
Economic Feasibility and Patient Diagnostic Mix of Family Nurse Practitioners

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THE TRAINING OF SKILLED MID-LEVEL PRACTITIONERS as new providers of primary care is one approach to solving the deficit in primary care practitioners and keeping health care costs down. Questions have been raised, however, about the economic feasibility of having these new care providers on a medical care team and about the contributions they can make.

For example, nurses and physicians agree that a nurse practitioner should earn a higher salary than a regular nurse, but they want to know how much more and at what rate the nurse practitioner can pay his or her own way. The private solo physician wants to know if the nurse practitioner can generate enough income to cover not only his or her salary but also the increased overhead, such as space, equipment, expanded nursing and office support, malpractice insurance, supplies, utilities, and other expenses. Questions often asked are: What types of patients can the nurse practitioner see? Are the patients similar to those seen by the physician in terms of diagnoses, severity of illness, and demographic characteristics? What does the nurse practitioner add to the medical team? Does the nurse practitioner offer skills that enhance the care and upgrade the practice?

To seek answers to these questions, three different types of medical practices employing family nurse practitioners were studied in terms of the family nurse practitioners' assumption of responsibilities and generation of revenue.

Training and Role of the Family Practitioner

Nurses with previous clinical training and experience in a variety of medical settings can qualify as family nurse practitioners upon completion of formal education pro-

grams to update their skills in physical diagnosis and in the management of uncomplicated health problems under a physician's supervision.

Training programs for family nurse practitioners differ. For example, didactic training may last from 6 to 12 months. In addition, in some programs, the family nurse practitioner student works part time in a physician's office as a trainee and the balance of time in another office or in the same office as a regular nurse. Sometimes the trainee's original physician employer (or supervisor) becomes the preceptor with whom the student does his or her clinical training and internship. Or students may be rotated through specific programs, such as a public health department, family planning program, pediatric clinic, or physician's office. In one large prepaid group, the family nurse practitioner trainee begins by doing complete physical examinations and later works at a drop-in clinic. In some cases, students are matched with physicians willing to employ them and to serve as their preceptors. After completing the training program, the graduate may continue to work in a similar setting but in the new family nurse practitioner role. The family nurse practitioner may work independently or enter into team relationships with physicians, sharing responsibilities in a practice.

Nurse practitioners see themselves as offering services that overlap those provided by physicians, but they believe that they offer additional perspectives in patient care. They believe that nurses study and learn how to apply in practice more insights in social, developmental, and psychological areas than do most physicians. Further, the nurse practitioners believe that nurses take the lead in applying this knowledge, not only to deal with illnesses, but also in anticipatory health counseling to help clients adopt health patterns that will increase the likelihood of their staying healthy.

Other Studies of Mid-Level Practitioners

Several studies have shown that mid-level practitioners can generate revenues above the total of their salaries

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and overhead (1-3), but in at least two studies the net income for some practices was found to have actually declined when a physician's assistant was employed (4, 5). At a clinic 30 miles north of Seattle, Wash., however, a nurse practitioner generated between \$28,000 and \$31,000 in patient bookings over a 10½ month period in 1974, as against a salary of \$10,085 (1). This nurse practitioner saw an average of 10 to 12 patients daily and occasionally as many as 20 patients.

Yankauer and associates examined the income-generating potential of 26 pediatric nurse practitioners in relation to the costs of training them (2). Although the income the pediatric nurse practitioners generated was low because their office visits were billed at only \$5 each, the results indicated that even as trainees they could produce enough income to increase the office's net revenue. Based on a work week of 38 hours and 45 minutes, they generated an average of \$19,400 in income annually. After deducting 40 percent for overhead (\$7,760) and an average salary of \$9,100, the net annual income to the practice was \$2,500.

In a two-physician pediatric practice located in a suburb of Denver that had recruited a pediatric nurse practitioner, it was found that although she saw an average of only eight children per day, she generated an income of \$1,400 per month, or \$18,800 for the year 1968, with no significant increase in overhead or space requirements (3). Her revenues exceeded her \$635 monthly salary after the first 5 months. Also, the physicians in this practice stated that the quality of patient care they delivered improved because they had more time to spend with patients.

