

DR. MICHAEL PESKO (Orcid ID : 0000-0002-9247-9703)

Article type : Research Brief

Manuscript Number: HSR-16-0933

Spending Per Medicare Beneficiary is Higher in Hospital-Owned
Small- and Medium-Sized Physician Practices

Michael F. Pesko, Andrew M. Ryan, Stephen M. Shortell, Kenneth
R. Copeland, Patricia P. Ramsay, Xuming Sun, Jayme L.
Mendelsohn, Diane R. Rittenhouse, Lawrence P. Casalino

Michael F. Pesko, PhD*

Department of Healthcare Policy & Research, Weill Cornell
Medical College

402 East 67th Street - LA216, New York, NY 10065

646-962-8048

mip2037@med.cornell.edu

*Corresponding Author

Andrew M. Ryan, PhD

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/1475-6773.12765](https://doi.org/10.1111/1475-6773.12765)

This article is protected by copyright. All rights reserved

Department of Health Management and Policy, University of
Michigan School of Public Health
1415 Washington Heights, SPI II, RM 3124
Ann Arbor, MI 48109
734-936-1311
amryan@umich.edu

Stephen M. Shortell, PhD, MPH, MBA
Blue Cross of California Distinguished Professor of Health
Policy and Management Emeritus
Division of Health Policy and Management, School of Public
Health
50 University Hall-Oxford and Addison Streets
Berkeley, CA 94720
510-643-5346
shortell@berkeley.edu

Kennon R. Copeland, PhD
Senior Vice President and Director, Statistics and Methodology,
NORC at the University of Chicago
4350 East-West Highway, 8th Floor, Bethesda, MD 20814
301-634-9432
copeland-kennon@norc.org

Patricia P. Ramsay, MPH
Center for Healthcare Organizational and Innovation Research
Division of Health Policy and Management, University of
California, Berkeley
50 University Hall, Berkeley CA 94720
510-643-8063
pramsay@berkeley.edu

Xuming Sun, MS

Primary Care Information Project

New York City Department of Health and Mental Hygiene

42-09 28th Street - CN#12-65

Long Island City (Queens), NY 11101

347-396-7615

xsun1@health.nyc.gov

Jayne L. Mendelsohn, MPH

Boston University School of Medicine

72 East Concord Street, Boston MA 02118

Jlmendel@bu.edu

Diane R. Rittenhouse MD, MPH

Department of Family and Community Medicine

University of California, San Francisco

500 Parnassus Avenue, MU

San Francisco CA 94143

415-514-9249

rittenhouse@fcm.ucsf.edu

Lawrence P. Casalino

Professor of Healthcare Policy and Research, Healthcare Policy
and Research

Department of Healthcare Policy & Research, Weill Cornell

Medical College

402 East 67th Street - LA217, New York, NY 10065

646-962-8044

lac2021@med.cornell.edu

Acknowledgements: The Commonwealth Fund provided financial support for obtaining Medicare data and for conducting the analyses and writing the paper. The Robert Wood Johnson Foundation provided support for the National Survey of Small and Medium-Sized Physician Practices.

Disclosures: None.

Disclaimers: The statements, findings, conclusions, views, and opinions contained and expressed in this article are based in part on data obtained under license from the following IMS Health information services: Healthcare Organizational Services, (2007) IMS Health Inc. All rights reserved. The statements, findings, conclusions, views, and opinions contained and expressed herein are not necessarily those of IMS Health Inc. or any of its affiliated or subsidiary entities.

Abstract (125 words max):

Objective. To examine the relationship of physician versus hospital ownership of small- and medium-sized practices with spending and utilization of care.

Data source/study setting/data collection. Survey data for 1,045 primary care-based practices of 1-19 physicians linked to Medicare claims data for 2008 for 282,372 beneficiaries attributed to the 3,010 physicians in these practices.

Study design. We used generalized linear models to estimate the associations between practice characteristics and outcomes (emergency department visits, index admissions, readmissions, and spending).

