CHWS
Center *for* Health Workforce Studies

Are Qualified NPs in New York Establishing Collaborative Practice Relationships with Physicians?

Highlights

A recently enacted New York State law allows nurse practitioners (NPs) with more than 3,600 hours of qualifying practice experience to have collaborative practice relationships with physicians instead of written practice agreements. Researchers at the Center for Health Workforce Studies (CHWS) used data drawn from New York's mandatory NP re-registration survey to assess the likelihood that NPs who meet the 3,600-hour practice requirement have a collaborative relationship with a physician. Almost 70% of the state's active NPs reported meeting the 3,600-hour practice experience requirement which qualified them for a collaborative relationship with a physician. The analysis found that:

- **Over 75 percent of NPs with 3,600 hours of qualifying practice experience report having a collaborative practice relationship with a physician.**
- **NPs aged 65 or older were less likely to report a collaborative practice relationship with a physician than NPs in younger cohorts.**
- **Black/African American NPs were less likely to report collaborative practice relationships with physicians compared to White NPs.**
- **NPs working in independent NP practices or in physician practices were less likely to report collaborative practice relationships with physicians compared to NPs working in hospitals or emergency departments.**
- **NPs working in specialty physician practices were more likely to report collaborative practice relationships with physicians compared to NPs working in primary care practices.**
- **NPs working in patient care fewer than 50 hours per week were less likely to report collaborative practice relationships with physicians compared to NPs working 50 or more hours per week.**

Background

A 2014 New York law[1] allows NPs with more than 3,600 hours of qualifying NP experience to practice under a collaborative relationship with a physician rather than a written practice agreement. NPs with less than 3,600 hours of qualifying NP experience are still required to have written practice agreements. The law marks a regulatory change that gives experienced NPs more flexibility with regards to physician oversight of practice.[2]

The factors influencing the type of arrangements NPs have with physicians are not fully understood. Practice characteristics such as setting and specialty may influence the type of agreement more than individual demographic characteristics. Additionally, organizational culture of practice may exert a greater influence than either practice or individual characteristics and contribute to variation in NP practice arrangements with physicians.[3] [4]

Researchers at CHWS analyzed data drawn from a mandatory NP re-registration survey to identify factors associated with NPs reporting collaborative practice relationships with physicians. This research brief describes findings from that analysis.

Methods

The data for this analysis were drawn from re-registration survey responses received from September 1, 2015 through December 31, 2017. The survey was developed by CHWS in collaboration with the New York State Education Department (SED) and the New York State Department of Health (DOH). The survey includes questions on demographic, educational, and practice characteristics, as well as questions about practice arrangements with physicians. A total of 14,172 survey responses were received, representing the vast majority of active NPs relicensed during that time period.

For the purposes of this study, researchers analyzed responses from all active NPs practicing in New York. In order to establish an unduplicated count of active NPs in New York, those with out-of-state work addresses were excluded, and NPs holding more than one specialty certification were counted only once.[5] NPs who were not working, were working in a position that did not require NP certification, or were retired were also excluded from the analysis. A total of 9,987 active NPs were identified for this analysis, and 6,907 of them reported having more than 3,600 hours of qualifying practice experience (Table 1).

Table 1. Counts of New York's NP Responses

Category	Count
Surveys Received	14,172
Duplicate Submissions	-1,495
Out of State NPs	-982
Inactive NPs	-1,708
Active NPs practicing in New York	9,987
Active NPs with more than 3,600 hours of qualifying experience	**6,907**

Descriptive statistics were run to identify factors that may be associated with NPs having a collaborative practice relationship with a physician in lieu of a written practice agreement. Chi-square tests were conducted to analyze the statistical significance of the observed associations with several variables, including age, race/ethnicity, practice setting, practice speciality, among others.

Additionally, a binary logistic regression model was run to estimate the association of individual factors on the likelihood of having a collaborative practice relationship with a physician, taking into account the influence of other NP characteristics.

Findings

Findings from the CHWS research included the following:

- Nearly 77% of NPs with 3,600 hours of practice experience reported having a collaborative practice relationship with a physician.

- NPs aged 65 or older were less likely to report collaborative practice relationships with physicians than NPs in younger cohorts.

