

# Effects of Compensation Methods and Physician Group Structure on Physicians' Perceived Incentives to Alter Services to Patients

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**Objective.** To examine how health plan payment, group ownership, compensation methods, and other practice management tools affect physician perceptions of whether their overall financial incentives tilt toward increasing or decreasing services to patients.

**Data Source.** Nationally representative data on physicians are from the 2000–2001 Community Tracking Study Physician Survey ( $N = 12,406$ ).

**Study Design.** Ordered and multinomial logistic regression were used to explore how physician, group, and market characteristics are associated with physician reports of whether overall financial incentives are to increase services, decrease services, or neither.

**Principal Findings.** Seven percent of physicians report financial incentives are to reduce services to patients, whereas 23 percent report incentives to increase services. Reported incentives to reduce services were associated with reports of lower ability to provide quality care. Group revenue in the form of capitation was associated with incentives to reduce services whereas practice ownership and variable compensation and bonuses for employee physicians were mostly associated with incentives to increase services to patients. Full ownership of groups, productivity incentives, and perceived competitive markets for patients were associated with incentives to both increase and reduce services.

**Conclusions.** Practice ownership and the ways physicians are compensated affect their perceived incentives to increase or decrease services to patients. In the latter case, this adversely affects perceived quality of care and satisfaction, although incentives to increase services may also have adverse implications for quality, cost, and insurance coverage.

**Key Words.** Physician compensation, financial incentives, physician group ownership, managed care

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Attempts by managed care plans during the 1990s to alter productivity incentives inherent in traditional fee-for-service (FFS) arrangements with others favoring more efficient treatment styles focused attention on the use of financial incentives to influence physician behavior (Robinson et al. 2004). Concern that new arrangements, such as capitation, served to reduce quality fueled much of the backlash against managed care. We now are seeing renewed interest in physician financial incentives aimed specifically at improving quality and promoting greater care coordination, under the rubric of “pay-for-performance” (Conrad and Christianson 2004). Despite the interest in altering physician compensation to influence their clinical behavior, the precise methods by which physicians are compensated and whether physicians perceive that these arrangements motivate them to alter their treatment patterns are not well understood. In this paper, we investigate how health plan payments to physician groups, group methods for directly compensating physicians, group ownership, and other factors are associated with physicians’ perceptions of whether their overall financial incentives tilt toward increasing or decreasing services to patients.<sup>1</sup>

## FINANCIAL INCENTIVES AND INDIVIDUAL PHYSICIANS

Three classes of financial incentives are potentially relevant for their effect on costs and quality: arrangements between the health plan and physician group, average or “ambient risk” that the organization experiences from all contractual arrangements with multiple payers, and specific arrangements between the physician group and individual physicians. Even to the extent health plans believe they are dealing with individual physicians, those physicians often assign their financial relationships to intermediary organizations such as independent practice associations (IPAs), physician–hospital organizations, and physician groups.

Plan arrangements with physician groups start with one of three basic pure forms: salary, payment related to panel size (capitation), and payment related to services rendered (FFS) (Glaser 1970; Hillman 1987; Hillman, Welch, and Pauly 1992; Kendel and Lazaar 1992). In practice, capitation and

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FFS are the dominant arrangements as few HMOs directly employ physicians and reimburse them via fixed salary (Gold et al. 1995). Under full capitation, risk is transferred from the health plan to the physician group whereas under FFS the plans retain the risk associated with costs for the provision of services. In between these are a variety of intermediate arrangements that reflect various degrees of risk sharing between health plans and physician groups. These mixed forms dominate (Goldfield et al. 1992; Hillman, Welch, and Pauly 1992; Robinson 1999; Rosenthal et al. 2002; Robinson et al. 2004).

