The Impact of Financial Incentives on Quality of Health Care

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IN THE LAST TWO DECADES THE FINANCIAL arrangements in health care have rapidly multiplied and become far more complex. The constant flux in the relations between payors and plans and between plans and providers adds to the difficulty of studying the effect of a specific financial arrangement on the quality of health care provided. Nonetheless, there are good theoretical reasons to believe that financial incentives do have an impact on quality. To address this issue, we briefly describe the difficulty of defining quality and, even with a definition, the problems encountered in measuring it. We then discuss the types of financial incentives that could stimulate quality (however it is measured) and to whom payments that reward quality should be made. Because most available evidence about the impact of financial arrangements on quality is derived from studies that compare health maintenance organizations (HMOs) with fee-for-service (FFS) health plans, we build upon our earlier work and review existing data, heavily flawed though they might be. Given the limitations of these data and the need for a better understanding of the relation be-

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tween financial incentives and quality, we recommend directions for future research. Finally, we discuss how financial incentives fit into an integrated strategy for improving quality.

Defining and Measuring Quality

The variety and frequent changes in payment arrangements are not the only impediments to studying the impact of financial incentives on quality. Other than a general consensus that mortality is important, quality itself is inconsistently and inadequately defined in the empirical literature (Blumenthal 1996). Furthermore, methods to risk-adjust quality indices for mortality or any other outcome variable are not consistently applied (Brook, McGlynn, and Cleary 1996). These limitations leave investigators of quality struggling for useful and meaningful outcome variables. This is true both for measuring quality of care in general populations and for treatment of specific conditions.

The Institute of Medicine (IOM) Definition of Quality

In 1990, an IOM committee defined quality of care as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (Lohr and Schroeder 1990). Although this definition ignores issues of distributive justice and resource constraints, it nevertheless acts as a valuable reminder that there are few “gold standards” in measuring quality and that random variability in outcomes is inherent in health care.

Measuring Quality

The IOM definition of quality implies that research on payment arrangements should assess the extent to which financial incentives increase the probability of desired health outcomes. This would suggest that investigators should be doing studies in which the payment arrangement is the predictor variable and health outcomes, like length and quality of life, are the dependent variables. However, most variation

in health outcomes is due to factors that are independent of, or only weakly related to, the current financial incentives faced by plans or providers. For example, consider a middle-aged woman who belongs to an HMO in 1998. Most of the risk that this woman will die of a heart attack in 1998 is determined by her genes, her lifestyle choices throughout her life, and, because most individuals change health plans many times over their lifetimes, the health services (e.g., smoking cessation, blood pressure monitoring) offered by her providers in the plans in which she was enrolled previously. Of course, her care may well have reflected the financial incentives presented to those earlier providers. Unfortunately, we rarely have the information or models that would enable us to risk-adjust this woman's probability of a particular outcome based on these important variables.

One may argue that the quality of care proximate to her heart attack could be determined if we collected sufficiently detailed data about that care. Even with this approach, however, assessments of quality could be affected by patient characteristics. For example, relatively passive people may prefer certain health plans, and their differential adherence to drug regimens may influence treatment outcomes. Thus, the effect of these regimens should not be attributed entirely to the plan.

Because of the difficulty of measuring and risk-adjusting clinically significant outcomes (which is exacerbated when the focus is on the outcomes in a small group, such as a single clinician's panel of patients), much research on the quality of care examines surrogate markers. Such surrogates include structural features (e.g., the ratio of physicians to patients in a health plan), processes of care (e.g., the percentage of patients presenting with meningitis who receive antibiotics in the first hour), or intermediate outcomes that are easily measured (e.g., blood sugar levels in diabetics) (Brook, McGlynn, and Cleary 1996). The value of studying these surrogates is determined by the strength of their relation to clinically significant outcomes. Unfortunately, this relation can be quite tenuous, especially with structural measures of quality.

Two other major types of measures are often used to assess "quality" or "performance": patient satisfaction and resource utilization. Patient satisfaction clearly has some bearing on quality, at the very least on the quality of the patient's life while he or she is interacting with the medical system, and perhaps even far beyond that period. However, consumer satisfaction may not always correlate with achievement of the desired clinical outcome.

Similarly, studies of resource utilization do not provide information on quality of care unless there is clear evidence about the clinical appropriateness of the utilization. A higher rate of carotid endarterectomy in Health Plan A than in Health Plan B has no meaning unless we know the appropriate rate of endarterectomy in those two populations. Most studies of utilization in plans or by medical groups have not included estimates of appropriateness. (See, for example, Pallak et al. [1994].)

In our review, we summarize the available information for each measure of quality. We believe that risk-adjusted measures of clinically significant outcomes are the most important indices of quality, but they are not often available. For this reason, we also report on other measures of quality while recognizing their limitations.

Assessing Distributive Justice

The IOM definition of quality acknowledges the impact of health services on individuals and populations, but it does not explicitly address the differential impact of health services on subpopulations (e.g., poorer or less educated patients). A perfect measure of quality would record not just the overall impact of a service on outcome, but also whether the benefits of that outcome were distributed equitably across racial, ethnic, age, gender, educational, income, and socioeconomic groups. Analysis of the impact of financial arrangements on quality from this perspective is rare, although studies have compared patient satisfaction of high- and low-income groups.

Estimating Opportunity Costs

The IOM explicitly chose to ignore resource constraints in formulating its definition of quality (Cangialose et al. 1997). However, economic analysis would suggest that, in a context of limited resources, quality improvement often means a shift of resources from one clinical area to another. Particularly where there are financial incentives to do so, plans or providers may decide to concentrate on improving quality for one or a small number of diseases or patient populations. For example, there is a growing trend toward disease management programs—focused efforts to improve outcome for certain clinical conditions like asthma and back pain. If, however, a primary care physician knows that she will be eval-

uated by her performance in asthma care, she may have less time to help patients with conditions that are not monitored so closely (e.g., patients with vague abdominal complaints). We were unable to find any research that set out to explore the opportunity costs of focused investments in quality.

