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ABSTRACT As policy makers and others seek to reduce health care cost growth while improving health care quality, one approach gaining momentum is fee-for-value reimbursement. This payment strategy maintains the traditional fee-for-service arrangement but includes quality and spending incentives. We examined Blue Cross Blue Shield of Michigan's Physician Group Incentive Program, which uses a fee-for-value approach focused on primary care physicians. We analyzed the program's impact on quality and spending from 2008 to 2011 for over three million beneficiaries in over 11,000 physician practices. Participation in the incentive program was associated with approximately 1.1 percent lower total spending for adults (5.1 percent lower for children) and the same or improved performance on eleven of fourteen quality measures over time. Our findings contribute to the growing body of evidence about the potential effectiveness of models that align payment with cost and quality performance, and they demonstrate that it is possible to transform reimbursement within a fee-for-service framework to encourage and incentivize physicians to provide high-quality care, while also reducing costs.

Policy makers, health care providers, payers, and other stakeholders are engaging in a variety of activities to reduce health care cost growth, enhance health care quality, and improve population health. One approach that has gained momentum in recent years is to use fee-for-value approaches that maintain fee-for-service reimbursement but include quality and spending incentives.¹⁻⁴

Many pay-for-performance and fee-for-value initiatives are under way, yet evaluations of these programs typically show limited impact on the quality and cost of health care.⁵⁻⁷ However, recent studies have shown that more comprehensive approaches linking providers and payers show promise.⁸

We report on an independent analysis of the impact of one of the nation's largest fee-for-value initiatives, Blue Cross Blue Shield of Michigan's Physician Group Incentive Program, on health care spending and quality. The size, scope, and structure of the program provide an important opportunity to inform ongoing policy debates about emerging models in the public and private sectors, including the implementation of patient-centered medical homes and accountable care organizations (ACOs).

The Physician Group Incentive Program is a pay-for-performance program that Blue Cross Blue Shield of Michigan developed over the past decade with input from Michigan physicians and physician organizations. In Michigan, physician organizations are umbrella organizations—such

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as independent practice associations, physician-hospital organizations, and large multispecialty group practices—that provide clinical leadership, administrative structure, technical infrastructure, and other resources for physician practices. Most physician organizations in the state operate within a single, defined geographic area. Physician organizations serve as intermediaries between Blue Cross Blue Shield of Michigan and practices participating in the Physician Group Incentive Program.^{9–11}

The program now includes more than 19,000 physicians, representing more than 68 percent of all active Michigan primary care physicians and 49 percent of all active specialists.¹² Over 5,000 physician practices joined and remained in the Physician Group Incentive Program for the period 2008–11 and beyond. Collectively, these physician practices have established 1,422 patient-centered medical homes.

Physicians in the program are eligible for a variety of financial and nonfinancial incentives that target improvement on population-based cost measures and evidence-based processes of care. For example, participating primary care physicians are eligible for up to 20 percent increased reimbursement in their office visit (evaluation and management) fees through the patient-centered medical home components of the program. They may also bill for care coordination and care management services provided by ancillary providers. There is also an opportunity to earn an additional 5 percent in evaluation and management fees for achieving high performance on quality measures. Primary care providers include family practice, pediatric, general practice, adolescent medicine, and internal medicine physicians.

To be eligible for the higher office visit fees, physician practices must implement a substantial proportion of a set of defined patient-centered medical home capabilities and achieve target levels on identified cost and quality metrics. Practice performance is determined by claims analysis, physician self-reports of practice capabilities, and observations at site visits by Blue Cross Blue Shield of Michigan staff members. Furthermore, to be eligible for the maximum increases in fees, practices must be members of physician organizations that achieve higher performance on population-level metrics, compared to other organizations in the program. Exhibit 1 outlines the chief components of the Physician Group Incentive Program.

Blue Cross Blue Shield of Michigan splits the incentive pool between rewarding past performance and supporting future-oriented, capability-building efforts at the levels of physician organizations and practices. For example, the

insurer sponsors quarterly meetings and pilot projects to identify and test new approaches to fostering practice change and improving patient experience with care.

