Impact of Provider Incentives on Quality and Value of Health Care

Tim Doran,[1] Kristin A. Maurer,[2] and Andrew M. Ryan[2]

[1]Department of Health Sciences, University of York, Heslington, York YO10 5DD, United Kingdom; email: tim.doran@york.ac.uk

[2]Department of Health Management and Policy, School of Public Health, University of Michigan, Ann Arbor, Michigan 48109; email: maurerka@umich.edu, amryan@umich.edu

Annu. Rev. Public Health 2017. 38:7.1–7.17

The *Annual Review of Public Health* is online at publhealth.annualreviews.org

This article's doi: 10.1146/annurev-publhealth-032315-021457

Keywords

pay-for-performance, value-based purchasing, quality, value, health care

Abstract

The use of financial incentives to improve quality in health care has become widespread. Yet evidence on the effectiveness of incentives suggests that they have generally had limited impact on the value of care and have not led to better patient outcomes. Lessons from social psychology and behavioral economics indicate that incentive programs in health care have not been effectively designed to achieve their intended impact. In the United States, Medicare's Hospital Readmission Reduction Program and Hospital Value-Based Purchasing Program, created under the Affordable Care Act (ACA), provide evidence on how variations in the design of incentive programs correspond with differences in effect. As financial incentives continue to be used as a tool to increase the value and quality of health care, improving the design of programs will be crucial to ensure their success.

INTRODUCTION

Although they are often characterized as a recent innovation, extrinsic incentives have always been used to influence physician behavior, including the quality and quantity of care provided. Traditional forms of remuneration are loaded with embedded incentives; most obviously, fee-for-service (FFS) payment encourages high-intensity care, whereas capitation payment discourages it. The effects of incentives on the provision of care have consequences for patients—which may be benign or harmful, depending on the appropriateness of the intervention—and for the value of health care spending. Crucially, the financial rewards received by physicians under these systems depend on how much care was offered or withheld, not on whether it was correct to do so.

To address the lack of discrimination in traditional methods of remuneration, policy makers have spent the past two decades experimenting with a range of explicit incentives, both financial and reputational, in an attempt to link the rewards obtained by physicians to the quality of care provided. However, results from early schemes have been underwhelming, leading to recent attempts to reinvigorate the approach through more sophisticated incentive frameworks. Despite the lack of evidence for effectiveness, several reforms introduced under the Patient Protection and Affordable Care Act (ACA) in the United States rely on the use of physician incentives.

This review aims to explore the evidence related to the use of explicit financial incentives to improve quality in health care and the implications for health care in the United States under the ACA. The review is organized into three parts: first, an overview of the evidence on the effectiveness of incentives in health care; second, a summary of the use of incentives under the US ACA; and finally, a comparative analysis of the differential impacts of two major incentive programs.

PART 1: THE EVIDENCE ON INCENTIVES FOR QUALITY IN HEALTH CARE

Incentive programs are increasingly common internationally; however, for this overview we have focused on the United States, where pay-for-performance in health care was first introduced, and the United Kingdom, where the largest experiment in physician incentives to date—in terms of breadth of conditions covered and size of payments—was created.

The Use and Impact of Incentives in the United States and the United Kingdom

The era of explicit incentives for quality began with tentative steps in the United States, where isolated schemes initiated by commercial insurers offered generally modest payments for a handful of activities (79). Then, in 2004, the UK's National Health Service took a great leap forward with the Quality and Outcomes Framework (QOF), which instantly increased UK family practice income by about 25%, dependent on practice performance on 146 quality indicators (76). Around that time, the Centers for Medicare and Medicaid Services began the Hospital Quality Incentive Demonstration, its first major test of value-based payment. The passage of the ACA in 2010 created new value-based payment programs—such as the Hospital Value-Based Purchasing (HVBP) program—for virtually all the services covered by Medicare (81). In most of the United Kingdom, the QOF continues in modified form to the present day (30), and additional experiments for hospital incentives have been tested (94).

Evidence on effectiveness of quality incentives from trials is sparse, and most evidence comes from observational studies. The Cochrane Collaboration's review of reviews, based on 4 systematic

reviews of 32 studies, concluded that financial incentives were generally effective at improving targeted process of care, but there was little evidence for improved patient outcomes (37). A more inclusive review of reviews, based on 22 systematic reviews of pay-for-performance programs, drew similar conclusions but warned that the positive impacts of incentives were difficult to separate from other improvement initiatives implemented contemporaneously (33). A second Cochrane review of incentives in primary care found modest improvements for incentivized activities, but it was based on just seven studies that met the strict inclusion criteria (89). Robust evidence on cost-effectiveness is scarcer still: A review by Emmert et al. (35) found three full economic evaluations, which taken together suggested that pay-for-performance is an inefficient means of improving quality.

More inclusive reviews, incorporating observational and qualitative studies, have found that quality improvements under incentive schemes are at best modest and often temporary (50). An overview of the UK's QOF reported small improvements in incentivized processes of care, data recording, and teamwork, as well as reductions in hospital admissions for some conditions (43). However, improvements were restricted to the first three years of the scheme and were offset by deteriorations in continuity of care, patient centeredness, and quality of care for nonincentivized conditions (31).

Since the publication of these reviews, further trials offering modest incentives to providers have resulted in modest improvements in processes and intermediate outcomes (6, 74), but evidence for impacts on outcomes remains elusive. Recent studies examining the impact of QOF on mortality found no clear association between practice performance and mortality rates (61) or any apparent benefit to the United Kingdom in terms of reduced mortality for incentivized conditions (86). This evidence comes despite a nationwide, multibillion pound scheme that focused specifically on secondary prevention for several major chronic diseases. In the United States, both Medicare's Hospital Compare public reporting scheme (87) and Premier's Hospital Quality Incentive Demonstration (HQID) (55, 80) appear to have had no impact on mortality rates. When HQID was transferred to England, there was an apparent short-term reduction in mortality for patients admitted with one of the three targeted conditions (pneumonia) (94), but this result was not sustained after the second year (63). Furthermore, reanalysis of the data suggested not only that the initial reduction was not statistically significant but also that mortality rates for nonincentivized conditions increased (62). Similarly, mortality rates for conditions not incentivized under the QOF increased in the United Kingdom relative to other countries during the early years of the scheme, although this increase was not statistically significant (86).

