

**The NCQA Accreditation Process:
Do HMOs Serving Rural Areas Apply for
and Obtain Accreditation?**

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EXECUTIVE SUMMARY

This paper is the first in a series of three papers that explore the relationship between accreditation and HMOs serving rural areas. This study addresses two research questions: (1) whether HMOs serving rural populations are as likely to seek National Committee for Quality Assurance (NCQA) accreditation as HMOs that primarily serve urban populations, controlling for the effect of HMO organizational and market area characteristics, and (2) whether HMOs serving rural populations are as likely as plans primarily serving urban populations to achieve full accreditation, again controlling for HMO characteristics.

The relationship between NCQA accreditation and the extent to which an HMO serves rural populations is of policy interest for several reasons. Managed care organizations (MCOs) in competitive health care markets face increasing pressure from large employers to obtain accreditation, and several states require HMOs to undergo accreditation or external quality review as a condition of HMO licensure or as a qualification for serving state employees. State HMO accreditation requirements and employer pressures for HMO accreditation have the potential to affect how many and which types of HMOs enter rural markets. They may promote the expansion of large, nationally affiliated, urban-based HMOs with a long history of accreditation, while creating additional barriers to the development of regionally based HMOs in rural areas. They may limit the ability of nonaccredited plans to market their products to rural employers. State HMO accreditation requirements also may conflict with efforts to expand enrollment of rural Medicaid and Medicare beneficiaries in managed care. MCOs that are not traditional HMOs, including Medicaid plans composed of community-based providers and Medicare provider service organizations, may find it especially difficult to commit the resources needed to attain accreditation.

This study used a logistic regression model to examine the relationship between the rural proportion of an HMO's service area population and the likelihood of the HMO's applying for NCQA accreditation, controlling for HMO size, age, model type, affiliation, federal qualification, Medicare participation, and Medicaid enrollment as a proportion of total enrollment; the number of competing HMOs; the HMO market penetration rate; state HMO accreditation requirements; and census divisions. The relationship between the rural proportion and the likelihood of applying for accreditation is initially positive, increasing from a 39 percent probability of applying for an HMO with no rural service area population to 48 percent for an HMO with a 20 percent rural service area population. The probability of applying for accreditation levels off when the rural proportion is between 20 and 30 percent, and declines in a relatively linear pattern between 30 and 70 percent rural. The probability of applying for accreditation declines more rapidly above 70 percent rural, reaching 0.5 percent for an HMO whose service area population is entirely rural.

Several HMO organizational and market variables, including size, affiliation, federal qualification, age, the HMO market penetration rate, and state HMO accreditation requirements, are significantly and positively related to the likelihood of applying for NCQA accreditation. HMOs with high proportions of Medicaid enrollees are significantly less likely to apply for accreditation. Among HMOs that attain accreditation, the rural proportion of the HMO's service area population is not significantly related to the likelihood of attaining full accreditation versus one-year or provisional accreditation.

These findings raise several rural health policy issues, including: (1) whether HMOs that serve significant rural populations, especially smaller, regionally based HMOs, have the financial and organizational capacity to prepare for and obtain accreditation; (2) whether the accreditation process validly assesses the capacity of HMOs that predominantly serve urban enrollees to provide quality care to rural enrollees; and (3) whether the lower accreditation rates among HMOs with high proportions of their service area populations in rural areas have had any impact on the quality of care received by rural HMO enrollees.

Future research efforts will need to examine the impact of changes in the accreditation process, including the incorporation of audited Health Plan Employer Data and Information Set (HEDIS) data in accreditation scores, on the application rates and accreditation statuses of HMOs serving rural populations. It also will be important to evaluate the impact of state HMO accreditation requirements on the availability of HMOs to serve rural areas and on their relationships with rural providers and enrollees.

INTRODUCTION

The National Committee for Quality Assurance (NCQA) began accrediting managed care organizations (MCOs) in 1991, and approximately half of the HMOs in the country have applied for NCQA accreditation. For most HMOs, the decision to apply for accreditation is voluntary. However, MCOs in competitive health care markets face increasing pressure from large employers to obtain accreditation (Iglehart, 1996; Gosfield, 1997). In addition, nine states require HMOs to undergo accreditation or external quality review as a condition of HMO licensure, and four states require HMOs to be accredited to serve state employees; many of these states have substantial rural populations (Casey, forthcoming).

This paper is the first in a series of three papers that explore the relationship between accreditation and HMOs serving rural areas. This paper specifically explores the relationship between NCQA accreditation and the extent to which an HMO serves rural populations. First, it assesses whether HMOs serving rural populations are as likely to apply for NCQA accreditation as HMOs that primarily serve urban populations, while controlling for the effects of HMO organizational and market area characteristics. Second, the paper examines whether serving rural populations affects the likelihood of an HMO's achieving full accreditation (the highest level of accreditation), again controlling for the effects of HMO characteristics. Subsequent papers will analyze the implications of state HMO accreditation requirements for HMOs serving rural areas, and explore the experiences of a sample of HMOs serving rural areas with NCQA accreditation and the collection and reporting of HEDIS data.

The relationship between NCQA accreditation and the extent to which an HMO serves rural populations is of policy interest for several reasons. State HMO accreditation requirements and employer pressures for HMO accreditation have the potential to affect how many and which types of HMOs enter rural markets. They may promote the expansion of large, nationally affiliated, urban-based HMOs with a long history of accreditation, while creating additional barriers to the development of regionally based HMOs in rural areas. They may limit nonaccredited plans' ability to market their products to rural employers. State HMO accreditation requirements also have the potential to conflict with state and federal efforts to expand enrollment of rural Medicaid and Medicare beneficiaries in managed care. MCOs that are not traditional HMOs, including Medicaid plans composed of community-based providers and Medicare provider service organizations, may find it especially difficult to commit the resources needed to attain accreditation.

