Title: Pay-for-Performance - Impact on Diabetes

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Abstract

Pay-for-performance schemes explicitly link provider remuneration to the quality of care provided, with the aims of modifying provider behavior and improving patient outcomes. If successful, pay-for-performance schemes could drive improvements in quality and efficiency of care. However, financial incentives could also erode providers' intrinsic motivation, narrow their focus, promote unethical behaviour, and ultimately increase health care inequalities. Evidence from schemes implemented to date suggests that carefully designed pay-for-performance schemes that align sufficient rewards with clinical priorities can produce modest but significant improvements in processes of diabetic care and intermediate outcomes. There is limited evidence, however, on whether improvements in processes of care result in improved outcomes, in terms of patient satisfaction, reduced complications and greater longevity. The lack of adequate control groups has limited research findings to date, and more robust studies are needed to explore both the potential long-term benefits of pay-for-performance schemes and their unintended consequences.

Introduction

Over the past two decades, wide and persistent variations in the quality and efficiency of care have led purchasers and policy makers to explore alternative payment mechanisms as a means of increasing value in health care. Traditional methods of remuneration - whether based on capitation, salary or fee-for-service payments - influence both the structuring of health care systems and the behaviour of individual clinicians, who respond to implicit financial incentives (1). Whilst these traditional methods of remuneration are superficially neutral towards the quality of care provided, they can encourage sub-standard and even harmful practices. For example, capitation payments can lead to neglect of patients deemed high risk (2) and fee-for-service payments to overtreatment (3). Not only do these payment systems not align incentives to support quality improvement, they reinforce existing organizational structures that do not always provide the best value (4). Pay-for-performance schemes aim to modify provider behaviour and facilitate re-design of services, and ultimately to improve patient outcomes, by explicitly linking provider remuneration to the quality of care provided to patients (5).

Paying for performance, however, carries its own risks. Its use in healthcare is relatively new, but evidence from other fields illustrates the risks of explicit financial incentives on performance. Insensitively applied incentives can erode intrinsic motivation (6), narrow focus (improving the performance of simple and repetitive activities, but diminishing performance of complex or creative activities (7)), promote unethical behaviour and short-term thinking (8), and can lead to neglect of unincentivized activities. Advocates of pay-for-performance in healthcare have argued that medical ethical codes and professionalism will mitigate against these

unintended consequences, and that specific incentives reflecting professional values will lead to wider systematic improvements in quality of care with benefits beyond the incentivized activities (9). Critics argue that unintended consequences will accompany pay-for-performance schemes in healthcare as they do in other fields, and rather than providing a bulwark against these unintended consequences, medical professionalism and intrinsic motivation will be undermined by financial incentives to the ultimate detriment of patient care (10).

Developing diabetes pay-for-performance schemes

Pay-for-performance schemes cover a broad range of interventions and have been applied in a range of different healthcare settings. Schemes differ in their patient populations, the conditions included, aspects of care covered (e.g. clinical quality, efficiency, patient experience), their definitions of quality, setting of benchmarks and targets, level of intervention (e.g. individual clinicians, groups or organizations), measurement of performance, provision of support, adjustment for case-mix, and the size and timing of incentive payments (11,12). There are several design and implementation steps in any pay-for-performance scheme, and performance of each of these steps will affect the ultimate success of the scheme (13,14). The basic requirements are: a robust monitoring infrastructure (ideally computerised records linked to a central database) for both incentivised activities and unintended effects; a process for defining quality of care and revising those definitions; the establishment of baseline performance; a process for setting and revising targets; a transparent system for paying rewards; and a process for adapting the scheme in light of new evidence.