A key challenge for designers of incentive schemes is to understand and then counter this disconnect between success on processes of care and failure on outcomes (84). Early incentive schemes tended to focus on processes, as these are generally more straightforward to measure than outcomes and are easier to attribute to the actions of providers. Multiple factors determine the likelihood of a successful outcome, many of which (e.g., age, deprivation, and comorbidity) lie outside the control of the individual physician and therefore require sophisticated risk-adjustment methods to allow for meaningful comparison between providers. However, growing concerns that process measures were too far removed from the intended patient benefits led to a greater focus on outcomes, albeit restricted mostly to intermediate (or surrogate) outcomes, such as blood pressure and cholesterol levels. More recently, attention has refocused on processes (9), with the recognition that incentives can be effective only if they change physician behaviors (92), but the repeated failure of incentive schemes to improve patient outcomes has threatened to discredit the whole approach.

One explanation for these failures is that providers are alienated by incentive schemes (3) and misreport their way to high achievement (16), claiming that missed targets have been hit. Alternatively, the link between incentivized processes and outcomes may not be sufficiently strong to drive improvements in outcomes. Yet another explanation is that individual incentives discourage the

kind of cooperative behavior that is fundamental to achieving successful outcomes in health care (98), which often requires coordinated effort by multiple actors, including patients themselves, across multiple processes. To address this disconnect, Asch et al. (5) encouraged cooperation as part of a clinical trial, offering shared financial incentives to patients with high cardiovascular risk as well as to their physicians. They found that jointly incentivizing physicians and patients was more successful at reducing cholesterol levels than offering incentives to either physicians or patients alone. The same logic broadly applies to the shared savings offered to providers who collaborate in accountable care organizations (14) (see the section titled Part 2: Incentives in the Affordable Care Act), under which groups of providers share the same set of incentives for quality and efficiency (93).

Insights on Physician Response to Incentives from Social Psychology and Behavioral Economics

Many of the results outlined above could be predicted by behavioral science theory. Social psychology experiments in fields outside medicine have established that financial carrots work as expected for mechanical, repetitive activities; higher rewards generally stimulate greater effort and more of the desired output (64, 73), although the relationship is not linear [small rewards can be less effective than no rewards (46)]. However, for more complex activities that require greater cognitive input, financial incentives often lead to poorer performance. This counterintuitive result is attributable to several unintended effects that incentives can have on behavior: They crowd-out intrinsic motivation (27); diminish creativity (45); encourage cheating and shortcuts (47); and lead to selfish and uncooperative behavior (98). Perhaps most damaging of all, incentives can be highly addictive (59), leading to net deteriorations in quality following their withdrawal (65).

Although many health care activities are routine and mechanical, and should therefore be good candidates for financial incentives, many more are cognitively demanding and require cooperation and coordination between the patient and different providers. In these cases, intrinsic motivations, such as autonomy, altruism, and competence, are likely to be more effective than financial rewards (72, 88).

Financial penalties generally have effects—both desired and undesired—that are similar to those of rewards, but the effects appear to be stronger. The observation that people work harder to keep what they already hold—that they are loss averse—underpins prospect theory (57), a cornerstone of the field of behavioral economics. This hybrid of economics and psychology recognizes that people have limited cognitive resources (91) and employ mental shortcuts (heuristics) in their decision making (95). These shortcuts are usually effective (42) but can sometimes lead people astray, resulting in damaging cognitive biases or systematic departures from predictable rational economic behavior (**Table 1**). Because incentive schemes rely on providers responding in predictable and rational ways, understanding cognitive biases offers both an explanation for the failings of previous incentive schemes and a potential framework for designing more effective schemes in the future (75).

Advocates of pay-for-performance in health care maintain that its early failures are the result of inadequate design, a failure to incorporate a more sophisticated understanding of provider motivation into program design (26). On the basis of evidence from early schemes and readings of economic and psychological theory, several researchers have produced blueprints for second-generation pay-for-performance frameworks. Their recommendations for designers include making rewards large enough to be meaningful; using penalties in addition to rewards; aligning incentives to professional priorities; using absolute rather than relative performance targets; providing frequent, discrete rewards or punishments; and making an explicit long-term commitment to incentives (23, 32, 38).

Table 1 Cognitive biases and their effect on incentivized behavior

Cognitive bias	Solution
Mental accounting: Infrequent incentive payments subsumed into standard remuneration packages are less noticeable and influential than frequent small incentives awarded as discrete bonuses.	Provide frequent rewards/punishments, separated from usual compensation.
Goal gradient: Motivation and effort increase as the goal is approached. Providers starting from a low baseline may feel that the effort required to achieve a target is unlikely to yield a reward, particularly in competitive frameworks.	Reward improvement as well as absolute performance; provide tiered targets; reward on an individual patient basis.
Hyperbolic discounting: Immediate pay-offs are preferred to deferred pay-offs, and long time lags between effort and reward therefore reduce motivation.	Provide frequent rewards linked to recent performance, rather than annual payments.
Loss aversion: The promise of a bonus is less motivating than the threat of a loss.	Use financial penalties instead of/in addition to bonuses.
Choice overload: Too complex or too many options leads to decision paralysis and less behavior change.	Use fewer performance metrics.

Many of these recommendations aim to compensate for—or to exploit—cognitive biases. However, designers have been slow to respond, and evidence for the effectiveness of incentive schemes is yet to materialize. Commentators have therefore returned to the behavioral economics literature in an attempt to reinvigorate pay-for-performance (34, 58, 77), basing their guidance on interpretations of key biases affecting physician behavior under incentive schemes (**Table 1**).

However, some of these solutions are difficult to implement, are contradictory, or introduce further unintended consequences. For example, adopting absolute performance thresholds to decrease uncertainty for providers increases uncertainty for payers, who cannot accurately predict budgets under such systems (77); using fewer metrics to avoid choice overload and inertia can lead to neglect of nonincentivized aspects of care (34); using threats of financial penalties to leverage loss aversion can be demotivating over the long term; and concealing threats in deposit contracts (paying a bonus in advance and clawing it back if targets are not met), while shown to be successful outside of health care (39), is likely to meet with disapproval (48). It is also not clear whether lessons about individual psychology and behavior can be successfully applied to organizations (12), which are frequently the targets of incentive programs.

Impact of Financial Incentives on Equity

Reducing variations in care is a key aim of pay-for-performance programs, and if financial incentives lead to a greater focus on applying evidence to all patients (52), they could mitigate physician bias and improve equity of care (51). However, there are several reasons why financial incentives might worsen existing disparities (15). More affluent groups commonly benefit disproportionately from new public health interventions (96), and the relative difficulty providers face in achieving quality targets is dependent on patient age, frailty, comorbidities, ethnicity, social status, and motivation, which can disadvantage providers with particular mixes of patients. The effort required to meet incentivized targets is likely to be greater for providers who are starting from low baseline performance and are dealing with more deprived patients than for providers who have a more affluent mix of patients. This greater focus on incentivized conditions means that the risk of

neglect for nonincentivized conditions is correspondingly greater, potentially increasing disparities for these conditions. Because nonincentivized conditions are not monitored in the same way, any increase in disparities under incentive schemes may go undetected.

