RURAL PHYSICIANS AND HMOs: AN UNEASY PARTNERSHIP

Anthony Wellever, M.P.A.
Michelle Casey, M.S.
Sarah Krein, R.N., B.S.N.
Barbara Yawn, M.D., M.Sc.
Ira Moscovice, Ph.D.

Rural Health Research Center
Institute for Health Services Research
School of Public Health
University of Minnesota

Working Paper #17

December 1996

Support for this paper was provided by the Office of Rural Health Policy, Health Resources and Services Administration, PHS Grant No. 000003-04-0. The authors express appreciation for the comments and assistance provided by Jon Christianson and Willard Manning.

TABLE OF CONTENTS

ABSTRACT

This study uses data obtained by a telephone survey of 1200 rural physicians in Minnesota and Oklahoma to examine rural physician experiences with and attitudes toward health maintenance organizations (HMOs). Minnesota was selected to represent a state with a high rate of HMO enrollment and Oklahoma was selected to represent a state with a low rate of HMO enrollment. The physician sample was composed of 400 rural primary care physicians and 200 rural specialists per state.

The rural physicians in our study report that they participate in HMO arrangements primarily to preserve market share. Fee-for-service and discounted fee-for-service are the most common payment forms for rural physicians with HMO contracts in these two states. Capitation and salary arrangements are used less frequently, although they are more common in Minnesota than in Oklahoma. Withholding a portion of the provider payment as a hedge against year-end losses is also more common in Minnesota than in Oklahoma. When providers do have withhold provisions in their contracts, the proportion of the payment withheld is similar in both states.

Rural physicians who have provider contracts with HMOs have more favorable opinions of HMOs than those who do not. Rural primary care physicians have significantly more favorable opinions of HMOs than do rural specialists. Rural physicians in Minnesota report more favorable overall opinions of HMOs than those in Oklahoma. Despite variations in rural physician attitudes about HMOs among subgroups, the findings suggest that the opinions of rural physicians toward HMOs in the two states studied are essentially negative.

The results of this study indicate that the HMO-related attitudes and experience of rural physicians resemble those of urban physicians. Rural physicians participate in HMO arrangements for much the same reasons, and they have similar attitudes about HMOs. Their dislike of HMOs, however, does not appear to have affected meaningfully the willingness of rural physicians to participate in HMO arrangements. Rural physicians may accept HMOs as an environmental fact of life, one they might prefer did not exist but, equally, one they know they must tolerate.

INTRODUCTION

Both market-based health system reform and federal and state efforts to reform the Medicare and Medicaid programs rely heavily on expanded use of managed care arrangements. These arrangements are expected to control health care costs while maintaining or improving access to health care services. Much of the research conducted to date on physician participation in and attitudes toward managed care has focused on urban physicians (e.g., Goldberg and Martin, 1989; Kohrman, 1986; Kralewski, Feldman, and Gifford, 1992; Scheckler and Schulz, 1987; Schulz, Scheckler, Girard, and Barker, 1990; Schulz, Girard, and Scheckler, 1992; Scheckler, Schulz, and Moberg, 1994). Whether the results of these urban physicians studies can be generalized to rural physicians is not known; yet, understanding the behavior, attitudes, and motivations of rural physicians with regard to managed care is vital to designing successful health system reforms in rural areas.

The purpose of this study is to examine rural physician participation in and attitudes toward HMOs in two states with different HMO penetration and experience. Using data collected in a telephone survey of rural primary care and specialist physicians, the study attempts to answer the following research questions:

1. ***Nature and extent of HMO arrangements.***

   - What do rural physicians in Minnesota and Oklahoma report as the payment and risk arrangements that exist between them and HMOs?

   - Do physicians report different arrangements in a state with high HMO penetration compared to a state with low HMO penetration? (HMO penetration is the ratio of HMO enrollees to population for a given geographical area.)

2. ***Factors influencing participation.***

   - What factors influence the decisions of rural physicians to participate in HMOs?

3. ***Attitudes among subgroups.***

   - Are there differences in attitudes about HMOs between rural physicians with HMO contracts and those without HMO contracts?
   - Between rural primary care physicians and rural specialists?
   - Between rural physicians in a high-penetration state and a low-penetration state?

Physicians who have little or no experience with HMOs are reported to have more negative attitudes about them than physicians who have greater experience with HMOs (Schulz et al., 1990). This premise suggests that, as a group, rural physicians are likely to have somewhat more negative opinions about HMOs than urban physicians, because many rural physicians have little or no experience with HMOs. The actual rate of HMO penetration in rural areas nationally is not known at this time, but it is apt to be a fraction of the urban rate. Ricketts, Slifkin, and Johnson-Webb (1995) analyzed the Group Health Association of America's 1993 *National Directory of HMOs* and reported that 61 percent of rural counties were served by at least one HMO in 1992. Self-reported service areas, however, do not accurately depict the availability of HMOs in rural areas, because they fail to identify the counties in which HMOs have developed provider networks sufficient to care for their enrollees.

Christianson and Wholey (1995) defined the service area of an HMO more narrowly to include only those counties in which an HMO has an agreement with at least one physician to provide services to the HMO's enrollees. Analyzing InterStudy survey data from 1991, Christianson and Wholey found that, using this definition, only 38 percent of rural counties were served by HMOs. Even this more conservative estimate likely overstates the number of rural counties served by HMOs, because some plans that sell both HMO and traditional health insurance products may use a single provider contract (e.g., IPA-model HMOs operated by Blue Cross plans). Despite the existence of an "HMO arrangement" with a physician in a county, the HMO may have no enrollees in the county and may not have made an effort to market its HMO products to employers and residents of the county. Therefore, the best measure of HMO penetration in rural areas is not the proportion of rural counties served by HMOs but the proportion of rural HMO enrollees compared to the total rural population.

Rural physicians in states with smaller overall HMO enrollment rates are likely to have more negative opinions about HMOs than rural physicians in states with larger overall HMO enrollment rates. However, because rural penetration rates are low even in states with high overall enrollment rates, the attitudes of rural physicians toward HMOs generally are likely to be somewhat negative.

Because rural HMO penetration is low, few empirical studies of HMOs have focused exclusively on rural areas. Although most HMO studies do not include a rural component, several hypotheses about rural physician experience with and attitudes

about HMOs may be suggested by urban studies and by the small number of rural HMO studies. Some of these studies are summarized below.

