

Top-Down and Bottom-Up Approaches to Health Care Quality: The Impacts of Regulation and Report Cards

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Abstract

The high cost of the US health care system does not buy uniformly high quality of care. Concern about low quality has prompted two major types of public policy responses: regulation, a top-down approach, and report cards, a bottom-up approach. Each can result in either functional provider responses, which increase quality, or dysfunctional responses, which may lower quality. What do we know about the impacts of these two policy approaches to quality? To answer this question, we review the extant literature on regulation and report cards. We find evidence of both functional and dysfunctional effects. In addition, we identify the areas in which additional research would most likely be valuable.

INTRODUCTION

Although the United States spends, by far, a higher fraction of its gross domestic product on health care than does any other country, it does not excel in aggregate indicators of health such as longevity and infant mortality (34). Many studies have raised questions about the quality of medical care and its contribution to health. For example, an Institute of Medicine (IOM) study reported that between 44,000 and 98,000 Americans die each year because of medical errors. Annually 100,000 die from health care–acquired infections (62). Another IOM study reported that US hospitals average one medication error per patient day (4). Innovations seem to take 15 to 20 years to move from discovery to routine clinical care (27). Moreover, performance varies widely across hospitals and geographic regions in terms of mortality and readmission rates for many conditions (65). As health reform will increase access for millions of Americans (45), concerns about quality will only become more salient.

The IOM defines quality as “[t]he degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (27, p. 1161). Concerns about quality of care have persisted for decades and underlie many of the provisions of the Affordable Care Act [Pub. L. 111–148 (2010)], such as the National Strategy for Quality Improvement, accountable care organizations (ACOs), and reporting requirements. During most of the twentieth century, efforts to address these concerns have been regulatory in nature, whether spearheaded by governments, federal and state, or private professional organizations such as the Joint Commission (formerly known as the Joint Commission on Accreditation of Healthcare Organizations) or the various physicians’ specialty boards. These efforts focus on setting standards, typically related to the structure and processes of care (29), followed by monitoring adherence to these standards. The development in information technology during the 1990s, which allowed assessment of outcomes across entire patient populations for the first time, made available a new and more direct way to evaluate care. Risk-adjusted patient outcomes as measures of quality, such as risk-adjusted mortality rates, offer feasible means for quality assessment of individual care providers. The ability of patients to intuitively understand these outcomes paved the way for public quality reporting.

Quality regulation and public quality report cards are the two major policy responses to what have long been recognized as the principal reasons health care markets fail to be efficient: information asymmetries favoring health care providers (3) and third-party payment incentives for overprovision and overconsumption of care (91). Both often prevent competition from delivering the highest possible quality at any given price. As in other cases involving information asymmetry (104), public policy interventions are designed to either improve the functioning of the market by correcting the underlying problems, i.e., the information asymmetry, or improve market outcomes, i.e., regulating the behavior of market participants to mimic the behavior that would have prevailed in the absence of market failures. The first is a bottom-up approach, and the latter is a top-down approach.

Regulation in health care markets takes several different forms. Often it operates through the licensing of or certification requirements for providers, such as minimum educational attainment for key personnel or staffing levels. Licensing seeks to place a floor on quality by restricting entry of low-quality providers into the market, whereas certification provides a way for providers in the market to better convey the levels of quality they offer. Whereas licensing is typically mandatory, such as the requirement that all physicians hold degrees from accredited medical schools and be licensed by the state, certification is usually voluntary, for example physician specialists may or may not choose to become or remain board certified. These examples can be viewed as regulations that target structure. Other types of regulations target processes of care. They involve setting

standards for how resources are used in producing care, for monitoring their use, and for applying sanctions for failures to meet the standards. For example, regulations may require that all nursing home patients receive flu vaccinations. Although regulations can apply standards to outcomes, they most often focus on either the structure or the processes that produce the outcomes.

Quality report cards require organizations to provide data about their structure, processes, or outcomes to some third party that converts the data to comparative information and disseminates it to their potential customers (40). The information can facilitate better choices by individual consumers and organizations, such as insurers and other payers. Report cards are expected to affect quality in several ways. Lowering the cost to consumers of searching for high-quality providers may increase the demand elasticity for quality and change the trade-off between quality and price (or quality and distance when patients are fully insured) that patients make when choosing providers, thus altering the incentives facing providers. Concerns about professional reputations, responses to so-called “name and shame” (7), can encourage providers to improve quality. And for those providers whose mission includes provision of high quality, the information in public report cards lowers the barriers to identifying opportunities for quality improvement.

What do we know about the relative effectiveness and relative costs of regulation and quality reporting in improving quality? Theory suggests that both can lead to functional responses, i.e., actual improvements in quality. However, dysfunctional responses are also likely (40). Providers may react by “cream skimming”: Rather than investing in quality improvement, providers may attempt to improve their reported or monitored performance by treating patients who are less sick. They may also engage in “teaching to the test”: Providers shift resources from unmonitored, or masked, areas to areas that are scrutinized and reported on. These responses frustrate the intentions of the regulatory and reporting policies, and both regulation and report cards are susceptible to them.


The field has a large body of empirical evidence, focusing particularly on the effectiveness of report cards. In this review, we seek to expand on this evidence by examining and contrasting the effects of regulation and report cards. We identify areas in which the evidence supports or contradicts the predictions of the theory about functional and dysfunctional providers’ behavior, and we identify directions for future research.

