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Publication Date

2002-12-01

Peer reviewed

Characteristics of Eye Care Practices With Managed Care Contracts

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Objectives: To describe the variation in practice structure, financial arrangements, and utilization and quality management systems for eye care practices with managed care contracts.

Study Design: Cross-sectional survey of 88 group and 56 solo eye care practices that contract with 6 health plans affiliated with a national managed care organization. The survey contained modules on practice structure, financial arrangements, utilization management, and quality management. The survey response rate was 85%.

Results: Group practices with both ophthalmologists and optometrists were triple the size of ophthalmology-only groups, and 5 times the size of optometry-only groups. Fee-for-service payments were the primary source of group practice revenues, although 60% of groups derived some revenues from capitation payments. Group practices paid their physicians almost exclusively with fee-for-service payments or salary arrangements, with minimal capitation at the individual level. Almost no practices used both capitation and bonuses to compensate providers. Most practices received practice profiles and three fourths were subject to utilization review, which mainly consisted of preauthorization for procedures, tests, or referrals. Nearly all practices used clinical guidelines, protocols, or pathways in managing patients with diabetic retinopathy or glaucoma. Further, nearly all group practices used computerized information systems to assist in delivering care, and most had provider education programs.

Conclusions: Managed care has affected the way eye care providers organize, finance, and deliver healthcare. In general, our findings paint an optimistic picture of eye care practices that contract with managed care organizations. Few practices bear substantial financial risk, and nearly all practices use quality management tools that could help to improve the quality of care.

(*Am J Manag Care* 2002;8:1057-1067)

Mechanisms to monitor providers' utilization patterns, such as practice profiling and preauthorization, have been widely adopted. Quality management tools have rapidly diffused in attempts to improve providers' ability to deliver high quality healthcare.²

Several studies have examined how the financial arrangements between large group practices and managed care plans affect the adoption of mechanisms to manage utilization, cost, and quality.³⁻⁵ In general, increased levels of capitation have been found to encourage practices to adopt their own methods for utilization review and quality management (QM). Much of this work was done in California, however, where large, capitated, multi-specialty medical groups grew rapidly in the 1990s.⁶ Few studies have assessed practice characteristics and arrangements with managed care plans for a single specialty,⁷ and no study has done so for eye care providers.⁸

Understanding the relationships between managed care plans and medical care providers, as well as the internal methods by which group practices manage and pay individual providers, is crucial, for these relationships may ultimately affect the amount and quality of care that patients receive. How man-

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Supported by Cooperative Agreement U01-HS-09942 from the Agency for Health Care Research and Quality and the American Association of Health Plans Foundation.

A version of this report was presented to the Annual Meeting of the Academy for Health Services Research and Health Policy held in Atlanta, Ga, June 11, 2001.

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Managed care has influenced the organization, financing, and delivery of healthcare for nearly every medical specialty.¹ New financial mechanisms designed to reduce utilization and cost, such as capitation and bonuses, are common.

aged care plans have interacted with eye care providers is of particular interest, not only because they have been at the forefront of many of the innovations in healthcare delivery and financing, including outpatient surgery, managed care "carve-outs," and capitated specialty networks, but because their relationship may be a harbinger of changes for other specialties.^{9,10}

Thus we began an ongoing project to examine the care that patients with diabetic retinopathy or open-angle glaucoma receive under managed care. We describe here our early findings on the variation in practice structure, financial arrangements, and utilization and QM techniques for eye care practices that contract with 6 health plans affiliated with a large, national managed care organization.

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METHODS

Setting

The 6 study health plans were independent practice association (IPA)-model health maintenance organizations (HMOs) affiliated with a large managed care organization. One plan was located in the Northeast, 3 in the Midwest, 1 in the South, and 1 in the West. Each plan offered 2 commercial products: HMO and HMO-Plus. Members in the HMO product were not required to identify a primary care physician or to obtain referrals for specialty care within the plan's network, but they were not covered for out-of-network use. The HMO-Plus product offered out-of-network coverage subject to higher cost sharing than for in-network services. Both products included pharmacy benefits subject to cost sharing. Each study plan selectively contracted with ophthalmologists and optometrists in the community. Contracting eye care providers practiced in every type of setting, including solo practice, small and large eye care groups, and multispecialty groups.

