

The National Health Service Corps: Rural Physician Service and Retention

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Background: The National Health Service Corps (NHSC) scholarship program is the most ambitious program in the United States designed to supply physicians to medically underserved areas. In addition to providing medical service to underserved populations, the NHSC promotes long-term retention of physicians in the areas to which they were initially assigned. This study uses existing secondary data to explore some of the issues involved in retention in rural areas.

Methods: The December 1991 American Medical Association (AMA) Masterfile was used to determine the practice location and specialty of the 2903 NHSC scholarship recipients who graduated from US medical schools from 1975 through 1983 and were initially assigned to nonmetropolitan counties. We used the AMA Masterfile to determine what percentage of the original cohort was still practicing in their initial county of assignment and the relation of original practice specialty and assignment period to long-term retention.

Results: Twenty percent of the physicians assigned to rural areas were still located in the county of their initial assignment, and an additional 20 percent were in some other rural location in 1991. Retention was highest for family physicians and lowest for scholarship recipients who had not completed residency training when they were first assigned. Retention rates were also higher for those with longer periods of obligated service. Substantial medical care service was provided to rural underserved communities through obligated and postobligation service. Nearly 20 percent of all students graduating from medical schools between 1975 and 1983 who are currently practicing in rural counties with small urbanized populations were initially NHSC assignees.

Conclusions: Although most NHSC physicians did not remain in their initial rural practice locations, a substantial minority are still rural practitioners; those remaining account for a considerable proportion of all physicians in the most rural US counties. This study suggests that rural retention can be enhanced by selecting more assignees who were committed to and then completed family medicine residencies before assignment. (J Am Board Fam Pract 1997;10:272-9.)

The United States has one of the most pervasive problems of medical underservice of any industrialized country. Despite ever-increasing national investment in health care and medical education, substantial portions of the population lack access to even the most basic medical attention. Although the greatest barrier to care is the lack of a

national health insurance program, a second impediment is the historic shortage of physicians in rural locations and inner cities.¹

There have been two major types of governmental response to these problems. The first concentrates on improvements in insurance coverage of vulnerable populations—Medicare and Medicaid are the classic examples—with the expectation that enhanced demand and reimbursement for services will stimulate supply. The second response has been the establishment of direct service delivery programs designed to bring physicians and other health professionals to places of need. The foremost example of these latter programs is the National Health Service Corps (NHSC).²⁻⁷

The NHSC from the outset encouraged the physicians it assigned to wean themselves from governmental support. Physicians who success-

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fully made the transition from federal to private practice were considered to have been retained,^{8,9} and retention has been used as one measure of the program's success. Retention, however, declined when the program shifted in 1972 from an all-volunteer format to a system where most NHSC assignees went to communities in exchange for medical school scholarships or loan repayment. As Pathman and his colleagues¹⁰ recently showed, physicians with NHSC obligations were less likely to stay in rural practice after their service obligations ended than were physicians not discharging service obligations.

In a related study, Pathman and colleagues¹¹ studied more than 400 generalist NHSC scholarship physicians who were assigned to health personnel shortage areas across the nation during 1987 through 1990 by comparing them with 200 control physicians who moved into similar shortage areas voluntarily. They concluded that NHSC physician needs and preferences were not well met by the scholarship program (eg, they were not matched well to places where they were trained or had lived), and probably as a result NHSC physicians compared unfavorably with the control group in retention and satisfaction.

One potential shortcoming of the Pathman et al study is that it was based on a relatively recent cohort of generalist graduates, many of whom had not yet completed their obligations to the NHSC. The purpose of our study was to determine whether earlier findings are supported by examining the current practice locations of the entire cohort of NHSC scholarship recipients who graduated from United States medical schools between the years from 1975 through 1983 and were assigned to nonmetropolitan areas. We also sought to determine whether there were differences in retention rates with time. In addition, our study was designed to investigate whether retention was associated with physician specialty and the length of NHSC service obligation.