REVIEW METHODS

Previous reviews of the literature related to improving quality of health care have focused on various aspects of report cards (14, 32, 37, 51, 59, 63, 74, 94, 98, 99, 100). We took the review by Fung et al. (37), which reviewed the report card literature through March 2006, as our starting point and extended it through March 2012. We extended our review to include research about dysfunctional effects and costs of report cards and the literature on the effectiveness, costs, and dysfunctional effects of regulation.

We performed a systematic review of the extant empirical literature on quality regulation and report cards in the US medical care system. First, we searched the following databases: PubMed, EconLit, Web of Knowledge, and Business Source Premier. (See Online Appendix A for search terms. Follow the **Supplemental Material link** from the Annual Reviews home page at <http://www.annualreviews.org>.) In addition, we searched these databases for articles on quality regulation. We also checked for citations and related citations to all the previous reviews cited above. Finally, we evaluated the reference lists of all manuscripts obtained through the primary searches.

The searches yielded a large number of studies on quality regulation and on report cards since 2006. Most of the research on quality regulation concerns nursing homes. We summarize this

 **Supplemental Material**

literature by type of regulation. The recent literature on report cards is broader, covering hospitals, physicians/clinics, health plans/health maintenance organizations (HMOs), nursing homes, and home health agencies. We summarize this literature in terms of consumer demand and choice, functional provider responses that improve quality, dysfunctional provider responses that likely reduce quality, and financial impacts on providers.

REGULATION: SEEKING QUALITY FROM THE TOP DOWN

Federal and state governments regulate most health care providers, ranging from full-service hospitals to dialysis service centers. Nonetheless, recent empirical research on the impact of regulation on the quality of health care has focused almost exclusively on care provided by nursing homes. Long-standing concern about quality of care and the important roles of Medicaid and Medicare as third-party payers have resulted in substantial state and federal regulation of the quality of nursing home care. Variation over time and across states has given researchers some leverage for assessing the impact of these regulations on the quality of nursing home care.

Investigation of the effects of regulation on nursing home quality is facilitated by the availability of two national data sets: the Minimum Data Set (MDS) and the On-Line Survey and Certification Automated Records (OSCAR). Although some concerns have been raised about overreporting of professional staffing levels in OSCAR (57), these data sets are the mainstay of empirical research on the effects of policy on the quality of care in nursing homes.

As displayed in **Table 1**, we identified three categories of nursing home regulation that have been empirically investigated. Two of these can be thought of as regulatory regimes aimed at increasing quality in general, and one relates to a specific nursing home policy: the Medicaid bed-hold requirements.

Beyond the regulation of nursing homes, the only other research in recent years on the impact of regulations specifically targeting quality has focused on Medicare standards for community acquired pneumonia (CAP) treatment delays in hospitals. These studies are also included in **Table 1** and discussed below.

Direct Regulation of Nursing Home Quality

More than 90% of nursing homes in the United States participate in Medicare and Medicaid. To participate they must meet more than 170 quality and health standards set by the Centers for Medicare and Medicaid Services (CMS). States have the option of imposing additional standards. Compliance with both federal and state standards is monitored by state surveyors. State survey teams can issue sanctions, impose financial penalties, and take administrative actions on the basis of the survey results. The delegation of monitoring compliance to the states results in considerable variation in regulatory stringency across states and over time (58).

Empirically exploiting the variation in regulatory stringency is complicated because of the possibility that stringency is endogenous to quality—not only might stringency affect quality but prior levels of quality may also affect current levels of stringency. Researchers have attempted to address the possible endogeneity of stringency with panel data and instrumental variables methods. Each method finds some effect of stringency on quality: using citations as measures of stringency, Bowlblis & Lucas (11) find small positive effects using panel data, and Mukamel et al. (83) using the Harrington Regulation Stringency Index (HRSI) (48) find positive effects for four of seven quality measures studied using instrumental variables. Li et al. (67) find that increased stringency increases voluntary termination of operations by poorly performing nursing homes, suggesting improvement in quality through elimination of poorly performing facilities.

Table 1 Empirical studies and surveys of studies on the impacts of regulation on quality of care^{a,b}