BACKGROUND ON THE NCQA ACCREDITATION PROCESS

NCQA evaluates a plan's quality of care systems using accreditation standards in six categories: (1) quality management and improvement (which accounts for 40 percent of a plan's score); (2) physician qualifications and evaluation (credentialing) (10 percent); (3) members' rights and responsibilities (17.5 percent); (4) utilization management (17.5 percent); (5) preventive health services (10 percent); and (6) medical records (5 percent).

During an on-site accreditation survey, an NCQA team composed of physicians and administrators with managed care expertise reviews an MCO's quality-related systems and assesses the extent to which these systems are in compliance with NCQA standards.

Possible accreditation decisions include full (three-year) accreditation, one-year accreditation, provisional accreditation, and denial.

To determine a plan's accreditation status, NCQA uses decision rules that take into account the plan's overall score and points for each category (NCQA, 1997b). For example, to achieve full accreditation, 1997 scoring guidelines required a plan to have an overall score of 85 or above; significant or full compliance on the standard addressing the effectiveness of the HMO's quality improvement program; a minimum of 70 points (of a possible 100) in the quality improvement category; and no major deficiency in any area.

In 1997, NCQA developed a "new health plan" accreditation process for plans that are less than two years old. The new health plan standards are a subset of the regular accreditation standards, without the requirement that a plan have a demonstrated record of quality improvement over time. New health plan accreditation is on a pass/fail basis, with plans that pass receiving two-year accreditation. NCQA also accredits managed behavioral care organizations and is in the process of developing accreditation standards for preferred provider organizations (PPOs).

NCQA is also responsible for the continued development of the Health Plan Employer Data and Information Set (HEDIS), a standardized set of performance measurements designed to provide purchasers and consumers with information to compare the performance of MCOs. HEDIS 3.0 is a set of seventy-one performance measures in eight domains: (1) effectiveness of care; (2) accessibility and availability of care; (3) satisfaction with experience of care; (4) cost of care; (5) stability of the health plan; (6) informed health care choices; (7) use of services; and (8) plan descriptive information (NCQA, 1997a).

In its Accreditation 99 process, NCQA will base 75 percent of a plan's accreditation score on its degree of compliance with NCQA standards and 25 percent of the plan's score on its audited results for a selected set of HEDIS performance measures. The HEDIS measures to be used are childhood and adolescent immunization status, prenatal care in the first trimester, and checkups after delivery (Medicaid and commercial products only); flu shots for elderly (Medicare only); breast cancer screening, cervical cancer screening, advice to smokers to quit, beta-blocker treatment after a heart attack, eye exams for diabetics, and follow-up after hospitalization for mental illness.

Plans may earn one of five accreditation statuses: excellent, commendable, accredited, provisional, or denial. According to NCQA, commendable status will be comparable to the current full accreditation status, and accredited will be comparable to the current one-year category. Excellent is a new category of accreditation "designed to drive improved performance throughout the industry by highlighting the few best performing plans nationwide" (NCQA, 1998a). The new accreditation standards will be applied to surveys conducted after July 1, 1999. In the first year, the HEDIS results will count only if they raise the plan's accreditation status; in 2000, the HEDIS results will count regardless of their impact on accreditation status (NCQA, 1998c).

CONCEPTUAL FRAMEWORK

HMO accreditation is a relatively recent phenomenon, and the literature on the topic consists primarily of historical information about the development of the accreditation process and descriptions of the NCQA accreditation standards. Due to the lack of previous empirical research on HMO accreditation, the conceptual framework for this exploratory study was developed using descriptive information about the HMO accreditation process (Iglehart, 1996;

O'Malley, 1997; Enthoven and Vorhaus, 1997; Gosfield, 1997; Kertesz, 1997, 1998; Interview with C. Sennett, NCQA, February 10, 1998). The framework also draws upon research on managed care in rural areas (Moscovice, Casey, and Krein, 1998) and research on HMO competitive behavior (Wholey, Feldman, and Christianson, 1995; Wholey, Christianson, Engberg, and Bryce, 1997).

HMOs with a high proportion of rural enrollees may be less likely, for several reasons, to seek accreditation than those that are primarily serving urban areas. First, the presence of large employers in an HMO's service area is likely to increase competitive pressures for accreditation. Large employers were actively involved in initial efforts to develop HMO accreditation standards and remain more likely than smaller employers to consider accreditation status as a factor in their health insurance purchasing decisions (Scanlon, 1996). Compared with urban areas, rural areas tend to have fewer large employers (Frenzen, 1993).

Second, in market areas with high HMO penetration, accreditation of competing HMOs has increased competitive pressures on HMOs to seek accreditation (Igelhart, 1996). Rural areas are less likely than urban areas to have large numbers of competing HMOs and high HMO market penetration rates (Moscovice, Casey, and Krein, 1998), and thus will be less likely to experience competitive pressures for HMO accreditation.

Third, IPA model HMOs, which account for 58 percent of HMOs serving rural areas (Moscovice et al., 1998), may be less likely to apply for accreditation. In markets with low HMO penetration, the predominant form of competition for IPA model HMOs may be indemnity insurers rather than other HMOs (Wholey, Feldman, and Christianson., 1995). IPA model HMOs also may find it more difficult than staff, group, network, or mixed models to obtain

accreditation, because of the independent nature of the physician practices that make up IPAs and the less centralized quality assurance programs of IPAs.