Because little data on how groups compensate physicians exist, most work on how financial arrangements affect individual physicians has been theoretical and draws on the literature of professional organizations. Some view medical groups as a mechanism for spreading financial risk among physicians and/or as a means for either attenuating or exaggerating health plan incentives (Gaynor and Gertler 1995; Lang and Gordon 1995; Landon, Wilson, and Cleary 1998). Groups can further serve as a locus for accountability or coordinate the process of care (Baker 1992; Kendel and Lazaar 1992; Pauly 1996). Finally, individual physicians' clinical choices are most likely affected by their specific financial incentives, which are influenced by the methods used for rewarding and assigning risks within these varied organizational structures (Casalino 1992; Murray et al. 1992; Stearns, Wolfe, and Kindig 1992; Conrad et al. 1996; Kralewski et al. 1996; Conrad and Christianson 2004). Thus, there is often a cascading set of financial incentives that begin with a health plan but which can be affected by several levels of organizational and contractual structures before reaching the individual clinician.

Physician group owners receive a share of the residual profits and benefit from the value of the organization upon its sale. These are likely to be powerful incentives affecting behavior, with incentives presumably tied to the size of the ownership stake and value of the practice (Robinson 2001; Conrad and Christianson 2004). Even within larger groups, physicians with an ownership interest are more likely to be aware of and internalize incentives from contractual arrangements with health plans than employee physicians, even though other components of their compensation may be the same.

The organizational context of the physician group is important in understanding the role and effect of financial incentives on physician behavior. Health plans use other mechanisms to affect physician behavior, including network selection and utilization management. Moreover, behavioral norms inculcated within the physician organization can serve to align physician and organizational goals, although the ability of organizations to achieve this diminishes with size (Gaynor and Pauly 1990; Robinson 2001). Finally, the

larger market environment, including competition among physicians, insurer concentration, and distribution of provider organizations both influences and mediates financial incentives (Conrad and Christianson 2004).

## PREVIOUS WORK

An extensive literature relating physician payment at the level of FFS, capitation, and salary to physician behavior exists, with results generally in expected directions. Reviews of these studies can be found elsewhere (e.g., Hellinger 1996, 1998; Armour et al. 2001). These studies generally fail to distinguish payment to the medical group from payment to the physician. Of those that examine direct physician payment methods while controlling for group incentives, results are mixed (Conrad et al. 1998, 2002; Kralewski et al. 2000).

## DATA AND METHODS

We estimate a model to investigate factors associated with physician reports of whether their overall financial incentives are to increase services to patients, neutral, or to decrease services to patients. This is specified as a function of the form of health plan payments to the physician's group, the group's methods for compensating physicians, practice ownership, and market conditions, while controlling for group and physician characteristics.

We use a nationally representative sample of patient care physicians from the 2000–2001 Community Tracking Study (CTS) Physician Survey. This telephone survey gathered information on 12,406 nonfederal physicians engaged in at least 20 hours per week of patient care. Specialties with little or no direct patient contact, such as pathology, were excluded. The sample is largely clustered in 60 local health care markets. The weighted response rate was 59 percent, which compares favorably with similar surveys. More information about the survey is available elsewhere (Center for Studying Health System Change 2003; Diaz-Tena et al. 2003).<sup>2</sup>

### *Dependent Variable*

Our dependent variable comes from a survey question asking physicians whether the overall financial incentives in their practice favor reducing services to individual patients, expanding services to individual patients, or

neither.<sup>3</sup> This variable has the advantage of being a simple, broad-based measure that distills a potentially very complex set of incentives facing the physician into a single measure. It has the disadvantage, however, of being subjective and, as such, reflecting the unobserved standards and expectations of the responding physician. Although objective cost or quality data have more direct relevance to policy and practice, such information is often only available for patients covered by a given health plan, raising questions of generalizability and proper specification. Although subjective, physicians' perceived financial incentives are more likely to affect their clinical behavior than the precise set of financial arrangements they operate under. Moreover, in other research using CTS Physician Survey data linked to Medicare claims, the same subjective measure we use was found significantly related to the quantity of services provided by physicians to their FFS Medicare patients (measured as revenue value units), in the expected directions, providing justification for its use here (Hadley and Reschovsky 2006). We also assessed the criterion validity of this measure by examining whether perceived financial incentives are associated with physicians' perceptions of their ability to provide high-quality care and to obtain needed services for their patients in expected ways.