Maintaining or increasing the number of patients treated appears to be a major inducement for urban physician participation in HMOs, a motive that may be linked to a desire to maintain or increase one's income (Rosenbach, Harrow, and Hurdle, 1988; Schulz et al., 1990; Ahern, 1993). The willingness of rural residents to travel for care suggests that rural physicians may be subject to competitive pressures similar to those of their urban counterparts, and may be induced to join HMOs to preserve their market share of patients (Bronstein and Morrisey, 1990: Adams, Houchens, Wright, and Robbins, 1991). Wholey, Christianson, and Sanchez (1993) suggest that both financial and autonomy considerations play an important role in a rural physician's decision to participate in an HMO, with physicians accepting a reduction in their autonomy in exchange for access to greater numbers of patients.

Managed care plans typically pay physicians on a salary, capitation, or fee-for-service (FFS) basis. In addition, many plans include risk-sharing, bonus arrangements, or both in their compensation packages to encourage cost-conscious behavior by physicians (Gold, Nelson, Lake, Hurley and Berenson, 1995). Christianson, Wellever, Hamer and Knutson (1996) report the compensation methods used by HMOs to pay rural physicians based on a 1995 national survey of all HMOs with rural physician contracts. The most common methods cited by the HMO respondents were discounted fee-for-service based on a fee schedule and discounted fee-for-service with a percentage withheld and distributed at the end of the contract

year as defined in the terms of the contract. Substantially fewer HMOs contracting with rural physicians made capitated payments to a physician group or individual practice association (IPA), or directly to primary care physicians.

Christianson, Shadle, Hunter, Hartwell and McGee (1986) hypothesize that negative attitudes toward managed care may be prevalent among rural physicians because of a) their strong preferences for independent practice, and b) their lack of firsthand knowledge about HMO participation. By inference, it may be hypothesized that rural physicians in larger, more organized practices may be more favorably disposed toward HMOs than solo practitioners, and that physicians with more HMO experience may have more favorable attitudes than physicians with little or no experience with HMOs.

Recent studies in urban and mixed urban and rural areas suggest that physicians' attitudes toward managed care may be influenced by physician specialty, practice setting, the type of managed care model, and the extent of the physician's experience with managed care. In general, primary care physicians have been found to have more positive attitudes toward managed care than specialists (Ellsbury and Montano, 1990; Ellsbury, Montano, and Kraft, 1990; Schulz et al., 1990; Schulz et al., 1992), although Ahern (1993) reached the opposite conclusion. Attitudes have also been found to vary among different types of specialists (Ellsbury et al., 1990).

Physicians in group practices have significantly more positive attitudes toward managed care than their counterparts in solo practices (Ellsbury and Montano, 1990). However, Baker and Cantor (1993) did not find a clear relationship between physician

satisfaction and managed care affiliation, either among self-employed physicians or among physicians who work for other employers.

Experience with managed care has been related to positive attitudes about managed care among the same group of physicians over time (Scheckler and Schulz, 1987; Schulz et al., 1990; Schulz et al., 1992; Scheckler et al., 1994). Physicians with more patients in managed care plans and more years of experience with these plans have also been found to have more positive attitudes than those with fewer patients and less experience (Ellsbury and Montano, 1990; Ellsbury et al., 1990).

These studies, although conducted primarily in urban or predominantly urban settings, can serve as a source of speculation about rural physician participation in and attitudes toward managed care arrangements. The results of the studies suggest that rural physicians are less likely than urban physicians to contract with HMOs; that when they do contract with HMOs, they are apt to participate in IPA model plans that use FFS payments as the chief method of reimbursement; and that the percent of rural patients who are HMO enrollees is relatively small. These studies also suggest that rural physicians join HMOs primarily to avoid losing patients or to obtain more patients; that primary care physicians and physicians in group practices have more favorable attitudes about HMOs than do specialists and solo practitioners; and that greater experience with HMOs correlates with more positive attitudes about HMOs.

We tested these hypotheses by surveying rural primary care and specialist physicians in two states. This study differs from previous ones in two ways. First, it focuses exclusively on rural physicians and takes into account the effect of HMO

penetration rates on experience and satisfaction with HMOs. Second, unlike previous studies of HMO-physicians payment arrangements, the rural physician is the unit of analysis, not the HMO.

METHODOLOGY

Selection of the Survey States

To examine the relationship of HMO penetration rates on physician behavior and attitudes, rural physicians from two states were selected for the survey, one state with a high HMO penetration rate (Minnesota: 26.2 percent overall rate; 4.0 percent rural rate), and one with a low rate (Oklahoma: 7.1 percent overall; 0.7 percent rural rate) (Minnesota Department of Health, 1996; Oklahoma Health Care Initiatives, 1995). Although statewide HMO penetration rates can be calculated using a number of sources, Minnesota and Oklahoma are among only eight states that collect data sufficient to calculate rural HMO penetration rates (University of Minnesota Rural Health Research Center, 1996). Information about the HMOs licensed in these two states is summarized in **Table 1**.

Sample and Survey

To select the physician sample for the survey, we obtained lists of all currently licensed physicians in the two states from the Oklahoma State Board of Medical Licensure (for MDs), the Oklahoma Board of Osteopathic Examiners (for DOs), and from the Minnesota Department of Health (for both MDs and DOs). We also obtained HMO provider lists from the state health departments in Oklahoma and Minnesota.

Table 1

HMOs Licensed in Minnesota and Oklahoma, 1995

	Enrollment
Minnesota[1]	
Blue Plus	70,168
First Plan HMO	10,013
Group Health, Inc.	135,019
Health Partners	226,961
Mayo Health Plan	4,218
Medica	564,598
Metropolitan Health Plan	31,030
Northern Plains Health Plan	N/A
NWNL Health Network, Inc.	41,611
UCare Minnesota	39,045
Oklahoma	
CIGNA HealthCare of Oklahoma: Tulsa	2,423
CIGNA HealthCare of Oklahoma: Oklahoma City	4,899
Community Care Oklahoma's HMO	15,722
Blue Lincs HMO	28,890
PacifiCare Health Systems, Oklahoma City and PacifiCare Health Systems, Tulsa[2]	126,943
PruCare of Oklahoma City	41,019
PruCare of Tulsa	33,932
Foundation Health	N/A

[1] Central Minnesota Group Health Plan, which was previously licensed as an HMO, became a Community Integrated Service Network effective January 1, 1995. MedCenters Health Plan merged into Health Partners effective January 1, 1995.