Principal findings. Beneficiaries linked to hospital-owned practices had 7.3% more emergency department visits and 6.4% higher total spending compared to beneficiaries linked to physician-owned practices.

Conclusions. Physician practices are increasingly being purchased by hospitals. This may result in higher total spending on care.

Key words: ambulatory/outpatient care; health care organizations and systems; ownership/governance

Introduction

Health care reform appears to be accelerating two decades-old trends: physician practices are increasingly owned by hospitals, and physicians in small practices are moving into medium-sized and large practices (Burns, Goldsmith et al. 2013, Casalino 2014). Between 2013 and 2015, the percentage of physicians in practices with 1-24 physicians (i.e., small- and medium-sized practices) decreased from approximately 48% to approximately 42%; the percentages were similar for primary care physicians (Muhlestein and Smith 2016). Estimates of the percentage of physicians employed by hospitals vary (Burns, Goldsmith et al. 2013, Kane 2015); a recent study suggested that the percentage increased from 29% to 33% between 2012 and 2014 (Physicians Advocacy Institute 2016). Recent policy developments – such as the Medicare Access and CHIP Reauthorization Act (MACRA) – are likely to further accelerate these trends (Squires

and Blumenthal 2016). Little is known about the performance of hospital-owned practices or about the performance of small- and medium-sized practices (Casalino 2006, Casalino, Pesko et al. 2014).

To address these questions, we linked Medicare claims data to a large, unique dataset - the National Study of Small- and Medium-Sized Physician Practices (NSSMPP) - one of the largest surveys of medical practices ever conducted in the U.S. In a previous article using this data, we found that practices with 1-2 physicians had 33 percent fewer preventable admissions than practices with 10-19 physicians, that practices with 3-9 physicians had 27 percent fewer preventable admissions than 10-19 physician practices, that preventable admission rates for 1-2 and 3-9 physician practices were as good or better than the national average for practices of all sizes, and that hospital-owned small- and medium-sized practices had higher rates of preventable admissions than physician-owned practices (Casalino, Pesko et al. 2014). In this article, we analyze the relationship between practice size and ownership and measures of utilization and Medicare spending.

Data and Methods

We linked survey data from the NSSMPP to Medicare claims data. NSSMPP has been previously described (Rittenhouse, Casalino et al. 2011). Briefly, NSSMPP involved 40 minute telephone surveys, conducted between July 2007 and March 2009, with the physician leader or administrator of a national sample of practices with 1-19 physicians. One thousand, seven hundred forty-five practices responded; the adjusted response rate was 63.2 percent (Online Appendix 1). For this paper, we analyzed data for the 3,010 physicians in the 1,045 practices that included at least 33% primary care physicians, were not

community health centers, had patients attributed to them in 2008, and were not academic faculty practices (Online Appendix 1). We attributed 282,379 Medicare beneficiaries to these physicians, using claims data for 2008 from a national sample of 999,990 Medicare beneficiaries who during that year had seen a physician operating in a NSSMPP practice at least once, were enrolled in Part A and B coverage continuously, were not in the End Stage Renal Disease Program or Medicare Advantage, and survived throughout the year. We attributed each beneficiary to the physician with whom the beneficiary had a plurality of outpatient evaluation and management visits, with tie-breakers as described in Online Appendix 2.

Our objective in this study is to examine the influence of outpatient ownership and size on beneficiary spending and utilization information. As such, our outcome variables included three utilization measures and five spending measures. The utilization measures were emergency room visits, hospital index admissions (all hospital admissions not including readmissions), and the readmission rate for beneficiaries with at least one hospitalization. The spending measures included hospital inpatient spending, hospital outpatient spending, post-acute care spending, physician service spending, other spending (e.g. ambulatory surgery centers, outpatient imaging, and durable medical equipment), and total spending (the sum of all spending categories). These utilization and spending measures were constructed using beneficiary-level data that were aggregated by CMS and provided in the 2008 Master Beneficiary Summary File. We geographically adjusted the spending measures as described in Online Appendix 3.