### *Independent Variables*

*Financial Incentives.* As indicated above, physicians face a cascading set of financial incentives from health plans, through their physician group or other intermediate organizations, to the specific ways the physician group compensates them. We capture health plan incentives, albeit crudely, by categorizing the group's percentage revenue from capitated payments (0, 1–25, >25 percent). The physician's compensation method within the group comes from survey information on whether the physician is a full or part owner of the group, the physician's basic method of compensation (fixed salary, adjustable salary, wage, other), factors used to determine compensation (productivity, profiling results, patient satisfaction, and explicit quality measures), and the receipt and size (relative to total income) of any bonus, returned withholds, or incentive payments.<sup>4</sup> Based on analyses of alternative, mostly more complex, specifications, we constructed a five-level categorical compensation method variable, entered as a set of dummy variables. The categories are employee with fixed compensation (salary or wage) and little or no bonus opportunity, employee with fixed compensation plus large bonuses (of 5 percent of total income or more), employee with

variable compensation arrangements, part owner, and full owner.<sup>5</sup> In addition, we constructed four dummy variables to indicate whether physicians' compensation was affected by their productivity, satisfaction surveys of their patients, quality measures, or results of profiling scores comparing their utilization patterns with other physicians.<sup>6</sup>

*Group Characteristics.* In some practices, performance as a gatekeeper can affect bonuses or payouts from withholds. We measure the extent of gatekeeping by the percentage of physicians' patients in gatekeeping arrangements (<10, 10–49, and 50 percent+).<sup>7</sup> We also included a set of dummy variables describing the type and size of practice organization: solo/2 physician (reference group), group with three to 10 physicians, group with 11–50 physicians, group with >50 physicians, group/staff model HMO, hospital-owned practice, medical school, or other.

*Physician and Market Characteristics.* Physician characteristics include years in practice (5 or less, 6–29, 30 or more), gender, specialty (primary care versus specialist), and graduation from a foreign medical school.<sup>8</sup> To characterize local market conditions, we included categorical responses to a question about respondents' perception of competition among physicians, defined as pressure to undertake various activities to attract and retain patients (very, somewhat, not at all competitive). Instead of specific market-level variables, we included dummy variables for the CTS markets to control for fixed effects. As these had virtually no effect on other model coefficients and standard errors, they were dropped from the equations reported here.

#### *Endogeneity of Financial Incentives*

One threat to validity of observational studies of this sort is that variables characterizing the financial compensation of physicians and physician groups are potentially endogenous. This would occur if physicians choose to work in groups where the incentives are consistent with their talents and preferences. For instance, physicians with a less resource-intensive practice style may be more likely to select practices where this behavior is rewarded, such as staff model HMOs, while others whose practice style is more service intensive may be attracted to practices where compensation is based on billings or other measures of productivity. Barro and Beaulieu (2003) found evidence of physician selection of practices based on compensation methods.

As our model uses multiple compensation variables and we lack exogenous identifying variables, instrumental variable estimation is not a feasible method to test and correct for this possible bias. We do, however, attempt to mitigate potential endogeneity bias by including four variables that describe physicians' preferences about different aspects of their medical practice. Physicians rated (on a 1–10 scale) the importance potential income and of control over working hours, clinical decisions, and business decisions.<sup>9</sup> These variables were dichotomized, indicating those with the strongest preferences. As responses were heavily skewed toward values of 10 (very important), the cut-off value was set at 9.

### *Estimation*

As our dependent variable is ordinal, an ordered logit was used. We also estimated a multinomial logit (MNL)—using neutral incentives as the reference group—to identify nonmonotonic relationships. For example, a particular factor may have a significant effect on reducing the likelihood of reporting neutral financial incentives, while increasing the likelihoods of both incentives to decrease service to patients and to increase services to patients. We do not report the MNL results, but do mention these instances in the text.<sup>10</sup>

The model was estimated on the full sample as well as on various subsamples (primary care physicians [PCPs] versus specialists, physicians in small versus large organizations, and by various levels of practice revenue from capitation). Generally results were similar, so only full sample results are shown. We also interacted the ownership variables with the capitation variables on the supposition that owners would be more likely to internalize health plan payment incentives than employee physicians. These too were not found to be significant and are not reported.

All analyses used survey weights designed to account for probability of selection and survey nonresponse. Estimation of standard errors accounted for the survey's complex design.

