The Changing Effect of Managed Care on Physician Financial Incentives

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Objective: To examine how managed care affects physician financial incentives to reduce services to their patients, particularly how this relationship has evolved over time and whether the effects of capitated managed care and noncapitated managed care are different.

Study Design: Retrospective study using Community Tracking Study physician survey data from 2000-2001 and 2004-2005.

Methods: Physicians were included in the study sample only if they were surveyed in both 2000-2001 and 2004-2005 (balanced panel data). The study sample consisted of 4154 physicians, for a total of 8308 observations in 2 periods. Bivariate and multivariate analyses were used to analyze responses to questions regarding financial incentives, involvement with managed care as a share of practice revenues, and physician and practice characteristics.

Results: Both capitated and noncapitated managed care significantly increased physician incentives to reduce care during 2000-2001, but neither had a statistically significant effect on financial incentives by 2004-2005. Capitated managed care rather than noncapitated managed care created the strongest incentives to reduce care; however, even these effects became rather weak during 2004-2005 compared with those in 2000-2001.

Conclusion: Managed care and traditional indemnity plans were substantially more similar in their effects on physician incentives to provide care by 2004-2005 than they were just 3 years earlier. This should alleviate policy concerns that managed care is providing physicians with the "wrong" financial incentives to provide care.

(Am J Manag Care. 2008;14(10):653-660)

For author information and disclosures, see end of text.

How managed care affects provider incentives and patterns of care has been debated in the medical literature. Managed care commonly refers to a cluster of health insurance plans that use financial incentives or specific controls to encourage utilization of specific providers associated with the plan.[1,2] The alternative health plan is fee for service, which is not restricted to specific providers and does not implement utilization controls.

Managed care encompasses a diverse array of institutional arrangements. Specific types include HMOs, preferred provider organizations (PPOs), independent practice associations (IPAs), and point-of-service plans. HMOs are normally capitated, and physician services are prepaid. Some HMOs require each patient to select a primary care physician, and the patient may access specialists only through referrals from the primacy care physician. Other types of managed care plans encourage patients to utilize in-network providers with lower rates of copayment, coinsurance, and/or deductible than providers out of network. Physicians also are restricted by managed care organizations, which generally design financial incentives to influence their practice styles in order to promote more efficient treatment.[3,4]

Managed care became increasingly common in the United States from the mid-1980s throughout the 1990s, and is still the dominant form of health insurance. Managed care has long been thought to create financial incentives for physicians to reduce services—a premise that has been studied empirically by a number of researchers.[5-7] Managed care systems do face the major challenge of balancing cost control with provision of high-quality care,[8] and physicians have been required to disclose their financial incentives.[9] However, in recent years the restrictive practices of managed care organizations have met with increasing criticism, and the role of managed care in constraining healthcare services is believed to have declined.[10-12]

Most previous studies have measured managed care as capitated care, but managed care includes noncapitated forms as well, such as IPAs and PPOs. There is relatively little evidence on how financial incentives to provide services differ between capitated and noncapitated managed care plans. Moreover, existing studies examine data that are fairly old—often dating back more than 10 years. Although research has documented managed care's prior

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successes in achieving cost control, there is little quantitative evidence on whether these effects declined. Using a unique set of data that provides information for a large sample of physicians over time, this study seeks to bridge these gaps in the literature. Specifically, we examined how managed care affects physician financial incentives to reduce services to their patients. Of particular interest were how this relationship has evolved over time and whether the effects of capitated managed care and noncapitated managed care are different.

METHODS

Data

This study uses Community Tracking Study (CTS) physician survey data from 2000-2001 and 2004-2005 maintained at the Center for Studying Health System Change. The survey is conducted by the Gallup Poll and includes physicians who are engaged in direct patient care for at least 20 hours per week in 60 randomly selected communities in the United States. The CTS surveys include a wealth of information on managed care, physician financial incentives, and other demographic characteristics, and have achieved response rates of 59% to 65%. Physicians were included in the study sample only if they were surveyed in both 2000-2001 and 2004-2005 (balanced panel data), and 67% of physicians in 2004-2005 were previously interviewed in 2000-2001. We compared physicians surveyed in both 2000-2001 and 2004-2005 with physicians only surveyed in 2000-2001, and we did not find significant differences, at least in terms of the sociodemographic and practice characteristics available to us ($P < .05$ was considered to indicate statistical significance). The study sample consisted of 4154 physicians, for a total of 8308 observations in 2 periods.