Study Sample

We selected the sample of eye care practices for the study using a 3-step process. First, we used administrative data from the study plans to identify patients who were continuously enrolled in a study plan between June 30, 1997, and December 31, 1998, and had at least 1 claim for diabetic retinopathy or open-angle glaucoma from an ophthalmologist or optometrist between January 1, 1997, and June 30, 1998. Second, we assigned each patient to an eye care practice based on the ophthalmologists and optometrists responsible for most of the

patient's claims. Finally, we sampled practices using a sampling algorithm that assigned higher probabilities of being sampled to practices with more patients. The initial study sample consisted of 182 practices.

Survey

We developed a survey that contained modules on: (1) practice structure, (2) financial arrangements, (3) utilization management, and (4) QM. Because these characteristics of ophthalmology and optometry practices have not been well described, we adapted our survey from instruments used in earlier studies of multispecialty group practices and independent practice associations.^{3,5,11,12}

The module on practice structure elicited information on the number and types of providers in the practice; providers' experience and credentials; the practice's age, size, and caseload; and the practice's history with managed care contracts and network affiliations. The module on financial arrangements assessed the sources of practice revenues and the mechanisms by which practice revenues were distributed to individual ophthalmologists and optometrists as income. The module on utilization management assessed the practice's experience with provider profiles (defined as performance reports or reports on utilization patterns), who developed the profiles, and what the provider profiles measured. This module also assessed the practice's experience with utilization review, who conducted the utilization review, and what types of services were subject to utilization review. The module on QM assessed the practice's experience with clinical guidelines (defined as descriptions that guide recommended treatment based on literature and scientific review), protocols, and pathways (defined as a prescribed series of steps for treating a particular condition); who developed these QM tools; and who decided whether the practice would use these QM tools. In addition, this module assessed whether a practice tracked the use of preventive screening measures, had provider education systems, and had computerized information systems.

We administered the survey by telephone between November 1999 and June 2000. The same questions were asked of each practice, although skip patterns were implemented to ensure that questions specific to group practices were not asked of solo practices, and that questions specific to ophthalmologists or optometrists were not asked of practices without that type of provider. Prior to the telephone interview, worksheets detailing particular items in

the survey were mailed to respondents, along with a \$50 incentive to encourage participation. During the telephone interview, each module began with the interviewer asking to speak with the person most knowledgeable about the particular topic. Respondents included providers, office managers, or both.

Of the 182 practices in the initial sample, 7 could not be reached and 5 had closed or relocated. Of the remaining 170 practices, 144 responded to the survey, yielding a response rate of 85%. Respondents and nonrespondents were similar in geographical distribution and cared for similar numbers of study plan members.

Analysis

We conducted descriptive analyses at the level of the practice for key survey items. The analyses were stratified in 2 dimensions: type of practice (group or solo), and type(s) of eye care provider(s) in the practice (ophthalmologists, optometrists, or both). This resulted in 5 subgroups (Figure).

Many sections of the questionnaire used a “trigger question” to determine whether a practice engaged in a particular activity, with several follow-up questions that explored the topic in greater detail. For example, one trigger question was, “In the past 12 months, did ophthalmologists in this group receive performance reports or utilization profiles regarding care delivered to patients in this practice?” If respondents answered, “Yes,” they were asked follow-up questions about practice profiles; if they answered, “No,” the interviewer moved on to the next section. In such cases, we first analyzed the proportion of practices that responded positively to

