

Nurse Practitioners in Physician Practices: Implications for Member Satisfaction

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Abstract

Background: There is limited information about how Nurse Practitioners can affect patient satisfaction among elderly patients. This study considered the implications of assigning in-office Medicare Advantage (MA) plan Nurse Practitioners (NPs) in Primary Care Physician (PCP) practices which were affiliated with the (MA) plan. Specifically, this was a baseline study that explored whether the presence of an NP in the PCP practice was associated with improved satisfaction of members of the MA plan with their PCP, and whether member satisfaction with their PCP was associated with satisfaction with the MA plan.

Methods: Self-reported, cross-sectional data previously collected by the MA organization from enrollees was linked to data on participating PCPs. Twenty-two percent of responding members had a PCP with an NP in the practice. Multivariate logistic regression models were estimated to find the association between presence of in-office NPs and a 'high' member rating of the PCP, and the association between 'high' rating of PCP and 'high' rating of MA plan.

Findings: PCPs with in-office NPs were four percentage-points more likely to be rated highly by members (OR: 1.37, $p < 0.05$, 95% CI: 1.06-1.78) than those without NPs. Members who rated PCPs highly were also 24 percentage-points more likely to give the MA plan a high rating (OR: 6.58, $p < 0.01$, 95% CI: 5.64-7.35) than members who did not.

Conclusion: These associative relationships support an intervention where the MA plan has started placing NPs in PCP practices. Follow-up analyses will help ascertain whether embedding NPs had a causal impact on improving patient satisfaction.

Keywords: Nurse practitioners; Medicare advantage; Patient satisfaction; Star ratings

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Citation: Guerard B, Rahrurkar S, Omachonu V, et al. Journal of Hospital & Medical Management. J Hosp Med Manage. 2016, 2:1.

Received: December 16, 2015; **Accepted:** January 12, 2016; **Published:** January 25, 2016

Introduction

Since the 1970s, Medicare beneficiaries have had the choice of receiving Medicare benefits through private managed care plans, as an alternative to the federally administered traditional Medicare program. This is sometimes referred to as 'Medicare Part C'. The Medicare Modernization Act (MMA) of 2003 renamed Medicare's managed care program "Medicare Advantage." Over the past decade, the share of Medicare beneficiaries in Medicare Advantage (MA) plans has increased from 5.3 million-about 13% of all Medicare beneficiaries, to 15.7 million-about 30% of all Medicare beneficiaries (Kaiser Medicare Advantage Fact Sheet, 2014). The plans provide all benefits traditionally provided

through Medicare Part A and B, as well as prescription drug coverage, and may provide additional benefits not traditionally included in Medicare such as vision, dental, and wellness programs. Enrollees typically pay an added monthly premium for the MA plan [1-3].

Currently, MA plans are facing a series of shifts in the competitive environment following the Patient Protection and Affordable Care Act (PPACA). Identifying ways to enhance member satisfaction is a key element in retaining a competitive edge. Member satisfaction or patient satisfaction is considered a key measure of the quality of health care services provided to patients. The

Institute of Medicine (IOM) recommends that providers and healthcare organizations focus on patient satisfaction as one way to enhance “quality of care”. Equally importantly for MA plans, member satisfaction is one of the important elements that the Centers for Medicare and Medicaid Services (CMS) Star Program (CMS, Star Ratings) uses to rate MA Plans [4].

We present results from a baseline study on member satisfaction and the presence of nurse practitioners (NPs), conducted at a large provider-owned Medicare Advantage plan in Southeast Louisiana. To enhance its competitive position, this organization has re-engineered its’ medical management model, adopting components of the patient centered medical home (PCMH) model for its’ contracted primary care practices. One of the proposed interventions in the organization’s model is to place MA-plan employed NPs in contracted PCP practices with 700 or more members in an effort to improve member experience and member satisfaction. This is motivated by the fact that NPs are believed to play an important role in providing patient-centered care as part of the ongoing innovations in healthcare delivery model [5].