Dependent Variable

Physician Financial Incentives. To gauge financial incentives affecting the level of care provided, the CTS survey asked physicians the following questions:

- How would you describe your overall personal financial incentives in your practice?
- On balance, do these incentives favor reducing services to individual patients, favor expanding services to individual patients, or favor neither?

Because this study focuses on whether managed care provides physicians with financial incentives to reduce services, we coded this variable as 1 if incentives favor reducing services to individual patients and 0 if incentives favor not reducing services to individual patients. It is important to note that this variable measures the financial incentives perceived by physicians,[13] which could conceivably differ from actual financial incentives.

Independent Variables

Managed Care Involvement. We measured physicians' involvement with managed care as the share of their practice revenues from all managed care organizations. More specifically, the CTS survey asks each physician:

> What percentage, if any, of the patient care revenue received by the practice in which you work comes from all managed care combined? Managed care programs include, but are not limited to, those with HMOs, PPOs, IPAs, and point-of-service plans. Managed care includes any type of group health plan using financial incentives or specific controls to encourage utilization of specific providers associated with the plan.

Physician responses to the above measure is hereafter termed "all managed care," which includes both capitated (prepaid) managed care and noncapitated managed care. The CTS survey also asks each physician:

> Thinking about the patient care revenue from all sources received by the practice in which you work, what percentage is paid on a capitated or other prepaid basis? Under capitation, a fixed amount is paid per patient per month regardless of services provided.

Using the response to this and the previous question, we are able to measure physician involvement in capitated managed care and noncapitated managed care as well.

Other Control Variables. In addition to managed care measures, the multivariate regression models included a variety of physician and practice characteristics that may affect physician perceptions about financial incentives in their practices. Physician characteristics include years of practice experience, sex, race (white, African American, Hispanic, Asian, and other), the physician's specialty (internal medicine, family/general practice, pediatrics, medical specialties, surgical specialties, psychiatry, and obstetrics/gynecology), board certification status, and whether the physician is a foreign medical graduate.

Practice characteristics included percentage of patient care practice revenue from Medicare, percentage of patient care practice revenue from Medicaid, practice hours per week, practice income during the previous year, practice ownership (not an owner, part owner, and full owner), practice type (solo/2 physicians, group with ≥3 physicians, HMO,

medical school, hospital based, and other practice type), and competitive situation of practice (not competitive, somewhat competitive, and very competitive).

One set of multivariate analyses pooled data across both 2000-2001 and 2004-2005. Therefore, we included a time trend dummy (2004-2005 = 1; 2000-2001 = 0) to capture intertemporal effects on financial incentives.

Statistical Analysis

The main analyses were framed to measure the effects of managed care and physician financial incentives on reduction of services; the differential effects, if any, of capitated and noncapitated managed care; and the changes in these relationships over time. Statistical analyses were implemented using STATA version 9.2 (STATA Corporation, College Station, TX), and included both bivariate and multivariate studies. Bivariate analysis used *t* tests to compare variations between 2000-2001 and 2004-2005. In a few instances, *t* tests were not available because there were no variations between 2 periods (eg, sex, race). Multivariate models used logistic regression to study the effects of managed care on physician financial incentive variables. Odds ratios and *P* values are reported in the tables.

