Journal of Primary Care & Community Health
2016, Vol. 7(4) 249–257

DOI: 10.1177/2150131916659674
jpc.sagepub.com
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Factors Associated With Seeking Physician Care by Medicare Beneficiaries Who Receive All Their Primary Care From Nurse Practitioners

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Abstract

Background: A shortage of primary care physicians has led to the alternative strategy of nurse practitioners (NPs) as primary care providers for the growing elderly population. Many states have implemented policies that allow NPs to practice independently with no physician oversight. Little is known about the continuity of primary care provided by NPs. **Objective:** To examine rate and correlates of switching from exclusive NP primary care to receiving some or all primary care from physicians. **Design:** A retrospective cohort study. **Participants:** Medicare beneficiaries (n = 38618) with diabetes, congestive heart failure, or chronic obstructive pulmonary disease who received all their primary care from NPs in 2007. **Main Measures:** Multivariable logistic regression model was used to assess patient and disease characteristics associated with switching from sole NP primary care in 2007 to receiving some or all primary care from physicians between 2008 and 2010. **Results:** Of elderly patients receiving all their primary care from NPs in 2007, 53.8% switched to receiving some or all primary care from physicians in 2008-2010. The switching patients had less comorbidity before the switch and were more likely to reside in metropolitan areas, ZIP code areas with high education or states with the most restriction on NP scope of practice. In multivariable analyses, significant predictors of switching included one of the following within 30 days before the switch: emergency room visits (odds ratio [OR] = 1.55, 95% confidence interval [CI] = 1.44-1.68), hospitalization (OR = 1.13, 95% CI = 1.02-1.25), new diagnosis of heart attacks (OR = 5.52, 95% CI = 4.33-7.02), pneumonia (OR = 4.84, 95% CI = 3.71-6.32), atrial fibrillation (OR = 3.99, 95% CI = 2.93-5.44), stroke (OR = 2.94, 95% CI = 2.31-3.74), or cancer (OR = 2.65, 95% CI = 1.94-3.63). **Conclusions:** About half of Medicare patients under exclusive NP primary care switched to physicians for some or all primary care over a 3-year period. Future study is needed to understand the reasons for switching.

Keywords

nurse practitioner, primary care, Medicare, discontinuity of care

Introduction

Having one physician as a usual source of primary care is key to effective primary care of older patients with multiple coexisting diseases that require care coordination across multiple health care settings.[1-5] In a study of adult primary care network of 181 primary care physicians (PCPs), patients who did not identify one physician as their usual source of care were less likely to receive guideline-recommended diabetes care and cancer screenings.[3] Older patients who see different PCPs at each visit are more likely to experience medical errors and potentially avoidable acute care visits, and have high health care cost.[2,6-10] To reduce such care fragmentation in older patients, the Affordable Care Act (ACA) authorized implementation of patient-centered medical home delivery models and other alternative health care models.[11-13] Success for these models depends on long-term continuity of primary care and a stable patient-clinician relationship.

A major challenge to long-term continuity of primary care is the growing shortage of PCPs; nurse practitioners (NPs) are increasingly being used to address this shortage.[11,14,15-22] Between 1998 and 2010, the proportion of Medicare recipients

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billed for outpatient care by NPs increased 9.5%, with the greatest increase in states with no restriction on NP practice.[15] Some states such as Arizona and Maryland have policies that allow NPs to practice independently with no physician oversight.[16] In addressing the shortage of PCPs, the federal government under ACA provided $50 million per year (from 2012 to 2015) to expand the training of NPs in primary care.[17] Several studies have examined continuity of care among PCPs,[3-5,23] but there have been no population-based studies of long-term continuity of primary care among older patients receiving all their primary care from NPs. Understanding factors associated with longitudinal continuity of primary care in this population is critically important in improving quality and decreasing cost of care. The present study examined rates and correlates of switching from exclusive NP primary care to receiving care from PCPs between 2008 and 2010 among Medicare beneficiaries with diabetes, congestive heart failure (CHF), or chronic obstructive pulmonary disease (COPD) who received all their primary care from NPs in 2007.

Methods

Establishment of the Cohort Study

We identified all Medicare beneficiaries with diabetes, CHF, or COPD in 2006-2007 from the CMS Chronic Disease Data Warehouse (CCW). To select the NP cohort, we identified all patients aged 66 years or older who received all of their primary care from NPs in 2007. We identified the patients through bill records for 2 or more outpatient evaluation and management (E&M) services by NPs and with no outpatient E&M services from MDs (general practitioner, family physician, general internist, or geriatrician). We excluded patients whose original entitlements were based on disability or end-stage renal disease. Also excluded were patients who stayed in a nursing home in 2007 and those without continuous enrollment in parts A and B or covered in a health maintenance organization (HMO) in 2006 and 2007.