There are multiple ways for practices to work together and learn how, for example, to care for patients with chronic conditions, improve practice throughput using techniques such as Lean, and implement and sustain patient-centered medical home capabilities. The Physician Group Incentive Program has provided a variety of resources and supported capacity building in practices and physician organizations and across Michigan communities.

Previous research has shown robust positive effects on cost and quality resulting from participation in the patient-centered medical home components of the program^{13,14} and has described the active engagement of physician organizations and their member physicians in the program.¹¹ This study is the first evaluation of the Physician Group Incentive Program's overall impact on spending and quality.

Study Data And Methods

STUDY POPULATION The study population included over 3.2 million people under age sixty-five who were enrolled for at least twelve continuous months during the study period (2008–11 for the cost analyses; 2008–10 for the quality analyses) in any Blue Cross Blue Shield of Michigan commercial, preferred provider organization, or indemnity plan. Blue Cross Blue Shield of Michigan members were attributed to a primary care physician for each study year using a retrospective claims-based attribution algorithm that is conceptually similar to the approaches used by the Massachusetts Alternative Quality Contract and by Medicare to assign patients to ACOs.¹⁵ Additional details about the attribution process are available in the online Appendix.¹⁶

For the analyses, we defined four cohorts of physicians. The first cohort consisted of 2,991 practices in the Blue Cross Blue Shield network that never participated in the Physician Group Incentive Program (the comparison or control group for our analyses, referred to as “nonparticipants”). The second cohort contained 5,019 practices that joined the program in or before 2008 and stayed through 2011 (referred to as “early participants”). The third cohort consisted of 2,755 practices that joined between 2009 and 2011 and stayed through 2011 (referred to as “late participants”). The fourth cohort contained 1,106 practices that moved in and out of the program multiple times (these practices were excluded from our analyses).

Physician distribution by specialty and study

EXHIBIT 1

Categories Of Activities And Payment Mechanisms In The Blue Cross Blue Shield Of Michigan Physician Group Incentive Program, 2010

Category	Description	Examples	Payments made to:	Payment type
Initiatives	Over 25 initiatives to improve processes and outcomes of care, organized in 5 areas (improvement capacity, conditions, services, core clinical processes, and information technology)	Process improvement teams; generic drug use; patient-centered medical home capacity (extended access, coordination of care, patient registry, patient web portal)	Physician organization	Incentive payments made twice a year
Patient-centered medical home designation program	Annual designation based on reporting on domains of function	12 domains of function measured and reported every six months, plus site visits to verify reported capabilities	Physician	10% increase in evaluation and management office visit fees; potential for additional 10% to designated practices whose physician organizations are benchmark performers for total cost
Support for care management	Care management and self-management provided by ancillary providers	Care coordination provided by navigators, chronic care teams	Physician	Reimburse for care coordination and care management services provided by ancillary providers
Projects	Specific projects aimed at supporting practice transformation	Health Detroit (diabetes self-management), several learning collaboratives, depression management pilot, and others	Physician organization	Incentive payments for the work of participating physician organizations

SOURCE Authors' analysis of data from Blue Cross Blue Shield of Michigan.

cohort is provided in Appendix Exhibit 1. Descriptive statistics for the study population are provided in Appendix Exhibits 2A and 2B.¹⁶

STUDY DESIGN We used an intervention-control, pre-intervention–post-intervention (or difference-in-differences) approach. The pre-intervention period was 2008. For the spending analyses, the post-intervention period was 2009–11. For the quality analyses, data limitations required a two-year post-intervention period (2009–10).

The Physician Group Incentive Program existed before 2008, but the initiatives described and evaluated here were not fully implemented until the beginning of 2009. For example, 2009 was the first year that the program's patient-centered medical home practices were designated as such by Blue Cross Blue Shield of Michigan.

The intervention group included all enrollees attributed to the program's physicians. The control group consisted of enrollees attributed to physicians not participating in the program.

DATA Data were obtained from several Blue Cross Blue Shield of Michigan databases and included membership information, utilization, and spending. More information on data used in this analysis can be found in the Appendix.¹⁶

INDEPENDENT VARIABLES In our analytical models, the primary explanatory variables were the attributed physician's Physician Group Incentive Program status; indicators for each

post-intervention year; the interaction between the pre-intervention and post-intervention years; and a variable indicating when the practice first became part of the program, or the "join year." The interaction term produced the difference-in-differences policy effect of the program. The join-year indicator allowed us to test whether the effect of the program on outcomes was modified in the first year of participation.

