Physician-Nurse Practitioner Teamwork in Primary Care Practices in New York: A Cross-Sectional Survey

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BACKGROUND: Primary care practices increasingly rely on the growing workforce of nurse practitioners (NPs) to meet primary care demand. Understanding teamwork between NPs and physicians in primary care practices is critically important.

OBJECTIVE: We assessed teamwork between NPs and physicians practicing within the same primary care practice and determined how teamwork affects their job satisfaction, intent to leave their current job, and quality of care.

DESIGN: A cross-sectional survey design was used to collect data from both NPs and physicians in New York State in 2017.

PARTICIPANTS: 584 participants (398 NPs and 186 physicians) from 476 primary care practices completed the survey yielding a 27% response rate for NPs and 12% for physicians.

MAIN MEASURES: The survey tool contained validated measures of teamwork and three outcomes: job satisfaction, intent to leave, and perceived quality of care. Simple and multi-level multivariable regression models were built.

KEY RESULTS: Most participants (76%) were either moderately satisfied or very satisfied with their job (NP sample: 75%; physician sample: 77%) and about 10% intended to leave their current job (NP sample: 11%; physician sample: 9%). The average perceived quality of care was the same across NP and physician samples with a mean of 8.5 on a 11 point scale. After controlling for confounders, a higher organizational-level teamwork score was associated with higher job satisfaction (cumulative OR: 3.00; 95% CI: 1.85-4.88), lower odds of intent to leave (OR: 0.25; 95% CI: 0.09-0.74), and higher perceived quality of care (b=1.00; 95% CI: 0.77-1.23).

CONCLUSIONS: This study produced evidence about NP-physician teamwork in primary care practices. We found the vast majority of NPs and physicians reported favorable teamwork, and that teamwork affects clinician job satisfaction and intent to leave as well as perceived quality of care in their practices.

KEYWORDS: primary care; teamwork; nurse practitioners; physician; job satisfaction; intent to leave; quality of care.

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BACKGROUND

Team-based care models are viewed as critical for redesigning primary care delivery in the United States (U.S.) to meet the increased demand for timely, high quality, patient-centered care [1]. Team-based care promotes effectiveness and value of primary care and increases its capacity [2–4]. In response, many primary care practices have adopted team-based care delivery models [5]. Currently, physicians, physician assistants, and nurse practitioners (NPs) deliver the bulk of primary care services, with physicians and NPs comprising about 90% of the total primary care provider (PCP) workforce [6]. While most PCPs are physicians, projections show that NPs (whose numbers are predicted to increase by 93% between 2013-2025) will comprise about one-third of the total PCP workforce in 2025 [6]. Currently, primary care practices increasingly rely on the NP workforce [7].

Primary care teams comprised of NPs and physicians hold potential in meeting the growing demand for care and improving its quality. However, designing interdisciplinary teams and bringing together members with varied training and skillsets is challenging. Studies from organizational and business management studies have shown that teams comprised of members with diverse characteristics, skills, and competencies can be efficient, creative, and productive [8,9]. However, these teams also often experience conflict and miscommunication [8,10,11], which can reduce job satisfaction and lead to turnover and other negative outcomes such as absenteeism [12–15].

As NPs are beginning to more frequently serve as PCPs and work in teams alongside physicians, it is critical to understand how teamwork between these providers affects their work experiences. Assuring positive work experiences for clinicians is a national priority as indicated in the National Academy of Medicine's recent Action Collaborative on Clinician Well-Being and Resilience initiative [16]. Studies have evaluated the impact of NP-physician teams on patient outcomes but have not investigated how teamwork affects clinician outcomes such as job satisfaction or turnover [17]. Furthermore, most studies to date have focused only on specific perspectives of either NPs or physicians, but not both, especially of those working in the same practice. Given different educational backgrounds and professional identities of these PCPs, it is important to understand their perspectives about teamwork and its impact on their

outcomes. We investigated the perspectives of both NPs and physicians practicing within the same primary care practice on teamwork and determined how teamwork affects their job satisfaction, intent to leave, and quality of care.

