Characteristics of Medical Practices in Three Developed Managed Care Markets

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Objective. To describe physician practices, ranging from solo and two-physician practices to large medical groups, in three geographically diverse parts of the country with strong managed care presences.

Data Sources/Study Design. Surveys of medical practices in three managed care markets conducted in 2000–2001.

Study Design. We administered questionnaires to all medical practices affiliated with two large health plans in Boston, MA, and Portland, OR, and to all practices providing primary care for cardiovascular disease patients admitted to five large hospitals in Minneapolis, MN. We offer data on how physician practices are structured under managed care in these geographically diverse regions of the country with a focus on the structural characteristics, financial arrangements, and care management strategies adopted by practices.

Data Collection. A two-staged survey consisting of an initial telephone survey that was undertaken using CATI (computerized assisted telephone interviewing) techniques followed by written modules triggered by specific responses to the telephone survey.

Principal Findings. We interviewed 468 practices encompassing 668 distinct sites of care (overall response rate 72 percent). Practices had an average of 13.9 member physicians (range: 1–125). Most (80.1 percent) medium- (four to nine physicians) and large-size (10 or more physicians) groups regularly scheduled meetings to discuss resource utilization and referrals. Almost 90 percent of the practices reported that these meetings occurred at least once per month. The predominant method for paying practices was via fee-for-service payments. Most other payments were in the form of capitation. Overall, 75 percent of physician practices compensated physicians based on productivity, but there was substantial variation related to practice size. Nonetheless, of the practices that did not use straight productivity methods (45 percent of medium-sized practices and 54 percent of large practices), most used arrangements consisting of combinations of salary and productivity formulas.

Conclusions. We found diversity in the characteristics and capabilities of medical practices in these three markets with high managed care involvement. Financial practices of most practices are geared towards rewarding productivity, and care management practices and capabilities such as electronic medical records remain underdeveloped.

Key Words. Physician groups, managed care, financial incentives

Medical practices and other provider organizations serve a variety of functions (Landon, Wilson, and Cleary 1998; Rosenthal, Landon, and Huskamp 2001). These include the sharing of financial risk, the management of physician behavior, cost control, and quality management. A great deal of attention has been focused on large medical groups. However, all physicians, including solo physicians, practice in settings that have the potential to influence the way in which care is delivered. For instance, even solo practices can have varying financial arrangements or levels of technology investment in areas such as electronic medical records (EMRs). A recent study by Casalino et al. described care management practices and information technology capabilities of *large* medical practices throughout the country. That study included practices with at least 20 members and thus is not representative of all of the types of settings where physicians practice nationally (Kletke, Emmons, and Gillis 1996). No recent data of which we are aware are available on the structural characteristics and financial arrangements of the broader cross section of physician practices (Casalino et al. 2003b).

In this paper, we begin by briefly reviewing some economic influences on medical group practices and discuss the ways in which physician practices can affect quality of care based on a conceptual model of the effect of organizations on the quality of care (Landon, Wilson, and Cleary 1998). We then present information collected in 2000–2001 from physician practices of *all* sizes that provide primary care services in three geographic regions of the U.S. The three sites all have similar high levels of managed care penetration, but differ with respect to population, reimbursement rates, and physician and hospital supply. We do not, however, explore the features of markets that lead to the formation of specific types of medical practices. Rather, we include descriptions of the three selected markets to provide context for interpreting our results (Gold et al. 1995; Gold 1999).

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BACKGROUND

Efforts to redesign medical care delivery systems have recently become the focus for improving the quality of care in the United States (Committee on Quality Health Care in America 2001; Casalino et al. 2003b). In the outpatient setting, physician practice settings are the objects for these types of interventions (Landon, Wilson, and Cleary 1998). Medical practices transmit policies adopted by larger organizations such as health plans. Health care organizations are postulated to influence physician behavior in four ways that can affect quality including structural characteristics, financial incentives, managerial practices, and the normative environment (Landon, Wilson, and Cleary 1998). A second view of medical practices that underlies our work is based on the work of Glied and Zivin (2002). That research indicates that medical practices facing a complex set of financial and administrative policies from multiple payers set up relatively simple sets of rules that spread financial risk and organize care without necessarily maximizing income. Thus, our theoretical construct identifies domains through which medical practices can influence physician behavior and then seeks to identify simple strategies within these domains that medical practices can adopt to influence care patterns and quality.

The organizational structures and management processes that medical practices adopt are motivated by a combination of efficiency and market power concerns. Efficiency concerns will drive integration only to the extent that physicians can share in any savings. At one extreme, under a fee-for-service reimbursement system, only a limited amount of potential efficiency gains accrue to physicians, such as those from sharing space, staff, and call duty. At the other extreme, in a fully capitated environment, all efficiency gains can accrue to physicians (at least in the short run). While data from the Community Tracking Study from 2000 to 2001 suggest that risk contracting had declined since 1998–1999, two-thirds of primary care physicians (PCPs) continued to derive at least some revenue from capitation in 2001 (Strunk and Reschovsky 2002; Mays, Hurley, and Grossman 2003).

Structural Characteristics

The structure of primary care practice includes basic organizational characteristics such as size and the inclusion of other specialties. Prior to the growth of managed care and the onset of risk contracting, physicians generally aggregated into small groups to achieve economies of scale (Rosenthal, Landon, and Huskamp 2001; Casalino et al. 2003b). Research prior to the managed

care era demonstrated that practices achieved maximal scale economies at sizes of five to seven physicians (Pope and Burge 1992, 1996). However, efficiencies related to the sharing of risk and the adoption of expensive medical technologies (e.g., EMRs) as well as the creation of bargaining power with health plans may alter this calculation.