It is also important to ensure that real world comparisons do not ignore resource constraints. For example, a comparison of quality between the HMO and the free FFS arms of the Rand Health Insurance Experiment, which did not reflect well on the HMO for low-income patients who were initially in poor health, should not ignore the fact that the HMO was about 25 percent less costly. It is plausible that if FFS expenses were cut by 25 percent, or if the HMO were to increase its use of resources by 25 percent, the HMO would have fared better in the quality comparison.

Types of Financial Arrangements That Could Theoretically Affect Quality

Having stated those caveats, we will now consider the manner in which financial arrangements could, in theory, affect quality. Our review of the available data will reveal that there is little empirical evidence to answer these two questions: What type of payments increase quality? To whom should payments be made? Very few studies have explicitly evaluated the quality of care provided by physicians or plans in the context of all their actual short- and long-term financial incentives. Note that this initial discussion focuses on direct financial incentives to influence quality rather than on the indirect effects of payment differences like that, for example, between capitation versus fee-for-service. Nor does it emphasize the influence of organizational factors, like that of group versus solo practice, or the implementation of continuous quality improvement techniques.

Managers or policy makers can use two payment methods to stimulate quality: The first is to tie salaries, bonuses, or other periodic payments (akin to “wages, salaries and tips” in the context of the Internal Revenue Service) to performance on quality measures. The second approach is to permit the person or group whose behavior is to be modified to create a business that provides the good or service of interest and receive a return on equity (“business income” or “capital gains” to the

IRS) that depends on quality. Either approach could be applied to influence the behavior of individuals or groups.

Direct Payments for High Quality

Linking salaries and bonuses to performance on quality measures is common in other industries. In the health care industry, however, this practice has been rare until recently and has not been well studied. We could find no controlled trials of direct payments based on quality that used a contemporaneous control group (as opposed to historical controls). There are reports from US Healthcare (a health plan) that compensation based on quality has increased compliance with preventive service guidelines and has improved documentation of patient encounters. Based on these findings, US Healthcare has introduced an incentive system that measures several areas of process and utilization, as well as patient satisfaction. However, this program will have only historical controls for comparison (Hanchak, Schlackman, and Harmon-Weiss 1996).

Increasing Ownership Profits (Return on Equity) to Stimulate Quality

The relations between return on equity and quality can be complex. In situations that allow for easy measurement, two approaches could be used to improve the return on equity associated with providing high quality: (1) offering a high price relative to cost; and (2) offering increased patient volume.

In the first case, there is a higher return on equity because profit margins have increased, although volume has not necessarily expanded. High quality either lowers cost (because there are fewer mistakes to correct), allowing the provider or plan to keep the price near the market average (resulting in a higher than average profit margin), or, where high quality does not lower cost, the provider or plan can demand a higher than average price on the basis of the high quality of its services.

In the second case, return on equity is increased with an average profit margin on each unit because high quality leads payors to contract more often with the high-quality provider or plan than with its competitors. Of course, these two approaches could both occur at the same time in different contracts.

We have been unable to identify studies in the health care sector that link ownership profits to quality, despite the existence of outside models like, for example, that of U.S. automobile manufacturing, which has improved the quality of its products since the 1970s in response to potential ownership profits. Despite reports that health plans in some regions of the country have been willing to use quality information when selecting hospitals for contracted services (Schulman et al. 1997), there is no evidence that such behavior clearly influences outcome. To cite another example from the automobile industry, General Motors has developed a performance scale for its health plans, and it shares information on the results with employees. The company reports a slow increase in enrollment share among the highest-rated plans, but again there is no contemporaneous control group to show that the practice improves outcome (Iglehart 1997). This initiative is an attempt to increase return on equity primarily by increasing the volume of patients or enrollees in high-quality plans. However, perhaps because there are no conclusive data to show that these strategies work, many health plans do not use quality information when selecting their providers (Schulman et al. 1997).

Ownership, Return on Equity, and Incentives to Lower Quality

Unfortunately, when quality is hard to measure, there are many ways to increase return on equity by lowering quality. If consumers are relatively insensitive to price (or when price is borne by a third party) and cannot recognize quality, then profits can be increased by generating sales, even when this leads to worse quality (overutilization). A classic example in medicine would be suggesting an unnecessary tonsillectomy to a patient with a zero-deductible FFS plan. Several investigators have evaluated the utilization patterns of physicians who owned therapeutic or diagnostic radiology equipment, compared with physicians who did not own equipment. Equipment owners tended to order more procedures, although there were no identifiable medical reasons for doing so. The investigators concluded that equity ownership of medical equipment, and the potential to profit from its use, can lead to overutilization (Hillman et al. 1990; Mitchell and Sunshine 1992).

In situations where consumers or payors are more sensitive to price than quality—either because they cannot measure quality or because

they do not care about it—it may also be possible to increase return on equity without providing high quality. An insurance company could offer a plan with a small employee contribution and low service, possibly creating an underutilization quality problem. This could be a profitable strategy, especially if the employer contribution continued to be substantial.

Another approach would be to increase profit margins. A health plan could offer a plan with a small employee contribution and low service, possibly creating an underutilization quality problem. Alternatively, a plan could avoid situations in which total expenditures are expected to be high relative to payment, perhaps by encouraging chronically ill subscribers to disenroll. If this method of selection is achieved by denying services, it could create an underutilization type of quality problem. Alternatively, one could increase profit margins by seeking situations in which total expenditures are likely to be low relative to payment—as when a health plan emphasizes wellness programs to attract the young and healthy. Although this approach would not necessarily lead to quality problems for the healthy enrollees, it is likely to be socially inefficient. Furthermore, to the extent that, to achieve favorable selection, plans offer benefits that only the healthy can enjoy (like discounted health club memberships), they may compromise distributive equity. Because these strategies, if openly admitted to by plans or providers, would engender social censure, they have not been explicitly studied.

Thus, there are many ways to link salaries, bonuses, or the financial gains of ownership to the quality of care provided. Unfortunately, the health care market has been slow to adopt incentives that stimulate high quality. In large part, this reflects uncertainty about the definition of quality in health care and the absence of good means to adjust what can be measured (e.g., outcomes like mortality from a particular surgery) for other factors that might influence results (e.g., selection of only low-risk patients). Because quality is hard to determine and incentives for high quality are rare, we often see health plans emphasizing market share, especially profit margins, rather than quality. This is manifest in strategies like “gag rules” and limits on length of stay after mastectomy (Mechanic 1997).