Financial incentive schemes typically work on annual cycles, and issues of lag times have led to a reliance on process measures (for example, measuring blood pressure) over outcomes (for example, mortality) when constructing quality indicators. Process measures have the advantages of immediacy and straightforward attribution, but ultimately it is outcomes that are of interest and these are more difficult to link to the actions of a particular provider. Factors beyond providers' control, such as random variation (particularly in small panels (15)) and the socioeconomic circumstances of patients, mean that better performance on processes of care does not necessarily translate into reduced complications or mortality (16). For this reason, pay-for-performance approaches are most likely to be effective for high prevalence conditions where there is a set of well-defined, easily measured processes of care that have a direct impact on patient outcomes. Diabetic care is therefore in some respects an ideal candidate, and has other advantages as a subject for pay-for-performance schemes: clear diagnostic criteria, biological parameters that require regular monitoring, and the existence of several intermediate outcomes (such as control of glycated haemoglobin levels) which share some of the advantages of processes - for example ease of measurement - whilst being closer to final health outcomes.

For these reasons, and due to the public health importance of the disease, diabetes is frequently included in pay-for-performance schemes. In the US, the Bridges to Excellence initiative (a collaboration between several major US employers) has included diabetes in its pay-for-performance programs since it was established in 2003 (17). Pay-for-performance schemes have since multiplied across the US, with many either including or specifically focusing on diabetes. In the UK, diabetes was one of 10 conditions included in the original Quality and Outcomes Framework (QOF) pay-for-performance scheme for primary care introduced in 2004, and currently 15 of the 101 quality indicators in the scheme relate to diabetic care (**table 1**).

Other diabetes-related incentive schemes have been introduced in Australia, France, the Netherlands, New Zealand, and Taiwan.

Performance targets for diabetic care are generally based on care guidelines produced by national or international bodies (for example: the National Committee for Quality Assurance, the National Institute for Health and Clinical Excellence), but are often adapted to reflect technical issues of data collection and the interests of payers and providers, and so do not always completely align with recommended care. Targets can also be stepped - for example the UK's QOF has three indicators for glycaemic control: HbA1c ≤59 mmol/mol, ≤64 mmol/mol and ≤75 mmol/mol (**table 1**). A patient with HbA1c of 58 mmol/mol would count towards a practice's attainment on all three indicators, whereas a patient with HbA1c of 70 mmol/mol would be counted as a success for the 75 mmol/mol indicator and as a fail on the other two. Target setting is usually an iterative process, as indicators need to adapted in the light of new evidence or the concerns of clinicians and patients. Indicators can also be 'retired' if there is evidence of harmful unintended consequences or if achievement levels reach a ceiling (18,19), for example: indicators for the measurement of total cholesterol and HbA1c levels were removed from the UK's QOF scheme in 2011/12 because mean achievement rates in the previous year exceeded 96%.

One of the major technical issues with constructing targets for pay-for-performance schemes is risk adjustment, which if not adequately addressed can lead to distortions of care and a loss of faith in the scheme on the part of providers. Pay-for-performance targets are generally applied to all patients with the index condition regardless of severity or circumstance, and this is a particular problem for diabetes, which affects patients across all age groups and has two disease types with different risk profiles. There are three main approaches to addressing this

problem. First, different targets can be set for different sub-groups, for example: prescription of angiotensin converting enzyme inhibitors for patients with hypertension and evidence of nephropathy. The drawback of this approach is that it creates a plethora of targets and a more complex scheme. Second, attainment thresholds can be set below 100%, so providers are not expected to achieve the targets for all patients. However, it can be difficult to determine the appropriate level for thresholds, and providers with a more severe case mix are likely to be disadvantaged under this system. Third, providers can be permitted to exclude individual patients for whom universal targets are deemed inappropriate from the scheme. This approach has the advantage of precision, but relies on the honesty of providers not to artificially inflate their achievement scores by excluding patients for whom the targets are appropriate (20).

Effects on processes of care

Despite the growth in pay-for-performance schemes over the past decade, evidence on their effectiveness remains relatively thin. Schemes have frequently been implemented across whole groups of providers, regions or countries without any piloting or control groups, and as a result researchers have generally been obliged to use observational and before-and-after designs.

Early experimentation with pay-for-performance schemes in the United States produced mixed results. One of the earliest schemes, operating in Rochester NY between 1999 and 2004, provided incentives of around $1,500 to primary care physicians for performing routine tests (measuring HbA1c levels, measuring low density lipoprotein (LDL) levels, urinalysis, and eye examinations) and administering influenza vaccinations. There was only a significant improvement for one of the activities: eye examination rates increased from 44% to 51% in the

first year, but there was little further improvement in subsequent years (21).