Financial Incentives

Most of the research on compensation schemes for individual physicians has been theoretical and generally does not recognize the need to translate complex incentives into simpler sets of rules that can be used to manage the activities of member physicians. For example, medical groups have been viewed as a mechanism for spreading financial risk among physicians (Gaynor and Gertler 1995), and as a means of attenuating or exaggerating health plan incentives (Lang and Gordon 1995). They also serve as a locus for accountability (Baker 1992; Kendel and Lazaar 1992), and they can coordinate the process of care (Welch, Hillman, and Pauly 1990).

Gold described four key variables that could be used to define the form of financial incentives in managed care. These include the nature of the contract with physician, the basic payment systems for physicians, the use of "withhold" funds or bonuses, and the limitation of risk (Gold 1999). The incentives faced by an individual physician depend on the methods used for rewarding and assigning risks within an organization (Casalino 1992; Murray et al. 1992; Stearns, Wolfe, and Kindig 1992; Conrad et al. 1996; Kralewski et al. 1996; Ransom et al. 1996). In considering the impact of financial risk on the clinical choices of individual physicians, the two classes of financial arrangements that are most relevant are the average or "ambient risk" on the group from all contractual arrangements, and the arrangements between the group and its individual physicians (Glied and Zivin 2002).

There is little in the way of description of these most basic financial arrangements. Moreover, few studies in the literature have examined both the effect of individual- and group-level financial incentives concurrently. Conrad et al. (1998) found that physician compensation method was not related to utilization and costs while Kralewski et al. (1996) found that capitated medical groups and groups that considered resource utilization in their compensation scheme had lower adjusted patient costs. In the Conrad study, which included 60 groups in their final analyses, 90 percent of enrollees were cared for by salaried physicians, and this distribution might have contributed to the lack of findings related to physician payment method.

Managerial Practices

Medical practices have used a number of managerial techniques to improve quality or control costs (Hillman et al. 1991). Generally, physician practices develop a relatively small set of simple responses to their overall incentives that are likely to influence physician quality, utilization, or both. Among these approaches are the use of guidelines (Brook 1989, 1995), information and feedback, e.g., practice profiling reports, the use of clinical “teams” for organizing care, and the implementation of EMRs (Maviglia et al. 2001; Bates 2002). A variety of guidelines and implementation strategies have been tested with mixed results (Fix and Oberman 1992; Weingarten et al. 1994; Ellrodt et al. 1995; Lee et al. 1995; Chodoff et al. 1996; Robinson, Thompson, and Black 1996). Similarly, although becoming widespread (Eisenberg 1986; Tompkins et al. 1996), there is little empirical evidence supporting the use of feedback and information at the level of the individual physician. Data from the Community Tracking Study suggest that over half of physicians are affected by guidelines and that one-third are affected by profiling (Reed, Devers, and Landon 2003).

Summary

In summary, we argue that medical practices are the final common pathway that mediates the effects of health care organizations on the behavior of individual physicians. The main features available to organizations that influence the quality of care are financial incentives, managerial tools, and their structural characteristics. We further propose that medical practices generally implement simple sets of rules or strategies in these domains that can influence the quality of care. In this paper, we describe these characteristics of medical practices in three developed managed care markets.

DATA SOURCES AND METHODS

Study Sites

This study examined primary care practices in three metropolitan areas (Boston, MA; Portland, OR; and Minneapolis, MN). The sites were chosen because we had existing relationships with health care organizations in these areas and they gave us access to their network data. In Boston and Portland, we used the networks of two large health maintenance organizations (HMOs) to develop our sample. In Minneapolis, we worked with the Health Education and Research Foundation to identify physicians and medical groups providing

care for patients admitted to five large hospitals in the city that, in aggregate, account for 82 percent of the hospital care provided in the area. All three markets have a long history of involvement in managed care but are geographically diverse and differ with respect to physician supply, degree of hospital and provider consolidation, and Medicare costs (Rosenthal, Landon, and Huskamp 2001) (Table 1).

Samples within Study Sites. In Boston and Portland, we obtained rosters of participating PCPs from each health plan that were assembled into medical practices. We also identified distinct sites of care within larger medical groups. We classified organizations with more than one site of care as multisite practices if they were managed in a uniform manner including their methods for compensating physicians. For these cases, we administered a short series of screening questions in order to distinguish practices with more than one site of care (i.e., managed by the same team, pay physicians

Table 1: Health Care Market Characteristics of Selected Sites

<i>Indicator</i>	<i>Boston, MA</i>	<i>Portland, OR</i>	<i>Twin Cities, MN</i>	<i>National Average</i>
Population in millions, 2000*	4.3	1.9	3.0	—
Estimated HMO penetration for the commercial population, 2001 [†]	59%	47%	37%	41%
Average percent of primary care services reimbursed by HMOs via capitation, 2001 [†]	10.0%	67.6%	16.9%	29.0%
# Primary care physicians [‡] per 1,000, 2001	0.15	0.22	0.39	0.26
# Specialists [‡] per 1,000, 2001	3.1	1.7	1.4	1.5
# Hospital beds per 1,000, 2000 [§]	3.7	1.9	2.4	4.0
Medicare adjusted average per capita cost, 1999 [¶]	\$564	\$398	\$393	\$424
Average commercial HMO monthly premium for single coverage, 1999	\$183	\$127	\$157	\$143

Sources: *Population 2000 Census, Area Resource File February 2002 Release, National Center for Health Workforce Analysis, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services.

[†]Competitive Edge Database, InterStudy, July 1, 2001.

