The Nurse Practitioner as a Physician Substitute in a Remote Rural Community: A Case Study

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RESIDENTS OF RURAL AREAS have difficulty in gaining access to health services. Part of the reason for this difficulty is that physicians—who are the principal providers of medical care in the United States—have been increasingly unwilling to practice in isolated settings. Early results from the National Health Service Corps (NHSC) experience suggest that communities with fewer than 4,000 people and without hospitals are unlikely to attract or retain physicians (*1*).

New health practitioners—physician's assistants, nurse practitioners, and Medex—frequently have been supported and trained to help fill the provider gap in rural areas. In a number of cases, these practitioners have been placed in remote practice locations without onsite physician supervision. The amount and quality of remote supervision varies considerably from site to site, ranging from close audiovisual links supplemented with frequent site visits to perfunctory arrangements without much substance.

The results of numerous studies support the statement that in carefully controlled situations new health practitioners provide care that is acceptable to patients and that is of a quality comparable to the care provided by physicians. However, others have demonstrated the intrinsic organizational instability of small-scale remote practices by new health practitioners. We report the results of an experiment in which a solo physician was replaced by a solo nurse practitioner in

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an attempt to provide stable primary care in an isolated rural community.

The Setting

Condon is a town of 910 people on the fertile wheat-bearing plateau of eastern Oregon. In 1975, the solo physician, who had worked in Condon for 2 years under the auspices of the NHSC, was replaced by a nurse practitioner. Since both the physician and the nurse practitioner were initially NHSC assignees, and both were sponsored by the same community board, the major differences between their respective practices were personal characteristics and type of training. We compared the impact of these differences on the composition and viability of the two practices.

In 1973, Condon was without a physician. The solo practitioner who had been there for decades had left in 1972, and the replacement physician—attracted to the town by citizens' enthusiasm—stayed only briefly. Situated 40 miles and 1 hour's drive from the nearest hospital and 4 hours' drive from the nearest large city, Condon was unable to recruit a physician who was willing to practice in the town on an independent basis.

In 1973, a young physician partially trained in internal medicine was assigned to Condon for 2 years by the NHSC. Toward the end of his assignment, the physician reported to the NHSC that although he and his wife enjoyed the area and the lifestyle, he could not stay on because the practice would not allow him to attain financial equilibrium. More importantly, he said that the lack of a hospital and the distance to professional colleagues prevented him from using the techniques and knowledge acquired in his training.

In 1975, members of the NHSC—after discussions with the community board and the Corps assignee—decided to experiment by replacing the physician with a new health practitioner. Three hypotheses were proposed: (*a*) a new health practitioner would be capable of providing the same range of medical care as a physician in this setting, (*b*) a practice operated by a new health practitioner would be more likely to attain financial equilibrium, and (*c*) a new health practitioner would experience greater personal satisfaction than a physician and might be more likely to remain in the community.

Despite misgivings by some members of the Condon Community Board and an uncertain regulatory environment for this kind of practice, the experiment was carried out. A nurse practitioner—licensed as a registered nurse, trained in one of the early Medex programs, and with 3 years' experience in a satellite clinic in Idaho—was recruited to take the physician's place. The choice of a nurse practitioner rather than a physician's assistant was dictated by a permissive Nurse Practice Act and a Medical Practice Act that restricted physician's assistants in Oregon. Both Idaho and Oregon recognized this provider as a nurse practitioner and accredited him as such under their respective State regulations.

The nurse practitioner arrived 1 week before the physician's departure and was oriented by the physician to the practice and the community. Formal supervisory links were established with a young physician in a town 40 miles away, who made weekly onsite visits and developed protocols and referral mechanisms. The physician was paid for his services through a Rural Health Initiative grant awarded to a three-county consortium that included Gilliam County, in which Condon is located. The practice continued without interruption in the same building, with the same equipment, and the same staff. The extent to which the three original hypotheses were sustained is reported later in this paper.

