

Practice Environment and the Employment of Nurse Practitioners, Physician Assistants, and Certified Nurse Midwives by Community Health Centers^{1*}

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ABSTRACT: This report examines the relation between state variations in the regulation of nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs), and the employment of these nonphysician providers (NPPs) by community health centers (CHCs). Data for this report came from a 1991-92 survey of CHCs assessing the employment of NPPs, and secondary available data. The dependent variables examined were the numbers of NPPs currently employed by CHCs. Independent variables included 1992 practice environment scores, CHC location, number of CHC physicians, and NPP-to-population ratios. The number of NPs and PAs employed by CHCs was significantly associated with practice environment for these practitioners. NPP-to-population ratios and the number of CHC physicians are also significantly associated with NPP employment by CHCs. State decision makers may reduce legislative and regulatory barriers to practice as a way to improve the practice environment for nonphysician primary care providers, particularly NPs and PAs. Thus, community health centers can employ adequate number of NPPs to fulfill their mission of serving the poor and underserved population.

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INTRODUCTION

Health care policy that aims at improving access to primary care often emphasizes increasing the proportion of physicians practicing in primary care specialties¹⁻³. An effective and efficient, but less emphasized, approach is to increase the number of

nonphysician primary care providers such as nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs)⁴⁻⁵. Nurse practitioners (NPs) are registered nurses who have completed either an advanced certificate program or a master's degree program of study leading to competence to practice in an administrative or clinical role⁶. Physician assistants (PAs) are graduates of the physician assistant training program and licensed to perform medical procedures under the supervision of a physician⁷. Certified nurse midwives (CNMs) are registered nurses with additional training in midwifery from a nurse-midwifery program including maternal and fetal procedures, and patient assessment⁸. Their ability to deliver both high quality and cost-effective medical care has been well established⁹⁻¹⁷.

Nonphysician primary care providers are especially valuable to federally assisted Community Health Centers (CHCs) that have been serving as a primary care safety net for the nation's poor and underserved since their emergence in the 1960s¹⁸. By design, CHCs are situated in medically underserved areas where there are shortages of primary care physicians¹⁹. The employment of nonphysician providers (NPPs) thus is critical for CHCs to provide primary care to the poor and underserved²⁰⁻²¹. In 1993, there were 524 federally funded CHCs in the contiguous United States, serving 6.2 million people, including over 25 percent of the nation's indigent population. The patients are drawn primarily from minority groups: 31 percent black, 28 percent Hispanic, and 5 percent other minorities²².

Although NPs, PAs, and CNMs provide a viable solution to the need for primary care providers, legislative and regulatory constraints,

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which vary by state, may prevent the full use of these practitioners. This report examines the relation between state variations in the regulation of NPs, PAs, and CNMs, and the employment of these practitioners by CHCs. If the relation is significant, regulatory intervention may be part of the solution to increase the presence of nonphysician primary care providers in medically underserved areas.

METHODS

Data

Data for this report come from both primary and secondary sources. The primary source is a 1992 survey of CHCs assessing the employment of NPs, PAs, and CNMs conducted by the authors under contract with the National Rural Health Association. Among other things, the survey asked about the number of Full-time Equivalent (FTE) NPPs by category as well as physicians currently employed and planning to be employed in the next three years by CHCs. The CHC national directory was used as the sampling frame²¹. All CHCs in the contiguous United States ($n=515$) were included. The survey instrument was mailed to administrators of all the CHCs in North and South Carolina during May 1991 for a pre-test. The questionnaire was modified based on respondents' feedback and sent in late 1991 to executive directors of all the CHCs in the contiguous United States. All nonrespondents were sent an additional mailing, and the remaining nonrespondents were contacted by telephone. The survey was completed in 1992. Overall, 74 percent of CHCs ($n=383$) responded to the survey. Based on analysis of data from Bureau Common Reporting Requirements (BCRR) forms submitted to the Bureau of Health Care Delivery and Assistance of the U.S. Department of Health and Human Services by all CHCs as part of the requirement for receiving federal funding, we did not find significant differences between responding and nonresponding CHCs in terms of center size (either measured by budget, total staff, or medical staff) and scope of services provided.

The secondary source is from data compiled by Sekscenski and his colleagues at the Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, and published in the *New England Journal of Medicine*²⁴. Specifically, the data used for this study are 1992 measures of the regulatory environment (i.e., legal status, reimbursement, and

authority to prescribe) of each of the 50 states and the District of Columbia for NPs, PAs, and CNMs to practice, and the current supply of these practitioners at the state level²⁴. These data were collected by the authors from current publications by the American Academy of Physician Assistants, the American College of Nurse-Midwives, and others²⁵⁻²⁸. In all states, information was sought about regulatory conditions in 1992, similar to our primary CHC survey.