[‡]Ratios calculated by InterStudy, based on data collected from Physician Characteristics and Distribution in the U.S., American Medical Association, copyright 2001.

[§]Ratios calculated by InterStudy. This includes all hospitals, not just those associated with HMOs. *Source:* AHA Annual Survey Database, fiscal year 2000. Copyright 2001: Health Forum, LLC, a subsidiary of the American Hospital Association.

[¶]Centers for Medicare and Medicaid Services.

^{||}Competitive Edge Database, InterStudy, January 1, 1999. These data are not available in the July 1, 2001 InterStudy data.

HMO, health maintenance organization.

in a similar manner) from separate practices that have come together in an independent practice association (IPA) or similar arrangement. In Minneapolis, we identified sites of care and practices based upon information given to us by hospitalized patients about the site of their primary care. Because of the large network of the health plan we worked with in Boston, almost all physician practices in the Boston area were represented in our sample, with the exception of Harvard Vanguard Medical Associates, a large multispecialty group that was closely allied with a single health plan at that time. The practices affiliated with the Portland health plan represented all of the major groups in the Portland area but we cannot estimate the percentage of primary care practices included in their network because their network is not as extensive. For Minneapolis, the survey sample included all of the large medical groups in the city that we are aware of but because of the way the sample was accrued we have no way of estimating how many smaller groups were not included.

We identified either an administrator (e.g., CEO) or a medical director at each practice to contact for the interview. Because of the large number of small physician practices (including solo, two-, and three-member practices) in Boston, we randomly sampled one-third of these practices. Otherwise, all identified practices and sites were approached for the survey.

Survey Administration. We designed a multimode survey so as to maximize the response rate for key questions in the survey. As part of pretesting, we conducted cognitive interviews with three medical practices and modified the questionnaire sequentially based on these interviews. The survey was conducted during 2000 and 2001 and follow-up was completed early in 2002. The two-stage surveys consisted of an initial telephone survey followed by written follow-up modules triggered by specific responses to the telephone survey. A \$50 incentive check accompanied the modules. Nonresponders to the telephone instrument were subject to aggressive follow-up attempts including personalized phone calls from physician researchers.

Our final survey sample included 409 practices in Boston (after excluding 406 small groups that were not sampled), 156 in Portland, and 97 in Minneapolis. The sample also included 365 sites within multisite practices. The overall response rate to the phone interview was 72 percent with a range of 70–80 percent across the three sites. We had a 71 percent response rate from distinct medical practices and a 74 percent response rate from sites within multisite practices.

Survey Questionnaire. We elicited information on each practice's structural characteristics, financial arrangements, and management practices. Each respondent received a customized survey depending upon whether she was providing information about a practice, a site of care within a practice, or both.

Information on basic structural characteristics of the practice included location, ownership, and number and types of physician extenders. Sites of care and single-site practices were also asked about care management practices that might vary across sites including arrangements to care for hospitalized patients, the extent of use of EMRs, and use of flow sheets for cardiovascular conditions.

Information on the financial arrangements of the practice included the proportion of a practice's patients that were enrolled in HMOs, PPOs (preferred provider organizations), Medicaid, and Medicare, and the share of practice revenues coming from capitation, fee-for-service payments, and year-end bonuses and returned withhold payments. Depending on their responses, the practices then received written follow-up modules that elicited further information on the nature of these payments. Practices that received any capitation payments also were asked whether it covered primary care services only, all professional services, or all services, including hospitalization (i.e., full capitation) (Newhouse et al. 2002).

We determined if the practice either split the net proceeds of the practice equally or paid physicians according to their productivity (e.g., proportional to their billings or collections). Based on case studies and a review of the relevant literature, physician practices with up to three physicians were assumed to use productivity methods. In cases where neither of these methods was used, practices were asked about the composition of physician pay. The shares of salary, per-patient capitation, profit-sharing distributions based on the performance of the practice, or bonuses based on the performance of the individual or a subgroup of physicians were assessed. For practices that used any salary types of compensation, we determined the extent to which their salary was based on a specified time commitment or current or prior year's productivity (e.g., panel size, visit volume, or revenue). For practices that used profit sharing, we ascertained if this was based on hours worked, panel size, or seniority. Finally, for practices that used performance bonuses, we asked which physicians were eligible for these, whether they were based on the performance of individuals or a subgroup, and the amount of bonus (as a percent of salary) that was received in the last year.

Information on utilization review and care management activities included preapproval policies, use of group meetings to discuss utilization and

referrals, receipt of and collection of performance data, and the extent to which such data are disseminated to group members.

Analysis

We restricted our analyses to primarily descriptive summaries, examining major practice features that might affect the cost and quality of care. We compared characteristics of physician practices along several dimensions including location, primary care only versus multispecialty group, and practice size (small groups and solo/two person practices [< 4], medium-sized groups [4–9], and large groups [≥ 10]). We also compared practices according to the amount of capitation they received. We report means (standard deviations) for continuous-valued variables and frequencies for discrete-valued variables. We tested for differences according to capitation level using the Cochran–Armitage test for trend.

For analytic purposes, all discrete locations that provided care were characterized as “sites” of care. These included sites within multisite practices as well as single-site practices. Because “practices” were defined to include both single- and multisite practices, there is some overlap, consisting of single-site practices, between analyses of “sites” and analyses of “practices.” Means and frequencies for all questions were calculated based on all available responses. Item nonresponse was generally less than 10 percent and was less than 20 percent for all questions reported herein.