RESULTS

Bivariate Analysis

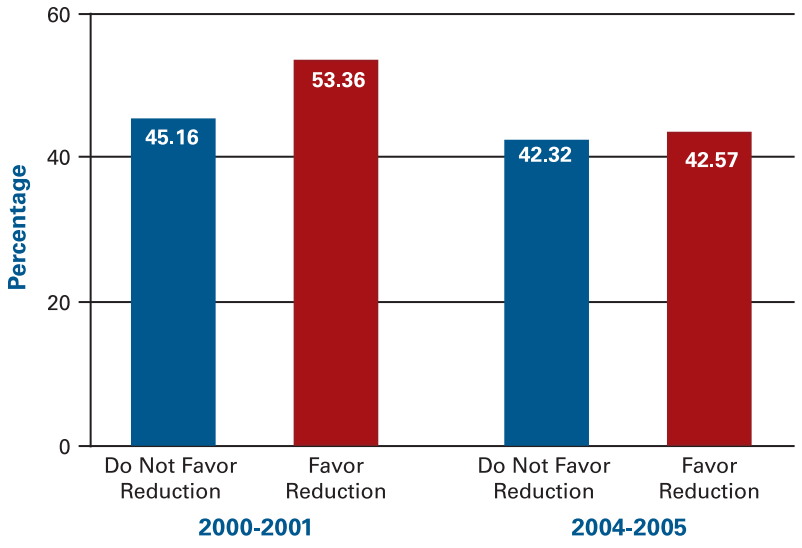
Table 1 shows descriptive statistics of the study sample. In 2000-2001, 7.90% of physicians reported that their financial incentives favored reducing services to individual patients, but this percentage rose to 12.13% in 2004-2005 ($P < .01$ for the difference between the 2 periods). Generally, physicians' financial in-

Table 1. Names and Summary Statistics for Study Variables

Variable	Percentage 2000-2001	Percentage 2004-2005	P[a]
Financial incentives to reduce services	7.90	12.13	<.01
Practice revenue			
All managed care	45.81	43.23	<.01
Capitated managed care	16.42	14.48	<.01
Noncapitated managed care	29.39	29.84	.44
Medicare	29.58	29.86	.57
Medicaid	15.03	15.77	.06
Board certified	85.68	87.29	.03
Practice hours per week			
20-40	21.69	26.31	<.01
41-60	56.48	55.03	.19
>60	21.83	18.66	<.01
Annual practice income, $			
<100,000	17.50	17.89	.65
100,000-200,000	58.91	51.71	<.01
200,001-300,000	16.27	19.43	<.01
>300,000	7.32	10.97	<.01
Practice ownership			
Not an owner	45.93	43.09	<.01
Part owner	24.77	23.95	.38
Full owner	29.30	32.96	<.01
Practice type			
Solo/2 physicians	32.96	34.95	.05
Group with ≥3 physicians	30.81	29.66	.25
HMO	4.48	4.19	.52
Medical school	8.21	8.28	.90
Hospital based	12.83	11.72	.12
Other practice	10.71	11.20	.48
Practice competition status			
Not competitive	33.15	37.36	<.01
Somewhat competitive	46.20	45.07	.30
Very competitive	20.65	17.57	<.01
Years of practice experience			
<5	4.96	1.13	<.01
5-15	42.34	42.99	.55
16-25	33.94	34.14	.85
>25	18.76	21.74	<.01
Male	74.89	74.89	—
Foreign medical graduate	17.96	17.96	—
Race			
White	79.08	79.08	—
Black	3.61	3.61	—
Hispanic	4.57	4.57	—
Asian	11.20	11.20	—
Other	1.54	1.54	—
Specialty			
Internal medicine	16.92	16.92	—
Family/general practice	23.95	23.95	—
Pediatrics	13.05	13.05	—
Medical specialties	23.04	23.04	—
Surgical specialties	13.67	13.67	—
Psychiatry	4.89	4.89	—
Obstetrics/gynecology	4.48	4.48	—
Sample size	4154	4154	—

[a]Student *t* test for 2 proportions.

