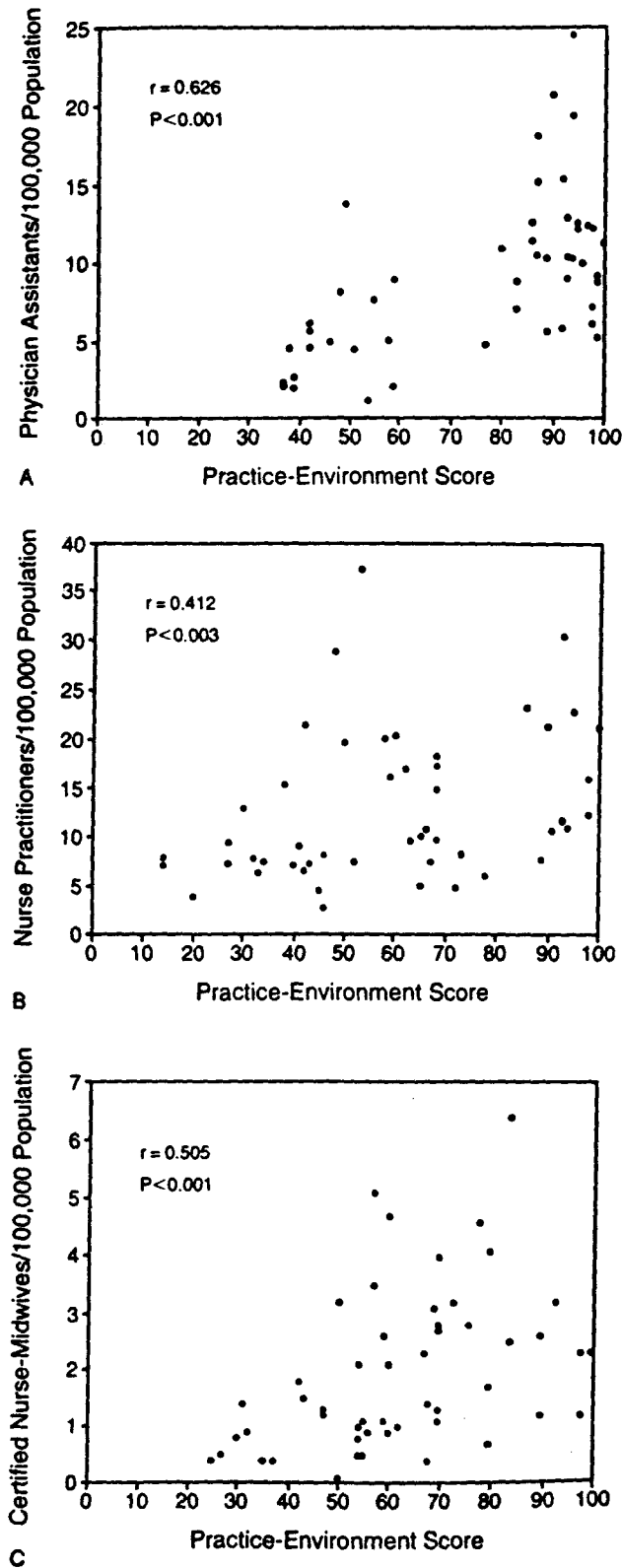


Figure 1. Correlation of the Practitioner-to-Population Ratio with the Practice-Environment Score for Three Groups of Practitioners in Each of the 50 States and the District of Columbia, 1992.

The numbers of practicing, nonfederally employed physician assistants (Panel A), nurse practitioners (Panel B), and licensed, certified nurse-midwives (Panel C) per 100,000 population are shown, with Spearman rank-correlation coefficients and P values for the correlations.

To examine the potential effect of competition between physicians and either physician assistants or nurse practitioners, we compared the supply of each group of practitioners with that of generalist physicians in the state. (Certified nurse-midwives were excluded from this analysis because of their relatively small numbers; federally employed physicians were also excluded.) We found significant positive relations between the supply of each group of practitioners and the supply of allopathic generalist physicians (with residents in graduate medical training excluded) after controlling for state population (Table 4). In most states, a greater number of physician assistants and nurse practitioners did not appear to be associated with a lesser supply of generalist physicians.

We found a positive correlation in the states between the supply of physician assistants and the number of resident physicians in graduate medical training, suggesting that a disproportionate number of physician assistants may be employed in teaching hospitals (Table 4). No comparable relation was apparent between the supply of nurse practitioners and the number of resident physicians in the states.

Some studies suggest that competition between physicians and nonphysicians has triggered the creation of barriers to practice for nonphysician practitioners in some states.^{15,34} We therefore compared the supply of generalist physicians in the states with the practice-environment scores for nurse practitioners and physician assistants. No associations were found between the practice-environment scores for either group of practitioners and the supply of generalist physicians, whether resident physicians were included or excluded from the analysis.

Areas with Shortages of Primary Care Physicians

An adequate supply of physician assistants, nurse practitioners, and certified nurse-midwives may be particularly important in areas lacking sufficient numbers of primary care physicians. We repeated some of our analyses for the 17 states with the highest proportions of people living in areas designated as having a shortage of primary care in 1992 (Table 3). These proportions ranged from 11.6 percent of people in North Carolina to 25.0 percent in North Dakota. Three quarters of these areas with primary care shortages were rural. Nonphysician practitioners are not counted in the formula used by the federal government to characterize these areas.³¹

In the 17 states, favorable practice-environment scores for physician assistants and nurse practitioners were associated with practitioner-to-population ratios significantly above the national average (Table 3). For certified nurse-midwives there was a similar trend ($P = 0.09$). The nine states with practice-environment scores of 90 or higher for physician assistants had an average ratio of 13.4 physician assistants per 100,000 people, as compared with 1.8 in the states with scores of 40 or less. The four states with practice-envi-

ment scores of 90 or higher for nurse practitioners had an average of 17.5 nurse practitioners per 100,000 people, as compared with 6.4 in the five states with scores of 40 or less. For certified nurse-midwives, the ratios were 1.2 per 100,000 for the two states with scores of 90 or higher, and 0.8 per 100,000 for the four states with scores of 40 or less.

DISCUSSION

Favorable state practice environments for physician assistants, nurse practitioners, and certified nurse-midwives were strongly associated with a greater supply of these practitioners. States with less favorable practice environments had fewer such practitioners for every 100,000 people. In general, practice environments within a state were consistently favorable or unfavorable for all three groups. Inability or limited ability to write prescriptions was a major factor in lowering practice-environment scores for all three groups. Reimbursement issues were important in lowering the scores for nurse practitioners, but they were of lesser importance for physician assistants and certified nurse-midwives.