[2] PacifiCare Health Systems, Oklahoma City and PacifiCare Health Systems, Tulsa are licensed separately but their enrollment statistics are combined for InterStudy reporting.

Source: InterStudy, 1995; Minnesota Department of Health, 1996; Oklahoma Health Care Initiatives, 1995.

From the physician lists, we eliminated all physicians with primary practice addresses located in metropolitan area counties, and those employed by the state or federal government (e.g., in settings such as state correctional institutions, state mental health centers, and Indian Health Service facilities). Physicians with specialties that are typically based in hospitals (e.g., radiology and anesthesiology) were also excluded.

The remaining physicians were grouped by specialty into primary care physicians (defined as general practice, family practice, general internal medicine, and general pediatrics) and specialists (defined as all other specialties, except those which were excluded as described above). The lists of rural primary care physicians and specialists were then matched with HMO provider lists from their respective states. This allowed us to assign physicians in each state to one of four groups:

1) rural primary care physicians participating in one or more HMOs
2) rural primary care physicians who are not participating in any HMOs
3) rural specialists participating in one or more HMOs
4) rural specialists who are not participating in any HMOs

Initially, we planned to survey 400 primary care physicians and 200 specialists in each state, with each group divided evenly between those who participated in HMOs and those who did not. These sample sizes would be sufficient to distinguish mean differences of not less than +/- 5 percent with 95 percent confidence for a) cross-state comparisons of primary care physicians, and b) group comparisons of specialists and primary care physicians. As **Table 2** indicates, Minnesota did not have a sufficient number of specialists or primary care physicians who do *not* participate

Table 2

Rural Physician Sample by State, Specialty, and HMO Participation

	Primary Care		Specialists	
	In HMO	Not In HMO	In HMO	Not In HMO
Minnesota				
Sample Size	368	84	173	42
Surveys Completed	322	78	160	40
Response Rate	88%	93%	92%	95%
Oklahoma				
Sample Size	127	342	71	154
Surveys Completed	104	296	61	139
Response Rate	82%	87%	86%	90%

Overall Response Rate: 88%

an HMO, and Oklahoma did not have a sufficient number of specialists or primary care physicians who *do* participate in an HMO to carry out that plan. Consequently, the sampling frame for the survey was revised to include all rural primary care physicians (n = 84) and specialists (n = 42) in Minnesota who do not participate in an HMO, and all primary care physicians (n = 127) and specialists (n = 71) in Oklahoma who do participate in an HMO, complemented by sufficient numbers of additional primary care physicians and specialists to achieve the desired number of physicians in each group (i.e., 400 primary care physicians and 200 specialists per state). **Table 2** displays the sample size and response rates by state, specialty, and HMO participation.

To maximize response rates, the survey was designed as a telephone survey that could be administered in approximately 15 minutes. Respondents were asked to verify that the information regarding their HMO provider contracts was correct, and were then asked a series of questions regarding their experience with HMOs, factors affecting their decision to participate in an HMO, attitudes toward managed care, and physician and practice characteristics. Primary care physicians and specialists were asked the same questions, except for questions relating to the HMO's use of case managers/gatekeepers. The survey instrument for the study was pre-tested on a sample of 20 Minnesota primary care and specialist physicians. The survey was conducted during the period October through December of 1995 by the Survey Research Center of the Institute for Health Services Research, University of Minnesota. An overall response rate of 88 percent was achieved.

Multivariate Model and Statistical Procedures

Initial analysis involved the use of chi-square and t-tests to examine differences in attitudes across various groups (e.g., primary care physicians versus specialists) as well as the relationship between attitudes and physician or practice characteristics. A multivariate model was then developed to investigate the effect of experience with HMOs on physician attitudes while controlling for factors such as a) the physician's satisfaction with medical practice, b) specialty type, and c) physician's age.

The dependent variable in the model was the overall opinion of the effect (or likely effect, for physicians without contracts) of HMOs on a rural physician's practice. This was measured on a five-point Likert scale ranging from very unfavorable (1) to very favorable (5). The six independent variables included:

- percent of a physician's patients in HMOs (an experience measure)
- state (coded "1" for Minnesota and "0" for Oklahoma — an indirect measure of exposure to HMOs)
- medical specialty (coded "1" if specialist, "0" if primary care)
- practice size (i.e., physician FTEs in the practice)
- satisfaction with medical practice (measured on a five-point Likert scale)
- physician's age

The multivariate analysis used weighted least squares regression and the Huber/White consistent estimator (Huber, 1967; White, 1980) of the variance-covariance matrix to correct the inference statistics for heteroscedasticity. Sampling weights, the inverse of the probability of being in the sample, were used to account for the sampling strategy and unequal sample proportions. Squared terms were added for both the percentage of a physician's patients in HMOs and the physician's

age because of apparent non-linear relationships with the physician's attitudes toward HMOs.

RESULTS

Descriptive Analysis

The characteristics of rural physicians and their practices (e.g., physician age, number of years in rural practice, specialty distribution) were similar in both states with one notable exception: practice organization. Solo practice was much more common in Oklahoma than in Minnesota (see **Table 3**). Differences in practice organization are reflected in the average size of the practices. In Minnesota the average size of the practices of rural primary care physicians is 14.2 full-time equivalent (FTE) physicians; for specialists, it is 20.6 FTEs. The average rural practice size is much smaller in Oklahoma: 3.7 FTEs for primary care physicians and 3.8 FTEs for specialists. These differences indicate the long history of rural group practice in Minnesota (Minnesota Academy of Family Physicians, 1991).