Category	Study	Major finding
Direct general regulation of quality in nursing homes	Bowblis & Lucas (11)	Regulatory stringency had some positive effects. There was no effect from increase in licensing for nursing staff.
	Mukamel et al. (83)	Regulatory stringency was associated with improvements in quality for four of seven quality measures studied.
	Mukamel et al. (78)	One standard deviation increase in state regulatory stringency increased nursing home costs by 1.1%.
	Bowblis et al. (10)	Teaching to the test response was evidenced by greater use of antipsychotics in response to stringency.
	Li et al. (67)	Regulatory stringency increased voluntary termination by poorly performing nursing homes.
	Colón-Emeric et al. (26)	Nursing home regulation increased mindful behavior of staff in resident-centered nursing homes but reduced it in cost-focused nursing homes.
	Cherry et al. (23)	Adversarial relationship between staff and state surveyors increased paperwork and diverted effort from patient care.
Minimum staffing standards in nursing homes	Bowblis (9)	Minimum direct-care staffing requirements disproportionately increased staffing and quality in nursing homes most reliant on Medicaid patients.
	Tong (102)	Higher staffing standards increased staffing in previously low-staffed facilities.
	Kim et al. (60)	Higher RN staffing in nursing homes that consistently meet overall staffing standards reduced deficiencies.
	Kim et al. (61)	General staffing and RN staffing resulted in fewer overall, quality-of-care, and serious deficiencies.
	Park & Stearns (89)	Higher standards did not improve quality but did improve deficiencies for nonprofit nursing homes.
	Konetzka et al. (64)	RN staffing had positive effects on quality.
	Castle (18)	About 40% of 70 studies (1991–2006) reviewed found some relationship between staffing and quality, though many studies employed questionable methods.
	Collier & Harrington (25)	A review of studies (2002–2007) showed a positive relationship between RN staffing and quality.
	Maas et al. (72, 73)	General relationship between higher RN staffing and quality was found.
	Castle & Engberg (19)	The study found that staffing characteristics, including turnover, affect quality.
	Harrington et al. (49)	Standards were more effective than Medicaid reimbursement in increasing staffing levels.
	Lindbloom et al. (70)	A review of studies (1980–2005) found that inadequate staffing appears to contribute to elder abuse.
	Arling et al. (2)	The study found no direct relationship of staffing on process and outcome measures, but higher staffing was related to direct care time and ADL decline related to unlicensed care.

(Continued)

Table 1 (Continued)

Category	Study	Major finding
Medicaid bed-hold policies for nursing homes	Bostick et al. (8)	A review of studies (1975–2003) found a positive relationship between staffing levels and quality and a negative relationship between staffing levels and turnover, especially for licensed staff.
	Grabowski et al. (41)	Bed-hold requirements were positively related to rehospitalizations of Medicare postacute patients.
	Intrator et al. (52, 53)	Bed-hold requirements have positively affected the continuity of care.
	Gruneir et al. (43)	Bed-hold requirements were positively related to hospitalizations.
Direct regulation of quality in hospitals: CAP treatment delays	Pines et al. (92)	Despite widespread skepticism about the outcome measure, all participating providers implemented changes to meet new guidelines.
	Kanwar et al. (56)	Compliance led to increases in misdiagnosis of CAP and inappropriate use of antibiotics.
	Welker et al. (106)	Time to first diagnosis did not improve, but accuracy has deteriorated.
	Friedberg et al. (36)	Study did not find evidence for dysfunctional strategies with respect to rates of pneumonia diagnoses, antibiotic use, and wait times.

^a Abbreviations: ADL, activities of daily living; CAP, community acquired pneumonia; RN, registered nurse.

^b Bolded citations: findings reported as statistically significant.

Relatively little research has addressed dysfunctional responses. Bowlblis et al. (10) find increased use of antipsychotics in response to increased stringency regulating these drugs as evidence of teaching to the test. Colón-Emeric et al. (26) find that stringent regulation has a mixed impact on mindful behavior of staff.

Little research addresses the cost of direct regulation. Only one study, Mukamel et al. (78), attempted to quantify the costs that increased stringency imposes on nursing homes. They found that a one-standard deviation increase in the HRSI results in a 1.1 % increase in nursing home costs. In terms of indirect costs, Cherry et al. (23), consistent with theories of the “regulatory ratchet” (5), report that the adversarial relationship between nursing home staff and state surveyors increased paperwork and diverted effort from patient care.

Minimum Staffing Requirements for Nursing Homes

Minimum staffing requirements have been investigated both implicitly, through studies that assess the link between staffing and quality, as well as explicitly, through studies that assess the impact of staffing requirements on staffing levels, staffing composition, or quality of care.

On the basis of a review of studies published between 1975 and 2003, Bostick et al. (8) report a positive relationship between staffing and quality of care and a negative relationship between staffing and turnover. Castle & Engberg (19) in turn relate both low staffing and high turnover to low quality of care. Reviewing studies published between 1991 and 2006, Castle (18) reports that the majority of studies find a link between staffing and quality, although many employ questionable methods. Focusing on more recent studies, between 2002 and 2007, Collier & Harrington (25) also

raise concerns about study methods but nonetheless find a link between staffing with registered nurses (RNs) and quality. Reviewing evidence from a variety of sources, Maas et al. (72, 73) reach a similar conclusion. Looking specifically at studies of elder abuse published between 1980 and 2005, Lindbloom et al. (70) report that inadequate staffing contributes to elder abuse.

Addressing concerns about the possible endogeneity of staffing and quality, Konetzka et al. (64) find larger effects on quality of RN staffing than those reported in earlier studies. Harrington et al. (49) find that standards are more effective in increasing staffing than are Medicaid reimbursement rates. Kim et al. (60, 61) find a negative relationship between RN staffing and deficiencies.

In contrast to the general findings of these reviews, Arling et al. (2) fail to find a strong relationship between unit staffing and the quality of care using minute-by-minute activity data collected from nursing home staff in a large multifacility study. Although the researchers find a link between staffing levels and the quantity of direct care, they call for research that takes account of organization, as well as staffing, on quality of care. Tong (102), Park and Stearns (89), and Bowlblis (9) have studied the impact of minimum staffing standards and have shown that they are effective in increasing staffing levels in previously low-staffed facilities.

Thus, the research suggests that increased staffing affects quality and that regulation influences staffing levels. Largely missing from the literature, however, are studies of the dysfunctional effects, if any occur, and the costs imposed on nursing homes by higher minimum staffing standards.