Study Outcome

Patients were followed up from 2008 to identify discontinuity of primary care from NPs. Discontinuity of care was defined as a switch from exclusive NP primary care to receiving any care from a PCP any time between 2008 and 2010. Patients were censored at death, loss of coverage or the end of the study (December 31, 2010).

Measures

The demographic information on patients' age, gender, and race/ethnicity was obtained from Medicare enrollment files. We used a Medicaid indication in the enrollment file as a proxy for low socioeconomic status. Education for ZIP code areas was obtained from the 2010 Census data and categorized by quartiles. The Elixhauser comorbidity measures were generated from inpatient and outpatient claims in 2007 and the comorbidity sum for patients were the summation of all Elixhauser comorbidity measures excluding CHF, CPOD, and diabetes with or without chronic complications. Number of provider visits; whether patients saw a cardiology, endocrinology or pulmonary specialist; and number of hospitalizations in 2007 were generated. The size of residential area was categorized using Rural-Urban Continuum Codes that distinguish metropolitan counties by size and nonmetropolitan counties by degree of urbanization and proximity to metropolitan areas. State regulations of NP practice were classified into 5 categories from least to most restricted.[15]

To further explore potential factors associated with discontinuity of primary care, we examined rates of acute hospitalization or an emergency room (ER) visit in the 30 days prior to switching to an MD primary care. We also assessed whether patients had a new diagnosis of major health events in the 30 days prior to care switch. The incident events were cancer (International Classification of Diseases, Ninth Revision [ICD-9]: 140-239), stroke (ICD-9: 430-437), heart attack (ICD-9: 410-414), hip fracture (ICD-9: 820), atrial fibrillation (ICD-9: 427.3) and pneumonia (ICD-9: 480-486). The incident event was defined by a primary diagnosis in either inpatient or outpatient claims for the event and no such event in the previous 12 months. To ensure that the follow-up time was comparable to the 30-day look-back period between patients who switched to physician care (the switch group) and those who stayed with NP care (stay group), we randomly assigned the follow-up time to those in the stay group based on the distribution of follow-up time from the switch group.

Statistical Analyses

Using *t* test for continuous variables and chi-square test for categorical variables, we compared characteristics of patients who continuously received all primary care from NPs to those who switched to receiving some or all primary care from physicians. To examine potential factors associated with switching from sole NP primary care to physician primary care, we used a multivariable logistic regression model to evaluate the independent relationships between patient characteristics and the odds of switching to MDs for primary care. All tests of statistical significance were 2-sided ($P < .05$). Analyses were performed with SAS version 9.3 (SAS Institute, Cary, NC).

Results

The study cohort included 38 618 Medicare beneficiaries with CHF, COPD, or diabetes who received primary care from NPs in 2007. Table 1 shows the characteristics of the beneficiaries grouped according to whether they switch

Table 1. Characteristics of Medicare Patients Who Received All Their Primary Care From Nurse Practitioners (NPs) in 2007 Stratified According to Whether the Patients Received Some or All of Their Care From Primary Care Physicians or Continue With NP Primary Care Between 2008 and 2010.

Variables		n	Switch to Physicians (%)	Stay With NPs (%)	*P*
N		38618	20766	17852	
%			53.8	46.2	
Age in years					
66-74		15477	54.8	45.2	<.0001
75-84		17190	54.4	45.6	
85+		5951	49.3	50.7	
Gender					
Female		24144	55.3	46.7	<.0001
Male		14474	51.2	48.8	
Race					
Whites		33399	53.6	46.4	<.0001
Blacks		2793	51.9	48.1	
Hispanics		1414	54.5	45.5	
Other		1012	62.5	37.5	
Medicaid eligibility					
No		31577	54.6	45.4	<.0001
Yes		7041	50.2	49.8	
Proportion of education >12 years					
Q1 (lowest)		9539	51.9	48.1	<.0001
Q2		9524	53.0	47.0	
Q3		9345	53.4	46.6	
Q4 (highest)		9587	56.6	43.4	
Rural/urban					
Metro		23059	56.8	43.2	<.0001
Nonmetro urban		13148	49.8	50.2	
Rural		2411	46.1	53.9	
State regulation					
1 (least restrictive)		6484	53.8	46.2	<.0001
2		6337	53.0	47.0	
3		10418	52.4	47.6	
4		8718	54.0	46.0	
5 (most restrictive)		6661	56.3	43.7	
Prior hospitalization					
0		28007	54.6	45.4	<.0001
1		6764	52.6	47.4	
2		2348	51.7	48.3	
3+		1499	46.7	53.3	
Previous provider visit			9.9 ± 7.2	8.9 ± 7.2	<.0001
Specialty visit					
Cardiology	Yes	13604	53.9	46.1	.75
	No	25014	53.7	46.3	
Pulmonary	Yes	4346	53.4	46.6	.58
	No	34272	53.8	46.2	
Endocrinology	Yes	2658	58.9	41.1	<.0001
	No	35960	53.4	46.4	
Conditions					
Diabetes	Yes	26055	54.6	45.4	<.0001
	No	12563	52.1	47.9	
Congestive heart failure	Yes	12860	51.2	48.8	<.0001
	No	25758	55.1	44.9	