In our regression models, our primary independent variables of interest are group size (1-2 physicians, 3-9 physicians, and 10-19 physicians) and ownership (hospital-owned or physician-

owned). Of our 1,045 practices, 871 were physician-owned, and of these 37.3% were 3-9 physician practices and 4.4% were 10-19 physician practices. The 174 hospital-owned practices were larger on average ($p < 0.001$), with 55.8% having 3-9 physicians and 8.6% having 10-19 physicians.

Additional control variables are described in table footnotes and in Online Appendix 3.

Given the count nature of our dependent variables, we estimated our regressions using a generalized linear model with a log-link and a Poisson count nature as chosen (separately for total spending and each utilization measure) by a modified Park test (Buntin and Zaslavsky 2004). Associations are shown as the percent change in the outcome. Survey weights are used in all analyses, and standard errors are clustered at the level of the primary sampling unit.

The study was approved by the Institutional Review Board at Weill Cornell Medical College. Analyses were performed using Stata 14.1.

Results

Total spending per beneficiary/year was \$7,514, of which 38% was spent on hospital inpatient care, 14% on hospital outpatient care, 24% on physician services, 14% on post-acute care, and 14% on other spending (Exhibit 1). In part because the beneficiaries in our study survived all of 2008, average beneficiary/year spending of \$7,514 is lower than average standardized spending of \$8,359 per in 2008 (CMS, 2017). Each beneficiary had, on average, 0.48 emergency room visits per year and 0.24 index admissions per year. The 30-day readmission rate among beneficiaries with an index admission was 11.2%, which is lower than the national average and may also reflect our healthier population on average.

Our sample was also older than the mean FFS beneficiary in year 2008 (76.6 compared to 72.0), was more likely to be female (61.2% compared to 55.9%), and was more likely to be White, non-Hispanic (90.4% compared to 81.7%). Among other things, these differences may reflect our exclusion of End Stage Renal Disease beneficiaries and requirement that the individual received outpatient care (CMS, 2017). Given that important differences exist between our sample and the national FFS sample, our results should not be construed as being applicable for all Medicare FFS beneficiaries.

Eighty-five percent of practices were physician-owned (Exhibit 1). Nearly 25% of practices were 1-2 physician practices; 66.3% had 3-9 physicians; 8.8% had 10-19 physicians. Ninety-five percent of physicians in the practices were primary care physicians (though practices were included in our analyses if they included at least 33% primary care physicians, most practices turned out to be all primary care).

Exhibit 2 provides the associations between practice ownership and size and utilization measures. Beneficiaries attributed to hospital-owned practices had 7.3% more emergency department visits per beneficiary/year than beneficiaries attributed to physician-owned practices ($p=0.055$). Index admissions and readmission rates did not differ significantly between hospital-owned and physician-owned practices. Larger practices had statistically significantly higher rates of ED visits than 1-2 physician practices: 6.9% higher in 3-9 physician practices and 13.5% higher in 10-19 physician practices. However, hospital readmission rates were lower in larger practices: beneficiaries attributed to 3-9 physician practices had approximately 15% lower readmissions ($p<0.01$) and 10-19 physician practices each had approximately 10% lower readmissions per beneficiary/year compared to 1-2 physician

practices, although this latter association was imprecisely estimated and is not statistically significant.

Exhibit 3 provides the associations between practice ownership and size with spending. Total spending per Medicare beneficiary per year for hospital-owned practices was 6.4% higher ($p < 0.05$). Hospital-owned practices had significantly higher spending on hospital outpatient services (35.7%) and post-acute care services (17.1%), but lower spending on physician services (-8.3%). Three to nine physician practices had 7.7% higher total spending compared to 1-2 physician practices, mainly because of higher hospital outpatient spending, but 10-19 physician practices had only 2.0% higher spending compared to 1-2 physician practices (not statistically significant). Within these large practices, there was substantially more spending on hospital inpatient and outpatient care and less spending on all other categories.