Nelson and colleagues at Dartmouth studied the financial impact of MEDEX on 12 medical practices (5). Although patient charges in some of these practices were not actually broken down into MEDEX fees and physician fees, these investigators devised a formula which, by crediting the MEDEX for solo patient visits and patient visits shared with a physician, permitted an estimation of the income generated by the MEDEX.

Annual revenue produced by the MEDEX in the 12 practices ranged from \$12,840 to \$39,690, with an average of \$28,190. The mean salary paid to the 12 MEDEX was \$10,100. Two MEDEX created net losses, but the other 10 showed net profits ranging from \$20,000 to \$25,000 despite the authors' fairly high estimates of overhead expenses.

A nurse practitioner working entirely in skilled nursing facilities provided comprehensive health care to almost 400 patients in six nursing homes in Fremont, Calif. (6). The team physician was able to use his time more effectively and to provide medical supervision for a greater number of patients by sharing responsibilities with her. Although patients benefited, reimbursement by third-party payers was a problem. Even though the nurse practitioner started work at a salary lower than she had been offered elsewhere, it still took her 19 months to reach the break-even point.

Study Sites and Methods

Six sites were initially chosen for study, but three were excluded because the family nurse practitioners in them did not work full time. For ease of identification, the sites studied are designated as solo, community, and nonprofit practices. The solo practice was a private one in a small rural community in northern California. The other two were both nonprofit, prepaid group practices in southern California. One of these, the community practice, operated an urban clinic with Federal funding; most of its patients were cared for under a prepaid contract through Medi-Cal. The other, the nonprofit practice, consisted of a large private plan with several clinics. Most of its patients' charges were paid through their employee medical insurance plan or Medi-Cal.

Economic research on private medical practices is difficult because physicians are reluctant to provide data on revenue and expenses. Yet it seemed desirable to have at least one study site where the production outputs and net income of each team member could be calculated from billings. We were able to obtain these

data from the solo practice by preserving its anonymity.

To collect the study data, two evaluators visited each of the three sites and reviewed appointment logs, billing or charge sheets, patient charts, and financial records for 1 week in October 1974. Data collection methods were the same for each evaluator, and data on the patients' characteristics, diagnoses, and finances were centrally analyzed.

Because each practice was unique in terms of location, organization, and type of patients, it did not seem feasible to compare all family nurse practitioners with all physicians. Rather, it appeared more logical to make comparisons within each practice. To define differences between the patients of the family nurse practitioner and the physician, data were collected for all three practices on the number, sex, age, and diagnoses of patients each saw over a 5-day period. In one of the prepaid plans in which the family nurse practitioner worked with two physicians, these data were obtained on both physicians. In the solo private practice, in addition, the patient billing charges for both the family nurse practitioner and the physician were studied. Also, in this practice, to supplement the data on patient characteristics, the patients' occupations and methods of payment were ascertained.

Results

Patients' characteristics. The age and sex distribution of the patients seen in the three practices over a 1-week period are shown in table 1.

In the solo practice, the physician worked in the

office 4 days a week and spent the 5th day in the hospital. The family nurse practitioner's practice in the office included a greater proportion of females (59 percent) than did the physician's practice (53 percent). Except for infants and persons aged 35-44 years, the physician saw a higher percentage of male patients than the family nurse practitioner did. The family nurse practitioner saw most of the young girls (88 percent of those between 1 and 14 years); the physician's practice contained a higher proportion of young boys and teenagers. The family nurse practitioner cared for the majority of women aged 20-34 as well as more of the men of those ages. The median age of the family nurse practitioner's patients was 24 years compared with 32 years for the physician. The family nurse practitioner treated about the same proportion (39 percent) of adults (20-44 years of age) as the physician did (37 percent), but a lower proportion of adults 45 years and older (family nurse practitioner 17 percent, physician 34 percent). On the day that the physician was not in the office, fewer appointments were scheduled for older people, whether because these patients preferred to see the physician or because the office made an effort to book these patients to see him is not known.

