

Physicians Respond to Pay-for-Performance Incentives: Larger Incentives Yield Greater Participation

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Programs that create incentives and rewards for physicians are rapidly expanding in scope and reach.¹ There were 160 pay-for-performance (P4P) programs active in November 2007 (up from 39 in November 2003).² Of these 160 programs, physician programs outnumbered hospital programs 4 to 1. Despite such growth, there are still many unanswered questions about the effects of P4P, and in most markets around the United States, P4P incentives represent a very small percentage of physician income. A recent report shows that the average physician incentive was 2% or less and that the incentives offered did not seem to impact the quality of care delivered.³ Another report suggests that physicians participating in Bridges to Excellence (BTE) programs provided higher quality care at lower cost than nonparticipating physicians.⁴ However, neither of these studies examined the relationship between the size of the incentives offered to a physician or a practice and their active participation in the program. Yet for health plans or employers to optimize their investments in P4P programs, they must find a way to get physicians to actively participate and, therefore, to respond to the incentives offered.

Bridges to Excellence is a not-for-profit multi-stakeholder organization that has been implementing incentives and rewards programs for more than 5 years in different geographic sites across the United States.⁵ A key feature of BTE program implementations is the active collaboration of employers and health plans wherein all agree to focus on 1 or more of the programs for at least 3 years in order to encourage physicians to meet or exceed the programs' performance criteria.

Each program has a recommended fixed bonus reward per eligible patient cared for by that physician. The bonus is paid to the physician or practice once the physician or practice has become recognized. Bridges to Excellence recognition is awarded after the physician's or practice's performance has been assessed by an independent performance assessment organization such as the National Committee for Quality Assurance. The BTE measurement criteria apply to all patients treated by a physician, not only those patients covered by a purchaser offering incentives. Therefore, the benefits of any quality improvements accrue to all of a physician's patients, not just to patients covered by a BTE sponsor.⁴

Bridges to Excellence has 2 different types of programs. One is a prac-

Objective: To determine the extent to which the size of the available financial incentive influences a physician's decision to participate in a pay-for-performance (P4P) program.

Study Design: Statistical analysis of historical data from Bridges to Excellence (BTE).

Methods: Setting available financial incentives as the independent variable and physician participation rates as the dependent variable, we applied regression analysis to BTE's data from selected sites to explore the relationship of fixed bonus-based incentive programs to physician participation rates in those programs.

Results: The amount of incentives available to physicians strongly affected their rate of participation. Participation rates varied with the type of program, and overall physician participation rates might grow as more purchasers/payers within a community offer similar incentives.

Conclusion: Our analysis suggests that all stakeholders—health plans, physicians, and patients—would benefit from health plans collaborating on their P4P efforts to maximize physician participation.

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In this issue

Take-Away Points / p307

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■ **Table.** Distribution of Physicians and Reward Potential by Bridges to Excellence Implementation Site

Program	No. of Physicians	No. of Patients per Physician			Reward Potential per Physician, \$		
		Average	Minimum	Maximum	Average	Minimum	Maximum
Diabetes Care Link							
Louisville, KY	582	6	1	91	615	100	9100
Boston, MA	1924	2	1	67	174	80	5360
Albany, NY	607	4	1	61	321	80	4880
Cincinnati, OH	1097	7	1	118	657	100	11,800
Physician Office Link							
Boston, MA	7716	10	0	498	301	0	14,940
Albany, NY	1707	23	0	295	687	0	8850
	No. of Groups	No. of Patients per Group			Reward Potential per Group		
Boston, MA	3521	22	0	1311	880	0	52,440
Albany, NY	917	45	0	1343	1784	0	53,720

tice-based program called Physician Office Link (POL), which assesses the “systemness” of a practice, focusing mainly on the ability of the practice to actively identify and manage patients with chronic conditions and to adopt systems that reduce medical errors. The second type of BTE program focuses on an individual physician’s results in managing the care of patients with certain chronic conditions: diabetes (the Diabetes Care Link [DCL]), cardiac disease (the Cardiac Care Link), low back pain (the Spine Care Link), and depression (the Depression Management Care Link). The 2 categories of BTE programs require different levels and types of effort. The POL program requires significant investment by the practice as a whole (similar to what is required in today’s Medical Home pilots⁶), while the chronic condition–specific programs require a focused effort by individual physicians regarding 1 condition.

