

The Effect of HMO Competition on Gatekeeping, Usual Source of Care, and Evaluations of Physician Thoroughness

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Objectives: To examine the effects of HMO enrollment and HMO competition on evaluations of physician thoroughness through their effects on gatekeeping and having a usual source of care and to determine whether the effects of HMO competition spill over to individuals not enrolled in HMOs and whether these effects differ in those enrolled vs not enrolled in HMOs.

Study Sample: A nationally representative sample of 27 441 adults from the household component of the Community Tracking Study—Round 1 (July, 1996, through July, 1997).

Study Design: A retrospective econometric analysis of Community Tracking Study data merged with measures of HMO competition.

Methods: Gatekeeping was regressed on HMO enrollment, HMO competition, and control variables using ordered logistic regression. Usual source of care was regressed on gatekeeping, HMO enrollment, HMO competition, and control variables using logistic regression. Evaluation of physician thoroughness was regressed on gatekeeping, usual source of care, HMO enrollment, HMO competition, and control variables using multivariate regression.

Results: HMO competition increases use of gatekeeping and gatekeeping increases having a usual source of care for all individuals. For HMO enrollees, HMO competition increases having a usual source of care, whereas for those not in HMOs, it decreases having a usual source of care. For all individuals, having a usual source of care increases evaluation of physician thoroughness. For those in HMOs, gatekeeping decreases evaluation of physician thoroughness.

Conclusions: For HMO enrollees, the overall effect of HMO competition is to increase evaluations of physician thoroughness. For those not in HMOs, although there are HMO competition spillover effects, they are offsetting, resulting in no overall effect of HMO competition on evaluations of physician thoroughness.

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referrals for specialty care, ancillary tests, and hospital admissions. It has been argued that gatekeeping allows plans to use resources more efficiently, thus reducing costs.¹ Moreover, it has been argued that the use of gatekeepers improves quality by protecting patients from redundant or potentially harmful treatments, by encouraging individuals to develop a usual source of care relationship, by fostering continuity of care, and by coordinating the provision of medical services to individual patients.²⁻⁵ However, it has also been argued that gatekeeping results in the substitution of primary care physician visits for specialty visits,⁶ in withholding of care,^{7,8} and in negative assessments of outpatient care.⁹

Gatekeeping is common in HMOs, and existing research looks mostly at its effects in HMOs.¹⁰ Little is known about the spillover effect of HMO competition on the use of gatekeepers in non-HMO settings.¹¹ It is probable that spillover from HMO to non-HMO settings occurs, particularly in markets where HMOs are extensively developed.¹² It is also reasonable to expect that gatekeeping, when it occurs, affects patients in both HMO and non-HMO settings. If spillover does occur, then higher levels of HMO competition and penetration will result in greater use of gatekeeping for patients in HMO and non-HMO settings, with gatekeeping having a subsequent effect on patient evaluations of physician office visits.

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During the past 2 decades, the expansion of managed care has transformed the US healthcare system. These changes are most evident in managed care settings, where healthcare organizations have implemented structures to manage costs, utilization, and quality. One widely adopted convention is gatekeeping. In a typical gatekeeping arrangement, patients select a primary care physician who must authorize

This study uses data from the household component of the Community Tracking Study (CTS) to examine whether HMO competition affects the prevalence of gatekeeping among adults in HMO and non-HMO settings and to assess the effect of gatekeeping and HMO competition on patient appraisals of office visits and physician thoroughness. We ask:

- What is the effect of enrollment in an HMO and HMO competition on the likelihood of having a gatekeeper? Do these effects “spill over” into the non-HMO market?
- What is the effect of enrollment in an HMO, HMO competition, and gatekeeping on having a usual source of care?
- What is the effect of enrollment in an HMO, HMO competition, gatekeeping, and having a usual source of care on individuals’ evaluation of physician thoroughness?
- Do the effects differ in those enrolled vs not enrolled in an HMO?