Figure 1. All Managed Care and Physician Financial Incentives for Reducing Services



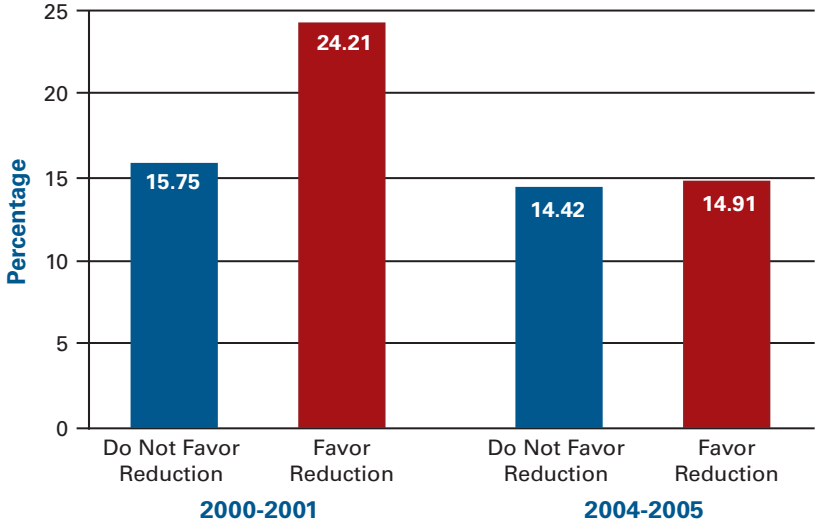
centives tilted toward reducing services between 2000-2001 and 2004-2005.

During 2000-2001, patient care in all managed care accounted for 46% of practice revenues; this percentage decreased to 43% in 2004-2005. Capitated managed care accounted for 16% and noncapitated managed care for less than 30% of practice revenues during 2000-2001. Both capitated and noncapitated managed care revenues declined slightly during 2004-2005 compared with 2000-2001.

Figure 1 shows the percentage of patient care practice revenue from all managed care for physicians, according to the financial incentives in their practices. In 2000-2001, physicians whose financial incentives favored reducing services had 53% of their patient care practice revenue from all managed care. Among physicians whose financial incentives did not favor reducing services, the average managed care involvement was lower: 45%. Thus, during 2000-2001, greater managed care involvement was associated with greater financial incentives to reduce services. In contrast, this association vanishes by 2004-2005: the percentage of patient care practice revenue from all types of managed care was about 43%, regardless of financial incentives favoring reducing or not reducing services. The *t* test for managed care incentive effects in 2000-2001 between physicians who reduced services and those who did not reduce services indicated a significant difference ($P < .01$), but this difference was not significant in 2004-2005.

The percentage of patient care practice revenue from capitated managed care for physicians with different financial incentives followed a similar trend (Figure 2). During 2000-2001, physicians whose financial incentives favored reducing services received 24% of their patient care practice revenue from capitated managed care. This percentage declined to 16% for physicians whose financial incentives did not favor reducing services. So there was a positive relationship between capitated managed care and physician financial incentives to reduce services in 2000-2001. But by 2004-2005, any associations between capitated managed care involvement and financial incentives to reduce care had disappeared.

Figure 2. Capitated Managed Care and Physician Financial Incentives for Reducing Services



Overall, the results in Table 1, Figure 1, and Figure 2 point to substantially different effects of all managed care and capitated managed care on physician financial incentives to provide services between 2000-2001 and 2004-2005. Whether these patterns persist in multivariate analysis is an empirical issue to which we now turn.

Multivariate Analysis

Effects of Managed Care. We pooled data from both periods and included a year dummy for 2004-2005 so that we could study how managed care generally affected physi-

cian financial incentives, and whether there was an intertemporal effect with the year dummy. As Table 2 indicates, physicians in all managed care were significantly more likely to have financial incentives favoring reduced services compared with physicians without managed care (odds ratio [OR] = 1.69; *P* <.01). (See also eAppendix Table A, available at **www.ajmc.com**.) When all managed care was divided into capitated and noncapitated, we found that it was actually capitated managed care rather than noncapitated managed care that led to financial incentives favoring reduced services. The OR for capitated managed care was 2.81 (*P* <.01). In contrast, the OR for noncapitated managed care was 1.22 (not significant; *P* = .23).

