

# The Economic Burden and Practice Restrictions Associated With Collaborative Practice Agreements: A National Survey of Advanced Practice Registered Nurses

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The U.S. healthcare system is facing workforce shortages in rural and primary care settings. Despite growing demand for providers and comparable quality metrics, advanced practice registered nurses (APRNs) still face significant barriers to independent practice due to reduced scope of practice regulations. In this study, APRNs working in rural areas and APRN-managed private clinics were one and a half to six times more likely to be assessed Collaborative Practice Agreement (CPA) fees, often exceeding \$6,000 and up to \$50,000 annually. Similarly, APRNs subject to minimum distance requirements, fees to establish a CPA, and supervisor turnover reported a 30% to 59% uptick in restricted care. Such unnecessary regulation risks diverting health services away from and increasing costs in traditionally underserved areas, contributing to inequities in care. It is incumbent on state legislatures to address these disparities and make their constituents' access to high-quality care a top priority.

*Keywords:* APRN, advanced practice registered nurse, collaborative practice agreement, supervising physician

Over the past 2 decades, numerous studies have documented a multitude of challenges facing the U.S. healthcare system. Chief among these are shortages in the provider workforce in rural areas and primary care settings (Green, Savin, & Lu, 2013; Petterson et al., 2012). These trends have been exacerbated by an aging population and recent coverage expansions under the Affordable Care Act, which preliminary evidence suggests have led to longer wait times (Ku, Jones, Shin, Bruen, & Hayes, 2011; Polsky et al., 2017). To address this projected shortfall, research examining scope of practice regulations has begun to explore the possible economic and patient safety implications of allowing advanced practice registered nurses (APRNs) to practice to the full extent of their education (Adams & Markowitz, 2018; DesRoches et al., 2013; Fairman, Rowe, Hassmiller, & Shalala, 2011; Federal Trade Commission, 2014; Institute of Medicine, 2011; APRN Consensus Work Group, 2008). According to the National Council of State Boards of Nursing (NCSBN, 2018), APRNs are granted full practice authority depending on the restrictiveness of state scope of practice regulations, which can vary considerably. Thus, the regulatory landscape and the corresponding challenges it presents APRNs and their patients differ based on geographic location (Kuo, Loresto, Rounds, & Goodwin, 2013; Reagan & Salsberry, 2013; Xue, Ye, Brewer, & Spetz, 2016). These differing regula-

tions compound pre-existing inequities in care by erecting further barriers to access in traditionally underserved and vulnerable populations (DesRoches et al., 2013; Kuo et al., 2013; Reagan & Salsberry, 2013; Xue et al., 2016; Chapman, Phoenix, Hahn, & Strod, 2018; Loresto, Jupiter, & Kuo, 2017; Neff et al., 2018).

Currently, 21 states grant all APRN roles full practice authority, which means a written Collaborative Practice Agreement (CPA), supervision, and conditions on practice are not required (NCSBN, 2018). The remaining 29 states mandate reduced scope of practice on at least one APRN role. In these markets, a CPA specifies the scope of practice with a general or direct supervision requirement by a clinician. Similar to the state laws that mandate these formal agreements, CPA frameworks vary considerably in terms of financial and professional requirements. In many instances, physicians require APRNs to pay them for signing on to a CPA and often entail patient medical record reviews, shared billing procedures, regular in-person or electronic communication, and patient referral pathways (DesRoches et al., 2013; Reagan & Salsberry, 2013; American Academy of Family Physicians, 2018; Rudner & Kung, 2017). Nonetheless, state-mandated requirements on distance restrictions between APRNs and their supervising providers, the nature and volume of patient medical record reviews, and the fees governing such arrangements are often not uniform.

Despite inconsistencies in what scope of practice restrictions require and how they are applied, proponents of CPAs often cite patient safety concerns as justification for their perpetuation and expansion. Common themes that emerge are whether APRNs have sufficient education and whether they have the breadth of experience to provide the same level of care as their physician counterparts (American Academy of Family Physicians, 2012; American Medical Association, 2010; Federation of State Medical Boards, 2005). Survey findings suggest the answers to these questions often depend on whom you ask, with physicians' responses and APRNs' responses typically inversely related (Donelan, DesRoches, Dittus, & Buerhaus, 2013). Additional research has also examined physician wage loss as a potential corollary to increased APRN scope of practice (Perry, 2009; Pittman & Williams, 2012). Regardless of the motivation, controversy persists as to the appropriate amount of autonomy APRNs should be granted in their day-to-day practice.