Given the relative sparsity of information about types of financial incentives that could be used explicitly to increase quality, we cannot conclude that direct payments are clearly better than increasing return on equity (or vice versa) to stimulate high quality. We now turn our

attention to the question of *to whom* quality-inducing payments could be made and the expected consequences of such payments.

Levels at Which Payment Could Theoretically Affect Quality

The various financial incentives can be provided to any participant in the health care industry. They would be most likely to stimulate quality, in theory, if they are offered to individuals or groups who have the power to influence it.

Incentives to Individual Clinicians

Intuitively, it would seem most appropriate to offer financial rewards for high quality to the physicians, nurses, and therapists who actually provide care. This could be accomplished through quality bonuses (e.g., Kaiser–Permanente physicians are now eligible for bonuses based on patient satisfaction surveys). For individuals with ownership interest in an organization, like physicians in solo practice, financial incentives for quality could take the form of higher contracted capitation rates with a health plan that recognizes the superior quality of their care.

Unfortunately, there is little research describing the relation between quality of health care and the financial incentives faced by individual clinicians. In the FFS setting, the financial incentive to individual clinicians is to provide more services, even when the clinical benefit of such services is small or unknown. The impact of these incentives has been shown in several studies of the medical appropriateness of services provided to patients in FFS plans, including Medicare. These studies have shown apparent overutilization. (See, for example, Brook et al. [1990].)

More recently, studies have been reported on surveys of physicians' views regarding the quality of care they provide within different contexts (capitation versus FFS and different forms of capitation versus each other). One such study reported that primary care providers believe the quality of care they provide to their patients through capitated contracts is inferior to the care they offer patients with other forms of insurance (Kerr et al. 1997). In another study, Borowsky et al. (1997) found that

physicians rated a staff-model HMO higher than other types of plans on the question, "Would you recommend this plan to a family member?" These studies, however, did not describe the direct financial incentives faced by the physicians surveyed. Nor did either study evaluate "quality" based on anything other than the participating physicians' opinions; structure, process, and outcome were not measured. Without objective measures of quality, many physicians trained in FFS settings would feel that lower utilization implies poor quality. Physicians trained or working in a capitated environment, however, might consider that higher expenditures indicate inappropriate utilization. Thus, opinions alone are difficult to assess in a meaningful way.

There is no information from controlled studies about the behavior of other clinicians, such as nurses, pharmacists, and therapists. This may reflect either their lesser degree of autonomy to make decisions about what care to provide, and when, or the lower percentage of total health care expenditures attributable to their activities.

Incentives to Hospitals and Health Care Facilities

There are few data about the effect of incentives offered to hospitals and health care facilities on quality of care. Studies of the quality of care received by uninsured or underinsured patients supply some indirect evidence. When caring for these populations, hospitals expect to lose money, so they have an incentive to provide minimal resources. Studies of outcomes of hospitalization among the uninsured have found increased rates of adverse events resulting from negligence (Burstin, Lipsitz, and Brennan 1992), as well as increased mortality for admissions with pneumonia (Yergan et al. 1988) and myocardial infarction (Young and Cohen 1991) compared with insured patients. Similarly, Medicaid patients who are admitted with myocardial infarction experience higher mortality rates than patients with private insurance (Young and Cohen 1992). All these findings suggest that negative financial incentives to hospitals may reduce quality of care.

Incentives to Medical Groups and Health Plans

Inherent in any discussion of bonuses to individual clinicians within a group or plan to maximize quality is the assumption that the clinician's

employer is willing to pay more for clinicians who do a better job. This is only likely to be true if, in the health care market, the clinician's employer—a medical group or a health plan in most cases—can command a higher-than-average price or can increase market share by providing higher-than-average quality of care. If quality cannot be easily measured, then the clinician's employer may not see any benefit from providing high quality. Further, if there is no adjustment in prices paid to medical groups or health plans for case mix, and if providing high-quality care leads to enrollment of a more severely ill population, there may actually be financial disincentives to offering superior services (Enthoven and Singer 1995).

Although there is little research on how incentives for individual providers affect quality, some attention has been directed to group incentives and the quality of care that health plans provide. Most research has emphasized comparisons between two types of approaches to financing health care (FFS versus HMOs) and the behavior of health plans acting within these payment systems.

Caveats about the Literature on Fee for Service, Capitation, and Quality of Care

We will present a synthesis of the available data on the quality of care provided by FFS and HMOs. (Note that, for the purposes of this review, we are including in the "HMO" category any fully prepaid health plan, whether it be a more traditional group- or staff-model HMO, or a fully capitated independent practice association, or another form of prepaid plan.) Several important limitations must be noted before we proceed.

Lack of Information about the Incentives Faced by Clinical Decision Makers

In addition to differences among types of health plans, not all plans within a given type (e.g., HMOs) offer their clinicians the same incentives. Some may create incentives primarily to minimize mortality, whereas others may want to stress patient satisfaction or cost control. Even the ways that incentives are applied to a particular goal can differ from plan to plan. For example, some plans control costs by capitating

their medical groups for all outpatient services, others capitate medical groups only for primary care, and still others control costs through utilization review and economic profiling. Because the real determinants of quality are the decisions made by individual clinicians, these differences in incentives could have important implications for quality of care, but they are almost never described in the literature.

Diversity of Populations Studied and Measures of Quality

The literature on FFS versus HMOs covers studies of general populations and of subpopulations defined by social or clinical characteristics (e.g., Medicaid eligible or hypertensive). Typically, the dependent variables in these studies include outcomes, process measures, patient satisfaction, and utilization. Because there are no research questions for which a large number of studies have examined the same quality measure in similar populations, formal meta-analysis of the FFS versus HMO literature is not possible.