METHODS

Design

We used a cross-sectional survey design to collect data from PCPs (both NPs and physicians) in New York State in 2017. The study was approved by the Institutional Review Board of Columbia University Irving Medical Center (approval #: AAAQ5708).

Sample

We used the SK&A database to identify primary care practices employing both NPs and physicians in New York State [18]. The database allows identifying both NPs and physicians practicing within the same practice [18]. We used physician specialties to determine primary care practices as physician specialty is likely to drive the practice type [19]. The following specialties were used: family medicine, general practice, internal medicine, internal medicine/pediatrics, internal medicine/preventive medicine, general preventive medicine, and geriatrics. Following the approach of Barnes et al., for practices with a mix of both primary care and specialty physicians, we designated a practice as primary care if the majority of physicians within the practice were primary care physicians [19]. We first extracted practice addresses of all NPs in primary care practices in New York State and then drew a 20% random sample of physicians from these practices since there were about 5 times more physicians than NPs. Overall, we extracted contact information for 1,590 NPs and 1,592 physicians.

Survey Tool

The survey tool contained measures of teamwork, job satisfaction, intent to leave, and quality of care. The teamwork measure, used in previous research, asks PCPs to report their perception about various aspects of teamwork including whether NPs and physicians collaborate to provide patient care or practice as a team [20]. The measure consisted of 5 items reported on a 4-point scale ranging from "1 - strongly disagree" to "4 - strongly agree". PCPs reported their job satisfaction on a 4-point scale (1-"very dissatisfied" to 4-"very satisfied") as well. Intent to leave was measured using a dichotomous item probing whether PCPs intended to leave their position within the next year (yes/no). Perceived quality of care was measured by asking PCPs to rate the quality of care within their practices on an 11-point scale ("0" as "worst care possible" to "10" as "best care possible").

The survey tool also collected demographic information such as age, sex, race, and education. Some questions were tailored for NPs and physicians to collect relevant information.

Data Collection

After extracting contact information, paper surveys were mailed to 3,182 PCPs using their practice addresses. A letter and consent form – which described the study, its voluntary nature, and the confidentiality of responses – accompanied the survey. PCPs completed the survey and returned it in an enclosed prepaid envelope to the research team. Using a modified Dillman approach for mailed surveys to encourage maximum response rate, a postcard reminder was sent to non-respondents 2 weeks after the initial mailing and then a second mail survey was sent to non-respondents [21]. As an incentive, PCPs were offered an opportunity to participate in a lottery drawing to win 1 of 30 FitBit Zips.

Data Analysis

The data was entered into SPSS 24 [22], cleaned, coded, and checked for accuracy. Descriptive statistics on PCP demographic variables were computed. We assessed the internal consistency of the teamwork scale by computing the Cronbach's α at organizational-level. We also computed generalizability coefficients to assess the measurement errors from multiple sources by considering the hierarchical nature of the data (e.g., PCPs nested within practices). G coefficient as relative generalizability coefficient and Φ coefficient as absolute generalizability coefficient were computed to assess the dependability of the scale [23]. We first created the individual PCP's teamwork score by computing the mean of the items comprising the scale and then aggregated the scores of all respondents from each practice and computed organizational-level teamwork mean scores. We also dichotomized the items on the teamwork scale by combining the positive "3-agree" and "4-strongly agree" responses into 1 category and the negative "1- strongly disagree" and "2-disagree" responses into another category. We computed the percentages of NPs and physicians endorsing the positive responses and tested the mean differences between the groups.