A review of the impact of incentives on equity—mostly based on the UK's QOF—found modest improvements in socioeconomic disparities; preexisting gaps in quality of care across social groups narrowed under incentive schemes (4). In the case of the QOF, this may have been the result of offering increasing payments for increasing achievement, which incentivized providers with even very low baseline performance (29). It may also have been the result of a general compression in quality performance, as many practices approached the maximum achievable quality performance over time. However, inequalities between age, sex, and ethnic groups persisted. Results have been similar in hospital-based schemes in the United States. For example, hospitals serving deprived populations quickly caught up on quality metrics with hospitals serving more affluent populations under the HQID (54). However, due to the tournament nature of the scheme, with only the top-performing hospitals receiving bonuses, these faster-improving hospitals were less likely to receive financial rewards than were hospitals with higher baseline scores and more affluent patients (87). Consequently, resources were diverted away from populations with the greatest health care need.

Careful program design is therefore necessary to avoid exacerbating existing disparities. For example, the risk of cherry-picking "profitable" patients (15)—or disenrolling "unprofitable" patients (68)—can be reduced by rewarding target achievement on an individual patient basis or providing larger rewards for deprived and comorbid patients (6). In tournament systems, offering bonuses for improvement in addition to absolute performance provides a more level playing field for providers who serve more deprived populations (82). Holding incentive payments and penalties constant between classes of providers (e.g., those caring for more or less deprived populations) is another way to address disparities in value-based payments (24).

PART 2: INCENTIVES IN THE AFFORDABLE CARE ACT

The ACA placed incentives at the center of US health care reform, and the success of the Act will ultimately depend on making these incentives work. The ACA contains several provisions to increase the availability and affordability of health insurance (e.g., health insurance exchanges, Medicaid expansion, and bans on insurance discrimination against preexisting medical conditions) and to reduce the rising costs of health care (e.g., excise taxes on high premium insurance plans and reducing the growth rate of Medicare payments).

The ACA also includes changes to both payment systems and the organizational structure of health care. Specifically, it contains numerous provisions that aim to shift payments away from volume-based reimbursement by linking payments to quality in multiple settings, including hospitals, physician groups, nursing facilities, home health agencies, hospices, and dialysis facilities (1, 10, 66). For example, in the hospital setting, the Hospital Readmission Reduction Program (HRRP), the Hospital-Acquired Condition Reduction Program (HACRP), and the Hospital Value-Based Purchasing Program (HVBP) use payment adjustments to incentivize performance improvements, and the physician value-based payment modifier (PVBPM) allows for differential payments for physicians or physician groups based on the quality of care they provide to their patients (10, 21, 66). The ACA also established two programs to encourage the formation of accountable care organizations (ACOs): the Pioneer model and the Medicare Shared Savings Program (MSSP). ACOs consist of physician groups, hospitals, and other health care providers that collectively agree to be accountable for the quality and spending for their patient population. ACOs that meet quality benchmarks can share savings they achieve (1, 10).

Additional legislation has followed. In April 2015, the Medicare Access and Children's Health Insurance Program Reauthorization Act (MACRA) effectively repealed the sustainable growth rate formula that measures increases to provider payments against changes in GDP. Beginning in 2019, all clinicians who bill Medicare (e.g., physicians and nurse practitioners) must participate in either the alternative payment model (APM) or the merit-based incentive payment system (MIPS), both of which are value-based payment models. Clinicians who join APMs will receive 5% fee increases for payments on FFS payments between 2019 and 2024. However, to be eligible for these fee increases, physicians must join advanced APMs, in which they are subjected to "two-sided risk" (e.g., potential bonuses or penalties based on spending) for at least 25% of their patients in 2019. Bundled payment models and the Pioneer ACO model are examples of advanced APMs.

Clinicians who do not join APMs will be subject to the MIPS. The MIPS combines three existing value-based incentive programs: the physician quality reporting system, the physician value-based payment modifier, and the meaningful use criteria for electronic health records. Medicare will not offer automatic fee increases to MIPS participants. Instead, clinicians will be subject to positive or negative payment adjustments based on their performance related to quality, resource utilization, meaningful use, and clinical practice improvement activities. These adjustments will be significant: bonuses of up to +12% in 2019 (and 27% by 2022) and penalties of up to −4% in 2019 (and 9% by 2022).

MACRA will eventually form the largest value-based purchasing program in the United States (78) and is likely to be both controversial and intensely studied.

The Effectiveness of Incentives Under the ACA

Evidence on the effectiveness of incentive programs established through the ACA is just emerging. Early evidence suggested that the HVBP did not improve clinical process or patient experience performance in its first year (83). More recent evidence indicates that the program has also not reduced mortality (36). The Department of Health and Human Services reported the first-ever national decline in hospital-acquired conditions between 2010 and 2013 (2). However, even though the HACRP was created by the ACA, it could not be responsible for this decline because it did not take effect until 2014 [other Centers for Medicare and Medicaid Services (CMS) programs, such as nonpayment for adverse events beginning in 2007, may have contributed]. Recent evidence suggests that the HRRP has been successful in reducing hospital readmissions (100), and potential explanations for its greater success in meeting its aims compared with HVBP are explored in the next section of this article.

Medicare ACOs, including Pioneer ACOs and some MSSP ACOs, have been associated with some spending reductions and quality improvements (71). Evidence from the Pioneer ACO program, which targeted more advanced delivery systems with greater financial risk, have been modestly positive. An analysis of the first year of the program found that it was associated with a 1.2% reduction in Medicare spending (70). Another study of the first two years of the program found that beneficiaries attributed to Pioneer ACOs had smaller increases in total expenditures compared with general Medicare FFS beneficiaries (72). However, little to no savings have been observed in the much larger MSSP (70). In addition, the Pioneer model appears to be failing: Of the original 32 Pioneer ACOs, only 9 have remained in the program (17, 69). In contrast, the number of providers participating in the MSSP has steadily grown such that the program now encompasses approximately 14% of Medicare beneficiaries (71). Stronger incentives in the Pioneer program led to greater improvements but a high rate of dropouts, whereas weaker incentives in the MSSP led to minimal improvements. This pattern of results is not encouraging and calls into question the long-term sustainability of a program that relies on voluntary participation.

The effects of other initiatives, such as the PVBPM, have not yet been formally evaluated. The PVBPM appears to be having a modest financial impact on physicians through payment adjustments that range from a 1% penalty to a 5% bonus (20), but it is unclear whether it is driving changes in the organization and delivery of care on the physician or practice level.