Fourth, a large portion of HMO service area expansion to rural counties has occurred since 1994 (Moscovice et al., 1998). HMOs that recently expanded their rural service areas may have delayed applying for accreditation while they developed relationships with rural providers and employers and established their quality assurance programs in those rural areas.

HMOs serving rural areas range from very small HMOs whose enrollment is entirely or predominantly rural to large urban-based HMOs whose rural enrollment is a relatively small proportion of total enrollment. Most HMOs that serve rural areas are based in urban areas and have both urban and rural enrollees (Moscovice et al., 1998). When rural enrollees make up a relatively small proportion of an HMO's total enrollment, the decision to apply for accreditation is likely to be influenced more heavily by characteristics of the urban portions of the HMO's service area, for example, the presence of large employers and higher HMO market penetration. As the rural proportion of enrollment increases, it is likely to have an increasingly negative impact on the likelihood of applying for accreditation, especially when an HMO's rural enrollees begin to outnumber its urban enrollees.

A number of other HMO organizational and market area characteristics, in addition to the extent to which an HMO serves rural areas, may also potentially affect whether an HMO will apply for accreditation and whether it achieves full accreditation. These characteristics include an HMO's size, age, affiliation, federal qualification status, and participation in the Medicare or Medicaid programs, and whether or not the HMO operates in a state with HMO accreditation requirements.

Larger and older HMOs are more likely than smaller and younger HMOs to have a fully developed quality assurance and management information system infrastructure and adequate financial and organizational resources to devote to the accreditation process. The costs of applying for NCQA accreditation are higher on a per-member basis for smaller HMOs. For a full accreditation survey, plans with up to 50,000 members pay a base fee of \$35,000, and plans with more than 50,000 members pay a base fee of \$37,850 plus \$.011 per member above 50,000 (NCQA, 1997c). NCQA explicitly recognizes the role of HMO age in the accreditation process; it requires HMOs to be at least eighteen months old before applying for accreditation, and has developed a “new plan” accreditation process for plans less than two years old.

HMOs that are affiliated with national firms may be more likely to seek and obtain accreditation. National firms have access to capital to invest in information systems and performance monitoring systems (Corrigan, Eden, Gold, and Pickreign, 1997). They can benefit from economies of scale in allocating resources to the accreditation process, and several national firms also have adopted corporate policies encouraging or requiring their affiliated HMOs to become accredited.

HMOs that are federally qualified under the HMO Act of 1973 and those that serve Medicare beneficiaries may be more likely to seek accreditation and obtain full accreditation as a result of their experience meeting federal regulatory requirements. Federally qualified HMOs must have an ongoing quality assurance program that “uses systematic data collection of performance and patient results, provides interpretation of these data to its practitioners, and institutes needed changes” (42CFR417.106). HMOs that serve Medicare enrollees are required to have ongoing quality assurance programs that meet similar requirements (42CFR417.418). As

of January 1, 1997, HCFA also began requiring Medicare managed care plans to report HEDIS measures for their Medicare enrollees (HCFA, 1997b).

The relationship between serving Medicaid beneficiaries and having experience meeting regulatory requirements is less clear. HCFA requires HMOs and prepaid health plans that contract with state Medicaid agencies to have internal quality assurance systems (42CFR434.34), but there are no federal Medicaid requirements regarding reporting of HEDIS measures. As of 1996, eleven states required Medicaid HMOs to report HEDIS measures, and fourteen more planned to require HEDIS reporting in the future (Partridge and Torda, 1997). Many of the Medicaid-dominated and Medicaid-only plans, which constitute a growing percentage of the Medicaid market, are not licensed by states as HMOs. With few or no commercial enrollees, they do not face pressure from employers to seek accreditation, and may have limited resources to devote to the accreditation process (Felt-Lisk and Yang, 1998).

State requirements that HMOs be accredited or undergo external quality review as a condition of licensure will increase the likelihood of accreditation among HMOs operating in those states.

State regulations that allow accredited HMOs to be deemed in compliance with state quality assurance requirements and state contract provisions that require HMOs to be accredited to serve state employees may be additional incentives to seek accreditation (Casey, forthcoming).

STUDY DESIGN

The primary focus of this exploratory study is to determine whether serving rural areas affects the probability that an HMO will (1) apply for NCQA accreditation and (2) obtain full accreditation. The conceptual framework discussed in the previous section suggests that an HMO's decision to apply for NCQA accreditation and the type of accreditation status obtained be modeled as a function of the extent to which an HMO serves rural populations. The framework

also suggests that several HMO characteristics may be associated with the probability of applying for and obtaining accreditation and should be controlled for in the models.

Data

The unit of analysis for this study is the individual HMO. The InterStudy HMO Census contains data on all licensed HMOs operating in the United States, including the HMO's age, location, model type, federal qualification status, and enrollment (total, Medicare, and Medicaid), and counties in the HMO's service area (InterStudy, 1996, 1997). The InterStudy data used in this analysis were reported as of January 1, 1996, except for the service area data, which were reported as of January 1, 1997. The NCQA Accreditation Status List provides the name, location, and accreditation status of all HMOs that have applied for NCQA accreditation. The Accreditation Status List used in this analysis reported HMO's status as of June 30, 1998 (NCQA, 1998b). Individual HMO records from the NCQA and InterStudy databases were matched by HMO name and location.¹ Data from a total of 625 HMOs in the combined InterStudy/NCQA database were included in the analysis.