Table 2. NPs Reporting Collaborative Practice Relationships with Physicians by Age Group

Age Group	Total NPs	Number of NPs with collaborative relationships	% of NPs with collaborative relationships	Likelihood compared to reference group[6]
<34	665	522	78.5%	+33%
35~44	1,528	1,205	78.9%	+46%
45~54	1,865	1,428	76.6%	30%
55~64	2,129	1,622	76.2%	+30%
>65 (Reference Group)	691	497	71.9%	--
Total[7]	**6,878**	**5,274**	**76.7%**	**--**

- Black/African American NPs were less likely to report a collaborative practice relationship with a physician compared to White NPs.

Table 3. NPs Reporting Collaborative Practice Relationships with Physicians by Race/Ethnicity

Race / Ethnicity	Total NPs	Number of NPs with collaborative relationships	% of NPs with collaborative relationships	Likelihood compared to reference group
Hispanic	341	267	78.3%	+6%
Black / African American	741	550	74.2%	-19%
Asian / Pacific Islander	589	465	78.9%	+25%
Other[8]	291	213	73.2%	-25%
White (Reference Group)	4,936	3,793	76.8%	--
Total	**6,898**	**5,288**	**76.7%**	**--**

- NPs working in independent NP practices or in physician practices were less likely to report collaborative practice relationships with physicians than NPs working in hospitals or emergency departments.

- NPs working in specialty practices, including surgery (43%), psychiatry (51%), cardiovascular disease (56%), medical oncology (60%), and pediatric subspecialties (83%) were more likely to report a collaborative practice relationship compared to NPs in primary care practices.[9]

- NPs working in patient care fewer than 50 hours per week were less likely to report collaborative practice relationships with physicians compared to NPs working 50 or more hours per week.

Table 4. NPs Reporting Collaborative Practice Relationships with Physicians by Weekly Patient Care Hours

Weekly Patient Care Hours	Total NPs	Number of NPs with collaborative relationships	% of NPs with collaborative relationships	Likelihood compared to reference group
1 - 9	192	121	63.0%	-44%
11 - 19	328	236	72.0%	-22%
20 - 29	598	447	74.7%	-16%
30 - 39	1,348	1,010	74.9%	-17%
40 - 49	2,666	2,079	78.0%	-8%
50+ (Reference Group)	1,749	1,382	79.0%	--
Total	**6,881**	**5,275**	**76.7%**	**--**

Limitations

This analysis is subject to several limitations. The main limitation is that data used for the analysis are cross-sectional and thus, it cannot be determined which variables influenced decisions about entering into collaborative practice relationships. Rather, the analysis can only describe associations between NP characteristics and reporting such a relationship. A second limitation is the limited number of variables used in the analysis. Contextual variables related to organizational characteristics, among others, that potentially relate to decisions about the type of practice arrangements NPs seek were not available for the analysis.

Conclusions

This brief describes the associations between a number of NP demographic and practice characteristics and having collaborative practice relationships with physicians in lieu of written practice agreements. Age, race/ethnicity, practice setting and specialty, as well as patient care hours are among the characteristics found to be related to having collaborative practice relationships. The findings suggest that some of these characteristics may affect NPs' choices to enter into collaborative practice relationships with physicians. The results support further investigation, including how organizational requirements and an NP's individual motivations influence the type of practice relationships NPs establish with physicians.

Binary Logistic Regression Method

The binary logistic regression model was based on New York's nurse practitioner (NP) registration survey data (N=6,907) from September 1, 2015 to December 31, 2017 which represents approximately 64% of all active NPs in New York. The model estimated the likelihood that a NP having a collaborative practice relationship with a physician, rather than a formal written practice agreement.

Predictors

Potential variables were first examined in a univariate analysis to select candidate predictors. Variables examined included age, gender, race/ethnicity, NP certifications, rural/urban location, upstate/downstate location, region, research/administration experience, practice setting, practice specialty, primary care status, patient care hours, location of high school, location of nursing school, location of first NP program, as well as year of graduation from first NP program.