PART 3: COMPARATIVE CASE STUDY OF INCENTIVE PROGRAMS

The HVBP and the HRRP are two examples of financial incentive programs in the Medicare system. Both programs started to impact hospital income in the 2013 fiscal year (October 1, 2012, to September 30, 2013) and retrospectively determine the size of incentives on the basis of performance during a defined measurement period. In the 2013 fiscal year, for example, incentives were based on performance from July 1, 2011, to March 31, 2012, for the HVBP and July 1, 2008, to June 30, 2011, for the HRRP. The HVBP aims to improve the quality of inpatient care, and the HRRP is intended to reduce readmissions. Even though both programs define a measurement period prior to the current program year, they differ significantly in terms of how performance is measured. The HRRP uses a formula to calculate a hospital's excess readmission ratio, which is then compared with the national average to determine the penalty size. In contrast, the HVBP rewards both achievement and improvement on four separate performance domains. The HVBP also incentivizes a greater number of measures and utilizes a more complex calculation method to evaluate performance. As noted previously, early assessments of the programs have also found markedly different levels of success. Although the HRRP appears to be achieving its objective of lowering readmission rates, the HVBP has not been associated with improvements in quality (13, 36, 41, 83, 100). We posit that the difference in success of the two programs is related to the substantial variations in their designs, and the behavioral economics literature provides a useful framework for comparing the program outcomes. Specifically, the HVBP suffers from small incentive payments and choice overload; its multiple quality measures lead to difficult decisions by hospitals about where to focus effort and resources to maximize payments. In contrast, the HRRP benefits from a simple incentive structure with larger financial incentives in the form of penalties, leveraging loss aversion.

Structure of the HVBP and HRRP Programs

The measures incentivized through the HVBP are categorized into four domains: outcomes, clinical process of care, patient experience of care, and efficiency (**Table 2**). Measures have changed during each year of the program, reflecting the CMS's increasing emphasis on patient outcomes rather than on process measures for evaluating quality (25). In the 2013 fiscal year, the HVBP included measures in only the clinical process and patient experience domains. Three outcome measures—for pneumonia, acute myocardial infarction (AMI), and heart failure 30-day mortality rates—were added to the program in 2014, and the efficiency domain (a measure of spending per beneficiary) was added in 2015. The outcomes domain was also expanded to include measures related to patient safety. In 2016, the number of clinical process measures was reduced by four, and the outcome domain was expanded to include infections associated with urinary catheters and surgical sites. Only the patient experience domain has remained stable throughout the initial years of the program. This domain contains eight measures based on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

The HRRP initially included three outcomes: readmissions after hospitalization for AMI, heart failure, and pneumonia. As part of the program, a readmission is defined as an admission to a hospital within 30 days of discharge from the same or another hospital. The HRRP takes an all-cause

Table 2 Incentives and targets under the Hospital Readmission Reduction Program and Hospital Value-Based Purchasing Program

Payment year	2013	2014	2015	2016	2017
Hospital Value-Based Purchasing Program					
Period assessed[a]	July 1, 2011–March 31, 2012	April 1, 2012–December 31, 2012	January 1, 2013–December 31, 2013	January 1, 2013–December 31, 2013	January 1, 2015–December 3, 2015
Payment withheld	1.0%	1.25%	1.5%	1.75%	2.0%
Process targets	12	13	12	8	3
Patient experience targets	8	8	8	8	8
Outcomes targets	0	3	5	8	10
Efficiency targets	0	0	1	1	1
Total targets	20	24	26	25	22
Hospital Readmission Reduction Program					
Period assessed	July 1, 2008–June 30, 2011	July 1, 2009–June 30, 2012	July 1, 2010–June 30, 2013	July 1, 2011–June 30, 2014	July 1, 2012–June 30, 2015
Maximum penalty	1%	2%	3%	3%	3%
Outcomes targets	3	3	6	6	7

[a]The performance periods listed in this table are for process and patient experience targets. Performance periods differ for efficiency and outcome targets.

approach in defining readmissions, so the reason for readmission does not need to be related to the initial hospitalization. Planned hospitalizations were originally counted as readmissions, but as of 2014 hospitals are not penalized for elective admissions. Readmissions following hospitalization for chronic obstructive pulmonary disease, total hip arthroplasty, and total knee arthroplasty were added in 2015, and readmission following coronary artery bypass graft will be added in 2017. Pneumonia readmissions will also be revised in 2017 to include aspiration pneumonia and sepsis patients with pneumonia present on admission (excluding patients with severe sepsis).

Design Elements of HVBP and HRRP and Their Effects on Outcomes

The HVBP is funded through a percentage reduction from hospitals' base operating diagnosis related group (DRG) payments, known as a withhold. In 2013, the reduction was 1%, but it has gradually increased by 0.25% each year and will reach 2% in 2017. The funds collected through the payment reduction are redistributed to hospitals on the basis of their total performance score (TPS). Hospitals may earn back funds that are less than, equal to, or more than the initial reduction; yet in practice, hospitals have faced only minor payment adjustments under the program (**Table 3**). The TPS is a composite indicator of a hospital's performance during the measurement period as compared with a baseline period (**Table 4**) (19). As of 2015, for clinical process and patient experience measures, the performance period is a one-year timeframe that occurs in the calendar year two years prior to the program year, whereas the baseline period is a one-year period that occurs four years prior to the program year.

The design of the HRRP differs significantly from that of the HVBP; in particular, the HRRP relies solely on penalties whereas the HVBP includes rewards. Under HRRP, hospitals faced a maximum reduction in total DRG payments of 1% in 2013, 2% in 2014, and 3% in 2015. The

Table 3 Financial impact of Hospital Readmission Reduction Program and Hospital Value-Based Purchasing Program on hospitals, fiscal year 2016. Source: Author's analysis of 2016 CMS Impact File

	Hospital Value-Based Purchasing Program		Hospital Readmission Reduction Program	
Financial impact (i)[a]	Number	%	Number	%
$-3\% \leq i < -2\%$	0	0	111	3.31
$-2\% \leq i < -1\%$	18	0.54	391	11.67
$-1\% \leq i < -0.5\%$	313	9.34	633	18.90
$-0.5\% \leq i < 0\%$	1,044	31.16	1,485	44.33
$i = 0$	270	8.06	730	21.79
$0.0\% < i < +0.5\%$	1,058	31.58	0	0
$+0.5\% \leq i < +1\%$	413	12.33	0	0
$+1\% \leq i < +2\%$	211	6.30	0	0
$+2\% \leq i < +3\%$	23	0.69	0	0
Total	**3,350**	**100%**	**3,350**	**100%**