Medicaid Bed-Hold Policies for Nursing Homes

Bed-hold policies are Medicaid policies that require nursing homes to reserve beds for their residents when they are temporarily hospitalized. Medicaid pays nursing homes for bed-hold days, although the payment is lower than the regular Medicaid per diem. Requiring bed-holds increases the likelihood that residents can return to the same nursing home. Bed-hold policies vary greatly across states in terms of the number of bed-hold days and the rate. Some states have no such policies at all. These policies and their generosity have been shown to influence hospitalization rates of nursing home patients (17). Bed-hold policies appear to have both positive and negative (dysfunctional) impacts. On the one hand, they contribute to better continuity of care by ensuring that patients return to the same facility after the hospitalization (52, 53). On the other hand, they increase the probability of hospitalizations (17) and rehospitalization (41, 43, 53).

Studies of Direct Regulation Outside of the Nursing Home Sector

Although a plethora of studies has investigated the impact of different forms of regulation on quality in nursing homes, there is a dearth of studies addressing this issue for other provider types. Our literature search has identified only four studies, all examining the impact of one particular regulation of hospital care: the requirement to administer antibiotics within a four-hour window to emergency department patients admitted with CAP. Implementation of the standards was ubiquitous. All 129 programs studied by Pines et al. (92) developed strategies designed to meet the standard. Bratzler et al. (12) provide a general overview of the use of performance measures related to pneumonia.

The findings of the four studies about the impact of regulation on quality, measured by shortening the time to immunization, by improving diagnoses of CAP, and by limiting unnecessary use of antibiotics, are mixed. Kanwar et al. (56) and Welker et al. (106) conclude that time to diagnosis did not improve, but the rate of false diagnoses increased and with it the inappropriate use of antibiotics, suggesting that not only was this regulation ineffective but it actually led to worse quality of care. Friedberg et al. (36) studied a national sample of emergency departments

and did not find evidence for dysfunctional responses. The divergent findings may be the result of differences in the data used in these studies.

Summary of Extant Literature on Quality Regulation

The empirical evidence on the impact of direct regulation on quality of care is limited to the nursing home sector, with one exception related to studies of the impact of CAP standards on hospitals. Studies of direct nursing home regulation have shown that, in general, more stringent regulations lead to higher levels of quality, although this finding is not consistent in all studies and not with respect to all quality measures or dimensions (e.g., clinical versus hotel quality or different aspects of clinical quality) within the same studies. Minimum staffing standards were found to be effective in increasing staffing and quality. Bed-hold policies, as expected, have a mixed effect, contributing to continuity of care but also creating an incentive for hospitalization.

Areas for Future Research

This review of the extant literature identified several areas in which empirical evidence is completely missing, sparse, or of poor quality, thus suggesting directions for future research.

First, most of the nursing home studies rely on the OSCAR data for information about regulation, compliance, and nursing home characteristics. These data are known to have many limitations and inaccuracies. One of the more important limitations is the reliance on facility reports at the time of the state survey for staffing information, which appears to have an upward bias. CMS is currently developing an alternative process for obtaining staffing data from nursing homes' payroll systems directly. Once these data become available, we expect the quality of staffing data to be much improved. Other data elements may, however, continue to be problematic. Of particular concern is the fact that OSCAR captures only federal and not state deficiencies, thus providing an incomplete picture of the variation in quality across states (83). Furthermore, there are no national data sets comparable to OSCAR that would allow the ongoing study of the regulation of other provider sectors, such as hospitals and home care agencies.

The second issue worthy of more attention in future studies is the potential endogeneity between quality regulation and quality. Very few studies have attempted to address this threat to validity, and when they did they found that endogeneity exists; therefore, ignoring it does lead to biased results. Even though panel studies with fixed facility effects ameliorate some of the concern about endogeneity, the high temporal correlation in quality suggests that this approach may not be sufficient, and it may be necessary to find and employ instrumental variable methods.

Third, there is a dearth of studies that examine the impact of regulations on inducing dysfunctional responses from providers. Theory suggests that, depending on the circumstances, providers faced with quality standards that are binding may choose to engage in cream skimming, teaching to the test, or both. If a substantial proportion of providers adopt these strategies, then the original objective of reaching a minimum quality level may not be achieved. Furthermore, other adverse outcomes, including barriers to access for the sickest patients and lower quality in unmonitored areas, materialize. Developing empirical evidence on the magnitude of such dysfunctional responses is an essential part of determining the success of any regulatory system.

Finally, the field knows very little about the costs of regulation. To date, only one study has estimated the incremental costs of regulations to nursing homes. Future research should address other costs: costs to providers in other sectors, costs to regulators arising from activities related to both the development and the monitoring of regulations, and patient costs related to

dysfunctional responses of providers (e.g., limits on access). Absent information about these costs, a full assessment of the effectiveness of regulation is not feasible.

REPORT CARDS: SEEKING QUALITY FROM THE BOTTOM UP

Report cards have been utilized in the American health care system since the late 1980s. Schauffler & Mordavsky (98) and Gormley & Weimer (40) provide brief histories. More recently, several scholars have published reviews of the literature available at that time, summarizing the findings with an eye toward answering the question of what impact report cards have. We update and expand these previous reviews to include additional dysfunctional responses as well as the financial impacts of report cards, two areas not included in prior reviews. Our review is summarized in **Table 2** and discussed below. **Table 2** maps all the studies we reviewed to ten possible effects in four different provider settings (the same study may appear in more than one cell). The discussion below is organized by type of effect to allow similarities in provider response, to the degree that they exist, to emerge. Where available, we also report on evidence from prior reviews.