MANAGED CARE SPILLOVER

Many studies have examined the medical care provided to patients enrolled in managed care plans such as HMOs, but less attention has been given to whether and how HMO competition spills over to non-HMO settings.¹³ The research that has been completed suggests that spillover does occur. HMO competition is associated with changes in the medical infrastructure, the number of providers, or the accessibility of various technologies. Higher levels of HMO penetration, for example, are associated with lower rates of technology diffusion.¹⁴ For example, fee-for-service Medicare beneficiaries in areas with high HMO market penetration receive fewer services than those in areas with a low HMO market share.¹⁵ HMO competition may also be associated with medical groups and non-HMO health plans adopting utilization management structures similar to those used by HMOs and using those structures for their non-HMO enrollees.^{9,15,16} Finally, physicians with a large proportion of patients associated with an HMO may use the structures required to serve their HMO enrollees for their non-HMO enrollees.

Given managed care’s emphasis on managing resource use with structures such as gatekeeping, and considering the spillover effect of managed care in other areas, it is worthwhile to investigate whether managed care competition affects the adoption of gatekeeping in HMO and non-HMO settings. Similarly, it is worthwhile to examine how gatekeeping affects patient evaluations of physician thoroughness in HMO and non-HMO settings.

Gatekeeping, Usual Source of Care, and Physician Thoroughness Evaluation

HMOs encourage enrollees to choose a primary care physician, or gatekeeper, for 2 broad reasons.¹⁷ First, it can increase the likelihood of having a usual source of care—primary care relationship, which can improve the coordination and thoroughness of care patients receive. Second, gatekeeping can be used to manage healthcare resource use by holding physicians accountable for the services they order or provide.

Research findings on the effects of gatekeeping are mixed. Some research suggests that gatekeeping lowers resource use.¹⁸⁻²¹ Similarly, research shows that an emphasis on primary care offsets the decreased use of specialty care.^{1,19,21,22} Consistent with this finding are studies showing that patient self-referral leads to an increase in the use of specialty services.²³ However, other research presents mixed results.^{11,24} The elimination of gatekeeping requirements by Harvard Community Health Plan (now Harvard Vanguard Medical Associates), for example, resulted in only minor increases in visits to specialists and actually led to a decrease in the frequency with which individuals visited their primary care physicians.⁶

Because the goals of primary care and resource management may conflict, the direct and indirect effects of gatekeeping on patient evaluations of physician thoroughness are likely to be offsetting. Gatekeeping is likely to have a negative direct effect on evaluations of physician thoroughness because of its effect on perceptions of resource management. Requiring referrals or previous authorization for specialty care may hamper open communication between patients and their providers and may color a patient’s interpretation of the physician’s actions.²⁵⁻²⁷ Research supports this argument, showing that gatekeeping results in lower evaluations of physician thoroughness.^{9,28} Gatekeeping may also influence patient perceptions because of its associated bureaucratic hassle.²⁹ For example, the administrative burden associated with the gatekeeping process may interfere with continuity of care, thus offsetting some of the coordination benefits associated with primary care or causing patients to assess their physicians’ care as less than thorough.²⁷

The indirect effect of gatekeeping, which occurs through its effect on having a usual source of care, is likely to be positive. This positive expectation is based in the primary care relationship. In its ideal form, the primary care relationship is characterized by comprehensiveness, longitudinality, and continuity.⁴ Longitudinal care permits primary care physicians to observe the various types of health problems each patient has and to integrate medical information across

healthcare episodes; in addition, a provider has the opportunity over time to develop a close personal relationship with the individuals in his or her care.⁴ This continuity and comprehensiveness gives the primary care relationship an element of stability. As physicians familiarize themselves with an individual's preferences and idiosyncrasies, they can tailor their care for each particular patient, improving health outcomes and patient evaluations of thoroughness.

The effect of gatekeeping on patient evaluations may differ between HMO and non-HMO settings. In contrast to non-HMO patients, HMO patients may believe that there is a higher priority on cost containment. For adults in a non-HMO context such as indemnity health insurance or preferred provider organizations, the impact of gatekeeping on evaluation of physician thoroughness may be attenuated, since there are fewer concerns regarding cost containment.