In 2001 a New York based health plan rewarded physicians up to $12,000 for performance on a composite measure of diabetic care (measuring and controlling HbA1c levels (≤7.5%), LDL levels (≤100 mg/dl) and blood pressure (≤130/80 mmHg); and conducting retinal and foot examinations)(22). Physicians were rewarded for either achieving a benchmark score or making 50% improvements from baseline, with larger rewards for treating Medicare patients. Patients attending incentivized physicians had significantly greater improvements for 5 out of 6 process measures and 2 out of 3 intermediate outcomes (HbA1c and LDL control) compared with patients attending non-incentivized physicians. However, this was a small study of 21 incentivized physicians and 624 patients, whose participants volunteered for the scheme and started from lower average baseline achievement rates than non-participants.

In 2003 the PacifiCare Health System provided its California-based medical groups with financial incentives for measuring HbA1c levels of registered diabetic patients. Improvements in achievement rates were modest (increasing from 62.0% to 64.1%) and were no greater than for non-incentivized groups based in the Pacific Northwest (who improved from 80.0% to 82.1%), despite starting from lower baseline achievement (23). The intervention was, however, very limited and the payments were relatively small (~$1,000).

In Taiwan, the Bureau of National Health Insurance - which covers over 90% of hospitals and community clinics - has offered financial incentives to providers for diabetic care since 2001. Initially these incentives covered patient education, examinations and laboratory tests, but the scheme was expanded in 2006 to cover glycaemic and low-density lipoprotein control (24). Participation in the scheme is voluntary, and providers select which patients to include. Rewards are annually paid to the top 25% of performers on the basis of composite

quality scores. Compared with non-enrolled patients, diabetic patients enrolled in the scheme in 2005/6 had a significant increase in frequency of tests and physician visits. The differences between enrolled and non-enrolled patients diminished over time but remained significant after 4 years. For example: for enrollees the mean number of tests per year increased from 3.90 in the pre-incentive period to 6.32 in the first year, before falling to 5.08 in Year 4. In comparison, the mean number of tests for non-enrolled patients was 3.76 in the pre-incentive year, 3.83 in Year 1 and 4.22 in Year 4 (25).

The world's largest and most lucrative pay-for-performance scheme, the Quality and Outcomes Framework, was launched in 2004 and provides the UK's 10,000 family practices with average rewards of £118,000 ($191,000) each year based on their performance on over 100 quality indicators. The scheme currently covers 2.9 million adult diabetic patients, and practices can earn up to £11,000 ($17,800) for achieving the diabetic targets (see **table 1**). Achievement is assessed at the end of the financial year, and practices can exclude ('exception report') patients for whom targets are deemed inappropriate (for example due to recent diagnosis, contraindication to treatment or informed dissent). The QOF is the most intensively researched of all pay-for-performance schemes, but it is a universal scheme and there is therefore no comparison group available to researchers. A cohort study tracking quality of diabetic care in a sample of 42 UK family practices from 1998 to 2007 found that performance was already improving in most practices prior to the introduction of the QOF. In the first year of the scheme quality improved at a faster rate in 34 of the 42 practices, but this acceleration was only statistically significant for 13 (26) and was not sustained in the following years (27). A similar pattern was seen in a larger sample of 148 practices, with improvements in average measurement rates of HbA1c, blood pressure, serum creatinine and total cholesterol of 1.6-2.7% compared

with projected trends in the first year of the scheme (28). By the third year of the scheme measurement rates fell below the rates projected from pre-incentive trends, but at this point mean achievement rates exceeded 95%. Similar diminishing returns in later years of the scheme have been observed for intermediate outcomes indicators, such as control of total cholesterol and blood pressure levels, despite average achievement rates for these indicators remaining below 80% (29). A possible explanation for this apparent attenuation is that the upper performance thresholds - which were originally determined arbitrarily - were set too low, with the vast majority of practices exceeding the thresholds for most indicators in the first year of the scheme. As the thresholds have not been adequately revised since, there has been little financial incentive for most practices to make further improvements.