It is not possible to classify HMOs based on their actual rural enrollment, because the majority of states do not collect county-level commercial HMO enrollment data (Moscovice et al., 1998). Therefore, for the purposes of this study, HMOs were classified according to the proportion of the total population in the HMO's service area that is rural. Rural areas

¹ Forty-one HMOs in the NCQA database did not match with HMOs in the InterStudy database and were excluded from the analysis, including 28 HMOs with an accreditation status and 13 HMOs scheduled for a review. Of the 41 HMOs, 17 are regional affiliates of HMOs that are classified by NCQA as separate entities, but by InterStudy as a single HMO. Thirteen others were identified as Medicaid plans (HCFA, 1997a). As of 1996, there were 144 Medicaid-only and 12 Medicaid-dominated plans nationally (Felt-Lisk and Yang, 1998). Many of these plans are not state licensed as HMOs and are not included in the InterStudy directory. The remaining 11 plans included two plans that were denied accreditation and 9 plans that were scheduled for a review. Inclusion of these 41 plans in the analysis is unlikely to have altered the results of any meaningful way. It may have strengthened the significant positive relationships between applying for accreditation and 1) national affiliation and 2) state HMO accreditation requirements, given the numbers of HMOs in the group that have national affiliations (n=17) and that are located in states with HMO accreditation requirements (n = 18).

were defined as counties located outside of metropolitan statistical areas (MSAs).² The Area Resource File (USDHHS, 1997) provided information on the census division of each HMO and the MSA status and population of each county in the HMO's service area.

Statistical Models

Two logistic regression models were estimated for this study. The first model assessed the effect of the rural proportion of an HMO's service area population and HMO organizational and market area characteristics on the decision to apply for accreditation. The second model assessed the effect of the rural proportion of an HMO's service area population and HMO characteristics on the type of accreditation status achieved by HMOs that receive accreditation.

Dependent Variables

In the first model, the dependent variable was a dichotomous variable indicating whether or not the HMO had applied for NCQA accreditation. HMOs that had an accreditation status of full, one-year, provisional, or denial, as well as those that had accreditation results pending or site visits scheduled, were classified as having applied for NCQA accreditation. As of June 30, 1998, 300 HMOs met this criterion. More than half (162 HMOs) received full accreditation; about one-quarter (76 HMOs) received one-year accreditation; ten HMOs were provisionally accredited; nine HMOs were denied accreditation; and the status of two HMOs was being reviewed due to HMO mergers.³

² The federal Office of Management and Budget defines an area as an MSA if it includes at least one city with 50,000 inhabitants or an urbanized area of at least 50,000 inhabitants and a total metropolitan population of at least 100,000. The rural proportion was calculated by dividing the total population of all non-MSA counties in each HMO's service area by the total population of all counties in the service area.

³ The analysis was based on the HMO's accreditation status at that point in time. An HMO may receive a higher or lower status during subsequent reviews. The 41 HMOs described in note 1 were not included in the analysis because of the lack of InterStudy data.

In the second model, the dependent variable was a dichotomous variable indicating whether the HMO received full accreditation or one-year/provisional accreditation. (The latter categories were combined because only ten HMOs were provisionally accredited, and the time frame for both one-year and provisional accreditation is one year, while full accreditation is for a three-year period.) The 162 fully accredited HMOs were compared with the 86 HMOs with one-year or provisional accreditation. The number of HMOs denied accreditation (9) was quite small, and consequently these HMOs were not included in the second part of the analysis. HMOs that had an accreditation decision pending or an accreditation visit scheduled (41) or whose status was being reviewed (2) were also excluded from this part of the analysis.

Independent Variables

The rural proportion of an HMO's service area population was the independent variable of primary interest in both models. Bivariate analysis indicated that the relationship between the rural proportion of an HMO's service area and the probability of applying for accreditation was not linear; that is, the probability was lower at both low and high rural proportions than it was at moderate levels. Therefore, a squared term for the rural proportion variable was included in the logistic models to allow for the possibility of a nonlinear relationship.

Several additional independent variables were included in the two models, based on the hypothesized relationships described in the conceptual framework for the study and the results of bivariate analyses indicating statistically significant relationships between those variables and the probability of applying for accreditation. Both models included total HMO enrollment and dummy variables for model type (IPA, staff, group, network, or mixed), affiliation (national, Blue Cross and Blue Shield, or local), and federal qualification (yes/no). In the first model, HMOs were categorized as less than two years, two to five years, and more than five years old.

The two younger categories were combined in the second model because of the very small number of accredited HMOs in the youngest category.

Larger HMOs, older HMOs, non-IPAs, national affiliates, and federally qualified HMOs were expected to be more likely to apply for accreditation. The conceptual framework for the study suggested that age should be defined as a categorical variable, because of the NCQA requirement that HMOs be operating for a minimum of eighteen months to apply for accreditation and the expectation that the first two to five years of operation would be a critical period for a new HMO to fully develop its quality assurance and management information infrastructure. Descriptive analysis of the relationship between application for accreditation and HMO age supported the choice of these age categories.⁴

The conceptual framework for the study suggested that participation in the Medicare program would increase the likelihood of applying for accreditation, because of HMOs' experience meeting federal Medicare regulations. It also suggested that status as a Medicaid-dominated or Medicaid-only HMO would decrease the likelihood of applying, because of lack of demand for accreditation from employers and lack of financial resources. The influence of Medicare and Medicaid participation is complicated, however, because HMOs that serve Medicare enrollees may also serve Medicaid enrollees. In addition, HMOs that serve Medicaid enrollees may or may not also serve commercial enrollees.