Growing scientific evidence suggests that NPs can enhance patient satisfaction because they are sometimes perceived by patients to be more attentive than physicians, and patients rate their interactions with NPs very positively [6-8]. Randomized controlled trials have supported that patient health status is higher when treated by a NP versus a physician in primary care settings. A systematic review of 11 randomized controlled trials and 23 observational studies found that NPs spent longer in consultation with patients than MD’s, and that patient satisfaction was higher when NPs provided service as the first point of contact rather than the PCPs [9,10]. In specialized care settings as well, prior studies have found the introduction of NPs to be linked to increased patient satisfaction [11,12].

While the literature supports NPs enhancing patient satisfaction with quality of care, there is also some evidence that PCPs may often be resistant to the growing role of NPs in primary care, which may pose particular challenges for provider-owned healthcare organizations that are trying to expand the role of NPs [13-16]. In this baseline study we have added to the literature by considering a previously unexplored perspective—specifically, whether the presence of NPs in primary care physician practices is associated with greater patient satisfaction with the PCP. We hypothesized that the presence of NPs in PCP practices will be associated with greater member satisfaction with the PCP. The underlying conjecture is that availability of NPs may help improve patient access to care, improve provider-patient communications, and allow PCPs to more efficiently allocate their time and focus on the higher acuity patients; thereby improving overall patient satisfaction with their PCP. We further hypothesized that members who had higher levels of satisfaction with their PCP would also have higher levels of satisfaction with the MA plan. Note that we have used the term ‘member’ and ‘patient’ interchangeably in the rest of the paper.

Methods

We performed the baseline analysis utilizing the MA plans’ 2011-

2012 satisfaction survey data to explore if there is any evidence that the presence of NPs in the physician practice is associated with enhanced patient satisfaction. The data used were originally collected by a third party vendor in 2011-2012 as part of the organizations’ internal member satisfaction initiative, and were already in-house when we initiated this study. Specifically, we made use of the fact that some PCP practices in this organization already have an NP in the practice. We examined whether members expressed a higher level of satisfaction with the PCPs whose practices already had an in-office NP. Additionally, as mentioned earlier, we explored whether member satisfaction with their PCP was associated with member satisfaction with the MA Plan.

For the purpose of surveying Medicare beneficiaries’ experiences using the health care delivery system and satisfaction, CMS uses two survey instruments: the Consumer Assessment of Health Plans and Providers (CAHPS) and the Health Outcomes (HOS) surveys. CAHPS and HOS surveys are an integral part of CMS’ efforts to improve healthcare in the United States, and the data are relied upon as one of the key element in the CMS Star Program for rating MA plans. The organizations’ survey questionnaire was developed and administered by a third party vendor for purpose of acquiring information on member satisfaction, as part of the organizations’ internal member satisfaction initiative. The survey questionnaire contained 52 questions, selected from the CAHPS and HOS surveys. The survey was administered by the third party vendor to a random sample of individual enrollees who were members of the MA plans’ contracted primary care practices meeting the following criteria – that the PCP practices had a minimum of 200 of the MA plans’ members who had been enrolled in the health plan for at least six months. A pre-notification letter was mailed to randomly selected respondents one week prior to mailing the surveys. The survey instrument was mailed with a cover letter explaining the purpose and significance of the survey. A postage paid return business reply envelope addressed to an external third party was included with each questionnaire. Neither the organization nor the third party vendor performed any follow up calls and each randomly selected respondent received only one survey. Fifteen thousand surveys were mailed to members in three separate 5,000 survey increments, in September 2011, October 2011, and January 2012. Four thousand seven hundred fifty two surveys were returned (N=4,752), representing a 31.6% response rate.

The survey vendor was provided only the minimum necessary information to administer the survey. The survey results were returned to the health plan and linked to retrospective administrative data. This administrative data included enrollment, co morbid conditions, medical, and pharmacy claims, and the member’s assigned PCP.