DATA AND METHODS

Sample

The data are from the household component of the CTS—Round I. The CTS is a national longitudinal study devised to track changes in healthcare markets in the United States and to measure the effects of these changes on healthcare delivery. Participants were randomly selected from 60 sites in the contiguous United States, creating a nationally representative sample. The CTS—Round I data were collected by telephone interview between July, 1996, and July, 1997; the sampling method was random-digit dialing. Interviews representing 60 446 noninstitutionalized civilian adults were completed. The overall response rate was 68%. The household component of the CTS examines utilization of health services, satisfaction with care, and perceived overall health status for members of each household sampled according to a randomly selected family informant. In addition, information on insurance coverage, usual source of care, and household demographics was solicited for all adult family members. Because children did not respond to questions concerning evaluation of the last visit, they were excluded from the analysis.

A total of 34 796 respondents were available for the analysis of determinants of gatekeeping. Because analyses included patient evaluations of physician thoroughness at their last office visit and because only persons who had seen a physician at least once in the past 12 months were asked these items, the analysis is restricted to 27 441 adult respondents.

Further details of the CTS, including its design and sampling methods, are outlined elsewhere.^{30,31} The CTS

data and documentation are available through the Inter-university Consortium for Political and Social Research (<http://www.icpsr.umich.edu>).³²

Since we use individual responses from the survey about the presence of managed care structures and evaluations of physician thoroughness, we are studying the effect of individual perceptions of the presence of managed structures. These perceptions may not reflect a patient's actual healthcare arrangements. For example, research suggests that it is likely that respondents overreport the presence of managed care structures such as gatekeeping.³³ If this overreporting is more likely in markets with a high degree of managed care activity, then a positive association between managed care markets and gatekeeping in non-managed care settings may be due in part to measurement error. However, even if this is occurring, our analysis is still important because individual perceptions of managed care may matter just as much as the actuality of being in an HMO when evaluating physician thoroughness.³⁴

Measures/Variables

Table 1 identifies and defines the measures used in this study. The description in **Table 1** of the items drawn from the CTS can be combined with survey documentation from the Center for Studying Health System Change³⁴ to construct each variable.³⁵ **Table 2** gives the means and SDs of each variable used in the analysis.

The gatekeeper measure was constructed from the following questions: "Is there a book, directory, or list of physicians associated with the plan?"; "Does the plan require you to sign up with a certain primary care physician, group of physicians, or clinic?"; "Do you need a referral to see a specialist or to get special care?" Empirical analysis of CTS data showed that >95% of the respondents who had to obtain approval for nonspecialty care or who were required to sign up with a primary care provider also had to choose their physician from a list (results not shown but available on request). Therefore, a scale was constructed: 0 indicates no restrictions; 1, person has to choose from a provider list; and 2, person has to obtain approval for referrals or person has to sign up with a primary care physician. We argue that gatekeeping affects evaluation of physician thoroughness directly and indirectly, with the indirect path being through usual source of care.

Usual source of care was measured as a dichotomous variable capturing a respondent's answer to the question: "Is there a place you usually go to when you are sick or need advice about your health?" This is a more inclusive measure than asking about a usual source of care relationship with a particular physician. Using this