In the community practice, the family nurse practitioner worked with two physicians, who each saw patients only 4 days a week. (The family nurse practitioner's preceptor will be referred to as the primary physician and the other physician as the secondary physician.) The secondary physician, a 66-year-old woman, saw most of the older patients; more than half of her

Table 1. Percentage distribution and percentage male of patients seen by family nurse practitioners (FNPs) and physicians (MDs) in 3 practices during 1 week in October 1974, by age group

Age group of patient (years)	Solo practice				Community practice						Prepaid practice			
	FNP		MD		FNP		MD-1		MD-2		FNP		MD	
	Per-cent	Per-cent male	Per-cent	Per-cent male	Per-cent	Per-cent male	Per-cent	Per-cent male	Per-cent	Per-cent male	Per-cent	Per-cent male	Per-cent	Per-cent male
	(N = 132)		(N = 98)		(N = 45)		(N = 60)		(N = 48)		(N = 74)		(N = 106)	
All ages	100.0	41.2	100.0	46.9	100.0	36.4	100.0	40.7	100.0	27.1	100.0	14.3	100.0	43.4
Under 1	6.9	75.0	6.4	50.0	6.8	(¹)	3.9	(¹)	4.2	(¹)	...	...	...	...
1-4	12.2	31.3	6.4	83.3	6.8	(¹)	7.8	(¹)	4.2	(¹)	5.9	(¹)	2.0	(¹)
5-14	15.3	75.0	6.4	83.3	25.0	54.5	17.6	66.7	14.6	42.9	10.3	28.6	1.0	(¹)
15-19	9.2	33.3	9.7	55.6	6.8	(¹)	11.8	50.0	...	...	10.3	0.0	2.0	(¹)
20-34	29.0	26.3	26.9	32.0	25.0	0.0	33.3	17.6	16.7	12.5	41.2	0.0	25.7	34.6
35-44	9.9	53.8	9.7	44.4	15.9	28.6	9.8	20.0	8.3	(¹)	16.2	27.3	12.9	69.2
45-64	14.5	26.3	26.9	48.0	6.8	(¹)	11.8	33.3	41.7	25.0	14.7	20.0	25.7	53.8
65 and over	3.0	(¹)	7.5	42.9	6.8	(¹)	3.9	(¹)	10.4	40.0	1.4	(¹)	30.7	25.8

¹ Percentages not calculated for less than 5 patients.

NOTE: A few patients for whom age or sex was not recorded are included in totals but not in percentages. Leaders (....) indicate no patients in age group.

patients for the week were 45 years old or older, compared with less than one-sixth of the primary physician's and one-seventh of the family nurse practitioner's. The median age of the patients (24 years) was the same for the family nurse practitioner and the primary physician, but 46 years was the median for the secondary physician. Except that the family nurse practitioner saw a higher proportion of children than did the primary physician, the age distribution of their patients was similar. Although half of both practices were made up of persons 5-14 and 20-34 years old, the primary physician saw a higher proportion of 20 to 34-year-old patients than did the family nurse practitioner. Of the family nurse practitioner's patients, 39 percent were 14 years or younger, while 29 percent of the patients whom the physician saw were in these age groups. The secondary physician saw mainly females, largely because her practice was confined to older people, and most of the older patients were women. In general, the family nurse practitioner saw a greater percentage of the females than did the primary physician, as well as a higher proportion of the men 35-44 years of age.

In the other prepaid plan—the nonprofit practice, persons 20-34 years made up a larger percentage of the family nurse practitioner's practice (41 percent) than of the physician's (26 percent). The family nurse practitioner treated fewer middle-aged adults than the physician did and only one senior citizen, compared with 31 patients over the age of 65 for the physician. More than one-fourth of the family nurse practitioner's practice was made up of children and teenagers, compared with just 5 percent of the physician's. The family nurse practitioner saw proportionately many more females (86 percent) than did the physician (57 percent).

Like the family nurse practitioner in the community practice, the one in the nonprofit practice saw no male patients 20-34 years old, while more than one-third of the patients in this age group seen by the physician were men. Like the other family nurse practitioners, the proportion of middle-aged patients seen by the family nurse practitioner in the community practice was substantially lower than that seen by the physician.