Full results for Exhibits 2 and 3 including coefficients for control variables are available online.

Discussion

Our study, which includes a very large national sample of practices, is the first to compare utilization and total spending for hospital-owned vs. physician-owned small- and medium-sized primary care-based practices. Approximately 42% of physicians work in these practices. Research to date suggests that physicians in small- and medium-sized practices provide care that equals or exceeds the quality and spending performance of larger practices (Landon, Normand et al. 2008). We find that total spending per beneficiary per year was 6.4% (\$481) higher in hospital-owned practices compared to physician-owned practices. This higher spending resulted primarily from higher spending on hospital services and on post-acute care; spending

for physician services was significantly lower in hospital-owned practices. Rates of hospital admissions and readmissions were not significantly higher for hospital-owned practices, so our results suggest that higher hospital spending is driven by greater intensity of hospital outpatient services (e.g. diagnostic imaging and outpatient surgery), rather than from an increased frequency of admissions of beneficiaries to the hospital.

Total spending did not differ consistently by practice size, except that 3-9 physician practices had 7.7% higher total spending (\$579) per beneficiary per year compared to 1-2 physician practices, mainly because of higher spending on hospital services. The reason for this finding is not clear. Utilization of services did not vary consistently by group size: 10-19 physician practices had much higher rates of ED visits and hospital admissions compared to 1-2 physician practices, but much lower readmission rates.

Our findings add to - and are generally consistent with - the small body of literature on the comparative performance of hospital-owned vs. physician-owned practices. Other studies, in a variety of settings, suggest that hospital ownership of practices is associated with higher total spending per patient (McWilliams, Chernew et al. 2013, Baker, Bundorf et al. 2014, Robinson and Miller 2014, Capps, Dranove et al. 2015, Neprash, Chernew et al. 2015).

Given the rapid movement of physicians into hospital employment and into larger practices and the accelerating impact that key health reform policies are likely having on these two trends, it is important for researchers and policymakers to note that hospital-owned practices and larger practices (at least in the range up to 19 physicians) do not necessarily perform better, or even as well, as physician-owned practices and

smaller practices (Landon, Normand et al. 2008, Weeks, Gottlieb et al. 2010, McWilliams, Chernew et al. 2013, Carlin, Dowd et al. 2014, Kralewski, Dowd et al. 2014). Hospital-owned practices and larger practices have more resources - capital, information technology, and leaders whose time can be dedicated to finding ways to improve quality - to systematically improve the care they provide (Casalino, Gillies et al. 2003, Friedberg, Coltin et al. 2007, Casalino, Wu et al. 2013, Casalino, Chen et al. 2016). It is possible that these potential advantages do not outweigh - at least not yet - the potential advantages of small practices, for example the strong mutual knowledge and trust that can develop among patients, staff, and physicians in the small practice setting.

Our study is subject to at least five limitations. First, although it is based on a very large, randomly selected sample of small- and medium-sized practices weighted to be representative of the U.S., we cannot claim that it is a precisely representative sample, because no "gold standard" dataset exists that contains the population of U.S. physician practices. Second, by design, our study does not include practices that are primarily composed of specialist physicians or practices that include twenty or more physicians. However, approximately 42% of physicians still work in practices with fewer than twenty physicians (Muhlestein and Smith 2016). Third, our data on practice characteristics and incentives rely on the accuracy of self-report from a single leader of each practice. Fourth, our study is observational, and demonstrates only an association, not necessarily a causal relationship, between practice characteristics and utilization and spending. Fifth, our analysis was performed using data from 2008, which may reduce the applicability of our results to today's rapidly changing healthcare delivery environment.

Conclusion

Our findings suggest four implications:

First, it may be worthwhile for researchers and funders of research to give more attention to comparing the performance of physician practices that differ from each other in size and ownership.

