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Provider and Patient Directed Financial Incentives to Improve Care and Outcomes for Patients with Diabetes

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Abstract

Incentive programs directed at both providers and patients have become increasingly widespread. Pay-for-performance (P4P) where providers receive financial incentives to carry out specific care or improve clinical outcomes has been widely implemented. The existing literature indicates they probably spur initial gains which then level off or partially revert if incentives are withdrawn. The literature also indicates that process measures are easier to influence through P4P programs but that intermediate outcomes such as glucose, blood pressure, and cholesterol control are harder to influence, and the long term impact of P4P programs on health is largely unknown. Programs directed at patients show greater promise as a means to influence patient behavior and intermediate outcomes such as weight loss; however, the evidence for long term effects are lacking. In combination, both patient and provider incentives are potentially powerful tools but whether they are cost-effective has yet to be determined.

Keywords

Diabetes Mellitus; Reimbursement; Incentives; Pay for Performance; Economics; Behavioral

Introduction

There is a growing interest in the use of financial incentives to improve the delivery of care and health outcomes. Financial incentives are generally broken down into two large categories – incentives directed at providers (health plans, practice groups, and individual providers) and incentives directed at patients or employees. Incentives can be designed as carrots (a reward for a job well done) or as sticks (financial loss for not achieving a goal). The 2010 Patient Protection and Affordable Care Act (ACA) creates opportunities for both provider and patient incentive programs, and growth in the number and types of programs is

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expected. In this paper we provide an overview of the existing research and discuss future directions relating to the use of financial incentives to improve outcomes for patients with diabetes.

The rationale for incentives grows out of the field of behavioral economics, which incorporates psychological theory to understand why individuals frequently act irrationally in relationship to what might be predicted from conventional economic theory which predicts individuals will make optimal decisions based on information, resources and preferences [1]. Some key concepts supported by research are listed in Table 1. With present-bias future benefits are greatly discounted in favor of immediate rewards. For example, non-adherence to medications favors an immediate pleasure (not taking a pill) for a future benefit, well controlled diabetes and fewer complications from the disease. Financial incentives for both providers and patients create immediate rewards for actions that have no immediate benefit. In status quo or default bias individuals follow the path of least resistance. While patients might want to change a health behavior it takes work and is easier to continue with an unhealthy habit. Setting defaults to make a healthy behavior the path of least resistance can help circumnavigate default bias. For example acceptance of being an organ donor is much higher as an opt-out rather than an opt-in program [2]. Loss aversion refers to the tendency to strongly prefer avoiding loss to acquiring gains [3]. That is why putting one's own funds at risk can be highly motivating. While incentives come in many different forms (including non-financial incentives), in this paper we focus on how financial incentives have been used to date.

Financial Incentives Directed at Providers

Pay for Performance

The overarching goal of pay-for-performance (P4P) is to incentivize healthcare providers, or delivery systems, to provide more evidence-based care to gain a downstream effect of improved health outcomes. A typical P4P model provides bonuses from a pre-determined incentive pool, usually in addition to the base salary or fee schedule of the provider [4,5]. Proponents argue that compensating providers for the quality of care, rather than for care itself, promotes more efficacious delivery of healthcare. P4P is also well-aligned with widespread efforts to increase public reporting of quality measures.

As one of the most prevalent and costly chronic health conditions, diabetes has been an attractive target for many P4P programs [6]. The quality of diabetes care continually falls short of national and physician organization recommendations, and there are clearly documented disparities in care delivery. Much has been written about P4P experiences in a variety of healthcare settings and systems, and the results have fallen short of initial high expectations. A recent Cochrane review found there were only modest and variable effects on the quality of primary care, including diabetes care, with the use of P4P programs [7]. However, given that P4P programs are often part of greater quality care initiatives, it can be difficult to determine the actual impact of provider financial compensation alone. Additionally, the heterogeneity of P4P programs, the voluntary nature of many programs, and the lack of high quality studies limits rigorous evaluation.