Coverage versus Quality

In our review of the literature, we also found that many studies of quality focused on two areas in which FFS and HMOs have traditionally differed in terms of benefit design and coverage: preventive services and home health care. Although traditional FFS health plans did not cover preventive services (they were designed to protect against the high cost of getting sick), HMOs have always described themselves as prevention oriented. Whether for philosophical reasons, for market and political reasons, or simply because the HMO Act of 1973 mandates that federally licensed HMOs cover preventive services, most HMOs have always paid for preventive services. Thus, although preventive services are important, studies that purport to measure quality of care in FFS versus HMOs but that focus on preventive services may, in fact, be measuring differences in coverage. In addition, coverage decisions do not always create the appearance of greater quality in HMOs—HMOs historically have not provided home health services, whereas this care traditionally has been available through certain FFS plans. Therefore, “quality” studies that report differences in preventive service or home health utilization may distort the real relation between type of health plan and quality.

Fee for Service, Health Maintenance Organizations, and Quality of Care

Policy makers often have to make decisions with imperfect information, however, and one of the most important decisions facing Medicare and Medicaid is whether to encourage or force enrollees to enter HMOs. There are reasons to believe that differences in quality between FFS and HMOs might exist, so understanding the evidence is important.

Traditional Fee for Service and Incentives for Quality

Fee-for-service medicine, or the retrospective reimbursement of providers on the basis of services provided, is a system that offers both incentives and disincentives for high quality of care. For providers, FFS creates incentives to specialize, particularly in the most difficult, utilization-intensive medical problems. For the physician and the hospital administrator, this type of specialization provides many rewards (financial gain, professional recognition, intellectual stimulation, and positive interpersonal interactions with patients and colleagues). Thus, simple FFS creates incentives to provide high-quality care to patients with complicated illnesses.

Traditional FFS, however, can create quality problems. Because the rewards of FFS largely accrue to providers who focus on the most severely ill patients, those patients who need preventive or “mundane” services may be ignored (resulting in poor quality due to “underuse” of preventive or routine services). FFS also creates incentives for overutilization, so that even patients with severe illness face quality problems if they receive unnecessary or ineffective services. Whenever there is overutilization, purchasers pay more than they would for strictly medically necessary care. Under traditional FFS, health plans were not especially concerned about overutilization because they charged premiums on an experience-rated, “cost plus” basis, and competition for contracts was based on minimizing claims-processing costs rather than utilization.

Simple Prepayment and Incentives for Quality

Simple prepayment essentially reverses all the FFS incentives. (By simple prepayment, we mean situations in which a health plan receives a

monthly payment from the sponsor per enrollee, without adjustment for case mix.) Prepaid health plans have a financial incentive to select the healthiest patients who need the least care and to avoid patients who are very sick. Plans can use structural features, such as a relative lack of specialists, to avoid patients with chronic diseases. In order to attract healthy patients, or those with minor problems, prepaid plans may improve their preventive services and their care for common problems.

Under prepayment, plans also can cut costs by encouraging patients with chronic illness to select another plan in the next open enrollment period. This option was less available to health plans when there was only a single, self-insured FFS plan. Although this is not strictly a difference between FFS and HMOs, it is a real change that occurred with the introduction of HMOs—the widespread acceptance of the concept that subscribers should be offered multiple choices of health plan from a menu that usually includes at least one FFS and one HMO.

There are many theoretical reasons to believe that simple prepayment creates incentives to provide high-quality care to the healthiest members of a population, but a lower quality of care to enrollees with chronic disease. There is, however, at least one theoretical feature of HMOs that mitigates the incentives to skimp on care: an HMO becomes a deep pocket for lawsuits. Under traditional FFS, this did not happen because any decision by the plan to deny coverage was made *ex post facto*—after the patients had experienced the health outcomes that resulted from their physicians' actions. In an HMO, the influence of the plan on clinicians' behavior is more direct, more obvious, and may be exerted before clinicians decide what diagnostic and therapeutic services to offer. Moreover, because this is obvious to patients (and their lawyers), HMOs must often consider the medicolegal implications of a pattern of poor-quality care (Bursztajn and Brodsky 1996; Boyd and Kelley 1996).

The incentives to clinicians who accept patients from HMOs are not uniform. Clinicians who receive capitated payments or who are employees of HMOs may have incentives to deny necessary care. Clinicians must balance potential financial rewards from that denial against the cost to the clinician–patient relationship. This is a dilemma that particularly affects patients with conditions that are not immediately life threatening (and who thus do not need immediate care), as the adverse consequences of the neglect may not be apparent for a long time.

Many physicians within HMOs see patients on a fee-for-service basis. These physicians may face incentives nearly identical to those con-

fronted by physicians who practice in FFS health plans, and their patients may face quality problems similar to those expected within FFS (i.e., overutilization). However, such physicians may be in danger of removal from the plan's provider network if their utilization rates are too high, thus mitigating at least some of the FFS incentive to overutilize.

The Interaction between Type of Health Plan, Level of Competition, and Quality of Care

The different incentives created by FFS versus HMOs are largely a function of the degree of price sensitivity of the sponsors (employers or government health care programs) of health care. When sponsors become very price sensitive, insurers act more aggressively to control total expenditures. Under FFS or HMOs, quality problems caused by overuse can be reduced through utilization review and the requirement of prior approval, which implies that plans may shape their performance standards according to the competitive environment of the localities in which they operate.

Evidence on the Effects of FFS and HMOs on Quality of Care: Methods

Given the heterogeneity of study design, population, and type of quality measure, no widely used formal technique for combining results of studies (e.g., meta-analysis) was applicable. Therefore, we elected a four-step approach that we thought appropriate to the problem at hand:

1. Identify the quality measures of interest.
2. Identify relevant articles and apply rigorous inclusion criteria to avoid biased studies.
3. Combine results of well-done studies in a way that recognizes both statistical significance and the magnitude of the observed differences between FFS and HMOs.
4. Display the range of results from all studies comparing FFS and HMOs for each type of quality measure.