RESULTS

Description of Primary Care Practices (Table 2 and Figure 1a)

Medical practices in our sample represent a variety of forms. Minneapolis and Portland physicians tend to work in larger group practices, and physicians in these practices were usually distributed among multiple sites of care. Boston had a proportionally larger number of single-site practices (260 single-site practices versus 22 multisite practices) than did Minneapolis (34 versus 33) and Portland (104 versus 15). Approximately two-thirds of all practices were physician-owned with the highest rate being in Portland (79 percent). Almost 80 percent of large practices were multispecialty groups while the majority of medium and small practices included only PCPs. Practices had an average of 13.9 member physicians (range 1–125) with approximately three times as many PCPs as specialists. The majority of practices (83 percent) had fewer

Table 2: Characteristics of Practices in Boston, Minneapolis, and Portland

	<i>Boston</i>	<i>Minneapolis</i>	<i>Portland</i>
Number of sites			
Single site	260	34	104
Multisite	22	33	15
Mean number of physicians (median)			
Total*	11.0 (4.0)	27.1 (9.0)	11.0 (3.0)
PCPs	8.0 (3.0)	16.9 (8.0)	8.6 (2.0)
Specialists	2.8 (0)	6.7 (0)	2.4 (0)
Multispecialty (%)	42.9	46.3	21.8
Ownership (%)			
MD owned	64.5	62.1	79.4
Medical school/hospital	24.2	15.2	14.1
Other owned	11.3	22.7	6.5
Mean number of MD owners (median)	4.4 (1)	20.2 (2.5)	5.7 (2)

*The total number of physicians is not exactly equal to the number of PCPs and specialists in Minneapolis because a small number of large groups only provided information on the total number.

PCP, primary care physician.

than 20 physicians (Figure 1a). Most PCPs in this study (over 60 percent), however, were associated with practices of more than 30 physicians.

Characteristics of Sites Providing Care (Table 3 and Figure 1b)

Almost all sites where physicians provided care were office-based (average of 88.5 percent). Portland also had a larger percentage of sites of care consisting of PCPs only (80.7 versus 58.1 percent in Boston and 45 percent in Minneapolis). The average site of care had 10 physicians with a range of 1–145; sites tended to be smaller in Portland and larger in Minneapolis. Most sites (87 percent) had fewer than 20 physicians (Figure 1b). Although the majority of physicians were associated with large practices (Figure 1a), these physicians were distributed among sites such that the majority of physicians (54 percent) delivered care in sites with fewer than 20 physicians. Among the roughly 65 percent of sites that had physician extenders, the average site employed one physician extender for every four to six physicians. This ratio was somewhat higher among the largest groups.

The predominant method for the care of hospitalized patients was equally split between hospitalists and the patient's own physician. The remaining sites (7.5 percent) had an alternative system such as designated physician "rounders" on a weekly basis. In terms of medical records,

Figure 1: Distribution of Physician Practices and Sites of Care by Size and Proportion of Primary Care Physicians (PCPs)

approximately 16 percent of sites reported using EMRs that included office notes and laboratory tests.

Financial Arrangements (Tables 4 and 5)

A substantial proportion of patients in each of the markets were insured through HMOs and PPOs (72 percent in Portland to 64 percent in Boston, 50 percent in Minneapolis) and this did not vary substantially by practice size. The majority of practice revenue (56 percent) stemmed from fee-for-service payments with the highest percentage being in Minneapolis (73 percent). Most

Table 3: Site Characteristics and Care Management of Sites and Single-Site Practices

	<i>Boston</i>	<i>Minneapolis</i>	<i>Portland</i>
Distinct sites of care (single-site practices and sites within multisite practices)	353	149	166
Office setting (%)	81.2	88.7	98.4
PCPs only (%)	58.1	45.0	80.7
Physician extenders (% with any)*	63.5	77.2	55.4
Mean number of providers (median/S.D.)			
All MDs	9.7 (4.0)	14.7 (8.0)	6.5 (4.0)
PCPs	6.9 (3.0)	9.4 (6.0)	5.3 (3.0)
Specialists	2.8 (0.0)	5.2 (1.0)	1.2 (0.0)
Physician extenders	2.6 (1.0)	2.7 (2.0)	1.3 (1.0)
Inpatient care (%) [†]			
Hospitalist program	50.2	43.0	45.2
Designated rounders	2.1	22.8	3.0
MDs see their own patients	41.5	24.2	39.8
Medical records (%)			
Paper	84.6	83.7	84.6
Electronic [‡]	15.4	16.3	15.4
Flow sheets			
CAD	47.2	24.2	41.2
CHF	42.9	35.2	35.3

Note: *Physician extenders include nurse practitioners and physician's assistants.

[†]The remainder had different systems.

[‡]Denotes comprehensive electronic medical record including office notes, laboratory tests, etc.

HMO, health maintenance organization; PCP, primary-care physician.

other payments were in the form of capitation. Less than 10 percent of revenue to practices was in the form of year-end disbursements such as bonus payments, withholds, or surplus payments. Capitation payments most commonly included primary care services only; fewer than one-third of capitation arrangements were full capitation that included hospital risk.

The vast majority of practices were eligible for the year-end payments. Although most practices (64 percent) reported being eligible for bonuses based on quality, the amount of reimbursement they received for this was generally small (about 1.7 percent on average for eligible groups). Practice reimbursement did not vary substantially by group size after stratifying by market or among primary care versus multispecialty groups (data not shown).