Second, it would be worthwhile for policymakers to give additional consideration to the likely effects - intended and unintended - of policies (such as Meaningful Use, MACRA, and paying higher rates for services in hospital-owned facilities than for the same services in physician-owned practices (GAO 2015)) on the types of practices that survive. MACRA, for example, is very complex, will eventually require reporting from practices to CMS on numerous measures, and offers a guaranteed bonus to physicians in "advanced alternative payment models" while threatening physicians not in these models with large (up to 9% of Medicare revenues), penalties. Faced with this complexity and risk, many physicians in small and medium-sized practices may decide it is safer and easier to seek hospital employment (Casalino 2017, Schneider and Hall 2017).

From a policy point of view, this might be a good thing (even if it is not what some physicians and their patients prefer), if hospital-owned or large practices provide better care, but this is exactly where more research is needed. This does not mean that such policies should not be created, but does mean that they should be structured, if possible, in such a way that they do not, practically speaking, mean that certain types of practice are likely to prevail and others to disappear regardless of the cost or quality of care they provide. Many initiatives of the Center for Medicare and Medicaid Innovation (CMMI) show awareness of this issue; in addition the recently

released final MACRA rules show that policymakers are aware of this issue and try to issue rules that can accommodate small practices. Nevertheless, the overall effect of MACRA may well be to drive physicians into larger organizations (Squires and Blumenthal 2016).

Third, policymakers might consider increasingly vigorous enforcement of antitrust laws, including more intensive scrutiny of the effects of vertical integration (hospital acquisition of physician practices) on the quality and cost of care (Gaynor, Ho et al. 2015, Greaney and Ross 2016). Hospitals and medical groups large enough to negotiate much higher payment rates from health insurers (Vladeck and Rice 2009, Berenson, Ginsburg et al. 2012, Reschovsky and Rich 2015) can drive smaller hospitals and groups out of business regardless of their relative performance on quality and cost. This can occur because higher payment rates can provide much more revenue than the comparatively small amounts of revenue that can be gained by scoring well on performance measures (Berenson, Ginsburg et al. 2010).

Finally, hospital and physician leaders might try to find ways to combine the advantages of large organizational size with the advantages that can be provided by the human scale environment of small- and medium-sized practices (Mostashari 2016).

References

Baker, L. C., M. K. Bundorf and D. P. Kessler (2014). "Vertical integration: hospital ownership of physician practices is associated with higher prices and spending." Health Aff (Millwood) **33**(5): 756-763.

Berenson, R. A., P. B. Ginsburg, J. B. Christianson and T. Yee (2012). "The growing power of some providers to win steep payment increases from insurers suggests policy remedies may be needed." Health Aff (Millwood) **31**(5): 973-981.

Berenson, R. A., P. B. Ginsburg and N. Kemper (2010). "Unchecked Provider Clout in California Foreshadows Challenges to Health Reform." Health Affairs **29**(4): 699-705.

Buntin, M. B. and A. M. Zaslavsky (2004). "Too much ado about two-part models and transformation? Comparing methods of modeling Medicare expenditures." J Health Econ **23**(3): 525-542.

Burns, L. R., J. C. Goldsmith and A. Sen (2013). Horizontal and Vertical Integration of Physicians: A Tale of Two Tails. Annual Review of Health Care Managment: Revisiting the Evolution of Health Systems Organization. L. Friedman, J. Goes and G. T. Savage. Bingley, UK, Emerald Group Publishing Limited.

Capps, C., D. Dranove and C. Ody (2015). The Effect of Hospital Acquisitions of Physician Practices on Prices and Spending. Working Paper Series. Chicago, IL, Institute for Policy Research, Northwestern University.

Carlin, C. S., B. Dowd and R. Feldman (2014). "Changes in Quality of Health Care Delivery after Vertical Integration." Health Serv Res. **50**(4), 1043-1068.

Casalino, L. P. (2017). "The Medicare Access And CHIP Reauthorization Act And The Corporate Transformation Of American Medicine." Health Aff (Millwood), **36**(5), 865-869.