[a]Financial impact pertains to change in base diagnosis related group rate for Medicare payments to acute care hospitals.

maximum 3% penalty will continue until 2017. The actual size of the penalty is determined by calculating the hospital's excess readmission ratio, which compares its predicted and expected readmission levels during the performance measurement period. The performance measurement period is a three-year timeframe that ends over one year prior to the date that the penalty is levied. For example, for the 2013 fiscal year, the performance measurement period was July 1, 2008–June 30, 2011. Readmission rates are risk-adjusted for patient age, sex, and comorbidities. Through the risk-adjustment process, a hospital's excess readmission ratio is compared with the national

Table 4 Calculation of performance under the Hospital Readmission Reduction Program and Hospital Value-Based Purchasing Program

Hospital Value-Based Purchasing Program total performance score	Hospital Readmission Reduction Program excess readmission ratio
1. Calculate achievement and improvement points for each measure in the process, efficiency, and outcomes domains 2. Add the greater of either the achievement points or improvement points for each measure to produce domain scores 3. Normalize the domain scores 4. Calculate Hospital Consumer Assessment of Healthcare Providers and Systems consistency score for the patient experience domain 5. Add the consistency score to the normalized score to calculate the patient experience domain score 6. Multiply domain scores by risk weights 7. Add weighted domain scores to calculate the total performance score	Calculate excess readmission ratio as risk-adjusted predicted readmissions/ risk-adjusted expected readmissions

average for hospitals that are treating a similar patient mix. Hospitals with better-than-expected readmission levels do not receive a bonus or any other form of incentive (**Table 3**).

Several evaluations suggest that the introduction of the HRRP was associated with changes in behavior and small reductions in readmission rates (13, 41, 100). Hospitals have increased the adoption of quality-improvement activities in response to the HRRP (11), and there was a relative decline of 0.032 percentage points per month for the targeted diagnoses during the first 30 months of the program (100). This result translates into a reduction of approximately 4.7% over the first 30 months of the program. Some evidence also shows that the HRRP is having a broader impact through reductions in readmission rates for non-Medicare patients and for conditions not penalized through the program, such as gastrointestinal disease (13, 41, 100). However, there is also some indication that the rate of reductions in readmissions is declining over time, which suggests that the success of the program may not be sustained in the future (100). In contrast to the HRRP's relative success, the results from evaluations of the HVBP have been disappointing. Recent studies on the early effects of the HVBP found no evidence that the program improved performance on clinical process or patient experience measures (83) or that it was associated with reduced mortality (36).

Behavioral economic theory would predict that the relatively large penalties in the HRRP, along with its simpler program design, would lead to its greater success as compared with HVBP (53). Although the design of the HVBP is moderately well aligned with best practice—it uses measurements with room for improvement, includes incentives for both achievement and improvement, and provides technical assistance to hospitals—the incentives may not be sufficiently large to motivate a response (85). Despite substantial between-hospital variations in quality for individual measures, the intricately constructed overall measure of quality in the HVBP results in a very small financial impact, even for hospitals with extremely high or low performance (99).

Although the levels of success of the two programs differ, both have generated concerns about unintended consequences. The primary concern is that hospitals that treat more disadvantaged patients are disproportionately penalized (44, 56, 81, 90). One study estimated that safety net hospitals are more than twice as likely to be penalized under the HRRP (44). Under the HVBP, safety net hospitals also face higher penalties, in part owing to worse performance in the patient experience domain (44). Other research has found that the disproportionate share hospital (DSH) index is inversely related to scores for achievement and improvement, as well as to overall payment adjustments (81). The penalties incurred by these hospitals have the potential to reduce the resources available to safety net hospitals to improve their quality of care, which may exacerbate health care disparities. Without revisions to the risk-adjustment procedure, hospitals may become more reluctant to serve disadvantaged patient populations.

Another concern specifically related to the HRRP is that hospitals are reducing readmissions by keeping patients in observational units rather than readmitting them. Although evidence suggests that the use of observational units has increased since the passage of the ACA, one study found that the increase was not associated with reductions in readmissions (18, 40, 100).

Medicare's HVBP and HRRP illustrate different approaches to implementing incentive programs in health care. The HVBP offers modest incentives in the form of rewards to offset an initial deduction, based on multiple indicators across four domains combined into a highly complex overall score. The HRRP offers larger incentives in the form of straightforward penalties, based on a handful of outcome indicators. In terms of motivating provider behavior and improving outcomes, the plain stick of the HRRP appears to be more effective than the fancy carrot of the HVBP, which is consistent with many of the predictions of behavioral economics and other psychological theories. Perhaps by incorporating other lessons from these theories, the HRRP could be made even more effective, for example by levying penalties more frequently or moving

from relative readmission targets—which can penalize high levels of performance if another hospital has performed even marginally better—to absolute targets. However, the greatest impact of the HRRP was in the first 30 months of the program (100), with little improvement after the third year. This pattern of limited, short-term success is similar to the pattern seen in the UK's Quality and Outcomes Framework (31), which suggests that continued improvement under any framework may be difficult to achieve with only minor modifications.

CONCLUSIONS

The idea that reimbursement incentives can improve quality and value has proven sufficiently seductive to justify the widespread adoption of value-based payment programs in the United States and the United Kingdom. However, much of the evidence suggests that incentives for providers do not improve value or lead to better outcomes for patients. Programs are slowly becoming more sophisticated, but unless clear evidence for cost-effectiveness emerges soon, the incentive experiment may have to be abandoned. Many commentators see this abandonment as inevitable, believing incentive programs to be fundamentally flawed. Some concerns are technical in nature and relate to the difficulty of accurately defining and measuring the most important aspects of quality with the greatest impacts on patient outcomes (7). Incentive schemes, as a consequence of their one-size-fits-all nature, also promote a guideline-driven approach that discourages physicians from considering individual patient preferences (67). Mechanisms to counter the overriding of patient preferences, such as allowing physicians to exclude unsuitable or dissenting patients, introduce problems of gaming and suboptimal care (60). A more fundamental concern is that altruism, trust, and compassion—indispensable virtues in the field of health care (28)—will inevitably be degraded by pecuniary incentives (3, 49, 97). Berwick (8) has argued that ushering in the next era of health care will require reducing excessive measurement, complex incentives, and profit maximization—an approach that is directly opposite to that proposed by advocates of incentives.

Advocates would argue that incentives can play an important balancing role in a blended payment model, countering the perverse incentives of other forms of remuneration (77), and that the failures of incentives to date represent part of the learning process as program designs develop. In enlisting behavioral economics to rescue a faltering idea, it may be that they are simply yoking two fashionable but unproven bandwagons together; it would not be the first time that the medical fraternity favored intuitive appeal over the weight of evidence (22). However, lessons from social psychology and behavioral economics strongly suggest that incentives in health care have not been effectively calibrated to date, and evaluations of value-based payment programs initiated under the ACA support this conclusion.