(continued)

Table 1. (continued)

Variables		n	Switch to Physicians (%)	Stay With NPs (%)	*P*
COPD	Yes	7600	51.4	48.6	<.0001
	No	31018	54.4	45.6	
Number of conditions					
1		31542	54.6	45.4	<.0001
2		6255	50.7	49.3	
3		821	46.5	53.5	
Comorbidity sum					
0		7130	54.7	45.3	<.0001
1		14551	54.5	45.5	
2		8340	54.4	45.6	
3+		8597	51.2	48.8	
Comorbidity					
Valvular disease	Yes	3216	52.7	47.3	.19
	No	35402	53.9	46.1	
Pulmonary circulation disease	Yes	828	45.1	54.9	<.0001
	No	37790	54.0	46.0	
Hypertension	Yes	27103	53.9	46.1	.61
	No	11515	53.6	46.4	
Peripheral vascular disease	Yes	3735	50.2	49.8	<.0001
	No	34883	54.1	45.9	
Paralysis	Yes	281	50.2	49.8	.23
	No	38337	53.8	46.2	
Neurological disorders	Yes	1264	44.9	55.1	<.0001
	No	37354	54.1	45.9	
Hypothyroidism	Yes	4694	54.8	45.2	.12
	No	33924	53.6	46.4	
Renal failure	Yes	3086	51.7	48.3	.02
	No	35532	53.9	46.1	
Liver disease	Yes	232	60.8	39.2	.03
	No	38386	53.7	46.3	
Peptic ulcer	Yes	21	33.3	66.7	.06
	No	38597	53.8	46.2	
Acquired immune deficiency syndrome	Yes	15	26.7	73.3	.04
	No	38603	53.8	46.2	
Rheumatoid arthritis	Yes	1005	55.0	45.0	.42
	No	37613	53.7	46.3	
Coagulopthy	Yes	920	52.5	47.5	.43
	No	37698	53.8	46.2	
Obesity	Yes	1216	54.0	46.0	.86
	No	37402	53.8	46.2	
Weight loss	Yes	609	48.4	51.6	.01
	No	38009	53.9	46.1	
Fluid and electrolyte disorders	Yes	3414	50.5	49.5	<.0001
	No	35204	54.1	45.9	
Chronic blood loss anemia	Yes	438	48.6	51.4	.03
	No	38180	53.8	46.2	
Lymphoma	Yes	387	52.2	47.8	.53
	No	38231	53.8	46.2	
Metastatic cancer	Yes	401	41.6	58.4	<.0001
	No	38217	53.9	46.1	
Solid tumor without metastasis	Yes	3250	50.3	49.7	<.0001
	No	35368	54.1	45.9	

(continued)

Table 1. (continued)

Variables		n	Switch to Physicians (%)	Stay With NPs (%)	*P*
Deficiency anemias	Yes	5458	50.9	49.1	<.0001
	No	33160	54.2	45.8	
Alcohol abuse	Yes	178	57.9	42.1	.24
	No	38440	53.7	46.3	
Drug abuse	Yes	39	48.7	51.3	.53
	No	38579	53.8	46.2	
Psychoses	Yes	810	52.8	47.2	.59
	No	37808	53.8	46.2	
Depression	Yes	1720	52.7	47.3	.38
	No	36898	53.8	46.2	

care from sole NP to any MD (switch group) or stayed with NP care (stay group) any time between 2008 and 2010. Of the patients receiving NP care, 53.8% switched to MDs for their primary care. Patients in the switch group were more likely to be female, younger, reside in metro areas, reside in ZIP codes with higher education, and reside in states with most restrictions on the scope of NP practice. They were also more likely to have diabetes or liver disease, and have endocrinology specialty consult. They were less likely to be black and impoverished. The switch group had fewer comorbidities and prior hospitalizations than the stay group, but more NP provider visits in the previous year. The switch group participants were less likely to have CHF, COPD, pulmonary circulation disease, peripheral vascular disease, neurological disorder, renal failure, AIDS, anemia, peptic ulcer, weight loss, and cancer.