METHODS

To assess physician response rates to BTE rewards, we used BTE’s Master Physician Lists from each of its 4 initial pilot sites—Louisville, Kentucky; Cincinnati, Ohio; Albany, New York; and Boston, Massachusetts. For each physician in those markets, the Master Physician Lists provide the number of rewards-eligible patients treated by the physician and indicate whether the physician achieved BTE recognition. The attribution of patients to physicians was done using a methodology created by BTE,⁷ and the same method was applied to all BTE programs across all sites (see the **Table** for a summary). For example, the Master Physician List for Louisville contained 582 physicians, each with a patient count ranging from 1 to 91.

Because BTE’s programs and the pilot implementations assigned a specific bonus for each patient attributed to a phy-

sician, the Master Physician List also provides a simple and effective way to calculate the bonus potential for each physician. For example, if the bonus per patient was \$80 and a physician treated 15 rewards-eligible patients, then that physician’s total reward potential was \$1200. According to BTE’s program evaluation submitted to the Robert Wood Johnson Foundation,⁸ each physician received several communications from BTE during the pilot implementations about the specific amount of the bonus for which they were eligible, the program associated with that bonus, and the specific requirements needed to achieve recognition and receive the bonus. In our analysis, we examined the total bonus potential for all physicians for the DCL program (which was implemented in all 4 areas) and for the POL program (which was implemented only in Albany and Boston). Because POL is a practice-based assessment, we grouped physicians by practice based on their address. This grouping resulted in a list of 917 and 3521 practices in Albany and Boston, respectively, with bonus potentials ranging from \$0 to about \$50,000. The overall numbers of physicians, practices, patients, and bonuses for the 4 markets are listed in the **Table**.

Using these Master Physician Lists, we calculated for each reward level the percentage of physicians and practices that achieved recognition in the DCL and POL programs through the end of 2005, which represented the second full year of program implementation. For example, of all the physicians eligible for about \$2500 in DCL rewards, 17.2% achieved BTE recognition. Based on these data, we created regression models for the participation rate of any physician or practice in the DCL or POL programs. We conducted 3 separate regression analyses: 1 for DCL and 2 for POL. In 1 of the POL analyses, potential rewards were aggregated at the practice level; the

other analysis used the average reward per physician (ie, total practice reward potential divided by number of physicians in the practice). In all 3 analyses, reward potential is the independent variable and the percentage of physicians at that reward potential who achieved BTE recognition is the dependent variable. For example, if there were 100 physicians with \$1000 in reward potential, and 8 of these physicians achieved BTE recognition, then the independent variable is \$1000 and the dependent variable is 8%. By looking at these values over a range of data, we could estimate how the participation rate varied as a function of the reward potential. Because the physician reward and participation rate variables had a skewed distribution, in our regression analysis we applied a log transformation to both variables to improve the normality of the data.

We also performed an analysis of covariance (ANCOVA) test to determine whether the regression relationships between the DCL and POL data were statistically different, not merely the product of random variation in the data.

RESULTS

Patients and Reward Potential Are Not Evenly Distributed Among Physicians

The distribution of patients (and reward dollars) across physicians is asymmetric, following a Pareto-like distribution, as illustrated in **Figure 1**. The scale on the y-axis is dependent on the total size of the market, and the area under the curve represents the total number of local physicians. The scale on the x-axis is dependent on the number of purchasers/payers engaged in the BTE program and the size of rewards offered. In **Figure 1**, the distribution is highest at the left margin, meaning that most of the physicians had very few rewards-eligible patients, and, therefore, very limited reward potential. However, a few physicians—those toward the right tail of the distribution—had a large number of rewards-eligible patients

Take-Away Points

Physician response rates to pay-for-performance (P4P) programs follow a predictable pattern: higher rewards lead to greater participation.

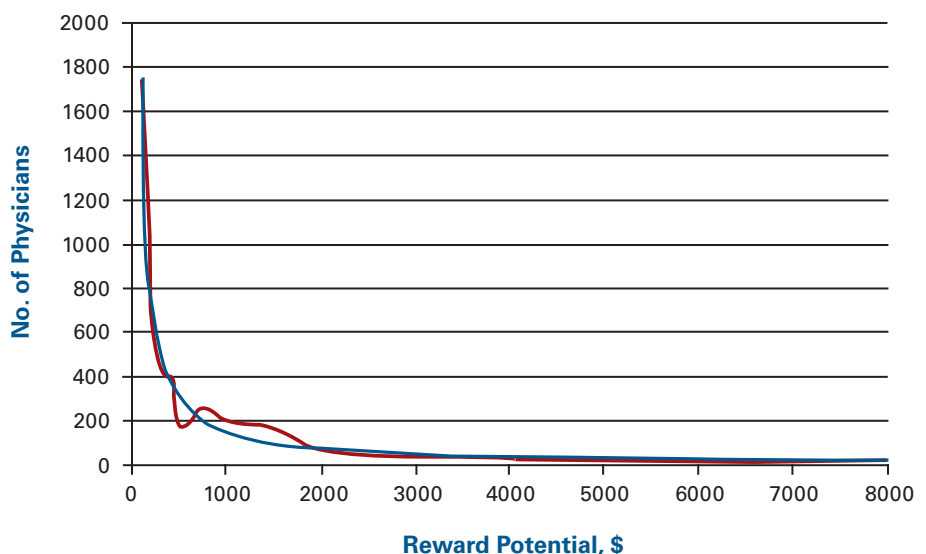
- Understanding the relationship between rewards and physician participation can help health plans and purchasers design more effective incentive programs.
- Health plans with moderate to low market shares will be better off collaborating on a P4P effort.
- Physician participation seems to vary depending on the nature of the program and the incentives offered.