A descriptive analysis was conducted of the NCQA application rates of four groups of HMOs: (1) those that serve neither Medicaid nor Medicare enrollees; (2) those that serve Medicaid, but not Medicare, enrollees; (3) those that serve Medicare, but not Medicaid,

⁴Although some HMOs were younger than 18 months old as of January 1996, when the InterStudy data were collected, all the HMOs in the analysis were at least 18 months old and therefore eligible to apply for NCQA accreditation as of June 30, 1998, the date of the NCQA accreditation status data used in the analysis.

enrollees; and (4) those that serve both Medicaid and Medicare enrollees. The analysis revealed much lower rates for the first two groups, compared to the last two groups. These results suggested that participation in the Medicare program would be a significant predictor of NCQA application, whether or not the HMO participates in Medicaid. Therefore, the Medicare variable included in the models was a dummy variable indicating whether the HMO participates in the Medicare program. To assess the influence of Medicaid enrollment in relation to commercial enrollment, the Medicaid variable included in the models was a continuous variable measuring an HMO's Medicaid enrollment as a proportion of its total enrollment.

The first model also included the HMO market penetration rate and the average number of competing HMOs in each HMO's service area. The HMO market penetration rate (defined as the proportion of the total population enrolled in all HMOs) and the average number of competing HMOs in each HMO's service area have been used as competition measures in previous research on HMOs (Wholey, Feldman, and Christianson, 1995; Wholey, Christianson, and Feldman, 1997).⁵ Both variables were expected to be positively related to the likelihood of applying for accreditation, but were not expected to strongly affect the level of accreditation achieved, and thus were not included in the second model.

A state HMO accreditation requirement dummy variable (yes/no) was included in both models. Based on analysis of state regulations and interviews with state officials (Casey, forthcoming), Florida, Pennsylvania, Rhode Island, and Oklahoma were classified as states with

⁵The HMO penetration rate was calculated by first prorating each HMO's enrollment over the counties served by the HMO in the same proportion as county population; then creating county HMO penetration rates by dividing total HMO enrollment in each county by its population; and then using a weighted average of the county-level penetration rates over all counties where each HMO operates. The average number of competing HMOs variable was constructed in a similar manner to the HMO penetration rate variable, using a weighted average of the number of HMOs operating over the counties served by the HMO. See Wholey, D., Feldman, R. and Christianson, J. (1995).

HMO accreditation or external quality review requirements prior to 1997.⁶ Because many HMOs operate in multiple states, HMO service area data from InterStudy (1997) were used to identify all of the states in which each HMO operates. HMOs that operated in any of the four states with a pre-1997 requirement were classified as being subject to a state HMO accreditation requirement.

Census division dummy variables were also included in both models, because of differences in health care delivery across regions of the country and because previous research found significant regional differences among HMOs in HEDIS quality measures (Thompson, Bost, Ahmed, Ingalls, and Sennett, 1998).

Table 1 describes the organizational and market area characteristics of HMOs that have applied for accreditation and those that have not applied. On average, HMOs that have applied have a smaller proportion of their service area population in rural areas, and Medicaid enrollment is a smaller proportion of their total enrollment. Applicant HMOs are larger and older than nonapplicants; they also are more likely to be federally qualified, have national affiliations, and serve Medicare enrollees. Table 2 shows the distribution of all HMOs by the independent variable of primary interest, the rural proportion of the HMO's service area population. Correlation coefficients were generally below .20 for the independent variables used in the models, thus multicollinearity was not a problem.

⁶South Carolina also has an HMO accreditation requirements; however, a number of HMOs in the state are relatively new and not yet subject to the requirement. The New Jersey and West Virginia requirements were implemented in 1998. Kansas and Nevada require external quality reviews using state standards.

Table 1

HMO Organizational and Market Area Characteristics by NCQA Application Status

	HMOs That Have Applied For Accreditation (n=300)			HMOs That Have Not Applied for Accreditation (n=325)		
	N	Mean	Std Dev	N	Mean	Std Dev
Rural proportion of HMO service area population	299	.124		321	.169	.215
Total enrollees	300	154,486	337,398	325		88,913
HMO age (years)	300	13.51	7.75	325	7.87	9.13
HMO market penetration rate	297	.314	.119	311	.261	.128
Competing HMOs in service area	297	12.25	5.16	311	11.74	5.73
Federally qualified	300	.610		325	.262	
For-profit	300	.73		325	.74	
IPA model	300	.53		325	.54	
Mixed model		.31			.27	
Network model		.06			.13	
Group model		.07			.03	
Staff model		.02			.03	
National affiliation	300	.59		325	.41	
Local affiliation		.26			.49	
Blue Cross Blue Shied affiliation		.16			.10	
Serves Medicare enrollees	300	.48		325	.18	
Medicaid enrollment as proportion of total enrollment	300	.069	.152	325	.171	.331
State law requiring accreditation	300	.167		325	.068	
E No Central Census Division	300	.20		325	.19	
So Atlantic Census Division		.21			.15	
Med Atlantic Census Division		.13			.11	
Pacific Census Division		.10			.07	
W So Central Census Division		.09			.11	
Mountain Census Division		.08			.10	
W No Central Census Division		.07			.10	
E So Central Census Division		.03			.10	
New England Census Division		.08			.05	

Table 2

**Distribution of HMOs by Rural Proportion of HMO Service Area Population
(n=620 HMOs)**

Rural Proportion of HMO Service Area Population	Number of HMOs	Percent of HMOs
0%	158	25.5%
.01 – 10%	177	28.5%
10.01 – 20%	103	16.6%
20.01 – 30%	81	13.1%
30.03 – 50%	65	10.5%
50.01 – 70%	26	4.2%
>70%	10	1.6%

Limitations

A limitation of the current study, and all research on HMOs serving rural areas, is the lack of data on actual rural HMO enrollment. Using the rural proportion of an HMO's service area population, as in this study, is preferable to using the number of rural counties in an HMO's service area, because rural counties vary considerably in population across states and regions of the country. A rural county may have a greater proportion of an HMO's service area population than its proportion of actual enrollment. However, measuring the rural proportion at the HMO service area level minimizes the potential impact of county level differences in service area population and actual enrollment on the analysis. Another potential limitation of the study is the lack of data from other organizations that accredit managed care organizations. However, available evidence indicates that the number of HMOs accredited by organizations other than NCQA is small (Iglehart, 1996; Casey, forthcoming).