The effects of the UK QOF scheme varied by population and disease sub-group. Findings from local studies suggest that Black and South Asians patients were less likely to meet intermediate outcome targets for diabetes (control of HbA1c, blood pressure and total cholesterol) than white patients (30,31,32). Improvements in management were greater for patients with Type 2 compared with Type 1 diabetes (29) and - consistent with this - for older patients (33). Newly diagnosed patients, who could be exception reported and have their care deferred to the next financial year, benefitted less than patients with established disease (34). Patients with multiple co-morbidities - who could be double-counted under the scheme for targets such as blood pressure control - were more likely to have the quality targets met, but these patients were also receiving better care prior to the introduction of the scheme (35). Certain provider characteristics were also influential: performance tended to be worse in practices with smaller list sizes and those located in more deprived areas (36).

Effect on patient outcomes

Pay-for-performance schemes typically do not provide direct incentives for outcomes, but aim to improve outcomes through improving processes of care and intermediate outcomes. Even if processes do appear to improve, however, this may not be associated with better outcomes, either because processes have not genuinely improved (for example, due to measurement errors or mis-reporting) or due to external factors such as patients' socioeconomic circumstances.

Under the Taiwanese pay-for-performance scheme, enrolled patients had significantly fewer hospitalizations in the first year of the scheme (24), but after four years there was no significant difference in change in admission rates for enrolled compared with non-enrolled patients (25). Patients enrolled in the scheme for at least a year reported marginally greater satisfaction with their care than new enrollees (overall rates of satisfaction 76.4% and 74.8% respectively) and were significantly more compliant with diet, exercise and self-monitoring (overall compliance rates 69.2% and 64.8% respectively) (37).

In 2003 in the Emilia Romagna region of Italy, primary care physicians were provided with modest financial incentives - equivalent to <2% of annual income - to participate in local diabetes management plans and to attend audit meetings (38). Participation with management plans was associated with lower rates of emergency hyperglycaemic admissions, but a lack of pre-incentive data makes it difficult to attribute these improved outcomes to the financial incentives.

For the UK's QOF scheme, little research has been published to date on outcomes such as diabetic complications or mortality. Improved processes of care (for example HbA1c measurement) were found to be associated with improved intermediate outcomes (for example

HbA1c control), and explained about a third of the improvement in the latter over the first five years of the scheme. (39). Patients attending practices with lower rates of poor glycaemic control (HbA1c >10) were also less likely to have an emergency admission: a 1% decrease in the proportion of practice patients with poor control was associated with a 1.9% (CI: 1.1–2.6%) decrease in emergency admission rates (40). However, there did not appear to be any additional benefit, in terms of reduced emergency admissions, of moving patients from moderate to good glycaemic control (HbA1c ≤7.4).

One outcome yet to be the focus of an incentive scheme is the initial development of diabetes. Schemes implemented to date have focused on secondary prevention in patients with existing disease, rather than preventing new cases, leading to concerns that primary prevention may be neglected. The UK's QOF scheme does include an indicator for obesity, but this relates to maintenance of a register and there are no indicators for reducing the prevalence of obesity. Indicators for early intervention for diabetes are feasible, but evidence suggests that screening high risk populations does not result in improved diabetes-related mortality (41).

Unintended consequences

The rapid spread of pay-for-performance schemes across healthcare systems has raised two major sets of concerns: the effects on provider motivation, behaviour and professionalism; and neglect of patients who do not have an incentivized condition or for whom targets are difficult to achieve. With respect to behaviour, financial incentives have been shown in psychological studies to make recipients more persistent and goal-oriented, but less co-operative, when completing tasks (42). As health care is essentially a co-operative activity - both within

clinical teams and between providers and patients - this could have serious consequences in a medical context. Qualitative studies suggest that financial incentives and performance targets influence physicians to take more biomedical, disease-oriented approaches to patient care (43) and to be more aggressive with treatment (44), but do not appear to damage intrinsic motivation (45). Following the introduction of the QOF in the UK there was a small but significant reduction in continuity of care - in terms of patients being able to see their regular doctor - but no significant change in patient satisfaction with communication (27).