## RESULTS

### *Sample Characteristics*

Table 1 shows sample characteristics. Overall, 69.4 percent of physicians report neutral financial incentives, i.e., they do not believe that their group's financial incentives encourage them to provide either more or fewer services to patients. Only 7.4 percent report an overall financial incentives to reduce

Table 1: Sample Characteristics

Perceived financial incentives	
Reduce services to patients	7.4%
Neutral	69.4
Increase services to patients	23.3
Gender	
Male	76.5
Female	23.6
Specialty	
Primary care	39.8
Specialist	60.2
Years in practice	
≤5	19.0
6–29	72.6
30+	8.5
Foreign medical graduate	
No	78.8
Yes	21.2
Ownership and compensation	
Employees	
Fixed income with no/small bonus	27.5
Fixed income with large bonus	2.4
Variable income	14.0
Part owners	24.1
Full owners	32.1
Factors determining compensation	
Productivity	78.1
Profiling based on use of services	9.3
Results of patient satisfaction surveys	17.7
Specific quality measures	13.1
Practice revenue from capitation	
None	54.8%
To 25%	24.5
25% or more	20.7
Percent of patients physician serves as gatekeeper (PCPs) (%)	
<10	15.2
10–49	39.1
50+	45.8
Perceived market competitiveness	
Not competitive	31.5
Somewhat competitive	45.5
Very competitive	23.1
Practice preference factors that are very important	
Control over hours	64.2
Control over medical decisions	90.7
Potential income	42.3
Control over business decisions	48.3

*continued*



Table 1: *Continued*

Type of practice	
Solo/2 physician	33.4
Groups with 3–10 physicians	20.0
Groups with 11–50 physicians	6.9
Groups with > 50 physicians	2.4
Group/staff model HMO	3.8
Medical school	8.4
Hospital	12.0
Other	13.1

services and 23.3 percent report overall incentives to increase services. Over three-fourths of the physicians are male and 60.2 percent are specialists. Nearly 44 percent are employees, 24 percent are part owners, and 32 percent are full owners of their practices. (Almost four in five full owners are solo practitioners.) Among employees, the largest share has fixed incomes with little or no bonuses—comprising 27.5 percent of all physicians. An additional 2.4 percent of physicians are employees with fixed incomes who also received a bonus in excess of 5 percent of total compensation, whereas remaining employees, 14 percent of all physicians, receive some form of variable compensation.

A large majority of all physicians (78 percent), including full owners of solo practices, are in practices where productivity is taken into account when determining compensation. More than 9 percent indicate that profiling based on use of services is a factor, whereas about 18 and 13 percent report patient satisfaction surveys and specific quality measures are used, respectively.

#### *Association with Perceived Ability to Provide Quality Care*

The CTS survey assesses physician's perceived ability to provide high-quality care in a number of questions. The criterion validity of our dependent variable was evaluated by associating it with these variables (Table 2). Across all measures examined, those with an overall financial incentive to reduce services to patients express lower ability to provide high-quality care to their patients than physicians whose financial incentives are perceived as neutral or encouraging greater provision of services. There is little difference in response between those reporting an incentive to increase services and neutral incentives, suggesting that quantity-increasing financial incentives may be only weakly related to better quality of care.

Table 2: Association between Perceptions of Financial Incentives and Ability to Provide Quality Care

	Percent of All Physicians	Effect of Financial Incentives on Patient Care		
		Reduce Services (%)	Neutral (%)	Increase Services (%)
Agreement with:				
“It is possible to provide high quality care to all my patients”	78.4	59.1	79.3	81.6
“I have adequate time to spend with my patients during a typical patient visit”	63.5	45.6	64.9	64.7
“I can make clinical decisions in the best interest of patients without the possibility of reducing my income”	79.4	51.9	81.6	80.9
Ability to “always,” “almost always,” or “frequently” obtain needed services for patients				
Referrals to quality specialists	91.6	84.8	92.1	92.2
High-quality ancillary services	84.9	71.3	85.8	86.5
Adequate number of inpatient days	80.4	64.5	80.8	83.9
High-quality inpatient mental health care	44.9	33.5	45.9	46.5

$\chi^2$ -statistics are all highly significant at  $p \leq .0001$ .