Methods

We used the December 1991 American Medical Association (AMA) Masterfile to determine the location of practice and specialty of all NHSC scholarship recipients who were graduated from United States medical schools located within the 50 states during the years 1975 through 1983. Scholarship recipients who did not actually serve

in the NHSC were excluded. Of the 6854 NHSC scholarship recipients who served in the NHSC, we were able to locate the current practice and specialty for 6249 (92 percent). Nonmatched assignees did not differ from matched assignees by rural or urban assignment, length of obligation, or specialty.

The NHSC information available included physician graduation year, initial assignment location and date, and duration of obligation and assignment specialty. AMA information included physician practice location and self-reported specialty in December 1991. We coded the assignment and practice counties with rural-urban continuum codes, which placed them on a continuum from metropolitan (0 through 3) to nonmetropolitan (4 through 9).¹² We coded United States territories as nonmetropolitan ($n = 55$). For the purposes of this study, the term *rural* is used interchangeably with the term *nonmetropolitan*.

The physicians were categorized into the following six specialty groups: family medicine, internal medicine, pediatrics, obstetrics and gynecology, undifferentiated, and other specialties. The undifferentiated group is defined by the NHSC as those physicians who had not completed residency at assignment (personal communication, NHSC Scholarship Office, 28 October 1992). The other specialties group included emergency medicine, psychiatry, surgery, anesthesiology, and pathology. In addition to disaggregating assignees by their clinical discipline, we also divided the physicians into three cohort groups based on their medical school graduation years: 1975 to 1977, 1978 to 1980, and 1981 to 1983.

Because our primary interest was in the location and retention of assignees to nonmetropolitan areas, we focused on the 2903 physicians initially assigned to nonmetropolitan counties. Except where otherwise noted, the reported physician specialties are those at the time of assignment. Most of the scholarship recipients completed residencies before being assigned, but some started fulfilling their obligations immediately upon medical school graduation (ie, mostly the undifferentiated group).

For the purposes of this study, we chose to define retention as the decision to remain in the same county as the original NHSC assignment. We recognize that in some cases the index physician might have moved to another town within

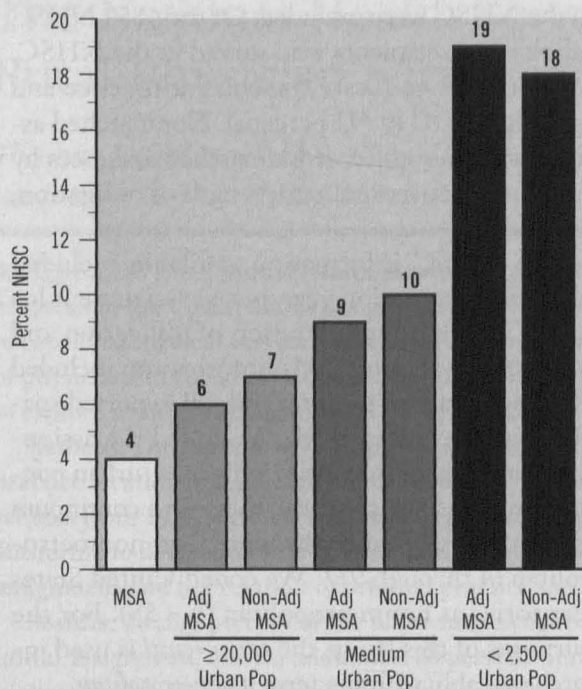


Figure 1. National Health Service Corps physicians as percentage of all physicians by site in 1991, 1975 through 1983 medical school graduates. Number of physicians from left to right: 4900, 257, 297, 272, 404, 64, and 96 (Guam physicians excluded). MSA - metropolitan statistical area, Adj - adjacent, Pop - population.

the county or shifted from one organizational entity to another within the same community. In both cases, however, the physician made a long-term decision to remain in close proximity to the original assignment location and was retained in that geographical area. We also report on the proportion of physicians who are no longer practicing in their assignment county but have remained in rural practice.