Previous reviews did not include studies of nursing homes, possibly because the Nursing Home Compare report card did not debut until 1998, and therefore much of the research was not available at the time the previous reviews were completed. We include these studies because they address the difficult task of constructing report cards when there are many possible dimensions of quality and because, in view of the dominance of nursing homes as the most common setting for the study of quality regulation, they provide a basis for comparing these different approaches to quality improvement.

We also note two categories that might be subject to different interpretation: The first is labeled “Patient sorting—higher risks to better providers,” and the second is labeled “cream skimming.” Both involve a change in the case mix of patient/provider matching following publication of report cards. The first, however, is a positive market outcome, matching the most difficult patients with the best providers, whereas the second is an undesirable market outcome, limiting access to care for the sickest patients. Unfortunately, studies based on observational data can only determine if a change in the matching pattern has occurred and in which direction. They cannot determine who initiated the change: the patient or the provider. Therefore, determining whether the study identifies patient sorting or cream skimming is often a matter of interpretation. In this review, we adopt the perspective of the authors and present the few articles that address these issues based on the authors’ descriptions.

Effect on Consumers’ Demand/Choice of Providers: Increased Demand for Higher-Quality Providers

The most immediate effect one expects from report cards is on choice of providers: Patients are expected to consult report cards when choosing a provider and to consider relative performance as a factor in their decision. Indeed, many of the studies we reviewed (16 studies) have addressed this question, almost as many as those examining their impact on quality of care (20 studies), thus making this research question the second most frequently addressed.

Studies prior to 2006 have also addressed this question. Fung et al. (37) conclude that the results for all provider types were mixed. Depending on the report card studied, the time period, the provider, and the methodology employed, research studies find a substantial, small, or no demand response to reported quality.

Our review continues to find mixed results. Four studies of hospital report cards (76, 93, 95, 105) find significant demand response, whereas two do not (21, 96). Two physician/clinic report

Table 2 Empirical studies and surveys of studies on the impacts of report cards since 2006^{a,b}

Effect type	Hospitals	Physicians/clinics	Health plans/health maintenance organizations	Nursing homes/home health agencies
Effect on consumers' demand/choice of provider				
Increased demand for higher-quality providers	Ryan et al. (96) Pope (93) Merle et al. (76) Chen et al. (21) Wang et al. (105) Romano et al. (95)	Chen et al. (21) Wang et al. (105) Epstein (30) Bundorf et al. (16)	Chernew et al. (22) Dafny & Dranove (28)	Grabowski & Town (42) Werner et al. (112) Werner et al. (111)
Patient sorting: higher risk to better providers				Werner et al. (110)
Functional responses				
Provider engagement in quality-improvement activities/programs	Laschober et al. (66) Tu et al. (103) Matthews et al. (75)	Smith et al. (101) Guru et al. (44)		Mukamel et al. (81) Zinn et al. (113)
Evidence of improved performance or improved patient outcomes	Werner & Bradlow (107) Ryan et al. (96) Hollenbeak et al. (50) Chen et al. (21) Li et al. (68) Romano et al. (95) Tu et al. (103) Besley et al. (6)	Ganz et al. (38) Jha et al. (54)	Bundorf et al. (15)	Mukamel et al. (85) Castle & Engberg (19) Werner et al. (108) Werner et al. (109) Werner et al. (112) Grabowski & Town (42) Clement et al. (24) Park et al. (88) Jung et al. (55)
Dysfunctional responses				
Cream skimming		Apolito et al. (1) Bridgewater et al. (13) Glance et al. (39)		Mukamel et al. (77)
Teaching to the test		Ganz et al. (38) Hamilton et al. (47)		Werner et al. (108) Werner et al. (109) Mukamel et al. (80)
Manipulating data-coding practices		Guru et al. (44)		Werner et al. (110)
Financial impact on providers				
Costs		Halladay et al. (46)		
Price/revenues changes	Pope (93)	Lin & Lin (69)		Clement et al. (24) Park et al. (88)
Profits	Ettinger et al. (31) Lindenauer (71)	Bundorf et al. (16)		Park & Werner (90) Park et al. (88)

^aBolded citations: report cards increased the category described, e.g., increased demand, increased quality, increased cream skimming, increased costs, etc.

^bPlain text citations: report cards had no significant effect on the category described.

card studies (16, 105) find significant demand response, whereas two (21, 30) do not. The only two new health plan studies during the review period, Chernew et al. (22) and Dafny & Dranove (28), find a demand response, albeit a small one. Using an approach introduced by Mukamel et al. (86), these two studies take account of the “news” content of report cards, allowing in addition for market-based learning. This method may explain their success in detecting the demand effect of report cards. The three nursing home studies also show mixed results, perhaps because these three studies focus on different subpopulations for whom different quality measures and perhaps different decision criteria for choosing a nursing home are important. Grabowski & Town (42) studied the long-term care population and did not find a demand response, whereas Werner et al. (111, 112) studied the postacute population and did find a demand response.