Choice of Quality Measures to Include

Quality in medicine traditionally is measured by structural features of a plan, processes of care, or clinical outcomes (Brook, McGlynn, and Cleary

1996). For this reason, in our literature review we concentrated on finding comparative data for FFS and HMOs based on structural, process, and outcomes measures. We found no studies that compared the structural features of FFS and HMO plans, but we did find some that included process and outcomes measures. We divided the outcomes measures into three categories: mortality, clinically significant morbidity (e.g., stroke rate in patients with hypertension), and laboratory abnormalities (e.g., glycosylated hemoglobin in diabetics).

We also sought studies of patient satisfaction. Because the structure of patient payments in FFS and HMOs is so different, we separated satisfaction data into "satisfaction with nonfinancial features of the plan" and "satisfaction with financial features of the plan."

Many studies of preventive service or home health care utilization have been presented as quality studies. However, HMOs have traditionally covered a wider range of preventive care, and FFS plans, for their part, have paid for more home health services; thus, differential performance of these two categories may be determined more by coverage than by a plan's quality efforts. Therefore, we chose not to include these studies in the "process" or "outcomes" analysis described above. We decided instead to summarize the literature on preventive service utilization and the availability of home health services separately in order to show the impact of coverage decisions on otherwise reasonable measures of quality.

Approach to the Literature Search

We reviewed the literature on FFS, HMOs, and quality published from 1980 to August 31, 1997. We used the following programs to identify articles:

- Medline (using key word searches of "quality," "outcome," or "mortality," cross-referenced with "fin#," "pay#," or "incent#"; and key word searches of "patient satisfaction," "prevent#," or "home health," cross-referenced with "health plan")
- Current Contents (using a title word search by "quality," "outcome," or "mortality," cross-referenced with "fin#," "pay#," or "incent#"; and title word searches of "patient satisfaction," "prevent#," or "home health," cross-referenced with "health plan")
- SocAbstracts (title word search same as used in Current Contents)

- FirstSearch Social Abstracts (using subject searches of “quality,” “outcome,” and “mortality,” cross-referenced with subjects “pay,” “finance+,” and “incentive+,” and subject searches of “patient satisfaction,” “preventive service+,” or “home health service+,” cross-referenced with “health plan+”)

Additional relevant articles were identified through a hard-copy search of the references in the articles that were produced by the on-line searches.

There were certain criteria for including articles in the review:

1. Data had to have ending dates of 1980 or later.
2. There had to be a comparison group. We believed that, given the rapid changes in health care since 1980, studies using historical controls would be biased. For this reason, we eliminated comparative studies of a group of people before and after switching from FFS to HMOs that failed to match the group to an FFS population for the same time period in the same area.
3. There had to be a reasonable attempt at statistical adjustment for noncomparable FFS and HMO enrollees. We included studies that examined enrollees with a particular diagnosis or condition only if they used regression methods to adjust for important differences in enrollee characteristics between plans, or if substantive differences in characteristics were minor. We included studies that did not focus on a specific diagnosis only if they used regression methods to adjust for health status and other enrollee differences between plans.
4. Quality reports were restricted to plans in the United States. Given the complexity of the question, we chose not to compare health plans from other countries.
5. The findings had to have undergone peer review.

Results Considered

We grouped the results from these studies into nine mutually exclusive dimensions of performance:

- Outcome measures—mortality
- Outcome measures—clinically significant morbidity

- Outcome measures—laboratory abnormalities
- Process measures
- Satisfaction with nonfinancial features of the plan
- Satisfaction with financial features of the plan
- Preventive services utilization results
- Home health care utilization results

For each study, we created one observation per dimension of performance of FFS compared with HMOs. A study that reported both blood sugar (a lab outcome) and number of foot infections (a clinically significant morbidity) among diabetics, for example, would be allowed one observation for each of these dimensions.

Some studies presented only a single comparison of FFS to HMOs for a given population. However, in other studies, results were presented for many comparisons. For example, a study by Retchin and Brown (1990a) compared FFS and HMOs on 25 separate process measures and eight separate preventive services measures. Rather than consider each of these comparisons as a separate observation (which would have allowed a small number of studies with multiple comparisons to dominate the results), we decided to combine multiple comparisons in a single dimension from a single study into one observation. Thus, this study was considered to include a single observation for process measures (taking the mean score of the 25 process comparisons) and another observation for preventive services (taking the mean of the eight preventive services comparisons). The method for scoring each comparison is described below.

We considered it plausible that the differences between FFS and HMOs might be more critical for some diseases than for others, so we allowed studies to produce more than one observation for the same dimension (e.g., mortality) if they separately compared the performance of FFS and HMOs for more than one specific disease. Thus, a study by Greenfield and his colleagues, which reported clinical morbidity and laboratory results for diabetic and hypertensive patients, was given two separate observations for clinical morbidity and two additional separate observations for laboratory abnormalities (Greenfield *et al.* 1995).

In a few cases, we transformed available results to create performance difference estimates consistent with the presentation of other results. In all, we had 72 observations on eight dimensions of performance from 48 studies.

Scoring Studies

In scoring each comparison of FFS versus HMOs in a given study, we compared both the statistical significance of the result and the magnitude of the difference (which we will call “effect size”). We felt that a large difference should be given more weight than a small difference, even if both are statistically significant. Therefore, each comparison was scored on a scale of 1 to 7:

- Score 1 if HMOs are better (statistically significant), with an effect size greater than 33 percent.
- Score 2 if HMOs are better (statistically significant), with an effect size of 10 to 33 percent.
- Score 3 if HMOs are better (statistically significant), with an effect size of less than 10 percent.
- Score 4 if not statistically significant.
- Score 5 if FFS is better (statistically significant), with an effect size of less than 10 percent.
- Score 6 if FFS is better (statistically significant), with an effect size of 10 to 33 percent.
- Score 7 if FFS is better (statistically significant), with an effect size greater than 33 percent.