Table 3. Rank-Correlation Coefficients and P Values for Practitioner-to-Population Ratios and Practice-Environment Scores for All States and for the 17 States with the Largest Proportions of People Living in Areas with a Shortage of Primary Care Physicians.*

MEASURES COMPARED	ALL STATES AND D.C. (N = 51)		SHORTAGE AREAS (N = 17)	
	COEFFICIENT	P VALUE	COEFFICIENT	P VALUE
Ratios and scores within group				
Physician assistants	0.626	<0.001	0.681	0.003
Nurse practitioners	0.412	0.003	0.538	0.026
Certified nurse-midwives	0.505	<0.001	0.424	0.090
First-practitioner ratio and second-practitioner score†				
Physician assistants and nurse practitioners	0.452	0.001	0.513	0.035
Physician assistants and certified nurse-midwives	0.502	<0.001	0.623	0.008
Nurse practitioners and physician assistants	0.416	0.002	0.493	0.044
Nurse practitioners and certified nurse-midwives	0.417	0.002	0.442	0.076
Certified nurse-midwives and physician assistants	0.226	0.110	0.219	0.398
First-practitioner score and second-practitioner score‡				
Physician assistants and nurse practitioners	0.570	<0.001	0.593	0.012
Nurse practitioners and certified nurse-midwives	0.357	0.010	0.512	0.036
Physician assistants and certified nurse-midwives	0.432	0.002	0.602	0.011

*Spearman rank-correlation coefficients are shown. Shortage areas were determined on the basis of the percentage of each state's population that was living in areas with a designated shortage of health professionals in September 1992, according to the Bureau of Primary Health Care.³¹ The 17 states with the highest percentages of people residing in such areas were North Dakota (25.0 percent), Mississippi (24.3), South Dakota (22.4), New Mexico (21.9), Idaho (19.6), Wyoming (19.5), Louisiana (19.1), West Virginia (19.1), South Carolina (18.4), Alabama (16.8), Alaska (14.0), Montana (13.5), Arkansas (13.5), Georgia (13.5), the District of Columbia (D.C.) (12.0), Illinois (11.9), and North Carolina (11.6).

†Indicates that the ratio for the first group listed is compared with the score for the second group.

‡Indicates that the score for the first group listed is compared with the score for the second group.

Table 4. Partial Correlation Coefficients and P Values for the Comparison of Estimates of the Supply of Physician Assistants and Nurse Practitioners with That of Generalist Physicians and Residents in the 50 States and the District of Columbia, with Control for State Population, 1992.*

GROUPS COMPARED	NONRESIDENT GENERALIST PHYSICIANS†		ALL ALLOPATHIC RESIDENT PHYSICIANS‡	
	r	P VALUE	r	P VALUE
Physicians and physician assistants	0.539	<0.001	0.583	<0.001
Physicians and nurse practitioners	0.347	0.014	-0.033	NS

*First-order partial correlation coefficients with population held constant are shown. NS denotes not significant.

†Includes all allopathic physicians in general practice, family practice, general internal medicine, or general pediatrics, excluding federal employees, according to the Bureau of Health Professions.²⁹

‡Includes all allopathic residents and fellows in all specialties in 1992, according to the Association of American Medical Colleges.³⁰

Our findings do not support the hypothesis that a larger supply of generalist physicians in a state is associated with a less favorable practice environment for nonphysician practitioners. Indeed, we found that the supplies of generalist physicians, physician assistants, and nurse practitioners within states were positively associated. However, states with documented shortages of primary care physicians that had environments favorable to physician assistants and nurse practitioners had more such practitioners than the national average.

Factors other than those we identified affect the practice environment for nonphysicians at the state level. For example, acceptance as professionals by physicians (including the extension of hospital admitting privileges and professional collaboration), inclusion in the terms of private and corporate health insurance policies, ability to obtain malpractice insurance, and acceptance by the public are probably important determinants of the supply of practitioners at the community, regional, and state levels. In addition, because our analysis applied to only one short period, we could not determine whether the greater supply of nonphysician practitioners preceded the removal of barriers to practice, or the reverse.

Our study demonstrates that regulation by the states of physician assistants, nurse practitioners, and certified nurse-midwives varies widely. These findings may help state legislators and regulators reduce specific barriers to practice and thus make these practitioners more available to patients.

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HENRY FORD HOSPITAL

Distributed at the BCG Academic Affairs Committee Meeting, Wednesday, April 19, 1995

2799 West Grand Boulevard
Detroit, Michigan 48202-2669

February 24, 1995

George C. Fuller, Ph.D.
Dean, College of Pharmacy &
Allied Health Professionals
Wayne State University
Detroit, Michigan 48202

Dear George:

Henry Ford Hospital and Henry Ford Health System is very supportive of the College's efforts to establish a Physician Assistant (PA) program. As previously discussed, and formally communicated to you in a letter dated October 6, 1994, we would like to offer our multi-faceted environment as a training ground for clerkships. With our hospital setting which serves our direct community and specialty services provided, coupled with our 30 ambulatory sites, we feel we could provide a unique experience for your students.

We are pleased that we would be sharing support for the program with the Detroit Medical Center (DMC). We understand your start-up needs and would be willing to provide \$35,000.00 per year for the first four years to offset some of your initial operating budget shortfall, assuming your program receives full accreditation. In addition, we would be willing to offer for two years the half-time (0.5 FTE) support of a clinical coordinator from our staff. We will evaluate extending that support prior to the end of the second year.

We feel very strongly that you need to seek grant funding from multiple sources and would be willing to help you identify other potential areas from which to request funding support.

Please keep us apprised of your discussions and support from the University.

Sincerely,

Stephen H. Velick
Group Vice President,
Henry Ford Health System
Chief Operating Officer, Henry Ford Hospital

cc: Peter W. Butler
Robert B. Johnson
Steven Nelson
David Leach, M.D.



Wayne State Univ

The Detroit
Medical Center

March 1, 1995

George C. Fuller, Ph.D.
Dean, College of Pharmacy
and Allied Health Professions
Wayne State University
Detroit, Michigan 48202

Dear George:

Thanks very much for providing responses to the questions/issues raised in my February 24, 1995 letter to you in support of the Physician Assistant Program. The information you provided me was helpful in addressing a number of our concerns. Even though there are still some important details we need to develop, I am sufficiently satisfied with the information you have provided to give you this unconditional letter of support. We will continue to discuss these issues with you.

As I indicated to you, the Detroit Medical Center will provide \$35,000 per year for the first four years to offset some of the initial operating budget shortfall. In addition, we will provide a half-time (0.5 FTE) support of a Clinical Coordinator for two years.

We are looking forward to working with you and your faculty and representatives from Henry Ford Health System in helping to make this program a success.

Sincerely,

A handwritten signature in black ink, appearing to read "R. B. Johnson", written over a horizontal line.

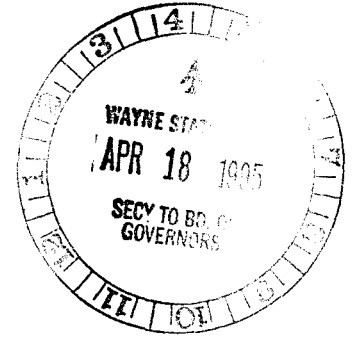
Robert B. Johnson
Executive Vice President/
Chief Operating Officer

cc: David J. Campbell
Stephen H. Velick
Daniel L. Zuhlke

The Detroit Medical Center
4201 St. Antoine Boulevard Detroit, Michigan 48201 313.745.5192

WAYNE STATE UNIVERSITY
College of Nursing

MEMORANDUM



TO: Board of Governors

FROM: Faculty Association
College of Nursing

SUBJECT: Physician Assistant Program
Pharmacy & Allied Health Professions

DATE: April 18, 1995

We understand that the Physician Assistant (PA) Program was recently approved by the University Graduate Council and will be reviewed on April 19 and 21, 1995 by the Board of Governors for approval.