The differences in practice size may also affect the findings of the study. Physicians in larger practices may be buffered from some administrative and clinical aspects of managed care that are more problematic for solo or smaller practices, and consequently, they may have more favorable opinions of HMOs. Physicians in larger practices may be more likely to be salaried, to participate in clinic quality assurance programs, to have clinic administrators who deal with contracting, and so on. Perhaps most important, rural physicians in larger practices are accustomed to

Table 3

Physician and Practice Characteristics

	Minnesota		Oklahoma	
	Primary Care (n = 400)	Specialist (n = 200)	Primary Care (n = 400)	Specialist (n = 200)
Age	46.7 (10.4)*	48.9 (9.4)	48.9 (11.5)	49.4 (9.7)
Years in Practice	16.6 (11.4)	16.8 (9.7)	18.1 (12.8)	17.2 (10.2)
Years in Rural Practice	15.5 (11.1)	14.2 (8.9)	16.8 (12.5)	14.8 (9.7)
Specialty (percent distribution)				
Family Practice	77.5	--	64.7	--
General Practice	4.0	--	11.8	--
General Internal Medicine	14.8	--	17.0	--
Pediatrics	3.7	--	6.5	--
Surgical Specialty	--	72.6	--	65.6
Medical Specialty	--	11.9	--	17.0
Other Specialty	--	15.4	--	18.0
Practice Type (percent distribution)				
Solo Practice	10.5	14.5	54.9	54.5
Single Specialty Group	27.8	22.0	21.3	20.0
Multi-Specialty Group	59.2	59.5	16.0	14.0
Other	2.5	4.0	7.8	11.5
FTEs in Practice	14.2 (16.6)	20.6 (22.3)	3.7 (6.2)	3.8 (6.4)

*Numbers in parentheses are standard deviations.

providing medical services within a system. More familiar with bureaucratic structures of service delivery, they may tend to react less negatively to the rules of managed care than physicians who practice in smaller, less complex practices.

Rural Physician Payment and Risk Arrangements

Physicians who had HMO contracts were asked what percent of their patients were enrolled in HMOs and were queried about the nature of their payment and risk arrangements with HMOs (see **Table 4**). A higher proportion of the patients of Minnesota physicians is enrolled in HMOs, which may be due to the longer experience of physicians with HMOs in Minnesota. In Minnesota, almost 18 percent of the patients of participating primary care physicians are enrolled in HMOs, compared to 11 percent in Oklahoma. Sixteen percent of the patients of participating rural Minnesota specialists are covered by an HMO, compared to 11.5 percent for Oklahoma specialists.

Fee-for-service (FFS) is the most common reimbursement method used by HMOs for physicians in both states. Approximately three of four physicians in both states reported that they receive FFS payments[1], however physicians in Oklahoma (both primary care and specialists) are more than two times as likely as Minnesota physicians to receive full charges (i.e., without a discount) as payment. Capitation

---

[1] Approximately twenty percent of physicians in both states said that they did not know the method by which they were paid by HMOs. If these responses were eliminated, approximately 90 percent of all Minnesota physicians with HMO contracts and 85 percent of Oklahoma primary care physicians with HMO contracts reported they were paid on a fee-for-service basis. One hundred percent of the Oklahoma specialists with HMO contracts who knew their method of compensation from the HMO said they were paid on a fee-for-service basis. See discussion of "don't know" responses below.

Table 4

Payment and Risk Arrangements for Rural Physicians with HMO Contracts

	Minnesota		Oklahoma	
	Primary Care (n = 322)	Specialist (n = 161)	Primary Care (n = 104)	Specialist (n = 61)
Percent of Patients in HMOs	17.6	15.9	10.9	11.5
Method of Payment by HMO (%)				
Charges (Fee-for-Service)	8.7	6.2	18.3	14.8
Discounted Fee-for-Service	58.6	63.4	41.3	47.5
Fee Schedule	6.9	7.5	8.7	13.1
Fee-for-Service Summary	74.2	77.1	68.3	75.4
Capitation	6.5	6.8	11.5	0.0
Salary	2.2	1.2	0.0	0.0
Other	0.3	0.0	1.0	0.0
Don't Know	16.5	14.9	19.2	24.6
Withhold Provision				
Yes	33.5	28.0	9.6	9.8
No	37.6	39.8	63.5	55.7
Don't Know	28.9	32.3	26.9	34.4
Withhold Percent	11.4	10.3	12.9	12.5
Bonus Provision				
Yes	20.2	16.1	7.7	6.6
No	55.0	53.4	67.3	54.1
Don't Know	25.8	30.4	25.0	39.3

is a much less frequently used method in either state. These responses resemble data from HMOs surveyed by Christianson et al. (1996): 62 percent of those HMOs said they reimbursed rural physicians primarily on a FFS basis, 19 percent made payments on a capitation basis to a group or individual practice association, and 11 percent made capitated payments directly to primary care physicians.

Capitation appears to be a much more common form of reimbursement in urban areas. In the twenty urban markets surveyed by Gold et al. (1995) in 1994, the majority of network and IPA model HMOs in these markets (56 percent) paid primary care physicians on a capitated basis. InterStudy data from a national HMO study indicate that approximately 23 percent of HMO enrollees receive care from primary care physicians who are reimbursed on a FFS or discounted FFS basis, and 68 percent receive care from primary care physicians paid on a capitated basis (InterStudy, 1995).

Approximately 20 percent of physicians in both states we studied said they do not know the method by which they are paid by HMOs. The primary explanation for this somewhat high figure is likely different in each of the two states. Rural Minnesota physicians who practice in larger groups may be isolated from the details of compensation arrangements between the group and the HMO. Hillman, Welch, and Pauly (1992) observe that, in three-tiered plans, physician incentives are determined more by the arrangements between the middle tier (in this case, the medical group practice) and physicians than between the plan and the middle tier. The practice may receive a capitated payment from the HMO, but the physician may

be paid a salary by the practice. Because physician compensation may not be directly related to the form of compensation the group receives from the HMO, many rural physicians in Minnesota may not know how the HMO pays the group.

In Oklahoma, some physicians may not be aware of the compensation arrangements in their HMO contracts because the number of HMO-enrolled patients they see is too small for them to take notice. A low proportion of HMO patients in a practice influences the awareness of compensation arrangements, which has implications for both providers and HMOs. Managed care is designed to alter practice patterns by making providers more responsible financially for their clinical decision-making. If providers do not know the methods by which they are paid by HMOs, they have no incentive to alter their behavior.

Withhold provisions in their HMO contracts are approximately three times more common for Minnesota physicians than for Oklahoma physicians. In Minnesota, 33.5 percent of primary care physicians expressed awareness of a withhold provision in their contracts, compared to 9.6 percent in Oklahoma. Twenty-eight percent of Minnesota specialists knew they had a withhold provision, compared to 9.8 percent of Oklahoma specialists. Even though withholds are more common in Minnesota than in Oklahoma, the rate of sharing risk with an HMO is relatively low in Minnesota: no more than one-third of respondents reported that they had withhold provisions in their contracts. This low figure is likely somewhat depressed by the relatively high number of "don't know" responses, which, once again, probably reflects practice organization and/or low HMO enrollee volume. When HMO contracts do have withhold provisions,

the average amount withheld is approximately the same regardless of specialty or state.