In the solo practice, because the physician saw more of the older patients, he saw more retired people than the family nurse practitioner. Among occupational groups, his practice showed a greater proportion of craftsmen, machine operators, salesmen, and clerks. The physician and family nurse practitioner saw equivalent proportions of patients whose source of payment was Medi-Cal. More of the family nurse practitioner's patients than of the physician's paid cash, while a higher proportion of the physician's patients made payment through private insurance.

Diagnoses. Table 2 details the diagnoses in broad categories for patients seen by the family nurse practitioners and physicians during the week studied. (The three-digit diagnostic codes of the 1968 Eighth Revision of the International Classification of Diseases, adapted for use in the United States, were used to summarize the diagnoses.) Infectious and parasitic diseases and neoplasms are not listed separately but are included in the corresponding system. Conditions related to pregnancy are listed under "Preventive and special conditions without sickness."

When the overall percentage distributions of diagnoses for the three family nurse practitioners are compared with the distributions for the four physicians, it is evident that the family nurse practitioners, probably consistent with their preparation and training, saw a far greater proportion of patients for preventive care than the physicians. Physicians saw a far greater proportion of patients with skin problems, musculoskeletal conditions, and diseases of the circulatory system (mainly hypertension and heart conditions). Although the numbers were small, physicians saw more patients with mental disorders and diseases of the digestive system. The physicians handled the more difficult diagnoses. For example, although the proportion of patients seeing family nurse practitioners and physicians for diseases of the nervous system and sense organs was almost the same, the physicians handled more nervous disorders and eye problems, while the family nurse practitioners handled more ear problems, primarily otitis media.

In the solo practice, the family nurse practitioner handled about three-fourths of the pregnancy-related visits, pelvic examinations, well-baby visits, and injections. In both prepaid plans, well-baby care was handled by pediatricians rather than by the family physicians. Other differences between the family nurse practitioner and the physician in the solo practice were that during the week studied the family nurse practitioner saw no patients whose primary diagnosis was either a mental problem or a heart condition, and she saw a lower proportion of patients with digestive, skin, and musculoskeletal conditions, but she saw a higher proportion of patients with respiratory and ear problems. In contrast to the family nurse practitioners in the other two practices, the family nurse practitioner in the solo practice handled a greater proportion of patients suffering from injuries and wounds, hypertension, and genitourinary ailments.

In the nonprofit practice, although the physician cared for 106 patients during the week, only 60 patients were given diagnoses; the other patients came for rechecks and prescription refills. Only the patients with

Table 2. Distribution of patients seen by family nurse practitioners (FNPs) and physicians (MDs) in 3 practices during 1 week in October 1974, by diagnostic category