*Multivariate Results*

Table 3 reports ordered logit results. To assist in interpretation, predicted probabilities were calculated and we report marginal probabilities for the three possible responses.

*Ownership, Compensation Factors, Capitation, and Gatekeeping.* Among employee physicians with fixed incomes (paid by wage or unadjusted salaries), significant bonus opportunities are associated with a perceived financial incentive to increase services to patients. Significant bonuses reduce the likelihood of reporting incentives to reduce services by 2 percentage points, while increasing the likelihood of reporting incentives to increase services by over 6 percentage points. Again compared with employees with fixed compensation, part owners are more likely to perceive that their financial incentives are to increase services. However, the coefficient for full

Table 3: Ordered Logit Estimates and Marginal Probabilities from Model of Physicians' Perceptions of Financial Incentives

<i>Independent Variable</i>	<i>Logit Coefficient</i>	<i>p-Value</i>	<i>Marginal Probabilities</i>		
			<i>Reduce Services</i>	<i>Neutral</i>	<i>Increase Services</i>
Ownership and compensation					
Employees					
Fixed income (ref. group)					
Fixed income with large bonus	<b>0.344*</b>	<b>.037</b>	-2.0	-4.2	6.3
Variable income	0.101	.165	-0.7	-1.1	1.7
Part owners	<b>0.248**</b>	<b>.003</b>	-1.5	-2.9	4.4
Full owners	-0.009	.927	0.1	0.1	-0.2
Factors determining compensation					
Productivity	<b>0.272***</b>	<b>.000</b>	-1.8	-2.7	4.5
Profiling based on use of services	-0.027	.790	0.2	0.3	-0.5
Results of patient satisfaction surveys	0.054	.527	-0.3	-0.6	0.9
Specific quality measures	0.037	.697	-0.2	-0.4	0.7
Practice revenue from capitation					
None (ref. group)					
To 25%	<b>-0.199**</b>	<b>.003</b>	1.2	2.4	-3.6
25% or more	<b>-0.591***</b>	<b>.000</b>	4.2	5.3	-9.5
Percent of patients for whom physician serves as gatekeeper (PCPs) (%)					
<10 (ref. group)					
10-49	0.120	.167	-0.7	-1.5	2.2
50+	<b>-0.182*</b>	<b>.040</b>	1.2	1.9	-3.1
Perceived market competitiveness					
Not competitive (ref. group)					
Somewhat competitive	<b>0.210***</b>	<b>.000</b>	-1.4	-2.2	3.5
Very competitive	<b>0.240***</b>	<b>.001</b>	-1.6	-2.5	4.1
Years in practice					
≤5 (ref. group)					
6-29	<b>-0.347***</b>	<b>.000</b>	2.0	4.4	-6.4
30+	<b>-0.514***</b>	<b>.000</b>	3.2	5.9	-9.1
Gender					
Male (ref. group)					
Female	<b>-0.123</b>	<b>.069</b>	0.8	1.3	-2.1
Specialty					
Specialist (ref. group)					
Primary care	0.046	.576	-0.3	-0.5	0.8
Foreign medical graduate					
No (ref. group)					
Yes	<b>-0.135*</b>	<b>.049</b>	0.9	1.4	-2.3
Important practice preference factors					
Control over hours	0.004	.932	0.0	0.0	0.1
Control over medical decisions	0.036	.661	-0.2	-0.4	0.6

*continued*

Table 3: *Continued*

<i>Independent Variable</i>	<i>Logit Coefficient</i>	<i>p-Value</i>	<i>Marginal Probabilities</i>		
			<i>Reduce Services</i>	<i>Neutral</i>	<i>Increase Services</i>
Potential income	<b>0.152**</b>	<b>.006</b>	-1.0	-1.7	2.7
Control over business decisions	0.031	.651	-0.2	-0.3	0.5
Type of practice					
Solo/2 physician practices (ref. group)					
Groups with up to 10 physicians	<b>0.534***</b>	<b>.000</b>	-3.2	-6.5	9.6
Groups with 11-50 physicians	<b>0.482***</b>	<b>.000</b>	-2.9	-5.6	8.6
Groups with 50+ physicians	<b>0.304*</b>	<b>.026</b>	-2.0	-3.2	5.2
Group/staff model HMO	0.077	.611	-0.6	-0.7	1.2
Medical school	0.168	.205	-1.2	-1.6	2.7
Hospital	0.108	.301	-0.8	-1.0	1.7
Other	0.086	.441	-0.6	-0.8	1.4