and received correspondingly greater rewards for achieving BTE recognition.

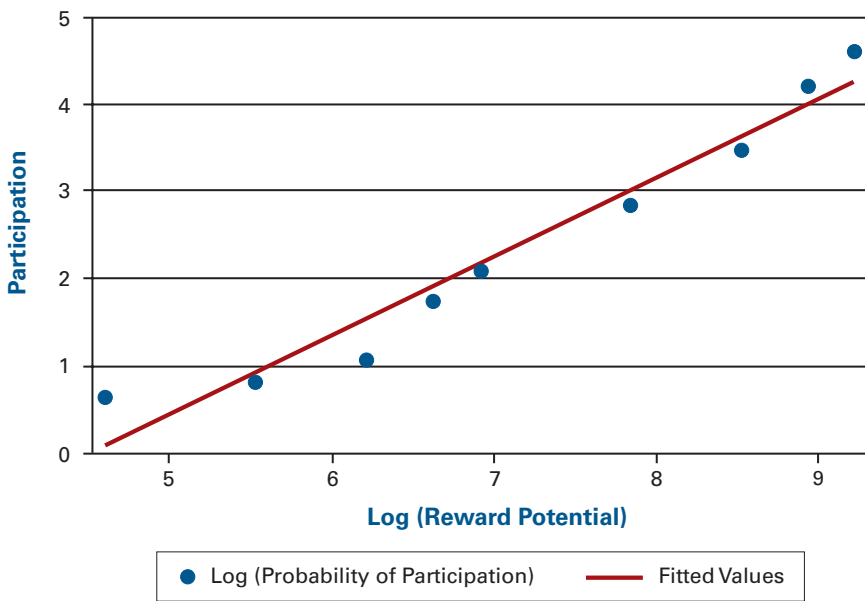
The causes of the unevenness of the patient allocation cannot be precisely determined from the data. However, one possible explanation is that the patients themselves are not evenly distributed within a market; the rewards-eligible patients tend to cluster near the work sites of employers that sponsor the program. Simple random variation is another possible explanation. Regardless of the cause, the asymmetric distribution of patients has important implications. If the distribution of reward potential were symmetric (eg, a normal distribution), then we would expect most physicians to cluster near the average. However, the asymmetric distribution we observed suggests that the average reward potential for physicians in a market is not very meaningful, because most physicians will have reward potential well above or below the average.

Note that the data illustrated in **Figure 1** are based on the experience in early-stage BTE pilots, in which purchasers offering the incentives covered a small percentage of all

■ **Figure 1.** Frequency Distribution of Physician Reward Potential—Diabetes Care Link



■ **Figure 2.** Response to Diabetes Care Link Rewards



patients. If all the health plans and employers in the pilot communities had participated in BTE's programs, then each individual physician would have had roughly equal reward potential (assuming the physicians each treat about the same number of patients). As overall payer/purchaser participation in an incentive program increases in a community, the distribution of reward potential will change. This influences physician adoption rates because physician participation is highly correlated with reward levels.

Physician Participation Varies by Reward Potential and Program

For the DCL program, we performed a regression of the log-transformed physician participation rate on log-transformed individual physician reward potential. The results indicate a linear relationship with an adjusted R^2 value of 0.95. The coefficient for reward potential was significant ($P < .001$), and the estimated equation is as follows: *Probability of participation* = $-4.07 + 0.902(\text{reward potential})$. **Figure 2** illustrates this relationship.

For the POL program, we first performed a regression using total practice reward potential as the independent variable. We regressed the log-transformed physician participation rate on log-transformed practice reward potential. The results indicated that this relationship also was linear with an adjusted R^2 value of 0.95. The coefficient for reward potential was significant ($P < .001$), and the estimated equation is as follows: *Probability of participation* = $-3.96 + 0.755(\text{reward potential})$.