Data were not available to directly measure the extent to which an HMO's enrollment is through contracts with large employers. However, HMO size and the rural proportion of an HMO's service area population are likely to be correlated with employer size; for example, large HMOs with predominantly urban service area populations are likely to have a larger percentage of enrollees through contracts with large employers.

RESULTS

The results of the logistic regression on application for NCQA accreditation (Table 3) indicate that the overall model does a good job of describing the association between the independent variables and the probability of application for accreditation (chi-square = 252.77, $p < .00001$, pseudo $R^2 = .3025$). The odds ratio is the ratio of the odds for an HMO with a given characteristic (such as federal qualification) of applying for accreditation as opposed to not

Table 3

**Logistic Regression Model: HMO Has Applied for NCQA Accreditation or Not
(n=603 HMOs)**

Independent Variables	Odds Ratio	Std. Err.
Rural proportion of HMO service area population	30.74	64.98
Rural proportion of HMO service area population squared*	0.00025	0.001
Federal qualification**	1.994	0.448
Enrollment/10,000**	1.040	0.014
Blue Cross Blue Shield affiliation ¹	1.559	0.513
National affiliation ¹ *	1.826	0.461
Age > 2 to 5 years ² **	8.017	4.74
Age > 5 years ² **	13.475	7.19
Medicare participation	1.527	0.384
Medicaid enrollment/total enrollment (percent)**	0.986	0.005
Mixed model ³	0.813	0.202
Staff model ³	0.584	0.343
Group model ³	2.290	1.285
Network model ³	1.727	0.739
Average number of competing HMOs	0.983	0.027
Average HMO market penetration (percent)*	1.024	0.010
State HMO accreditation requirement*	2.420	0.950
New England ⁴	1.896	1.206
Mid Atlantic ⁴	1.465	0.871
E No Central ⁴	2.402	1.257
W No Central ⁴	1.454	0.835
So Atlantic ⁴	1.971	1.079
W So Central ⁴	1.122	0.639
Mountain ⁴	1.088	0.639
Pacific ⁴	0.751	0.445

Log Likelihood = -291.48
 Chi²(25) = 252.77
 Prob > chi² = 0.0000
 Pseudo R² = .3025

¹Omitted category is local
²Omitted category is age 2 years or less
³Omitted category is IPA model HMO
⁴Omitted category is East South Central Census Division

** p<.01
 *p<.05

applying, to the corresponding odds for an HMO without that characteristic. In Table 3, an odds ratio less than 1.0 indicates a negative relationship between the probability of applying for accreditation and the independent variable in the first column, and an odds ratio above 1.0 indicates a positive relationship.

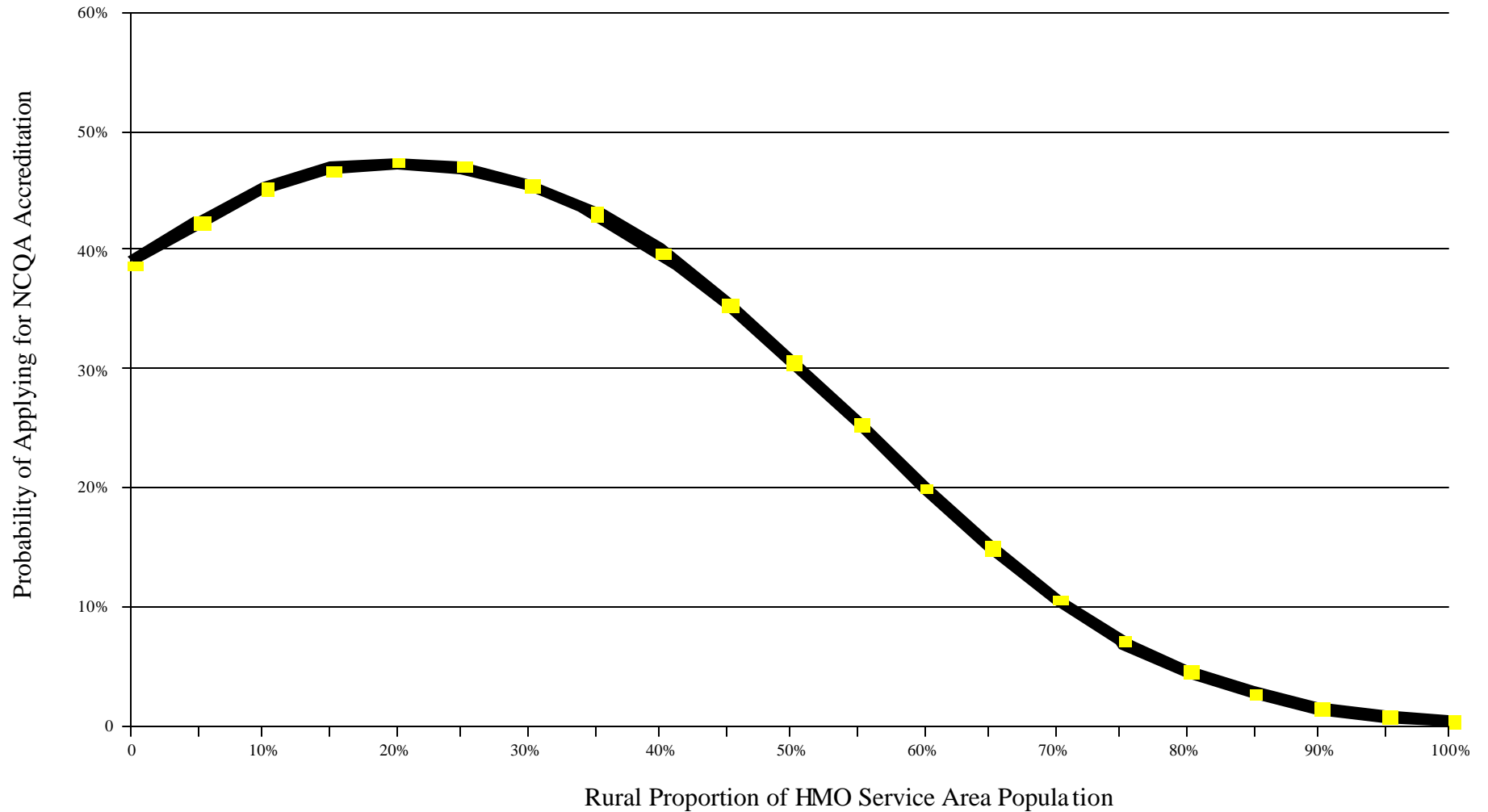
Table 3 shows that there is a statistically significant ($p < .05$) negative relationship between the rural proportion of an HMO's service area population (squared term) and the probability of applying for NCQA accreditation, controlling for several HMO organizational and market characteristics, including HMO size, age, model type, affiliation, federal qualification, Medicare participation, and Medicaid enrollment as a proportion of total enrollment; the number of competing HMOs; the HMO market penetration rate; state HMO accreditation requirements; and census divisions.