As the bivariate results suggest, the effects of managed care on physician financial incentives may differ across the 2 periods of the CTS survey. Thus, we also estimated logistic regression models for 2000-2001 and 2004-2005 separately. The results, summarized in Table 3, re-

Table 2. Determinants of Physician Financial Incentives in Practice: Balanced Panel Data

	Financial Incentive to Reduce Services (Logistic Model)			
	All Managed Care		Capitated and Noncapitated	
Variable	**Odds Ratio**	***P***	**Odds Ratio**	***P***
Year dummy of 2004-2005	1.69	<.01	1.70	<.01
Practice revenue				
All managed care	1.77	<.01	NA	NA
Capitated managed care	NA	NA	2.81	<.01
Noncapitated managed care	NA	NA	1.22	.23
Medicare	1.54	.03	1.41	.07
Medicaid	1.08	.74	0.99	.97
Board certified	1.16	.21	1.17	.17
Practice hours per week				
20-40	—	—	—	—
41-60	1.33	<.01	1.35	<.01
>60	1.72	<.01	1.74	<.01
Annual practice income, $				
<100,000	—	—	—	—
100,000-200,000	0.74	<.01	0.74	<.01
200,001-300,000	0.62	<.01	0.63	<.01
>300,000	0.53	<.01	0.53	<.01
Practice ownership				
Not an owner	—	—	—	—
Part owner	1.12	.42	1.15	.32
Full owner	1.80	<.01	1.86	<.01
Practice type				
Solo/2 physicians	—	—	—	—
Group with ≥3 physicians	0.67	<.01	0.65	<.01
HMO	0.60	.03	0.45	<.01
Medical school	0.74	.14	0.73	.12
Hospital based	0.66	.03	0.66	.03
Other practice	0.84	.34	0.80	.21
Practice competition status				
Not competitive	—	—	—	—
Somewhat competitive	1.08	.40	1.09	.35
Very competitive	1.29	.02	1.28	.02
Years of practice experience				
<5	—	—	—	—
5-15	0.67	.07	0.67	.07
16-25	0.81	.33	0.79	.30
>25	0.67	.08	0.66	.08
Male	1.01	.90	1.03	.78
Foreign medical graduate	1.03	.78	1.02	.87
Race				
White	—	—	—	—
Black	1.13	.52	1.08	.68
Hispanic	1.01	.94	1.00	1.00
Asian	0.82	.18	0.80	.12
Other	1.34	.19	1.27	.29
Specialty				
Internal medicine	—	—	—	—
Family/general practice	0.87	.23	0.87	.22
Pediatrics	0.95	.77	0.98	.89
Medical specialties	0.71	<.01	0.75	.03
Surgical specialties	0.86	.28	0.91	.50
Psychiatry	1.37	.08	1.41	.06
Obstetrics/gynecology	1.00	.99	1.07	.74

NA indicates not applicable to this model.

Table 3. Determinants of Physician Financial Incentives in Practice: Comparison of 2000-2001 and 2004-2005 Cross-Sectional Data