We then performed another regression using the average per physician reward potential as the independent variable. We regressed the log-transformed physician participation rate on log-transformed per physician average reward potential. The results indicated that this relationship was linear with an adjusted R^2 value of 0.89. The coefficient for reward potential was significant ($P < .001$), and the estimated equation is as follows: *Probability of participation* = $-4.20 + 0.835(\text{reward potential})$. **Figure 3** illustrates this relationship.

Note that for the POL program, the R^2 value was higher in the practice reward model. This suggests that the decision to participate in POL was likely made at the practice level, a reasonable assumption given that

POL requires modification of practice systems, not simply individual physician action. However, for comparison purposes with DCL, we used the individual physician reward model.

The regression analyses show that, at any given reward potential, physicians were less likely to achieve POL recognition than DCL recognition (see **Figure 4**). We conducted an ANCOVA analysis to determine whether this difference was statistically significant. We tested the null hypothesis that the slopes for physician participation as a function of rewards for DCL and POL programs would be equal. The result showed there was no evidence to reject the null hypothesis of equal slopes (F statistic for program type * group [DCL vs POL] was 0.28; $P = .6037$). Data from additional BTE implementation regions where there are higher reward potentials might help shed further light on this issue, as the gap in participation rate per reward level increases as the line gets further from the intercept.

DISCUSSION

Our analysis indicates that there is no single "cut-off" reward amount above which all physicians participate in a program and below which they all decline. Instead, at any reward level, there is some probability that physicians will seek recognition, and that probability increases as the potential rewards increase. Therefore, the higher the aggregate amount of incentives offered to a physician, the greater the likelihood of participating.

The BTE Master Physician Lists indicate that the participation of physicians is largely a function of the size of the in-

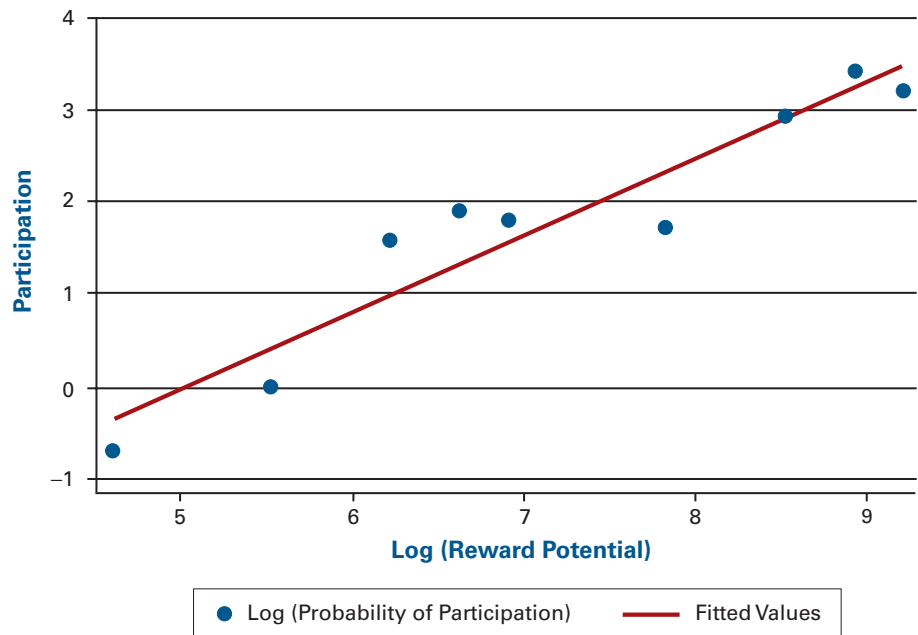
Pay-for-Performance Incentives

centive/bonus for which they are eligible. In our regression analyses for both the DCL and POL programs (in the practice-reward model), we derived R^2 values of 0.95 with very high confidence levels, demonstrating the importance of financial incentives. In fact, these findings confirm a central hypothesis of BTE's programs: financial incentives do have an impact on physician decision making and on the willingness of physicians to report quality data. Importantly, our analysis also suggests that the vast majority of physicians in the country will respond to the incentives offered by the HITECH portion of the American Recovery and Reinvestment Act, and adopt electronic medical records.