Effect on Consumers’ Demand/Choice of Providers: Patient Sorting and Higher Risks to Better Providers

Only one study examined the question of whether patients sort themselves differently once they have information about providers’ quality. Werner et al. (110) examined postacute patients sorting into nursing homes with regard to three quality measures: pain, delirium, and walking without help. They found that patients at high risk for pain were more likely to seek higher-quality facilities, based on the pain quality measure. They did not find similar results for the other two measures. These mixed results cannot be attributed to methodological differences because all three outcomes were included in the same study, although it is possible that the sensitivity of the outcomes to measurement errors and the available risk factors were different and affected the findings.

Functional Responses: Provider Engagements in Quality-Improvement Activities/Programs

Proponents of report cards expect providers to respond to low rankings in a report card by engaging in quality-improvement activities. The motivation might be declining demand or the threat of declining demand, an organizational objective to improve quality (as often is assumed to be the case for nonprofit providers), or the “name and shame” effect driven by professional pride (7).

Many fewer studies examined programmatic improvements: We found only 7 such studies, compared with 18 for improved outcomes, and none addressed health plans. This dearth of studies might be explained by the fact that determining if providers engaged in quality-improvement activities typically requires primary data collection, unlike studies of demand or outcomes, which can often be performed using extant, administrative data sets. Because primary data collection is more expensive, it is not surprising that we find fewer studies in this area.

Fung et al. (37) concluded that hospitals have engaged in quality-improvement activities stimulated by report cards, although they note that the studies tended to be mostly descriptive. They found no studies that addressed this area for either health plans or individual physicians. Our review also failed to find any studies of health plans. However, we found three new studies of hospitals reporting positive effects (66, 75, 103). We also found two studies of nursing homes reporting positive effects (81, 113). Both of these studies were based on the same survey of nursing homes, although they provide different information about the activities undertaken by these providers. With respect to physicians, Smith et al. (101) found positive effects of public reporting on clinics’ implementation of diabetes-improvement interventions, but Guru et al. (44), through a survey of cardiologists, found that less than 20% indicated that they made changes to their clinical practice in response to the report card.

Functional Responses: Evidence of Improved Performance

The largest number of studies (20 studies) examined whether those dimensions of quality or patient outcomes published in the report cards improved as a result of the publication. The prior review by Fung et al. (37) found that report cards had mixed success in improving quality. Furthermore, they noted that the majority of studies focused on hospitals, mortality rates, and cardiac care. Our review still finds that 8 of the 20 studies focused on hospitals, but another 7 focused on nursing homes. Only 2 studies focused on physicians, and we found only 1 for health plans and 1 for home care agencies.

Fifteen studies (6, 19, 21, 24, 38, 50, 55, 68, 85, 88, 96, 107–109, 112) found that public reporting led to better performance and patient outcomes, whereas five (15, 42, 54, 95, 103) did not. Thus most studies found positive effects. This conclusion should be qualified, however, with respect to the studies of nursing homes and the one home health agency study. The Nursing Home Compare and the Home Health Compare report cards include a large number of quality measures. Studies typically examine the effect of several of these measures. If they find a significant effect, more often than not, it is with respect to some but not all the measures. In **Table 2** these studies are indicated as having found a significant effect, but the reader should note that these findings do not necessarily apply to all quality measures.

Compared with the Fung et al. (37) review, we find more evidence that report cards affect quality of care. This impact may be due, to some extent, to the addition of nursing homes to the literature. It may also result from the maturation of report cards and providers' responses to them. Furthermore, it may reflect the increased methodological sophistication used in the studies seeking to identify the impact of report cards. For example, Hollenbeak et al. (50) used propensity score matching, difference-in-difference models, and other advanced econometric techniques, and Romano et al. (95) used mixed linear regression modeling methods. Because true experiments are unlikely to be feasible for assessing system-wide changes like report cards, research will require the skillful use of such quasi-experimental methods.

Dysfunctional Responses: Cream Skimming

Fung et al. (37) reported mixed findings from their review of ten studies examining cream skimming in cardiac surgery following publication of the New York State (NYS) Cardiac Surgery report. We identified four additional studies since then, examining different settings. Our findings were also mixed. Mukamel et al. (77) found only minimal evidence for cream skimming among nursing homes and only with respect to some of the reported quality measures. The other three studies examined cream skimming among cardiac surgeons. Apolito et al. (1) found evidence for cream skimming among cardiac surgeons in NYS during the period 1993–1997. Interestingly, Glance et al. (39), studying the same cardiac surgeons but in a later period, 1997–1999, and using different methods, do not find evidence for cream skimming and conclude that the most risky patients are treated by the surgeons with the best scores. Bridgewater et al. (13) also find no evidence for cream skimming.

A possible decline in cream skimming in response to the NYS Cardiac Surgery report may be related to a shift from bypass surgery to angioplasty, which increased the relative supply of surgeons and, therefore, reduced the incentive for surgeons to avoid the sickest patients. Mukamel et al. (82) suggest that this increased surgical capacity might explain why the disparity African Americans have experienced regarding access to surgeons who have low risk-adjusted mortality rates appeared to decline in the early part of the past decade.