Because of the explicit nature of the incentives within pay-for-performance schemes and the reliance on self-report for many activities, fraudulent behaviour is a recurring concern. Given the sensitivity of this issue, however, direct evidence is difficult to obtain. For example, whilst fraud checks are routine under the UK's QOF, few cases have been brought to date. Indirect evidence, however, does suggest that some manipulation of performance data occurs. For example: clustering of blood pressure readings just below the target levels started to occur immediately after the introduction of the QOF in 2004 (46, 47). However, patterns of improvement for indicators measured by third parties, for example HbA1c and cholesterol levels, were similar to those for outcomes measured by practices themselves, which suggests that gaming does not entirely explain the improvements seen under the QOF (29, 34).

With respect to relative neglect, there is some evidence that quality of care for non-incentivized conditions stagnates or deteriorates in the context of pay-for-performance schemes (28, 48). This may affect diabetic patients even in the context of a diabetes-related incentive scheme, as co-morbidities or primary preventive activities could be overlooked. Pay-for-performance schemes also risk widening health care inequalities, either by focusing providers' attention on particular patient groups or by driving differential improvements in sub-groups of

patients. These risks can be increased by framework designs that favour particular patient groups over others. For example: the pay-for-performance scheme operated by Minnesota Community Measurement (a collaboration between Minnesotan health plans) sets targets for providing 'optimal' diabetic care. Rather than measuring performance against individual indicators, 'optimal' care requires providers to meet all of five treatment targets for each patient (originally set as BP <130/80 mmHg, HbA1c < 7.0%, LDL <100 mg/dl, tobacco-free status, and daily aspirin for patients aged 41-75). Over the first five years of the scheme, rates of optimal care for patients enrolled in state administered health plans (who are more likely to be of lower socioeconomic status, from an ethnic minority, disabled or elderly) increased from 2% to 10%, whilst rates for patients enrolled with other purchasers increased from 4% to 17% (49). So whilst care for most patients improved, the gaps between different socioeconomic groups widened. Achievement rates for the individual indicators were not only much higher, but followed different socioeconomic patterns, for example: in 2009 the rate of blood pressure control for patients in state plans and in private plans was 49.5% and 52.8% respectively, whilst rates of tobacco free status were 63.6% and 79.5% respectively. Creating a composite score requiring the attainment of all five targets therefore disadvantaged providers caring for poorer and sicker populations.

In contrast, the UK's QOF scheme provided incentives for individual indicators and used a scale of payments rather than absolute thresholds, so that even practices with very low baseline performance could earn rewards by making modest improvements. In the first year of the scheme practices in more deprived areas made fewer referrals for investigations (50), were less likely to provide treatments such as statins (51), and generally had lower rates of achievement on the quality indicators (52) (53) (36). This had an inequitable effect on resource allocation which was

compounded by the QOF payment formula, which did not adequately adjust payments for disease prevalence. As a result practices with high prevalence - which are more likely to be located in deprived areas - were systematically disadvantaged and resources were distributed away from deprived areas (54). However, in the second and third years of the scheme, practices located in deprived areas improved at the fastest rate and consequently the gap in achievement rates between practices in the most affluent and the most deprived 20% of areas narrowed (from 4·0% to 0·8% for overall achievement (55)). The most rapid improvements occurred for processes of care but gaps also closed for intermediate outcomes, with areas with low achievement rates converging on areas with high rates (see **Figure 1**).

Inclusion criteria for pay-for-performance schemes can also disadvantage particular patient groups. Under the Taiwanese scheme - where providers select patients for participation - older patients and those with more co-morbidities are more likely to be excluded from the scheme (56). Hospitals with lower performance in one year also tended to exclude more patients the following year, a phenomenon also noted in the UK's QOF scheme (57). Exclusion rates in the UK were also found to be higher for Black and South Asian patients (58) and people living in more deprived areas (59).

