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**Do Physician-based or Hospital-based Provider Service Networks
Better Control Medicaid Expenditures?**

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Abstract

In a recent demonstration project, Florida Medicaid enrollees were required to pick a managed care plan that was either a Health Maintenance Organization (HMO) or a Provider Service Network (PSN). PSNs are a form of managed care very similar to Accountable Care Organizations (ACOs) that provides health care services directly through a provider or network of organizations to a defined population without a “middle man” such as a third party insurance company and health plan. There are two types of PSNs: Physician-based PSNs and Healthcare system-based PSNs. Physician-based PSNs are created and controlled by physicians groups. Healthcare system-based PSNs are based on safety net hospitals and their outpatient clinics. Health system-based PSNs are integrated delivery systems, which are organizations that combine healthcare providers into one organization and may provide more efficient care with lower cost of care due to economies of scale. The objective of this study was to examine the differences in healthcare expenditures by enrollees in physician-based and health system-based PSNs. Using a difference in difference approach our study found that compared to enrollees in physician-based PSNs, enrollees in health system-based PSNs lowered expenditures to a greater extent over time compared to physician-based PSNs. Findings from this study provide important information to states considering implementing alternative delivery models to control Medicaid costs.

Key words: Medicaid, Managed Care, Provider Service Networks, Accountable Care Organizations, Expenditures

Introduction

Medicaid is administered by individual states under broad federal guidelines, with the federal government reimbursing each state for a portion of the costs. The program constitutes approximately 8 percent of total federal government spending, while states spend an average of 24.5 percent of their budget on Medicaid (Kenen, 2012; National Association of State Budget Officers, 2014; Sommers et al., 2010). Economic recession and rising healthcare costs combined with Medicaid expansion under the Patient Protection and Affordable Care Act (PPACA, 2010) have placed significant burdens on state budgets. This has caused many states to create strategies designed to improve the efficiency of their Medicaid programs (Kenen, 2012). Florida is one of several states that remodeled their Medicaid program into a managed care structure in an effort to improve efficiency in the provision of healthcare services and reduce expenditures. Medicaid managed care organizations are created to improve access to care for Medicaid beneficiaries and to slow the growth in Medicaid expenditures (Halstead et al., 1998; Holahan et al., 1998). The general difference between Medicaid managed care and Medicaid Fee-for-Service (FFS) was that Medicaid enrollees in managed care are more likely to have a primary care provider, less likely to use hospital care, emergency room, have prescription drugs, and be referred to specialists, and more likely to be satisfied with their cares than Medicaid beneficiaries in Medicaid FFS (Kirby et al., 2003; Sisk et al., 1995).

The Florida Medicaid Reform Demonstration was approved by the Center for Medicare and Medicaid Services on October 19, 2005 and implemented in Broward and Duval counties starting July 1, 2006. The aims of this program were to increase Medicaid enrollees' empowerment and responsibility, increase market competition through choice of health plans, and to improve enrollee health status by providing financial incentives for their healthy behavior (Coughlin et al., 2008; Hall et al., 2013; Harman et al., 2011; Landry et al., 2011). Under the Florida Medicaid Reform Demonstration, Medicaid beneficiaries living in the participating counties were required to choose their health plan between private Provider Service Networks (PSNs) or Health Maintenance Organizations (HMOs).

Among Medicaid managed care service networks, Provider Service Networks (PSNs) are provider-led organizations whose goals are to eliminate costs of third party health plans, to manage healthcare expenditures without having to reduce needed care, and to improve overall quality of care using a shared savings model (Duncan et al., 2007; Hall et al., 2013; Johnson et al., 2010; Schiller et al., 2010; The Florida Statutes, 2012). That is, healthcare providers will deliver care to beneficiaries efficiently through a coordinated continuum of care in PSNs (Davis, 1997; Schiller et al., 2010). PSNs are all not-for-profit entities owned by physician-only or health systems, including physicians, hospitals, and other healthcare providers and operated only in Florida, although the delivery model used by PSNs in Florida are essentially the same as Accountable Care Organizations (ACOs) that are operating in other states. Previous research examining PSNs from an earlier demonstration found that PSNs had lower spending that appeared to be largely due to reductions in office visits and prescription drugs compared to HMOs, primary care case management and fee-for service plans (Lemak et al., 2005; Johnson et

al., 2010; Vogel et al., 2004). Since PSNs showed promise in the earlier Medicaid demonstration, they were offered as option to beneficiaries in the Demonstration beginning in 2006. After the first four years of this Demonstration, Medicaid beneficiaries in PSNs had overall lower expenditures relative to those in HMOs (Harman et al., 2014).