Finally, we examined the effects of organizational-level teamwork scale on each of the outcome variables (i.e. job satisfaction, intent to leave, and perceived quality of care) separately. We used proportional-odds cumulative logit models for job satisfaction as it was measured on a 4-point Likert scale, binary logistic regression models for intent to leave, and linear regression models for perceived quality of care [24]. We used linear regression models for the outcome perceived quality of care as it was measured on an 11-point Likert scale; and studies show that Likert or ordinal variables with 5 or more categories can often be used as continuous without any noticeable harm to the analysis [25,26]. We tested if the outcome measures were the same for the physician and NP samples to assure that we could build a final model for each outcome by combining the data from both samples. Using simple regression models, we first assessed the bivariate association between each potential covariate and the outcome variables. Profession indicator (2 groups: physician vs NP) was also included in each final model as an important covariate associated with the outcomes. The final models accounted for the hierarchical design of the data, where 584 participants (Level-1) were

nested in 476 practices (Level-2). Covariates measuring PCP demographics and work characteristics were entered as Level-1 measures. The main predictor was the organizational-level teamwork scale (Level-2). With 476 practices, we had a sufficient sample size to obtain accurate estimates for the organizational-level predictor [27]. Unadjusted and adjusted cumulative odds ratios were reported for job satisfaction, odds ratio for intent to leave, and regression coefficient for quality of care, along with 95% confidence intervals (CIs) to assess the strength and direction of the effects. We also conducted subgroup analysis only including participants from practices with at least 1 NP and at least 1 physician in each practice to ensure that we have robust results. Data analysis was conducted in SAS 9.4 [28].

RESULTS

A total of 584 PCPs completed the survey: 398 NPs (27% response rate) and 186 physicians (12% response rate). To test the response bias by geographic location, we linked the zip codes of practices to the Rural Urban Commuting Area codes [29] to classify each primary care practice as urban or rural. We assessed whether PCPs from different geographic areas (i.e., urban or rural) were more likely to respond to our survey and found no significant difference in the response rate between participants from urban (19%) and rural (23%) practices (p =.08). Among the 476 practices in the study, 82 (19%) practices had at least 1 NP and 1 physician.

Table 1 presents the descriptive statistics on the demographic and work characteristics of participants and the outcome measures. The average age of the participants was about 53 years (SD=11.5) with physicians being significantly older than NPs (p<0.05). Most participants were female (76%) and white (86%). However, the percentage of females in the NP sample (92%) was significantly higher than that in the physician sample (41%) (p<0.05).

Table 1 Demographic and Work Characteristics of Study Participants

	Total (*N*=584)	**Physicians (*N*=186)**	**NPs (*N*=398)**	***P***
Demographic Characteristics				
	Mean (SD)	Mean (SD)	Mean (SD)	
Age *	52.6 (11.5)	55.8 (10.6)	50.9 (11.5)	< 0.001
	% (n)	% (n)	% (n)	
Sex				
Female	76 (441)	41 (75)	92 (366)	< 0.001
Race				
White	86 (498)	81 (150)	88 (348)	0.02
Educational level				
Doctoral degree	36 (210)	98 (183)	7 (27)	< 0.001
Work Characteristics				
	% (n)	% (n)	% (n)	
Practice setting				
Physician office	58 (339)	63 (118)	56 (221)	0.11
Hospital practice	18 (103)	17 (31)	18 (72)	
Community health clinic	9 (52)	10 (18)	9 (34)	
Hours worked in past week				
1-20 hours	7 (43)	6 (11)	8 (32)	< 0.001
21-40 hours	51 (295)	40 (73)	56 (222)	
40+ hours	42 (240)	54 (99)	36 (141)	
Length of time in current primary position				
< 3 years	21 (123)	14 (26)	25 (97)	< 0.001
4-9 years	28 (165)	22 (41)	31 (124)	
10+ years	51 (295)	64 (119)	44 (176)	
Total number of NPs in practice				
1	22 (125)	17 (31)	24 (94)	< 0.001
2-6	63 (365)	54 (100)	67 (265)	
7+	15 (89)	29 (54)	9 (35)	
Patient panel size				
<100	28 (98)	13 (14)	35 (84)	<0.001
100-999	36 (125)	19 (21)	44 (104)	
>=1000	36 (124)	68 (73)	21 (51)	
Own patient panel †	58 (338)	68 (127)	53 (211)	< 0.001
Job satisfaction ‡				
Very dissatisfied	12 (68)	8 (14)	14 (54)	0.12
A little dissatisfied	12 (71)	15 (27)	11 (44)	
Moderately Satisfied	35 (199)	37 (68)	33 (131)	
Very Satisfied	41 (239)	40 (73)	42 (166)	
Intent to leave job †	10 (55)	9 (15)	11 (40)	0.46
	Mean (SD)	Mean (SD)	Mean (SD)	
Quality of care * §	8.5 (1.3)	8.5 (1.2)	8.5 (1.4)	0.96