Dysfunctional Responses: Teaching to the Test

Four studies assessed whether teaching to the test occurred by examining the impact of report cards on domains of quality not included in the report card and that are, therefore, masked from observation by potential patients. These studies find some, albeit not very overwhelming, evidence for this behavior. Hamilton et al. (47) studied Kaiser pediatric psychiatry clinics and found that the organizational reporting of access and service indicators limited implementation of evidence-based practices. Werner et al. (108, 109) examined the impact of Nursing Home Compare on postacute nursing home residents during the 1999–2005 period. They found that potentially avoidable rehospitalizations were not affected, for the most part, by the publication of the report card, and in those instances in which rehospitalizations did increase, the change was small (109). When they examined other outcomes masked in the report card, they found that facilities with high quality on reported outcomes also performed well on masked outcomes but that low-scoring facilities either did not change or performed worse on masked outcomes (108). This finding suggests that perhaps the low-quality facilities may be facing resource constraints that translate into teaching-to-the-test behavior, a strategy that facilities that are better off financially are not forced to adopt. Mukamel et al. (80) studied the response to Nursing Home Compare during a similar period, 2001–2006. This study expanded the comparison to all clinical services versus hotel services. It was motivated by the hypothesis that publication of the report card, which is focused on clinical quality, changed patients' relative ability to observe these two dimensions of quality, increasing the transparency of clinical quality. The investigators found, as expected, that the introduction of the report card changed the ratio of resources between room-and-board type services and clinical services; more resources flowed to clinical services. However, the increase in clinical expenditures was funded by new money, thus not requiring a decrease in hotel expenditures. So even though the study found teaching-to-the-test behavior, it deviates from the full impact of such a response because the availability of new monies enabled nursing homes to improve performance in the reported areas without diminishing quality in the masked areas.

Dysfunctional Responses: Manipulating Data-Coding Practices

We found only two studies documenting the manipulation of data-coding practices. Guru et al. (44) identified this behavior in responses from a 2003 survey of cardiac surgeons in Ontario, and Werner et al. (110) concluded that down coding may explain trends they observed in nursing home data. These studies suggest the importance of auditing the quality of the data upon which report cards are based.

Financial Impact on Providers: Costs

Only one study estimated the costs of quality reporting on providers. On the basis of a study of eight primary care practices in North Carolina, Halladay et al. (46) found that the costs of implementing the data system required for quality reporting ranged from less than \$1,000 up to \$11,000 per clinical (physician + nurse practitioner) full time equivalent (FTE). Annual maintenance costs ranged from less than \$100 up to \$4,300 per clinical FTE. The practices they studied were quite diverse in terms of size (1–8 physicians, 0–6 nurse practitioners, and 3–36 total FTEs), ownership, location, and type of data and medical records systems (electronic medical record, disease registry, and an information technology specialist on-site). The practices also participated in up to four different types of data reporting systems. The authors concluded that the large variation in costs

could be attributed to the different quality-reporting program requirements, amount of on-site assistance provided to the practice, experience and expertise of practice personnel, and the extent of data system problems encountered.

Some quality-reporting systems do not necessarily impose a substantial marginal cost on providers, particularly when data collection is already mandated for other purposes by payers or regulators. For example, the nursing home quality report card is based on the Minimum Data Set. Collection of these data is mandated by CMS to support payment and program management. Similarly, California quality reporting on hospitals is based on the patient discharge data system, which has been mandated by the state for decades and has been only minimally altered for quality reporting. Hence, in many circumstances the marginal cost of reporting data for quality assessment is probably low. However, the NYS Cardiac Surgery Reports do require a dedicated data-collection effort, and the costs to hospitals associated with these reports have not been estimated. There is likely a trade-off between ensuring data quality, including the minimization of manipulation, and the marginal cost to providers and report card producers.

Financial Impact on Providers: Price Changes

Fung et al. (37) found only one study that reported a positive relationship between better outcomes and higher prices; Mukamel & Mushlin (79) found that NYS cardiac surgeons who had better risk-adjusted mortality scores commanded higher prices. Our review identified four new studies, all of which found a significant effect of the report card on prices or revenues. Pope (93) found that hospitals ranked highly by *U.S. News & World Report* had substantial increases in revenues. Lin & Lin (69) found a similar impact for dentists in Taiwan. Park et al. (88) found that nursing homes that improve their quality scores were rewarded with increased revenues and profits. Clement et al. (24) found that only low-quality nursing homes increased their quality and their prices.

Financial Impact on Providers: Profits

Five studies examined the impact of quality reporting on providers' profits, and all found an effect. Ettinger et al. (31) and Lindenauer (71) described the impact that a poor grade on a quality report card had on UMass Memorial Medical Center after it was reported as an outlier in a cardiac surgery report. Bundorf et al. (16) studied fertility clinics and found that the report card effect on their demand translated into a positive impact on their bottom lines. Park & Werner (90) found that profits were higher for higher-quality nursing homes only after publication of the report cards. Similarly, nursing homes with improved performance had increased profit margins (88).

Summary of Extant Studies

Recent studies have focused much more on the impact of report cards than on the effect that regulations have on the health care system. This focus probably reflects the relative newness of report cards as a policy tool targeting the imperfection of health care markets and the resulting interest in assessments of their effectiveness. Studies of the impact of report cards encompass many more settings and are more comprehensive of the type of potential behaviors being evaluated. Not surprisingly, most of the studies focus on the effect that report cards have on demand and on quality of care. And even though results are mixed, as was the case in previous reviews—some studies reported the expected impact and some did not find it—our review finds, on balance, more evidential support for the expected impacts.