The Faculty Association of the College of Nursing have had indepth discussions on this proposed program. Additionally, we have studied health care trends, nationally, regionally and locally. The College of Nursing has had a nationally recognized Nurse Practitioner Program since 1969. Based on this background work and housing of a similar program, we endorse the letter sent to President Adamany dated February 8, 1995 by Dean Hough, which highlighted concerns with the PA Program. We further add these critical concerns:

1. PA's and NP's compete for clinical education sites while in school, and for positions of employment after graduation. (Attached are national advertisements that reinforce the employment similarity.) We believe that this connates the concept of "similar programs. As identified in application for the new program, Wayne State University has a policy about the establishment of a new program that is similar to a current program. In the application for the new PA program, the applicants only address the similarities between the new program and offerings in the community. They do not address the similarities between the proposed program and existing programs at Wayne State, ie Nursing.

2. As identified in the attached research article, Nurse Practitioners deliver quality care similar to PA's at lower costs than PA's. Since WSU has a mission that includes service to the community, that mission would be enhanced by support of an existing program that produces a less costly provider while maintaining quality of care.

cc: Edythe Hough, Dean
George Fuller, Dean
Marilyn Williamson, Provost, Sr. V.P.

Attachments: 1. Advertisements
 2. Article, Author Lombness

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Northeast

General

■ Upstate NY, New England, Pennsylvania, Mid Atlantic States. Outstanding opportunities for Physician Assistants and Nurse Practi-

tioners. All specialties. High starting salaries. Excellent benefits. Call, mail or fax CV in confidence to: Roblor Health Care Consultants, 3522 James Street, Suite 210, Syracuse, NY 13206. Phone: 315-463-7150. Fax: 315-436-8571.

■ Some Things In Life Are Free: Mitchell/Martin, Inc., the leader in PA and NP recruitment in NY, WCH, LI, NJ, and CT, has many full-time, part-time, and per-diem opportunities in all specialties and settings. Tell us what you want, we'll do the rest. No fees of any kind. Free CV preparation. Call Lorraine Walker at 212-943-4015.

Emergency Medicine

■ New Jersey: Full-time position available for an NP to play a key role in the fast track area of the emergency department of our central New Jersey hospital located 20 minutes from Philadelphia. Mid-day, 8-hour shift, Monday thru Friday only. Responsibilities will involve direct patient care in conjunction with our quality physician team. ED sees approximately 22,000 patients a year. Competitive compensation package. Interested candidates may contact Karen McGough, RN at 800-848-3721.

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Difference in Length of Stay with Care Managed by Clinical Nurse Specialists or Physician Assistants

Patricia M. Lombness, M.S.N., C.C.R.N.

CNS

THE PURPOSE OF this study was to examine the relationships among patient length of stay, complications, and type of care manager (clinical nurse specialists [CNSs] vs. physician assistants [PAs]). A descriptive comparison of two groups was performed. Data were collected using a retrospective chart audit of 105 randomly selected patients who had undergone elective coronary artery bypass surgery for the first time between 1991 and 1993. Group 1 comprised patients for whom PAs and cardiac surgeons co-managed postoperative care. Group 2 comprised clients whose care was co-managed by CNSs and cardiac surgeons. Complication rates were similar between the two groups. Findings indicated that the CNS-managed group had a statistically significant shorter length of stay. Results suggested that care managed by CNSs can decrease length of stay, when compared with care managed by PAs.

Key Words: clinical nurse specialist, physician assistant, length of stay, advanced nursing practice

Since cardiovascular surgery was first introduced in 1953, the number of patients undergoing the procedure, as well as their severity of illness, has increased greatly (Connor & Bustow, 1985). Coupled with this, health care costs are growing at more than twice the rate of inflation amid a shrinking economy that includes fixed reimbursement for some clients (Iezzoni, Foley, Daley, Hughes, Fisher, & Heeren, 1992). This has created an impetus for health care providers to deliver cost-conscious, quality care.

Because health care costs rise with each additional day patients are hospitalized, approaches to shorten patients' length of stay (LOS) have been implemented by many health care institutions. While use of LOS is not a perfect indicator of resource utilization because it does not account for variation in treatments, testing, and equipment use, it is the most commonly used

parameter (Weintraub, Jones, Craver, Guyton, & Cohen, 1989).

To decrease LOS, institutions have developed techniques to streamline patient care while maintaining quality. These techniques include case management, managed care, and implementation of standardized patient care plans or critical pathways. In addition to these efforts to shorten LOS, one successful strategy to decrease cost of care delivery is utilization of physician assistants (PAs) and clinical nurse specialists (CNSs) to carry out duties typically performed by physicians: performance of histories and physicals, order writing, daily surveillance of patients, and ordering and interpreting laboratory and diagnostic tests (Dubaybo, Samson, & Carlson, 1991; Elinger, 1985; Silver & McAtee, 1985).

Even though the PA and CNS may be carrying out all or some of the same duties, performance of the roles is really quite different. The PA is a health professional who works under the direct supervision of a licensed physician and is often called a physician extender (Anderson, 1990; Huch, 1992). A majority of the programs that graduate PAs offer a bachelor's degree upon conclusion of study (Sturmann, Ehrenberg, & Salzberg, 1990). The PA is not considered to be an independent practitioner (Huch, 1992), but carries out technical duties, which frees the physician for more complex functions (Marchione & Garland, 1980). PAs have provided assistance and welcome relief to

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physicians by lifting the burden of increased workloads while providing a cost savings not related to LOS.

On the other hand, the CNS is a nurse in advanced practice who has received advanced education at the Master's or even doctoral level. The curriculum concentrates heavily on advanced skills in assessment, intervention, health promotion, illness prevention, and critical thinking. In addition, the educational preparation is theoretically grounded in multiple theories of nursing, as well as theories from other disciplines (Huch, 1992). The CNS is prepared to approach the client using a holistic approach, integrating physiological, psychological, cultural, spiritual, and sociological aspects of the patient and family into their care. The advanced practice nurse (APN) is groomed with skills in critical thinking and clinical management (Alexander, 1985; Cronin & Maklebust, 1989; Norris & Hill, 1991; Papenhausen, 1990). The CNS is an independent and interdependent practitioner who functions in a collaborative role with the physician (Alexander, 1985; Brower, 1985). While the CNS and PA sometimes perform similar tasks, because of the advanced education of the CNS, that individual has an extended role that goes beyond tasks, requires different critical thinking and critical judgment skills, and incorporates case management strategies.

PURPOSE OF THE STUDY

Many studies have compared the PA and CNS with physicians in regard to quality of patient care delivered, cost-benefit ratios, and patient satisfaction with care. No studies, however, have compared CNSs with PAs. This study attempted to identify differences in the LOS of patients undergoing coronary artery bypass surgery when patient care was managed by CNSs versus PAs. In addition, complications occurring after cardiac surgery were examined to determine whether a relationship existed between type of care manager (CNS vs. PA) and complications after surgery. Since there is an absence of literature regarding differences between PAs and CNSs in similar job roles, the results of this research may be valuable for both groups of health care professionals, as well as hospital administrators and policy makers.

RESEARCH QUESTIONS

This study attempted to answer the research questions: (1) What differences are seen in LOS when the cardiovascular surgical patient's care is managed by CNSs versus PAs? and (2) Is there a relationship between manager of care (CNS vs. PA) and postoperative complications for patients who undergo cardiovascular surgery? A complication was considered to be an event that caused either additional intervention (surgery, medication, electrical, diagnostic testing, consultation) or an increased hospital stay for more observation (as documented in the physician's progress notes). Also, for an event to be considered a dysrhythmia complication, it had to be treated with additional

medications, cardioversion, or increased time on the heart monitor (as documented in the physician progress notes).