Table 1. Variable Operationalization*

Variable	Comments [†]
<p>Gatekeeper and Visit Evaluation Gatekeeper: • “Is there a book, directory, or list of physicians associated with the plan?” • “Does plan require individuals to sign up with a certain primary care physician, group of physicians, or clinic?” • “Does the person need a referral to see a specialist or to get special care?”</p> <p>Usual source of care: “Is there a place you <i>usually</i> go to when you are sick or need advice about your health?”</p> <p>Physician thoroughness: • How would you rate the thoroughness and carefulness of the examination and treatment you received? • How would you rate how well the physician listened to you? • How would you rate how well the physician explained things in a way you could understand?</p>	<p>Because almost everyone who had to obtain approval for nonspecialty care or was required to sign up with a primary care provider also had to choose their physician from a list, a scale was constructed: 0 = no restrictions 1 = person has to choose from a provider list 2 = person has to obtain approval for referrals or person has to sign up with a primary care physician</p> <p>Indicator variable: 1 = yes</p> <p>Scale: poor (1) to excellent (5) Cronbach alpha = .91</p>
<p>Enrolled in an HMO and HMO Competition Insured by an HMO</p> <p>Number of HMOs</p> <p>HMO penetration</p>	<p>The Community Tracking Study definition used for “HMO” was borrowed from the National Health Interview Survey. It reads: “With an HMO, you must generally receive care from HMO doctors; otherwise, the expense is not covered unless you were referred by the HMO or there was a medical emergency.” Indicator variable: 1 = insured by an HMO</p> <p>Data from InterStudy (1997)</p> <p>Data from InterStudy (1997)</p>
<p>Utilization and Costs Predicted visits:</p> <p>Predicted value from a regression of number of physician visits on HMO competition, HMO penetration, enrollment in an HMO, length of enrollment in an HMO, physical health status, mental health status, preferences, risk taker, poverty level, black, Hispanic, Asian, age, education, hospital visits, insurance type, and change in insurance during past year</p>	<p>Continuous variable</p> <p>Effects for the identifying variables <i>hospital visits</i> and <i>private insurance</i> (direct, employer, outside family) had T statistics >2</p>
<p>Preferences and Choice Prefers cost: “I would be willing to accept a limited choice of physicians and hospitals if I could save money on my out-of-pocket costs for medical care.”</p> <p>Risk taker: “I’m more likely to take risks than the average person.”</p>	<p>Indicator variable: 1 = prefers cost Scale: strongly agree (1) to strongly disagree (5); distribution was bimodal The prefers cost variable was set to 1 for individuals responding “strongly agree” or “agree”</p> <p>Indicator variable: 1 = risk taker Scale: strongly agree (1) to strongly disagree (5); distribution was bimodal Risk taker was set to 1 for individuals responding “strongly agree” or “agree” (Continues)</p>

*Data from the Center for Studying Health System Change.³⁵

[†]The baseline universe is all respondents who completed the self-response module of the survey. Qualifications that limited this universe are noted.

Table 1. Variable Operationalization* (*Continued*)

Variable	Comments [†]
Individual Characteristics	
Physical health status: Constructed variable that indicates an adult's SF-12 Physical Component summary score	Reverse coded: higher values are lower status
Mental health status: Constructed variable that indicates an adult's SF-12 Mental Component summary score	Reverse coded: higher values are lower status
Poverty level: Total household income as a percentage of the Federal Poverty Level (1996) for the size of the census family	Constructed variable represents a poverty index: the ratio of family income to the census poverty level for the family
Out-of-pocket medical costs: Total out-of-pocket medical costs for the family	Scale: 0 = \$0; 1 = \$1-\$499; 2 = \$500-\$1999; 3 = \$2000-\$2999; 4 = \$3000-\$4999; 5 = \$5000+

broader definition is appropriate for 2 reasons. First, it captures commonly used health plan enrollment processes that require individuals to select a primary care clinic as a usual source of care site. Second, because a patient's evaluation of thoroughness may include interactions with triage nurses and other staff as well as interactions with the physician, it is important to measure usual source of care at the clinic level.

Evaluation of physician thoroughness was measured with an item constructed using a principal components combination of the respondent's assessment of physician-patient interaction at his or her last office visit: how well the physician listens, how clearly he or she explains things to patients, and how careful and complete the medical examination was.

HMO competition was measured with 2 variables: the number of competing HMOs and the overall level of HMO penetration (ie, HMO enrollment as a percentage of the population). These measures were constructed from InterStudy HMO census data using techniques developed to study HMO performance.³⁶ The HMO census conducted by InterStudy contains the location of each HMO operating in the United States, its founding year, model type, enrollment, and a list of counties the HMO covers. Enrollment data, used to calculate penetration, were obtained by combining the list of counties where an HMO operates, reports of HMO enrollment by metropolitan statistical area (MSA), and reports of enrollment by county, which InterStudy began collecting in 1997.