Evidence in support of full practice authority has allayed public safety concerns. Many studies document comparable clinical outcomes (Reagan & Salsberry, 2013; Loresto et al., 2017; Dill, Pankow, Erikson, & Shipman, 2013; Fung, Chan, & Chien, 2014) and high patient satisfaction ratings for APRN-managed care (Laurant et al., 2008; Mundinger et al., 2000; Roblin, Becker, Adams, Howard, & Roberts, 2004). Furthermore, longstanding research indicates APRNs are more likely to serve traditionally underserved and minority populations (DesRoches et al., 2013; Xue et al., 2016; Neff et al., 2018; Buerhaus, DesRoches, Dittus, & Donelan, 2015; Barnes, Richards, McHugh, & Martsof, 2018). Adding to this existing body of evidence, new lines of inquiry on the economic benefits of removing CPA restrictions have shed light on the potential cost savings states could accrue with expanded scope of practice regulation (Conover & Richards, 2015; Hooker & Muchow, 2015; Timmons, 2017). To make these findings more actionable, additional information on which CPA components place undue financial and practice restrictions on APRNs is necessary.

To date, much of the research on scope of practice regulations has focused on strategies to address projected provider shortfalls and the inevitable gaps in care that result. Of particular concern are shortfalls among primary care, mental health, and midwifery providers (Chapman et al., 2018; Declercq, Paine, Simmes, & DeJoseph, 1998; Huang & Finegold, 2013). Utilization trends and broader workforce issues, such as general practice patterns and perceptions of provider care, also received much attention. By contrast, less information is available in the scientific literature on specific CPA components, including financial requirements, provisions regarding the extent and frequency of collaboration, and particularly restrictive/beneficial aspects. To augment the literature on these important topics, the NCSBN designed a cross-sectional study to identify current APRN practice trends in states that require CPAs and to ascertain the potential benefits and challenges such formal arrangements present.

TABLE 1

### Sampled States

#### Collaborative Practice Agreement States

Alabama	Maryland	Ohio
Arkansas	Maine	Oklahoma
California	Michigan	Pennsylvania
Florida	Mississippi	South Carolina
Georgia	Missouri	South Dakota
Illinois	Nebraska	Tennessee
Indiana	New Hampshire	Texas
Kansas	New Jersey	Virginia
Louisiana	New York	Wisconsin
Maine	North Carolina	

## Methods

### Sample

A stratified random sample of 8,701 APRNs practicing across 29 states that mandate reduced scope of practice on at least one APRN role comprised the final study sample (Table 1). A demographic analysis compared the breakdown of respondent sex, race, and age to the APRN characteristics identified in the 2017 National Nursing Workforce Survey to assess for potential non-response bias (Smiley et al., 2018). Table 2 confirmed the overall sample and role-specific cohorts aligned with national estimates. Participants were contacted via postcard and email between September and November 2017. An online survey was administered using Qualtrics (Provo, UT). The instrument consisted of 47 questions divided across four content areas: (a) baseline demographics, (b) CPA framework, (c) practice patterns, and (d) CPA benefits/challenges. The study was determined to be exempt by the Western Institutional Review Board.

### Data

#### Dependent Variables

The majority of survey items in the analysis used participants' raw response values; however, several covariates were recoded to facilitate further analysis. One of the two primary dependent variables, CPA fee requirements, is an amalgamation of APRN responses to two survey questions. The first asked respondents whether they or their facility had to pay a fee to *establish* their CPA, whereas the second solicited information on whether they or their facility had to pay a fee to *maintain* their CPA. As either arrangement represents an additional financial burden on practicing APRNs or their employers, responses to these two items were combined. The second dependent variable was assessed in its raw form as a dichotomous outcome (yes/no) asking whether APRNs experience any practice restrictions associated with their CPA.