There are two different organizational types of PSNs: physician-based PSNs (P-PSNs) and health system-based PSNs (H-PSNs) as shown in Table 1.

Table 1. Characteristics of Physician-based and Health System-based PSNs

	Physician-based PSNs	Health System-based PSNs	HMOs	MediPass (PCCM)
Financial Mechanism				
Payments	Fee-for-Services and Shared Savings model	Fee-for-Services and Shared Savings model	Capitation	Per member per month (PMPM)
Managerial Structure				
Reform counties	Yes	Yes	Yes	No
Area Served	Florida only	Florida only	Multi-state	Multi-state
Geographic Orientation	Local and Regional	Local	Local and Regional	Local and Regional
Ownership	Not-for-profit	Not-for-profit	For-profit/ Not-for-profit	For-profit/ Not-for-profit
Mission	Medicaid only	Medicaid only	Diversified, Medicaid, Govt payers	Medicaid only
Organizational Structure				
Provider-led	Physician network	Health system		Primary care physicians
Primary care medial home base	Yes	No	No	Yes

P-PSNs and H-PSNs were formed by large physician group practices and safety net hospitals (Davis, 1997; Duncan et al., 2007; Landry et al., 2011; Lemak et al., 2004; Johnson et al., 2010; Schiller et al., 2010). Providers in both types of PSNs receive fee-for-service (FFS) payment but qualify to share in any savings resulting from cost reduction and meeting predetermined performance and utilization targets (Hall et al., 2013; Schiller et al., 2010; The Florida Statutes, 2012). However, organizational structures may be different depending on who will lead these organizations. P-PSNs are a physician-only network created and controlled mainly by physicians groups that provide healthcare services to Medicaid enrollees from

Demonstration counties. P-PSNs have a horizontal organizational structure, in that they only incorporate healthcare workers that provide services at one level of the patient care continuum. This is in contrast to H-PSNs, which are a network of healthcare providers that operate through safety net hospitals and their affiliated physician groups, outpatient clinics, and ambulatory care centers. PSNs are very similar in structure and aim to Accountable Care Organizations (ACOs) that were created and spread after the Patient Protection and Affordable Care Act of 2010. Determining which model is most effective was identified as one of the pressing questions that needs to be answered during a roundtable discussion of ACOs (Lee et al., 2010). This study provides evidence highlighting the differences in expenditures between these two types of organizations four years after implementation.

Differences in expenditures between P-PSNs and H-PSNs are expected due to differences in levels of integration between these two organizational forms. This structural approach allows for more resources, including electronic medical records, healthcare providers, and quality improvement activities among H-PSNs compared to P-PSNs. For this reason, more integrated organizations are more likely to redesign care processes, take advantages of economies of scale, and make the changes needed to improve care than less integrated organizations (Crosson, 2005; Shortell et al., 2008). Therefore, we hypothesized Medicaid beneficiaries in H-PSNs will have lower healthcare expenditures compared to Medicaid beneficiaries in P-PSNs.