For the purpose of this study, we used the existing data from this survey. Since information was included on the member’s assigned PCP, it was possible to match PCP-level information, including whether the PCP had an NP in the practice. It also allowed incorporation of additional information about members, such as whether they were “dual” eligible Medicare/Medicaid enrollees, which accounts for approximately twenty percent of the MA plan enrollees, demographic and living situations as well

as an array of health conditions. The resulting analytic file was recorded in a manner that individuals could not be identified directly or through other identifiers linked to the plan member. The project was reviewed and granted full waiver of informed consent as outlined in 45 CFR 46.116(d) by the Institutional Review Board of the University of Alabama, Birmingham. All the survey data were handled according to the security and confidentiality guidelines set by the Health Insurance Portability and Accountability Act (HIPAA). As is required for MA plans, the survey tool was submitted for review by CMS prior to use.

The dependent variable questions in the survey asked members how they rated the participating organization on a scale of 0 to 10, as well as how they rated their PCP on a scale of 0 to 10, with 10 being the highest rating.

Our main hypothesis of interest was whether the presence of an NP in the practice was associated with a high satisfaction rating for the PCP. Our follow-up hypothesis of interest was whether members who gave a high satisfaction rating to their PCP were also more likely to give a high rating to the organization. The survey asked respondents to rate their PCP, as well as the MA plan, on a scale of 0 to 10, with higher scores indicating better ratings. For purposes of our analysis, we defined a "high rating" for PCP and for the MA plan as a binary indicator of whether they were given a score of 9 or 10, versus 8 and lower. All inferential statistical analyses used an alpha level of 0.05 for the threshold for statistical significance.

Generalizability and response bias were assessed by comparing descriptive statistics for the sample of responders to active membership during the survey period. To account for a Type I error associated with oversampling standardized differences were used to compare demographic and chronic conditions variables, either measured as continuous or binary outcomes. Standardized differences are independent of the unit of measure and are not influenced by sample size as they compare the means between groups in units of standard deviation [17]. A standardized difference greater than 0.10 was deemed to indicate imbalance between groups [18,19]. All demographic and chronic conditions that were not in balance between groups were adjusted for by including them as covariates in our multivariate empirical models.

To test our first hypothesis, we estimated unadjusted and adjusted logistic models, with the outcome being the binary indicator for "high rating" versus not for the PCP. For the adjusted models, we purposefully selected out of the extensive set of patient characteristics and provider characteristics available by using the model building strategy suggested by Hosmer and Lemeshow [20]. Initially univariate logistic regressions were fitted to each predictor of interest; following that, predictors with p -values < 0.25 , in addition to essential demographic characteristics like age and gender, were included in the final multivariate model analysis. Using predictors with p -values < 0.25 is a "rule of thumb" because the more stringent $p < 0.05$ may sometimes fail to identify important predictors in a univariate setting, and can result in model misspecification. We estimated two sets of adjusted logistic models; first adjusted for the patient characteristics that met the criterion of p -values < 0.25 , and then adjusted for both patient and physician characteristics

that met the criterion of p -values < 0.25 in the univariate analyses. Also, to account for the hierarchical nature of the data wherein NPs are present at the provider level but satisfaction is measured at the patient level, we adjusted all standard errors using the Huber-White technique.