Table 3 Statistical summary of studies of the impact on quality of report cards

Report card impact	Total number of studies	Number (percent) of studies with significant findings
Effect on consumers' demand/choice of provider	17	12 (71)
Functional responses	27	22 (81)
Dysfunctional responses	11	7 (64)
Financial impact on providers	10	10 (100)
All	65	51 (78)

Table 3 summarizes the studies we reviewed. Of the 65 studies we reviewed, 51 (79%) presented significant findings indicating that report cards have engendered the responses predicted by theory. Not all the responses were positive. Forty-four of the 51 studies (86%) examining positive outcomes (demand, quality performance, and financial outcomes) found a significant effect. Of the 11 studies examining dysfunctional responses, 7 (64%) reported significant findings.

Areas for Future Research

Our review of the recent literature on report cards, together with the prior reviews, provides a rather comprehensive picture of their important impacts on consumers' demand and quality of care. Most of the studies reviewed concluded that report cards do indeed affect behavior. The effect is not necessarily large and not necessarily along all quality dimensions (as in the case of nursing homes), but it is there and it may be sufficient to achieve the objective of report cards. Report cards aim to provide the correct incentives for providers, ensuring that they are not responding to cost signals alone in markets where most dimensions of quality are masked (84).

Future studies should focus on the less studied effects of report cards, especially the incentives they may create for dysfunctional responses. Only 11 of the 67 studies we reviewed addressed dysfunctional responses, and 7 of them did find supporting evidence, suggesting that providers react as expected to the perverse incentives in report cards as well. Providers who engage in these activities impose costs on society, both direct and indirect, which lower the benefits of report cards. Therefore, it is important to understand the circumstances under which providers are more likely to engage in dysfunctional responses and identify the factors that determine the magnitude of such effects. We note in particular that no new studies of physicians, clinics, or hospitals have addressed cream skimming or teaching to the test. And even though Fung et al. (37) identified four such hospital cream-skimming studies, they all were limited to cardiac care. Therefore, the thrust of future research on report cards should be aimed at understanding the attributes of report cards, markets, and providers, and the interactions among them, that lead to substantial dysfunctional responses.

Another area that requires more attention is the cost of report cards. One study assessed the marginal cost for a primary care practice to produce the data required for a report card. This study was based on eight case studies from which one cannot generalize to the whole industry. A full evaluation of the desirability of report cards as mechanisms for inducing higher quality cannot be made without assessing the costs associated with their production.

DISCUSSION

Regulation and report cards take two very different approaches to increasing the quality of health care. Regulation is a top-down approach that seeks to put floors on quality, both quality dimensions

that consumers can observe, and more importantly, those dimensions that they cannot observe. A report card is a bottom-up approach that seeks to make dimensions of quality more apparent to consumers, who in turn will make choices that encourage providers to offer higher quality. Each approach can induce teaching to the test if it creates a stronger incentive for providers to respond to one component of quality rather than to another. When risk adjustment does not fully account for the differences among patients, each approach can be subject to cream skimming. Although very few efforts have been made to measure the costs of these approaches, regulation, when enforced, is almost certainly more costly.

In some cases, one or the other approach may seem more desirable. For example, the focus of the NYS Cardiac Surgery Report on a dominant dimension of quality, mortality, and its reliance on specialized, clinical data for risk adjustment, makes it the gold standard of report cards. It is considered an attractive policy instrument in an area where surgeon skill is very important and probably difficult to regulate. Yet the costs imposed by the specialized data collection have not been estimated, and it is, therefore, difficult to assess the implications of replicating this model to other conditions beyond cardiac surgery and outside of NYS. One example for an area that might lend itself better to regulation is the risk of delayed treatment for pneumonia. This risk may not be significant to enough potential patients to make a report card effective; therefore, direct regulation may be a more appropriate approach than a report card. Of course, regulation and report cards are not necessarily substitutes. As we have seen, both regulation and report cards are used to improve the quality of nursing home care. Because of the multidimensional nature of nursing home quality, the floors on quality sought through regulations and the increments to quality sought by report cards complement each other in assuring quality care. In fact, regulation and quality reporting have coexisted over the past two decades in most sectors of the health care system in some fashion or another.

One of our objectives in undertaking this review has been to compare the effectiveness and cost-effectiveness of regulation and report cards in improving quality of health care. Our assessment, after having reviewed the extant literature, is that such a comparison is not yet feasible. This limitation is partly because the studies examining the impact of these two policy tools use different metrics to measure their effects, partly because they do not address the same sectors (e.g., the almost complete neglect of studies of regulation of any other health providers but nursing homes), and partly because of the dearth of cost studies. Although we have identified the gaps and suggest future research directions for each approach separately, we also emphasize the need for studies designed from the outset to allow a comparison of regulation and quality reporting.

Finally, we note the emergence of new models of care delivery in the past decades, including evidence-based medicine (87, 97), comparative effectiveness analysis (20), innovative delivery systems integrated with financial incentive such as ACOs (35), and patient-centered medical homes (33). However desirable these are, they will almost certainly require public policies such as regulation and report cards to induce their rapid and widespread adoption. Thus, better understanding of the advantages and disadvantages of these policy instruments will likely continue to be valuable in our quest to improve health care quality.

DISCLOSURE STATEMENT

D.M. is a consultant on nursing home staffing and quality for Marks, Balette & Giessel, P.C. The authors are not aware of any other affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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