REVIEW OF LITERATURE

A few published studies compare care delivered by CNSs and PAs with that delivered by physicians. Early research of advanced nursing practice that compared nurses with physicians in regard to delivery of care had been rather limited because it was completed during the early stages of advanced nursing practice (Burkett, Parken-Harris, Kuhn, & Escovitz, 1978; Celentano & Anderson, 1980; Simmons & Rosenthal, 1981). Also, many of these studies did not state the educational preparation of the nurses in the study, although most of the nurses were called nurse practitioners (Celentano & Anderson, 1980; Linn, 1974; Simmons & Rosenthal, 1981). Most of the role performance was also examined in terms of analysis of tasks (Burkett et al., 1978; Sultz, Zielesny, Gentry, & Kinyon, 1978) and practice that was evaluated based on the medical model (Sox, 1979).

More recent research of the CNS role has examined the traditional role of the unit-based CNS. Ropka and Castronovafay (1984) conducted a study that provided a database of the characteristics and various roles of the CNS. Most unit-based CNSs in this study directed their efforts at development of the staff, as well as direct or indirect improvement in patient care.

The CNS as a collaborative partner with physicians in the delivery of patient care commonly functions in a service-based environment in which the clientele are the patients. Gunderson and Kampen (1988) examined the service-based CNS in a descriptive study to determine the frequency of use of physician extenders (PAs, nurse practitioners, and CNSs) by neurologists across the United States. One third of the 494 neurologists who responded reported using more than one extender, either a PA or an APN, and stated that utilization of them was an economical way to provide specialty care to a greater number of patients.

Since CNSs and PAs in the traditional physician extender role are performing physician functions, research has been directed at determining whether delivery of care by these practitioners is comparable to that by physicians in quality and effectiveness. De Jong (1981), DiGirol and Parry (1983), and Graveley and Littlefield (1992) examined this issue by comparing PAs and CNSs with physicians in competency, congruence of treatment plans, and patient satisfaction and compliance.

De Jong (1981) found that care delivered by CNSs and PAs was not different than that delivered by the physicians ($p < 0.001$), and patient compliance was increased with physician extenders ($p < 0.001$). DiGirol and Parry (1983) found congruence of treatment plans by CNSs and physicians in 88.4% of the cases (no statistically significant difference). Graveley and Littlefield (1992) found that care delivered by CNSs had a better cost per client ratio ($p < 0.001$) than care

delivered by physicians, with no difference in patient complications ($p < 0.001$).

Schull and co-workers (1992) studied the impact on LOS of Master's-prepared CNSs as case managers at a large medical center in Dallas, TX. Clients admitted with diagnoses of epilepsy and ischemic stroke who received case-managed care had an LOS 2 days shorter than those who did not receive case management. This amounted to hospital charges that were 21.5% lower in the case-managed group (Schull, Tosch, & Wood, 1992).

The literature review also revealed that increased incidence of complications for patients following open heart surgery has been shown to increase LOS significantly (Grossi et al., 1991; Hashimoto, Ilstrup, & Schaff, 1991; Lowe, Hendry, Hendrickson, & Wells, 1991; Weintraub et al., 1989). In addition, inadequate discharge planning can result in longer LOS (Grady, Haller, Gruisk, & Corliss, 1990).

METHODOLOGY

Research Design

A descriptive comparison was used to study the two groups. Group 1 comprised patients whose care following coronary artery bypass was managed by PAs. Post-surgery care of group 2 patients was managed by CNSs.

Sample

The sample included all patients who had undergone elective coronary artery bypass surgery for the first time between August 1991 and February 1992 (group 1) and August 1992 and February 1993 (group 2). Fifty-two patients were randomly selected for group 1 and 53 were selected for group 2. The different time frames were used because there was a transition from staffing the cardiovascular service with PAs during the group 1 time period to CNSs during the group 2 time period. PAs left their positions for higher salaries at another facility. The PA positions could not be filled and were replaced by CNSs. Educational preparation of PAs was a bachelor's degree and CNSs had a Master's degree.

Setting

The setting was a 900-bed private hospital located in the Midwestern United States that provided care to approximately 1100 patients per year following cardiovascular surgery. Clients admitted typically were middle class and Caucasian, and carried private health insurance. Eight PAs were involved in managing care for patients in group 1, and six CNSs were care managers for group 2 patients (including the author). The study was designed, and data were collected after February 1993, to decrease author bias. PAs and CNSs all worked with the same seven cardiac surgeons during the time of study.

CNS and PA management of care involved performing histories and physicals, updating physician progress notes, and writing postoperative and transfer orders. Also, CNSs and PAs participated in daily rounds with the attending physician to discuss progress, ordered and interpreted laboratory and diagnostic tests, consulted specialists, and responded to abnormalities in laboratory values, vital signs, and rhythm disturbances. In addition, care may have included drawing blood and removing chest tubes, intra-aortic balloon pump catheters, venous and arterial lines, pacemaker wires, and staples. Discharge planning included determination of appropriate discharge dates, coordination of discharge plans, and referral to long-term care facilities when needed. These functions were performed in collaboration with the cardiovascular surgeons.

Instrument

LOS was computed from the date of admission until discharge, regardless of time of day. Reliability of LOS computation in this manner was supported because this was the method used to compute LOS in the institution in which the study took place. Validity of LOS as an indicator of efficiency and effectiveness of care is supported by Papenhausen (1990), Gaedeke and Hill (1991), Norris and Hill (1991), Schroer (1991), and Sparacino (1991). LOS for the intensive care unit (ICU) included the dates of stay in the ICU as well as stepdown units. Data regarding complications were obtained by the author by reading the physician progress notes, nursing notes, and medication and order records of the chart.

Procedure

The hospital numbers of all patients who had undergone surgery in the specified time frame were obtained from a computer list generated by the hospital. A random sampling process was carried out to select 52 patients for group 1 and 53 for group 2. From this sample, a retrospective chart review was conducted. Data were collected and LOS was determined.

RESULTS

The participants ($n = 105$) were 23 females (22%) and 82 males (78%). The two groups were homogenous in regard to gender; group 1 had 11 female (21%) and 41 male subjects (79%). Group 2 included 12 females (23%) and 41 males (77%). Subjects ranged in age from 42 to 81 years of age, with the majority ($n = 67$) being between the ages of 60 and 75 years of age (64% of the sample). Patients' body weight ranged from 50 to 126 kg. The typical patient was male, was 63 years of age, and weighed 83 kg (Table 1).

The two groups were tested to see whether the demographic variables (age, weight, and gender) and comorbid conditions (presence of diabetes, recent myocardial infarction, and classification of angina) were

TABLE 1
DISTRIBUTION OF GENDER, AGE, AND BODY WEIGHT
IN STUDY

	Group 1	Group 2
Gender		
Female	11	41
Male	12	41
Age		
40-50 Years	6	6
51-60 Years	10	11
61-70 Years	23	24
71-80 Years	13	11
81-90 Years	0	1
Body weight		
50-65 kg	7	6
66-80 kg	19	17
81-95 kg	17	17
96-110 kg	5	12
>110 kg	4	1

evenly distributed. A Fisher exact, two-sample, two-tailed test was used to examine the distribution of age within both groups to see whether groups 1 and 2 were homogeneous. No significant difference in age was detected ($p = 0.857$). Complication rates and group were also examined, and results indicated that there was no significant difference with regard to complication rates ($p = 0.885$), even though there were fewer complications in the CNS-managed group. The other variables were not further studied, because they were not found to be related to LOS in this study.