Table 2 shows the rates of acute care events and new diagnoses in the 30 days before switch in the switch group compared with rates in the stay group. Patients in the switch group were more likely to have experienced hospitalization (8% vs 4.5%) and ER visits (13.8% vs 6.5%) in the 30 days before they switched to MD care. In the 30 days before they switched, they were also more likely to have been newly diagnosed with cancer, stroke, heart attack, atrial fibrillation, and pneumonia.

Table 3 presents the associations between patient characteristics and odds of switching from NP primary care to MD primary care. In the multivariable analyses, significant predictors of switching from NP care to MD primary care include female gender, not being on Medicaid, high education, residence in a metro area or in a state with most restrictions on NP practice, fewer prior hospitalization and comorbidities, and frequent clinic visits to the NP. Other significant predictors of switching from NP to MD care included ER visits (odds ratio [OR] = 1.55, 95% confidence interval (CI) = 1.44-1.68) or hospitalization (OR = 1.13, CI = 1.02-1.25) in the 30 days prior to switch. Odds of switching from NP to MD also increased significantly after patients were newly diagnosed with heart attacks (OR = 5.52, 95% CI = 4.33-7.02), pneumonia (OR = 4.84, 95% CI = 3.71-6.32), atrial fibrillation (OR = 3.99, 95% CI = 2.93-5.44), stroke (OR = 2.94, 95% CI = 2.31-3.74), or cancer (OR = 2.65, 95% CI = 1.94-3.63). About 8% of variation in switching care from NP to MD was explained by the characteristics listed in Table 3.

Discussion

About half of Medicare beneficiaries with NPs as their sole primary care provider in 2007 switched to receive some or all of their primary care from physicians between 2008 and 2010. The switch group patients were more likely to have been hospitalized or visited ER within 30 days prior to the switching, relative to the stay group patients. The switch group patients were also more likely than those in the stay group to have been newly diagnosed with cancer, stroke, heart attack, atrial fibrillation, and pneumonia in the 30 days before they switched. More Medicaid-eligible patients stayed with their NP primary care providers compared with non-Medicaid eligible patients; this may reflect the reluctance of some physicians to take on Medicaid patients for primary care.[24]

Our finding of higher NP-to-MD switching in states with the most restrictions of NP practice is consistent with prior findings of lower likelihood of NP primary care when NP practice is restricted.[15] The restrictions ranged from limitations on admitting patients to hospital, making referrals, ordering diagnostic tests to prescribing medications.[15] Our study showed that NP-to-MD switching occurred more frequently after a patient experienced a hospitalization or ER visit. These acute care experiences, especially in the context of high NP practice restriction, may alter the patient perception of the ability of the NP provider to facilitate future tests, medications or hospital/ER transfers. A future qualitative study is needed to examine relationship between degree of NP practice restriction and domains of patient-perceived continuity of care such as relational and informational continuity (interpersonal trust and knowledge) that are not captured in quantitative study like ours.[23,25,26-31]

Table 2. Hospitalization and Emergency Room (ER) Visits and New Diagnoses in Medicare Patients 30 Days Before the Patients Switched From Sole Nurse Practitioner (NP) Primary Care to Receiving Any Care From a Primary Care Medical Doctor (MD), 2008-2010.

Variables	Switch to MD	Stay With NP[a]	*P*
N	20766	17852	
Length of follow-up months (mean ± SD)	12.3 ± 9.9	10.8 ± 9.8	
Hospitalization and ER (%)			
Hospitalization	8.0	4.5	<.0001
Preventable hospitalization	2.4	1.1	<.0001
Nonpreventable hospitalization	5.9	3.5	<.0001
ER visits	13.8	6.5	<.0001
Specific disease (new case) (%)			
Principal diagnosis			
Cancer (excluding skin cancer)	0.86	0.30	<.0001
Stroke	1.80	0.50	<.0001
Heart attack	2.56	0.45	<.0001
Hip fracture	0.13	0.11	.42
Atrial fibrillation	1.35	0.29	<.0001
Pneumonia	2.12	0.37	<.0001
Pneumonia (excluding 481-484.6)	2.08	0.36	<.0001
Any position on diagnosis			
Cancer (excluding skin cancer)	1.24	0.38	<.0001
Stroke	2.53	0.66	<.0001
Heart attack	3.38	0.69	<.0001
Hip fracture	0.16	0.12	.28
Atrial fibrillation	1.71	0.41	<.0001
Pneumonia	2.60	0.56	<.0001

[a]To ensure that the follow-up time was comparable to the 30-day look-back period between patients who switched to physician care (the switch group) and those who stayed with NP care (stay group), we randomly assigned the follow-up time to those in the stay group based on the distribution of follow-up time from the switch group.