We used county enrollment if provided. If not, we prorated the HMO's reported MSA enrollment to the MSA's constituent counties. Finally, we prorated enrollment not allocated by the previous 2 rules over all the

remaining counties served by the HMO. All prorating was based on county population weights (eg, an HMO operating in 2 counties with populations of 100 000 and 200 000 would have one third of its reported enrollment allocated to the smaller county and two thirds to the larger county). Although not all HMOs provided detailed MSA- or county-level data, a substantial proportion of HMO enrollment can be allocated to the county level using the detailed data (in 1997, 44% of all HMO enrollment was directly reported at the MSA and county level). Finally, the county-level data were aggregated to the level of each market area included in the CTS. The measure of HMO penetration constructed with InterStudy data correlated with the CTS self-report measures of being enrolled in an HMO (aggregated to the community) at the 0.70 level, which suggests that the InterStudy-based measure is valid.

Control Variables

We controlled for predicted number of visits to the physician during the previous year because gatekeeping tends to increase primary care visits and also because greater frequency of contact between a patient and provider can foster a more trusting relationship.²³ Finally, analyses controlled for physical and mental health status, medical costs, and demographics (race or ethnicity, age, education, and income).

Models

Three models were estimated. First, gatekeeping was regressed on enrollment in an HMO, HMO competition, and the remaining variables. Second, usual source of care was regressed on gatekeeping, enrollment in an HMO, HMO competition, and the remaining variables.

Third, patient visit evaluation was regressed on gatekeeping, usual source of care, enrollment in an HMO, HMO competition, and the remaining variables. These models allow measurement of the direct and indirect effects of gatekeeping on visit evaluations. HMO competition, gatekeeping, and having a usual source of care were interacted with not being enrolled in an HMO to test whether there are differences in effects for individuals enrolled in HMOs and those not enrolled in HMOs. (Models were also estimated for usual source of care and evaluation of physician thoroughness that did not include any of the indirect paths for the effect of HMO competition [gatekeeping was excluded in the usual source of care model and gatekeeping and usual source of care were excluded in the evaluation of physician thoroughness model]. In these models, the estimates for HMO competition capture the total effects for HMO competition through all direct and indirect paths. Although these models are not reported, the results are reported where appropriate.)

Methods

Special methods for estimating the SEs of estimates were required because of the complexity of the CTS design. Following the CTS documentation, SUDAAN statistical software (Research Triangle Institute, Research Triangle Park, NC) was used. Ordered logistic regression was used for gatekeeping, logistic regression was used for usual source of care, and multivariate regression was used for evaluation of physician thoroughness. F statistics are reported for joint tests.

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RESULTS

Table 3 gives the estimates for gatekeeping, usual source of care, and evaluation of physician thoroughness.

Determinants of Gatekeeping

Enrollment in an HMO, HMO competition, and HMO penetration increase the likelihood of gatekeeping. However, these effects are attenuated at very high levels of HMO competition (the number of HMOs and HMO

Table 2. Descriptive Statistics

Variable	Mean	Standard Deviation
Physician thoroughness	0.021	0.018
Health plan structure		
Gatekeeper	1.376	0.013
Enrolled in an HMO	0.396	0.009
Market structure		
Number of HMOs	12.150	0.419
HMO penetration	0.260	0.016
Number of HMOs × HMO penetration	3.634	0.344
Market change		
Change in number of HMOs	2.222	0.174
Change in HMO penetration	0.050	0.006
Individual changed insurance during past 12 mo	0.062	0.002
Preferences and health status		
Prefers cost	0.559	0.004
Risk taker	0.468	0.004
Physical health status (divided by 100; scale = 0 to 1)	0.510	0.001
Mental health status (divided by 100; scale = 0 to 1)	0.475	0.001
Utilization and costs		
Have a usual source of care	0.905	0.003
Predicted visits	3.823	0.020
Medical costs	1.333	0.015
Demographics		
Black	0.106	0.011
Hispanic	0.081	0.020
Asian	0.059	0.003
Age, y		
18-25	0.092	0.002
26-35	0.192	0.003
36-55	0.400	0.003
56-65	0.116	0.002
Male	0.467	0.002
Education and income		
Completed high school	0.599	0.007
Completed college	0.248	0.004
Wealth	3.780	0.043