Measures

The dependent variables examined in this report were the numbers of NPs, PAs, and CNMs currently employed by CHCs. These variables were directly obtained from our CHC survey.

The independent variables included practice environment scores for NPs, PAs, and CNMs, derived from the secondary source stated above. A 100-point scoring system was constructed by researchers from the Bureau of Health Professions for each type of practitioner with 100 representing the most favorable environment and 0 the least favorable²⁴. Specifically, a maximum of 20 points were 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 without physician oversight. Researchers from the Bureau of Health Professions also performed the scoring and assessed the scoring reliability. They concluded that "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, comparisons of scores between states is more appropriate within a discipline than between disciplines." The detailed description of the composition of these scores was presented by Sekscenski et al. and summarized in Figure 1²⁴. For the purpose of our analysis, each CHC was assigned the practice environment scores for its state.

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Figure 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 recognition, 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 physicians, 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, another 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.

Source: Sekscenski et al. (1994)²¹.

Other independent variables used as controls were obtained from our survey. They included CHC location, CHC physician staff size, and NPP-to-population ratios. All measures were for 1992. CHC location refers to rural (coded as 1) or urban (coded as 0) situation of CHCs. Centers were identified as rural if they were designated as "rural" grantees by virtue of having one or more of their clinical sites or

a significant portion of their clientele located in rural areas²³. Among 383 responding CHCs, 243 were classified as rural and 140 urban. The response rate was higher for rural CHCs (87%) than urban ones (59%). However, based on BCRR data, we did not find significant differences between responding and nonresponding CHCs, both rural and urban, in terms of center size and scope of services provided.

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Table 1
Current and Planned Employment of NPs, PAs, and CNMs (FTE) by Community Health Centers

STATE	1991-1992 NP STAFFING	PLANNED NP NEW HIRES	1991-1992 PA STAFFING	PLANNED PA NEW HIRES	1991-1992 CNM STAFFING	PLANNED CNM NEW HIRES
Alabama	1.56	3.11	1.22	0.78	0.00	2.89
Alaska	0.00	0.00	3.00	1.00	0.00	0.00
Arizona	2.00	0.43	0.43	0.43	0.71	0.29
Arkansas	1.00	2.00	0.17	0.17	0.00	0.17
California	1.30	2.96	1.74	3.00	0.30	1.87
Colorado	2.00	2.86	3.14	2.14	0.14	0.00
Connecticut	3.00	2.50	0.00	0.00	1.25	0.25
Delaware						
Dis. Columbia						
Florida	1.13	2.00	1.00	1.04	0.79	0.88
Georgia	0.85	0.54	0.69	0.85	0.00	0.23
Hawaii	2.50	2.50	2.00	1.50	0.00	0.00
Idaho	1.75	2.25	1.00	1.50	0.75	0.25
Illinois	1.27	2.36	0.27	0.73	0.00	0.36
Indiana	0.00	1.00	0.00	0.00	1.00	1.00
Iowa	1.50	1.00	1.75	2.25	0.00	0.00
Kansas						
Kentucky	2.14	0.71	1.00	0.14	0.00	0.14
Louisiana	0.00	0.36	0.09	0.18	0.00	0.09
Maine	0.75	0.25	1.33	0.25	0.00	0.00
Maryland	0.25	1.25	0.50	1.25	0.25	0.00
Massachusetts	3.00	1.80	0.22	0.33	0.33	0.56
Michigan	0.33	0.25	1.33	0.67	0.08	0.50
Minnesota	1.00	4.50	0.00	1.50	0.33	0.17
Mississippi	1.07	1.40	0.00	0.47	0.27	0.80
Missouri	2.75	1.50	0.50	0.00	0.00	0.25
Montana	0.00	0.06	0.06	0.00	0.00	0.00
Nebraska	0.00	1.00	1.00	1.00	0.00	0.00
Nevada						
New Hampshire	3.00	1.00	1.00	0.00	0.00	0.00
New Jersey	0.75	2.25	0.00	0.50	1.00	1.50
New Mexico	0.58	0.58	0.63	0.53	0.05	0.00
New York	3.11	2.95	1.68	2.05	0.74	0.95
North Carolina	0.56	0.67	1.22	0.78	0.06	0.06
North Dakota						
Ohio	1.20	0.60	0.20	0.20	0.00	0.60
Oklahoma	0.19	0.50	0.00	0.00	0.00	0.00
Oregon	5.25	1.00	1.50	0.25	0.50	0.25
Pennsylvania	0.69	0.63	1.00	0.44	0.19	0.00
Rhode Island	1.50	2.00	0.00	0.75	0.00	0.25
South Carolina	0.85	1.23	0.19	0.46	0.69	1.46
South Dakota	0.17	0.17	1.17	1.00	0.17	0.00
Tennessee	1.80	1.20	0.80	0.20	0.00	0.50
Texas	1.20	2.12	0.56	1.12	0.44	0.84
Utah	1.00	1.00	2.80	1.40	0.00	0.00
Vermont	4.00	0.00	2.00	0.00	0.00	0.00
Virginia	0.53	0.73	0.20	0.27	0.07	0.53
Washington	2.08	0.92	2.33	0.58	0.42	0.33
West Virginia	0.79	0.21	1.00	0.50	0.50	0.43
Wisconsin	0.57	0.86	2.00	2.43	0.14	0.29
Wyoming						