Data and Methods

Analytic Strategy

To minimize selection bias and issues related to unobserved confounding, we used a difference-in-difference approach, with a person-month as the observational unit for expenditures. The analyses used Florida Medicaid claims data from the two fiscal years immediately preceding the Demonstration (FY0405 and FY0506), and the first four fiscal years after implementation of the Demonstration (FY0607 through FY0910). The difference-in-difference approach assessed changes in expenditures before and after implementation of the Demonstration between H-PSNs and P-PSNs. Data from beneficiaries in MediPass, a primary care case management program, was used for the pre-Demonstration period because PSNs did not exist in Broward and Duval counties prior to the Demonstration but services were paid for on a fee-for-service (FFS) basis in both PSNs and in MediPass. Claims data from all Medicaid beneficiaries from Broward and Duval counties (Demonstration counties) who were enrolled in one of the two types of PSNs after the policy change (P-PSNs: N= 838,254 person months and H-PSNs: N=1,073,434 person months) and from beneficiaries in MediPass before the policy implementation (N=2,544,281 person months) was used in the expenditures analyses. Because we are interested in understanding differences in the population average per member per month expenditures over time between the two types of PSNs, the analytic approach did not model individual changes in expenditures pre- and post-implementation, but simply the average expenditures for all beneficiaries in the pre-period vs. the post-period. Additionally, examining individual changes over time would also significantly limit the scope of the analysis, and thus the generalizability, as the analysis would have to be limited to Medicaid beneficiaries with continuous Medicaid eligibility over a six-year period if this approach was taken.

Measures

The primary independent variable of interest was a binary indicator variable for whether the beneficiary was enrolled in an H-PSN vs. P-PSN. Beneficiaries who selected HMOs were removed from the analysis because the aim of this study is to compare the two organizational forms of PSNs. The dependent variable was per member per month (PMPM) expenditures. Monthly expenditures were calculated by summing all paid claims during a calendar month, including monthly administrative management fees. Covariates included age, gender, race/ethnicity, geographic location, eligibility status (TANF (Temporary Assistance for Needy Families) vs. SSI (Supplemental Security Income)), and risk scores. Risk scores were calculated using the Medicaid Rx methodology, which measures health status using pharmacy claims (<http://medicaidrx.ucsd.edu/>), to account for any difference in the health status of the populations that selected to enroll in P-PSNs vs. H-PSNs. The Florida Agency for Healthcare Administration (AHCA) used the Medicaid Prescription Drug risk adjustment model to calculate risk scores to risk-adjust premiums for each HMO and PSN recipient. Medicaid Prescription Drug risk adjustment model was used to expect enrollees' diagnosed diseases and calculate risk score based on enrollee's prescription drug list. Although, PSNs were paid on a fee-for-service (FFS) basis during the entirety of the study period examined here, risk scores were still calculated because the original plans for the demonstration were to eventually move PSNs over to a capitated payment model. Everyone starts in the same population in the pre-period because neither type of PSNs were implemented at that point, so there is no difference in risk for this period and therefore risk scores were set to zero for all observations in the pre-period. This is the same approach used in previous studies examining this population (Harman et al, 2011; Harman et al 2014). We used data from FY0405 and 0506 as baseline and data from FY0607 to 0910 as follow-up.

Statistical Approach

Previous analyses of expenditures using the same dataset demonstrated that Generalized Estimating Equations (GEE) using a gamma family displayed adequate model fit (Harman et al, 2011; Harman et al, 2014). Therefore, a GEE using a gamma family with a log link was used to estimate the difference in PMPM expenditures between H-PSNs and P-PSNs. The estimated equation is:

$$\text{PMPM Expenditures} = \exp [\beta_0 + \beta_1 * \text{Time} + \beta_2 * \text{Post} + \beta_3 * \text{HPSN} + \beta_4 * (\text{Time} * \text{Post}) + \beta_5 * (\text{Time} * \text{Post} * \text{HPSN}) + \beta_6 * \text{Covariates} + \varepsilon],$$

where β_3 represents the difference in the intercept for the period after the Medicaid reform for observations from H-PSNs compared to observations from P-PSNs. β_5 is the difference in the change in the slope pre- and post-policy implementation between H-PSNs and P-PSNs and represents the estimated marginal difference in expenditures over time between H-PSNs and P-PSNs, and is the primary coefficient of interest, as it demonstrates whether H-PSNs or P-PSNs were better able to control expenditures over time.