We also adjusted for patients' health status using a proprietary risk assessment tool called Episode Risk Groups, version 6.5, which predicts individuals' health care costs based on their episodes of care, demographic characteristics, medical encounter and utilization data, and pharmaceutical data.¹⁷ More details about risk adjustment are found in the Appendix.¹⁶

DEPENDENT VARIABLES We analyzed total annual spending and annual spending by category (total expenditures, inpatient facility expenditures, outpatient facility expenditures, and professional service expenditures combined across all settings), averaged per member per enrolled month during each calendar year. These per member per month spending variables combined Blue Cross Blue Shield of Michigan's fee-for-service payments and enrollees' cost sharing, adjusted to 2011 dollars using the Medical Consumer Price Index.

These measures included the fee increases described above but not incentives that physician

organizations paid directly to providers. We excluded drug spending from our analyses because not all enrollees had drug coverage through the insurer. Outliers at the 99 percent level were set equal to the next-highest value.

We examined performance on fourteen evidence-based care measures for 2008–10 (these data were not available for 2011). Each measure followed standard Healthcare Effectiveness Data and Information Set definitions regarding eligibility for each type of care (denominator) and experience in receiving care (numerator).

Our analyses explored two preventive care measures for adults, five preventive care measures for adolescents and children, and seven measures of evidence-based care for patients with diabetes. Each variable was based on whether the criteria for the measure were met for a member eligible for it in a given year. These measures are primary care-oriented, under the control of providers in the Physician Group Incentive Program, and routinely used for evaluating ACOs.¹⁸ Full descriptions of the measures are provided in Appendix Exhibits 3A and 3B.¹⁶

ANALYSIS STRATEGY All analyses were conducted at the enrollee-year level, with random effects at the patient level. For the spending models, we used a one-part model to estimate average per member per month spending. Our spending models were not logarithmically transformed because the risk score was designed to predict dollar spending, not log dollar spending. The conclusions were robust to alternative specifications (such as log cost and log risk score). For inpatient spending, we applied a two-part model to analyze the probability of any inpatient spending and then the amount of inpatient spending for those with any such spending.

For the quality models, we used linear probability models, which modeled enrollee-level experience indicators given eligibility for a particular screening or well care visit. For the cost dependent variables, separate analyses were conducted for adults (ages 18–64) and children (ages 0–17). Additional model specification information is provided in the Appendix.¹⁶

LIMITATIONS This analysis has several limitations. First, we did not separately examine some relevant performance indicators, such as spending for ambulatory care-sensitive admissions and nonurgent use of the emergency department. Nor did we account for the initial or ongoing costs associated with administering the Physician Group Incentive Program.

Second, we did not entirely account for initiatives, reforms, or interventions in the program before 2008 that might have differentially affected practices that participated in the program and those that did not.

Third, our analyses did not adjust for geography.^{19,20} However, most physician organizations operate within a single community, and therefore their inclusion may address some of the within-state geographic variation.¹³

Fourth, as in any pay-for-performance program, improvement in the measured and rewarded domains could have come at the expense of performance in unmeasured and unrewarded domains. Our study was able to include only process, and not outcome, measures in our assessment of performance. However, the Physician Group Incentive Program's measures are evidence based and were selected with providers' input regarding their importance.

Fifth, our analyses accounted for multiple observations per patient using patient random effects but did not account for hierarchical provider structures in the data because of the complicated and asymmetrical nature of those relationships. For example, members of the control group of nonparticipating physicians are not in a physician organization, while participating physicians could be in a variety of organization models. Therefore, it is possible that the estimated standard errors were biased downward.

Sixth, there may be unobserved differences between participating and nonparticipating physicians and their patient populations. Both groups of patient populations had similar observed characteristics. However, it is unknown if physician characteristics that might influence cost and quality improvements were evenly distributed across the intervention and control groups. For example, general practice physicians were more prevalent in the control group than in the intervention group.

If such differences affected the level of performance at a point in time, but not the rate of change, the difference-in-differences approach would account for any differences across groups that were fixed over time. But if the performance trajectories over time would have differed between the two, had the Physician Group Incentive Program not existed, selection bias would remain a concern.