The UK Experience

In April 2004, the United Kingdom (UK) started an ambitious P4P program, the Quality of Outcomes Framework (QOF). The contract between the government and primary care groups of family practitioners, allowed practice groups to earn up to 24% of their baseline salary in additional P4P funds [8]. Since the base salary of family practitioners was not reduced, the government initially allocated £1.8 billion (\$3.2 billion) for quality payments. Payments are provided annually based on the number of points a practice earns for meeting predetermined

quality goals. Points are awarded by meeting targets for clinical care, practice organization, patient experience, and additional specified services. A total of 1050 points are available and each practice is allowed to claim a maximum of 1000 points [9].

Within the first year of the QOF, targets were met for 83% of eligible patients and practices earned a median of 95.5% of all the points available. Initial budget estimates anticipated 75% rate of achievement; revisions have subsequently been made given the unexpected costs of this program [10]. The National Institute for Clinical Excellence (NICE) estimates that the QOF costs the National Health Service (NHS) about £1bn per year in England, or 15% of the primary care budget.

In 2012/2013 practices can earn up to 88 points based on 15 diabetes-specific indicators, with six outcomes measures (three glycosylated hemoglobin [HbA1c goals], two blood pressure -- BP goals, and one cholesterol goal) accounting for 60% of the points [11]. In 2012–13 each point is valued at £133.76. The number of indicators and points available have undergone numerous revisions since the initial version. At the time the QOF was initiated there were 21 diabetes-specific indicators: ten process metrics, three outcome metrics, and eight conditional process metrics. The outcome metrics were HbA1c 7.4% and BP 140/85mmHg within the past 15 months, and a total serum cholesterol 190 mg/dL (5 mmol/l) within the past five years [12].

In an interrupted time-series evaluation of 42 randomly selected practices, there was significant improvement in the overall quality of diabetes care; however, improvement was already being made prior to the introduction of QOF [8]. In 1998, the mean quality score for diabetic patients seen in these practices was 61.6, which by 2003, before the introduction of QOF, was already 70.4. After the introduction of QOF means scores improved to 81.4 by 2005 and then stabilized such that the mean score for diabetes was 83.7 in 2007. During the pre-implementation period, 1998–2003, the average rate of improvement was 1.8% per year (95% CI: 1.1–2.4), compared to about 3.7% per year between 2003 and 2005 ($p < 0.001$), and then falling back to pre-implementation rates between 2005 and 2007 ($p = 0.91$). The targets for process metrics were more quickly met, in some part because many of the metrics were very close to goal at baseline. In 2007, the mean clinical quality scores for diabetes process metrics in this cohort were 90 and above, with the exception of funduscopic exam which only achieved a mean score of 81. Although there were significant improvements from baseline, the outcome measures all still fell short of goal. The mean practice clinical quality score for HbA1c 7.4% increased from 39.8 to 50.6 to 54.9, in 2003, 2005, and 2007 respectively. The mean BP quality score increased from 35.4 to 49.0 to 51.6; the results for cholesterol targets went from 52.0 to 72.5 to 78.9. The authors of this evaluation suggested that once initial gains were made subsequent gains were more difficult and that the structure of the incentive did not reward further improvement once targets had been achieved. Other evaluations of the QOF found similar trends [13,14].