Methods

We obtained data on practice composition and operation by analyzing all patient encounters during the 19th, 20th, and 21st months of the respective practices. Every patient visit during January, February, and March of 1975 and 1977 was analyzed. The chart abstracting was performed by the clinic assistant, who worked steadily in the clinic throughout the tenure of both practitioners. The choice of the seventh quarter for analysis was a compromise. After March 1975, it became generally known in Condon that the physician was leaving, and this knowledge had an impact on the patients' use of the practice. The seventh quarter was the latest period available for study before the physician's departure disrupted growth of the practice.

From the data, we analyzed three major components of the practice: economics, with an emphasis on practice growth and visit pattern; patients' characteristics, demographic and clinical; and medical process variables reflecting the nature of the medical interactions. The encounter forms were coded and then analyzed. When the data were assembled, we visited Condon and reviewed the data for accuracy with members of the community board and the clinic assistant. We also visited and interviewed the physician and the nurse practitioner.

Results

Practice growth and visit pattern. In the first quarter of 1975, during the physician's tenure, the practice was visited by 440 patients in 800 separate encounters. In

the first quarter of 1977, when the nurse practitioner was in attendance, 600 patients were seen in 1,139 encounters. During both time segments, the clinic assistant was the major medical provider 7 percent of the time, doing blood pressure checks and giving injections. The average charge during 1975 was $13.06 per visit; in 1977, it was $13.78 per visit. The only difference in the respective fee schedules was that the nurse practitioner charged $8 for a routine office visit and the physician charged $6.50. The population of Condon and of the county changed less than 1 percent between the two periods; it grew from 2,100 to 2,120 people.

The physician saw twice as many new patients as the nurse practitioner. Both practitioners had almost the same percentage of return visits per patient during the first quarter of each year, as the following table shows.

	Percent of visits	
Patient visit status	*Physician*	*Nurse practitioner*
New patients	15	7
First visit for new problem	44	56
Second visit for new problem	15	14
Third visit or more for same problem	27	23

$\chi^2 = 42.5$, $df = 3$, $P < 0.001$.

Approximately 7 percent of the encounters in both providers' practices occurred outside of clinic hours, at night or on weekends.

From the preceding data it is clear that the practice continued to grow despite the transition from physician to nurse practitioner. The nurse practitioner saw 36 percent more individual patients in 42 percent more encounters than the physician during the same period. On an annualized basis, the nurse practitioner's charges were $63,000, compared to $42,000 for the physician. Although it is not possible to calculate the percentage of those in the medical service area who used either provider, the practice was well accepted by the people of Condon. The increased productivity during the nurse practitioner's tenure allowed the clinic to attain self-sufficiency.

Patients' characteristics. The age-sex profiles of the patients in the two practices were almost identical, with one major exception—24 percent of the physician's patients but only 15 percent of the nurse practitioner's patients were over 65 years old. The difference is statistically significant ($\chi^2=20.3$, $df=1$, $P< 0.0001$). During this period, the proportion of the population over 65 declined from 15 to 12 percent, but this change alone is not sufficient to account for the difference in the proportions of the elderly seen by the two practitioners.

The major apparent reason for this discrepancy was that the nurse practitioner was not eligible for reimbursement under Medicare. Thus, elderly patients unable or unwilling to pay the entire cost of their care may have elected to travel for medical care or go without. The place where care was provided also may have contributed to this discrepancy, as the following percentages show.

	Percent of visits	
Location	*Physician*	*Nurse practitioner*
Clinic	88	94
Nursing home	11	1
Home	1	5

$\chi^2 = 113.5$, $df = 2$, $P < 0.0001$.

Since the nurse practitioner was not recognized as a provider by Medicare, he could not provide routine care in the nursing home in Condon. Patients were referred to the nursing home by physicians in adjacent communities, who provided their routine care. Although the nurse practitioner responded to emergency calls at the nursing home, he was not reimbursed for those services. The greater proportion of home visits by the nurse practitioner stemmed from his perception of home visits as consistent with his role as a community-based practitioner and as traditional nursing services. The physician considered home visits an inefficient use of his time.