*A t- test generated p-value.
†Dichotomous item (yes/no)- % that responded "yes."
‡4-point scale ("1-very dissatisfied" to "4-very satisfied").
§11-point scale ("0" as "worst care possible" to "10" as "best care possible").

The outcome variables did not vary between NPs and physicians. Most of the participants were either moderately satisfied or very satisfied with their job and only about 10% intended to leave their job. The average perceived quality of care (on a 11-point scale, higher indicating better quality of care) in the overall sample was 8.5.

Organizational-level Teamwork Scale and Outcomes

The descriptive statistics and the reliability coefficients on the teamwork items and scale are presented in Table 2. On average, PCPs reported an organizational-level teamwork score of 3.47 on a 4-point scale which indicated agreement that key teamwork attributes were present within their practices. The organizational-level teamwork scale had acceptable internal consistency reliability (Cronbach's α=0.85) and dependability (G coefficient=0.85; Φ coefficient=0.82). The descriptive statistics on individual teamwork items for NPs and physicians are presented in Table 3. At least 89% of NPs and physicians reported favorable aspects of teamwork within their practices on all 5 items. More than 90% of NPs and physicians reported that NPs and physicians practice as a team.

Unadjusted effects of the organizational-level teamwork scale and each covariate are reported in Table 4. Without controlling for any covariates, a higher organizational-level teamwork score was associated with a higher category of job satisfaction, 71% lower odds of intent to leave current job, and higher perceived quality of care. Only covariates with p-value less than 0.20 in the bivariate analysis were included in the final multi-level multivariable regression models presented in Tables 5 and 6. As none of the outcome measures were different between physicians and NPs, we built the multi-level multivariable final models using the aggregated sample and included profession indicator (physician vs NP) as a covariate. After adjusting for effects of potential covariates, a higher organizational-level teamwork score was associated with higher job satisfaction (cumulative OR=3.00; 95% CI: 1.85-4.88, p<0.05); with a 1-unit increase in the organizational-level teamwork score, the odds of a higher job satisfaction category nearly tripled. Controlling for confounders, a higher organizational-level teamwork score was associated with lower odds of intent to leave current job (OR: 0.25; 95% CI: 0.09-0.74, p<0.05) with a 1-unit increase in the organizational-level teamwork score, the odds of intent to leave current job decreased by 75%. No other covariate had a significant effect on intent to leave current job after controlling for the organizational-level teamwork score. A higher organizational-level teamwork score was associated with higher perceived quality of care (b=1.00; 95% CI: 0.77-1.23, p<0.05). Specifically, with a 1-unit increase in the teamwork score, there was 1-unit increase in the perceived quality of care.

In addition, we performed subgroup analysis that only included practices with at least 1 NP and 1 physician. This analysis included 182 participants with 95 NPs and 87 physicians from 82 practices. The effects of the organizational-level teamwork score on the 3 outcomes were similar to those of the full sample (see Table 6). After adjusting for the effects of potential covariates, a higher organizational-level teamwork score was associated with higher job satisfaction (cumulative OR: 4.75; 95% CI: 1.34-16.80, p<0.05), lower odds of intent to leave current job (OR: 0.12; 95% CI: 0.01-0.93, p<0.05), and higher perceived quality of care (b=1.18; 95% CI: 0.53-1.83, p<0.05).