HMOs may also provide opportunities for providers to augment their earnings with performance-based bonus payments. Minnesota physicians are approximately 2.5 times more likely to have bonus provisions in their contracts than Oklahoma physicians. Meeting utilization standards or utilization and quality standards comprise the primary criteria for bonus payments. Despite the somewhat higher rate of withholds and bonus payments in rural Minnesota, these financial incentives may be more common in urban areas than rural areas. In their survey of twenty urban markets, Gold et al. (1995) found that 88 percent of network/IPA model HMOs that pay individual primary care physicians on a FFS basis do not use withholds or bonuses. The limited use of these incentives in rural areas may be due to the relatively small percentages of HMO enrollees in rural practices and the unwillingness -- and lack of necessity -- of rural physicians to share risk with HMOs. HMOs, in return, may be unwilling to pay rural providers performance bonuses if they do not share in the financial risk of delivering services to enrollees. Rural providers' reluctance to accept risk may fade in the future if the number of enrollees in rural areas increases, or if rural provider networks become more exclusive, or both.

Approximately three of five primary care physicians in both states function as gatekeepers under their HMO contracts and approximately two of five report that their payments are affected by referrals. A gatekeeper, in this context, is a primary care physician who coordinates all services provided to HMO enrollees, including

referrals to specialists. The goal of a gatekeeping system is to assure that patients receive appropriate services, while avoiding unnecessary referrals. Approximately 60 percent of specialists reported that they are required to obtain prior authorization from the HMO before initiating treatments and procedures. One-quarter of specialists in Minnesota and one-third of those in Oklahoma said they need prior authorization from the gatekeeper, and approximately one-quarter of specialists in both states indicated that they are required to inform gatekeepers of treatment plans. Prior authorization procedures may be seen by specialists as infringements upon clinical autonomy and/or as unnecessarily bureaucratic requirements that add to the "paperwork" burden of medical practice.

Overall, rural physicians who have HMO contracts report FFS and discounted FFS as the most common payment forms. Capitation and salary arrangements are used relatively infrequently in these rural areas. The proportion of rural physicians who share risk with the HMO is relatively low across all four physician categories. Withholds are more common in Minnesota than in Oklahoma, but the amount withheld from physicians who have such provisions in their contracts is similar in both states. In contrast to urban and national studies of HMO payment arrangements, it appears that rural physicians in both states are more likely to be compensated on a FFS basis and less likely to share risk with the HMO (Gold et al., 1995; InterStudy, 1995).

Factors Affecting the Decision of Rural Physicians to Participate in HMOs

As part of our survey, rural physicians who had HMO arrangements were read a list of possible reasons why they decided to participate in an HMO and were asked

to rate the importance of each reason. From that list, they were then asked to select the most important reason (see **Table 5**). More than 40 percent of physicians in both groups in both states said "preserving market share" was the most important reason for participating. Approximately one-quarter of physicians surveyed said they joined to increase market share, although increasing market share was a less prevalent strategy among rural specialists in Oklahoma. These findings conflict with the assertion of Korczyk and Witte (1991) that rural physicians -- many of whom feel themselves to be overworked -- will not be induced to participate in HMOs merely to increase or maintain patient volume. Rural physicians in Minnesota and Oklahoma decided to join HMOs for many of the same reasons that urban physicians do. Rosenbach et al. (1988), for example, found that 75 percent of physicians surveyed nationally said that maintaining or increasing their patient load was a reason for participating in an HMO.

Some of the rural physicians in our sample had been asked to participate in an HMO and had refused (n = 112). They were read a list of possible reasons why they decided to not participate in an HMO and were asked to rank the importance of each reason on a five-point scale. From that list of reasons, they were then asked to select the most important reason why they decided not to participate in an HMO arrangement. Across subgroups, the two most common reasons for deciding not to participate (cited by rural physicians who have rejected overtures to join an HMO) were "probable loss of income" and "probable loss of clinical autonomy." A substantial proportion (19.4 percent) of rural primary care physicians in Oklahoma

Table 5

Factors Affecting the Decision to Participate in an HMO

	Minnesota		Oklahoma	
	Primary Care	Specialist	Primary Care	Specialist
Most Important Reason for Participating (%):	(n = 322)	(n = 161)	(n = 104)	(n = 61)
Preserve Market Share	42.8	46.2	47.1	48.3
Increase Market Share	25.0	25.6	26.9	15.0
Increase/Maintain Income	5.0	5.0	3.8	6.7
Improve Quality of Care	3.7	0.6	5.8	1.7
Case Management Makes Sense	4.4	5.0	1.9	1.7
Favorable Previous Experience	0.9	0.0	2.9	1.7
Other Reasons	5.3	6.9	7.7	16.7
Most Important Reason for Not Participating (%):	(n = 32)	(n = 33)	(n = 36)	(n = 11)
Loss of Income	59.4	24.2	25.0	27.3
Loss of Clinical Autonomy	9.4	24.2	30.6	36.4
Negative Impact on Physician-Patient Relationship	9.4	12.1	19.4	9.1
Restrictions on Referrals	6.2	9.1	2.8	9.1
No Need	3.1	15.2	0.0	0.0
Other Reasons	3.1	9.1	19.4	18.2

who had been asked to join an HMO and refused were also concerned about the possible negative impact of the HMO on the physician-patient relationship.

Rural Physician Attitudes Toward HMOs

Rural physicians were asked to rate their overall opinion of HMOs on a five-point Likert scale. The average responses of primary care and specialist physicians were compared across states; a comparison of the responses of physicians who have contracts with those who do not have HMO contracts was also conducted (see **Table 6**). Rural primary care physicians in both Minnesota and Oklahoma had significantly more favorable opinions of HMOs than did rural specialists. Rural primary care physicians in Minnesota who contract with HMOs also have significantly more favorable opinions of HMOs overall than their counterparts who do not have HMO contracts. In the remaining subgroups, physicians in HMOs hold more favorable opinions of HMOs than those who are not in HMOs, but the differences are not significant. These differences notwithstanding, the results show that rural physicians in the two states have primarily negative attitudes about HMOs; this finding holds true across states and across specialties, regardless of whether or not physicians contract with HMOs. The highest average rating among the subgroups occurs among the Minnesota primary care physicians with HMO contracts; that group gave HMOs a rating of 2.7 on a five-point scale (1 = very unfavorable, 5 = very favorable).