Seventh, the experience in Michigan might not be generalizable to other states. In particular, Blue Cross Blue Shield of Michigan has a larger share of its state's private insurance market than is typical for most states' largest insurers, which likely facilitated the rollout of this large-scale program. However, health plans in Alabama, Alaska, and Delaware have a comparably large presence, and the largest health plans' market share exceeds 50 percent in twenty-one other states.²¹

Additionally, physician organizations exist throughout the United States.²² Nonetheless,

they do not have the same history, and many of them do not have the same number of years of managed care experience, as those in Michigan. The fact that over five thousand physician practices have participated in the Physician Group Incentive Program since 2008 suggests that our results may apply to other areas, particularly those that have more limited programs and less diverse provider types.

Study Results

DESCRIPTIVE STATISTICS We found that the patient panels of Physician Group Incentive Program participants and nonparticipants were similar in age, sex, risk score, and spending. Full descriptive information is provided in Appendix Exhibits 2A and 2B.¹⁶ In the overall study population, average per member per month spending was \$329 for adults and \$109 for children. Performance on the quality metrics ranged from a low of 36 percent (for eligible adolescents receiving immunizations) to a high of 81 percent (for eligible people with diabetes receiving the appropriate hemoglobin A1c screenings). Descriptive information on these measures is provided in Appendix Exhibits 4A and 4B.¹⁶

SPENDING We first examined total spending for adults between 2008 (before the Physician Group Incentive Program was implemented) and in the period 2009–11 (after implementation), controlling for sex, risk, year (post-intervention year), and the first year in the program. Our model's estimates show that participating practices decreased their total per member per month spending by \$4.00 more than control practices did (a 1.1 percent difference). However, practice per member per month spending increased by \$5.95 during the practice's first year in the program, relative to practices that had participated before that year. Essentially, this implies that the \$4 savings experienced by participating practices was offset during the first year of participation and that practices did not accrue net savings until the second year.

We estimated expected spending by Physician Group Incentive Program status and pre- and post-intervention, standardizing for case-mix (Exhibit 2). After adjusting for patient risk score and the other variables described above, we found that participating in the program had a significant and negative relationship with total spending, outpatient spending, and professional spending for adults and children. From the pre- to the post-intervention period, total per member per month spending grew \$4.00 less for adults and \$5.16 less for children in practices that had joined the program in or before 2008, compared to nonparticipating practices.

When we included the practices that joined the program in 2009–11 and used a weighted average difference-in-differences, we found that spending for participants was \$3.53 less for adults and \$5.44 less for children, compared to spending for nonparticipants. The analyses by type of spending indicated that inpatient facility spending did not differ significantly by participation status for adults or children.

QUALITY We found that, compared to the performance of nonparticipating practices, the practices that joined the Physician Group Incentive Program in 2008 or before achieved the same or better performance over time on eleven of fourteen quality measures (Exhibit 3).

Specifically, we observed a significant improvement for participating practices relative to nonparticipating ones for three of the seven quality measures for preventive care (adolescent well care, adolescent immunization, and well-child visits at ages 3–6). The percentages of eligible patients who received breast cancer screenings and child immunizations declined over time for both groups. However, the amount of decline was less in participating practices than in nonparticipating ones.

Furthermore, we observed a significant improvement for participating practices relative to nonparticipating ones for four of the seven quality measures for diabetes care (screenings for HbA1c, low-density lipoprotein cholesterol, and nephropathy; and delivery of angiotensin-converting enzyme [ACE] inhibitors to patients with hypertension). The percentages of eligible patients receiving lipid-lowering drugs and patients with nephropathy receiving ACE inhibitors declined over time, but the amount of decline was less among participating practices than among nonparticipating ones.

There was no significant difference between participating and nonparticipating practices for three of the fourteen quality measures (cervical cancer screening, well-child visits at 0–15 months, and delivery of ACE inhibitors to eligible patients with congestive heart failure). We thus conclude that the overall effect of the program on physician practices' quality performance was positive.