We next estimated unadjusted and adjusted logistic models to test our follow-up hypothesis, that patients giving a high rating to their PCP are more likely to give a high rating to the organization. In this case, the adjusted models only included patient characteristics. We first included only those patient characteristics that were included in the logistic regressions for presence of NPs and PCP ratings. After that, we additionally included those patient characteristics that predicted satisfaction with the organization at $p < 0.25$ in univariate analyses, even though they had not predicted satisfaction with the PCP. We presented results from the models in the form of odds ratios (OR). However, there are well-known problems with meaningfully interpreting ORs in a way that is intuitive—they are frequently interpreted as risk ratios, which can produce extremely inaccurate answers when the proportion of "success" (in this case, rating the PCP "high") in the sample is high [21-26]. Thus, we also calculated "marginal effects" for our main results of interest; marginal effects inform on how the predictor variable of interest impacts the probability of success—i.e. achieving the outcome of "high rating". We used marginal effects to quantify the association between presence of NPs and satisfaction with PCP, as well as satisfaction with PCP and satisfaction with the organization. The formula for calculating marginal effects is available in advanced econometric textbooks, and we can make available a simple derivation of the formula to any reader upon request. The default is to calculate marginal effects for the whole sample while holding values of other covariates at specific values (the default is the sample mean value), but it may also be computed separately for different sub-populations. We calculated marginal effects for the whole population, and for sub-populations of patients with no self-reported chronic conditions and with 1-3, 4-6 and 7 or more chronic conditions. The statistical software STATA version 12 was used for all analyses.

Results

After the de-identified data was cleaned-up for missing responses and incomplete surveys, 3816 valid surveys were analyzed. Seventy-six percent of respondents gave a high rating (i.e., either a "9" or "10") to their primary care physicians (PCP). Furthermore, 81% gave a high rating to the health plan. Twenty two percent of members had a PCP with a nurse practitioner in the practice. Additional descriptive statistics for PCP and member characteristics along with PCP behavior are listed in **Table 1**.

Results for our assessment of response bias (responders versus active membership) are presented in the appendix. Imbalance was demonstrated for the following characteristics: age, length of membership in months, minority status, total chronic conditions, and specific chronic conditions of coronary artery disease (CAD), congestive heart failure (CHF), chronic kidney disease (CKD) chronic obstructive pulmonary disease (COPD), and diabetes. Thus, these characteristics were included as covariates in all adjusted models.

Table 1. Descriptive statistics.

Variable	N	Mean or Percentage ²	SD ³
Doctor rated 'high' ^u	4254	76.00%	
Plan rated 'high' ^v	4640	81.10%	
Any Nurse Practitioner	4331	22.20%	
PCP¹ Characteristics			
is the Owner	4331	40.10%	
uses a Hospitalist	4331	72.00%	
Number of partners in practice	4246	1.28	1.631
PCP Behavior			
Explains Easily	4751	69.20%	
Listens	4751	71.10%	
Respectful	4751	74.10%	
Member Characteristics			
Age as of 2011	4677	76.02	8.048
Years with Plan	4734	9.22	2.861
Minority ²	4735	25.90%	
Dual Plan	4735	18.30%	
Female	4735	57.10%	
Schooling³			
Some High School	4630	16.20%	
Completed High School	4630	42.00%	
Some College	4630	18.80%	
Completed College	4630	5.90%	
Graduate	4630	4.10%	
Self-reported number of chronic conditions^x			
1 to 3	4598	63.20%	
4 to 7	4598	5.30%	
7 or more	4598	1.00%	
Specific chronic conditions			
Congestive Heart Failure	4735	11.00%	
Coronary Artery Disease	4735	31.10%	
Chronic Kidney Disease	4735	25.20%	
End-Stage Renal Disease	4735	1.20%	
Cancer	4735	4.00%	
Chronic Obstructive Pulmonary Disease	4735	12.00%	
Diabetes	4735	31.30%	
Total chronic conditions from patient records^w			
2	4735	19.00%	
3	4735	10.20%	
4	4735	4.20%	
5	4735	1.00%	
6	4735	0.01%	

¹PCP: Primary care physician

²For binary variables percentages are presented.