Table 2 Descriptive Statistics of Teamwork Scale and Items

Items	Mean (SD)	Min	Max	Item-deleted Cronbach α
Item-Level*				
Physicians support NP patient care decisions	3.51 (0.58)	1	4	0.82
I feel valued by my colleagues	3.39 (0.70)	1	4	0.82
In my organization, NPs and physicians collaborate to provide patient care	3.46 (0.64)	1	4	0.79
In my organization, physicians and NPs practice as a team	3.42 (0.68)	1	4	0.79
In my practice setting, I have colleagues who I can ask for help	3.57 (0.60)	1	4	0.87
Scale-Level				
Organizational-level Teamwork Scale	3.47 (0.46)	1.6	4	0.85†

Note. N=584.
**Items reported on 4-point scale ("1- strongly disagree" to "4-strongly agree").*

Table 3 Physician and NP Responses on Teamwork Items

Item	Total (*N*=584)	Physicians (*N*=186)	NPs (*N*=398)	*P* (χ^2)
	% (n)	% (n)	% (n)	
Physicians support NP patient care decisions	97 (557)	97 (174)	97 (383)	0.75
I feel valued by my colleagues	90 (522)	94 (170)	89 (352)	0.06
In my organization, NPs and physicians collaborate to provide patient care	94 (543)	96 (172)	94 (371)	0.43
In my organization, physicians and NPs practice as a team	91 (526)	91 (163)	92 (363)	0.66
In my practice setting, I have colleagues who I can ask for help	96 (553)	91 (166)	97 (387)	<0.001

Note. All items were reported on 4-point scale ("1- strongly disagree" to "4-strongly agree"). Percentages indicate those who responded "3-agree" or "4-strongly agree" to the item.

DISCUSSION

We investigated teamwork between NPs and physicians and how it affected job satisfaction, intent to leave, and perceived

Table 4 Simple Regression Models Assessing the Unadjusted Effect of Each Independent Variable on Job Satisfaction, Intent to Leave Current Job, and Quality of Care

	Job Satisfaction		Intent to Leave		Quality of Care	
Predictor	**Cumulative OR**	**95% CI**	**OR**	**95% CI**	**Regression Coefficient**	**95% CI**
Organizational-level teamwork subscale	3.01§	2.14,4.24	0.29 §	0.16,0.51	1.11 §	0.90,1.33
Age	1.01	0.99,1.02	0.99	0.97,1.02	0.01 †	0.002,0.02
Male	0.97	0.68,1.37	0.60 ‡	0.29,1.27	-0.08	-0.34, 0.17
White	1.00	0.64,1.56	1.04	0.47,2.30	0.08	-0.23,0.39
Doctoral degree	0.91	0.66,1.24	1.41	0.76,2.59	0.01	-0.22, 0.23
NP (Ref: physician)	0.97	0.70,1.33	1.26	0.68,2.35	-0.01	-0.24, 0.23
Length of time in current primary position (Ref: >=10 years)						
<=3yr	0.75 ‡	0.50,1.10	1.89 †	0.99,3.61	-0.39 ‡	-0.66, -0.11
4-9yr	0.75 ‡	0.53,1.06	0.85 ‡	0.42,0.75	-0.47 §	-0.72, -0.23
Practice setting (Ref: physician's office)						
Community health center	0.74	0.43,1.27	2.13 *	0.94,4.80	-0.52 ‡	-0.90, -0.14
Hospital based clinic	0.66 †	0.45,0.99	1.17	0.55,2.49	-0.72 #	-1.00, -0.43
Other	1.19	0.76,1.85	0.75‡	0.30,1.86	-0.19	-0.49, 0.11
Hours worked in past week (Ref: >40 hours)						
20-40	1.05	0.77,1.44	0.95	0.53,1.71	0.10	-0.13, 0.33
<=20hrs	1.40	0.76,2.58	1.27	0.45,3.56	-0.04	-0.48, 0.39
Having own panel	0.92	0.68,1.25	1.34	0.77,2.35	0.01	-0.21, 0.23
Total # of NPs in practice (Ref: 1 NP)						
2-6 NPs	1.22	0.84,1.77	1.53 ‡	0.72,3.25	-0.12	-0.38, 0.15
>6 NPs	1.92 †	1.16,3.19	0.92	0.31,2.69	-0.04	-0.40, 0.32
Patient panel size (Ref: <100)						
100-1000	0.82	0.50,1.35	0.86	0.34,2.22	0.18	-0.40, 0.30
>1000	0.73	0.45,1.20	1.46*	0.62,3.48	0.18	-0.42, 0.29