A final concern for pay-for-performance schemes is that universal targets will generate an uneven playing field for providers and lead to distortions of care. For example: a target blood pressure of 130/80 mmHg may be more appropriate and is more achievable for younger patients, and providers with a higher proportion of older patients may be disadvantaged or tempted into over-treatment. Once again, this is an under-researched area, however there was no association between rates of tighter glycaemic control and hypoglycemic admissions under the UK's QOF (40). Concerns over the potential effects of setting tight targets for glycaemic control

nevertheless led to the tight HbA1c target, which had been lowered to 7.0% in 2009, being relaxed back to 7.5% in 2011.

Conclusion

In recent years pay-for-performance schemes have proliferated across healthcare systems despite a relative lack of evidence for their effectiveness. In some countries a more cautious approach is now being adopted towards further expansion, for example: a proposed scheme in Australia - the Diabetes Care Project - is being piloted for three years prior to a potential nationwide roll-out (60). In other countries large-scale expansion is already planned: in the US the Patient Protection and Affordable Care Act requires the Centers for Medicare & Medicaid Services to incorporate “value-based payment modifiers” into remuneration for physicians working in large groups by 2015 (61).

The evidence available to date is predominantly observational and suggests that financial incentives for healthcare providers can produce small but significant improvements in the quality of diabetic care in the short term, but these improvements may not be sustained over time and may have limited impact on outcomes for patients. Unintended consequences, including deterioration in continuity of care and widening of health inequalities, are also a particular risk with pay-for-performance schemes, but the full extent of these risks is not yet known. The ongoing uncertainty over the effect of financial incentives is attributable to several factors: the lack of trials and adequate control groups; the simultaneous use of other types of incentives (for example reputational incentives through public reporting) in conjunction with quality payments; insufficient monitoring arrangements for unintended consequences; the wide range of different

payment mechanisms available; and the lack of research into the experiences of patients under pay-for-performance schemes.

It is clear that physicians and other healthcare professionals respond to explicit financial incentives, and that carefully constructed incentive frameworks - supported by other quality improvement mechanisms - can stimulate improvements in the management of patients with diabetes. It is still not clear, however, whether pay-for-performance schemes will produce long-term benefits for patients, and whether these benefits will outweigh the unintended consequences.

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Table 1: Quality of care indicators for diabetic patients under the UK's Quality and Outcomes Framework

Indicator	Payment range *	Points †	Maximum payment ‡
Measurement			
Register of all patients aged 17 and over with diabetes mellitus	--	6	£750
Body Mass Index recorded	50-90%	1	£125
Retinal screening recorded	40-90%	5	£625
Peripheral pulses examined	50-90%	4	£500
Neuropathy testing recorded	50-90%	3	£375
Micro-albuminuria screening recorded (patients with proteinuria)	40-90%	3	£375
Serum creatinine measured	50-90%	1	£125
Treatment and immunisation			
ACE-inhibitor/A2 antagonist prescribed (patients with proteinuria/microalbuminuria)	45-80%	3	£375
Influenza immunisation	45-85%	3	£375

Intermediate outcomes			
HbA1c ≤ 59 mmol/mol (7.5%)	40-50%	17	£2,125
HbA1c ≤ 64 mmol/mol (8.0%)	45-70%	8	£1,000
HbA1c ≤ 75 mmol/mol (9.0%)	50-90%	10	£1,250
Total cholesterol ≤ 5 mmol/l	40-75%	6	£750
Blood pressure ≤ 140/80 mmHg	40-65%	10	£1,250
Blood pressure ≤ 150/90 mmHg	45-71%	8	£1,000

* Practices are awarded 'points' according to the proportion of patients for whom targets are achieved within the given range. For example, for retinal screening practices must arrange examinations for at least 50% of patients in order to receive any points at all, and can earn up to 5 points for screening 90% of patients. No further points are earned for screening more than 90% of patients.

† The maximum number of points available for the indicator. Each point earns the practice £125, adjusted for list size and disease prevalence.

‡ The payment a practice of average size and disease prevalence earns for attaining maximum points.

Figure 1: Average practice reported achievement rates for glycaemic control under the Quality and Outcomes Framework, England 2004/5 to 2008/9

Source: Data from The Information Centre for Health and Social Care (62). Analysis by the University of Manchester.