\*\*\* $p \leq .001$ ;\*\* $p \leq .01$ ;\* $p \leq .05$ . Statistically significant coefficients are in boldface.

owners is small and insignificant. The MNL model identified full ownership as having a nonmonotonic relationship with perceived financial incentives. Full owners were more likely to report incentives to increase services and to decrease services to patients, relative to neutral incentives (OR = 1.43 and 2.26, respectively;  $p \leq .001$ ).

Productivity is the factor most often cited by physicians as affecting their compensation. Although the ordered logit model implies a significant monotonic effect between productivity and perceived financial incentives, the MNL suggests that productivity incentives increases the likelihood of perceiving overall incentives are to reduce and to increase services to patients relative to neutral incentives (OR = 1.61 and 1.71, respectively,  $p \leq .001$ ).

The percentage of a group's revenue from capitation is significantly associated with perceptions that incentives are to reduce services to patients. For instance, physicians whose groups have at least a quarter of their revenue from capitated contracts are over 9 percent less likely to report incentives to increase services to patients and over 4 percent more likely to say that their financial incentives encourage reducing services to patients compared with physicians in groups with no capitation. In an alternative specification that omitted the explicit factors affecting compensation, the coefficients on the capitation variables changed very little. This suggests that capitation does not operate through its effect on a group's use of the direct incentives we include

in our model, but rather that it directly affects perceived financial incentives or affects other specific compensation incentives not included in our model (such as capitation of individual physicians or compensation based on practice financial performance).

Gatekeeper arrangements to manage patients' care also are associated with perceived financial incentives. Compared to PCPs with little or no gatekeeping responsibilities, those PCPs who serve this role for a majority of their patients are about 3 percent less likely to report having an overall financial incentive to increase services to patients.

*Market Competition.* Physicians describing their practices as facing somewhat or very competitive situations are more likely report financial incentives to increase services to patients. Although the ordered logit results indicate that this relationship is monotonic, the MNL results suggest that more competitive practice environments encourage both types of nonneutral financial incentives. More competition was associated with a greater likelihood of perceiving that overall financial incentives were to both reduce and increase services to patients (OR = 1.30, 1.46 for "somewhat competitive," 1.82, 1.73 for "very competitive," respectively;  $p < .02$ ).

*Other Control Variables.* Financial incentives are perceived as pointing toward provision of fewer services for more experienced, female, and foreign trained physicians, as compared with physicians who are less experienced (1–5 years in practice), male, and U.S. trained physicians, respectively. The association with years in practice may reflect strong incentives to build up one's practice in the first few years after completing residency training. This incentive appears to diminish over time, with very experienced physicians much less likely to report having overall financial incentives to increase services to patients.

Only one of the four practice preference variables was significantly associated with perceived financial incentives. Physicians who indicated that potential income is a very important aspect of medical practice were more likely to be in practices where they perceived the financial incentives as motivating greater service provision toward patients.

The last set of control variables shows the relationships between practice type and perceived financial incentives. The reference group is physicians in solo and two-physician practices, which the theory suggests should derive their financial incentives most directly from health plan

incentives without intervening internal practice financial incentives. The results in fact suggest that physicians in larger office-based groups are significantly more likely to report an overall financial incentive to increase services to patients. Those in smaller groups (three to 10 physicians) are most likely to report incentives to provide greater services to patients relative to those in larger groups, a finding consistent with Gaynor and Pauly (1990) and Conrad et al. (2002).<sup>11</sup> However, physicians in institutional settings, which are more likely than large office-based groups to be nonprofit organizations, report financial incentives similar to those of solo and two-physician practices.