³SD is presented for continuous variables only

⁴Reference category: Not a minority

⁵Reference category: Education ≤ 8th grade

⁶Reference category: No chronic conditions

⁷Reference category: 1 chronic condition

^uHigh: Doctor was rated 9 or 10

^vHigh: Plan was rated 9 or 10

Other patient-level characteristics that were included as covariates in the models for rating PCP high, based on p<0.25 in univariate analyses, included the patient's gender, education-

level and self-reported number of chronic conditions. Physician characteristics that were candidates for predictors in these models based on p<0.25 were whether the physician was one of the owners of the organization, whether the practice utilized a hospitalist, the number of partners in the practice, whether the patient considered the doctor to mostly or always be easy to understand, whether the patient believed that the doctor listened carefully, and whether the patient reported that the doctor was always respectful.

Regarding the association between presence of an NP in the practice and patient satisfaction with PCP, univariate logistic regression results (**Table 2**) indicated that patients who attended a PCP practice with an in-office NP had higher odds of giving a "high" rating to their PCP (OR: 1.27, p=0.01). These results persisted in the multivariate models that controlled for patient characteristics (OR=1.32, p=0.004), and patient as well as physician characteristics (OR=1.37, p=0.017). Based on these results, we reject the null hypothesis of no association between presence of NP in PCP practice and member satisfaction with their PCP, and conclude that there is an association between presence of an NP in the PCP practice and patient satisfaction with the PCP.

Regarding the association between patient satisfaction with their PCP and patient satisfaction with the organization, univariate and multivariate regression results indicated that patients who rated their PCP highly had substantially higher odds of also rating the organization highly. The odds ratios (p-values) of the three estimated models were respectively OR: 6.74 (p<0.01), OR: 6.23 (p<0.01) and OR: 6.58 (p<0.01) (**Table 3**). Thus, we reject the null hypothesis and conclude there is an association between patients rating their PCP highly and patients rating the organization highly.

For the full sample, the marginal effect was 0.04 (95% CI: 0.007-0.075). Essentially, this implies that for patients with otherwise "average" values of all covariates, the presence of an NP in the PCP practice is associated with a 4 percentage point increase in the likelihood of rating the PCP high. For the sub-population of patients with no chronic conditions, the marginal effect is 0.036 (95% CI: 0.006-0.07), for those with 1-3 conditions it is 0.04 (95% CI: 0.007-0.08), for those with 4-6 conditions it is approximately 0.05 (95% CI: 0.007-0.08), and for those with 7 or more chronic conditions, it is 0.05 (95% CI: 0.003-0.09). Corresponding results for other sub- groups in the sample are available on request.

We also find that, in logistic regressions for rating the organization high, the marginal effect of rating the PCP high is 0.24 (95% CI: 0.22-0.26). This suggests that, for patients with average sample characteristics, rating their PCP highly is linked to a 24 percentage point higher likelihood of rating the organization highly.

Discussion

Our findings from member survey data in one large MA plan finds that members of the plan give a higher rating to their PCPs when the PCP has an NP as part of their practice. Our findings also indicate that members who give a high rating to their PCP are also more likely to give a high rating to the MA plan.

Nurse practitioners (NPs) represent the single largest group of

Table 2. Logistic regression results for PCP rated high.