Results

Descriptive Analysis

MediPass enrollees before the reform period contributed 2,544,281 member months. Over half of these enrollees were male (54.05%) and lived in Broward County (57.60%). Almost half of MediPass enrollees were African-American (47.48%) while most beneficiaries were enrolled through TANF (84.52%). Since risk scores were not calculated before the demonstration period, these values were not available for MediPass beneficiaries. Therefore, scores for these enrollees were assigned a baseline value of 0 at baseline (average risk). P-PSNs and H-PSNs contributed 838,254 and 1,073,434 member months respectively. Over half of the beneficiaries in these plans were female (53.94% and 56.13%), African-American (51.94% and 59.52%), and were enrolled in TANF (85.24% and 81.73%). Enrollees in H-PSNs were older compared to P-PSNs (17.68 vs. 14.95) and had lower risk scores (0.10 vs. 0.12). Also, more enrollees in H-PSNs lived in Duval County, while more enrollees in P-PSNs lived in Broward County.

Table 2. Sample characteristics

		Pre-reform MediPass (N=2,544,281)	Post-reform P-PSNs (N=838,254)	Post-reform H-PSNs (N=1,073,434)
Age		13.34	14.95	17.68
	<1	10.91%	3.76%	3.85%
	1-5	26.95%	22.31%	16.50%
	6-13	28.25%	32.62%	31.71%
	14-20	14.58%	20.93%	19.66%
	21-54	16.19%	17.29%	23.91%
	55-64	2.71%	2.67%	3.91%
	>65	0.36%	0.33%	0.30%
Gender				
	Female	45.95%	53.94%	56.13%
	Male	54.05%	46.06%	43.87%
Race/Ethnicity				
	White	23.84%	20.61%	19.55%
	Black	47.48%	51.94%	59.52%
	Hispanic	15.84%	16.87%	11.87%
	Other	12.84%	10.47%	8.95%
County				
	Duval	42.39%	35.42%	57.59%
	Broward	57.60%	64.58%	42.41%
Eligibility Status				
	SSI	15.48%	14.76%	18.27%
	TANF	84.52%	85.24%	81.73%
Risk score		0	0.12	0.10

Multivariate Analysis

The results of the GEE model of PMPM expenditures are shown in Table 3. The coefficient for Time \times Post \times HPSN was -0.0180 ($p < 0.001$). This indicates that PMPM expenditures for enrollees in H-PSNs decreased by 1.80% every month relative to expenditures for those in P-PSNs. The coefficient for health system-based PSNs (HPSN) was 0.9726 ($p < 0.001$). This indicates that H-PSN enrollee PMPM expenditures were higher on average during the Medicaid Demonstration compared to P-PSN enrollees. Therefore, while PMPM expenditures for enrollees in H-PSNs were higher on average during the Demonstration period, their expenditures are trending lower over time relative to beneficiaries in P-PSNs, indicating that H-PSNs reduce expenditures to a greater extent over time.

Table 3. GEE model of PMPM expenditures

	Estimate	S.E.	95% Confidence limits		Pr > Z
Time	-0.0061	0.0009	-0.0079	-0.0043	<.0001
Post-reform	-2.0935	0.0438	-2.1793	-2.0077	<.0001
HPSN	0.9726	0.0572	0.8604	1.0848	<.0001
Time \times Post	0.0492	0.0013	0.0466	0.0517	<.0001
Time \times Post \times HPSN	-0.0180	0.0012	-0.0203	-0.0157	<.0001
Age	0.0068	0.0005	0.0058	0.0078	<.0001
Gender (Female)					
Male	-0.0539	0.0118	-0.0770	-0.0307	<.0001
Race/ethnicity (White)					
Black	-0.2715	0.0782	-0.4248	-0.1182	0.0005
Hispanic	-0.2318	0.0793	-0.3873	-0.0763	0.0035
Other	-0.2116	0.0814	-0.3711	-0.520	0.0093
County (Broward)					
Duval	-0.1388	0.0124	-0.1632	-0.1145	<.0001
Eligibility (SSI)					
TANF	-1.5720	0.0208	-1.6128	-1.5312	<.0001
Risk score	0.1180	0.0053	0.1015	0.1221	<.0001