Diagnostic category	Number of patients with diagnosis								
	Percent distribution		Solo practice		Community practice			Prepaid practice	
	All FNPs	All MDs	FNP	MD	FNP	MD-1	MD-2	FNP	MD
All diagnoses	100.0	100.0	138	104	62	79	67	75	60
Endocrine, nutritional, and metabolic	5.5	3.5	3	3	10	1	2	2	5
Thyroid problems	1	2	3	..	..	..	2
Diabetes	2	..	1	1	1
Obesity	2	1	5	..	1	1	2
Malnutrition	1	..	..	..
Blood (anemia)	..	0.3	..	..	..	..	1	..	..
Mental disorders	0.7	2.9	0	4	2	2	3	0	0
Alcoholism	2	..	..	..	..	..
Mental retardation	1	1	..	..	..	..
Other	1	1	2	3	..	..
Nervous system and sense organs	8.0	8.4	12	7	4	11	5	6	3
Nervous disorders	2	4	2	3	4	..	1
Eye problems	1	1	6	..	1	2
Ear problems	10	2	1	2	1	5	..
Circulatory system	4.7	11.9	9	10	2	6	12	2	9
Hypertension	8	8	..	3	9	1	3
Heart conditions	2	2	1	2	..	4
Other	1	..	..	2	1	1	2
Respiratory	15.6	18.1	30	16	4	17	14	9	9
Upper respiratory infection	20	2	3	1	5	4	1
Tonsillitis	3	2	..	8	1	1	..
Pneumonia and influenza	5	2	..	4	6	2	6
Bronchitis	2	7	..	1	..	2	..
Asthma	2	..	2	1	..	1
Other	1	1	1	1	..	1
Digestive system	2.5	4.5	3	6	4	4	3	0	1
Stomach problems	1	..	1	..	..	..	..
Hernias	2	1	..	..	..	..	..
Intestinal problems	3	2	2	1	..	1
Liver and biliary tree problems	1	..	1	1	..	..
Other	1	1	1	1	..	..
Genitourinary	10.5	8.7	9	5	11	8	9	9	5
Venereal disease	1	..	2	..	..	1	..
Urinary tract infections	4	1	3	1	1	3	2
Other	3	1	1	..	..
Male conditions	1	1	1	..	..	1
Female conditions	4	3	2	5	7	5	2
Skin	2.9	7.7	4	8	4	10	1	0	5
Infection	2	..	..	..	..
Allergies and inflammatory conditions	2	1	2	6	1	..	1
Other	2	7	..	4	..	..	4
Musculoskeletal	2.9	8.1	2	11	6	4	3	0	7
Arthritis	2	..	..	1	..	1
Back problems	1	..	3	2	..	..	..
Pain	6	1	..	..	..	5
Other	1	3	2	2	2	..	1
Accidents, injuries, and wounds	7.3	8.4	18	9	1	9	4	1	4
Fractures	2	2	..	1	..	..	..
Sprains and strains	1	..	..	3	..	..	1
Lacerations and contusions	4	5	..	5	..	1	..
Other	11	2	1	..	4	..	3
Preventive and special conditions without sickness	39.3	17.4	48	25	14	7	10	46	12
Pregnancy and post-partum care	14	4	1	1	1	3	..
Physical examinations	5	9	..	2	1	16	11
Papanicolaou smear and pelvic examination	5	3	1	..	1	23	1
Well-baby care	10	5	4	..	1	..	..
Injections, tests, and immunization	12	3	4	2	6	4	..
IUD (intrauterine device) removal	1	..	..	..	..	..
Counseling	2	..	4	2	..	..	..

NOTE: Patients seen for 2 causes are listed twice. Leaders (...) indicate no diagnoses in category.

diagnoses are listed in table 2. Most of the family nurse practitioner's patients saw her for preventive care or for genitourinary, respiratory, or ear conditions; only six patients (8 percent) saw her for other reasons. More than half of her patients received preventive care in the form of physical or pelvic examinations, injections, or pregnancy care. By contrast, the physician did only one pelvic examination, and preventive procedures represented only one-fifth of his diagnoses. He saw patients with a variety of diagnoses and handled all the skin and musculoskeletal problems.

In the community practice, the family nurse practitioner's practice was more like that of the physicians with whom she worked than in the other practices studied, largely because pregnancy and preventive procedures were handled elsewhere in the clinic. She saw most of the patients with thyroid disorders, diabetes, and obesity and some of the patients with digestive and musculoskeletal problems, but fewer of the patients with eye or skin conditions or with injuries and wounds than the physicians; she saw no hypertensive patients and very few patients with respiratory conditions.

Productivity. As shown in the following table, the physicians saw an average of 18 patients per day, 1.5 patients more than the family nurse practitioners' average number. The family nurse practitioner in the community practice saw three-fourths as many patients as the secondary physician and three-fifths as many as the primary physician. In the nonprofit practice, the family nurse practitioner averaged one-third fewer patients per day than the physician, but she did more physical examinations, which take more time. Since data collected by the nonprofit practice showed that the family nurse practitioner averaged 18.8 patients per day in sample weeks during the last quarter of 1974 and 23.1 patients per day during sample weeks of January and February 1975, the week that we examined apparently was a light one.

<i>Kinds of practice</i>	<i>Mean office visits per day during week studied¹</i>	
	<i>Family nurse practitioners</i>	<i>Physicians</i>
All 3 practices	16.5	18.0
Solo	26.4	23.8
Community	9.0	...
Physician-1 .....	...	15.0
Physician-2 .....	...	12.0
Nonprofit	14.0	21.2

¹ Based on average of 5 days for all family nurse practitioners and for physician in nonprofit practice; based on average of 4 days for physicians in solo and nonprofit practices.

The productivity of the family nurse practitioner in the solo practice was impressive. She handled a well-rounded share of various types of patients, as well as performing more preventive procedures (although no more physical examinations) than the physicians. Yet she managed to average 26.4 patients per day, the highest number of patients among the seven physicians and family nurse practitioners studied.