The maximum lengths of retention within the initial assignment counties range from 16.5 years for the first study graduation class to 8.5 for the last study graduation class. After starting to practice in their initial assignments, some graduates were reassigned by the NHSC to other locations for a variety of reasons. Because we were not able to determine from the available data whether these reassignments were caused by administrative necessity (such as a county losing its designation as a shortage area) or physician behavior, we only counted physicians who remained in their initial assignment county as having been retained.

As a result, retention is underestimated because some physicians who were reassigned for administrative purposes subsequently remained in the counties where they were assigned. Data provided by the NHSC indicate that approximately 17 percent of the study physicians had more than one assignment, with little variation among the generalist specialties.

To determine how length of obligation was associated with length of practice beyond obligation, we disaggregated each of the three graduation cohorts into groups with obligations of 2, 3, and 4 years, respectively. We analyzed the difference between the percentage of physicians remaining in their initial assignment counties for the groups. Standard chi-square and analysis of variance tests were used in the specialty and obligation difference tests. All tests used a significance level of 0.05.

Results

The majority of the 6299 assignees who graduated from medical school from 1975 through 1983 had completed training in family medicine or internal medicine. The largest group of assignees had received training in internal medicine (1851, or 29.3 percent of all assignees), followed closely by family medicine (1803 or 28.6 percent of all assignees). Eight hundred forty-seven assignees (13.4 percent) had not completed their residency training at the time they began their assigned NHSC practice. Of the 6299 assignees, 2903 were assigned to practices within rural counties (46.1 percent), whereas 3396 (54.9 percent) were assigned to urban counties. Internists, pediatricians, and obstetricians were preferentially assigned to metropolitan areas, and family physicians and physicians who had not finished residency training were more likely to be assigned to rural areas.

Although NHSC scholarship program assignments made before 1975 were primarily to rural areas, this emphasis shifted as time passed and the program grew.⁹ Of the 2903 NHSC scholarship recipients initially assigned to rural areas, 69.8 percent had an urban practice address in the 1991 AMA Masterfile. Flow in the opposite direction occurred much less often; only 6.8 percent of the 3396 assignees to urban areas were in a rural practice site in December 1991.

Though most NHSC physicians at the time of

the study were practicing in urban areas, those who remained in rural practice represented a disproportionately large proportion of the physician workforce in those places (Figure 1). Nearly 20 percent of medical students graduating from 1975 through 1983 who were practicing in rural counties with small urbanized populations were NHSC assignees, although only 5.4 percent of all those who graduated from 1975 through 1983 received NHSC scholarships. Even though many of the rural NHSC assignees ultimately left their rural locations, those who remained are an important source of medical care for small communities.

Retention in Rural Areas of Rural County Assignees

Physician specialty dramatically affected the likelihood that physicians were retained in their original assignment county or remained in rural practice (Figure 2). Overall, 20.0 percent of the entire study sample were still located in the county to which they were originally assigned at the end of the study period, and an additional 20.2 percent were still in a rural area but had moved from their original assignment county. Retention in assignment county and in any rural county was substantially higher for family physicians, both in terms of absolute numbers and as a percentage of the original cohort of the assignees (statistically significantly higher than each of the other specialty groups at the $P = 0.05$ level). More than one half (51.5 percent) of the assigned family physicians were located in rural counties and 27.2 percent were located in their initial assignment counties (20.2 percent were located in the same ZIP code area). By contrast, only 8.5 percent of physicians who had not completed residency training when they began their assignments (ie, the undifferentiated group) were still in the county of initial assignment. Other specialty groups were much less likely than family physicians to be retained either in the same county or in any rural county.