We considered a result “statistically significant” if its probability value was less than .05. Effect size was calculated by a three-step process:

1. Determine whether HMOs or FFS has the better result.
2. Calculate the *absolute difference*, where absolute difference is the percentage of the population receiving optimal care in HMOs or FFS (whichever is higher) minus the percentage of the population receiving optimal care in HMOs or FFS (whichever is lower).
3. Determine the *effect size*, where effect size is the absolute difference divided by the percentage receiving optimal care in FFS or HMOs (whichever is lower). For example, if a study had shown that 90 percent of hypertensive patients in FFS have “good blood pressure control,” compared with only 60 percent of hypertensives in HMOs, and this difference had been statistically significant, we would have recorded the absolute difference as 30 percent and the effect size as 30 percent divided by 60 percent or 50 percent. This com-

parison, then, would show FFS to be statistically significantly better than HMOs with an effect size of 50, and the score on the comparison scale would be a 7. We chose to use the percentage in the plan with poorer results as the denominator to reflect the benefit of moving patients to a higher-quality plan. There were no comparisons in which the denominator was near or equal to zero.

For each study, the mean score for all comparisons within a single dimension was then calculated. Thus, a study with three comparisons of FFS versus HMOs on process measures that were scored 3, 4, and 3, would be assigned a mean score of 3.33 for the comparison of FFS with HMOs on process. In this method, each combination of study and dimension of quality was reduced to a single score.

These approaches to scoring and a greater sensitivity to differences in the types of quality measures reported are among the major differences between the findings reported here and those in our earlier papers (Miller and Luft 1994, 1997). Furthermore, we have added eight studies and have dropped several that did not include estimates of medical appropriateness.

Evidence on the Effects of Fee for Service and Capitation on Quality of Care: Results

Overall Level of Quality

Although the overall performance of the plans varied by measure, quality was often disappointingly poor for both FFS and HMOs. Even measures as simple as advising patients to quit smoking (Coffey et al. 1995), suggesting that patients with congestive heart failure restrict their salt intake (Retchin and Brown 1990a), or starting depressed patients on antidepressants (Wells et al. 1994) were reported for less than 50 percent of patients.

Comparison of FFS versus HMOs

The majority of studies of *outcomes* uncovered no difference between FFS and HMOs. In figure 1, the results of all 13 studies in which FFS and HMO mortality was compared are plotted on the scale from 1 to 7. Most

FIG. 1. Comparison of mortality in FFS versus HMOs (total number of observations = 13). *Sources:* Young and Cohen 1991; Carlisle et al. 1992; Vernon et al. 1992; Langa and Sussman 1993; Manton et al. 1993; Lee-Feldstein, Anton-Culver, and Feldstin 1994; Shaughnessy, Schlenker, and Hittle 1994; Angus et al. 1996; Lave et al. 1996; Phibbs et al. 1996; Starr et al. 1996; Yelin, Criswell, and Feigenbaum 1996; Retchin et al. 1997.

studies had a mean score of around 4 (no difference). The same tendency toward no difference between FFS and HMOs was observed for clinically significant morbidity (fig. 2) and laboratory abnormalities (fig. 3). In all three outcomes categories, studies uncovered statistically significant differences between FFS and HMOs, but these studies showed no clear pattern favoring one or the other.

Nor did studies of process measures reveal a dominant pattern. Although the modal finding was no difference, many studies in fact found statistically significant differences between FFS and HMOs, but these favored FFS as frequently as they did HMOs (fig. 4).

There were, however, clear patterns in enrollee satisfaction. Enrollees preferred the nonfinancial aspects of their interactions with FFS health plans—relationships with clinicians, time spent with clinicians, access and availability of specialists (fig. 5). On the other hand, enrollees preferred the financial aspects of HMOs (fig. 6).

As we had expected, based on the fact that HMO plans offer better coverage of preventive services, HMO enrollees were more likely to have received preventive services (fig. 7). On the other hand, access to home health services was greater for FFS enrollees (fig. 8).

FIG. 2. Comparison of clinically significant morbidity in FFS versus HMOs (total number of observations = 17). *Sources:* Yelin, Shern, and Epstein 1986; Preston and Retchin 1991; Miller 1992; Retchin et al. 1992; Braveman et al. 1994; Cole et al. 1994; Lurie et al. 1994; Riley et al. 1994; Shaughnessy, Schlenker, and Hittle 1994; Carey et al. 1995; Greenfield et al. 1995; Lave et al. 1996; O'Toole et al. 1996; Ware et al. 1996; Yelin, Criswell, and Feigenbaum 1996.

FIG. 3. Comparison of laboratory abnormalities in FFS versus HMOs (total number of observations = 5). *Sources:* Preston and Retchin 1991; Udvarhelyi et al. 1991; Lurie et al. 1994; Greenfield et al. 1995.

FIG. 4. Comparison of process measures in FFS versus HMOs (total number of observations = 14). *Sources:* Cummings et al. 1989; Wells et al. 1989; Bredfeldt, Brewer, and Junker 1990; Retchin and Brown 1990a,b, 1991; Preston and Retchin 1991; Retchin and Preston 1991; Carlisle et al. 1992; Miller and Luft 1992; Vernon et al. 1992; Wells et al. 1994; Coffey et al. 1995; O'Toole et al. 1996.

FIG. 5. Comparison of satisfaction with nonfinancial features of the plan in FFS versus HMOs (total number of observations = 9). *Sources:* Lubeck, Brown, and Holman 1985; Rossiter et al. 1989; Rubin et al. 1993; Safran, Tarlov, and Rogers 1994; Adler 1995; Mark and Mueller 1996; Sisk et al. 1996.

FIG. 6. Comparison of satisfaction with financial features of the plan in FFS versus HMOs (total number of observation = 4). *Sources:* Lubeck, Brown, and Holman 1985; Rossiter et al. 1989; Safran, Tarlov, and Rogers 1994.

FIG. 7. Comparison of preventive services utilization in FFS versus HMOs (total number of observations = 6). *Sources:* Retchin and Brown 1990a; Bernstein, Thompson, and Harlan 1991; Udvarhelyi et al. 1991; Merkel and Caputo 1994; Mustin, Holt, and Connell 1994; Lave et al. 1996.

FIG. 8. Comparison of home health services utilization in FFS versus HMOs (total number of observations = 4). *Sources:* Shaughnessy, Schlenker, and Hittle 1994; Experton et al. 1996; Kane et al. 1996.