In contrast to the decreased proportion of Medicare patients in the nurse practitioner's practice was the increased proportion of patients enrolled in the Medicaid program. While only 5.5 percent of the physician's patients were under Medicaid, 10.5 percent of the nurse practitioner's patients were enrolled in the program. The percentage of the population on Medicaid in Gilliam County rose from 6 to 7 percent between 1975 and 1977, but this small increase does not fully account for the doubled proportion of the nurse practitioner's practice devoted to Medicaid clients. In the Oregon Medicaid program, the nurse practitioner was considered as a certified provider, and he was reimbursed by the program in the same manner as his physician predecessor. The disparity between the utilization rates of Medicare and Medicaid patients underlines the pervasive influence of reimbursement policies on medical practice patterns in rural areas.

The most frequent major complaints and diagnoses of the two practitioners' patients were as follows.

Complaints and diagnostic categories	Percent of visits	
	Physician	Nurse practitioner
Complaints:		
Respiratory	23.3	34.6
Skin, nails, hair	15.5	12.7
Musculoskeletal	13.9	14.4
Cardiovascular	5.3	4.2
Nonsymptomatic	5.3	4.2
Digestive	4.9	6.1
Nervous system	4.8	2.1
Urinary system	3.8	2.8
Diagnostic categories:		
Respiratory	15.4	24.4
Accidents	11.2	9.8
Circulation	9.9	8.2
Skin	7.0	4.3
Ear, nose, and throat and central nervous system	3.8	6.0
Genitourinary system	3.8	3.1
Allergy	2.0	5.6

The individual chief complaints were collapsed for analysis into the categories in the National Ambulatory Medical Care Survey Reasons-for-Visit Code (*2*), and the diagnoses were coded according to the Royal College of General Practitioners' diagnostic categories (*3*).

The similarity in the practice profiles is striking. Patients used the clinic for the same range of medical problems, and the proportion of problems in each category was almost identical. The increased proportion of patients with respiratory diseases seen by the nurse practitioner may have been due to an influenza epidemic in the winter of 1977. The chief complaints and diagnoses also closely resembled those reported from a national study of the practice composition of general and family practitioners in private settings (*4*).

Process of medical care. Given a basically similar spectrum of complaints and diagnoses, the next issue is the way in which the two practitioners approached the diagnosis and treatment of those problems. The clinic had an X-ray unit, and the physician obtained X-rays in 6.5 percent of all encounters compared to 4.9 percent for the nurse practitioner. The difference was not statistically significant ($\chi^2=1.66$, $df=1$, $P=0.197$). The physician was more likely to request laboratory tests—35 percent of all encounters as opposed to 25 percent of all encounters for the nurse practitioner. The major differences were that the physician requested more urinalyses and more frequently sent less common laboratory tests to remote laboratories, practices reflecting a tendency to perform more complex diagnostic workups.

The nurse practitioner was more likely to prescribe medications, give injections, or recommend over-the-counter preparations; he used these methods for 58 percent of all cases as opposed to the physician's 46 percent. Unfortunately, it was not possible to separate the recommendation of over-the-counter drugs from the prescription of legend medications. Anecdotal information suggests that part of the discrepancy in the proportion of cases in which drugs were recommended can be attributed to a greater tendency for the nurse practitioner to recommend over-the-counter preparations. The physician referred 4 percent of all patients to other physicians, and the nurse practitioner referred 5.8 percent, a percentage not significantly different from that of the physician's ($\chi^2=2.99$, $df=1$, $P=0.84$) and lower than the rate reported by others (*5,6*).

An attempt was made to compare the decision-making and treatment process for a selected group of commonly encountered diagnoses. The outcome was as follows.