The probability of applying for NCQA accreditation was calculated for rural proportion values ranging from zero to 100 percent, holding the other HMO organizational and market characteristics in the model constant at their mean values (Figure 1). The relationship between the rural proportion and the likelihood of applying for accreditation is initially positive. The probability of applying for accreditation increases from 39 percent for an HMO with no rural service area population to 48 percent for an HMO with a 20 percent rural service area population. The probability of applying for accreditation levels off when the rural proportion is between 20 and 30 percent, and has a relatively linear decline between 30 and 70 percent rural. The probability of applying for accreditation declines more rapidly above 70 percent rural, reaching 0.5 percent for an HMO whose service area population is entirely rural.

It is not clear why the relationship between the rural proportion of an HMO's service area population and the likelihood of applying for accreditation is initially positive. The model may

Figure 1

Probability of Applying for NCQA Accreditation by Rural Proportion of HMO Service Area Population¹



¹The probability is calculated holding the following HMO organizational and market characteristics constant at their mean values: Federal qualification, Medicare participation, age categories, Medicaid enrollment as a proportion of total enrollment, size, affiliation, model type, HMO market penetration rate, average number of competing HMOs, state HMO accreditation requirements, and census division.

be failing to account for one or more organizational or market area characteristics of HMOs with low rural proportions that influence the decision to apply for accreditation, for example, the types of employers in those areas. The leveling off of the probability of application between 20 and 30 percent rural and its relatively linear decline thereafter are consistent with the conceptual framework for the study, which suggested that increases in the rural proportion of HMO enrollment are likely to have an increasingly negative impact Figure 1 on the likelihood of applying for accreditation, especially after the rural proportion exceeds the urban proportion.

Other results of interest are the statistically significant relationships between applying for accreditation and several HMO organizational and market area characteristics (Table 3). The two age variables, federal qualification, and enrollment are significant ($p < .01$) and positive. The national affiliation, HMO market penetration rate, and state HMO accreditation requirement variables are also positive, and significant at $p < .05$. Medicaid enrollment as a proportion of total enrollment has a significant ($p < .01$) negative relationship with applying for accreditation. These relationships are all consistent with the conceptual framework for the study.

For the categorical variables (age, federal qualification, national affiliation, and state accreditation requirements), the odds ratios in Table 3 indicate the likelihood of applying for accreditation for the category or categories of HMOs included in the model, as compared to the omitted category. For example, compared to HMOs aged two years or under, HMOs between two and five years old are eight times as likely to apply for NCQA accreditation, and HMOs over five years old are more than thirteen times as likely to apply.

For the continuous independent variables, enrollment, HMO market penetration rate, and Medicaid enrollment as a percentage of total enrollment, the marginal probability of applying for accreditation was calculated for each unit increase in the independent variable. On average, the

probability of applying for accreditation increases 0.6 percent with each 10,000 increase in enrollment. It increases 0.4 percent for each one percent increase in the HMO market penetration rate. The probability of applying for accreditation decreases 0.2 percent with each one percent increase in the proportion of Medicaid enrollment.

Table 4 presents the results of the second logistic regression, which compares HMOs that are fully accredited with those that have one-year or provisional accreditation. The results indicate that the overall model does not explain the relationship between the independent variables and the probability of obtaining full accreditation very well (chi-square = 26.66, $p > 0.22$, pseudo $R^2 = 0.0838$). The rural proportion of an HMO's service area population is not significantly related to the likelihood of obtaining full accreditation versus one-year or provisional accreditation.