	Financial Incentive to Reduce Services (Logistic Model)							
	All Managed Care				Capitated and Noncapitated			
	2000-2001		2004-2005		2000-2001		2004-2005	
Variable	Odds Ratio	*P*	Odds Ratio	*P*	Odds Ratio	*P*	Odds Ratio	*P*
Practice revenue								
All managed care	3.57	<.01	1.08	.71	NA	NA	NA	NA
Capitated managed care	NA	NA	NA	NA	6.15	<.01	1.54	.08
Noncapitated managed care	NA	NA	NA	NA	2.22	<.01	0.84	.43
Medicare	1.46	.20	1.66	.05	1.30	.37	1.58	.07
Medicaid	0.80	.57	1.38	.29	0.72	.40	1.31	.38
Board certified	1.04	.84	1.25	.16	1.05	.81	1.27	.14
Practice hours per week								
20-40	—	—	—	—	—	—	—	—
41-60	1.27	.14	1.35	.02	1.28	.13	1.36	.02
>60	1.41	.08	1.95	<.01	1.42	.07	1.97	<.01
Annual practice income, $								
<100,000	—	—	—	—	—	—	—	—
100,000-200,000	0.75	.07	0.77	.04	0.75	.06	0.77	.05
200,001-300,000	0.70	.11	0.59	<.01	0.69	.11	0.60	<.01
>300,000	0.53	.05	0.51	<.01	0.53	.05	0.52	<.01
Practice ownership								
Not an owner	—	—	—	—	—	—	—	—
Part owner	0.84	.40	1.45	.06	0.86	.50	1.47	.05
Full owner	1.77	<.01	1.96	<.01	1.83	<.01	2.00	<.01
Practice type								
Solo/2 physicians	—	—	—	—	—	—	—	—
Group with ≥3 physicians	0.86	.41	0.56	<.01	0.82	.30	0.55	<.01
HMO	0.74	.38	0.50	.05	0.53	.08	0.41	.01
Medical school	0.65	.19	0.84	.49	0.61	.14	0.83	.48
Hospital based	1.03	.93	0.45	<.01	1.02	.95	0.45	<.01
Other practice	1.09	.76	0.72	.17	1.01	.96	0.70	.14
Practice competition status								
Not competitive	—	—	—	—	—	—	—	—
Somewhat competitive	1.06	.69	1.12	.33	1.08	.60	1.12	.33
Very competitive	1.37	.06	1.23	.15	1.35	.07	1.22	.16
Years of practice experience								
<5	—	—	—	—	—	—	—	—
5-15	0.56	.03	1.07	.89	0.55	.02	1.12	.81
16-25	0.79	.37	1.17	.75	0.75	.28	1.22	.69
>25	0.69	.19	0.95	.91	0.66	.15	0.99	.99
Male	0.88	.39	1.14	.30	0.88	.40	1.16	.25
Foreign medical graduate	1.07	.69	0.99	.98	1.06	.74	0.99	.93
Race								
White	—	—	—	—	—	—	—	—
Black	0.97	.91	1.26	.34	0.92	.78	1.22	.40
Hispanic	0.98	.94	1.04	.85	0.95	.86	1.03	.87
Asian	0.79	.29	0.83	.34	0.77	.24	0.81	.27
Other	1.02	.97	1.52	.11	0.99	.99	1.47	.15
Specialty								
Internal medicine	—	—	—	—	—	—	—	—
Family/general practice	1.11	.55	0.72	.04	1.12	.52	0.72	.03
Pediatrics	0.86	.53	1.04	.86	0.89	.62	1.06	.78
Medical specialties	0.78	.22	0.67	.02	0.87	.50	0.68	.03
Surgical specialties	0.75	.22	0.93	.70	0.84	.47	0.96	.82
Psychiatry	1.36	.28	1.42	.13	1.49	.16	1.43	.13
Obstetrics/gynecology	0.67	.25	1.29	.32	0.76	.43	1.33	.26

NA indicates not applicable to this model.

vealed that the OR for all managed care in 2000-2001 was 3.57 (P <.01), indicating that physicians in managed care were more likely to have financial incentives to favor reducing services. (See also **eAppendix Table B**, available at **www.ajmc.com**.) In 2004-2005, the OR for all managed care became 1.08 (P = .71). In other words, in 2004-2005, managed care did not affect physicians' financial incentives for providing care.

Take-away Points

We study the changing effects of managed care on physician financial incentives to reduce services, using data from the Community Tracking Study physician survey.

- Both capitated and noncapitated managed care significantly increased physician incentives to reduce care during 2000-2001, but neither had a statistically significant effect on financial incentives by 2004-2005.
- Managed care and traditional indemnity plans were substantially more similar in their effects on physician incentives to provide care by 2004-2005 than they were just 3 years earlier. This should alleviate policy concerns that managed care is providing physicians with the "wrong" financial incentives to provide care.