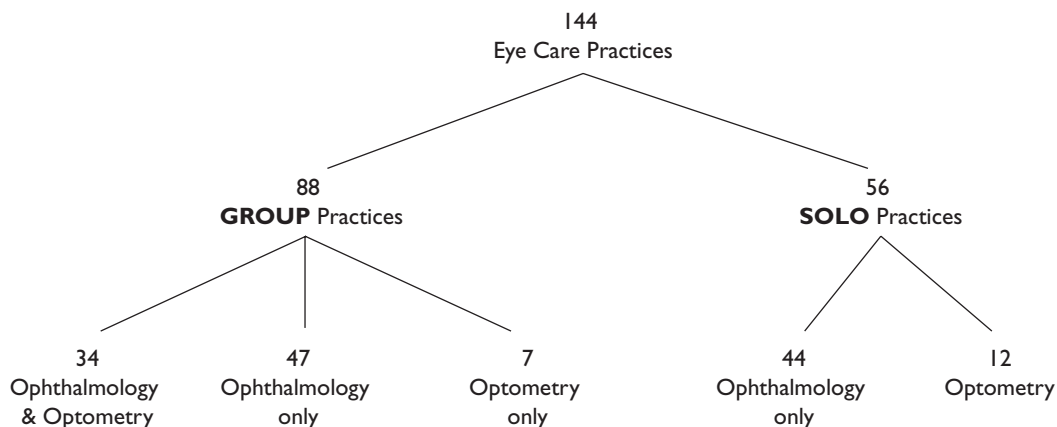
the trigger question, and then analyzed follow-up items conditional on having a positive answer to the trigger question. For example, after calculating the proportion of practices with providers who received practice profiles (trigger question), we calculated the proportion of practices that answered follow-up items, such as who conducted the profiling and what measures were included in the profile, conditional on having answered positively to the trigger. Hence, the proportions calculated for these latter measures apply only to the subset of practices with individual providers who received profiles, not to all sampled practices.

We used 2-sample *t*-tests, 1-way analysis of variance, and chi-square tests to assess differences between subgroups of practices. We used Pearson correlation coefficients to assess associations between variables. All analyses were weighted using inverse probability weights to account for differences across practices in the probability of being included in the study sample.

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RESULTS

Of the 144 practices that responded to the survey, 88 were group practices and 56 were solo practices (Figure). Thirty-four of the 88 group practices included both ophthalmologists and optometrists, 47 included only ophthalmologists, and 7 included only optometrists. Two of the 47 ophthalmology-only group practices were multispecialty practices that included ophthalmologists, primary care providers, and other specialists. All other group practices in our sample consisted entirely of eye

Figure. Types of Eye Care Practices



care providers. Of the 56 solo practices, 44 were ophthalmologists and 12 were optometrists.

Practice Characteristics

Group practices with both ophthalmologists and optometrists averaged 10.1 eye care providers per practice and were triple the size of ophthalmology-only group practices (mean, 3.3 eye care providers), and nearly 5 times the size of optometry-only group practices (mean, 2.1 eye care providers; **Table 1**). Despite the differences in size, the level of training and credentials of ophthalmologists and optometrists did not differ significantly between practice types. All practice types had similar proportions of specialist ophthalmologists, board-certified ophthalmologists, therapeutic pharmaceutical agent-certified optometrists, US or Canadian medical graduates, and ophthalmologists with more than 10 years of experience. Overall, 24% of ophthalmologists were specialists, 94% of ophthalmologists were board certified, 91% of ophthalmologists were US or Canadian medical graduates, 99% of optometrists were therapeutic pharmaceutical agent-certified, and 100% of optometrists were US or Canadian optometric graduates. Twenty-nine percent of group practices with any ophthalmologists included a mixture of generalist and specialist ophthalmologists, 13% of group practices included only specialists, and 58% of group practices included only generalists. Solo optometrists had a higher percentage of providers with more than 10 years of experience than optometrists in group practices (98% vs 64%; $P < .01$).

On average, optometry-only group practices were newer than group practices with any ophthalmologists (9.9 vs 16.8 years; $P = .03$). For solo practices, however, no differences were noted in ages of the ophthalmology and optometry practices. As expected, larger practices had been established for a longer time ($r = 0.57$; $P < .01$).

Providers in optometry-only group practices treated fewer patients than providers in group practices with any ophthalmologists (63 vs 117 patients per provider per week; $P < .01$; **Table 1**). In addition, optometrists in optometry-only group practices treated fewer patients than optometrists in solo practices (63 vs 93 patients per provider per week; $P = .01$). No differences were noted in patient caseload between ophthalmologists in group and solo practices. However, providers in specialist-only ophthalmology group practices treated fewer patients per week than providers in generalist-only ophthalmology group practices (78 vs 122 patients per provider per week; $P < .01$).