Variables	N=3880 ^a		N=3675 ^b		N=3605 ^c	
	Odds ratio	95% CI p-value	Odds ratio	95% CI p-value	Odds ratio	95% CI p-value
Any Nurse Practitioner	1.27	[1.06-1.53] 0.01	1.32	[1.09-1.59] 0.004	1.37	[1.06-1.78] 0.017
Member characteristics						
Female	--	--	1.08	[0.92-1.25] 0.355	1.1	[0.90-1.33] 0.344
Minority	--	--	1.03	[0.86-1.23] 0.745	0.92	[0.74-1.14] 0.453
Dual	--	--	0.89	[0.72-1.09] 0.258	0.88	[0.70-1.11] 0.281
Schooling						
Some High School	--	--	1.16	[0.87-1.56] 0.298	1.03	[0.73-1.45] 0.869
Completed High School	--	--	1.12	[0.87-1.43] 0.363	1.17	[0.86-1.57] 0.320
Some College	--	--	0.97	[0.73-1.27] 0.802	0.94	[0.67-1.32] 0.736
Completed College	--	--	0.74	[0.52-1.06] 0.106	0.74	[0.47-1.14] 0.180
Graduate	--	--	0.75	[0.50-1.11] 0.154	0.93	[0.58-1.48] 0.774
Self-reported number of chronic conditions						
1 to 3	--	--	0.67	[0.56-0.80] <0.001	0.63	[0.50-0.78] <0.001
4 to 7	--	--	0.59	[0.41-0.83] 0.004	0.6	[0.39-0.92] 0.022
7 or more	--	--	0.57	[0.44-1.23] 0.194	0.38	[0.13-1.07] 0.067
Specific chronic conditions						
Congestive Heart Failure	--	--	1.07	[0.78-1.46] 0.684	1	[0.70-1.44] 0.982
Coronary Artery Disease	--	--	0.81	[0.63-1.02] 0.079	0.83	[0.64-1.08] 0.175
Chronic Kidney Disease	--	--	0.82	[0.64-1.03] 0.095	0.74	[0.57-0.95] 0.022
End-Stage Renal Disease	--	--	0.52	[0.18-1.48] 0.220	0.55	[0.14-2.26] 0.396
Cancer	--	--	0.82	[0.55-1.22] 0.317	0.75	[0.46-1.22] 0.249
Chronic Obstructive Pulmonary Disease	--	--	0.74	[0.56-0.95] 0.021	0.75	[0.56-1.01] 0.059
Diabetes	--	--	0.98	[0.78-1.23] 0.870	0.87	[0.68-1.12] 0.274
Total chronic conditions from patient records						
1	--	--	1.09	[0.85-1.38] 0.49	1.13	[0.86-1.46] 0.377
2	--	--	1.57	[1.09-2.28] 0.017	1.82	[1.23-2.68] 0.003
3	--	--	2.12	[1.24-3.59] 0.006	2.49	[1.42-4.37] 0.001
4	--	--	3.66	[1.69-7.88] 0.001	7.24	[3.13-16.78] <0.001
PCP Characteristics						
is the Owner	--	--	--	--	1.1	[0.89-1.34] 0.368
uses a Hospitalist	--	--	--	--	1.12	[0.90-1.37] 0.296
Number of partners practice	--	--	--	--	1.04	[0.96-1.11] 0.311
PCP Behavior						
Explains Easily	--	--	--	--	2.46	[1.88-3.22] <0.001
Listens	--	--	--	--	3.13	[2.27-4.31] <0.001
Respectful	--	--	--	--	3.24	[2.40-4.38] <0.001

Independent variables are as follows

^aModel 1: Only Any Nurse Practitioner (NP)

^bModel 2: Member characteristics and any NP

^cModel 3: Member characteristics, PCP characteristics and any NP

All models use robust standard errors to account for heteroscedasticity

advanced practice nurses in the U.S., numbering approximately 180,000, with approximately 144,000 practicing in primary care settings [27]. As the health care landscape continues to change, so does the role of NPs, and a growing body of literature has highlighted their role and functions [27-31]. In general, existing studies suggest that patient satisfaction with the quality of care provided by NPs is equal to or higher than patient satisfaction with quality of care provided by physicians [32-35]. Research on patient satisfaction among the elderly and NPs is relatively limited. One study on nursing home patients found that presence of geriatric nurse practitioners at nursing homes was

not significantly associated with residents' functional status or satisfaction [36]. More recently, a study found that elderly patients reported statistically similar satisfaction levels with care regardless of whether their primary provider was a NP or a physician [37]. Another study found that, in community based practices, geriatric patients receiving PCP-NP co-managed care had better outcomes than those receiving care from a PCP only [38].