The complexity and choice overload inherent in the HVBP program, combined with its small incentives, have likely undermined its effectiveness. At the same time, the penalty structure and larger incentives in the HRRP may have effectively leveraged loss aversion, leading to greater responsiveness from hospitals. Because value-based payment programs are one of the few tools currently being used by the CMS to improve value, getting the program designs right will be crucial for the success of health care reforms.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

LITERATURE CITED

1. Abrams M, Nuzum R, Zezza M, Ryan J, Kiszia J, Guterman S. 2015. *The Affordable Care Act's payment and delivery system reforms: a progress report at five years*. Commonw. Fund Issue Brief 12, Washington, DC. **http://www.commonwealthfund.org/publications/issue-briefs/2015/may/aca-payment-and-delivery-system-reforms-at-5-years**
2. AHRQ (Agency for Healthc. Res. Quality). 2014. *Interim Update on 2013 Annual Hospital-Acquired Condition Rate and Estimates of Cost Savings and Deaths Averted from 2010 to 2013*. Rockville, MD: AHRQ. **http://www.ahrq.gov/professionals/quality-patient-safety/pfp/interimhacrate2013.pdf**
3. Akerlof G, Kranton R. 2010. It is time to treat Wall Street like Main Street. *Financial Times*, Feb.24.**https://www.ft.com/content/3a8c9e76-217c-11df-830e-00144feab49a**
4. Alshamsan R, Majeed A, Ashworth M, Car J, Millett C. 2010. Impact of pay for performance on inequalities in health care: systematic review. *J. Health Serv. Res. Policy* 15(3):178–84
5. Asch D, Troxel A, Stewart W, Sequist T, Jones J, et al. 2015. Effect of financial incentives to physicians, patients, or both on lipid levels. *JAMA* 314(18):1926–35
6. Bardach N, Wang J, De Leon S, Shih S, Boscardin W, et al. 2013. Effect of pay-for-performance incentives on quality of care in small practices with electronic health records. *JAMA* 310(10):1051–59
7. Berenson R, Rice T. 2015. Beyond measurement and reward: methods of motivating quality improvement and accountability. *Health Serv. Res.* 50(S2):2155–86
8. Berwick D. 2015. *Keynote four*. Presented at Annu. Natl. Forum on Quality Improv. in Health Care, 27th, Orlando
9. Bilimoria K. 2015. Facilitating quality improvement—pushing the pendulum back towards process measures. *JAMA* 314(13):1333–34
10. Blumenthal D, Abrams M, Nuzum R. 2015. The Affordable Care Act at 5 years. *N. Engl. J. Med.* 373(16):1580–58
11. Bradley EH, Sipsma H, Horwitz LI, Curry L, Krumholz HM. 2014. Contemporary data about hospital strategies to reduce unplanned readmissions: What has changed?. *JAMA Intern. Med.* 174(1):154–56
12. Camerer C, Malmendier U. 2007. Behavioral economics of organizations. In *Behavioural Economics and Its Applications*, ed. P Diamond, H Vartiainen, pp. 235–90. Princeton, NJ: Princeton Univ. Press
13. Carey K, Lin M. 2015. Readmissions to New York hospitals fell for three target conditions from 2008 to 2012, consistent with Medicare goals. *Health Aff.* 34(6):978–85
14. Casalino L. 2014. Accountable Care Organizations—the risk of failure and the risks of success. *N. Engl. J. Med.* 371(18):1750–51
15. Casalino L, Elster A, Eisenberg A, Lewis E, Montgomery J, Ramos D. 2007. Will pay-for-performance and quality reporting affect health care disparities? *Health Aff.* 26(3):w405–14
16. Chokshi D. 2014. Improving health care for veterans—a watershed moment for the VA. *N. Engl. J. Med.* 371(4):297–99
17. CMS (Cent. Medicare Medicaid Serv.). 2006. *Pioneer ACO model*. Updated Sept. 27, CMS, Baltimore, Md. **https://innovation.cms.gov/initiatives/Pioneer-ACO-Model/**
18. CMS (Cent. Medicare Medicaid Serv.). 2014. *Medicare Hospital Quality Chartbook: Performance Report on Outcome Measures*. Baltimore, MD: CMS. **https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/hospitalqualityinits/downloads/medicare-hospital-quality-chartbook-2014.pdf**
19. CMS (Cent. Medicare Medicaid Serv.). 2015. *Hospital Value-Based Purchasing*. Baltimore, MD: CMS. **http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/Hospital_VBPurchasing_Fact_Sheet_ICN907664.pdf**
20. CMS (Cent. Medicare Medicaid Serv.). 2015. *Summary of 2015 Physician Value-Based Payment Modifier Policies*. Baltimore, MD: CMS. **http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeedbackProgram/Downloads/2015-Value-Modifier-Results.pdf**
21. CMS (Cent. Medicare Medicaid Serv.). 2016. *Value-based payment modifier*. Updated Sept. 15, CMS, Baltimore, Md. **https://www.cms.gov/medicare/medicare-fee-for-service-payment/physicianfeedbackprogram/valuebasedpaymentmodifier.html#**
22. Cohen L, Rothschild H. 1979. The bandwagons of medicine. *Perspect. Biol. Med.* 22(4):531–38