The goal of QOF was to improve and standardize the quality of care delivered within the UK, not specifically to address disparities in care, but many groups have evaluated the effects of QOF on different patient populations and in different healthcare settings. Studies looking at practices serving lower income populations have been mixed, with analyses showing overall worse achievement [10], similar achievement [15], and better achievement [13] in low income areas. One study showed no difference in achievement in BP targets or cholesterol for individuals with diabetes from different social classes (as defined by manual vs. skilled labor) before or after QOF. Attainment of target HbA1c was significantly lower in the manual labor group prior to initiation of QOF and was attenuated but not abolished after the initiation of QOF [16]. Millet et al, published an analysis of practices in Wandsworth, an ethnically diverse, 22% non-white community in London and found that

there were improvements in most diabetes-specific metrics, but existing disparities between ethnic groups persisted after initiation of the QOF and appeared to widen for HbA1c and BP control between the black Caribbean and white population [17]. Another study showed that disparities narrowed between men and women, and older patients appeared to benefit more from the introduction of QOF than younger patients [15]. Diabetic patients with and without co-morbid conditions both showed improvement [18] and the quality of diabetes care improved similarly in patients with and without mental illness in the first year of QOF [19].

The US Experience

To date P4P experience in the United States has taken place on a much more diffuse and limited scale. However, as of 2006 it was estimated that more than half of physicians practicing in commercial HMOs and about a quarter of physicians in other settings are part of a P4P contract [20,21]. The structure and reimbursement plans of P4P programs in the US differ widely, limiting comparisons between them, but potentially allowing for greater insights into how to more optimally design future programs.

Levin-Scherz, et al reported on the experience of a P4P program implemented in 2001 within the Partners Community HealthCare Inc (PCHI), the provider network associated with Partners HealthCare in Boston, MA. Under this program, about 10% of physician fees were withheld and used as reward bonuses for the physician network. Over two years, there was an improvement in HbA1c screening of 7.0% vs. 4.9% statewide and in diabetic eye exams by 18.7% compared to slight statewide decline. LDL screening improved by 13.2% and nephropathy screening by 15.2%, both about twice the state average [22]. Another P4P pilot program was initiated in Portland, Maine between Aetna and NovaHealth, an independent physician association, in 2008 for a Medicare advantage population. In addition to fee-for-service reimbursement, Aetna provided each physician member with a monthly quality payment, paid in a lump sum at the end of the year. Aetna also provided a case manager to work with NovaHealth care coordinators. The diabetes metrics included a biannual visit and an annual HbA1c measurement. In 2008, just over 80% of eligible patients had an HbA1c measured, compared to 99% in 2011 [23]. Modest improvement was also seen in the number of diabetics with glycemic, BP, and cholesterol control. In contrast, Rosenthal et al found no difference in improvement in HbA1c screening compared to a control group in the Pacific Northwest after initiation of a Californian P4P group-reimbursement program [24]. Chen et al examined the results of a voluntary P4P program instituted by a Hawaiian PPO. Physicians could earn an additional 1.5–7.5% of their base fee (a maximum of \$10,000–16,000 per year) for performing diabetes-specific process metrics, as determined by the 2006 HEDIS algorithm [25]. After initiation of P4P there was an increase in the number of HbA1c and LDL tests ordered from baseline and the group of physicians participating in P4P had better results than those not participating. There were also decreased diabetes-specific hospitalizations during this time. However, no baseline data was reported and the PPO rolled out a diabetes disease management program shortly after P4P, making it difficult to determine the actual impact of the P4P program. Results were quite modest for a P4P program in Rochester, NY that placed physicians taking part in a capitated Blue Choice HMO program under limited financial risk for not meeting agreed-upon quality targets. All improvements seen after the initiation of the program, with the exception of a one-time referral for ophthalmologic evaluation, were attributed to underlying secular trends [26].

One of the only studies to look at P4P in a disadvantaged U.S. population looked at the impact of a P4P program implemented in 2004 at Access Community Health Network (ACCESS), a system of federally qualified health centers in Chicago. Physicians' base salaries were reduced between 11–21%, but could be made up in incentives provided for additional visits and quality procedures above a pre-defined minimum productivity level.

Diabetes specific incentives were a \$5 payment (the typical procedure rate) per completed diabetes flow sheet, HbA1c ordered, and foot check performed. In this study an increase in the number of patients who received two HbA1cs a year was observed without associated improvement in the percentage of patients achieving glycemic control [27].