#### Independent Variables

A "career stage" variable was derived from participants' raw numeric responses related to years in practice. Respondents below the 25th percentile (5 years) were considered early career, whereas

TABLE 2

**Study Demographic Profile Compared to 2017 Workforce Characteristics**

Group	Demographic Variable	2017 Workforce <sup>a</sup>	Study Sample
NP	Sex (female)	92%	91%
	Race (White)	84%	86%
	Age (median)	51	52
CNM	Sex (female)	100%	99%
	Race (White)	87%	92%
	Age (median)	57	57
CRNA	Sex (female)	62%	55%
	Race (White)	88%	84%
	Age (median)	52	53
CNS	Sex (female)	93%	95%
	Race (White)	83%	90%
	Age (median)	60	58
Total	Sex (female)	90%	90%
	Race (White)	81%	87%
	Age (median)	53	52

Note. NP = nurse practitioner; CNM = certified nurse midwife; CRNA = certified registered nurse anesthetist; CNS = certified nurse specialist.

<sup>a</sup>Weighted estimates reflect population characteristics.

those between the 25th percentile and median were considered midcareer, and those at or above the median (13 years) were considered established. Furthermore, respondents who reported practicing in multiple states or working under two or more CPAs were re-classified into two binary predictors (i.e., one = 0, two or more = 1). CPA authorship was also dichotomized to distinguish between any level of APRN involvement versus no input. Finally, as more than 85% of respondents were reportedly “White/Caucasian,” all other racial/ethnic categories were collapsed into a single minority group.

### Statistical Analysis

A descriptive summary of the final respondent sample included frequencies and proportions for all categorical variables. Continuous variables were expressed as means and standard deviations or medians and interquartile ranges (IQRs) based on their underlying distributions. Univariable and multivariable binary logistic regression models were used to examine CPA fee requirements and restrictive care trends (Hosmer, Lemeshow, & Sturdivant, 2013). As a measure of global fit, the composition of the final multivariable models was determined using only those parameters that best minimized Akaike’s information criterion. An alpha error rate of  $p \leq .05$  was considered statistically significant.

A supplemental latent class analysis was used to further classify APRNs into more discrete groups based on their practice profiles. The final number and composition of the latent cohorts was determined based on APRN responses regarding self-payment to establish or maintain their CPA, as well as the perceived restrictions, benefits, disadvantages, and challenges associated with CPA enforcement. Facility payments were excluded from this follow-up analysis to better account for the particularly onerous nature of out-of-pocket expenses. Bayesian information criterion estimates were assessed to determine the final number of groups used in the analysis. As a measure of accuracy, the proportion of respondents expected to belong to each subgroup, known as class membership probabilities, are reported (Collins & Lanza, 2013). All analyses were conducted using SAS 9.4 (Cary, NC).

## Findings

### Demographics

The mean age of APRN respondents was 52 years ( $SD = 11.1$ ), with a median of 13 years of work experience ( $IQR = 5-20$ ) (Table 3). The majority were White ( $n = 6,653, 86.7%$ ), female ( $n = 6,926, 89.7%$ ), and certified nurse practitioners (CNP) ( $n = 6,218, 80.0%$ ). A master’s degree was the most frequent level of nursing education reported ( $n = 5,860, 75.3%$ ), but a sizeable proportion of respondents also indicated having a doctor of nursing practice degree ( $n = 1,003, 12.9%$ ). Most respondents worked in large health facilities/systems ( $n = 4,515, 58.0%$ ) in urban areas ( $n = 5,264, 67.9%$ ). Few respondents reported practicing in two or more states ( $n = 295, 3.8%$ ), but about one-fifth did indicate they work under more than one CPA ( $n = 1,894, 21.8%$ ). Patient populations are fairly diverse, with most APRNs reporting family/individual across lifespan ( $n = 3,139, 31.4%$ ), followed by adult/gerontology ( $n = 2,808, 28.1%$ ) and women’s health ( $n = 1,337, 13.4%$ ).

APRN majorities reported discussing at least one patient case ( $n = 5,866, 93.7%$ ) with and/or referring at least one patient case ( $n = 4,923, 78.7%$ ) to a member of their physician team in the past month. Despite APRNs’ active role under CPAs, physician activity was less consistent. Only half of respondents ( $n = 3,143, 50.2%$ ) indicated they communicate in person with their supervising physician at least once per month. A similar proportion ( $n = 3,850, 61.5%$ ) also indicated they communicate with their supervising physician via phone/text/email at least once per month. Approximately half of respondents ( $n = 3,551, 56.6%$ ) reported their supervising physician conducts medical record reviews.