The physicians in this study graduated from medical school during a 9-year period from 1975 through 1983. The situation is complicated in that physicians had varying durations of obligated NHSC service of 2, 3, and 4 years. It is possible that retention percentages vary not only by the original specialty of the NHSC physicians but also by the time of their assignments and the

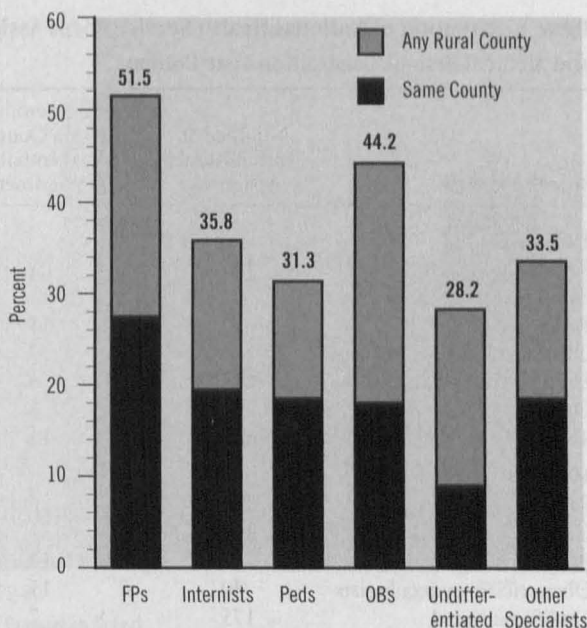


Figure 2. National Health Service Corps retention in rural areas by specialty, 1975 through 1983 medical school graduates. Total number of assigned physicians in each column from left to right: 1707, 614, 224, 120, 507, and 331. Overall analysis of variance of difference across specialties for same county and any rural county were significant at $P = 0.05$ level. FPs - family physicians, Peds - pediatricians, OBs - obstetrician-gynecologists.

lengths of their obligated service. To examine this possibility, we separated the sample into three medical school graduation cohorts of equal length (1975-77, 1978-80, and 1981-83).

As shown in Table 1, retention rates are generally higher for those physicians from the more recent graduation cohorts. Some nongeneralist physicians in the most recent cohort (1981-83) are still under obligation because of their more recent graduations and longer periods of residency training. Nevertheless, the results for the three graduation year cohorts mirror the overall combined findings: family physicians had the highest retention levels and the undifferentiated group had the lowest for each cohort.

We hypothesized that NHSC physicians with longer obligations would be more likely to continue practicing in their initial assignment counties. Because the relation between length of obligation and retention might be masked by differences in specialty mix and graduation cohort,

Table 1. Retention of National Health Service Corps Assignee Physicians by Specialty at Time of Assignment and Medical School Graduation Year Cohort.

Specialty	Number of Initial Rural Assignees	Percent in Same County as Initial Assignment	Percent in Any Rural County	Percent Remaining in Assignment Specialty	Percent in Any Generalist Specialty*
1975-77					
Family physicians	145	23	50	85	88
General internists	82	13	34	59	62
Pediatricians	54	11	31	70	74
Obstetrician-gynecologists	6	17	50	50	0
Undifferentiated	186	6	27	0	30
Other specialties	38	8	24	92	8
Total	511	13	35	48	54
1978-80					
Family physicians	305	26	48	82	82
General internists	201	21	33	58	61
Pediatricians	67	10	18	82	82
Obstetrician-gynecologists	40	15	40	83	3
Undifferentiated	175	7	28	0	22
Other specialties	72	8	25	93	7
Total	860	17	36	54	55
1981-83					
Family physicians	657	29	53	89	92
General internists	331	20	18	74	78
Pediatricians	103	26	40	85	85
Obstetrician-gynecologists	74	29	46	96	3
Undifferentiated	146	14	30	0	20
Other specialties	221	23	38	93	4
Total	1532	24	44	78	65
Grand total	2903	20	40	66	60

*Defined as family medicine, general internal medicine, and general pediatrics.

analyses were performed by specialty and graduation cohort. Figure 3 shows the percentage of family physicians that have remained in their initial assignment counties by medical school graduation cohort and length of NHSC obligation. As hypothesized, the pattern consistently shows longer obligations associated with higher retention for family physicians. Analyses for other specialties show similar results in all cases where the number of physicians is sufficient for meaningful analyses. For instance, internist retention for the 1981-83 cohort for 2-, 3-, and 4-year obligations was 10.1, 22.6, and 26.5 percent (overall significantly different, $P = 0.003$). The similar figures for the 1978-80 cohort were 16.8, 28.6, and 44.4 percent (overall significantly different, $P = 0.02$).