Discussion

Health systems, states, insurers, and others are experimenting with different ways to improve health care value. This evaluation demonstrates that it is possible to drive improvement by strengthening and engaging primary care physicians. Several thousand physician practices are engaged in the Physician Group Incentive Program in Michigan and have created 1,422 pa-

EXHIBIT 2

Estimated Per Member Per Month Spending By Providers For Adult And Pediatric Study Populations, By Blue Cross Blue Shield Of Michigan Physician Group Incentive Program (PGIP) Participation

Spending	Participants				Nonparticipants		Difference vs. nonparticipants ^a			
	Pre-intervention	Post-intervention			Pre-intervention	Post-intervention	Early	Late	All ^b	% difference, all ^b
	All	Early	Late	All ^b						
ADULT PATIENTS										
Total	\$325.72	\$ 329.00	\$ 331.35	\$ 329.47	\$329.84	\$ 337.12	-\$4.00	-\$1.65	-\$ 3.53	-1.1****
Inpatient	806.60	1,163.41	1,156.92	1,162.00	907.32	1,203.31	6.82	0.33	5.42	0.5
Outpatient	106.68	100.76	99.75	100.56	106.68	102.40	-1.65	-2.66	-1.85	-1.8****
Professional	144.11	141.75	142.27	141.85	139.69	140.42	-3.10	-2.58	-3.00	-2.1****
PEDIATRIC PATIENTS										
Total	119.17	107.76	105.79	107.49	105.85	99.61	-5.16	-7.13	-5.44	-5.1****
Inpatient	577.30	566.21	532.79	561.58	599.89	551.62	37.18	3.75	32.54	5.8
Outpatient	27.90	27.90	29.28	28.09	27.63	30.42	-2.78	-1.40	-2.59	-9.2****
Professional	68.71	65.05	64.24	64.93	58.30	57.09	-2.46	-3.26	-2.57	-4.0****

SOURCE Authors' analysis of data from Blue Cross Blue Shield of Michigan. **NOTES** Sample sizes were as follows. Adult patients: for total, outpatient, and professional spending, $n = 5,101,946$; for inpatient spending, $n = 313,458$. Pediatric patients: for total, outpatient, and professional spending, $n = 1,746,584$; for inpatient spending, $n = 55,681$. Early participants joined the program in or before 2008 ($n = 5,019$ practices); late participants joined in 2009–11 ($n = 2,755$ practices). Participants in both groups stayed in the program through 2011. Pre-intervention is 2008; post-intervention is 2009–11. There were 2,991 practices in the nonparticipant group. ^aResults from difference-in-differences analysis (difference in the per member per month spending for PGIP participants post- and pre-intervention, less the difference in the per member per month spending for nonparticipants post- and pre-intervention), controlled for model effects. ^bWeighted average based on enrollee population in PGIP cohort. Model effects are described in the text. **** $p < 0.001$

tient-centered medical homes that are showing reduced spending and improved quality of care.

A key measure of the program's success is the consistent pattern of reduced spending. Savings over our four-year study period are especially remarkable in light of increased office visit payments to physicians who performed well in the program and the inclusion of practices that were in their first year of participation in the program. Administrators of performance improvement programs should anticipate initial spending increases for participating practices. However, the continued impact on benefit payouts as the program grew and participating practices matured as patient-centered medical homes¹³ supports the expectation that these investments will yield a positive return.

Our findings are in the same range as those of other evaluations of emerging value-based programs, such as the Alternative Quality Contract.^{8,15,23} Furthermore, in contrast to many other programs, the Physician Group Incentive Program uses a variable value-based reimbursement approach (increased office visit fees for high performers). This means that the spending results reported here are net of program costs.

This analysis strongly suggests that any comprehensive approach to improving population health may incur higher spending in the first year. The increase is likely due to primary care

physicians' additional work of getting all patients in for initial screenings and physicians' efforts to help patients begin to manage their chronic diseases. Over time, these efforts may pay off in reduced outpatient facility fees and professional charges.

In this study of employed, commercially insured people younger than age sixty-five, however, we found no significant reduction in hospital spending. Such changes may take longer to emerge, particularly in a population in this age group. Organizations that design and implement similar programs may want to keep these findings in mind, particularly as they relate to performance measurement, the sharing of financial rewards, and expectations regarding the time it may take for programs to achieve desired goals.