To answer the first research question, LOS for the two groups was determined. LOS was examined by calculating three different lengths of stay: hospital LOS for the total stay (LOS), LOS from the date of surgery (LOSOR), and LOS in ICU (LOSICU). This was done for several reasons. First, it was not uncommon at this institution for a patient scheduled for elective surgery to wait beyond the scheduled day of surgery due to an emergency that took precedence. Sometimes this wait could exceed a day, especially if the scheduled day for surgery was just before the weekend. This type of a delay reflected a system problem, not differences in management of care. In addition, LOS in ICU was found to be associated with an increased total hospital stay in previous studies (Gross, DeMauro, Antwerpen, Wallenstein, & Chiang, 1988; Lowe et al., 1991). For these reasons, LOSOR and LOSICU were calculated to determine whether these numbers were different in the two groups, and hence had an impact on total LOS.

Survival analysis was performed using the Kaplan-Meier method to examine LOS data. All assumptions for use of the Kaplan-Meier were met. To avoid censoring (dropout), any patient who expired was removed from the study.

When looking for a difference in LOS between groups 1 and 2, the Mantel-Haenszel statistic revealed a significantly lower LOS in group 2 (CNS-managed, $p < 0.001$) when compared with group 1 (PA-managed; Figure 1). Minimum LOS for the PA-managed group was 6 days, compared with 5 days for the CNS-managed patients. Likewise, the mean LOS dropped from 9.423 days for Group 1 to 7.377 days for group 2. The

median values also dropped significantly when care was managed by CNSs (from 8 to 7 days). Maximum LOS also was greater in the PA group (28 vs. 12 days).

Group 1 had one case (patient 15) with an LOS of 28 days, which was 12 days longer than the next longest LOS of either group. To determine whether patient 15 affected the significance of the LOS calculation, patient 15 was removed and LOS was recalculated (Figure 2). When the recalculated LOS for group 1 was compared with LOS for group 2, again using the Kaplan-Meier method, it was still found to be significantly longer ($p < 0.001$). Exclusion of patient 15 maintained the significant difference in LOS for the CNS group and the PA group (mean LOS decreased from 9.423 to 9.059 in group 1 and remained at 7.377 days for group 2).

LOS from date of surgery was calculated next. LOSOR ranged from 4 to 27 days. Using Kaplan-Meier estimation, results again supported that group 2 had a significantly shorter LOSOR than PA-managed group 1 ($p < 0.001$). The mean LOSOR for group 1 was 8.17, while the LOSOR for group 2 was 6.38 days. Maximum, median, and minimum values were also less for the CNS-managed group (Figure 3).

The third LOS calculation was the LOSICU (number of days in ICU or stepdown ICU). LOSICU was also significantly decreased in the CNS-managed group ($p < 0.001$). Groups 1 and 2 both had patients who spent only 1 day in ICU, while the longest recorded stay was 20 days (in group 1). Mean and median LOSICU stays were significantly less in the CNS-managed group. All three LOS measurements (LOS, LOSOR, and LOSICU) were less for patients whose care was managed by CNSs (Figure 3).

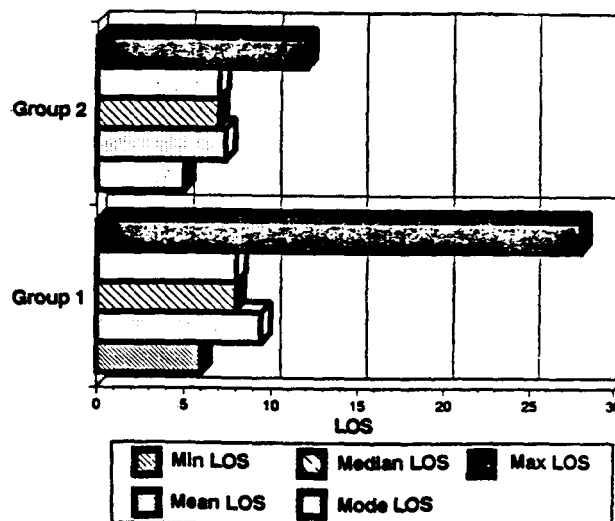


Figure 1. LOS (total hospital stay from admission to discharge) for groups 1 and 2 (min LOS = minimum number of days, max LOS = maximum number of days). For group 1, min LOS = 6 days, mean LOS = 9.423 days, median LOS = 8 days, max LOS = 28 days. For group 2, min LOS = 5 days, mean LOS = 7.377 days, median LOS = 7 days, max LOS = 12 days. Group 1 had a significantly longer LOS than group 2 ($p < 0.001$).

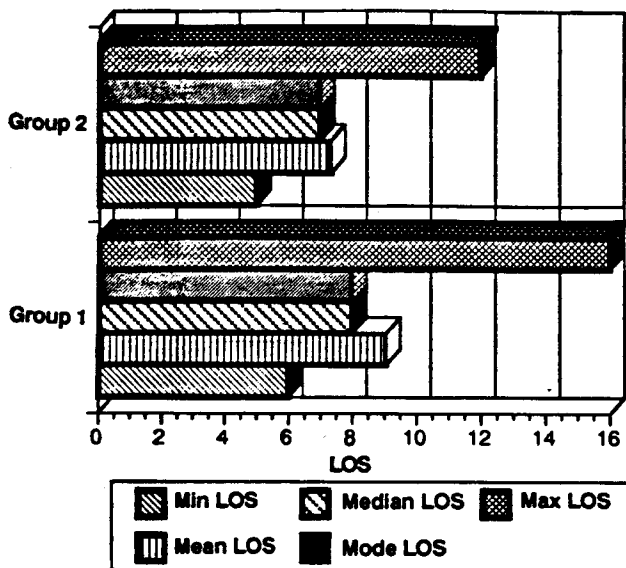


Figure 2. Calculated LOS excluding patient 15 from group 1 (min LOS = minimum number of days, max LOS = maximum number of days). For group 1, min LOS = 6 days, mean LOS = 9.059 days, median LOS = 8 days, max LOS = 16 days. For group 2, min LOS = 5 days, mean LOS = 7.377 days, median LOS = 7 days, max LOS = 12 days. Group 1 had a significantly longer LOS than group 2 ($p < 0.001$).

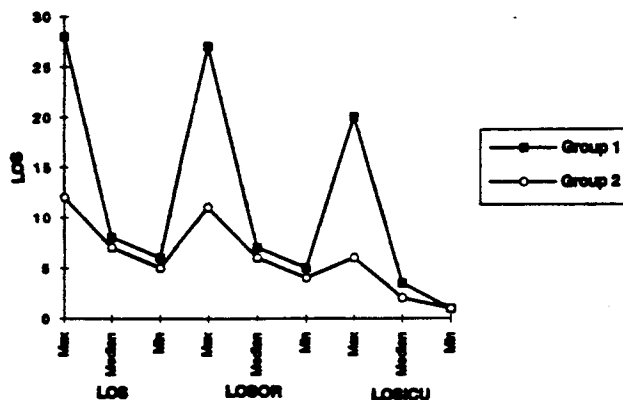


Figure 3. LOS: group 1, min = 6 days, median = 8 days, max = 28 days; group 2, min = 5 days, median = 7 days, max = 12 days. LOSOR: group 1, min = 5 days, median = 7 days, max = 27 days; group 2, min = 4 days, median = 6 days, max = 11 days. LOSICU: group 1, min = 1 day, median = 3.5 days, max = 20 days; group 2, min = 1 day, median = 2 days, max = 6 days. Group 1 had significantly longer LOS, LOSOR, and LOSICU than group 2 ($p < 0.001$).