Table 3. Adjusted Odds Ratio (OR) From a Multivariable Analysis Estimating the Odds of Switching From Receiving All Primary Care From Nurse Practitioners in 2007 to Receiving Some or All Care From Primary Care Physicians Between 2008 and 2010.

		95% CI	
	OR	Lower Limit	Upper Limit
Age in years			
66-74	Reference		
75-84	0.95	0.91	1.00
85+	0.75	0.71	0.80
Female	1.24	1.18	1.29
Race			
White	Reference		
Black	0.99	0.91	1.08
Hispanic	1.08	0.97	1.22
Other	1.61	1.40	1.84
Medicaid eligibility	0.83	0.78	0.88
Proportion of education >12 years			
Q1 (lowest)	Reference		
Q2	1.02	0.96	1.08
Q3	1.02	0.96	1.09
Q4 (highest)	1.13	1.06	1.20

(continued)

Table 3. (continued)

		95% CI	
	OR	Lower Limit	Upper Limit
Rural/urban			
Metro	Reference		
Nonmetro urban	0.77	0.74	0.81
Rural	0.67	0.62	0.73
State regulation			
1 (least restrictive)	Reference		
2	1.00	0.93	1.07
3	1.06	1.00	1.14
4	1.10	1.02	1.18
5 (most restrictive)	1.19	1.11	1.28
Prior hospitalization			
0	Reference		
1	0.97	0.91	1.03
2	0.94	0.86	1.04
3+	0.77	0.69	0.87
Previous provider visit	1.03	1.02	1.03
Specialty visit			
Cardiology	0.95	0.91	0.99
Pulmonary	0.87	0.81	0.93
Endocrinology	1.08	0.99	1.17
No. of conditions			
1	Reference		
2	0.85	0.80	0.90
3	0.75	0.64	0.87
Comorbidity sum			
0	Reference		
1	0.94	0.89	1.00
2	0.91	0.85	0.97
3+	0.77	0.71	0.84
Hospitalization*	1.13	1.02	1.25
Emergency room visit*	1.55	1.44	1.68
Principal diagnosis*			
Cancer	2.65	1.94	3.63
Stroke	2.94	2.31	3.74
Heart attack	5.52	4.33	7.02
Hip fracture	0.81	0.43	1.52
Atrial fibrillation	3.99	2.93	5.44
Pneumonia	4.84	3.71	6.32

* In the 30 days prior to the switch.

Some of the patients who switched might still be cared for by NPs under a team model of care where NPs and MDs work together to care for older patients with multiple chronic diseases.[27-34] The NP-MD team model may best serve the needs of the switch group patients whose health conditions have become more complex following their recent hospitalizations or new diagnoses. Evidence showed that patients with multiple comorbidities experienced better outcomes at lower cost under a collaborative model of NPs and MDs.[32-36]

One potential explanation for the switching after hospitalization or ER visits may be related to physician perceptions of quality of NP clinical skills. These perceptions may implicitly or explicitly encourage these hospitalized patients to switch to primary care physicians.[37-39] The number of NPs generally is increasing,[15] so a decreasing population of NPs does not explain the high switch rate. Patients who switch after ER visits or hospitalizations may also switch because they feel they need to seek physician involvement after their acute care visits or new diagnoses, given that many of these visits are to emergency specialties.

There are several limitations to our study. Because we studied only fee-for-service Medicare patients, our findings may not be generalizable to younger populations or patients

with commercial insurance. We may also not have captured all patients who received all their primary care from NPs. This possibility could arise in a group medical practice when the physician rather than the NP submits the higher billing charge under the MD name for care given by the NP. We also do not have data on quality of communication and patient trust, factors that are critical to longevity of the clinician-patient relationship.[23,25,26,40] Qualitative interviewing of NPs, physicians and patients may help clarify the perceived added value of physician primary care versus NP primary care versus team care, implicit and explicit biases in the health care system, and organizational and system barriers impeding continuity of care. [27-31,41-46]

Acknowledgments

The authors have no financial, personal or potential conflicts of interest to disclose. The funders had no role in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; or the preparation, review, or approval of the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by Grant No. R24-HS022134 from the Agency for Healthcare Research and Quality, and Grant Nos. R01-AG033134, P30-AG024832, and UL1TR001439 from the National Institutes of Health.

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