Model Goodness of Fit

Significant variables were then entered as covariates in the regression using the backward Wald procedure in SPSS. Variables were first entered as continuous if possible, and then examined as categorical. Nagelkerke R Square and Hosmer-Lemeshow statistics shown below were used to evaluate model fit. The R square of .083 is generally considered low-meaning the model explained 8% of the variance in outcome. Also, the -2 Log-likelihood value of 6164.570 suggested the model explained more of the observed variance in the outcome compared to an intercept-only model. The statistically significant result from the Hosmer-Lemeshow test estimated a goodness-of-fit of 25%, which can be considered a moderately good fit.[10]

Table 5. Regression Model Fit Results
Summary R-Squared

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6164.570[a]	.081	.083

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer-Lemeshow Goodness of Fit

Step	Chi-square	df	Sig.
1	10.254	8	.248

Model

Constructing the final model, covariance matrices for correlations of estimates were performed to check for collinearity. A collinear relationship between the constant and age was found; however, the standard error of the beta coefficient for age was small and eliminating age as a predictor worsened the model fit, so the variable was kept. The final model is shown in Table 5.

Table 6. Final Regression Model Results

Predictor		β-coefficient	S.E.	p value	Odds Ratio	Difference in Likelihood %
Age Group	>65			**0.097**		
	25~34	0.288	0.172	**0.094**	1.334	**33.4%**
	35~44	0.377	0.138	**0.006**	1.457	**45.7%**
	45~54	0.265	0.123	**0.031**	1.304	**30.4%**
	55~64	0.260	0.114	**0.023**	1.296	**29.6%**
Gender	Male	0.175	0.115	0.129	1.191	19.1%
Race / Ethnicity	White_NH			**0.021**		
	Hispanic	0.062	0.159	0.696	1.064	6.4%
	Black_NH	-0.214	0.113	**0.059**	0.808	**-19.2%**
	Asian_NH	0.227	0.148	0.127	1.254	25.4%
	Other_NH	-0.288	0.153	**0.060**	0.750	**-25.0%**
Urban	Prin. Urban	-0.103	0.104	0.323	0.902	-9.8%
Downstate	Prin. Downstate	0.084	0.077	0.278	1.088	8.8%
Setting	Hospital Inpatient / ER			**0.000**		
	Health Center / Clinic / Hospital Outpatient	0.048	0.105	0.648	1.049	4.9%
	Independent NP Practice	-0.393	0.182	**0.031**	0.675	**-32.5%**
	Nursing Home / Long term Care	0.285	0.211	0.178	1.330	33.0%
	Physician Practice	-0.295	0.119	**0.013**	0.745	**-25.5%**
	Urgent Care Center	0.187	0.339	0.582	1.205	20.5%
	Other Setting	-0.347	0.150	**0.021**	0.707	**-29.3%**
	Multi-Setting with Primary Care	0.075	0.153	0.626	1.078	7.8%
Speciality	Primary Care (Fam Med, Gen Prac, IM Gen, OBGYN, Ped Gen)			**0.000**		
	IM_Cardiovascular	0.445	0.154	**0.004**	1.560	**56.0%**
	IM_Geriatrics	0.210	0.225	0.350	1.234	23.4%
	IM_Medical Oncology	0.473	0.188	**0.012**	1.604	**60.4%**
	Other IM Subspecialty	0.096	0.151	0.526	1.100	10.0%
	Occupational Medicine	-0.309	0.229	0.178	0.734	-26.6%
	Pediatrics Subspecialty	0.604	0.212	**0.004**	1.830	**83.0%**
	Psychiatry	0.409	0.131	**0.002**	1.505	**50.5%**
	Surgery (General & Subspec)	0.354	0.148	**0.017**	1.425	**42.5%**
	Other Speciality	0.241	0.098	**0.014**	1.272	**27.2%**
	Multi-speciality	0.268	0.117	**0.022**	1.307	**30.7%**

Table 6. Final Regression Model Results (Continued)