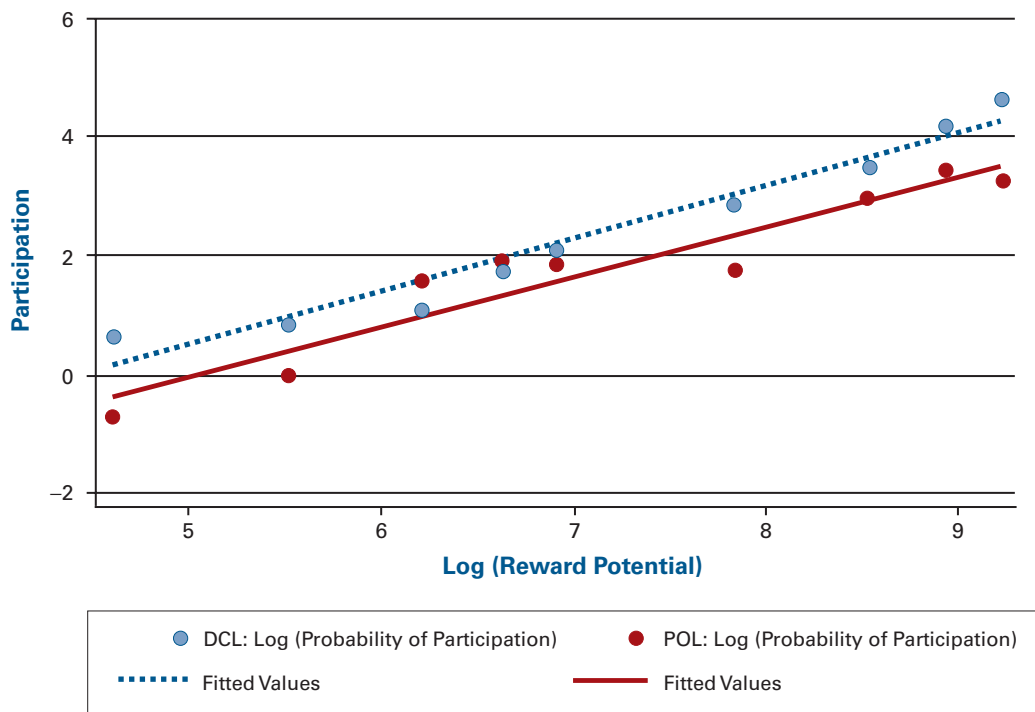
We also observed different physician response rates for similar reward amounts across the different BTE programs.

Physicians seemed more willing to seek the DCL recognition at a given reward amount than they were to seek the POL. Although these observed differences were not large enough to

■ **Figure 3.** Response to Physician Office Link Rewards (per Physician Average Reward Potential)



■ **Figure 4.** Response to Bridges to Excellence Rewards (per Physician Average Reward Potential)



DCL indicates Diabetes Care Link; POL, Physician Office Link.

be statistically conclusive and further research in this area is needed, they do suggest that physicians likely go through their own “return on investment” analyses when considering their participation in a P4P program. Rewards that are sufficient for participation in one type of program may not be adequate for another. Pay-for-performance program architects should pilot-test different incentive amounts to determine which might best motivate the change they are seeking to stimulate.

Our analysis also seems to dispel the hypothesis that prior readiness to meet the quality standards is the primary cause for physician participation in a P4P program. If that were true, we would expect to observe roughly equal participation rates at each reward level. Instead, we saw that the participation rate went up as a linear function of the reward level. Indeed, the strong R^2 values indicate that most of the variation in physician participation decisions can be explained by the amount of the available financial reward.

Finally, our analysis has implications for health plans trying to design effective P4P programs. According to a recent report,⁴ the incremental benefit when a physician earns BTE recognition can be estimated to be roughly \$250 per patient for the health plan. (The study identified a per patient cost advantage of \$300 per year for POL-recognized physicians. Because BTE’s recommended per patient per year bonus for POL is \$50, the incremental benefit would be \$300 – \$50 = \$250.) However, to garner the greatest potential incremental benefit, the health plan must get as many physicians to participate as possible. Given the Pareto-like distribution of patients observed in this study (Figure 1), any individual health plan or employer acting alone will have a difficult time maximizing participation, because most of their physicians will be toward the left side of the distribution and will, therefore, have relatively low reward potential.

By aligning their P4P efforts, health plans may, in effect, alter the distribution of reward potential so that more physicians have high reward potentials, which will increase their likely rate of participation. A health plan’s self-interest might be best served by collaborating with others around aligned incentive programs if the sum of the incentives collaboratively offered increases the overall participation rate of physicians. The temptation for any plan to “free ride” on the efforts of

another, or to offer P4P programs that are very different from other programs in the market, would be reduced because the plan would never garner as much benefit as it would if it collaborated. Although health plans’ decisions about P4P programs merit further study, we believe that our analysis suggests that all stakeholders—health plans, physicians, and patients—would be better off if health plans aligned their P4P efforts to maximize physician engagement.

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