The second research question concerned complications following surgery: Is there a relationship between manager of care (CNS or PA) and postoperative complications? The majority of the patients in this study had dysrhythmia complications, including ventricular tachycardia, ventricular fibrillation, atrial flutter, and/or atrial fibrillation (Table 2, Figure 4). Some of the patients had only one of the stated dysrhythmias; others had more than one. A total of 44% of the pa-

TABLE 2
INCIDENCE AND TYPE OF POST-OPERATIVE COMPLICATIONS

Complication	Group 1	Group 2
Dysrhythmia	23	25
Lidocaine toxicity	1	0
Labile blood sugar	3	2
Labile blood pressure	1	0
Pneumothorax	1	3
Thrombus related to IABP	1	0
Inadequate protime	1	0
Leg infection	4	2
Urinary tract infection	2	1
Elevated temperature/white blood cell count	1	3
Tracheobronchitis	1	1
Abdominal	2	0
Inadequate activity level	1	0
Urinary retention	2	0
Confusion/depression	2	1
Total	46	38

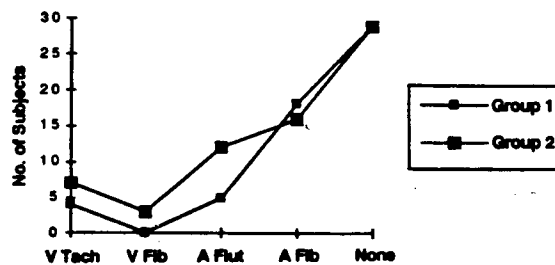


Figure 4. Incidence of dysrhythmias in study population. Group 1: V Tach = 4, V Fib = 0, A Flut = 5, A Fib = 18, none = 29; Group 2, V Tach = 7, V Fib = 3, A Flut = 12, A Fib = 16, none = 29.

tients in group 1 had one or more dysrhythmias, compared with 45% in group 2. Of the rhythm disturbances that were noted to occur in the postoperative period, atrial flutter and atrial fibrillation were more common than their ventricular counterparts. Overall rate in both groups of atrial flutter, atrial fibrillation, or both was 36%. Ventricular tachycardia or fibrillation was noted in 12.4% of all ($n = 105$) patients. Fifty-eight subjects (29 from group 1 and 29 from group 2) had no cardiac dysrhythmias noted.

Other complications varied greatly (Table 2). Some patients had more than one complication, but in those cases, they were still weighted as one complication, since it could only affect LOS for one case. It was noted, however, that there was a higher incidence of total complications in the PA-managed group (46 vs. 38). The total number of cases that had one or more complications in both groups 1 and 2 was identical (36 cases), but the breakdown of complications differed somewhat. Group 1 had a greater number of cases with nondysrhythmia complications (23, compared with 13 in group 2). This difference in nondysrhythmia complication rates, however, was not statistically significant ($p = 0.14$).

The Kaplan-Meier estimation was performed to determine the relationship between complications and

LOS, while control for group membership was again maintained (Figure 5). Subjects who had no complications had the shortest mean LOS of 7.0 days. This was compared with those with dysrhythmia complications alone (LOS = 8.18 days), those with complications other than dysrhythmias (LOS = 9.5 days), and those with both dysrhythmia plus other complications (LOS = 11.73 days). Results of this analysis indicated that an increased incidence of complications strongly correlated with an increased LOS ($p < 0.001$).

DISCUSSION AND CONCLUSIONS

Overall, study results support use of CNSs as care managers for cardiovascular surgery patients. By examining the three different LOS dates (LOS, LOSOR, and LOSICU), attempts were made to decrease the chance of system problems impacting research results. Analysis revealed statistically significant shorter LOS for patients with CNS-managed care compared with those who had care provided by PAs.

Complications recorded in this research following open heart surgery were many, and typical of those reported in the literature by Weintraub et al. (1989), Hashimoto, Ilstrup, & Schaff (1991), Grossi et al. (1991), and Lowe et al. (1991). Determination of complications was based on documentation in physician progress notes, medication records, and written orders. As was mentioned earlier, to be considered a complication, additional testing, treatment, or surveillance was needed. For instance, if a leg wound was noted to be erythematous, but no additional medication (antibiotic), laboratory testing (blood work), treatment (heating pad), or increased surveillance (additional assessment) was required or ordered, it was not considered a complication.

No significant difference in complication rates was found between the two Groups ($p = 0.885$). This was important, since incidence of complications was found to be closely related to an increased LOS ($p < 0.001$). In examining the complications, however, it was noted

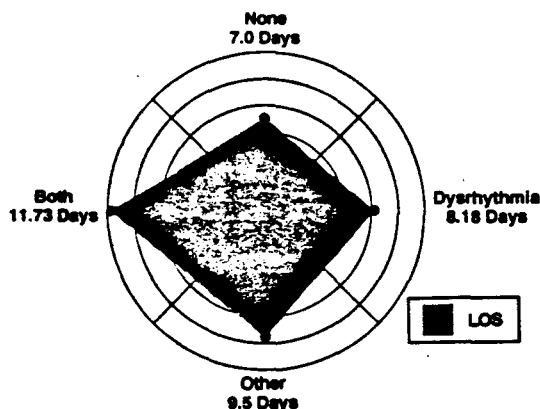


Figure 5. Relationship between complications and LOS: Mean LOS for no complications = 7.0 days, dysrhythmia = 8.18 days, other than dysrhythmia = 9.5 days, both dysrhythmia/other = 11.73 days. Complications were found to be related to increased LOS ($p < 0.001$).

that CNS-managed group 2 had fewer nondysrhythmia complications than group 1 (13 vs. 23). This may have occurred because of the increased early surveillance of CNSs in assessment and intervention directed at potential complications. This difference of 10 cases was not statistically significant, however ($p = 0.14$). It may be concluded that: (1) complication rates following cardiovascular surgery are rather constant, regardless of care management, and (2) the sample size was too small to draw conclusions about the difference between the nondysrhythmia complication rates. The one difference between the two groups to account for the decreased LOS in group 2 was management of care (CNS vs. PA).

As was mentioned earlier, other variables were examined for even distribution in groups 1 and 2. It was found that the groups were homogenous in regard to age, which was the only demographic variable found to have a relationship with LOS in this sample. Therefore, it may be concluded that the reason LOS was significantly lower in the CNS-managed group was related to care by the CNS.

IMPLICATIONS

Technological advances and competition in the health care market have challenged the nursing profession to redefine its many roles. As nursing continues its evolution, nursing's role will expand, especially in advanced practice. Nurses who are creating these new roles will be expected to develop them in response to the changing needs of the health care delivery industry and of society. Role development will depend on an individual's education, experience, and personality, plus employer responses and client expectations (Brower, 1985).