Over half of medium-sized groups (range 36 percent in Minneapolis to 67 percent in Portland) and just under half of large groups (range 41.7 percent

Table 4: Financial Arrangements by Payers with Practices

	<i>Boston</i>	<i>Minneapolis</i>	<i>Portland</i>
<i>Payor mix (% of patient population served)</i>			
Managed care (PPO or HMO)	64.0	50.0	71.9
Medicare	32.4	32.7	28.0
Medicaid	14.1	10.5	14.1
<i>Revenues*</i>			
FFS	54.5	72.6	49.3
Capitation	34.0	13.5	40.0
Year end disbursements	8.5	6.4	6.2
<i>Capitation share</i>			
Percentage of groups with more than 30%	45.6	17.7	63.3
Percentage of groups with more than 50%	24.3	9.7	34.4
<i>Types of capitation (% of practices receiving any capitation)</i>			
Primary care only	38.5	37.5	47.8
All professional services	19.1	125	16.1
Full (includes hospital risk)	32.1	50.0	23.8
Other	6.5	0.0	11.7
<i>Eligible for year end payments (% of all groups)</i>			
Withholds	87.3	80.0	96.2
Surplus distributions	83.1	83.7	96.1
Quality bonuses	74.6	62.2	38.5
<i>Year end payments (% received for eligible practices)</i>			
Withholds (% revenue)	0.7	1.1	1.5
Mean % withheld	12.1	10.0	12.0
Mean % of withhold returned	28.9	58.2	36.3
Surplus payments (% revenue)	2.1	0.1	1.1
Quality bonuses (% revenue)	3.2	0.1	1.3

Notes: *Some numbers do not total to 100 because of rounding errors.

PPO, preferred provider organization; HMO, health maintenance organization.

in Boston to 67 percent in Portland) compensated physicians proportional to individual or group productivity. Of the practices that did not use straight productivity methods (ranging from 33 percent of medium-sized practices in Portland to 58 percent of large practices in Boston), most used blended arrangements consisting of combinations of salary and productivity formulas. Among those that used salary, however, most reported that the salary was directly tied to productivity. The average proportion of pay in the form of per-patient capitation payments was small (5 percent in large groups). In addition, 3–5 percent of pay was in the form of group incentive payments, and 2–9 percent was in the form of individual incentive payments, mostly based on individual productivity or utilization.

Table 5: Reimbursement Approaches for Physicians in Practices of Varying Sizes

Group Size	1-3*	4-9			10+		
Market		Boston	Minneapolis	Portland	Boston	Minneapolis	Portland
Productivity based	100	57.1	35.7	66.7	41.7	46.7	66.7
Blended arrangements	0	42.9	64.3	33.3	58.3	53.3	33.0
Type of payment for blended arrangements (%)							
Salary	—	81.3	78.1	87.1	80.1	89.1	62.8
Per-patient capitation	—	1.5	0	2.9	6.1	0	11.0
Profit sharing	—	6.3	0	4.9	1.3	9.3	2.5
Performance bonus	—	4.0	21.9	7.1	2.2	0.9	0.5
Method of salary payment (%)							
Salary for a specified time commitment	—	35.3	33.3	42.9	39.4	6.7	0.0
Salary related to productivity (current or prior years)	—	41.2	66.7	57.9	39.4	46.7	80.0
Salary related to a combination of specified time commitment and productivity	—	23.5	0.0	0.0	21.2	46.7	20.0

*Based on pretesting, small groups were assumed to use productivity-based reimbursement, whether solely on their individual productivity or on the productivity of the practice. Salaried arrangements that were based on productivity were classified as productivity based.

Utilization Management and Flow of Information (Table 6)

Practices that reported receiving lower amounts of capitated payments were less likely to require authorizations by member physicians for referrals and hospitalizations ($p < .01$ for trend), and these groups were also less likely to require group approval for hospitalizations ($p < .05$). For instance, 24 percent of practices that received over 30 percent of revenue in the form of capitation required approval for hospitalizations compared with 7 percent of practices that received no capitation. Highly capitated practices were also more likely to have regularly scheduled meetings to discuss utilization of resources ($p < .01$ for trend) and were also more likely to collect and feedback their own information on the quality of care ($p < .05$). The use of guidelines or disease management programs in the area of cardiovascular disease also varied according to how the practice was compensated. Highly capitated practices were more likely to have adopted internal disease management programs or explicit guidelines for both congestive heart failure and coronary heart disease, although even among these practices, the vast majority of practices had not done so.

Table 6: Requirements for Authorization and Use of Information by Practices According to the Proportion of Overall Revenue in the Form of Capitation

	Capitation Level				
	0	0-10	10-30	30+	Overall
Number of Practices	71	121	68	118	378
Authorizations					
Referrals					
By MD**	82.6	89.1	92.3	94.9	90.3
By group	7.8	13.7	12.3	15.8	13.1
By plan	29.2	39.8	26.2	33.9	33.5
MRI					
By MD	73.5	72.7	76.6	77.4	75.7
By group	6.5	10.7	12.7	13.6	11.2
By plan	28.6	34.9	23.8	25.7	28.7
Hospitalization					
By MD**	80.3	78.4	86.2	90.5	84.3
By group*	7.1	20.5	20.0	24.1	19.4
By plan	40.0	53.6	49.2	49.1	48.9
Information Dissemination					
Regularly scheduled meetings for UR**	54.6	72.6	83.3	90.9	77.7
Percentage (of those meeting) meeting once a month or more	83.3	88.6	96.7	86.7	88.8
Pay tied to attending meetings	0	55.6	33.3	12.5	30.0
Receives utilization reports	85.7	94.2	94.2	93.9	92.5
Reports received $\geq 4 \times$ year	59.3	71.0	65.6	71.0	70.0
Aggregate data presented	85.9	84.6	96.9	87.3	87.9
Aggregate data distributed	90.9	86.2	93.8	95.5	91.3
Individual performance data distributed	92.3	88.9	90.8	96.4	92.2
Collects and feedbacks info*	21.1	30.3	37.3	36.8	31.8
Cardiac Care					
Congestive Heart Failure					
Guidelines	14.6	17.3	13.9	26.7	19.7
Disease management	33.3	30.5	50.0	39.3	37.2
Feedback data*	17.1	15.5	31.3	26.3	22.1
Coronary Heart Disease					
Guidelines**	4.8	4.9	13.0	22.5	12.7
Disease management	30.0	26.3	29.4	21.0	25.7
Feedback data	38.8	40.5	45.5	42.2	41.7

*Cochran-Armitage trend test p -value $< .05$.