Group practices with any ophthalmologists had a larger percentage of elderly patients in the practice than optometry-only group practices (57% vs 23%; $P < .01$). Similarly, solo ophthalmologists had more elderly patients than solo optometrists (58% vs 20%; $P < .01$).

Practices were almost exclusively provider owned, and many practices had more than 1 outpatient office. Group practices had substantial experience with managed care, having had managed care contracts for 9 years and averaging 19 contracts per practice. Surprisingly, the number of managed care contracts was not associated with group size. Solo practices also had considerable experience with managed care, although solo practices had fewer managed care contracts than group practices (9 vs 19 contracts; $P < .01$). Most group practices with any ophthalmologists and solo ophthalmologists participated in an IPA or a physician-hospital organization. In contrast, optometry-only group practices and solo optometrists were rarely involved in these types of organizations.

Financial Arrangements

For group practices, we were interested in 2 sets of financial arrangements, consistent with the concept of "tiers" in managed healthcare¹³: (1) the sources of revenue at the practice level, which reflect the arrangements between group practices and payers, and (2) the components of income at the individual provider level, which reflect how practices pay their individual providers.

Group Practices. Overall, group practices received 68% of their revenues from fee-for-service payments, only 9.3% of their revenues from capitated payments, and the remaining 23% of revenues from out-of-pocket and other payments (**Table 2**). Among the 60% of group practices with any capitation, the portion of revenues from capitation was 15%, and other types of revenue were reduced proportionally (63% from fee-for-service payments and 21% from out-of-pocket or other payments). Across all groups, the portion of revenues from capitation was positively correlated with group size ($r = 0.42$; $P < .01$).

Within group practices, individual ophthalmologists and optometrists received nearly all of their income on a fee-for-service (46% and 44%, respectively) or salary basis (52% and 56%, respectively). No differences were noted in the mechanisms used to pay generalist and specialist ophthalmologists in group practices.

Capitation of individual eye care providers within groups was unusual, accounting for 2.0% of ophthalmologists' income and 0.5% of optometrists' income. However, in the 16% of group practices that

used some capitation to pay individual providers, capitation accounted for 8.4% of ophthalmologists' income and 7.1% of optometrists' income. All groups that paid individual providers with capitation derived a portion of their group revenues from capitated payments. In fact, the portion of group revenues derived from capitated payments was correlated with the proportion of individual ophthalmologists' income based on capitation ($r = 0.40$; $P < .01$).

Group practices with any ophthalmologists were more likely to use bonuses, withholds, or other performance incentives for individual eye care providers than were optometry-only group practices

(44% vs 17%; $P = .01$; Table 2). However, the portion of income that individual providers received from bonuses was similar for group practices with any ophthalmologists and for optometry-only group practices. All providers reported productivity criteria to be a major determinant of the bonus.

Interestingly, when compensating individual providers, group practices chose between using bonuses, withholds, or performance incentives and basing a portion of individual providers' income on capitation. Although 45% of group practices used either capitation or bonuses to pay individual providers, only 0.5% of group practices used both.

Table 1. Practice Structure: Group and Solo Practices

	Group Practices			Solo Practices	
	Ophthalmologists & Optometrists (n = 34)	Ophthalmologists Only (n = 47)*	Optometrists Only (n = 7)	Ophthalmologists (n = 44)	Optometrists (n = 12)
No. of physicians & optometrists	10.1	4.7	2.1	1.0	1.0
No. of ophthalmologists	7.2	3.3	—	1.0	—
Proportion specialists (%)	20	27	—	23	—
Proportion board certified (%)	94	95	—	93	—
Proportion US/Canada medical graduates (%)	97	92	—	83	—
Proportion with more than 10 years experience (%)	70	68	—	74	—
No. of optometrists	2.9	—	2.1	—	1.0
Proportion TPA certified (%)	98	—	100	—	100
Proportion US/Canada medical graduates (%)	100	—	100	—	100
Proportion with more than 10 years experience (%)	63	—	65	—	98
Patient load and composition					
Patients per week	952	414	132	129	90
Patients per provider per week	117	117	63	129	90
Proportion of patients older than 65 years old (%)	48	62	23	58	20
Other practice characteristics					
Years of operation	16	17	10	15	18
Have residents or medical or optometry students (%)	37	45	64	15	0
Have multiple outpatient offices (%)	69	70	34	37	49
No. of offices for practices with multiple outpatient offices	6.0	3.3	2.3	2.4	2.2
Practices and managed care					
Years with managed care contracts	9.7	10	7.4	8.6	13
Number of managed care contracts	24	19	15	10	6.7
Participate in IPA/PHOs (%)	54	68	2.0	73	9.0

Values given as means unless otherwise noted.