The impetus to decrease patient LOS while still delivering quality nursing care has come from pressure outside the nursing profession. To respond to this challenge, CNSs must use advanced knowledge and skills in daily assessment of clients to discover problems early, resolve them effectively, and plan for smooth and timely discharges (Norris & Hill, 1991; Schroer, 1991; Sparacino, 1991). Many times the impact the CNS makes upon patient care is difficult to quantify (Houston & Linquire, 1991). One measure that is quantifiable, however, is that of LOS, since it is an objective measure that hospitals use to examine efficiency and effectiveness of care (Norris & Hill, 1991; Schroer, 1991; Sparacino, 1991). Findings of this study demonstrated the use and greater effectiveness of APNs as care managers in expanded roles, since it was found that CNS-managed care resulted in decreased LOS, when compared with PA-managed care.

There are many possible explanations for decreased LOS in group 2, one of which is the use of the nursing process by CNSs. Nurses with advanced assessment skills not only identify abnormalities early, but begin intervention quickly. Evaluation of interventions is ongoing by the astute nurse, with frequent re-prioriti-

zation. CNSs excel in critical thinking and make higher level clinical judgments. They have gained specialized expertise in clinical management that PAs do not receive in their curriculum (Schroer, 1991).

Nurses are more likely to use a holistic approach to provide patient care. Not only does the patient's physical condition dictate the plan of care, but the patient's emotional, spiritual, and psychosocial state does as well. Nurses begin discharge planning on the day of admission. The client is not viewed from the framework of the medical model, as one who has an illness that needs to be cured, but as an individual who is dependent upon his environment and others. This approach to the patient, rather than the strict approach of the medical model, many times offers the balance necessary to provide superior patient care.

Nurses also work well within a hospital or clinic system (Schull et al., 1992). Often the delay in laboratory or diagnostic testing, or delay in initiation of medications, can be overcome by the nurse because of the understanding of how the system works, and how to use it to one's advantage. The PA typically does not function as well in a system, but rather, is an individual performer. For instance, if a chest radiograph were necessary before discharge to follow-up a mild abnormality, the nurse may order it the night before discharge, so that there would be no delays. This would be done because of the nurse's experience with scheduling delays, difficulties with transportation to the department, etc. The PA may not consider this, and order the radiograph in the morning before discharge, thinking of convenience for the patient. A delay in obtaining the radiograph may well delay discharge by a day, if it is not done in time to be interpreted before discharge.

The PA has been a highly dependable and crucial partner in the provision of health care for many decades. PAs have offered relief to physicians by performing routine and technical tasks that require generalized as well as specialized knowledge and skill. The PA, however, is trained from the perspective of the medical model, and typically approaches the client from that viewpoint. Often the PA is a "substitute" for a physician, whereas an APN can be a complement. The nurse/physician relationship uses a team approach to provide care, with each making a unique contribution.

The use of APNs as collaborative partners in the management of patient care, as supported by this research, can provide an enormous cost savings to the health care industry. During the 6 months of this study (time in which CNSs were care managers), estimated cost savings by the reduction in patient days was almost \$550,000! This computation was based on cost per day for the general surgical floor only, and does not include fees for medications, laboratory tests, or procedures (D. Hanson, William Beaumont Hospital, personal conversation, 1993).

Since increased incidence of complications was shown to be closely related to increased LOS, efforts must be made by nurses to monitor for onset of complications. Early detection of infections, for instance,

allows treatment to be started before patient instability.

LIMITATIONS

1. The population sample was taken from one institution in the Midwestern United States. This may limit generalizability of the study.
2. This was a retrospective study.
3. External factors not controlled for may have affected study results. (LOS may have become shorter during the time span of the study due to factors unrelated to management of patient care by CNSs or PAs; there were different time periods for both groups.)
4. Data collection regarding readmission rates was impossible (patients could have been readmitted to institutions other than the one involved in this study).
5. The researcher was one of six CNSs providing care in the cardiovascular surgery department during the time of study. However, since the measure of CNS effectiveness was objective (LOS), this should have affected study results minimally.

RECOMMENDATIONS

The following are recommendations for future research of CNS-managed care of the cardiovascular surgical patient:

1. In future studies, include a larger patient population, to re-examine the relationship existing between the variables not found to be predictors of LOS in this study.
2. Extend the study to include patients who have undergone valve surgery and other cardiovascular procedures that are commonly associated with an increased hospital stay, to see whether a CNS has impact in that setting.
3. Replicate the study to compare CNSs with PAs who manage other patient populations, such as peripheral vascular, oncology, neurological, etc.
4. Attempt to discover why LOS is shorter. Critically examine educational preparation and critical thinking skills between the CNS and PA.
5. Research differences in CNS and PA practice in other settings, such as outpatient clinics and surgery.

Acknowledgments

The author acknowledges Dr. Frances Jackson and Dr. Anahid Kulwicki for their invaluable guidance throughout the development and completion of this study. - CNS -

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late and interpret financial and clinical data in order to effectively manage costs, especially in relation to high cost devices such as specialty beds and mattresses and other new pressure-reducing technology.

- CNS -

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Submitted by: Marilyn L. Williamson, Vice President for Academic Affairs
and Provost

**ESTABLISHMENT OF DEPARTMENT OF PHYSICIAN ASSISTANT STUDIES
AND
MASTER OF SCIENCE IN PHYSICIAN ASSISTANT STUDIES**

Recommendation

It is recommended that the Board of Governors authorize the establishment of a Department of Physician Assistant Studies and a program leading to the Master of Science in Physician Assistant Studies in the College of Pharmacy and Allied Health Professions, effective Spring/Summer Term 1996.

Background

Physician assistants are an important provider of comprehensive primary care in this country. Working under the supervision of physicians, they provide diagnostic and therapeutic patient care. They take patient histories, perform physical examinations, and order and interpret laboratory tests. When medical problems are diagnosed, they develop treatment plans and explain them to patients and, in certain instances, recommend medications and drug therapies. Cost containment and cost effectiveness are key words in today's health care debate. With their shorter training period and accreditation, certification, and recertification quality control processes, primary care physician assistants are an attractive, lower cost alternative to assist physicians in the work force.

The proposed program is consistent with the Essentials and Guidelines for an Accredited Educational Program for the Physician Assistant and compares favorably with similar programs at other major research universities in the United States. There are two other Physician Assistant programs in Michigan: University of Detroit Mercy and Western Michigan University. There is high interest and demand for graduates of these programs and the number of applicants far exceed the space available in the programs. Two other universities are in planning stages to offer a Physician Assistant program - Central Michigan University and Grand Valley State University.

Program Description

The Master of Science in Physician Assistant Studies will be housed in the new Department of Physician Assistant Studies in the College of Pharmacy and Allied Health Professions. The objectives of the program are to provide skills and competencies to meet the professional needs and requirements of the physician assistant including the authority to evaluate patients, recommend therapy, and monitor the progress of the health care plan in these patients. The program consists of 24 months of studies, half didactic, half clinical clerkships or rotations. The student will earn 48 credit hours and upon graduation will be eligible for the certification examination which is offered by the National Commission on Certification of Physician Assistants.

Admission Requirements:

Students must meet the admission requirements of the Graduate School. In addition, students must meet the following requirements:

1. Successful completion of a Bachelor's degree from an accredited college or university with a cumulative G.P.A. of 3.0.
2. Appropriate, recent prerequisites as spelled out in the application form (anatomy/physiology, nutrition, microbiology, biochemistry and statistics).
3. Experience in health or human services (500 hours).
4. Three letters of recommendations, a 1,000-words narrative, satisfactory GRE scores, and a personal interview with the faculty.