Note. N=584.
**p <.20.*
†p <.05.
‡p <.01.
§p <.001.

quality of care. We found that the vast majority of NPs and physicians reported favorable teamwork and there were no differences between NP and physician reports. Physician outcomes were slightly more positive than NP outcomes; a higher percentage of physicians reported being satisfied with their job and a lower percentage of physicians reported an intent to leave. However, the difference was not statistically significant. Both NPs and physicians rated the quality of care within their practices similarly. Even though we used perceived quality of care rather than clinical data, this finding is consistent with the literature documenting similar quality of care in practices delivered by NPs and physicians [30,31].

We also found teamwork between NPs and physicians being an important predictor of their outcomes. PCPs delivering care in practices with better teamwork are more likely to report higher job satisfaction, less intent to leave their job, and better

Table 5 Final Multi-Level Regression Models Assessing the Effect of Organizational-Level Teamwork on Job Satisfaction, Intent to Leave, and Quality of Care

	Job Satisfaction *		Intent to Leave †		Quality of Care ‡	
Predictor	**Cumulative OR**	**95% CI**	**OR**	**95% CI**	**Regression Coefficient**	**95% CI**
Organizational-level Teamwork Subscale	3.00†	1.85,4.88	0.25*	0.09,0.74	1.00‡	0.77,1.23
NP (Ref:Physician)	1.00	0.62,1.63	1.50		0.04	-0.18, 0.26
Age	–	–	–	–	0.01	-0.003,0.02
Male	–	–	0.89	0.20,3.87	–	–
Length of time in current primary position (Ref: >=10 years)						
<=3yr	0.93	0.54,1.61	1.58	0.46,5.44	-0.04	-0.34,0.26
4-9yr	0.80	0.49,1.32	0.62	0.18,2.14	-0.23	-0.48, 0.03
Practice setting (Ref: physician's office)						
Community health center	0.68	0.31,1.46	2.80	0.62,12.74	-0.42*	-0.78,-0.07
Hospital based clinic	0.71	0.39,1.28	0.83	0.21,3.32	-0.47†	-0.74,-0.19
Other	1.05	0.57,1.96	0.55	0.10,3.07	-0.15	-0.44, 0.14
Total # of NPs in practice (Ref: 1 NP)						
2-6 NPs	1.20	0.72,2.02	1.66	0.44,6.19	–	–
>6 NPs	2.17†	1.02,4.61	1.28	0.19,8.53	–	–
Patient panel size (Ref: <100)						
100-1000			0.94	0.18,4.97		
>1000			1.96	0.38,10.1		

Note. N=584.
**p <.05.*
†p <.01.
‡p <.001.

Table 6 Subgroup Analysis Assessing the Effect of Organizational-Level Teamwork on Job Satisfaction, Intent to Leave, and Quality of Care,

	Job Satisfaction *		Intent to Leave †		Quality of Care ‡	
Predictor	**Cumulative OR**	**95% CI**	**OR**	**95% CI**	**Regression Coefficient**	**95% CI**
Organizational-level Teamwork Subscale	4.75*	1.34,16.8	0.12*	0.01,0.93	1.18‡	0.53,1.83
NP (Ref:physician)	0.84	0.45, 1.58	1.92	0.61, 6.01	0.15	-0.23, 0.53
Age	1.00	0.97, 1.03	–	–	0.01*	0.005,0.04
Practice setting (Ref: physician's office)						
Community health center	0.45	0.11, 1.90	–	–	-0.08	-0.89,0.73
Hospital based clinic	0.71†	0.27, 1.87	–	–	-0.71†	-1.25,-0.18
Other	1.63	0.52, 5.12	–	–	-0.11	-0.73, 0.50
Hours worked in past week (Ref: >40 hours)			–	–		
20-40	2.38*	1.18,4.80	–	–	0.34	-0.06, 0.74
<20hrs	4.55*	1.05, 19.7	–	–	0.01	-0.78, 0.81
Own patient panel†	–	–	3.60*	1.02, 12.62	–	–