23. Conrad DA, Perry L. 2009. Quality-based financial incentives in health care: Can we improve quality by paying for it? *Annu. Rev. Public Health* 30(1):357–71
24. Damberg CL, Elliott M, Ewing BA. 2015. Pay-for-performance schemes that use patient and provider categories would reduce payment disparities. *Health Aff.* 34(1):134–42
25. Damberg CL, Sorbero ME, Lovejoy SL, Martsolf G, Raaen L, Mandel D. 2014. *Measuring Success in Health Care Value-Based Purchasing Programs Summary and Recommendations*. Santa Monica, CA: RAND Corp. **http://www.rand.org/pubs/research_reports/RR306z1.html**
26. De Brantes F, Woolhandler S. 2013. Should physician pay be tied to performance? *Wall Street Journal* June 16. **http://www.wsj.com/articles/SB10001424127887323528404578454432476458370**
27. Deci E, Koestner R, Ryan R. 1999. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychol. Bull.* 125(6):627–68
28. Doran T. 2015. Incentivising improvements in health care delivery: a response to Adam Oliver. *Health Econ. Policy Law* 10(3):351–56
29. Doran T, Fullwood C, Kontopantelis E, Reeves D. 2008. Effect of financial incentives on inequalities in the delivery of primary clinical care in England: analysis of clinical activity indicators for the quality and outcomes framework. *Lancet* 372:728–36
30. Doran T, Kontopantelis E, Reeves D, Sutton M, Ryan A. 2014. Setting performance targets in pay for performance programmes: What can we learn from QOF? *BMJ* 348:g1595
31. Doran T, Kontopantelis E, Valderas JM, Campbell S, Roland M, et al. 2011. Effect of financial incentives on incentivised and non-incentivised clinical activities: longitudinal analysis of data from the UK Quality and Outcomes Framework. *BMJ* 342:d3590
32. Eijkenaar F. 2013. Key issues in the design of pay for performance programs. *Eur. J. Health Econ.* 14(1):117–31
33. Eijkenaar F, Emmert M, Scheppach M, Schöffski O. 2013. Effects of pay for performance in health care: a systematic review of systematic reviews. *Health Policy* 110(23):115–30
34. Emanuel E, Ubel P, Kessler J, Meyer G, Muller R, et al. 2015. Using behavioral economics to design physician incentives that deliver high-value care. *Ann. Intern. Med.* 164(2):114–19
35. Emmert M, Eijkenaar F, Kemter H, Esslinger A, Schöffski O. 2011. Economic evaluation of pay-for-performance in health care: a systematic review. *Eur. J. Health Econ.* 13(6):755–67
36. Figueroa J, Tsugawa Y, Zheng J, Orav E, Jha A. 2016. Association between the value-based purchasing pay for performance program and patient mortality in US hospitals: observational study. *BMJ* 353:i2214
37. Flodgren G, Eccles M, Shepperd S, Scott A, Parmelli E, Beyer F. 2011. An overview of reviews evaluating the effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes. *Cochrane Database Syst. Rev.* (7):CD009255
38. Frølich A, Talavera J, Broadhead P, Dudley R. 2007. A behavioral model of clinician responses to incentives to improve quality. *Health Policy* 80(1):179–93
39. Fryer R, Levitt S, List J, Sadoff S. 2012. *Enhancing the efficacy of teacher incentives through loss aversion: a field experiment*. Natl. Bur. Econ. Res. Work. Pap. 18237. **http://www.nber.org/papers/w18237**
40. Gerhardt G, Yemane A, Apostle K, Oelschlaeger A, Rollins E, Brennan N. 2014. Evaluating whether changes in utilization of hospital outpatient services contributed to lower Medicare readmission rate. *Med. Med. Res. Rev.* 4(1):e1–13
41. Gerhardt G, Yemane A, Hickman P, Oelschlaeger A, Rollins E, Brennan N. 2013. Medicare readmission rates showed meaningful decline in 2012. *Med. Med. Res. Rev.* 3(2):pii:mmrr.003.02.b01
42. Gigerenzer G, Brighton H. 2009. Homo heuristicus: why biased minds make better inferences. *Topics Cogn. Sci.* 1:107–43
43. Gillam S, Siriwardena A, Steel N. 2012. Pay-for-performance in the United Kingdom: impact of the quality and outcomes framework—a systematic review. *Ann. Fam. Med.* 10(5):461–68
44. Gilman M, Hockenberry JM, Adams EK, Milstein AS, Wilson IB, Becker ER. 2015. The financial effects of value-based purchasing and the Hospital Readmission Reduction Program on safety net hospitals in 2014: a cohort study. *Ann. Intern. Med.* 163(6):427–36
45. Glucksberg S. 1962. The influence of strength of drive on functional fixedness and perceptual recognition. *J. Exp. Psychol.* 63(1):36–41

46. Gneezy U, Rustichini A. 2000. Pay enough or don't pay at all. *Q. J. Econ.* 115(3):791–810
47. Gravelle H, Sutton M, Ma A. 2010. Doctor behaviour under a pay for performance contract: treating, cheating, and case finding?. *Econ. J.* 120(542):f129–56
48. Halpern S, French B, Small D, Saulsgiver K, Harhay M, et al. 2015. Randomized trial of four financial-incentive programs for smoking cessation. *N. Engl. J. Med.* 372(22):2108–17
49. Heath I. 2004. The cawing of the crow. . .Cassandra-like, prognosticating woe. *Brit. J. Gen. Pract.* 54(501):320–21
50. Houle S, McAlister F, Jackevicius C, Chuck A, Tsuyuki R. 2012. Does performance-based remuneration for individual health care practitioners affect patient care? A systematic review. *Ann. Intern. Med.* 157(12):889–99
51. IOM (Inst. Med.). 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century: Health and Medicine Division*. Washington, DC: IOM. **http://www.nationalacademies.org/hmd/Reports/2001/Crossing-the-Quality-Chasm-A-New-Health-System-for-the-21st-Century.aspx**
52. IOM (Inst. Med.). 2002. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care: Health and Medicine Division*. Washington, DC: IOM. **http://www.nationalacademies.org/hmd/Reports/2002/Unequal-Treatment-Confronting-Racial-and-Ethnic-Disparities-in-Health-Care.aspx**
53. Jha AK. 2013. Time to get serious about pay for performance. *JAMA* 309(4):347–48
54. Jha AK, Epstein A, Orav EJ. 2011. The effect of financial incentives on hospitals that serve poor patients. *Ann. Intern. Med.* 154(5):370–71
55. Jha AK, Joynt KE, Orav EJ, Epstein AM. 2012. The long-term effect of premier pay for performance on patient outcomes. *N. Engl. J. Med.* 366(17):1606–15
56. Joynt KE, Jha AK. 2013. Characteristics of hospitals receiving penalties under the hospital readmissions reduction program. *JAMA* 309(4):342–43
57. Kahneman D, Tversky A. 1979. Prospect theory: an analysis of decision under risk. *Econometrica* 47(2):263–92
58. Khullar D, Chokshi D, Kocher R, Reddy A, Basu K, et al. 2015. Behavioral economics and physician compensation—promise and challenges. *N. Engl. J. Med.* 372(24):2281–83
59. Knutson B, Fong G, Kaiser E, Adams C, Hommer D. 2000. Anticipation of monetary rewards activates nucleus accumbens. *NeuroImage* 11(5):S237
60. Kontopantelis E, Springate D, Ashcroft D, Valderas JM, Van der Veer S, et al. 2015. Associations between exemption and survival outcomes in the UK's primary care pay-for-performance programme: a retrospective cohort study. *BMJ Qual. Saf.* 25:657–70
61. Kontopantelis E, Springate D, Ashworth M, Webb R, Buchan I, Doran T. 2015. Investigating the relationship between quality of primary care and premature mortality in England: a spatial whole-population study. *BMJ* 350:h904
62. Kreif N, Grieve R, Hangartner D, Turner A, Nikolova S, Sutton M. 2015. Examination of the synthetic control method for evaluating health policies with multiple treated units. *Health Econ.* 24(11):1300–17
63. Kristensen SR, Meacock R, Turner AJ, Boaden R, McDonald R, et al. 2014. Long-term effect of hospital pay for performance on mortality in England. *N. Engl. J. Med.* 371:540–48
64. Lazear EP. 2000. Performance pay and productivity. *Am. Rev.* 90(5):1346–61
65. Lester H, Schmittdiel J, Selby J, Fireman B, Campbell S, et al. 2010. The impact of removing financial incentives from clinical quality indicators: longitudinal analysis of four Kaiser Permanente indicators. *BMJ* 340:c1898
66. Markovitz AA, Ryan AM. 2016. Pay-for-performance: disappointing results or masked heterogeneity? *Med. Care Res. Rev.* In press
67. McCartney M, Treadwell J, Maskrey N, Lehman R. 2016. Making evidence based medicine work for individual patients. *BMJ* 353:i2452
68. McDonald R, Roland M. 2009. Pay for performance in primary care in England and California: comparison of unintended consequences. *Ann. Fam. Med.* 7(2):121–27
69. McWilliams JM, Chernew ME, Landon BE, Schwartz AL. 2015. Performance differences in year 1 of pioneer accountable care organizations. *N. Engl. J. Med.* 372(20):1927–36
70. McWilliams JM, Hatfield LA, Chernew ME, Landon BE, Schwartz AL. 2016. Early performance of accountable care organizations in Medicare. *N. Engl. J. Med.* 374:2357–66

