Physician and Clinical Integration Among Rural Hospitals

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ABSTRACT: *The pressures for closer alignment between physicians and hospitals in both rural and urban areas are increasing. This study empirically specifies independent dimensions of physician and clinical integration and compares the extent to which such activities are practiced between rural and urban hospitals and among rural hospitals in different organizational and market contexts. Results suggest that both rural and urban hospitals practice physician integration, although each emphasizes different types of strategies. Second, urban hospitals engage in clinical integration with greater frequency than their rural counterparts. Finally, physician integration approaches in rural hospitals are more common among larger rural hospitals, those proximate to urban facilities, those with system affiliations, and those not under public control.*

There is a growing body of research that examines mechanisms to align the strategic and economic interests of hospitals and physicians (Alexander, et al., 1996a, 1996b; Goes, et al., 1995; Morrisey, et al., 1996; Shortell, 1991a). With increasing managed care penetration, hospitals seek partnerships with physicians to accept and manage risk, to foster collaboration and, ultimately, to provide more cost-effective care (Burns, Morrisey, et al., 1997; Glandon, et al., 1986; Shortell, 1991b). From the physicians' perspective, managed care and competition from alternative providers have increased the risks of solo practice and forced many physicians into groups (Burns & Thorpe, 1997; Shortell, 1991a). These groups often look to hospitals for capital, practice management expertise and partnerships for managed care contracting (Shortell, 1991a, 1991b; Shortell, et al., 1996). Such incentives have made obsolete the traditional parallel but separate relationships that have characterized hospitals and their medical staffs (Burns & Thorpe, 1997; Glandon, et al., 1986). Today, hospitals and physicians are experimenting with a variety of organizational vehicles (e.g., Physician-Hospital Organizations [PHOs]; Management Services Organizations [MSOs]), incentive plans and integrative processes to increase alignment of interests and improve the delivery of clinical services.

Much of the discussion and research about both hospital-physician and clinical integration has focused on urban institutions. Surprisingly, little attention has been given to integration in rural markets where the interdependencies between hospitals and physicians often are greater than in urban markets (Mackesy, 1993). For example, 50 percent of physicians surveyed in rural areas indicated that financial health of the local rural hospital has a significant impact on the viability of their practices (Movassaghi, et al., 1989). Rural physicians typically have fewer hospitals in which to practice, thus creating greater dependence on a single hospital. Similarly, a rural hospital often depends on a handful of key physician admitters to sustain its operations. Despite the fact that the fates of rural hospitals and rural physicians are intertwined, the often striking differences in community culture, financial resources

and practice patterns between rural and urban areas and even among rural settings make it unlikely that all integration strategies will be equally appropriate or feasible (Cordes, 1989; Mick, et al., 1990; Seavey, et al., 1992; Smith, et al., 1990). Accordingly, this study attempts to document empirically how rural hospitals differ from urban hospitals in their approaches to physician and clinical integration, and how physician and clinical integration practices differ among different types of rural hospitals and rural hospital markets (Cordes, 1989; Moscovice, et al., 1985). Findings of the study are intended to inform rural physicians and managers and boards of rural hospitals about the conditions under which specific approaches to clinical and physician integration emerge.

Background

Shortell and others have argued that physician and clinical integration are interdependent but separate concepts (Gillies, et al., 1993; Shortell, et al., 1996). Physician integration has been defined as the extent to which physicians are economically linked to the hospital or hospital system; use its facilities and services; and actively participate in planning, management and governance. Integrated physicians share common objectives with the hospital and respond to incentives to foster collaboration with the hospital (Gillies, et al., 1993). Clinical integration, by contrast, is defined as the coordination of patient care services across people, functions, activities and sites to maximize the value of services delivered to patients (Shortell, et al., 1996). Because physicians decide the nature of care services they provide to their patients, physician integration often is viewed as a necessary precursor to clinical integration. That is, the hospital or hospital system must first establish mechanisms to tie physician interest and activities more closely to the goals and objectives of the organization before it attempts to rationalize clinical services.