The lack of significant results for the second model indicates either that the model failed to identify the relevant HMO or other characteristics that are significantly related to accreditation status or that HMOs with full accreditation status do not differ significantly from those with one-year or provisional accreditation. An analysis of accreditation status over time might reveal more significant differences among HMOs, (e.g., plans that obtain full accreditation in their initial application may differ from those that initially obtain a lower accreditation status, and then obtain full accreditation upon subsequent review).

The proportion of accredited HMOs achieving full accreditation has increased since NCQA began accrediting HMOs, and HMOs with full accreditation now constitute a majority of accredited HMOs (Interview with C. Sennett, NCQA, February 10, 1998). The increase in the proportion of fully accredited HMOs may reflect HMOs' growing familiarity and experience with the accreditation process or improvement in accredited HMOs' quality of care systems.

Table 4

**Logistic Regression Model: HMO Has Full Accreditation
Or One-year/Provisional Accreditation Status
(n=247)**

Independent Variables	Odds Ratio	Std. Err.
Rural proportion of service area	0.290	0.807
Rural proportion of service area squared	2.446	14.207
Federal qualification	1.164	0.363
National affiliation ¹	1.721	0.646
Blue Cross Blue Shield affiliation ¹	1.793	0.852
Enrollment/10,000	0.996	0.004
Age > 5 years ²	0.536	0.346
Medicare participation*	2.160	0.720
Medicaid enrollment as portion of total enrollment (percent)*	0.103	0.011
Mixed model ³	0.946	0.202
Staff model ³	1.764	2.209
Group model ³	1.712	1.190
Network model ³	1.435	1.090
State HMO accreditation requirement	0.717	0.301
New England ⁴	1.032	0.957
Mid Atlantic ⁴	0.931	0.851
E No Central ⁴	1.321	1.156
W No Central ⁴	0.502	0.462
So Atlantic ⁴	1.156	1.007
W So Central ⁴	2.542	2.507
Mountain ⁴	2.645	2.848
Pacific ⁴	1.315	1.255

Log Likelihood = -145.67
 Chi²(25) = 26.66
 Prob > chi² = 0.2244
 Pseudo R² = 0.0838

¹Omitted category is local
²Omitted category is HMOs <5 years old
³Omitted category is IPA model HMO

*p<.05

NCQA apparently has recognized that the current full-accreditation status fails to adequately differentiate among fully accredited plans, as evidenced by its decision to add the new accreditation status of *Aexcellent* in 1999.

DISCUSSION AND CONCLUSIONS

The NCQA application process requires a significant commitment from an HMO, in terms of application fees, expenses, and staff time preparing for and participating in the accreditation survey. In addition, an HMO must weigh the risks of potential negative publicity and possible contract cancellations by employers if it receives an unfavorable accreditation decision. Consequently, one would expect HMOs that voluntarily apply for accreditation to possess characteristics that make them reasonably confident that they will achieve accreditation if they apply.

The results of this study indicate that NCQA applicants do, in fact, differ significantly from nonapplicants on several HMO organizational and market area characteristics. The significantly lower probability of applying for accreditation among HMOs with higher proportions of their service area populations in rural areas raises several rural health policy issues. For example, do HMOs with a majority of rural enrollees and HMOs that primarily serve urban enrollees evaluate the costs and benefits of applying for accreditation in different ways? Do HMOs that serve large proportions of rural enrollees, especially small, regionally based HMOs, have sufficient financial and organizational resources to prepare for the accreditation process? Are there specific HMO accreditation standards that HMOs serving rural areas find more difficult to meet? Does the accreditation process validly assess the capacity of HMOs with predominantly urban enrollment to provide quality care to rural enrollees? Have the lower

accreditation rates among HMOs with high proportions of their service area populations in rural areas had any impact on the quality of care received by rural HMO enrollees?

To further explore the relationship between HMOs serving rural areas and accreditation, two related projects are currently underway at the University of Minnesota Rural Health Research Center. The first project is an analysis of the rural implications of state HMO accreditation and external quality review requirements, and the second project involves a series of interviews with HMOs that serve rural areas about their decision making and experiences regarding NCQA accreditation and collection of HEDIS data.

The NCQA Accreditation '99 standards require all HMOs applying for accreditation to submit externally audited data on selected HEDIS measures. The audited HEDIS results will count as 25 percent of a plan's accreditation score. This requirement will be a major change for the majority of HMOs, as only 20 percent of the HMOs that submitted 1996 HEDIS data to NCQA reported undergoing external audits of their data prior to submission (Thompson et al., 1998).

It will be important to assess the impact of incorporating HEDIS data in the accreditation process on the application rates and accreditation statuses of HMOs serving rural areas, especially smaller plans that do not have enough eligible members to meet sample size requirements for some HEDIS measures. NCQA's analysis of the 1996 HEDIS data revealed significant variation across plans and regions of the country on seven HEDIS clinical measures that will be incorporated into the Accreditation '99 scoring process (Thompson et al., 1998). The new accreditation scoring system initially will incorporate regional differences, but NCQA's goal is to transition to using only national benchmarks in three to five years (NCQA, 1998a).

Finally, it will be important to evaluate the rural impact of state requirements for HMOs to apply for or obtain accreditation as a condition of gaining HMO licensure or serving public employees. Issues that should be addressed include whether these requirements are a barrier to HMO entry into rural markets and what is the impact of the requirements on implementation of state and federal policy initiatives designed to promote managed care enrollment among rural Medicaid and Medicare beneficiaries and public employees.

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