Evidence on the Effects of Fee for Service and Capitation on Quality of Care: Conclusions

The available data suggest that patients were more satisfied with the nonfinancial aspects of their coverage in FFS than in HMO plans. In contrast, both high- and low-income enrollees preferred the smaller copays and deductibles of HMOs to the financial arrangements of FFS.

Notably, however, there is little evidence of any consistent difference in clinical quality between FFS and HMOs. This is especially true when one separates issues of coverage (e.g., the better performance of HMOs on preventive service measures) from issues of quality.

Thus, in our review of the literature, we found no conclusive evidence that FFS plans provide either consistently better or consistently worse quality of care than HMOs. There are, however, many studies pointing to clinically important and statistically significant differences. The inconsistency in findings may well reflect the importance of variables beyond the FFS–HMO dichotomy. Thus, there are many things we do not know about the differences between FFS and HMOs, and we need to determine the best alternatives to respond to the imperfections of both systems.

Future Directions for Research on the Impact of Financial Incentives on Quality

Much research remains to be done on how financial incentives affect quality. We must define more explicitly the financial choices clinical decision makers face, address the complexities and various designs of HMOs and other forms of managed care, and improve quality measurement and reporting. Further, it would be useful to know more about how other organizational characteristics and management capabilities interact with financial incentives to affect quality. The sheer number of variables to be studied will make it difficult to control for all potential confounders when experimenting with any one variable. For this reason, there may be room for more observational studies that clearly describe the differences between comparison groups (versus randomized studies with few differences between groups). Judgment may also play a larger role in this field than in other areas of the health sciences.

Studying Explicit Financial Incentives

The literature on payment mechanisms and quality has been largely devoted to the observed differences in quality between FFS and HMOs. However, although general statements can be made about the incentives to health plans under FFS and HMOs, it is hard to know either what actual incentives individuals face within a plan or the degree of their importance to the individual's overall practice. Clinicians contracted to HMOs range from employees of staff-model HMOs to solo practitioners who receive a small percentage of their revenues from one or a small number of HMOs.

Even if one were to restrict the analysis to staff-model HMO clinicians, however, there may be important differences in mission, culture, or contract language between individual staff-model HMOs and their clinician employees. To understand how clinicians respond to financial incentives, quality-of-care researchers should explicitly state not merely the type of health plan being studied but also the goals that are set for the plan's clinicians, how the plan measures their performance (which may differ from how investigators measure it), and the rules governing financial and other rewards.

This same information must be included in the study of clinicians who are not directly employed by health plans. However, in the report-

ing of this research, it will also be important to describe the relative importance of the health plan to the clinician's overall practice. For example, the investigators might report the percentage of each clinician's patients who are enrolled in the type of plan being studied.

Comparing Types of HMOs

In most of the research we have discussed, HMOs were grouped together. Clearly, however, there are many different forms of HMOs. There are also plans that manage care (in the sense of trying to affect utilization) that are not HMOs. Given the variety and ongoing evolution of forms of health plans, research that evaluates quality as a function of the type of managed care or HMO would be useful. However, such research still must report the incentives faced by the individual clinicians.

Other Management Capabilities and Policies

There are no studies of other management capabilities that might have an impact on quality and the interaction among these capabilities, financial incentives, and quality. For example, if one knew that Plan A offered large incentives to improve rates of mammography, whereas Plan B offered small incentives, then one would expect Plan A clinicians to be more likely to contact appropriate patients about getting a mammogram. Imagine, however, that Plan B could easily identify both patients receiving mammograms (the numerator in "mammography rate") and all women aged 40 to 70 assigned to each clinician (the denominator), whereas Plan A could identify only women receiving mammograms (the numerator) and women aged 40 to 70 assigned to a clinician *who had a clinic visit that year*. In this case, Plan A clinicians might decide that tracking down women who had not made an office visit that year in order to send them a reminder to get a mammogram would increase their denominator more than their numerator.

Thus, although the financial incentives for encouraging appropriate use of mammography in Plan A appeared to be better than those in Plan B, the weak Plan A information systems might mitigate, or even eliminate, this effect. Similarly, a disease management program for asthma might have more of an effect on the asthma hospitalization rate than would be produced by financial incentives to primary care doctors to control utilization.

Identifying Appropriate Comparison Groups

Most studies of quality have chosen HMOs or FFS patients from the same locality, yet there is increasing evidence that utilization rates in FFS plans are relatively lower in areas with rapid growth of HMOs (or other forms of managed care). This “competitive” effect may reflect the spread of managed care practice styles to FFS patients. Often, the result is similar (and lower) rates of hospital use for both FFS and HMOs. This implies a major effect of HMOs on utilization, even if all the side-by-side comparisons show no effect. By analogy, we should test whether quality of care, even when it is comparable in FFS and HMOs settings, is better or worse in areas with high HMO penetration. To further complicate the analysis, studies should take into account the possibility that HMOs may attract patients who do not have the same interest in quality or whose adherence to treatment is different. Studies that account for selection effects are notably absent in the literature on quality.

Developing Better Measures of Quality

Most previous research has reported a series of comparisons between FFS and HMOs on several quality issues in each study. However, there has been no attempt to estimate the clinical significance of these comparisons. For example, in a study of the quality of care provided to diabetics, Greenfield’s group reports both on “change in glycosylated hemoglobin level” and on “foot infections” for FFS and HMO patients (Greenfield et al. 1995). Studies of quality often include large tables of such comparisons, but they do not indicate which comparisons are most significant to the patient.

Although a discussion of all the potential improvements in quality measurement is beyond the scope of this paper, one approach would be to assign weights or ranks to the comparisons reported in studies of quality. Weights that reflected the importance of the question being asked would be a major advance in the study of quality. For example, “loss of vision from diabetic retinopathy” might have a greater weight than “blood sugar below 200,” whereas “death from complications of diabetes” would outrank both in importance. The sum of the weighted findings might lead to a “diabetes quality of care score.” Because the elements in the weighting system would have to be disease specific

(blood sugar may not be relevant in the treatment of hypertension), the health services researcher would have to collaborate with clinicians who have the appropriate expertise.