Casalino, L., R. R. Gillies, S. M. Shortell, J. A. Schmittdiel, T. Bodenheimer, J. C. Robinson, T. Rundall, N. Oswald, H. Schauffler and M. C. Wang (2003). "External incentives, information technology, and organized processes to improve health care quality for patients with chronic diseases." JAMA **289**(4): 434-441.

Casalino, L. P. (2006). "Which type of medical group provides higher-quality care?" Ann Intern Med **145**(11): 860-861.

Casalino, L. P. (2014). "Accountable care organizations--the risk of failure and the risks of success." N Engl J Med **371**(18): 1750-1751.

Casalino, L. P., M. A. Chen, C. T. Staub, M. J. Press, J. L. Mendelsohn, J. T. Lynch and Y. Miranda (2016). "Large Independent Primary Care Medical Groups." Ann Fam Med **14**(1): 16-25.

Casalino, L. P., M. F. Pesko, A. M. Ryan, J. L. Mendelsohn, K. R. Copeland, P. P. Ramsay, X. Sun, D. R. Rittenhouse and S. M. Shortell (2014). "Small primary care physician practices have low rates of preventable hospital admissions." Health Aff (Millwood) **33**(9): 1680-1688.

Casalino, L. P., F. M. Wu, A. M. Ryan, K. Copeland, D. R. Rittenhouse, P. P. Ramsay and S. M. Shortell (2013). "Independent practice associations and physician-hospital organizations can improve care management for smaller practices." Health Aff (Millwood) **32**(8): 1376-1382.

Centers for Medicare & Medicaid Services (2017). "State and County Level Demographic, Cost, Utilization, and Quality Data." http://download.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Geographic-Variation/Downloads/State_County_Table_All.zip.

Friedberg, M. W., K. L. Coltin, S. D. Pearson, K. P. Kleinman, J. Zheng, J. A. Singer and E. C. Schneider (2007). "Does Affiliation of Physician Groups with One Another Produce Higher Quality Primary Care?" Journal of General Internal Medicine **22**(10): 1385-1392.

GAO (2015). Increasing Hospital- Physician Consolidation Highlights Need for Payment Reform. Washington, DC.

Gaynor, M., K. Ho and R. J. Town (2015). "The Industrial Organization of Health-Care Markets." Journal of Economic Literature **53**(2): 235-284.

Greaney, T. L. and D. Ross (2016). "Navigating Through the Fog of Vertical Merger Law: A Guide to Counselling Hospital-Physician Consolidation Under the Clayton Act." Washington Law Review **91**: 199-252.

Kane, C. K. (2015). Updated Data on Physician Practice Arrangements: Inching Toward Hospital Ownership. Chicago, IL.

Kralewski, J., B. Dowd, D. Knutson, J. Tong and M. Savage (2014). "The Relationships of Physician Practice Characteristics to Quality of Care and Costs." Health Serv Res.

Landon, B. E., S. L. Normand, E. Meara, Q. Zhou, S. R. Simon, R. Frank and B. J. McNeil (2008). "The Relationship Between Medical Practice Characteristics and Quality of Care for Cardiovascular Disease." Medical Care Research and Review **65**(2): 167-186.

McWilliams, J., M. E. Chernew, A. M. Zaslavsky, P. Hamed and B. E. Landon (2013). "Delivery system integration and health care spending and quality for medicare beneficiaries." JAMA Internal Medicine **173**(15): 1447-1456.

Mostashari, F. (2016). "The Paradox of Size: How Small, Independent Practices Can Thrive in Value-Based Care." Ann Fam Med **14**(1): 5-7.

Muhlestein, D. B. and N. J. Smith (2016). "Physician Consolidation: Rapid Movement From Small To Large Group Practices, 2013-15." Health Aff (Millwood) **35**(9): 1638-1642.