		β	SE	p	OR	%
	Patient Care Hrs 50+			**0.072**		
	0	-0.306	1.166	0.793	0.736	-26.4%
	Per Diem	-0.723	0.740	0.329	0.485	-51.5%
Patient Care Hours	**1~9**	-0.584	0.186	**0.002**	0.558	**-44.2%**
	10~19	-0.254	0.155	**0.100**	0.775	**-22.5%**
	20~29	-0.174	0.126	0.167	0.840	-16.0%
	30~39	-0.186	0.098	**0.057**	0.830	**-17.0%**
	40~49	-0.085	0.085	0.322	0.919	-8.1%
High School Location	High School New York State			0.419		
	High School Out of U.S.	0.173	0.135	0.202	1.189	18.9%
	High School Other State	-0.018	0.104	0.866	0.983	-1.7%
1st RN Location	RN School New York State			**0.009**		
	RN School Out of U.S.	-0.526	0.181	**0.004**	0.591	**-40.9%**
	RN School Other State	0.082	0.111	0.460	1.085	8.5%
1st NP Location	1st NP Program New York State			0.874		
	1st NP Program Out of U.S.	-0.254	0.499	0.611	0.776	-22.4%
	1st NP Program Other State	-0.013	0.112	0.907	0.987	-1.3%
1st NP Graduation	NP Grad Since 2000			0.610		
	Before 1980	0.069	0.273	0.799	1.072	7.2%
	1980~1989	0.076	0.163	0.643	1.078	7.8%
	1990~1999	0.046	0.108	0.668	1.047	4.7%
	2000~2009	-0.078	0.089	0.377	0.925	-7.5%
Res.	Research	-0.019	0.094	0.841	0.981	-1.9%
Adm.	Administration	0.057	0.077	0.461	1.058	5.8%
	Constant	0.795	0.224	0.000	2.214	

a. Variable(s) entered on step 1: Age Group, Male, Race / Ethnicity, Prin.Loc.Urban, Prin.Loc.Downstate, Principal Setting, Principal Specialty, Patient Care Hrs, High School Location, 1st RN School Location, 1st NP Program Location, 1st NP Graduation Cat., Hours on Research, Hours on Administration.

Interpretation Guide

Table 5 provides the regression coefficient (β-coefficient), the standard error, p value (significance level at 90%), and the odds ratio for each variable category. The last column contains the differences in likelihood extracted from odds ratios as a percentage to assist interpretation for each variable. The positive percentages mean that NPs in that category are more likely to have a collaborative practice relationship than the reference group, while the negative percentages mean that NPs in that category are less likely to have a collaborative practice relationship and more likely to have a formal written practice agreement than the reference group.

The β coefficients measure the association between independent variable and dependent variable (relationship in this case), positive values indicate positive associations between those independent variables and having a collaborative practice relationship. For example, the β coefficients for all age groups are significant and positive, indicating that NPs in each of those age groups were more likely to having a collaborative relationship with a physician than NPs age 65 or older (the reference group), while controlling for all other variables. Moreover, the odds ratio column suggests that NPs in the youngest age group (25~35) were 1.33 times (or 33% more likely) than those in the oldest age group (the reference category) to have a collaborative practice relationship rather than a written practice agreement with a physician.

References

1. New York State Nurse Practitioners Modernization Act, S4611A, Amd § 6902, Ed L, 2014.

2. National Academies of Sciences, Engineering, and Medicine. 2016. *Assessing Progress on the Institute of Medicine Report The Future of Nursing.* Washington, DC: The National Academies Press. https://doi.org/10.17226/21838.

3. Poghosyan, L., Norful, A., & Martsolf, G. *Organizational structures and outcomes of newly hired and experienced nurse practitioners in New York State*. Nursing Outlook. 2017 Oct; 65(5):507-614.

4. Pittman, P., Leach, B., Everett, C., Han, X., & McElroy, D. *NP and PA privileging in acute care settings: do scope of practice laws matter?* Medical Care Research and Review. 2018 Feb.

5. NPs are licensed as RNs in New York State and certified in one or more NP specialties. They are required to recertify for each NP certification they hold.

6. A positive percentage in the column "Likelihood compared to reference group" indicates more likely to have a collaborative practice agreement than the reference group. A negative percentage in the columns indicates less likely to have a collaborative practice agreement and more likely to have a written practice agreement than the reference group.

7. Armstrong D, Liu Y, Forte GJ. 2016 New York Residency Training Outcomes: A Summary of Responses to the 2016 New York Resident Exit Survey. Rensselaer, NY: Center for Health Workforce Studies; July 2017.

8. Totals for each table reflect the number of NPs who answered the specific question.

9. Primary care practices include: family medicine, general medicine, general internal medicine, obstetrics/ gynecology, and general pediatrics.

10. Hosmer, D.W., Hosmer, T., Le Cessie, S. and Lemeshow, S. *A Comparison of Goodness-of-Fit Tests for the Logistic Regression Model. Statistics in Medicine*, 1997; 16:965-980.