Here, we approached the question from a somewhat different perspective, exploring whether elderly patients enrolled in a MA plan were likely to give their PCPs higher ratings when the PCP

Table 3. Logistic regression results Medicare Advantage (MA) plan rated high.

Variables	N=4185 ^a		N=3878 ^b	
	Odds ratio	95% CI p-value	Odds ratio	95% CI p-value
Doctor rated 'high' ^u	6.74	[5.80-8.24] <0.001	6.58	[5.45-7.88] <0.001
Age as of 2011	--	--	1.01	[0.99-1.02] 0.088
Female	--	--	1.21	[1.01-1.42] 0.04
Minority	--	--	0.95	[0.77-1.19] 0.66
Dual	--	--	2.48	[1.61-2.98] <0.001
Schooling ^y				
Some High School	--	--	1.01	[0.73-1.52] 0.761
Completed High School	--	--	1.11	[0.79-1.50] 0.491
Some College	--	--	0.67	[0.48-0.94] 0.023
Completed College	--	--	0.6	[0.39-0.90] 0.016
Graduate	--	--	0.52	[0.28-0.71] 0.001
Number of Chronic Conditions ^z				
1 to 3	--	--	0.79	[0.67-1.03] 0.09
4 to 7	--	--	0.64	[0.45-1.03] 0.07
7 or more	--	--	1.41	[0.45-5.00] 0.576
Years with Plan	--	--	1.05	[0.99-1.11] 0.07
Live alone	--	--	1.11	[0.95-1.42] 0.303

^uHigh: Doctor was rated 9 or 10

^yReference category: Education = 8th grade

^zReference category: No chronic conditions

Independent variables are as follows

^aModel 1: Only doctor rated 9 or 10

^bModel 3: Doctor rated 9 or 10 and other member characteristics

All models use robust standard errors to account for heteroscedasticity

had an NP in the practice. This adds to the literature on elderly patient satisfaction and NPs, while it also provides information that may be important in helping alleviate physician concerns about the expanding role of NPs. We found statistical evidence that the presence of an NP in the practice was associated with higher patient satisfaction with the PCP, even after controlling for other important patient and provider characteristics-including controls for whether the patient felt that the PCP explained things well, listened attentively, and was always respectful. Due to the observational, cross-sectional design of this study, the results cannot establish that the link between NPs and patient satisfaction found here is causal. However, the results provided strong support for initializing the intervention of embedding more NPs in PCP practices. We anticipate that future research

in this direction will be able to analyze whether embedding NPs changed patient satisfaction as well as patient outcomes using "before and after" type study designs.

Performing well in terms of patient satisfaction and patient outcomes is particularly important to MA plans. CMS has employed the CAHPS and HOS surveys to measure and report on performance of MA plans since 2001. The importance of these surveys has increased since CMS introduced a five-star quality rating system for MA plans in 2007, which rates MA plans on over 50 measures in five domains, which are: staying healthy, getting care from your doctor, timeliness of information from your health plan, managing chronic conditions and administrative measures related to appeals and grievances. The star rating program rates MA plans on a range from 1 (poor performance) to 5 (excellent performance) stars which are derived from a variety of sources including the Healthcare Effectiveness Data and Information Set (HEDIS), CAHPS, HOS and organizational administrative data which is reported to CMS [39]. For MA plans, a specific area of interest lies in the design of the CMS quality star rating program which relies heavily on survey measures to allocate bonus payments to MA plans which are used to fund enrollee benefits not covered by traditional Medicare. In 2012, CMS introduced a weighting system into the star program which identified three categories of measures: process measures assigned a weight of one, patient experience measures assigned a weight of 1.5 and outcome measures assigned a weight of three. CMS categorizes survey responses as patient experience (CAHPS) and outcome measures (HOS), which are weighted 1.5 and 3 respectively in the star rating quality program [40]. MA plans have started receiving bonuses based on their star ratings. Five star plans are additionally rewarded with the opportunity to enroll plan members all year-long versus a 6 week time period beginning in October. Recent research suggests that higher star ratings are also associated with an increased likelihood that first-time enrollees will select that plan [41].