Future Directions

Several P4P programs are featured in the 2010 Affordable Care Act. Most of the physician P4P programs in the ACA are voluntary, but the Value-Based Payment Modifier under the Medicare Physician Fee Schedule will become mandatory in 2017 [28]. Some practices are already voluntarily reporting to CMS on a limited number of quality indicators. Under the Value-Based Payment Modifier physician groups will be assessed on both the quality and cost of care delivered, as measured by a standardized quality score, and then paid for performance according to quality tier. The program is intended to be budget-neutral, meaning that groups with performance below the national mean will be subject to downward adjustment. Whether improvement in process and intermediate outcome metrics will lead to better health outcomes in the form of decreased morbidity, hospital admissions for diabetes complications, or mortality remains largely unknown. Future studies will need to address this important issue.

Financial Incentives Directed at Patients

Current Literature

There are few studies evaluating the efficacy of financial incentives for patients in regards to diabetes outcomes. We performed a randomized controlled trial at the Philadelphia VA Medical Center comparing usual care to peer mentors and financial incentives in African American veterans with persistently poor glycemic control [29]. The financial incentive improved HbA1c by about 0.5% compared to usual care but this was not statistically significant ($p < 0.5$). However, the study was not powered to detect a difference this magnitude. In a larger study (172 patients per arm rather than the close to 40 patients per arm in the current study) this difference may have been statistically significant and many diabetes interventions are thought to be clinically important if they improve control to this degree.

The incentive structure in this study may have limited its impact. Patients were told that they would receive \$100 for lowering their HbA1c by 1 point at 6 months and \$200 for lowering their HbA1c by 2 points or to 6.5%. Other than informing participants of their baseline HbA1c value and the goals they would need to reach to receive the incentives no additional intervention was provided. While straightforward, this design did not take advantage of many of the motivators that can be built into financial incentives such as frequent feedback, the opportunity to win large sums, and regret [1]. We are currently undertaking a larger study funded by NIDDK that incorporates all these elements. In the ongoing study (NCT01125969) diabetes participants with persistently poor glycemic control are randomly assigned to 1. usual care, 2. peer mentors, 3. financial incentives, or 4. peer mentors and financial incentives. Those assigned to the financial incentive arms call into an automated line each morning and report their fasting glucose value. If the reported values are between 80 and 140 mg/dl the participant is entered into a daily lottery and has a 1/10 chance of receiving \$10 and a 1/100 chance of receiving \$100. Each evening participants receive an automated call informing them if they won and how much they won. Payments are accumulated and sent out monthly. If the participant does not call in or the morning glucose is out of range, then the participant is still entered into the lottery but does not receive payment. In the evening patients out of range or who did not report in receive a call telling them what they would have won if the AM glucose had been in range. While we cannot

prevent cheating, participants are provided a glucometer with a downloadable memory which we are collecting at the end of the active intervention. Thus we will be able to assess the extent of cheating and its impact on glucose control. If cheating turns out to be an issue, future interventions can use Bluetooth enabled glucometers which transmit results automatically and are harder to game. However, the current design has several advantages: participants get daily feedback and the opportunity to receive frequent rewards (which takes advantage of present-bias); although less likely, there is the opportunity to earn large rewards; and by letting participants know what they could have won the incentive design incorporates regret (taking advantage of loss aversion). All three of these have been shown to motivate behavior change. Enrollment is almost complete for this study and final results should be available in a little over a year. An economic analysis will also provide insight into whether the intervention is cost-effective relative to usual care.

There is very little additional research regarding the use of incentives to achieve health care goals for patients with type 2 diabetes. A non-randomized study compared HbA1c and LDL test completion rates in adult patients seen in a group of clinics using a small one-time financial incentive (a \$6 card for gas) and a reminder letter to matched patients seen in the same health system but different clinics. The incentive was sent before the goal was achieved (testing) and the program only ran for three months. Over the two years of follow-up there was an initial increase in tests drawn; however the effect waned with time [30].