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CHC physician size referred to the number of physician FTE's currently employed by CHCs and was obtained from the CHC survey. If NPPs act as substitutes for physicians, then the number of NPs, PAs, and CNMs employed was expected to be inversely related to the number of physicians employed by CHCs. However, if the legal requirements were restrictive so that NPPs have to be supervised by physicians, then the employment of NPPs would be positively associated with that of physicians.

NPP-to-population ratios were obtained from the secondary source published in the *New England Journal of Medicine*²⁴, and consisted of 1992 NP-to-population ratio (i.e., the total supply of NPs per 100,000 population in each state), 1992 PA-to-population ratio (i.e., the total supply of PAs per 100,000 population in each state), and 1992 CNM-to-population ratio (i.e., the total supply of CNMs per 100,000 population in each state). The number of practitioners per each group was expected to be positively associated with their employment by CHCs because they represent the stock on which CHCs as well as other health services organizations rely for staffing purposes.

Statistics

A profile of CHCs' current and planned employment of NPPs was developed for each state based on the information from all responding CHCs from that state. Specifically, the profile consisted of the current average numbers of NPs, PAs, and CNMs employed per CHC in that state, and the planned average numbers of NPs, PAs, and CNMs employed per CHC in the next three years in that state.

The association between practice environment for NPPs and their employment by CHCs was examined through multiple regression analyses. Specifically, the numbers of NPs, PAs, and CNMs employed by CHCs served as the dependent variables in three separate regressions. Independent variables included practice environment scores, CHC location, number of CHC physicians, and 1992 NPs-, PAs-, and CNMs-to-population ratios so that their relative influence on the employment of NPs, PAs, and CNMs could be assessed.

RESULTS

Table 1 summarizes the employment of nurse practitioners, physician assistants, and certified

nurse midwives by community health centers for each state. The average number of NPs employed was highest in Oregon with 5.25 per CHC and lowest in Alaska, Indiana, Louisiana, Missouri, and Montana with 0 per CHC. Twelve states had 2 or more NPs per CHC while 20 states had less than 1 NP per CHC. Planned hiring of NPs was highest in Minnesota with 4.5 NPs per CHC. Thirteen additional states planned to hire 2 or more NPs per CHC in the next three years.

The average number of PAs employed was highest in Colorado with 3.14 per CHC and lowest in Connecticut, Indiana, Minnesota, Mississippi, New Jersey, Oklahoma, and Rhode Island with 0 per CHC. Seven states had 2 or more PAs per CHC while 22 states had less than 1 PA per CHC. Planned hiring of PAs was highest in California with 3 PAs per CHC. Fourteen additional states planned to hire at least 1 PA per CHC in the next three years.

The average number of CNMs employed was highest in Connecticut with 1.25 per CHC, followed by Indiana and New Jersey with 1 CNM per CHC. Twenty states did not have CNMs in their CHCs. Planned hiring of CNMs was highest in Alabama with 2.89 CNMs per CHC. Twelve additional states planned to hire at least 0.5 FTE CNM per CHC in the next three years.