### CPA Fees

One in five respondents reported that either they or their facility had to pay a fee to a collaborating physician ( $n = 1,275, 20.3%$ ). Of this subtotal, notable proportions of respondents reported paying directly out of pocket to establish ( $n = 228, 17.9%$ ) or

maintain ( $n = 263$ , 20.6%) their CPA. This APRN cohort was largely comprised of CNPs (87%) working in primary care settings (50%). For these direct payments, the median fee to establish a CPA was \$650 ( $n = 198$ ,  $IQR = \$150$ – $\$1,500$ ). However, establishment fees ranged considerably, from \$10 to \$50,000. Twenty-four respondents indicated they paid in excess of \$5,000 to establish their CPA, with eight of those reporting figures greater than \$20,000. By comparison, the median fee to maintain a CPA was \$500 per month ( $n = 213$ ,  $IQR = \$200$ – $\$1,000$ ). Maintenance fees also ranged widely, from \$4 to \$4,167 per month. Ninety-six respondents indicated they paid more than \$500 per month, with 40 reporting monthly figures over \$1,000.

Baseline demographics, such as age, sex, race, and education level, and the number of states in which an APRN reported practicing were not meaningfully associated with mandatory fee payments (results not shown). On multivariable analysis, APRNs practicing in rural areas were 52% (adjusted odds ratio [AOR] = 1.52, 95% CI [1.32, 1.75],  $p < .001$ ) more likely to report needing to pay a fee to establish or maintain their CPA (Table 4). Those working in a private practice setting established and managed by APRNs reported similar trends. APRNs who worked in large health facilities/systems (AOR = 0.31, 95% CI [0.24, 0.39],  $p < .001$ ), who worked in private practices run by physicians (AOR = 0.16, 95% CI [0.12, 0.22],  $p < .001$ ), or who were self-employed (AOR = 0.63, 95% CI [0.41, 0.97],  $p = .04$ ) were all 37% to 84% less likely to pay CPA fees compared to those who worked in a private practice managed by APRNs.

APRNs working remotely from their supervising physician were also 2.68 times (95% CI [2.23, 3.23],  $p < .001$ ) more likely to report a required fee to establish or maintain their CPA compared to those located in the same office/clinic. Similarly, APRNs working under two or more CPAs were 27% (AOR = 1.27, 95% CI [1.10, 1.47],  $p = .001$ ) more likely to pay CPA fees compared to those who only reported one. CPA fees varied by patient population but often aligned with facility setting. Respondents who work in family/individual lifespan (AOR = 1.64, 95% CI [1.41, 1.90],  $p < .001$ ) or psychiatric mental health (AOR = 1.47, 95% CI [1.18, 1.82],  $p < .001$ ) areas were more likely to report paying fees. Both services were offered more frequently in private APRN practices (both  $p < .001$ ). Conversely, APRNs in pediatric (AOR = 0.76, 95% CI [0.60, 0.96],  $p = .02$ ) and neonatal (AOR = 0.59, 95% CI [0.35, 0.98],  $p = .04$ ) specialties were less likely to pay CPA fees. These services were disproportionately offered at large health facilities/systems (both  $p < .001$ ).

### Care Restrictions

Approximately one-third of respondents ( $n = 1,947$ , 32.5%) reported that certain terms of their CPA significantly restricted their care of patients. When asked to specify the nature of these restrictions, a majority ( $n = 1,216$ , 62.5%) reported a range of restrictions specific to prescribing authority, permitted procedures, patient profiles, and distant/setting requirements. On