We also estimated separate logistic models for capitated and noncapitated managed care. In 2000-2001, the OR for capitated managed care was 6.15 (P <.01) and the OR for noncapitated managed care was 2.22 (P <.01). These findings show that both capitated and noncapitated managed care were associated with financial incentives to favor reducing care during 2000-2001. During 2004-2005, the OR for capitated managed care was 1.54 (P <.08), whereas the OR for noncapitated managed care was 0.84 (P = .43). Thus, both types of managed care had a much smaller and statistically insignificant effect on incentives to favor reducing services in 2004-2005 compared with the earlier period. We performed a Wald test with the null hypothesis that the estimated coefficients in 2000-2001 data and 2004-2005 data in Table 3 were statistically equal. The Wald test rejected the null hypothesis (P <.01).

Intertemporal Effects. The year dummy of 2004-2005 in both the all managed care regression and the capitated and noncapitated managed care regressions showed that physicians in 2004-2005 were more likely to report that their financial incentives favored reducing services (see Table 2). Thus, although the impact of managed care on financial incentives that favor reducing services appears to have declined over time, there was an intertemporal trend that enhanced financial incentives to reduce care. Thus, factors other than managed care appear to be creating incentives for physicians to reduce care.

Other Findings. Physicians in more competitive markets were more likely to believe that financial incentives in their practices favored reducing services. Physicians with more Medicare revenue were more likely to have financial incentives to reduce services, and the ORs in 2004-2005 were larger than those in 2000-2001. Generally, physicians favored reducing services if they practiced more hours, but physicians with higher annual practice income were less likely to favor reducing services. To check whether the pooled panel data were representative of the cross-sectional data, we analyzed the full sample without excluding physicians not surveyed in both 2000-2001 and 2004-2005. The results in the full sample data were very similar to those in the pooled panel data reported in this article, and they also were highly significant. Due to space limitations, the results for the full-sample data are not reported in the text but are available from the authors upon request.

DISCUSSION

This study examines the relationships between managed care and financial incentives for physicians to provide services. A particular focus is on the changing nature of these relationships over time. Even if more physicians reported having financial incentives to reduce services in 2004-2005 than 2000-2001, measures of the effects of managed care and capitated managed care actually declined. This may indicate that pressures from other sources are growing, while the effects of managed care and capitation are shrinking. In addition, the pressures on physicians may stem from sources other than payment (eg, administrative price limits). Indeed, the literature suggests the financial incentives for physicians come from 3 different sources: (1) how the insurance plan is paid, (2) how the practice organization is paid, and (3) how the physician is paid.[14,15]

We summarize our main findings as follows:

- All managed care significantly increased physician incentives to reduce care in 2000-2001, but not in 2004-2005.
- Both capitated and noncapitated managed care significantly increased physician incentives to reduce care during 2000-2001, but neither had a statistically significant effect on financial incentives by 2004-2005.
- Capitated managed care rather than noncapitated managed care created the strongest incentives to reduce care; however, even these effects became rather weak during 2004-2005 compared with those in 2000-2001.

The declining role of managed care in establishing financial incentives to limit care seems to suggest that managed care is itself becoming less restrictive, as others have

noted.[10-12] A second possibility is that other health plans are catching up, becoming more restrictive themselves. That is, traditional indemnity plans may be more likely to question procedures and services, much like their managed care counterparts. In any event, managed care and traditional indemnity plans were substantially more similar in their effects on physician incentives to provide care by 2004-2005 than they were just 3 years earlier. This, in turn, should alleviate policy concerns that managed care is providing physicians with the "wrong" financial incentives to provide care.

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Funding Source: None reported.

Author Disclosure: The authors (HF, JAR) report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (HF, JAR); acquisition of data (HF); analysis and interpretation of data (HF, JAR); drafting of the manuscript (HF, JAR); critical revision of the manuscript for important intellectual content (HF, JAR); and statistical analysis (HF, JAR).

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