In adolescents with type 1 diabetes, two published pilot studies provide intriguing results. One was of four teenagers. Participants could earn \$1 for posting a video of SMBG testing but could only keep the money if they posted at least 4 videos per day at least an hour apart at which time they also earned a \$3 bonus [31]. Participants could post a maximum of 8 videos a day and earn a maximum of \$11 a day. During the 5-day intervention each participant performed SMBG at least 4 times a day, compared to less monitoring either before or after the intervention. The second study, also using a pre-post design, was able to modestly increase SMBG using an App that enabled teens to earn experience points for SMBG testing which could then be redeemed for Apple iTunes purchases [32]. Unfortunately both studies were very small and lacked control arms and long term follow-up.

While we know of no other studies directly evaluating the effectiveness of financial incentives in diabetic patients, financial incentives have now been shown in several studies to improve weight loss compared to usual care. We point out these studies since obesity is frequently comorbid with diabetes and weight loss has the potential to improve control and even reverse diabetes or prevent diabetes onset if sustained [33–35]. Two studies by our colleague and a leader in this field, Kevin Volpp, have shown impressive results. The first tested lottery-based and deposit contract incentives versus usual care in achieving initial weight loss [36]. All participants received nutrition counseling and monthly weigh-ins and had a goal weight loss of 16 pounds in 16 weeks. Subjects were randomized to: 1. usual care; 2. a daily lottery similar to that described above; or 3. a deposit contract in which subjects could deposit \$.01–\$3.00 per day of their own money, which was matched 1:1. In the deposit contract arm, participants received the sum of both amounts each day they were on track to meet their monthly weight loss targets, but forfeited their deposit and match if they were not. After 16 weeks of follow-up, participants in each incentive group lost significantly more weight than control group participants (control group 3.9 lbs; lottery 13.1 lbs, p-value vs. control 0.014; deposit contract 14.0 lbs, p-value vs. control 0.003). Three months after stopping incentive payments participants had regained weight making the differences between arms no longer significant.

In a second study reported at the 2012 Society for General Internal Medicine National Meeting overweight hospital employees were randomized to: 1. monthly weigh-ins alone; 2. \$100 per month for being at or below their monthly target weight (4 lbs per month); or 3. \$500 per month split between groups of 5 participants, who received a larger share when they were at or below their monthly target weight but other group members were not [37]. At 6 months, participants in the group arm lost more weight (mean 10.7 lb, SE 1.8) than participants in the control arm (mean 1.1 lb, SE 2.0, $P = 0.0004$) and individual incentive arm (mean 3.7 lb, SE 1.9, $P = 0.0079$). The cost per pound lost was \$48.00. Three months after the incentives stopped those in the group arm had on average regained 3.2 lbs but were still doing significantly better than the control group. In both of these studies improvements were lost once programs were stopped which is characteristic of almost all weight loss interventions [38,39].

Currently several websites exist which use the principles explored in these weight loss studies, allowing participants to deposit money which can be won back if they meet their weight loss goals. Different models allow individuals to work on their own or in teams. Some pit one person against another with the potential for larger gains while others require participants to pledge money to organizations they do not support if they do not meet their goal (for example someone in favor of gun control could have his money go to the National Rifle Association or someone who did not believe in abortion could have her money go to Planned Parenthood). Sites include HealthWage.com, DietBet.com, Gym-Pact.com and Stickk.com. We know of no study evaluating their efficacy.