TABLE 3

### Respondent Demographics and Health Facility Characteristics (N = 8,701)

Respondent Characteristics	Valid N	n (%)
<i>Age (Mean, SD)</i>	7,588	52.1 (11.1)
<i>Race/Ethnicity</i>	7,673	
Minority		1,020 (13.3)
White/Caucasian		6,653 (86.7)
<i>Sex</i>	7,721	
Female		6,926 (89.7)
Male		795 (10.3)
<i>Professional Role</i>	7,771	
Certified nurse practitioner		6,218 (80.0)
Clinical nurse specialist		558 (7.2)
Certified nurse-midwife		514 (6.6)
Certified registered nurse anesthetist		481 (6.2)
<i>Highest Level of Nursing Education</i>	7,783	
Master's degree		5,860 (75.3)
Doctor of nursing practice		1,003 (12.9)
Doctor of philosophy (PhD)		349 (4.5)
Baccalaureate degree		137 (1.8)
Other		434 (5.6)
<i>Geographic Setting</i>	7,748	
Urban		5,264 (67.9)
Rural		2,484 (32.1)
<i>Type of Healthcare Facility</i>	7,783	
Health facility/health system		4,515 (58.0)
Private practice physician (MD)		1,283 (16.5)
Private practice (APRN)		442 (5.7)
Private practice other		247 (3.2)
Self-employed		224 (2.9)
Other		1,072 (13.8)
<i>Patient Population</i>	7,781	
Family/individual across lifespan		3,139 (31.4)
Adult gerontology		2,808 (28.1)
Women's health		1,337 (13.4)
Pediatrics		982 (9.8)
Psychiatric mental health		716 (7.2)
Neonatal		260 (2.6)
Other		768 (7.7)
<i>Number of CPAs</i>	8,701	
None		2,430 (27.9)
One		4,377 (50.3)
Two or more		1,894 (21.8)
<i>Practicing in Multiple States</i>	7,771	
No		7,476 (96.2)
Yes		295 (3.8)
<i>Years in Practice (Median, IQR)</i>	7,776	13 (5–20)

Note. APRN = advanced practice registered nurse; CPA = Collaborative Practice Agreement; IQR = interquartile range.

TABLE 4

**Univariable and Multivariable Binary Logistic Regression Results Examining CPA Fee Requirements**

Respondent and CPA Factors	Valid <i>n</i>	% Fees	OR (95% CI)	AOR (95% CI)
<i>Geographic Setting</i>				
Rural	2,068	27.3	1.86 (1.64, 2.10)*	1.52 (1.32, 1.75)*
Urban ( <i>Ref</i> )	4,172	16.9	-	-
<i>Career Stage</i>				
Early ( <i>Ref</i> )	1,769	22.1	-	-
Mid	1,377	22.4	1.02 (0.86, 1.21)	1.07 (0.89, 1.28)
Established	2,956	18.3	0.79 (0.68, 0.91)*	0.88 (0.75, 1.04)
<i>Type of Healthcare Facility</i>				
Health facility/health system	3,651	17.6	0.18 (0.15, 0.23)*	0.31 (0.24, 0.39)*
Private practice physician (MD)	1,091	10.1	0.10 (0.07, 0.13)*	0.16 (0.12, 0.22)*
Private practice (APRN) ( <i>Ref</i> )	351	53.9	-	-
Private practice other	200	35.5	0.47 (0.33, 0.68)*	0.60 (0.41, 0.88)**
Self-employed	135	38.5	0.54 (0.36, 0.81)*	0.63 (0.41, 0.97)**
Other	836	24.9	0.28 (0.22, 0.37)*	0.34 (0.25, 0.45)*
<i>Physician Practice Location</i>				
Same office/clinic ( <i>Ref</i> )	2,214	12.6	-	-
Same facility	1,543	10.8	0.84 (0.68, 1.03)	0.86 (0.69, 1.07)
Same city/town	1,287	31.3	3.16 (2.66, 3.76)*	2.68 (2.23, 3.23)*
other	1,227	34.8	3.70 (3.12, 4.40)*	2.66 (2.20, 3.21)*
<i>Number of CPAs</i>				
One ( <i>Ref</i> )	4,377	18.6	-	-
Two or more	1,894	24.4	1.41 (1.24, 1.61)*	1.27 (1.10, 1.47)*
<i>CPA Author</i>				
No ( <i>Ref</i> )	4,627	18.9	-	-
Yes	1,627	24.3	1.38 (1.20, 1.57)*	1.16 (0.98, 1.36)
<i>Patient Population<sup>a</sup></i>				
Family/across lifespan	2,576	26.9	1.96 (1.73, 2.20)*	1.64 (1.41, 1.90)*
Adult gerontology	2,223	16.6	0.69 (0.60, 0.79)*	0.87 (0.74, 1.01)
Women's health	1,013	15.8	0.70 (0.58, 0.84)*	0.86 (0.71, 1.06)
Pediatrics	767	14.7	0.65 (0.52, 0.80)*	0.76 (0.60, 0.96)**
Psychiatric mental health	595	28.2	1.62 (1.34, 1.96)*	1.47 (1.18, 1.82)*
Neonatal	182	11.5	0.50 (0.32, 0.80)*	0.59 (0.35, 0.98)**

Note. CPA = Collaborative Practice Agreement; OR = odds ratio; AOR = adjusted odds ratio; CI = confidence interval; APRN = advanced practice registered nurse.