*Two of these 47 practices were multispecialty group practices.

TPA indicates therapeutic pharmaceutical agent; IPA, independent practice association; PHO, physician-hospital organization.

Table 2. Financial Arrangements: Group Practices

	Group Practices		
	Ophthalmologists & Optometrists	Ophthalmologists Only	Optometrists Only
Components of group practice revenue (%)			
Fee-for-service (mean)*	61	76	62
Capitation (mean)†	11	6.1	12
Out-of-pocket or other (mean)‡	28	18	25
Receive any capitation revenues	76	48	64
Portion of revenues from capitation for practices receiving any capitation (mean)	14	13	20
Components of ophthalmologists' income (%)			
Fee-for-service (mean)*	55	39	—
Salary (mean)	43	59	—
Capitation (mean)†	1.9	1.7	—
Components of optometrists' income (%)			
Fee-for-service (mean)*	43	—	46
Salary (mean)	56	—	54
Capitation (mean)†	1.1	—	0
Use of bonuses or withholds (%)			
Practices that use bonuses/withholds	43	44	17
Portion of providers' income from bonuses in practices using bonuses (mean)	14	17	11
Criteria used to determine bonuses in practices using bonuses [§]			
Productivity (%)	95	88	100
Patient satisfaction (%)	5.0	12	0
Other criteria (%)	44	72	89

*Fee-for-service indicates that a group (or individual provider) received a fee for each service provided to patients.

†Capitation indicates that a group (or individual provider) received a fixed sum per member per month.

‡Out-of-pocket or other includes deductibles, coinsurance, and copayments, as well as any other sources of revenue not explicitly indicated.

§Because more than 1 response is possible, percentages may not total 100.

Solo Practices. Similar to group practices, fee-for-service payments comprised the largest portion of revenues for solo practices (Table 3). The remaining solo ophthalmologist and optometrist revenues were obtained from salary payments and from out-of-pocket and other payments. Because 94% of ophthalmology solo practices and 98% of optometry solo practices were provider-owned, solo providers most likely paid themselves a salary—eg, after incorporating—than received a salary from another source. Indeed, one fifth of provider-owned solo practices reported their income to be entirely from salary payments. Overall, solo providers received only 0.9% of their revenues from capitation. Among the 7.1% of solo practices with any capitation, however, the portion of revenues from capitation was 12%.

Utilization Management

About 65% of group practices with any ophthalmologists reported that eye care providers received a practice profile (Table 4), whereas only 1 respondent of the 7 optometry-only group practices reported receiving a profile (the proportion is reported as 1.8% in Table 4 due to the small weight for this practice). In group practices with both types of providers, moreover, ophthalmologists were more likely to receive a practice profile than optometrists (95% vs 46%; $P < .01$). In contrast to group practices, optometrists in solo practice were as likely to receive a practice profile as solo ophthalmologists. In all cases, health plans were the most likely source of a practice profile, and profiles were most likely to include information on patient satisfaction and performance of procedures.

More than three fourths of all practices reported some involvement with utilization review or preauthorization (Table 5). Specialist ophthalmologists were subject to utilization review at rates similar to generalist ophthalmologists. Optometrists in group practices with both types of providers were reviewed less frequently than ophthalmologists in the same practices (39% vs 76%; $P < .01$), and less frequently than optometrists in optometry-only group practices (39% vs 83%; $P < .01$). All providers reported preauthorization for procedures to be the most common element of utilization review, except for solo optometrists who reported preauthorization for referrals as the most common element of utilization review. As with practice profiling, plans were the most likely source for utilization review in all cases.