Creating Financial Incentives for Quality

The absence of clear quality differences between FFS and HMOs does not mean that financial incentives and payment systems cannot affect quality. On the contrary, the strong evidence that the uninsured receive worse care than the insured suggests that financial incentives, if they are large enough and are easily understood by providers, do make a difference. The low overall level of quality reported in the studies discussed here, however, suggests that we have not yet created either the right mix of plan and individual incentives or the kind of training that encourages clinicians to provide the best quality of care.

The greatest impediment to focusing on quality is that it does not pay a health plan to do so. Quality of care is most important to individuals who are sick. If a health plan achieves recognition for providing high-quality care, it is likely to enroll a disproportionate (and rising) share of individuals with chronic medical problems. Most purchasers—whether governmental or private—do not offer supplemental payments to offset this adverse selection. If plans believe that providing the highest quality of care will attract a large amount of uncompensated risk, this conviction will limit their willingness to emphasize or improve quality, especially for patients with chronic illness. Because the economic incentives for clinicians to provide quality care come from the plans, it is unlikely that strategies designed to appeal to clinicians will succeed until plans believe that it is in their economic interests to encourage high quality. Therefore, we believe that the first step is to free plans from concerns about risk selection.

There are many possible methods for correcting the problem of risk selection: risk adjustment, risk corridors, withholds and risk pools, carveouts, reinsurance, purchaser–plan profit and loss sharing, bundled fee arrangements, and hybrid approaches. Although a full discussion of the topic is beyond the scope of this paper (but see, for example, Newhouse, Buntin, and Chapman 1997), the overall goal should be to convince plans that they will receive for each enrollee a payment that accurately reflects the amount of money an *efficient plan* would need to

provide high-quality care to a *patient with that enrollee's medical problems*. This goal incorporates correction for risk (by taking into account health status), incentives to minimize utilization (by limiting the payment to the amount needed by an efficient plan), and the objective of high quality.

We believe the best approach will be risk-based payments—the correction of capitation rates to reflect the risk a plan enrolls—in a system that adjusts even “within disease” for expensive chronic diseases. Thus, all hypertension might get a single small supplement to the capitation rate, whereas breast cancer might carry a range of possible adjustments, depending on the stage of disease or other predictors of utilization. This approach is just now being explored, however, and the feasibility of collecting the necessary data and developing disease-specific risk-adjustment models is still unclear.

If a method of correcting for risk differences among enrolled populations can be devised, then plans will no longer have an incentive to avoid sick patients. In fact, some plans might actively seek to enroll these patients, because a 10 percent profit margin on a patient with an expected cost of \$50,000 per year is \$5,000, whereas a 10 percent profit on 20 patients expected to cost \$1,000 per year is only \$2,000. For plans that choose to cater to the chronically ill, quality probably will become the primary marketing tool. This statement is speculative, of course, because it has never been tested. However, we believe that when plans are rewarded for maximizing quality, they will rapidly develop and implement individual-level quality incentives for their contracted clinicians.

Where Payment Mechanisms Fit in Integrated Strategies for Quality Improvement

Although the exact method of correction for risk differences among enrolled populations has not emerged, it is clear that one must be instituted. Developing an approach to risk selection, however, is unlikely to be enough to create a quality-focused health care market. Financial incentives for quality should be developed concurrently with the creation of a minimum benefits package, the establishment of broader quality-reporting requirements, the setting of minimum information systems standards, and the establishment of financial solvency regulations.

Minimum Benefits Package

To have plans receive payments based on “the expected cost for an efficient plan caring for a patient with disease X,” the definition of benefits packages must be consistent from plan to plan. That is, hypertension may cost \$2,000 a year on average to a plan that covers outpatient drugs but almost nothing to a plan that does not. The identification of a minimum level of benefits would be essential to correcting for risk and allowing consumers to compare plans on price and quality. Plans could offer additional benefits, but these should not be medically necessary services (e.g., valet parking could be an additional benefit, but coronary bypass surgery should be in the minimum benefits package).

Quality Reporting Requirements

Most quality reports, like the Healthplan Employer Data and Information Set (HEDIS), focus on preventive services (National Committee for Quality Assurance 1996). Achieving a more quality-focused marketplace likely will require the reporting of other types of quality information. Some of these should be fairly general, like age-adjusted mortality, but it is likely that the most useful information will be disease-specific, and very detailed, process and outcome measures. For example: What percentage of patients with congestive heart failure is on an angiotensin-converting enzyme inhibitor? What is the median life expectancy for patients with Stage IV lung cancer? These quality metrics will have to be developed with input from plans, patient advocacy groups, clinicians, and health services researchers.

Information System Improvements

Much of what we have discussed here is not currently possible. Many plans and medical groups simply do not have the information systems capabilities to generate risk and quality reports. However, we believe that the quality-related benefits of requiring minimum data capabilities would far outweigh the costs.

Financial Solvency Requirements

The creation of risk-corrected payments offers many potential quality-related benefits to patients with expensive illnesses and to the plans and

providers who specialize in caring for these patients. However, it also creates a special risk for these same groups: if a plan or medical group that specializes in patients with chronic disease experiences a series of bad financial outcomes and becomes insolvent, a population of very expensive patients could be left without coverage. To protect against this eventuality, stringent financial solvency requirements should be developed at the same time that improvements in risk correction are sought.

Conclusion

Many fundamental issues must be solved before we can develop a quality-focused health care market. The experience of other industries—and the lower quality of care received by the uninsured—suggests that, if financial incentives are sufficiently large and clear, they can have an impact on quality. In theory, positive financial incentives could provide a great stimulus for quality. In health care, however, because of the difficulty in measuring quality and a lack of correction for risk, the financial incentives do not encourage health plans to maximize quality. That said, the quality of clinical outcomes appears to be similar in FFS and HMOs. Differences between FFS and HMOs that can be documented often relate more to benefits design and coverage decisions than to the intent of plans to provide high- or low-quality care.

It is unlikely that financial incentives for quality will be created unless risk differences among enrolled populations can be offset. This will be technically difficult, but is possible, even within high-cost conditions. The correction for risk differences will be the most important stimulus for quality, but it should also be tied to improvements in information systems and agreement on a minimum benefits package, quality reporting standards, and financial solvency requirements.

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