penetration are high). The effects differ slightly for those enrolled vs not enrolled in HMOs (the F statistic for the joint test of the interaction of not being in an HMO x HMO competition effects are zero is significant, while individual coefficients are small and not significant). This means that HMO competition has a spillover effect for gatekeeping.

Control variable estimates show that those who prefer cost savings to provider choice, those who have more visits, or those who are more educated are more likely to report having a gatekeeper. This may be due to these

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Table 3. Determinants of Gatekeeping, Usual Source of Care, and Evaluation of Physician Thoroughness

	Gatekeeping*		Usual Source of Care [†]		Physician Thoroughness [‡]	
	Estimate	T	Estimate	T	Estimate	T
Health plan structure						
Usual source of care					0.417 [§]	7.690
In HMO × usual source of care					-0.102	-0.954
Gatekeeper			0.239 [§]	3.581	-0.008	-0.419
In HMO × have gatekeeper			0.226	1.474	-0.151 [§]	-2.818
Enrolled in HMO	2.492 [§]	9.036	-0.707 [§]	-2.035	.232	1.162
Market structure						
Number of HMOs	0.042 [§]	2.621	0.0002	0.010	-0.004	-0.489
HMO penetration	2.222 [§]	3.475	1.787 [§]	2.239	0.489	1.796
Number × penetration	-0.182 [§]	-3.885	-0.128 [§]	-2.156	-0.042	-1.834
Not in HMO*						
Number	-0.003	-0.165	-0.026	-1.066	-0.005	-0.515
Penetration	0.023	0.030	-3.172 [§]	-3.293	-0.387	-1.008
Number × penetration	0.044	0.753	0.164 [§]	2.265	0.045	1.612
Preferences and health status						
Prefer cost	0.134 [§]	3.732	-0.173 [§]	-2.859	-0.162 [§]	-6.053
Risk taker	0.011	0.271	-0.008	-0.160	0.004	0.194
Physical health status	-2.374 [§]	-8.363	-0.917	-1.455	-2.103 [§]	-11.375
Mental health status	-1.121 [§]	-5.847	-1.466 [§]	-3.485	-2.808 [§]	-16.161
Utilization and costs						
Predicted visits	0.198 [§]	12.760	0.144 [§]	3.832	0.071 [§]	7.109
Medical costs	-0.070 [§]	-3.228	0.163 [§]	4.300	-0.001	-0.069
Demographics						
Black	0.006	0.088	-0.132	-1.327	-0.251 [§]	-5.660
Hispanic	-0.068	-1.152	-0.074	-0.483	-0.308 [§]	-6.287
Asian	0.026	0.381	-0.203	-1.678	-0.235 [§]	-5.215
Age, y						
18-25	-0.362 [§]	-4.969	-1.409 [§]	-9.943	-0.222 [§]	-4.771
26-35	0.008	0.107	-1.295 [§]	-9.270	-0.255 [§]	-7.587
36-55	0.163 [§]	2.545	-0.712 [§]	-5.001	-0.107 [§]	-3.401
56-65	-0.169 [§]	-3.052	-0.471 [§]	-3.405	0.058	1.291
>65 (contrast)						
Male	0.187 [§]	6.556	-0.053	-0.752	-0.181 [§]	-6.228
Education and income						
Less than high school (contrast)						
Completed high school	-0.068	-1.207	0.009	0.063	0.132 [§]	3.676
Completed college	0.038	0.585	-0.128	-0.939	0.145 [§]	3.403
Wealth	0.023 [§]	3.322	0.035 [§]	2.361	0.008	1.926
Intercepts						
Intercept 1	-0.758 [§]	-4.006	4.200 [§]	9.492	2.110 [§]	14.300
Intercept 2	1.335 [§]	7.279				
Joint tests (F statistic reported)						
Preferences and health status	22.37 [§]		6.01 [§]		11.23 [§]	
HMO competition	6.47 [§]		7.02 [§]		9.43 [§]	
HMO competition × not enrolled in HMO	2.83 [§]		5.11 [§]		3.47 [§]	
Overall model less intercept	186.53 [§]		32.10 [§]		82.64 [§]	