Quality Management

Nearly all practices reported using a QM tool such as clinical guidelines, protocols, or pathways for diabetes and glaucoma (Table 6). Practices with any ophthalmologists reported using tools developed by the American Academy of Ophthalmology, whereas optometry-only group practices and solo optometrists preferred tools developed by the American Optometric Association. Many group practices cited multiple sources for these tools, including the practice itself, suggesting that practice-specific variants were common. In nearly all cases, the tools were selected by the practice rather than by a health plan.

About 73% of practices reported tracking whether diabetic patients received annual dilated examinations, and 63% of practices reported tracking whether glaucoma patients received annual visual field examinations. These rates did not vary significantly across practice types. Nearly all of the practices that tracked annual visual field examinations for glaucoma patients also tracked annual dilated eye examinations for diabetic patients. Interestingly, the portion of group practice revenues obtained from capitation was positively correlated with tracking at least 1 of these services by group practices ($r = 0.41$; $P < .01$). In addition, the proportion of specialist ophthalmologists in the practice was negatively correlated with tracking both services ($r = -0.29$, $P < .01$ for dilated

examinations; $r = -0.43$, $P < .01$ for visual field examinations). None of the following variables—age or size of the practice, number of managed care contracts, bonuses for eye care providers, and use of provider profiles or utilization review—were associated with tracking these services.

A higher proportion of group practices than solo practices used computerized information systems (94% vs 69%; $P < .01$). Moreover, among solo practices, more ophthalmologists than optometrists used computerized information systems (79% vs. 47%; $P = .02$). The uses of these systems varied, but for all types of practices computers were most commonly used to generate reminders for follow-up appointments (92% of practices that used information systems). Other uses included computerized letters for referrals (58%), computers to obtain information about treatment alternatives (41%), reminders to alert providers about preventive services for which patients are due (41%), computers to obtain clinical data such as laboratory tests (26%), computers to obtain drug interaction lists (22%), and computerized versions of formal practice guidelines (21%). Few practices used electronic medical records (8.3%) or computerized lists of patients' medications (9.0%). Interestingly, having computerized information systems to remind providers when patients were due for preventive services was uncorrelated with tracking annual dilated eye examinations for diabetic patients or annual visual field examinations for glaucoma patients. Computerized information systems also were uncorrelated with reimbursement arrangements.

More than three fourths of group practices reported providing some sort of provider education for their providers, including sessions on procedure doc-

Table 3. Financial Arrangements: Solo Practices

Components of Solo Providers' Income (%)	Solo Practices	
	Ophthalmologists	Optometrists
Fee-for-service (mean)*	69	59
Salary (mean)†	18	2.8
Capitation (mean)‡	0.9	0.8
Out-of-pocket or other (mean)§	11	37

*Fee-for-service indicates that a solo provider received a fee for each service provided to patients.

†As described in the text, solo providers may incorporate and pay themselves a salary.

‡Capitation indicates that a solo provider received a fixed sum per member per month.

§Out-of-pocket or other includes deductibles, coinsurance, and copayments, as well as any other sources of revenue not explicitly indicated.

Table 4. Provider Profiling: Group and Solo Practices

	Group Practices			Solo Practices	
	Ophthalmologists & Optometrists	Ophthalmologists Only	Optometrists Only	Ophthalmologists	Optometrists
Any provider received a practice profile (%)	65	65	1.8 [†]	40	65
Any ophthalmologist received a profile (%)	95	100	—	40	—
Sources of profiles in practices where any ophthalmologist received a profile*					
Health plan (%)	70	65	—	95	—
IPA or other provider network (%)	39	6.1	—	24	—
The group practice (%)	31	39	—	—	—
Information in profiles in practices where any ophthalmologist received a profile*					
Diagnostic tests (%)	44	65	—	48	—
Referrals to specialists (%)	70	45	—	16	—
Procedures (%)	93	74	—	87	—
Patient satisfaction (%)	84	85	—	73	—
Any optometrist received a profile (%)	46	—	100	—	65
Sources of profiles in practices where any optometrist received a profile*					
Health plan (%)	87	—	0	—	100
IPA or other provider network (%)	32	—	0	—	0
The group practice (%)	42	—	0	—	—
Information in profiles in practices where any optometrist received a profile*					
Diagnostic tests (%)	26	—	0	—	73
Referrals to specialists (%)	32	—	0	—	0
Procedures (%)	78	—	0	—	21
Patient satisfaction (%)	94	—	0	—	27

*Because more than 1 response is possible, percentages may not total 100.