## DISCUSSION

Physicians often face a complex and cascading set of incentives, with physician groups and other intermediary organizations serving to modify incentives inherent in the contracts between health plans and these organizations. The analysis assumes that physicians' clinical behavior is motivated by how they interpret and weigh these objective incentive structures, which can differ in how strongly they apply to an individual physician and can sometimes have contradictory influences within a practice. Policymakers seeking to modify physicians' behavior through financial incentives will benefit from understanding how physicians perceive the effects of particular incentive structures.

This study examined one dimension of physicians' perceptions of their financial incentives—the association with the quantity of services provided to individual patients. Three in 10 physicians report that their overall financial incentives encourage them to either increase or decrease services to their patients. We find that the way health plans pay groups, physicians' ownership/employment status within their group, group compensation methods, and other internal organizational structures are associated with these reported incentives.

Seven percent of physicians who indicate their overall financial incentives are to reduce services are more likely than others to express concerns about their ability to provide high-quality care. Three times as many physicians (23 percent) report incentives to increase services. Although this group reports their ability to provide high-quality care on par with those reporting neutral financial incentives, overuse of medical services contributes to less efficient care delivery, imposing medical care cost burdens on purchasers:

individuals, governments, and employers. These cost burdens threaten insurance coverage and ultimately access to care.

Although a majority of physicians, including those in groups with substantial capitated revenue and variable compensation arrangements, indicate their financial incentives are neutral, we do find that both health plan payments to physician groups, specifically capitated payments, and groups' compensation methods affect physicians' perceptions of their financial incentives. Capitation and, for PCPs, participation in gatekeeping arrangements are associated with perceived financial incentives to provide fewer services. Conversely, financial incentives incorporated into physician compensation through adjustable salaries, bonus payments, or through partial group ownership, increase the likelihood of reporting that the overall financial incentive is to provide more services to patients.

The need for explicit methods to ensure physician productivity has been hypothesized to grow with organization size, as the ownership stake of individual physicians is likely to be smaller and as other more informal means of aligning individual with group incentives become more difficult. Even after controlling for ownership status and explicit compensation methods, we find evidence consistent with this hypothesis for physicians in office-based group practices with three or more physicians. However, physicians in more institutional settings, such as hospitals, medical schools, and group/staff model HMOs, were not more likely than physicians in solo or two-physician practices to report an overall financial incentive to increase services to patients. This probably reflects the absence of explicit internal financial incentives in small office-based practices and the greater prevalence of nonprofits among institutional practices.

While both the form of health plan payments to groups and the methods of physician compensation affect perceived incentives, we do not find evidence that methods of physician compensation attenuate the effect of health plan payments. Moreover, we failed to find evidence that the form of health plan payment has its greatest effect on owners. This may suggest that physician group incentives fail to modify incentives inherent in health plan payment, or that highly capitated practices align their internal incentives to reinforce the effect of capitation on services to patients.

For three of the factors examined—full practice ownership, compensation based on productivity, and market competition—multinomial logistic estimation revealed nonmonotonic relationships. These factors were associated with reduced likelihood of reporting neutral incentives, while they were positively associated with greater likelihoods of reporting that financial incentives promote either increased services or decreased services to patients.

These apparently contradictory results may reflect the fact that the concept of “services to patients” has multiple dimensions: the number of specific procedures or tests provided per patient, the amount of time spent with patients, and the costs to the practice (including the value of physician time) of providing the services patients receive.

For example, physicians who are full owners of their practices are residual claimants on their practice’s profits and, as such, are likely to directly internalize health plan incentives. Hence, the association of full ownership with perceptions that incentives are to both increase and reduce services to patients perhaps reflects the heterogeneity in the type of health plan contracts this group enters into. Full owners may be much more sensitive to the cost dimension of providing services to patients than part owners or employees with variable compensation. Thus, full owners are more likely to respond that their incentives are nonneutral, but whether their overall financial incentive pushed them toward providing more or fewer services may depend on whether the respondent is more focused on the revenue or the cost side of the profit equation. Perceived incentives to reduce services to patients may reflect a greater emphasis on reducing practice costs, whereas incentives to increase services may imply efforts to increase gross billings.