Finally, practices in the Physician Group Incentive Program improved their performance on a variety of quality measures. Not only did the participating practices outperform or match the performance of nonparticipating practices across multiple measures of preventive care and chronic condition management, but participants also typically experienced improved performance over time, compared to nonparticipants. A number of quality metrics were excluded from the evaluation. Nonetheless, the included metrics have particular relevance to

EXHIBIT 3

Estimated Change In The Average Percentage Of Patients Receiving Evidence-Based Care, By Practices' Participation In The Blue Cross Blue Shield Of Michigan Physician Group Incentive Program

Measure of evidence-based care	Estimated average percent receiving care				Early participants vs. nonparticipants ^a	
	Early participants		Nonparticipants		Percentage-point difference	Percent difference
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention		
ADULT PREVENTION						
Breast cancer screening	74.3%	73.8%	70.7%	69.5%	0.7	1.0 ^{****}
Cervical cancer screening	76.2	78.1	73.0	74.9	0.0	0.0
ADOLESCENT AND PEDIATRIC PREVENTION						
Adolescent well care	47.9	51.8	32.4	26.9	9.4	18.2 ^{****}
Adolescent immunization	26.7	39.6	21.9	25.4	9.5	23.9 ^{****}
Child immunization	76.4	70.6	72.9	65.1	2.0	2.8 ^{****}
Well child visit, 0–15 months	80.1	81.5	56.5	57.9	0.0	0.0
Well child visit, 3–6 years	67.2	70.8	48.6	44.0	8.2	11.6 ^{****}
CARE FOR PATIENTS WITH DIABETES						
HbA1c screening	79.0	80.8	76.6	75.8	2.6	3.2 ^{****}
LDL screening	78.8	78.8	76.1	74.4	1.7	2.1 ^{****}
Nephropathy screening	79.0	79.8	76.0	75.0	1.8	2.2 ^{****}
Lipid-lowering drug	72.0	67.2	68.2	62.3	1.1	1.7 ^{****}
ACE INHIBITORS DELIVERED TO PATIENTS WITH:						
CHF	81.7	78.1	83.7	77.4	2.7	3.3
Nephropathy	82.3	79.3	82.4	75.7	3.6	4.6 ^{****}
Hypertension	80.2	80.5	78.8	77.7	1.4	1.7 ^{****}

SOURCE Authors' analysis of data from Blue Cross Blue Shield of Michigan. **NOTES** Early participants joined the program when it began and stayed in it through 2010. Pre-intervention is 2008; post-intervention is 2009–10. Significance measures the effect of participating in the program. LDL is low-density lipoprotein cholesterol. ACE is angiotensin-converting enzyme. CHF is congestive heart failure. ^aResults from difference-in-differences analysis, controlling for model effects (see the text). ^{****}p<0.001

population health improvement and to people who are chronically ill with diabetes.

Future research will include analyses of subsets of patients within the Physician Group Incentive Program population, including those with the highest costs and most complex health care needs. It may also be important to explore whether various physician organization structures (such as physician-hospital organizations versus large group practices) achieve different savings and quality performance.

This evaluation describes the payoff of sustained efforts by Blue Cross Blue Shield of Michigan to engage doctors in continuous, iterative payment and health system transformation—that is, staying focused on and aligning incentives toward achieving an overarching, common vision of improved primary care. In short, we have demonstrated that the Physician Group Incentive Program's efforts with primary care physicians may be an important lesson for others. As of 2012, specialists have become more actively involved in the program's physician organizations and in the fee-for-value aspect of Blue Cross Blue Shield's payment transformation strategy, as they work toward creating medical home communities and community-orient-

ed organized systems of care.

Many emerging ACOs include physician owners and physician leaders. However, most remain largely driven and controlled by hospitals and health care systems.²⁴ During and since the period of this evaluation, the Physician Group Incentive Program began to motivate communitywide performance improvement through the active engagement of primary care physicians and specialists. In light of the sometimes contentious relationship between hospitals and physicians,²⁵ we have highlighted an alternative strategy for improving health care value. Future studies will further explore how alignment among multiple hospital- and physician-focused value reforms within the same community could achieve broader impact.

Conclusion

This study suggests that a statewide program that was developed collaboratively by a major health plan and physicians and that emphasized primary care and population health achieved modest but significant spending reductions and improvement on quality measures over time. ■

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