[†]n = 1 for this subgroup.

IPA indicates independent practice association.

umentation, managed care education, and cost-effectiveness seminars. Of the 5 types of provider education systems, written documents outlining procedures used to care for managed care patients were the most commonly reported (72%), followed by newsletters or notices providing clinical and practical updates on cost-effective practice (63%), periodic seminars or lectures focusing on cost-effective practice (48%), managed care orientation for new providers (32%), and periodic retreats focusing on the practice of cost-effective medicine (19%). Written documents outlining procedures used to care for managed care patients and newsletters or notices providing clinical and practical updates on

cost-effective practice were positively correlated with the percentage of group revenues from capitation ($r = 0.39, P < .01$; and $r = 0.39, P < .01$, respectively), tracking whether diabetic patients received annual dilated examinations ($r = 0.36, P < .01$; and $r = 0.52, P < .01$, respectively) and tracking whether glaucoma patients received visual field examinations ($r = 0.38, P < .01$; and $r = 0.47, P < .01$, respectively).

DISCUSSION

Nearly all eye care practices in our study used some mechanism to contain costs, manage utiliza-

Table 5. Utilization Review: Group and Solo Practices

	Group Practices			Solo Practices	
	Ophthalmologists & Optometrists	Ophthalmologists Only	Optometrists Only	Ophthalmologists	Optometrists
Any provider subject to utilization review (%)	76	85	83	84	81
Provider types subject to utilization review*					
General ophthalmologists (%)	75	85	—	96	—
Specialist ophthalmologists (%)	62	94	—	41	—
TPA certified optometrists (%)	38	—	83	—	81
Sources of utilization review in practices where any provider was subject to review†					
Health plan (%)	96	76	100	95	90
IPA or other provider network (%)	41	30	6.0	27	0
The group practice (%)	31	34	3.1	—	—
Type of utilization review in practices where any provider was subject to review†					
Preauthorization for tests (%)	71	50	24	54	42
Preauthorization for procedures (%)	100	100	26	94	32
Preauthorization for referrals (%)	60	38	21	59	79

*Percentages are only for practices with providers of indicated type.

†Because more than 1 response is possible, percentages may not total 100.

tion, or improve quality. Although we did not assess when these mechanisms were adopted or how they changed over time, the growth of managed care has likely helped to spur their spread. Nationally, managed care accounts for about half of practice revenues for ophthalmologists, and nearly all ophthalmology practices have at least 1 managed care contract.¹⁴ Studies have revealed that managed care arrangements affect optometrists' scope of practice as well.¹⁵

Our findings are consistent with evidence that health plans may set standards for providers' credentials when contracting with medical care providers.¹ For example, for ophthalmologists, results for practice size, patient caseload, and US-trained or Canadian-trained providers concurred with national estimates from the American Medical Association.¹⁶ However, our practices have higher proportions of board-certified ophthalmologists (94% vs 81% for the nation). Of course, rates of

board certification could possibly be higher than the national average in the urban areas represented in our study.

One of the most dramatic features of managed care has been the transfer of financial risk from insurers to medical care providers. Nationally, eye care practices have not assumed large levels of financial risk. Although nearly half of practice revenues for ophthalmologists are from managed care contracts, capitation accounts for a small portion of these revenues.¹⁴ Similarly, in our study, capitation payments typically accounted for a small portion of group practice revenues and a minuscule portion of the revenues of solo eye care providers. Our finding that the portion of group revenues from capitation increased with the size of the group is heartening, because larger practices are in a better position to absorb financial risk. We also found that groups rarely used capitation of individual eye care providers to transfer risk from the group down to individuals.