71. McWilliams JM, Landon BE, Chernew ME, Zaslavsky AM. 2014. Changes in patients' experiences in Medicare accountable care organizations. *N. Engl. J. Med.* 371:1715–24
72. Nyweide DJ, Lee W, Cuerdon TT, Pham HH, Cox M, et al. 2015. Association of Pioneer accountable care organizations versus traditional Medicare fee for service with spending, utilization, and patient experience. *JAMA* 313(21):2152–61
73. Pink D. 2009. *Drive*. New York: Riverhead Books
74. Petersen LA, Simpson K, Pietz K, Urech TH, Hysong SJ, et al. 2013. Effects of individual physician-level and practice-level financial incentives on hypertension care. *JAMA* 310(10):1042–50
75. Rice T. 2013. The behavioral economics of health and health care. *Annu. Rev. Public Health* 34:431–47
76. Roland M. 2004. Linking physicians' pay to the quality of care—a major experiment in the United Kingdom. *N. Engl. J. Med.* 351(14):1448–54
77. Roland M, Dudley R. 2015. How financial and reputational incentives can be used to improve medical care. *Health Serv. Res.* 50:2090–15
78. Rosenthal MB. 2015. Physician payment after the SGR—the new meritocracy. *N. Engl. J. Med.* 373(13):1187–89
79. Rosenthal M, Fernandopulle R, Song H, Landon B. 2004. Paying for quality: providers' incentives for quality improvement. *Health Aff.* 23(2):127–41
80. Ryan AM. 2009. Effects of the Premier Hospital Quality Incentive Demonstration on Medicare patient mortality and cost. *Health Serv. Res.* 44(3):821–42
81. Ryan AM. 2013. Will value-based purchasing increase disparities in care? *N. Engl. J. Med.* 369(26):2472–74
82. Ryan AM, Blustein J, Doran T, Michelow MD, Casalino L. 2012. The effect of phase 2 of the Premier Hospital Quality Incentive Demonstration on incentive payments to hospitals caring for disadvantaged patients. *Health Serv. Res.* 47(4):1418–36
83. Ryan AM, Burgess JF, Pesko MF, Borden WB, Dimick JB. 2015. The early effects of Medicare's mandatory pay-for-performance program. *Health Serv. Res.* 50(1):81–97
84. Ryan AM, Burgess JF Jr., Tompkins CP, Wallack SS. 2009. The relationship between Medicare's process of care quality measures and mortality. *Inquiry* 46(3):274–79
85. Ryan AM, Damberg CL. 2013. What can the past of pay-for-performance tell us about the future of value-based purchasing in Medicare? *Healthcare* 1(1–2):42–49
86. Ryan AM, Krinsky S, Kontopantelis E, Doran T. 2016. Long-term evidence for the effect of pay-for-performance in primary care on mortality in the UK: a population study. *Lancet* 388:268–74
87. Ryan AM, Nallamothu B, Dimick J. 2012. Medicare's public reporting initiative on hospital quality had modest or no impact on mortality from three key conditions. *Health Aff.* 31(3):585–92
88. Ryan RM, Deci E. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55(1):68–78
89. Scott A, Sivey P, Ait Ouakrim D, Willenberg L, Naccarella L, et al. 2011. The effect of financial incentives on the quality of health care provided by primary care physicians. *Cochrane Database Syst. Rev.* 9:CD008451
90. Sheingold SH, Zuckerman R, Shartzer A. 2016. Understanding Medicare hospital readmission rates and differing penalties between safety-net and other hospitals. *Health Aff.* 35(1):124–31
91. Simon H. 1978. Rationality as the process and product of thought. *Am. Econ. Rev.* 68:1–16
92. Siva I. 2010. Using the lessons of behavioral economics to design more effective pay-for-performance programs. *Am. J. Manag. C* 16(7):497–503
93. Song Z, Rose S, Safran DG, Landon BE, Day MP, Chernew ME. 2014. Changes in health care spending and quality 4 years into global payment. *N. Engl. J. Med.* 371(18):1704–14
94. Sutton M, Nikolova S, Boaden R, Lester H, McDonald R, Roland M. 2012. Reduced mortality with hospital pay for performance in England. *N. Engl. J. Med.* 367(19):1821–28
95. Tversky A, Kahneman D. 1974. Judgments under uncertainty: heuristics and biases. *Science* 185:1124–31
96. Victora C, Vaughan J, Barros F, Silva A, Tomasi E. 2000. Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet* 356:1093–98

97. Vladeck B. 2004. Ineffective approach. *Health Aff.* 23(2):285–86
98. Vohs K. 2006. The psychological consequences of money. *Science* 314:1154–56
99. Werner RM, Dudley RA. 2012. Medicare's new Hospital Value-Based Purchasing Program is likely to have only a small impact on hospital payments. *Health Aff.* 31(9):1932–40
100. Zuckerman RB, Sheingold SH, Orav EJ, Ruhter J, Epstein AM. 2016. Readmissions, observation, and the hospital readmissions reduction program. *N. Engl. J. Med.* 374:1543–51