In these two states, rural primary care physicians have more favorable opinions of HMOs than rural specialists do, and rural physicians with HMO contracts have more favorable opinions of HMOs than those who do not contract with an HMO.

Table 6

Rural Physicians' Opinions of HMOs
(1 = very unfavorable, 5 = very favorable)

	Minnesota		Oklahoma	
	Primary Care	**Specialist**	**Primary Care**	**Specialist**
All Physicians	(n = 400)	(n = 200)	(n = 400)	(n = 200)
Overall Opinion of HMOs[1]	2.6**	2.2	2.0*	1.8

	Primary Care		Specialists	
	In HMO	**Not In HMO**	**In HMO**	**Not In HMO**
Minnesota	(n = 322)	(n = 78)	(n = 160)	(n = 40)
Overall Opinion of HMOs[2]	2.7**	2.2	2.2	2.0
Oklahoma	(n = 104)	(n = 296)	(n = 61)	(n = 139)
Overall Opinion of HMOs	2.1	1.9	1.7	1.9

[1]Comparisons are between primary care and specialist physicians within states.
[2]Comparisons are between physicians in HMOs and not in HMOs within specialties, within states.

* $p < .05$
** $p < .01$

These findings are similar to studies conducted in urban settings (Ellsbury and Montano, 1990; Schultz et al., 1990). The results of this study also suggest that physicians in a state with a higher HMO penetration rate (Minnesota) -- whether or not they contract with HMOs -- have more favorable opinions of HMOs than physicians in a state with a lower HMO penetration rate (Oklahoma).

The variation in attitudes among states may be explained by the indirect exposure to HMOs that physicians in high penetration states gain through their routine collegial contacts. Physicians in high penetration states may have more opportunities to encounter colleagues who contract with HMOs and to discuss managed care issues with them. Because physicians who have HMO contracts have more favorable opinions than those who do not, it is likely that non-participating physicians in high penetration states will come into contact more frequently with colleagues who are more favorably disposed to HMOs than physicians in low penetration states. To the extent that opinions are socially constructed, a higher HMO penetration rate in urban areas of a state may create a more fertile seedbed for the expansion of managed care into minimally penetrated rural areas.

The attitudes of rural physicians about specific features of managed care were also measured (see **Table 7**). Physicians were asked to rate their agreement with a series of nine statements about HMOs on a five-point Likert scale. The individual statements were summarized into three issue areas: 1) practice autonomy afforded under HMO arrangements, 2) income potential of HMO arrangements, and 3) quality of care possible under HMO arrangements. A summary score for each issue was

Table 7

Rural Physician Attitudes Toward HMOs
(1 = strongly disagree, 5 = strongly agree)

	Primary Care		Specialist	
	In HMO	Not In HMO	In HMO	Not In HMO
Minnesota				
Attitudes Relating to:[1]				
Maintain Practice Autonomy	2.3**	1.9	1.9	1.8
Increase Income Potential	2.1*	1.8	1.8	1.5
Improve Quality of Care	2.4**	2.0	1.9	2.1
Oklahoma				
Attitudes Relating to:[1]				
Maintain Practice Autonomy	1.9*	1.7	1.6	1.6
Increase Income Potential	1.9	1.8	1.6	1.6
Improve Quality of Care	2.0	1.9	1.8	1.8

[1]Comparisons are between primary care and specialist physicians participating and not participating in HMOs.

* $p < .05$
** $p < .01$

obtained by averaging the responses to the individual statements. The scores of physicians in each of the subgroups indicate that they disagree with the notions that HMOs maintain physicians' clinical autonomy, increase physician income, and improve quality of care.

The trend across subgroups is similar: rural physicians are most favorable about the autonomy they are likely to retain in HMO arrangements and least favorable about the potential effect HMOs may have on their income. In general, rural Minnesota primary care and specialist physicians were more positive about HMOs, when measured on these dimensions, than rural Oklahoma physicians. Minnesota physicians with HMO contracts generally were more positive about HMOs than those who do not have contracts. Oklahoma primary care physicians with HMO contracts had slightly more favorable attitudes about HMOs than their counterparts without such contracts, but there was no difference in the attitude of Oklahoma specialists toward HMOs. In both states, primary care physicians generally were more positive about HMOs than specialists.

Although rural physician attitudes about HMOs vary somewhat among subgroups, these findings clearly suggest that the opinions of rural physicians toward HMOs in the two states studied are essentially negative. In some cases the negative opinions may stem from fear of the unknown; in other cases, they may be a reaction to a sense that rural physicians are being "forced" to join HMOs against their will simply to retain or accommodate their patients; and, in yet other cases, the negative opinions may spring from feelings that HMO administrators are insufficiently sensitive

to local conditions or rural practice styles. Whatever the cause, the high proportion of negative opinions among rural physicians in these two states may not have had a meaningful impact on the willingness of rural physicians to participate in HMO arrangements: only a relatively small proportion of physicians in each subgroup has refused to participate in HMO arrangements when asked to do so.

Multivariate Analysis

The results of the multivariate analysis support those of the descriptive analysis. Attitudes toward HMOs are positively associated with the percent of patients in a physician's practice that are enrolled in an HMO, a variable intended to measure a physician's experience with HMOs (see **Table 8**). The relationship between attitudes and experience, however, is non-linear, suggesting that attitudes become less positive after a certain percentage of HMO patients in a physician's practice is reached (approximately 42 percent). The diminishing association between attitudes and experience suggests that at a certain level of HMO enrollment in a physician's practice, physician attitudes about HMOs begin to deteriorate.

Attitudes toward HMOs are positively associated with practice in Minnesota (i.e., the high HMO penetration state), a variable that indirectly measures exposure to and greater familiarity with HMOs. As previously suggested, rural physicians in high penetration states likely function in collegial environments that are more positive about HMOs than the environments in low HMO penetration states.