Conclusion and Discussion

The Florida Medicaid Reform Demonstration program introduced PSNs as an option in Medicaid managed care to provide enrollees with a broader choice of health plans. This study focused on the two different types of PSNs. Controlling for enrollees' socio-demographic factors, expenditures for H-PSNs declined at a greater rate compared to expenditures for P-PSN enrollees, suggesting that H-PSNs can better control expenditures than P-PSNs. Even though the population that selected H-PSNs tended to have higher expenditures to begin with, PMPM expenditures will be lower for beneficiaries in H-PSNs versus those in P-PSNs by the 55th month of the demonstration, assuming the observed trend continues. This number was calculated by dividing the H-PSN coefficient (0.9726) by the rate of decline per month (-0.0180).

The findings of this study indicate the level of integration is a potential source of the variation in healthcare expenditures, but some limitations and other important factors need to be considered. It will be important to monitor the impact of integration over time as many hospitals are positioning themselves to become integrated systems, joining forces and purchasing physician practices, leaving fewer independent hospitals and physicians. Greater market share may give these health systems more market control, which may drive up expenditures over time. Additionally, differences in expenditures could stem from enrollees in H-PSNs potentially having higher health care needs that the risk scores could not completely account for. These reasons can explain average higher expenditures in H-PSNs after reform. However, given that the trends in expenditures for enrollees in H-PSNs were decreasing at a greater rate over time compared to PSNs, this suggests that H-PSNs may be more likely to better control costs, and overall savings can be achieved over longer periods of time. The effect of the level of integration may not be immediate and its influence on healthcare expenditures could take time to have an effect. It is possible that H-PSNs provide greater preventive care than P-PSNs, which incurs greater upfront costs but may reduce the need for expensive acute care services in the long run. This result also may be associated with the different level of integration. H-PSNs which are more integrated systems are available to align healthcare facilities, programs or services and offer a coordinated continuum of care, resulting in reducing unnecessary expenditures. Possible factors associated with differences in expenditures could include healthcare utilization, healthcare providers' attitudes, organizational culture, meaningful use of health information technology, H-PSNs and P-PSNs penetration rates, number of H-PSNs and P-PSNs, and market competition of Medicaid managed care markets, although this study did not directly test the influence of these individual factors. Future studies should compare patterns of utilization to assess how reductions in expenditures are achieved.

Some additional limitations that need to be acknowledged include the nonequivalent-comparison group study design. The study also used separate samples measured at two time periods. Non-equivalent comparison groups and the different individuals in the pre- and post-reform periods are susceptible to selection bias and threaten the internal validity of the study results. However, we used the same inclusion and exclusion criteria for the study population to minimize selection bias, used a difference-in-difference approach to measure the change in outcome differences between the two groups to minimize the influence of unobserved

confounding, and included risk scores to help control for differences in health status between the H-PSN and P-PSN post-implementation. An additional limitation is that this study only examined expenditures for the first four years after implementation, so it is possible that observed trends do not continue over time. Future studies should be conducted to assess outcomes over a longer period of time.

Despite these limitations, this study provided empirical evidence regarding the differences in healthcare expenditures between physician practice-based and hospital-based organizations. Findings from this study can inform policymakers across the country regarding different potential delivery models to implement for their Medicaid programs, particularly since many states are considering implementing ACOs or organizations similar to ACOs such as the PSNs in Florida. Shortell and Casalino (2008) introduced five different types of existing organizations that could serve as an ACO, including multispecialty group practice, hospital medical staff organization, physician-hospital organization, interdependent practice organization, and health plan-provider network. This means ACOs are mainly controlled by physicians and hospitals. Therefore, findings from this study can help inform whether there are advantages to hospital-based ACOs that are centered in hospitals compared to physician-based ACOs in terms of expenditures. However, the reason why more and less integrated delivery systems perform differently is not clear and a topic of future investigations. It will be important to monitor the different performance between physician-based and hospital-based organizations using more data and a longer study period and to determine how these variations are being achieved.

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