Although most physicians initially placed in rural counties did not remain in their counties of initial assignment, they did provide substantial amounts of obligated and nonobligated service in those and other rural counties by 1991. They

provided approximately 7900 person-years of service discharging their obligations. The estimated nonobligated service for physicians remaining in their initial assignment counties was approximately 6700 person-years by 1991. This latter figure does not include the nonobligated service provided by those assignees who remained in their assignment counties for some time after finishing their obligations but moved to another county before 1991.

Discussion

The NHSC represents the most direct approach that the United States has taken to address the persistent problem of medically underserved populations. By recruiting physicians to and supporting them in underserved communities, the federal government involved itself in the direct provision of service to millions of Americans. At the same time, the government has been reluctant to provide long-term employment for physicians re-

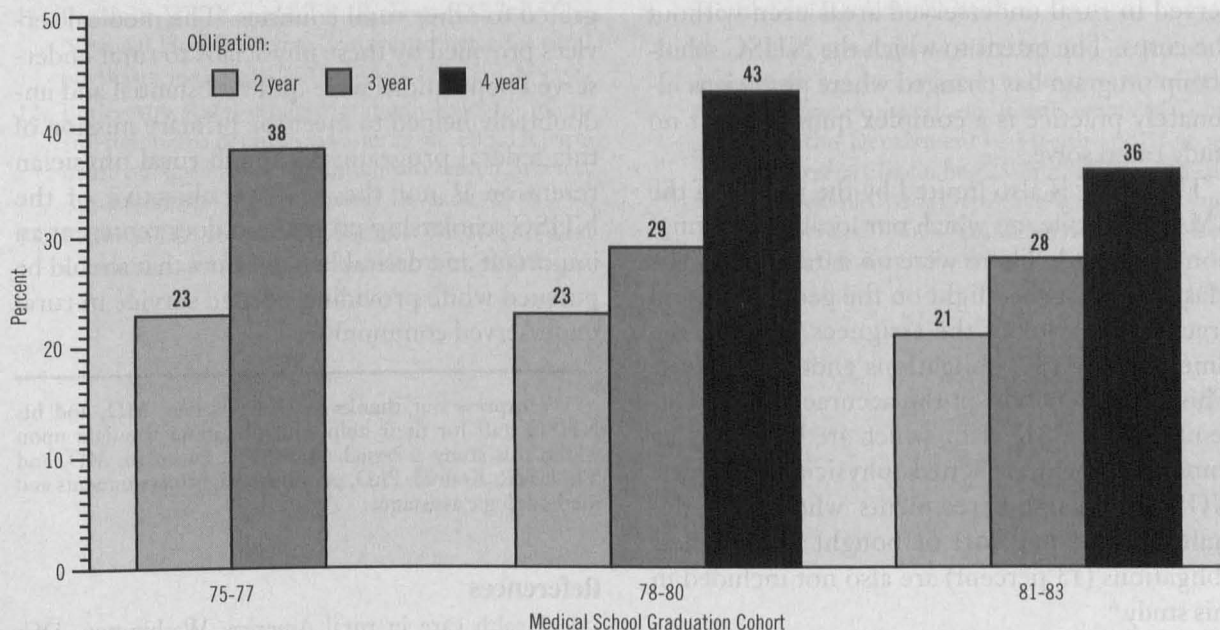


Figure 3. National Health Service Corps rural assigned family physician retention in initial rural placement counties by obligation and medical school graduation cohort, 1975 through 1983 medical school graduates. One-tailed chi-square *P* values of hypothesized within-cohort differences from left to right: 23 vs 38 (0.04), 23 vs 29 (0.17), 23 vs 43 (0.09), 29 vs 43 (0.21), 21 vs 28 (0.09), 21 vs 36 (0.002), and 28 vs 36 (0.03). The numbers of physicians upon which these estimates are based from left to right: 82, 63, 193, 98, 14, 168, 264, and 225. There were no 4-year obligations in the 1975-77 cohort.