Table 8

Weighted Least Squares Regression:
Factors Affecting Rural Physicians' Opinions of HMOs
(n = 1,046)

Variable	Coefficient	Standard Error
Percent of patients in HMO	0.0233***	0.0061
Percent of patients in HMO (squared)	-0.0003*	0.0001
Specialty (0 = Specialist, 1 = Primary Care)	-0.2751***	0.0569
Physician FTEs in practice	0.0023	0.0022
Satisfaction with medical practice (1 = Very Dissatisfied, 5 = Very Satisfied)	0.0837**	0.0322
State (0 = Oklahoma, 1 = Minnesota)	0.3625***	0.0689
Age	-0.0732***	0.0219
Age (squared)	0.0006**	0.0002
Intercept	3.6307***	0.5698
Adjusted R^2	0.1557	
F-Statistic	25.31***	

* $p < .05$
** $p < .01$
*** $p < .001$

Attitudes toward HMOs are positively related to the size of the physician's practice. However, these data do not support the hypothesis that the size of a physician's practice significantly affects attitudes about HMOs.

Finally, attitudes toward HMOs are negatively associated with the physician's age: younger rural physicians have more positive attitudes about HMOs than older rural physicians. At about age 60, however, physician attitudes about HMOs begin to become more positive. Physicians older than age 60 may be beginning to plan for their retirement; thus they may be less inclined to view HMOs as a situation from which they cannot escape, because retirement, in the not-too-distant future, is a realistic alternative. Another possible explanation is that older physicians may see HMOs as a way to unburden themselves of some of the administrative demands of medical practice. Some HMOs provide practice support in the areas of quality assurance, guideline development, billing, and regulatory compliance. This assistance may be welcomed by some older physicians.

DISCUSSION

The results of this study indicate that the attitudes and experience of rural physicians with HMOs resemble those of urban physicians. Rural physicians participate in HMO arrangements for much the same reasons, and they have similar attitudes about HMOs. Although rural physicians accept less risk than their urban counterparts, this difference may be only a function of the percent of a physician's practice that is enrolled in an HMO, a difference that will diminish as HMO enrollment

in rural areas increases. Like urban physicians, rural physicians with HMO contracts have more favorable attitudes about HMOs than those without contracts, and primary care physicians have more favorable attitudes about HMOs than specialists.

Even though one group of rural physicians may have more favorable opinions about HMOs than another, no group of rural physicians has favorable opinions about HMOs overall. Simply put, rural physicians do not like HMOs. Their dislike of HMOs, however, does not appear to have affected meaningfully their willingness to participate in HMO arrangements. Only nine percent of the physicians in our two-state sample have ever been asked to join an HMO and refused. Rural physicians may accept HMOs as an environmental fact of life, one they might prefer did not exist but, equally, one they know they must tolerate. Rural physician antipathy toward HMOs is likely not unique; rural physicians may harbor similar attitudes toward other payers such as Medicare and Medicaid, and perhaps even toward traditional health insurers who incorporate managed care features into their products.

Schulz et al. (1990) suggest that physician attitudes about HMOs may be influenced by how HMOs are introduced to a community, the physicians' role in implementing and managing HMOs, and the physicians' expectations of the effects of HMOs on their individual practices. One reason why rural physicians might have negative opinions about HMOs is because they fear the loss of local control of their practices. Only 13 of the 593 HMOs listed in the 1996 InterStudy *HMO Directory* have their headquarters in rural (i.e., non-MSA) areas. Locally developed, physician-driven HMOs in rural areas will likely be successful at moderating some of the

negative opinions of HMOs, especially those related to clinical autonomy and quality of care. To the extent that locally developed HMOs are less stable financially than larger HMOs, however, negative attitudes regarding a physician's income may increase, particularly if physicians must assume substantial personal risk for the failure of the HMO. Locally developed HMOs may attempt to moderate physician concern about high levels of risk by establishing low thresholds for reinsurance and establishing risk pools to compensate physicians for unusual, but appropriate, levels of service (e.g., outlier pools to reimburse primary care physicians for performing certain procedures in the office instead of referring to a specialist or performing the procedures in a hospital).

Urban-based HMOs may improve attitudes of rural physicians by adopting various strategies such as stressing the importance to the community of HMO development, establishing policies to refer patients within the local service area (thus retaining income for local specialists and hospitals), and decentralizing clinical decision making and administrative functions (Christianson et al., 1986). Adoption of strategies such as these may produce rural physician attitudes regarding autonomy and quality of care that are similar to those of physicians who participate in locally developed HMOs.

REFERENCES

Adams, K., Houchens, R., Wright, J., and Robbins, R. "Predicting Hospital Choice for Rural Medicare Beneficiaries: The Role of Severity of Illness," Health Services Research 26:583-612, 1991.

Ahern, M. "Survey of Florida Physicians: Characteristics and Satisfaction," Journal of Florida Medical Association 80:752-757, 1993.

Baker, L. and Cantor, J. "Physician Satisfaction Under Managed Care," Health Affairs 12:258-270, 1993.

Bronstein, J. and Morrisey, M. "Determinants of Rural Travel Distance for Obstetrical Care," Medical Care 28:853-865, 1990.

Christianson, J., Shadle, M., Hunter, M., Hartwell, S., and McGee, J. "The New Environment for Rural HMOs," Health Affairs 5:105-121, 1986.

Christianson, J., Wellever, A., Hamer, R., and Knutson, D. "HMO Financial Arrangements with Rural Physicians," University of Minnesota, Institute for Health Services Research, AHCPR Deliverable Number 9, Delivery Order Number 3, AHCPR Contract 282-93-0037, 1996.

Christianson, J. and Wholey, D. "Availability of HMOs in Rural Areas," Presentation at Developing Rural Managed Care Demonstration Projects: A Technical Assistance Workshop for AHCPR Rural Managed Care Centers, Scottsdale, Arizona, March 16, 1995.

Ellsbury, K. and Montano, D. "Attitudes of Washington State Primary Care Physicians Toward Capitation-Based Insurance Plans," The Journal of Family Practice 30:89-94, 1990.

Ellsbury, K., Montano, D., and Kraft, K. "A Survey of the Attitudes of Physician Specialists Toward Capitation-Based Health Plans with Primary Care Gatekeepers," Quality Review Bulletin 16:294-300, 1990.

Gold, M., Nelson, L., Lake, T., Hurley, H., and Berenson, R. "Behind the Curve: A Critical Assessment of How Little is Known about Arrangements between Managed Care Plans and Physicians," Medical Care Research and Review 52:307-341, 1995.

Goldberg, J. and Martin, H. "Physician Attitudes Toward Provider Relations, Reimbursement and Control in HMOs," Group Health Association of America Journal 10:55, 1989.

Group Health Association of America. Industry Profile. Washington, DC: GHAA, 1993.