\*  $p < .01$ .

\*\*  $p < .05$ .

<sup>a</sup> Each patient population was assessed as an independent binary predictor with a general referent of "no" indicating any other patient subgroup.

univariable analysis, age, race, education level, career stage, geographic setting, and facility setting were not meaningfully associated with restricted care trends, so they were omitted from the follow-up analyses (results not shown). On multivariable analysis, APRNs working in states that mandated medical record reviews ( $AOR = 1.40$ , 95% CI [1.22, 1.60],  $p < .001$ ) or imposed minimum distance requirements ( $AOR = 1.59$ , 95% CI [1.38, 1.84],

$p < .001$ ) were 40% and 59% more likely to report restrictions, respectively (Table 5). Respondents who reported paying out-of-pocket fees to establish their CPA were 57% ( $AOR = 1.57$ , 95% CI [1.03, 2.39],  $p = .04$ ) more likely to report restrictions compared to those who paid no fees. Additionally, APRNs whose facility paid similar fees were 41% ( $AOR = 1.41$ , 95% CI [1.08, 1.85],  $p = .01$ ) more likely to report restrictions.

APRNs who reported losing or needing to change supervising providers were 30% ( $AOR = 1.30$ , 95% CI [1.15, 1.46],  $p < .001$ ) more likely to report restrictions. Among this APRN subset, those who reported taking a few weeks/months (*vs. one week*;  $OR = 1.39$ , 95% CI [1.14, 1.71],  $p = .001$ ) or even over a half year (*vs. one week*;  $OR = 1.73$ , 95% CI [1.05, 2.86],  $p = .03$ ) to replace their supervisor were also significantly more likely to report restrictions. By contrast, those APRNs who either independently authored their CPA or substantially contributed to it were 20% ( $AOR = 0.80$ , 95% CI [0.70, 0.92],  $p < .001$ ) less likely to report restrictions compared to those whose facility or supervising provider constructed it without their input. Respondents who provide women's health services were 46% ( $AOR = 1.46$ , 95% CI [1.25, 1.69],  $p < .001$ ) more likely to report restrictions. As with select fee trends, women's health services were typically offered at APRN-managed private clinics ( $p < .001$ ).

Supplemental latent class analysis identified three primary APRN cohorts. The most restricted group, representing 5.3% of the sample, reported high probabilities of paying to establish and maintain their CPA out of pocket, as well as higher likelihoods of encountering restrictions, disadvantages, and challenges. The second most restricted group, 28.4% of the sample, often had CPA fees covered by their facility but still reported significant restrictions, disadvantages, and challenges. The remaining two-thirds of the sample (66.3%) noted no CPA fees and comparatively fewer restrictions, disadvantages, and challenges. The probability a respondent was classified into a category, if assigned, was 96% (most restrictive), 89% (restrictive), and 83% (least restrictive).

Compared to the least restrictive group, the most restricted cohort tended to be older (53 vs. 51 years,  $p = .01$ ), more experienced nurses (76.6% v. 69.9% mid/established,  $p = .03$ ) who disproportionately serve rural communities (47.3% vs. 32.4%,  $p < .001$ ) through private APRN-managed clinics (42.5% vs. 3.8%,  $p < .001$ ). Demographically, the second most restrictive group was more similar to the least restricted group. The two groups differed predominantly on reported practice restrictions. The restricted group was more likely to report state-mandated medical record reviews (58.6% vs. 49.3%,  $p < .001$ ), minimum distance requirements (29.1% vs. 18.9%,  $p < .001$ ), facility-paid CPA fees (20.0% vs. 10.5%,  $p < .001$ ), needing to change a supervising physician (38.5% vs. 28.6%,  $p < .001$ ), and working under multiple CPAs (34.2% vs. 28.0%,  $p = .03$ ). Overall, larger proportions of the least restricted group tended to be early career (30.1%) APRNs working in large facilities (59.5%) located in urban areas (67.6%).