Curriculum Requirements:

The Master of Science in Physician Assistant Studies' entry level professional program is a Plan C graduate program and will require the completion of 48 credit hours of course work over two years or six semesters. The curricular requirements by term are listed in Appendix A. In order for students to receive the Master of Science in Physician Assistant Studies degree, they must have a G.P.A. of 3.0 or better; in addition, students will be required to achieve the grade of B or better in each course of the curriculum. A grade of A in a given course will not offset a C grade in a different course having the same credit value.

Program Administration and Evaluation

The program will be administered by a program director who will serve also as the Department Chair. The Chair will report directly to the Dean of the College. The program will also require a Medical Director whose function will be to provide medical guidance for clinically-related program components, so that both didactic and supervised practicum instruction meet current acceptable standards. The academic coordinator will provide oversight of the team taught didactic courses. Student recruitment, admissions, advising and progress, curriculum development and program evaluation will be the responsibility of the graduate faculty associated with the program. Since this will be a relatively small program, individual faculty will have several responsibilities.

The Physician Assistant Studies program will be reviewed annually by the Department's graduate faculty and by an advisory committee which will include practicing health care professionals as well as faculty members. The program review will use the accreditation standards as a minimum basis for the evaluation process. In addition, the program will be subject to the University's program review process and to periodic accreditation reviews once the program is in place.

Budget And Resource Requirements

The program will be implemented in Spring/Summer 1996. Class size will be limited to twenty-five students for the first entering class. The plan is to increment enrollment by five students each year until a steady state of 50 students are admitted in the first professional year. Fifteen new courses are required to implement the program.

The program will require a minimum of 5.5 FTE: a Department Chair/Program Director (1 FTE), a medical director (0.5 FTE), an academic coordinator (1 FTE), a clinical coordinator (1 FTE), a secretary (1 FTE), and an academic staff support position (1 FTE). All courses will be team taught, using a number of faculty for the didactic instruction. It is expected that there will be a high level of volunteer faculty participation during the phase-in years; such faculty will be drawn from the School of Medicine as well as from various departments of the College of Pharmacy and Allied Health Professions. In FY 2002, when steady state is reached, enrollment will support 10.6 faculty lines (this is based on a Student Faculty Ratio of 8.5).

The Department and program will be housed in Shapero Hall. Clinical facilities of the Detroit Medical Center, Henry Ford Hospital System, Veterans Administration Hospital, as well as some rural sites, will be used for practicum and rotation experiences. Existing University library collections and computer services along with the resources of the Detroit Medical Center and Henry Ford Libraries will support the program.

Projected cost above the enrollment supported unit budget for implementing the program during the four-year enrollment phase in period is \$440,000 (Appendix B). Funding during the four-year start-up period will be derived from commitments by the Detroit Medical Center and Henry Ford Hospital and Henry Ford Health Systems. These two institutions will provide payments of \$280,000 (\$140,000 each) over four years as well as 0.5 FTE each in-kind services for two years for the clinical coordinator to reduce program expenses by \$160,000 (Appendix C and D). These combined commitments of \$440,000 will cover the \$440,000 shortfall over the first four years of the program. The college will temporarily subsidize the non-recurring costs and cash short fall in the first years from designated funds. Since the physical diagnosis laboratory course will be taught in present Medical School facilities, the non-recurring costs are estimated to be \$60,000. Assistance is being sought for funding of these non-recurring costs by equipment donations and grant applications. In FY 2000 and beyond, income based on enrollment will exceed the academic budget needs.

Accreditation

The proposed Master of Science in Physician Assistant Studies program will be submitted to the Accreditation Review Committee on Education for the Physician Assistant for preliminary review and for the granting of a Letter of Review prior to admission of the first class in Spring/Summer 1996. Full accreditation for the program must be sought after the completion of the first year of the first entering class. The Commission on Accreditation of Allied Health Education Programs (CAAHEP) is the national agency responsible for such accreditation.

Approvals

The proposal for the establishment of the Master of Science in Physician Assistant Studies was approved by the Faculties of Pharmacy and Allied Health Professions and the Dean of the College of Pharmacy and Allied Health Professions. The program is supported by the Dean of the School of Medicine and has been discussed with the Dean of the College of Nursing. The proposal was approved by the Graduate Council on January 18, 1995.

APPENDIX A

**SEQUENCE OF COURSES IN THE
PHYSICIAN ASSISTANT PROGRAM****DIDACTIC CURRICULUM:**

SPRING SEMESTER

PAS 700	Anatomy for Physician Assistants	3 credits
PAS 701	Physical Diagnosis/Patient Education	3 credits
PAS 702	Research Methods	1 credit
PAS 703	Seminar/Elective	1 credit

FALL SEMESTER

PTH 650	Pathophysiology	3 credits
PAS 704	Health Care Issues/Orientation	1 credit
PAS 705	Clinical Medicine I	4 credits

WINTER SEMESTER

PAS 706	Clinical Medicine II	4 credits
PAS 707	Pharmacology for Physician Assistants	4 credits

CLINICAL CURRICULUM ROTATIONS

SPRING SEMESTER

PAS 800	Internal Medicine	4 credits
PAS 801	Obstetrics and Gynecology	2 credits
PAS 802	Emergency Medicine	2 credits

FALL SEMESTER

PAS 803	Pediatrics	2 credits
PAS 804	Psychiatry	2 credits
PAS 805	Surgery	4 credits

WINTER SEMESTER

PAS 806	Family Medicine*	6 credits
PAS 807	Elective**	2 credits

*At HFH System this rotation will be part of a preceptorship and a continuity clinic which should encourage students toward practice in a primary care environment.

**This elective can be in a variety of specialties such as orthopedics, geriatrics, radiology or may lead the student to post-graduate training and certification after graduation.

APPENDIX B

**SUMMARY OF ADDITIONAL PHYSICIAN ASSISTANT PROGRAM COSTS,
ENROLLMENT REVENUES, AND HOSPITAL SUPPORT**

FY	Expense Category	Program Cost	Enrollment Based Support	Unfunded Balance	Hospital In-Kind Support	Hospital Cash	Unfunded Balance
FY96	Payroll	\$ 282,700	\$ 95,400	\$ (187,300)	\$ 80,300	\$	\$ (107,000)
	Supplies	49,000	0	(49,600)		70,000	20,400
FY97	Payroll	371,200	328,000	(43,200)	82,700		39,500
	Supplies	36,000	20,000	(16,000)		70,000	54,000
FY98	Payroll	580,300	524,500	(55,800)			(55,800)
	Supplies	37,000	20,000	(17,000)		70,000	53,000
FY99	Payroll	677,400	623,400	(54,000)			(54,000)
	Supplies	37,100	20,000	(17,100)		70,000	52,900
4-yr total		\$2,071,300	\$ 1,631,300	\$(440,000)	\$ 163,000	\$280,000	\$ 3,000

SUMMARY OF 4-YEAR P A PROGRAM ADDITIONAL COSTS AND SOURCE OF FUNDING

4 -YEAR COST	\$2,071,200
ENROLLMENT SUPPORT	1,631,300
UNFUNDED BALANCE	440,000
HOSPITAL IN-KIND SUPPORT	163,000
HOSPITAL CASH SUPPORT	280,000
SUPPORT IN EXCESS OF COST	3,000