Break-even point. In response to the question as to whether or not the family nurse practitioner was paying her own way, all family nurse practitioners and physicians agreed that she was. In the solo practice, where the family nurse practitioner had started as a student, the physician and the family nurse practitioner said that she started generating more revenue than expenses even as a student, sometime between the 6th and 9th month of her training program. In the group plans, both of the family nurse practitioners started as graduates. In the community practice, both the family nurse practitioner and the physician agreed that the break-even point had been reached a few months after the family nurse practitioner started. This record is comparable to that of the pediatric nurse practitioner in the Denver suburb, whose revenue exceeded her salary in 5 months (3).

Although the effect on the physician's patient load of the addition of a nurse practitioner was not examined, there is no reason to suspect that introduction of a family nurse practitioner reduces the demand for the physician's services. My analysis shows that a family nurse practitioner can bring in more revenue to a practice than it costs to employ her. This analysis, however, does not prove that a practice will maximize profits by employing a family nurse practitioner.

Revenue generated. The physician in the solo practice saw patients in the office on 4 days; on the 5th day he served as a surgical assistant in the hospital. The family nurse practitioner saw patients in the office all week except for a few hours when she went to a plywood factory to give influenza immunizations to employees.

A review of the distribution of charges in the rural solo practice showed that the family nurse practitioner had 21 no-charge visits and the physician had 4, primarily obstetrical or followup. To determine total income, charges were assigned for these no-charge visits. The regular office visit charge at this practice was \$8. Total revenue generated by the family nurse practi-

tioner for the week was thus \$1,261, compared with \$1,946 for the physician; the average charge for each visit was \$9.63 for the family nurse practitioner's patients and \$19.86 for the physician's. Only 3 percent of the family nurse practitioner's charges exceeded \$18, compared with 15 percent of the physician's. He had 11 charges of \$41 or more; however, for 5 of these (which totaled \$787), he either performed surgery or assisted in surgery. If office visits only are considered, the mean charge for the family nurse practitioner was \$9.73 and for the physician, \$12.46 (about 28 percent higher). The physician's handling of most of the complicated office cases (care of lesions, wart removal, repair of lacerations) accounted for the higher charges. The physician and the family nurse practitioner handled the same proportions of "moderately difficult" cases, which were billed at from \$9 to \$18. Because, however, the family nurse practitioner handled more routine obstetrical and well-baby patients, treated more upper respiratory and ear infections, and gave more injections, a higher proportion of her charges were under \$8.

As a final assessment of the productivity of the family nurse practitioner in the solo practice, after allowing 3 weeks for vacation, her charges for the study week were multiplied by 49 to estimate the revenue generated for the year. Although this method does not take into account seasonal variations, it does provide a way of comparing the income generated by the family nurse practitioners and the physicians. Yankauer and associates charged 40 percent for overhead in their study of pediatric nurse practitioners; I decided to use the higher overhead charge of 45 percent. The following table shows the approximate annual revenue generated by the family nurse practitioner and the physician in the rural solo private practice.

Item	Revenue generated	
	Family nurse practitioners	Physicians
Revenue for 1 week	\$ 1,271	\$ 1,946
Estimated revenue for 49 weeks . .	\$62,279	\$95,354
Deduction for overhead (45 percent)	28,026	42,909
Revenue left after deduction for overhead	\$34,253	\$52,445
Deduction for family nurse practitioner's salary	15,600	...
Revenue left after expenses	\$18,653	\$52,445
Increase in physician income from revenue generated by family nurse practitioner . . . . .	...	18,653
Total physician income . . . . .	...	\$71,098

After the 45 percent deduction for overhead, the physician's revenue was \$52,445, or about 53 percent higher than the family nurse practitioner's (\$34,253). After the family nurse practitioner's salary of \$15,600 is deducted, the annual net revenue is \$18,653. When this amount is added to the physician's income, his total income is increased by more than one-third. (It should be noted that without the family nurse practitioner, the physician also possibly could have generated a higher revenue, but probably not one as high as that generated by addition of the family nurse practitioner to the practice.) Moreover, although the family nurse practitioner had 10 years of previous nursing experience, she had been in full-time practice as a family nurse practitioner for only 6 months, and her productivity could be expected to increase with experience.