Future Directions

There are myriad permutations of how financial incentives aimed at individuals can be structured. The ClinicalTrials.gov website indicates several active studies employing incentives for a variety of health outcomes including medication adherence, tobacco cessation, healthy lifestyles, and diabetes-specific health behaviors. Results from these trials will help us better determine the best ways and under what circumstance to harness behavioral economics to motivate behavior change. However, currently what is most lacking is evidence that incentives can be used to motivate permanent behavior change and whether these interventions are cost-effective. It is easy to predict that incentives are likely to be cost-effective if permanent change is effected since diabetes and obesity exact a huge financial burden in this country. While the weight loss studies described above showed patients started regaining weight once the programs ended, this may not be the case for all outcomes, and an idea we are testing in our current study of financial incentives aimed at encouraging improved glucose control. Future studies should also test incentive designs that slowly extinguish reliance on incentives, encouraging healthy behaviors to become habits. Even if gains attained with incentives do not persist, then testing whether maintenance incentives are effective and worth the cost is important given the significant cost of many adverse health behaviors.

Concerns and Ethical Considerations

There are multiple concerns about the potential negative effects of provider and patient directed incentive programs. These have been well documented [5,6,10,40–42]. Some of the criticisms with regard to P4P programs are as follows. 1. P4P programs may simply lead to better documentation, rather than improved care itself. 2. P4P might increase healthcare disparities by incenting providers to focus efforts only on the patients closest to target. 3. Targeting certain disease conditions has the potential to lead to declines in the quality of care for non-incentivized conditions. 4. The high fixed cost of these programs brings into question their cost-benefit as compared to other interventions. 5. The long term sustainability of programs is unknown, and some data suggests that improvements are lost

when financial rewards are withdrawn [43]. In the case of diabetes, it is unclear whether rewarding physicians is an optimal way to improve outcomes that depend to a large extent on patient self-management. Future P4P programs will need to be designed with these concerns in mind and closely monitored to evaluate these potential effects.

Financial incentives for patients are even more controversial. Concerns include the undue influence incentives may have on low-income populations and blaming or viewing patients as weak for health conditions that are deemed controllable such as tobacco use and obesity [44,45]. Alternatively, financial incentives encourage patients to take a more active role in promoting their own health [1,46]. In a survey of patients in waiting rooms we found patients to be divided in their support for patient directed financial incentives [47]. Interestingly smokers were more likely than non-smokers to endorse using financial incentives for tobacco cessation and obese people were more likely than non-obese people to support incentives for weight loss. Most concerning to some are the programs where participants are penalized for behaviors such as smoking [41,44,48]. Clearly we need to be careful in how these programs are designed and implemented such that the most vulnerable are not left feeling blamed and unable to reap the benefits of these programs. We agree with the position taken by the American College of Physicians in favor of incentive programs as long as they are evidence based, culturally sensitive, and respect autonomy [42].

Conclusions

While ethical concerns persist about incentive programs directed at both providers and patients they have become increasingly widespread. P4P programs have been more widely implemented, and the existing literature indicates they probably spur initial gains which then level off or partially revert if financial incentives are then withdrawn. The literature also indicates that process measures are easier to influence through P4P programs but that intermediate outcomes such as glucose, blood pressure, and LDL control are harder to impact. The long term impact of P4P programs on health is largely unknown. Programs directed at patients show greater promise as a means to influence patient behavior and intermediate outcomes such as weight loss; however, the evidence for long term effects are lacking. Interventions that combine incentives with other behavioral supports and introduce extinguishing procedures to decrease reliance on incentives once aims have been achieved may go further to helping change become permanent. In combination, both types of incentives are potentially powerful tools but whether they are cost-effective has yet to be determined.

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Table 1

Example of Behavioral Economic Concepts

Bias	Description	Consequence	Intervention
Present Bias	Immediate rewards preferred to future benefits	Failure to in actions without current gains	Provide immediate rewards for actions with future benefits
Default Bias	The tendency to select the path of least resistance	Failure to take preferred action because it requires effort	Make healthy choices the past of least resistance
Loss Aversion Bias	The preference to avoid losses over acquiring gains	Failing to reap potential large gains because of avoidance of small losses	Risk personal assets if healthy behaviors are not followed