**Cochran-Armitage trend test p -value $< .01$.

UR, utilization review.

DISCUSSION

In this study, we assessed those capabilities and characteristics of physician practices of all types that are generally viewed as affecting the quality and costs

of care. In order to have a complete view of these capabilities and characteristics, we surveyed physician practices with three or more physicians as well as smaller physician practices including solo practitioners and two-physician partnerships, because physicians frequently practice in these smaller settings. We chose three market areas (Boston, MA; Minneapolis, MI; and Portland, OR) where physicians operate in an environment with a long history of involvement with and a large penetration of managed care.

Our study has several notable findings. The first finding contrasts our work with prior research based primarily on larger medical groups (Conrad et al. 1998; Kralewski et al. 2000; Rosenthal et al. 2002; Casalino et al. 2003a). Over half of our PCPs, including those in large multisite groups, deliver care at sites with fewer than 20 other PCPs. Moreover, their associated groups also have smaller numbers of member physicians—for example, over 80 percent of practices have fewer than 20 physicians, and many of these are solo or two physician practices. We believe that it is likely that these data, emphasizing numbers of physicians, understate the proportion of patients cared for in these smaller settings because more full-time physicians are likely to practice in smaller practices, and these physicians often have larger panels of patients. It is also likely that small sites of care are associated with cultures of practice and types of interpersonal interactions that differ from those in larger groups. If true, this fact may influence how external cost pressures are transmitted to individual member physicians.

Our second finding relates to financial arrangements within practices. Most practices did not have substantial amounts of risk sharing payers, and most physicians, including those in large groups, were compensated based on productivity with per-patient capitation payments being relatively rare. These findings suggest that on balance, net revenues to individual physicians are driven more by productivity (including seeing more patients who might be capitated) than by attempts to rein in costs and utilization of capitated patients. This suggests a potential conflict between payments to the practice and the incentives facing individual choices. Our findings with respect to financial incentives differ from previous data from California (Wagner, Austin, and Von Korff 1996; Bodenheimer, Wagner, and Grumbach 2002a, b) but not from other reports in the literature such as those from Washington state and earlier studies in Minnesota (Conrad et al. 1998; Robinson 1999; Kralewski et al. 2000; Rosenthal et al. 2002).

Finally, most practices, and in particular small practices, lack the ability to improve care or its efficiency through the availability of approaches such as guidelines or disease management programs or use of EMRs. The absence of

these strategies does not imply that the quality of care delivered in small practices is inferior. Smaller practices are not able to spread the costs of implementing these types of strategies over multiple physicians and may not require the complex systems put in place in larger practices. Consequently, appropriate strategies for smaller practices might differ from larger practices. For larger practices, our results are similar to those of Casalino et al. (2003a). Although few practices required approval for hospitalizations, referrals, or diagnostic tests, most had regular meetings to discuss utilization and disseminate reports from health plans. Such activities could serve as a foundation on which to add other care management approaches. Our observations related to the use of EMRs are particularly troubling. Even among the largest groups (with 10 or more physicians) in these advanced managed care markets, only 23 percent had EMR capabilities, as compared with approximately 15 percent of the larger groups in Casalino's study. This percentage ranged from 20 percent of large practices in Minneapolis and Portland to 30 percent of large practices in Boston. Many believe that EMR capabilities are essential for improving safety and quality (Maviglia et al. 2001; Bates 2002) and that without them it will be virtually impossible to implement more effective ways of chronic disease management.

Particular strengths of our study are the methods we used to define medical practices and the overall representativeness of physician practice in the three markets we studied. Because it was necessary to study aggregates of physicians that have the same organizational influences and these depend on the structural characteristics being studied, we distinguished between medical practices with uniform approaches to management, larger contracting entities such as IPAs, and distinct sites of care within medical practices (Wagner, Austin, and Von Korff 1996; Bodenheimer, Wagner, and Grumbach 2002a, b). We also included smaller medical practices that account for the majority of practices and 35 percent of PCPs. Interestingly, our data show that contrary to prior hypotheses there were not important differences in the financial arrangements between payers and practices as a function of practice size. There were, however, important differences in how these practices compensate individual physicians. In addition, our data also show that there appear to be important differences in practice characteristics across markets. Consequently, data from different markets should not be aggregated for future analyses.

Our results should be interpreted in light of several limitations. First, while we studied three markets with high levels of managed care involvement, caution should be used in extrapolating our findings more broadly.

In addition, our samples did not identify all primary care practices in the three markets. Nonetheless, because of differences in the markets studied and the large number of practices included, we believe that our results are likely to represent a large fraction of care sites in this country. Second, as with almost all surveys, we rely on self-reports from representatives of groups rather than objective audits of what is actually done. In addition, similar policies reported by different groups or practices might be implemented differently, and some could be systematically better.