Table 6. Clinical Guidelines, Protocols, or Pathways: Group and Solo Practices

	Group Practices			Solo Practices	
	Ophthalmologists & Optometrists	Ophthalmologists Only	Optometrists Only	Ophthalmologists	Optometrists
Used a clinical guideline, protocol, or pathway for patients with diabetes (%)	100	99	100	92	100
Sources of clinical guidelines, protocols, or pathways in practices that used these tools*					
The group practice (%)	83	88	7.5	—	—
American Academy of Ophthalmology (%)	96	93	22	95	20
American Optometric Association (%)	41	4.0	100	2.9	100
Clinical guideline, protocol, or pathway selected for use by*					
The group or solo practice (%)	100	99	100	92	100
Health plan (%)	12	14	0	11	2.1
Used a clinical guideline, protocol, or pathway for patients with glaucoma (%)	100	83	100	91	89
Sources of clinical guidelines, protocols, or pathways in practices that used these tools*					
The group practice (%)	88	95	22	—	—
American Academy of Ophthalmology (%)	96	93	22	100	14
American Optometric Association (%)	34	4.7	100	3.0	100
Clinical guideline, protocol, or pathway selected for use by*					
The group or solo practice (%)	100	100	100	99	100
Health plan (%)	10	0	0	7.1	2.4

*Note: More than one response possible; numbers do not sum to 100%.

Performance incentives, including bonuses and withholds, are additional financial mechanisms that may be used to influence the behavior of individual providers. However, recent evidence suggests that the efficacy of capitation and bonuses for controlling costs may differ.¹⁷ Our findings clearly indicated that group practices typically choose one mechanism or the other to influence the behavior of individual providers, and rarely use both simultaneously. The trade-offs between these 2 different financial mechanisms deserve further investigation.

The results of our study also are consistent with current thinking about the influence of capitation on practices' willingness to adopt their own utilization review techniques. In general, the entity that bears financial risk has incentives to manage providers to reduce this risk. Therefore, in cases in which practices assume significant financial risk through capi-

tated contracts, they also inherit incentives to manage their own utilization and cost. This notion is supported by studies of large, capitated group practices in California, where risk-bearing practices assumed utilization management responsibilities.³ The eye care practices in our study, however, did not bear significant financial risk. Consequently, utilization management responsibilities resided predominantly with health plans. Of note, a recent study suggested that the influence of capitation on group practices' decisions to adopt self-imposed utilization management may be overestimated.¹⁸

In contrast, the practices in our study used many QM techniques almost entirely on their own initiative. The emphasis on QM techniques by eye care practices may be related to a greater overall emphasis on medical care quality and could reflect a cultural change in the practice of medicine.

Alternatively, this emphasis may reflect providers' perceptions about what is required to maintain a sizeable patient base in a competitive market place.

One important QM tool is the tracking of necessary preventive services for patients. The American Diabetes Association recommends that diabetic patients receive annual dilated eye examinations, and more frequently if retinopathy is progressing,¹⁹ and the American Academy of Ophthalmology recommends a visual field examination every 3 to 24 months for glaucoma patients, depending on disease severity.²⁰ Existing studies suggest that practices that bear significant financial risk concentrate on preventive services rather than follow-up care.³ Our finding that the portion of practice revenues obtained from capitation was strongly correlated with tracking the provision of annual dilated eye examinations for diabetic retinopathy patients and visual field examinations for glaucoma patients supports this view. On the other hand, more than twice as many practices used computerized information systems for follow-up appointments as for preventive services. In addition, our finding that the proportion of specialists was negatively associated with tracking these services indicates that generalists may be more concerned about preventive care than specialists.

Our study has several limitations. First, although we sampled eye care practices that contract with one of the largest national managed care organizations, our results are not generalizable to eye care practices that do not contract with health plans or those in other areas of the country. Second, the data are self-reported, and we have no independent verification of their validity. Nonetheless, many of our key measures for practice characteristics and financial arrangements concur with published estimates.

In general, our results paint an optimistic picture of eye care practices that contract with managed care organizations. Few practices bear substantial financial risk, and nearly all practices insulate individual providers from the considerable financial risk associated with individual-level capitation. Moreover, most practices use several types of QM tools, have multiple computerized information systems, and conduct provider education. Used appropriately, these mechanisms could help to improve the quality of care. These findings bode well for eye care patients, although further studies should directly examine the influence of these characteristics on quality.

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