Neprash, H. T., M. E. Chernew, A. L. Hicks, T. Gibson and J. M. McWilliams (2015). "Association of Financial Integration Between Physicians and Hospitals With Commercial Health Care Prices." JAMA Intern Med **175**(12): 1932-1939.

Physicians Advocacy Institute (2016). Physician Practice Acquisition Study.

Reschovsky, J. D. and E. Rich (2015). "Hospital Acquisition of Physician Groups: On the Road to Value-Based or Higher-Priced Care?" JAMA Intern Med **175**(12): 1939-1941.

Rittenhouse, D. R., L. P. Casalino, S. M. Shortell, S. R. McClellan, R. R. Gillies, J. A. Alexander and M. L. Drum (2011).

"Small and medium-size physician practices use few patient-centered medical home processes." Health Aff (Millwood) **30**(8): 1575-1584.

Robinson, J. C. and K. Miller (2014). "Total expenditures per patient in hospital-owned and physician-owned physician organizations in California." JAMA **312**(16): 1663-1669.

Schneider, E. C., & Hall, C. J. (2017). "Improve quality, control spending, maintain access—can the merit-based incentive payment system deliver?" N Engl J Med, **376**(8), 708-710.

Squires, D. and D. Blumenthal (2016). *Do Small Physician Practices Have a Future?* New York, NY.

Vladeck, B. C. and T. Rice (2009). "Market failure and the failure of discourse: facing up to the power of sellers." Health Aff (Millwood) **28**(5): 1305-1315.

Weeks, W. B., D. J. Gottlieb, D. E. Nyweide, J. M. Sutherland, J. Bynum, L. P. Casalino, R. R. Gillies, S. M. Shortell and E. S. Fisher (2010). "Higher health care quality and bigger savings found at large multispecialty medical groups." Health Aff (Millwood) **29**(5): 991-997.

Exhibit 1: Descriptive Statistics, N = 282,372

	Mean	Standard Deviation
Outcomes		
Total Spending	\$7,514	\$13,271
Hospital Inpatient Spending, % of	\$2,532, 33.7%	\$7,675

<i>Total Spending</i>		
Hospital Outpatient Spending, % of Total Spending	\$1,017, 13.5%	\$2,467
Post-Acute Care Spending, % of Total Spending	\$1,064, 14.2%	\$4,553
Other Spending, % of Total Spending	\$1,077, 14.3%	\$1,410
Physician Services Spending, % of Total Spending	\$1,823, 24.3%	\$2,517
Emergency Room Visits	0.480	1.006
Hospital Index Admissions	0.242	0.544
Readmission Rate ¹	11.2%	0.245
Practice Characteristics		
Physician Owned	85.0%	-
Hospital Owned	15.0%	-
1-2 Physician Practice	24.9%	-
3-9 Physician Practice	66.3%	-
10-19 Physician Practice	8.8%	-
Percent of Primary Care Physicians	94.9%	0.121
Patient-Centered Medical Home Score Quartile 1 (0-11.76)	28.2%	-
Patient-Centered Medical Home Score Quartile 2 (>11.76-23.53)	30.8%	-
Patient-Centered Medical Home Score Quartile 3 (>23.53-37.5)	21.2%	-
Patient-Centered Medical Home Score Quartile 4 (>37.5-100)	19.9%	-
Beneficiary Characteristics		
Number of Chronic Conditions (0-25)	5.976	2.991
Beneficiary Age	76.645	6.854
Beneficiary Sex, Female	61.2%	-
Dual Eligible	7.9%	-