*Estimated using ordered logistic regression in SUDAAN.

[†]Estimated using logistic regression in SUDAAN.

[‡]Estimated using multivariate regression in SUDAAN.

[§]P < .05. Number of observations = 27 441.

individuals seeking the lower healthcare costs usually associated with gatekeeping structures. Individuals with worse physical and mental health status and higher healthcare expenditures are less likely to report having a gatekeeper. This may be due to these individuals seeking more open access in their choice of health plans. Men are more likely to report gatekeeping. Age effects are mixed, and there is no effect of race on gatekeeping.

Determinants of Usual Source of Care

Having a gatekeeper increases having a usual source of care. Although the effect is larger for HMO enrollees, the increase is not significant. The positive effect of enrollment in an HMO on usual source of care through gatekeeping (being enrolled in an HMO increases gatekeeping, which increases having a usual source of care) is offset by a negative direct effect of being enrolled in an HMO on usual source of care. This may be due to HMOs making it relatively easy to switch among primary care providers or to enrollees shopping around within an HMO for a provider who best meets their needs or will refer them to the specialist they desire.

The effect of HMO competition on reporting having a usual source of care differs by whether an individual is enrolled in an HMO. For those in an HMO, HMO penetration increases having a usual source of care. The large negative effect of the interaction of not being enrolled in an HMO and HMO penetration (-3.172) shows that for those not enrolled in an HMO, HMO penetration decreases having a usual source of care. For those enrolled in HMOs, HMO competition increases having a usual source of care indirectly through gatekeeping and directly. But, for persons not in an HMO, the spillover effect of HMO competition on having a usual source of care is complex—it indirectly increases having a usual source of care through gatekeeping while directly decreasing it. The latter may be due to physicians with greater HMO enrollment facing pressure to recruit and retain HMO enrollees. For those not in an HMO, the total effect of HMO competition on having a usual source of care, through both the direct and indirect paths, is negative. This suggests that HMO competition has a negative spillover effect for usual source of care—the greater the HMO competition, the less likely are those not enrolled in an HMO to have a usual source of care.

Control variable estimates show that those who prefer cost savings to provider choice, those who are in worse mental health, or those who are <65 years old are less likely to report having a usual source of care. Individuals with high utilization, in terms of visits and costs, are more likely to report having a usual source of care. Wealthier individuals are more likely to report having a usual source of care.

Determinants of Evaluation of Physician Thoroughness

The last column in Table 3 gives the effects of HMO competition, usual source of care, and gatekeeping on evaluation of physician thoroughness. Having a usual source of care increases evaluations of physician thoroughness for all individuals. Although gatekeeping does not affect evaluation of physician thoroughness for individuals who are not in an HMO, it decreases evaluation of physician thoroughness for those in an HMO. This suggests that the cost-containment context of an HMO negatively affects the way individuals interpret gatekeeping.

HMO penetration increases evaluation of physician thoroughness for those enrolled in HMOs; however, this effect is attenuated at high competition levels (a high number of HMOs and high HMO penetration; the F statistic for the joint tests that competition effects are zero is 9.43, which is significant at the .05 level). This positive effect of HMO penetration does not occur for individuals who are not in HMOs. This may occur only for those in HMOs because as HMO penetration increases, HMOs are better able to monitor physician performance. The total effect of HMO competition, through direct and indirect paths, on evaluation of physician thoroughness is significant at the .05 level for those enrolled in HMOs and is not significant at the .05 level for those not enrolled in HMOs. For individuals who are not enrolled in HMOs, the positive spillover effects of HMO competition through gatekeeping are offset by the negative spillover effects of HMO competition on usual source of care.