Hillman, A., Welch, W., and Pauly, M. "Contractual Arrangements Between HMOs and Primary Care Physicians: Three-Tiered HMOs and Risk Pools," Medical Care 30:136-48, 1992.

Huber, P. "The Behavior of Maximum Likelihood Estimates Under Non-Standard Conditions," Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability 1:221-233, 1967.

The InterStudy Competitive Edge 5.2. Part I: HMO Directory. Reporting Data as of January 1, 1995, August 1995.

Kohrman, C. "Medical Practice Where HMOs Dominate: The Perspective of Physicians in Minneapolis-St. Paul," Journal of Medical Practice Management 2:81-89, 1986.

Korczyk, S. and Witte, H. Managed Care in Rural America. Report to the National Rural Electric Cooperative Association and the Metropolitan Life Insurance Company, Washington, DC, 1991.

Kralewski, J., Feldman, R., and Gifford, G. "Physician Perspectives on the Structure and Function of Group Practice HMOs," Physician Executive 18:43-49, 1992.

Minnesota Academy of Family Physicians. A Study of Family Physician Cost and Production in Minnesota. Minneapolis, MN, 1991.

Minnesota Department of Health. 1994 HMO Operations in Minnesota. St. Paul, MN, 1996.

Oklahoma Health Care Initiatives. Analysis in Oklahoma by County. Oklahoma Department of Health and Oklahoma Department of Commerce, Oklahoma City, OK, June 8, 1995.

Ricketts, T., Slifkin, R., and Johnson-Webb, K. "Patterns of Health Maintenance Organization Service Areas in Rural Counties," Health Care Financing Review 17:1-14, 1995.

Rosenbach, M., Harrow, B., and Hurdle, S. "Physician Participation in Alternative Health Plans," Health Care Financing Review 9:63-80, 1988.

Scheckler, W. and Schulz, R. "Rapid Change to HMO Systems: Profile of the Dane County, Wisconsin Experience," Journal of Family Practice 24:417-424, 1987.

Scheckler, W., Schulz, R., and Moberg, P. "Physician Satisfaction with the Development of HMOs in Dane County: 1983-1993," Wisconsin Medical Journal 93:444-446, 1994.

Schulz, R., Girard, C., and Scheckler, W. "Physician Satisfaction in a Managed Care Environment," Journal of Family Practice 34:298-304, 1992.

Schulz, R., Scheckler, W., Girard, C. and Barker, K. "Physician Adaption to Health Maintenance Organizations and Implications for Management," Health Services Research 25:43-64, 1990.

University of Minnesota Rural Health Research Center. Summary of State Licensing Agency HMO Market Penetration Data. Minneapolis, MN, 1996.

White, H. "A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity," Econometrica 48:817-830, 1980.

Wholey, D., Christianson, J. and Sanchez, S. "The Effect of Physician and Corporate Interests on the Formation of Health Maintenance Organizations," American Journal of Sociology 99:164-200, 1993.

Previous University of Minnesota
Rural Health Research Center Working Papers

1. Moscovice, I., Wellever, A., Sales, A., Chen, M., and Christianson, J., ***Service Limitation Options for Limited Service Rural Hospitals***, March 1993.
2. Christianson, J., Moscovice, I., Hartley, D., Chen, M., and Nelson, D., ***The Structure of Rural Hospital Medical Staffs***, March 1993.
3. Christianson, J. and Moscovice, I., ***Health Care Reform: Issues for Rural Areas***, May 1993.
4. Wellever, A., Moscovice, I., Chen, M., ***A DRG-based Service Limitation System for Rural Primary Care Hospitals***, December 1993.
5. Hartley, D. and Moscovice, I., ***The Mobile Hospital Technology Industry: Focus on the CT Scanner***, March 1994.
6. Moscovice, I., Christianson, J., Wellever, A., ***Measuring and Evaluating the Performance of Vertically Integrated Rural Health Networks***, May 1994.
7. Wellever, A., ***Hospital Labor Market Area Definitions Under PPS***, October 1994.
8. Casey, M., Wellever, A., Moscovice, I., ***Public Policy Issues and Rural Health Network Development,*** December 1994
9. Yawn, B., Krein, S., Christianson, J., Hartley, D., Moscovice, I., ***Rural Radiology: Who is Producing Images and Who is Reading Them?,*** February 1995
10. Casey, M., ***Integrated Networks and Health Care Provider Cooperatives: New Models for Rural Health Care Delivery and Financing***, November 1995.
11. Krein, S., ***The Employment and Use of Nurse Practitioners and Physician Assistants by Rural Hospitals,*** December 1995.
12. Christianson, J. and Hart, J. ***Employer-Based Managed Care Initiatives in Rural Areas: The Experience of the South Dakota State Employees Group***. February 1996.
13. Manning, W., Christianson, J., and Chen, M. ***The Effect of Change in PPS Payment Status on Rural Hospital Performance***, March 1996.
14. Yawn, B. and Krein, S. ***Rural Enrollment in State Health Insurance Programs: The Minnesota Experience***, March 1996.
15. Wellever, A., Hill, G., Casey, M., Kauley, M., and Hart, P. ***State Health Care and Medicaid Reform Issues Affecting the Indian Health Care System***. April 1996.
16. Krein, S., and Christianson, J. ***The Composition of Rural Hospital Medical Staffs: The Influence of Hospital Neighbors***, June 1996.

Other University of Minnesota
Rural Health Research Center Monographs

1. Wellever, A., Moscovice, I., Hill, T., and Casey, M., ***Reimbursement and the Use of Mid-Level Practitioners in Rural Minnesota***, January 1993.
2. Yawn, B., Wellever, A., Hartley, D., Moscovice, I., and Casey, M., ***Access to Obstetrical Services in Rural Minnesota***, February 1993.
3. Hartley, D., Wellever, A., and Yawn, B., ***Health Care Reform in Minnesota: Initial Impacts on a Rural Community***, December 1993.
4. Yawn, B., Hartley, D., Krein, S., Wellever, A., and Moscovice, I., ***Obstetrical Services in Rural Minnesota, 1993***, January 1994.
5. Hartley, D., ***American Indian Health Services and State Health Reform***, October 1994
6. Moscovice, I., Wellever, A., Christianson, J., Casey, M., Yawn, B., and Hartley, D. ***Rural Health Networks: Concepts, Cases and Public Policy***, April 1996.