Similarly, the ordered logit results suggest that tying compensation to productivity and perceiving a somewhat or very competitive practice environment monotonically increase the likelihood of reporting an overall financial incentive to increase services, while the multinomial model suggests that these factors increase the likelihoods of reporting both of the nonneutral incentives. Productivity incentives can be interpreted as creating pressures to both increase revenues and cut costs, depending on which dimension of services to patients a respondent was focused on. For example, if “productivity” means seeing more patients per hour or reducing nonbillable ancillary treatment costs, then this could be interpreted as an incentive to reduce services. Conversely, for some physicians “productivity” may mean increasing the number of billable services per patient, translating into an incentive to increase services to patients. Likewise, some physicians may view a highly competitive environment as an incentive to reduce the costs of care per patient, while others view it as an imperative to increase billings per patient.

### *Areas for Future Research*

The two major methodological limitations of this research discussed earlier point to directions for future research. While this study used a survey question



about perceived financial incentives as its dependent variable as a way of gauging the effects of specific organizational structures and compensation arrangements, using objective information on clinical quality and costs as dependent variables is more directly related to policy and is preferable. This suggests efforts should be made to merge physician data with claims or chart data on their patients. Unfortunately such information is rarely available for the full spectrum of a physician's patients.

The other major limitation of this study is that it is observational. Because we use cross-sectional survey data, our study is subject to bias if physicians select practices to align their practice styles with compensation methodologies used and ownership opportunities. Although inclusion of our practice preference variables may mitigate some of this potential bias, some is likely to remain. Future research should look toward natural experiments or panel data to help control for possible endogeneity bias.

Finally, further research should be directed to obtaining more refined measures of the compensation systems that physician face. In particular, it would be useful to know more explicitly the extent to which compensation is based on individual performance versus group financial performance, the degree to which compensation is fixed versus variable, and the specific factors and their relative importance in determining the variable component of compensation. Moreover, our understanding of the effects of compensation methods and physician group financial incentives would be improved by more refined measures of "services" to patients. The concept of increasing or decreasing services to patients should be broken down into more precise components: the amount of time with patients, the amount of billable services per patient, and the costs of practice inputs and across different types of services that are more or less discretionary. This level of detail might help resolve the paradoxical findings that some factors, such as being a full owner or having compensation based on productivity, appear to increase the relative odds of both increasing and reducing services to patients.

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## NOTES

1. By "physician group," we refer to all physician organizations from solo practitioners to institutional providers such as hospitals and medical schools.
2. A copy of the survey instrument is available at the Center for Studying Health System Change website: <http://www.hschange.org/CONTENT/569/>
3. Respondents indicating incentives to reduce or increase services were further asked to characterize the strength of these as "a little," "a moderate amount," or "a lot." Using this greater level of detail failed to provide additional insights.
4. The survey does not provide information on the precise factors that were used to determine the size of bonus payments, although it asks in general terms which factors affect compensation.
5. By using a percentage of income threshold to categorize physician bonus arrangements, we are potentially confusing the strength of the incentive with the actual performance of the physician in light of the bonus incentive. A relatively small percentage of physicians report meeting this 5 percent threshold, suggesting that our measure most likely identifies those with the strongest bonus incentives, rather than those physicians most successful in meeting the criteria used in the bonus systems.
6. Full owners of solo practices were not asked these questions. We assumed that compensation of these physicians was affected only by their own productivity and coded these variables for them accordingly. Tests of models including and excluding full owners of solo practices indicated that results were not sensitive to this assumption.
7. Only PCPs were asked questions about gatekeeper arrangements. Specialists were coded as having no patients for whom they served as a gatekeeper.
8. More detailed specialty categories were tested, but did not affect results on variables related to financial incentives.
9. The multiple rounds of the CTS survey have a panel component, which could be useful in correcting for the potential endogeneity of compensation variables. However, this was not possible as the financial incentive question that serves as the source of our dependent variable was not asked prior to the 2000–2001 survey.
10. Full MNL results are available from the authors upon request.
11. Although not shown, the inclusion of other model variables substantially changes and for the most part reduces the association between practice type perceived incentives to reduce or increase services to patients. This comparison suggests that our model accounts for many of the differences in compensation practices observed across various practice types.

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