Control variable effects show that individuals who prefer cost savings to provider choice evaluate physician thoroughness lower. Those with worse mental and physical health evaluate physician thoroughness much lower. The negative effect of health status on patients' evaluation of physician thoroughness may be due to individuals with greater medical needs having higher expectations for their visits. The greater the number of patient visits, the more positive the evaluation of physician thoroughness.

Blacks, Hispanics, and Asians evaluate physician thoroughness lower than do whites, as do men, individuals <65 years old, and individuals with greater experience with HMOs. Greater education is positively associated with evaluations of physician thoroughness.

DISCUSSION

This study examined the effects of HMO competition on evaluation of physician thoroughness through its

effects on gatekeeping and usual source of care. Although there are significant spillover effects of HMO competition on evaluation of physician thoroughness, the effects are offsetting, resulting in no net effect. In fact, the effect of HMO competition on evaluation of physician thoroughness differs markedly as a function of HMO enrollment. For those enrolled in HMOs, HMO competition directly increases having a gatekeeper and having a usual source of care. Gatekeeping itself increases having a usual source of care. Usual source of care increases evaluation of physician thoroughness. Although these positive effects are offset by a negative effect of enrollment in an HMO on having a usual source of care and a negative effect of gatekeeping on evaluation of physician thoroughness for HMO enrollees, the total effect of HMO competition is positive. The latter effect is mainly due to a positive effect of HMO penetration. For individuals who are not in HMOs, HMO competition directly increases gatekeeping. Although gatekeeping increases having a usual source of care, this is offset by a negative direct effect of HMO competition on having a usual source of care. Although having a usual source of care increases evaluation of physician thoroughness, the offsetting direct and indirect effects of HMO competition on usual source of care result in no overall effect of HMO competition on evaluation of physician thoroughness.

Why does HMO competition have a positive effect on usual source of care for those enrolled in an HMO and no effect for those not enrolled in an HMO? It may be that as HMO penetration increases, physicians are under greater pressure to focus on attracting and retaining HMO patients because they are more dependent on HMOs for their patient population. Although their care of patients may not differ by HMO status, they could be giving preferential treatment to HMO enrollees in terms of forming a usual source of care relationship with them.

The estimates consistently show that HMO competition effects are attenuated in high-competition markets. This result is similar to those from studies of HMO premiums.³⁷ Perhaps this may explain some of the recent decisions by some managed care organizations, such as United Healthcare, to abolish gatekeeping requirements. Another possibility is that health plans in "matured" managed care markets must differentiate their product by creating plans with more open access and less stringent utilization management tools to attract new members.

Some study limitations should be noted. Most important is that causal interpretations should be undertaken with caution. One potential problem is that HMO penetration and the number of HMOs were treated as exogenous.

For the spillover argument, this implies that non-HMO plans are responding to the competitive pressures generated by HMOs. It may be, though, that the negative effect of gatekeeping on evaluation of physician thoroughness in the HMO environment is a cause in the demand for more open health plan products. The recent flattening and decline in HMO enrollment is consistent with this argument. The argument would be that lower evaluation of physician thoroughness results in lower HMO competition. This would make HMO competition endogenous and would bias the estimate of its effect.

A second limitation of this study is that the data rely on respondent self-reports. We are not certain if a study participant who reports "being in an HMO" is actually in an HMO. However, previous research suggests that perceptions of belonging to an HMO may be more important to patient satisfaction with care than actually being a member of an HMO.

In summary, our findings show that HMO competition has complex direct and indirect effects on evaluations of physician thoroughness through their effects on gatekeeping and usual source of care. Although HMO competition increases evaluation of physician thoroughness for those enrolled in HMOs because it increases gatekeeping and usual source of care, it does not have a similar effect for those not enrolled in HMOs because it decreases the likelihood of having a usual source of care.

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