## Discussion

In light of projected healthcare workforce shortages in rural areas and primary care settings, identifying strategies to maintain consumer access to high-quality care should be a national priority. One strategy is to allow APRNs to practice to the full

extent of their education and training (Adams & Markowitz, 2018; DesRoches et al., 2013; Fairman et al., 2011; Federal Trade Commission, 2014; Institute of Medicine, 2011; APRN Consensus Work Group, 2008). In support of this position, numerous studies document outcomes comparable to physicians (Reagan & Salsberry, 2013; Loresto et al., 2017; Dill et al., 2013; Fung et al., 2014), high patient satisfaction ratings (Laurant et al., 2008; Munding et al., 2000; Roblin et al., 2004), and increased access for residents of traditionally underserved and minority communities (DesRoches et al., 2013; Xue et al., 2016; Neff et al., 2018; Buerhaus et al., 2015; Barnes et al., 2018). The current patchwork of overly restrictive regulation contributes to significant market inequities. The results of this study provide new and specific evidence on continued barriers to independent practice.

Required CPA fees, whether offset by a facility or not, emerged as particularly strong barriers to independent practice and, thereby, possible impediments to access in this analysis. In line with market research on provider compensation, out-of-pocket expenses to establish and maintain CPAs often exceeded \$6,000 annually, with numerous respondents reporting fees more than \$10,000 and up to a maximum of \$50,000 per year (American Medical Group Association, 2016). Although these payments are meant to compensate physicians for the time they invest in supervising APRN caseloads, these fees can significantly increase the cost of care despite scant evidence that meaningful supervision occurs (Reagan & Salsberry, 2013). In this survey, approximately 40% to 50% of respondents reported irregular contact with their supervising physician and no formal review of their medical records. Furthermore, whereas those working in APRN-managed private clinics ( $p < .001$ ), often in underserved rural areas ( $p < .001$ ), reported required fees, there were no significant differences in the fees charged to early versus mid- and established career providers. Rather than being a form of regular supervision for less experienced APRNs to address patient safety concerns, these fees may function as barriers for consumers in medically-underserved communities and for the experienced entrepreneurial APRNs this partnership is purported to benefit.

In addition to fees, specific CPA supervising requirements are common impediments to independent practice (Reagan & Salsberry, 2013; Rigolosi & Salmond, 2014). In this study, minimum distance requirements ( $p < .001$ ), mandated medical record reviews ( $p < .001$ ), losing or needing to change a supervising physician ( $p < .001$ ), and practice location ( $p < .001$ ) all significantly restricted APRN care. Stringent practice requirements not only minimize the professional and psychological benefits APRNs accrue through independent practice (Kazer, O'Sullivan, & Leonard, 2018), but they also reinforce barriers to broad consumer access. Longstanding research shows divergent care patterns between physicians and APRNs, both in terms of the populations they serve and the locations in which they establish clinics (Reagan & Salsberry, 2013; Xue et al., 2016). The results of this study highlight how this misalignment can exacerbate