In summary, in this large survey of over 450 physician practices encompassing almost 700 distinct care sites, we found diversity in the characteristics and capabilities of medical practices in these three markets with high managed care involvement with respect to key characteristics thought to be related to the quality of care. Financial practices and information systems still carry a flavor of the 1970s. The data contrast with the popular notion of physicians working in high-technology environments facing high-powered financial incentives. Most practices are geared towards rewarding productivity, and care management practices and capabilities such as EMRs remain underdeveloped.

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REFERENCES

- Baker, G. P. 1992. "Incentive Contracts and Performance Measurement." *Journal of Political Economics* 100: 598–614.
- Bates, D. W. 2002. "The Quality Case for Information Technology in Healthcare." *BMC Medical Informatics and Decision Making* 2 (1): 7.
- Bodenheimer, T., E. H. Wagner, and K. Grumbach. 2002a. "Improving Primary Care for Patients with Chronic Illness." *Journal of the American Medical Association* 288 (14): 1775–9.

- . 2002b. "Improving Primary Care for Patients with Chronic Illness: The Chronic Care Model. Part 2." *Journal of the American Medical Association* 288 (15): 1909–4.
- Brook, R. H. 1989. "Practice Guidelines and Practicing Medicine. Are They Compatible?" *Journal of the American Medical Association* 262 (21): 3027–30.
- . 1995. "Implementing Medical Guidelines." *Lancet* 346 (8968): 132.
- Casalino, L. P. 1992. "Balancing Incentives. How Should Physicians Be Reimbursed?" *Journal of the American Medical Association* 267 (3): 403–5.
- Casalino, L. P., K. J. Devers, T. K. Lake, M. Reed, and J. J. Stoddard. 2003b. "Benefits of and Barriers to Large Medical Group Practice in the United States." *Archives of Internal Medicine* 163 (16): 1958–64.
- Casalino, L., R. R. Gillies, S. M. Shortell, J. A. Schmittiel, T. Bodenheimer, J. C. Robinson, T. Rundall, N. Owsald, H. Schauffer, and M. C. Wang. 2003a. "External Incentives, Information Technology, and Organized Processes to Improve Health Care Quality for Patients with Chronic Diseases." *Journal of the American Medical Association* 289 (4): 434–41.
- Chodoff, P., R. O. Bischof, D. B. Nash, and C. Laine. 1996. "The AHCPR Guidelines on Heart Failure: Comparison of a Family Medicine and an Internal Medicine Practice with the Guidelines and an Educational Intervention to Modify Behavior." *Clinical Performance and Quality Health Care* 4 (4): 179–85.
- Committee on Quality Health Care in America. 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: Institute of Medicine, National Academy Press.
- Conrad, D. A., C. Maynard, A. Cheadle, S. Ramsey, M. Marcus-Smith, H. Kirz, C. A. Madden, D. Martin, E. B. Perrin, T. Wickizer, B. Zierler, A. Ross, J. Noren, and S. Y. Liang. 1998. "Primary Care Physician Compensation Method in Medical Groups: Does It Influence the Use and Cost of Health Services for Enrollees in Managed Care Organizations?" *Journal of the American Medical Association* 279 (11): 853–8.
- Conrad, D. A., J. Noren, M. Marcus-Smith, S. Ramsey, H. Kirz, T. Wickizer, E. Perrin, and A. Ross. 1996. "Physician Compensation Models in Medical Group Practice." *The Journal of Ambulatory Care Management* 19 (4): 18–27.
- Eisenberg, J. M. 1986. *Doctors' Decisions and the Cost of Medical Care*. Ann Arbor, MI: Health Administration Press.
- Ellrodt, A. G., L. Conner, M. Riedinger, and S. Weingarten. 1995. "Measuring and Improving Physician Compliance with Clinical Practice Guidelines. A Controlled Interventional Trial." *Annals of Internal Medicine* 122 (4): 277–82.
- Fix, K. N., and A. Oberman. 1992. "Barriers to Following National Cholesterol Educational Program Guidelines. An Appraisal of Poor Physician Compliance." *Archives of Internal Medicine* 152 (12): 2385–7.
- Gaynor, M., and P. Gertler. 1995. "Moral Hazard and Risk Spreading in Partnerships." *Rand Journal of Economics* 26 (4): 591–613.
- Glied, S., and J. G. Zivin. 2002. "How Do Doctors Behave When Some (but Not All) of Their Patients Are in Managed Care?" *Journal of Health Economics* 21 (2): 337–53.