cruited through the NHSC. As a result, service in the corps has always been considered temporary, either a period of public service provided by altruistic volunteers, a bridge for new graduates to establish private practices in economically marginal areas, or a way in which impecunious students could repay the government for the costs of their medical education. The NHSC has influenced physician behavior through such mechanisms as its scholarship selection criteria, benefit package, placement policies, and assignee support policies.

Because the NHSC scholarship program has had multiple goals, it is very difficult to evaluate its effectiveness. The corps has been criticized with some justification by those who feel that it should have done more to match its placement of physicians better within communities, to support physicians while they were serving their obligations, and to encourage physicians to remain in their assignment communities after concluding their obligated service.^{10,13} As the program evolved, however, many scholarship recipients were sent to settings where long-term retention was extremely unlikely: prisons, severely deprived

rural and urban areas, and community health centers. The principal purpose of these assignments was service. Retention, though a laudable goal, was often secondary.

This study suggests that despite these structural barriers to retention, a substantial number of physicians remained in their initial counties of assignment even though they had discharged their obligations. It is also clear from these data that a meaningful fraction of all of America's rural physicians—particularly those in the most isolated areas—entered practice through the NHSC route. Although one cannot necessarily assume a causal relation, it is likely that the NHSC did contribute to the long-term location of physicians in rural communities through its selection of scholarship recipients and through assigning them to places where they would have been unlikely to practice had the program not existed.

Study Limitations

This study is limited by its cross-sectional design, and the results should be interpreted cautiously. Some of the scholarship recipients would have

served in rural underserved areas even without the corps. The extent to which the NHSC scholarship program has changed where physicians ultimately practice is a complex question that no study can resolve.

This study is also limited by the nature of the AMA Masterfile, on which our location information depended. There were no data in the AMA Masterfile that shed light on the geographic and practice behavior of the assignees between the time their NHSC obligations ended and 1991. This study depends on the accuracy of the December 1991 AMA data, which are known to lag somewhat behind actual physician changes. NHSC scholarship recipients who either defaulted on (4 percent) or bought out of their obligations (13 percent) are also not included in this study.⁶

Policy Implications

What relevance do these findings have for current health professional policy? With the absence of federal health care reform, it is likely that there will continue to be persistent areas of physician shortage in both rural and urban inner-city areas, a fact underlined by both the Council on Graduate Medical Education and the Office of Rural Health Policy.^{6,14} This study demonstrates that even during an era when the NHSC was not particularly sensitive to the personal and professional needs of assignees placed in rural areas, a substantial minority remained in or near their original assignment location long after their obligation ended. Implementation of recommendations that improve the selection, care, and nurturing of scholarship recipients might further enhance retention.⁴ This study suggests that retention can be improved by giving preferences to students who are likely to become family physicians. It also could be cost-effective to invest in longer periods of scholarship support, since assignees with longer obligations appear to become more bonded to the communities in which they practice.

In addition, this study shows the important contribution of NHSC scholarship physicians to rural communities, a finding also shown in an earlier study.⁷ Although the majority of rural assignees migrated to urban areas at some time after completing their service obligations, a substantial minority remained in the counties to which they had been initially assigned or mi-

grated to other rural counties. The medical services provided by these physicians to rural underserved populations were quite substantial and undoubtedly helped to meet the primary mission of this federal program. Although rural physician retention is not the primary objective of the NHSC scholarship program, it does represent an important and desirable byproduct that should be pursued while providing needed service in rural underserved communities.

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