White (non-Hispanic)	90.4%	-
Black (of African American)	5.4%	-
Hispanic	2.0%	-
Asian/Pacific Islander	1.5%	-
American Indian/Alaska Native/Other/Unknown	0.7%	-
Original Reason for Entitlement - Old Age and Survivors Insurance	93.3%	-
Original Reason for Entitlement - Disability Insurance Benefits (DIB)	6.7%	-
Original Reason for Entitlement - End State Renal Disease (ESRD)	0.02%	-
Original Reason for Entitlement - Both DIB and ESRD	0.01%	-
Environment Characteristics		
Large Central Metro County	14.7%	-
Large Fringe Metro County	24.8%	-
Medium Metro County	24.9%	-
Small Metro County	13.0%	-
Micropolitan County	14.2%	-
Noncore County	8.3%	-
Zip Code Income <\$20k	0.3%	-
Zip Code Income [\$20k to \$30k)	9.7%	-
Zip Code Income [\$30k to \$40k)	31.5%	-
Zip Code Income [\$40k to \$50k)	24.0%	-
Zip Code Income [\$50k to \$60k)	14.0%	-
Zip Code Income [\$60k to \$70k)	7.8%	-
Zip Code Income [\$70k to \$80k)	5.1%	-
Zip Code Income >\$90k	4.4%	-
Zip Code Income Missing	3.0%	-
Survey Period		

July 1 - December 31, 2007	3.5%	-
Jan. 1 - June 30, 2008	2.2%	-
July 1 - Dec. 31, 2008	66.8%	-
Jan. 1 - March 31, 2009	27.5%	-

Source: authors' analysis of NSPO survey data linked to Medicare claims data. ¹The readmission rate is calculated for only individuals with an index hospitalization (N = 53,256).

Author Manuscript

Exhibit 2: Percent Change in Hospital Utilization Associated with Physician Practice Characteristics

	(1)	(2)	(3)
	Emergency Room Visits	Hospital Index Admissions	Readmission Rate
Owned by a hospital 3-9 physicians	7.3 [3.8]	-0.8 [2.7]	4.1 [4.0]
10-19 physicians	6.9* [3.1]	6.2* [2.8]	-14.9** [5.4]
	13.5* [3.6]	19.7* [1.5]	-10.2 [8.8]
Subpopulation	282,379	282,379	53,256
Mean	0.480	0.242	0.112
SD	1.005	0.542	0.243

Source: authors' analysis of NSPO survey data linked to Medicare claims data. Each column presents the percent change for the category compared to the reference. Each column is estimated using a separate regression. All equations adjust for the percentage of primary care physicians in each practice, PCMH quartile, HRR, urbanicity, ZIP code-level income, survey period, 26 comorbidities diagnosed prior to 2008, beneficiary age, race/ethnicity, gender, dual-eligibility, and original reason for entitlement. Results can be interpreted as the difference per beneficiary/year compared to reference categories of physician owned, 1-2 physicians. Standard errors are in brackets. $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Exhibit 3: Percent Change in Spending Associated with Physician Practice Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Spending	Hospital Inpatient Spending	Hospital Outpatient Spending	Post-Acute Care Spending	Other Spending	Physician Services Spending
Owned by a hospital	6.4*	-2.1	35.7*	17.1*	1.2	-8.3*
	[1.4]	[4.0]	[7.5]	[7.0]	[3.8]	[2.0]
3-9 physicians	7.7*	6.3*	23.4*	1.5	6.2	3.0
	[1.6]	[2.7]	[3.9]	[3.4]	[3.3]	[2.4]
10-19 physicians	2.0	12.7**	27.3*	-11.8**	-13.4**	-12.0*
	[2.5]	[4.1]	[6.6]	[4.4]	[5.1]	[3.3]
Mean	7,514	2,532	1,017	1,064	1,077	1,823
SD	13,240	7,656	2,461	4,542	1,407	2,511

Source: authors' analysis of NSPO survey data linked to Medicare claims data. Each column presents the percent change for the category compared to the reference. Each column is estimated using a separate regression. All equations adjust for the percentage of primary care physicians in each practice, PCMH quartile, HRR, urbanicity, ZIP code-level income, survey period, 26 comorbidities diagnosed prior to 2008, beneficiary age, race/ethnicity, gender, dual-eligibility, and original reason for entitlement. Results can be interpreted as the difference per beneficiary/year compared to reference categories of physician owned, 1-2 physicians. Standard errors are in brackets. $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$