- Gold, M. 1999. "Financial Incentives: Current Realities and Challenges for Physicians." *Journal of General Internal Medicine* 14 (suppl 1): S6-12.
- Gold, M., L. Nelson, T. Lake, R. Hurley, and R. Berenson. 1995. "Behind the Curve: A Critical Assessment of How Little Is Known About Arrangements between Managed Care Plans and Physicians." *Medical Care Research Review* 52 (3): 307-41.
- Hillman, A. L., M. V. Pauly, K. Kerman, and C. R. Martinek. 1991. "HMO Manager's Views on Financial Incentives and Quality." *Health Affairs* 10 (4): 207-19.
- Kendel, E., and E. P. Lazaar. 1992. "Peer Pressure and Partnerships." *Journal of Political Economics* 100: 801-17.
- Kletke, P. R., D. W. Emmons, and K. D. Gillis. 1996. "Current Trends in Physicians' Practice Arrangements. From Owners to Employees." *Journal of the American Medical Association* 276 (7): 555-60.
- Kralewski, J. E., E. C. Rich, R. Feldman, B. E. Dowk, T. Bernhardt, C. Johnson, and W. Gold. 2000. "The Effects of Medical Group Practice and Physician Payment Methods on Costs of Care." *Health Services Research* 35 (3): 591-613.
- Kralewski, J. E., T. D. Wingert, D. J. Knutson, C. E. Johnson, and P. J. Veazie. 1996. "The Effects of Capitation Payment on the Organizational Structure of Medical Group Practices." *Journal of Ambulatory Care Management* 19 (1): 1-15.
- Landon, B. E., I. M. Wilson, and P. D. Cleary. 1998. "A Conceptual Model of the Effects of Health Care Organizations on the Quality of Medical Care." *Journal of the American Medical Association* 279 (17): 1377-82.
- Lang, K., and P. J. Gordon. 1995. "Partnerships as Insurance Devices: Theory and Evidence." *Rand Journal of Economics* 26 (4): 614-29.
- Lee, T. H., D. S. Pearson, P. A. Johnson, T. B. Garcia, M. C. Weisberg, E. Guadagnoli, E. F. Cook, and L. Goldman. 1995. "Failure of Information as an Intervention to Modify Clinical Management. A Time-Series Trial in Patients with Acute Chest Pain." *Annals of Internal Medicine* 122 (6): 434-7.
- Maviglia, S. M., J. M. Teich, J. Fiskio, and D. W. Bates. 2001. "Using an Electronic Medical Record to Identify Opportunities to Improve Compliance with Cholesterol Guidelines." *Journal of General Internal Medicine* 16 (8): 531-7.
- Mays, G. P., R. E. Hurley, and J. M. Grossman. 2003. "An Empty Toolbox? Changes in Health Plans' Approaches for Managing Costs and Care." *Health Services Research* 38 (1, part 2): 375-93.
- Murray, J. P., S. Greenfield, S. H. Kaplan, and E. M. Yano. 1992. "Ambulatory Testing for Capitation and Fee-for-Service Patients in the Same Practice Setting: Relationship to Outcomes." *Medical Care* 30 (3): 252-61.
- Newhouse, J. P., J. L. Buchanan, H. L. Bailit, D. Blumenthal, M. B. Buntin, D. Caudry, P. D. Cleary, A. M. Epstein, P. Fitzgerald, R. G. Frank, H. Gorski, H. A. Huskamp, N. L. Keating, B. E. Landon, B. J. McNeil, R. H. Palmer, M. B. Rosenthal, and A. M. Zaslavsky. 2002. "Managed Care: An Industry Snapshot." *Inquiry* 39 (3): 207-20.
- Pope, G. C., and R. T. Burge. 1992. "Inefficiencies in Physician Practices." *Advances in Health Economics and Health Services Research* 13: 129-64.

- Pope, G. C., and R. T. Burge. 1996. "Economies of Scale in Physician Practice." *Medical Care Research Review* 53 (4): 417-40.
- Ransom, S. M., S. G. McNeeley, M. L. Druger, G. Doot, and D. B. Cotton. 1996. "The Effect of Capitated and Fee-for-Service Remuneration on Physician Decision Making in Gynecology." *Obstetrics and Gynecology* 87 (5, part 1): 707-10.
- Reed, M., K. Devers, and B. E. Landon. 2003. *Physicians and Care Management: More Acceptance Than You Think. Issue Brief No. 60*. Washington, DC: Center for Studying Health System Change.
- Robinson, J. C. 1999. "Blended Payment Methods in Physician Organizations under Managed Care." *Journal of the American Medical Association* 282 (13): 1258-63.
- Robinson, M. B., E. Thompson, and N. A. Black. 1996. "Evaluation of the Effectiveness of Guidelines, Audit and Feedback: Improving the Use of Intravenous Thrombolysis in Patients with Suspected Acute Myocardial Infarction." *International Journal for Quality in Health Care* 8 (3): 211-22.
- Rosenthal, M. B., R. G. Frank, J. L. Buchanan, and A. M. Epstein. 2002. "Transmission of Financial Incentives to Physicians by Intermediary Organizations in California. Does the Use of Intermediaries Change Physicians' Financial Risk?" *Health Affairs* 21 (4): 197-205.
- Rosenthal, M., B. E. Landon, and H. A. Huskamp. 2001. "Managed Care and Market Power: The Evolution of Physician Organizations in Four Markets." *Health Affairs* 20 (5): 187-93.
- Stearns, S. C., B. L. Wolfe, and D. A. Kindig. 1992. "Physician Responses to Fee-for-Service and Capitation Payment." *Inquiry* 29 (4): 416-25.
- Strunk, B. C., and J. D. Reschovsky. 2002. *Tracking Report. Kinder and Gentler: Physicians and Managed Care, 1997-2001*. Results from the Community Tracking Study, No. 5. Washington, DC: Center for Studying Health System Change.
- Tompkins, C. P., S. G. Bhalotra, D. W. Garnick, and J. A. Chilingirian. 1996. "Physician Profiling in Group Practices." *Journal of Ambulatory Care Management* 19 (4): 28-39.
- Wagner, E. H., B. T. Austin, and M. Von Korff. 1996. "Organizing Care for Patients with Chronic Illness." *Millbank Quarterly* 74 (4): 511-45.
- Weingarten, S., M. Riedinger, L. Conner, B. Johnson, and A. G. Ellrodt. 1994. "Reducing Lengths of Stay in the Coronary Care Unit with a Practice Guideline for Patients with Congestive Heart Failure. Insights from a Controlled Clinical Trial." *Medical Care* 32 (12): 1232-43.
- Welch, W. P., A. Hillman, and M. V. Pauly. 1990. "Toward New Typologies for HMOs." *Millbank Quarterly* 68 (2): 221-43.