Discussion

Although it is not known if the experiences of the three practices described are typical of other practices employing family nurse practitioners, my study showed that the family nurse practitioners indeed paid their own way. In all three practices, the family nurse practitioners reached the break-even point fairly soon after starting. In comparison with the physician, the family nurse practitioner's productivity, in terms of number of patients, was good—somewhat higher in one practice and slightly lower in the other two practices. Many of the patients seen by the family nurse practitioners (for example, patients receiving complete physical examinations) were more time consuming than those seen by the physicians.

A trend in the type of patients seen by family nurse practitioners is suggested, inasmuch as all three family nurse practitioners in the study saw higher proportions of female patients and children and fewer older adults than the physicians with whom they worked. In the private solo practice, where occupational data on the patients (based on the occupation of the head of household) were available, only minimal occupational differences were noted between the type of patients treated by the family nurse practitioners and by the physicians.

In terms of diagnoses, the family nurse practitioners saw more patients for preventive and well-baby care and fewer patients for dermatological, musculoskeletal, circulatory, and digestive conditions. The family nurse practitioners handled more of the routine respiratory and ear infections. Female patients apparently sought out the family nurse practitioner for such services as pelvic examinations and obstetrical care. As a result,

they handled a greater proportion of these types of cases.

Data on charges in the solo practice showed that the family nurse practitioner generated substantial revenue, although as expected, it was not as high as the physician's revenue because the physician performed minor surgery in the office and assisted in surgery in the hospital. In this rural community, the presence of the family nurse practitioner enabled the physician to assist with surgical procedures at another location 1 day a week and still keep his office open that day to patients requiring medical care. Her presence also permitted the office to handle two complete caseloads rather than one.

In the prepaid groups, the family nurse practitioners had somewhat lower caseloads than the physicians. In the nonprofit group, a review of the diagnoses of the patients handled by the family nurse practitioner indicated that her lower caseload was mainly due to the physical and pelvic examinations that she did, which take more time. If these procedures were calculated on a fee-for-service basis, they actually would have generated more income than would appear from just looking at the number of patients seen.

The family nurse practitioner's salary in the solo practice was \$15,600, in the community practice \$15,924, and in the nonprofit practice \$15,840. A survey by the Health Manpower Council of Northeastern California revealed that salaries of physician's assistant-nurse practitioners in the council's area ranged up to \$18,000 (7). Three-fifths of the practices reported 10 to 30 percent higher gross incomes upon the employment of the physician's assistant-nurse practitioners—enough to cover their salaries and the additional overhead.

The noneconomic benefits physicians gain from employing nurse practitioners are not taken into account in my analysis. Most notably, the addition of a family nurse practitioner allows the physician more flexibility in tailoring the practice in ways that may be personally satisfying and yet will not reduce the availability of services to patients. Collins and Bonnyman's time-motion studies of a North Carolina private practice showed that a physician's assistant saved the physician 43 percent of the time he formerly spent in routine tasks and increased his time with patients an average of 16 percent (8). Lees reported that an average of 18 percent was saved for each unit of patient service in five family practice offices in Kingston, Ontario, when expanded-role nurses were employed (9). Kahn and Worth, who also used the time-motion method to study physicians in three practices who employed pediatric nurse practitioners (10), found that the physicians gained 22 to 30 percent more time in the working day

by employing the family nurse practitioners. One of the physicians used some of the time saved to shorten his day.

The workload handled by each family nurse practitioner in the three practices in this study generated sufficient income to cover the expenses and salaries and leave a net surplus. The family nurse practitioners cared for patients with a wide range of medical conditions of varying severity. My study also indicates that the family nurse practitioners were all economically viable, both in the rural private practice and in the two prepaid groups.

Conclusion

In terms of personnel shortages and the escalating costs of medical care, society could benefit from the use of more family nurse practitioners. If practices would share the extra income generated by family nurse practitioners, the cost savings could be passed on to the consumers. Family nurse practitioners offer skills that improve the quality of care, and this is the area in which they can make the most significant contribution.

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