This study found that that presence of NPs in the practice is linked to higher patient satisfaction with the PCP, and higher patient satisfaction with the PCP is associated with higher patient satisfaction with the MA plan, which is a component of the star ratings. Future research should also explore how access to in-office NPs impacts other survey responses and performance measures considered in the star ratings, to form a more comprehensive picture about the possible effect that placing in-office NPs in physician practices could eventually have on the organization's star ratings.

Conclusion

We acknowledge certain limitations of the study. The study used retrospective data that was accessible within the organization. It is essentially an observational study that does not establish causality. The issue is that practices with NP's and those without, or patients utilizing those practices, may be different in unobservable ways that our empirical models cannot account for. Another limitation is that, while we obtain information on whether the PCP had a NP from the organization's database on

all participating physicians, we do not have information on the extent or the specific nature of the NP's interaction with the respondent. Only about 8 percent of members who's PCP had an NP in the practice had a claim filed for a NP visit, though this may underreport contact with NPs, since a visit where the PCP also interacted with the patient due to some acute concern would be filed only as a PCP visit. At the same time, the presence of NPs could enhance patient experience in indirect ways—by allowing the PCP office to utilize resources more efficiently, so that patients could have improved access, or the PCP had more time to devote to higher acuity. Thus, we can provide conjectures, but these data do not allow us to decipher the precise pathways through which the presence of an NP in the PCP practice leads the member to give a higher rating to the PCP. Also, the survey relied on self-reported assessments of survey respondents, and as with most self-reported surveys, there are concerns of personal bias and recollection errors. Finally, this sample was limited to survey respondents for a single MA plan in southeastern Louisiana and therefore may not be generalizable beyond the specific population.

Nonetheless, this study provides initial support for the proposition that placing NPs in PCP practices can lead to greater satisfaction with the PCP, and by extension the MA plan. As stated before, further evaluations will be conducted using before-and-after study designs, given that the process of embedding NPs in PCP practices has been initiated. The findings may have implications for other organizations in Louisiana and neighboring states, who want to explore the possibility of better utilizing the services of NPs. Louisiana is a relatively poor state with higher poverty rates than the nation overall (19.1% versus 15.4% nationally), a large

African-American population (32.4% versus 13.2% nationally), and performs poorly on several health indicators. A detailed state-by-state report from the Centers for Disease Control and Prevention titled "The State of Aging and Health in America", informed that for the over 65 year old population in Louisiana (compared to the U.S overall), 28.2% (compared to 24.3%) were obese, 46.7% males and 45.0% females (compared to 48.5% for both males and females) were up to date on selected preventive services, 64.3% (compared to 66.9%) reported having a flu vaccine in the past year, 39.7% (compared to 37.8%) were categorized as having a disability, and 9.1% (compared to 6.9%) and reported frequent mental distress [42]. Hence, increasing access to health services by better utilizing the services of NPs may yield noticeable benefits for the state's elderly population. At the same time, a 2011 report showed that Louisiana has about 1.3% of the nation's NPs. This translates to about 52 NPs per 100,000 population, which puts it below the national average of 58 NPs per 100,000, and well behind some neighboring states like Mississippi (91 per 100,000) and Arkansas (92 per 100,000), though ahead of some other southern states like Alabama (40 per 100,000) and Georgia (50 per 100,000) [43]. A report by the IOM titled "The Future of Nursing: Leading Change, Advancing Health" Garrard et al. Nursing [36,44,45] emphasized the importance of ensuring that nurses participate in the care system to the full extent of their education and training, and have full partnership in healthcare redesign and improvement efforts. It seems that concerted efforts may be required on parts of interested organizations in these states to attract and retain NPs, and to offer them the scope to function at their full potential. This study may also provide a basis for initiating those discussions.

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