Table 2 presents the results of regression analyses of the number of nonphysician providers employed by community health centers on practice environment and center characteristics. The number of NPs employed was positively and significantly associated with practice environment score for NP ($t=2.14$; $p<.05$), number of physicians employed ($t=6.68$; $p<.01$), center location ($t=2.62$; $p<.01$), and NP-to-population ratio ($t=1.95$; $p<.05$). In other words, CHCs were likely to hire more NPs when they were designated as rural grantees, employed more physicians, and were situated in states with more positive practice environment, and higher NP-to-population ratio.

In the PA model, the number of PAs employed was positively and significantly associated with practice environment score for PA ($t=1.99$; $p<.05$), number of physicians employed ($t=6.81$; $p<.01$), and PA-to-population ratio ($t=2.04$; $p<.05$), but was not significantly related to center rural/urban location. In other words, CHCs were likely to hire more PAs when they employed more physicians, and were situated in states with more positive practice environment, and higher PA-to-population ratio.

Table 2
Regression of Number of Nonphysician Providers Employed by Community Health Centers on Practice Environment and Center Characteristics. (N=383)

INDEPENDENT VARIABLES	DEPENDENT VARIABLES		
	(1) Number of Nurse Practitioners Employed	(2) Number of Physician Assistants Employed	(3) Number of Certified Nurse Midwives Employed
Intercept	-.92 [.35] (-2.63)	-.48 [.32] (-1.50)	-.29 [.22] (-1.31)
Number of Physicians Employed .13	.11 [.02] (6.68***)	.04 [.02] (6.81***)	.01 (3.80***)
Center Location (1 = rural, 0 = urban)	.51 [.19] (2.62***)	-.09 [.16] (-.54)	.06 [.10] (.60)
NP-to-population Ratio	.03 [.01] (1.95**)		
PA-to-population Ratio		.04 [.02] (2.04**)	
CNM-to-population Ratio			.13 [.05] (2.50***)
Practice Environment Score for NP	.01 [.004] (2.14**)		
Practice Environment Score for PA		.01 [.005] (1.99**)	
Practice Environment Score for CNM			.001 [.003] (.36)
R ²	.18	.15	.07
F value	21.22***	16.83***	6.81***

Note: parameter estimates on top, standard errors in brackets, t values in parentheses.
*P < .1 **P < .05 ***P < .01

In the CNM model, the number of CNMs employed was positively and significantly associated with number of physicians employed ($t=3.80; p < .01$), and CNM-to-population ratio ($t=2.50; p < .01$), but was not significantly related to practice environment score for CNM or center rural/urban location.

In other words, CHCs were likely to hire more CNMs when they employed more physicians, and were situated in states with higher CNM-to-population ratio.

CONCLUSIONS

The results of our analysis indicate the employment of NPs and PAs by CHCs was significantly associated with practice environment for these practitioners. In other words, community health center are more likely to employ NPs and PAs in states with less restrictions on legal status, reimbursement, and authority to prescribe for their NPs and PAs. The policy implication of this finding is that state decision makers may reduce legislative and regulatory barriers to practice as a way to improve the practice environment for nonphysician

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primary care providers particularly NPs and PAs. Thus, Community Health Centers can employ adequate number of NPPs to fulfill their mission of serving the poor and underserved population.

The finding that NPP-to-population ratios are significantly associated with NPPs' employment by CHCs is understandable because NPPs have to be available before they can be sought after and employed. Since NPP-to-population ratios are closely correlated with NPP practice environment scores, it may be argued that practice environment also contributes to the supply of NPPs. Students are less likely to be attracted into a profession where there are many restrictions. Reducing the barriers to practice for NPPs can then provide incentives for people to enter into these professions and thus expand supply. An expanded labor force of nonphysician primary care providers can provide care in areas where there are shortages of primary care physicians. Moreover, they could well represent the future of medical care in this country: the integration of physician and nonphysician providers to provide cost-effective care that is prevention oriented and primary care focused.

The finding that the employment of NPPs is significantly associated with the number of physician FTEs currently practicing in CHCs indicates that CHC physicians are largely positive about using NPPs for rendering patient care. It may also reflect the restrictive practice environment which requires NPPs to be closely supervised by physicians.

This report also has its limitations. The relatively low R²s, ranging from 7 percent for the CNM model to 18 percent for the NP model, indicate that the models are incomplete and potentially important variables have not been included in the analysis. For example, the employment of practitioners, physicians or NPPs, is likely to be affected by community amenities, other center characteristics such as financial arrangement, and personal characteristics such as rural exposure. In other words, practice environment not only includes the legislative and regulatory aspect, but also aspects related to the particular community and center. The inclusion of these factors would make the models more complete.

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