Note. N=182.
**p <.05.*
†p <.01.
‡p <.001.

quality of care. Even after controlling for many factors such as age, sex, length of time in current position, practice type, and practice size in final models, teamwork was the only significant predictor across all 3 outcomes. In fact, for 2 of the outcomes — job satisfaction and intent to leave — teamwork was the only significant predictor, further underscoring the importance of teamwork in shaping clinician outcomes. These findings are consistent with evidence about the importance of teamwork in promoting clinician outcomes and quality of care [32].

IMPLICATIONS FOR POLICY, PRACTICE, AND RESEARCH

The study findings have important implications for policy, practice, and research. Job satisfaction and intent to leave are critical outcomes to focus on in policy interventions given the widespread dissatisfaction among clinicians including physicians [33] and NPs [34]. This has fueled a renewed focus on "bringing joy back to practice" [35] and development of the Quadruple Aim (i.e., improving patient experience, bolstering population health, reducing cost of patient care and enhancing the work life of health care providers) to improve the work life of clinicians and staff [36]. In addition, negative PCP outcomes may deplete primary care practices from much needed workforce resources and adversely affect patient outcomes. Given the increasing demand for primary care, team-based care can help to meet the demand and assure clinician well-being. Thus, it is critically important to build effective primary care teams in the current policy environment.

Several factors should be considered for promoting teamwork in primary care and subsequently improving clinician outcomes. In the U.S., NPs are allowed to deliver care to the fullest extent of their education in only 23 states [37]. The remaining states restrict NP practice by requiring supervision or oversight by physicians. Such policies, which limit the practice of a team member, may undermine teamwork and prevent NPs from fully contributing their skills to their teams. Thus, policy changes promoting full NP practice are necessary in many states as a first step to promote optimal teamwork. Improvements can also be made at the practice-level to promote teamwork and consequently clinician outcomes. Slightly more positive outcomes reported by physicians may be indicative of better policies and organizational environments for physicians compared to NPs (e.g., greater autonomy of practice) which may be created by the practice administration. Research shows that practice administrators in primary care practices play a critical role in promoting or hindering teamwork between NPs and physicians [20]. Thus, increasing administrators' awareness about optimal teamwork and designing and implementing organizational-level interventions to improve teamwork is necessary [38]. Future research should be conducted on the organizational and individual-level factors contributing to PCP job satisfaction and intent to leave.

The study has limitations. First, it relies on PCP self-reports which are subject to socially desirable response bias. Additionally, data was collected in 1 state (NY) with a reduced scope of practice for NPs where new NPs are required to have a written practice agreement with physicians to deliver care [39]. The findings may not be generalizable to other states with different NP scope of practice regulations (e.g., restricted or full scope of practice) or different regions of the country. Also, roughly 80% of practices only had 1 respondent per practice. However, the subgroup analysis showed practices with multiple respondents per practice had similar findings to that of the full sample. Response rate may also be a limitation. However, in another study using SK&A databases in 6 states (NY not included), we conducted a phone survey of NP non-responders. We selected a random sample of 600 NPs and called their practices only once and found that 24% of NPs either did not work there, never worked there, or had inaccurate contact information, which did not allow our survey to reach them. Based on this, we estimated 24% of NPs (382 individuals) may have been unreachable. By excluding undelivered mails and the estimated number of unreachable NPs, we could achieve a response rate of 36% for NPs.

CONCLUSION

Teamwork is important in shaping PCP job satisfaction, intent to leave, and quality of care. It is important for primary care initiatives to consider teamwork between NPs and physicians and how to promote it.

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