TABLE 5

**Univariable and Multivariable Binary Logistic Regression Results Examining Restricted Care Patterns**

Respondent and CPA Factors	Valid <i>n</i>	% Restricted	OR (95% CI)	AOR (95% CI)
<i>Sex</i>				
Female ( <i>Ref</i> )	5,379	31.6	-	-
Male	562	40.4	1.46 (1.23, 1.75)*	1.50 (1.24, 1.80)*
<i>Mandated Medical Record Reviews</i>				
No ( <i>Ref</i> )	1,871	27.0	-	-
Yes	3,096	36.4	1.55 (1.37, 1.76)*	1.40 (1.22, 1.60)*
<i>Mandated Minimum Distance</i>				
No ( <i>Ref</i> )	2,694	30.2	-	-
Yes	1,312	43.0	1.75 (1.52, 2.00)*	1.59 (1.38, 1.84)*
<i>Pay Fee to Establish CPA</i>				
No ( <i>Ref</i> )	4,375	29.2	-	-
Yes, and I paid it	224	38.0	1.48 (1.12, 1.96)**	1.57 (1.03, 2.39)**
Yes, and my facility paid it	759	42.7	1.81 (1.54, 2.11)*	1.41 (1.08, 1.85)**
<i>Pay Fee to Maintain CPA</i>				
No ( <i>Ref</i> )	4,254	29.3	-	-
Yes, and I paid it	256	34.8	1.29 (0.99, 1.68)	0.88 (0.59, 1.33)
Yes, and my facility paid it	775	41.4	1.71 (1.46, 2.00)*	1.15 (0.88, 1.50)
<i>Lost Supervising Provider</i>				
No ( <i>Ref</i> )	4,071	30.1	-	-
Yes	1,929	37.4	1.39 (1.24, 1.56)*	1.30 (1.15, 1.46)*
<i>Physician Practice Location</i>				
Same office/clinic ( <i>Ref</i> )	2,134	29.0	-	-
Same facility	1,464	32.2	1.17 (1.01, 1.35)**	1.10 (0.95, 1.28)
Same city/town	1,228	33.7	1.25 (1.07, 1.45)*	1.10 (0.94, 1.29)
Other	1,174	37.7	1.48 (1.27, 1.72)*	1.22 (1.03, 1.45)*
<i>Number of CPAs</i>				
One ( <i>Ref</i> )	4,187	31.0	-	-
Two or more	1,813	35.9	1.25 (1.11, 1.40)*	1.13 (1.00, 1.28)**
<i>CPA Author</i>				
No ( <i>Ref</i> )	4,384	34.0	-	-
Yes	1,599	28.3	0.77 (0.68, 0.87)*	0.80 (0.70, 0.92)*
<i>Patient Population<sup>a</sup></i>				
Family/across lifespan	2,462	33.2	1.06 (0.95, 1.19)	
Adult gerontology	2,122	31.6	0.94 (0.84, 1.06)	
Women's health	979	37.1	1.28 (1.11, 1.48)*	1.46 (1.25, 1.69)*
Pediatrics	728	31.5	0.95 (0.80, 1.12)	
Psychiatric mental health	571	33.1	1.03 (0.86, 1.24)	
Neonatal	172	39.0	1.34 (0.98, 1.83)	1.34 (0.97, 1.86)

Note. CPA = Collaborative Practice Agreement; OR = odds ratio; AOR = adjusted odds ratio; CI = confidence interval.

\*  $p < .01$ .

\*\*  $p < .05$ .

<sup>a</sup> Each patient population was assessed as an independent binary predictor with a general referent of "no" indicating any other patient subgroup.

existing gaps in provider care. Specifically, the inverse relationship between restricted care and supervisor proximity, based on practice location and total distance, suggest that related CPA requirements likely perpetuate the limited flow of services to traditionally underserved populations.

There is ample evidence that truly collaborative advanced provider networks can improve access to and quality of care, as well as the timeliness of rendered services (Green et al., 2013; Donelan et al., 2013; Buerhaus et al., 2015; Barnes et al., 2018; Deshefy-Longhi, Swartz, & Grey, 2008). Further, given the complexities of the U.S. healthcare delivery system, coupled with recent expansions in coverage and an aging patient population, such integrated teams are likely necessary to address evolving consumer demand (Barnes et al., 2018). In its current format, a CPA is not the mechanism for achieving this end. The findings of this analysis suggest CPAs do little to institutionalize potentially important checks on early career professionals, including regular communication and medical record reviews. Instead, they often inhibit access to care in regions that need it the most and can place significant financial and practice restrictions on midcareer and established APRNs, who are well positioned to address these shortfalls. Although progress continues toward removing these regulations, it is incumbent on state legislatures to make their constituents' access to high-quality care a top priority (Brom, Salsberry, & Graham, 2018).

## Limitations

To avoid overinterpretation of the results, there are several limitations to this study that require careful consideration. First, due to the retrospective design of this study, associations identified during this analysis are correlative rather than causal. Second, despite consultation with the four major APRN associations, the scope of the survey instrument is by nature not exhaustive; thus, there are likely topics that were not queried as part of this study that may warrant further research. Finally, because of our focus on APRN practice patterns, this study does not include physician or physician assistant feedback related to how CPAs impact the broader professional landscape or are perceived among other affected professional classes.

## Conclusion

Given the numerous challenges facing the U.S. healthcare system, state laws should facilitate APRNs practicing to the full extent of their education and training. The findings of this study underscore that CPAs, far from implementing checks and balances that augment patient safety, do little to generate a truly collaborative environment. Rather, they ultimately divert care away from traditionally underserved areas, curtail consumer choice, and place unnecessary restrictions and financial burdens on an entire class of advanced providers. In light of these results, states should redou-

ble their efforts to ensure critical healthcare services tailored to the needs of their residents remain widely accessible.

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