Diagnosis and process variables	Percent of cases for which action was taken	
	Physician	Nurse practitioner
Acute tonsillitis	(N=26)	(N=45)
Throat culture	69	71
Drugs prescribed	85	95
Patients referred	0	0
Acute upper respiratory infection	(N=76)	(N=108)
Laboratory test done	33	32
Drugs prescribed	69	90
Patients referred	3	1
Acute cystitis	(N=19)	(N=21)
Laboratory test done	95	100
Drugs prescribed	74	71
Patients referred	0	0
Congestive heart failure	(N=7)	(N=16)
Laboratory test done	43	13
Drugs prescribed	57	25
Patients referred	0	20
Hypertension	(N=60)	(N=57)
Laboratory test done	22	9
Drugs prescribed	74	71
Patients referred	2	2

For tonsillitis, upper respiratory infection, and cystitis, the use of laboratory tests was almost the same, but the nurse practitioner was more likely to prescribe or recommend a medication. For the two chronic and more serious conditions, congestive heart failure and hypertension, the physician was more likely to order laboratory tests and prescribe drugs, but less likely to refer patients. Although the sample was small and the method crude, the pattern does appear to reflect differences in approach attributable to differences in the training of the two providers.

Outcome of the Practice

The physician left Condon after 2 years with the National Health Service Corps. He finished his internal medicine residency and returned to Pendleton, Oreg., the nearest middle-sized city to Condon. He has reported that he occasionally sees patients from Condon whom he had not seen when he lived and practiced there and that these patients tend to have serious chronic diseases.

Early in the second year of his assignment at the clinic, the nurse practitioner made the transition from a NHSC-sponsored practice to a private practice in Condon. His initial income as a private practitioner exceeded the $15,000 a year that he had received from the NHSC. He bought a home in Condon and became an active member of the community. Yet, he left Condon at the end of his third year there primarily because the practice was no longer financially viable.

Three major factors contributed to the practice's demise. The nurse practitioner's ineligibility for Medicare reimbursement diminished the potential patient population. More importantly, the opposition of members of the boards of medicine and pharmacy in Oregon to the concept of a new health practitioner increased after the nurse practitioner came to Condon. This opposition led to a 5-month prohibition on the signing of prescriptions by nurse practitioners. This prohibition, as well as difficulty in finding a physician preceptor to sign prescriptions, led to the closing of the clinic in the summer of 1977.

Although the clinic was reopened in the fall of 1977, when temporary State legislation was passed to allow nurse practitioners to prescribe, the patient flow did not return to its previous volume. Moreover, the cost of obtaining physician supervision was relatively high, and this further eroded the financial viability of the clinic.

The nurse practitioner reported that the setting had been professionally challenging and satisfying and that he would not have left if economic difficulties had not forced him to seek employment elsewhere. Currently, Condon has no resident provider; it is visited 1 day a week by an itinerant physician.

Comment

It seems that the practice failed not because of conditions within the town, but because the larger environment in which it was set was hostile to the nurse practitioner in the role of a physician substitute. Much of the hostility was institutional. Although Medicare reimbursement plans had been established before new health practitioners were trained and assigned to various sites, even the passage of the Rural Health Clinic Services Act (Public Law 95–210) in 1977 did not and could not preserve the Condon clinic (*7*). The implementing regulations require onsite visits by a physician every other week. In an area such as Condon, the costs of such visits—if they could be arranged —would eliminate the financial advantages of Medicare reimbursement.

Some hostility was explicitly directed at the Condon clinic. Prescribing rights lie at the core of physicians' dominance, and some members of the medical and pharmaceutical professions in Oregon saw the Condon experiment as a dangerous wedge into their domains. Although temporary legislation allowed the nurse practitioner to prescribe medications again, the legal climate surrounding this issue is unsettled and uncertain.

At this juncture, it appears that independent practice by new health practitioners, based on the Condon model, is not viable in the private sector—even though patients' acceptance and the practice's productivity may be satisfactory (*8,9*). If Condon and other towns like it are to have full-time health care, deliberate intervention by outside agencies that are willing to support and subsidize remote practices is needed. The intrinsic organizational fragility of remote solo practices, irrespective of provider type or training, argues for the creation of regional support networks to sustain medical practices in isolated rural areas.

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