Managed care and its effects have dominated much of the recent literature on hospital-physician and clinical integration (Burns, Morrisey, et al., 1997; Burns & Thorpe, 1997; Emmons, 1988; Shortell, et al., 1996). This focus has placed urban markets in the spotlight and shifted attention away from physician integration issues in rural markets where managed care is less of a force. Some have argued, however, that the demands of managed care markets, including governmental payers, are affecting rural providers as much as, if not more than, their urban counterparts (Zismer, et al., 1995). Small rural employers are joining together in coalitions to control rising health care costs. Governmental payers have begun to show preferences toward integrative arrangements between hospitals and physicians to accommodate global fees, capitation and similar payment arrangements. Further, relationships between rural hospitals and physicians are becoming stressful because competition and other market forces threaten the financial health of both groups. First, greater numbers of hospitals and their physicians are competing with each other for primary care market share (Grayson, et al., 1989). Second, competition among urban facilities for patients, staff and other resources has now extended into many rural areas, making the relationship between rural physicians and rural hospitals even more tenuous (Boissoneau, 1987; Crandall, et al., 1990). Third, shifting economics and demographics (higher unemployment, aging population and more uninsured patients) in many rural areas have effectively eroded the resource base of both rural hospitals and rural physicians. Both parties are at considerable risk for not achieving a measure of clinical and physician integration. Existing data, however, indicate that integration approaches currently favored by urban hospitals and physicians, such as joint ventures, are not as strongly supported by rural physicians (Boissoneau, 1987). Lack of trust and perceptions of unequal risk are cited as two principal reasons for this reluctance. Other studies have concluded that physician dissatisfaction with rural practice stems primarily from the financial and economic aspects of the practice environment, areas most likely to be affected by the physician's relationship with the local community hospital (Movassaghi, et al., 1989).

Overlaying these trends is a larger movement aimed at creating networks or systems of care delivery (Moscovice, Christianson, et al., 1995; Moscovice, Johnson, et al., 1991). In both rural and urban areas, such networks are seen as offering the potential for greater efficiency, improved access and, when vertically linked, greater continuity of care for specific populations or communities. Currently, most health care net-

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works, whether rural or urban, have acute care hospitals as their core (Rural Health Research Center, 1997). Further, both rural and urban health care networks view functional or administrative linkages among delivery entities as a necessary, but by no means sufficient, condition to achieving the aforementioned benefits of integration. Shortell has persuasively argued that both physician integration with the delivery organization(s) and clinical integration must accompany functional linkages if networks are to achieve their intended goals (Shortell, et al., 1996). Lessons derived from the Essential Access Community Hospital/Rural Primary Care Hospital (EACH/RPCH) program, for example, showed that the close collaboration of medical practitioners with each other and with the hospitals with which they were affiliated were critical to making the limited-service rural hospital a viable entity (Campion, et al., 1995). This often entailed collectively rethinking the traditional goals of the hospital and realigning incentives, structures and behaviors to be consistent with these new goals.

Similarly, clinical integration also is increasing in importance among rural health care providers. As inpatient admissions decline and the percentage of ambulatory relative to inpatient revenues rises among rural hospitals, hard choices will have to be made regarding what services the hospital will offer, appropriate physician practice behaviors and the introduction of clinical practices that offer value to the patient (i.e., low cost and reasonable quality) (Zismer, et al., 1995). Clinical integration, both within rural hospitals and among hospitals in rural networks, will undoubtedly figure into the planning of delivery organizations and physicians as they seek to reduce competition between each other and increase their attractiveness to payers. However, approaches to integration will differ from those practiced in urban markets.

Because formal managed care has relatively little influence in rural areas and because there is limited capital available to rural hospitals, the authors expect that integration strategies aimed at competing effectively in managed care markets and those requiring substantial capital outlay will be practiced with greater frequency in urban markets than in rural markets. The researchers further anticipate that clinical integration will be practiced with greater frequency in urban hospitals, given their emphasis on coordinating care in large horizontally and vertically integrated systems. Integration strategies pursued by rural hospitals are likely to be those focused on recruiting and retaining physicians, such as guaranteed salaries, practice services and physician involvement with hospital management and policy-making (Alexander, et al., 1986).

There also is considerable diversity within the population of rural hospitals and rural hospital markets. Indeed, some rural health scholars argue convincingly that greater variation exists across rural markets than urban markets (Cordes, 1989; Seavey, et al., 1992). Based on previous research that demonstrates conditional associations between physician integration and hospital performance, it is expected that differences in the organizational and market characteristics of rural hospitals are associated with the type of clinical and physician integration strategies employed. For example, previous research found that paid physician involvement in hospital administration was associated with greater case-mix-adjusted output for smaller, but not larger, rural hospitals. Greater physician involvement in hospital governance had no statistically significant relationship with output of rural hospitals with fewer than 100 beds, but it was associated with greater output in larger rural facilities (Morrisey, et al., 1990). In this study, the researchers explored differences in integration approaches within the population of rural hospitals based on six organizational and market characteristics: hospital size, ownership, system membership, regional location, population density and distance to closest urban hospital.

The authors expected that larger rural hospitals would be more likely to engage in both physician and clinical integration activities. Larger facilities may possess more resources to develop such capital intensive integration strategies as joint ventures and networks. Further, their more complex set of services and larger physician staffs suggest that larger rural hospitals may have more to gain from the integration of physicians and clinical activities.

Also expected were differences in integration activity on the basis of ownership. Previous research, for example, indicates that investor-owned hospitals are less likely than their nonprofit counterparts to use salary arrangements with clinicians. Public nonprofit hospitals, on the other hand, were less likely than for-profit hospitals to use clinical guidelines (Morrisey, et al., 1997).

Rural hospitals that are part of health care systems (owned or contract managed) are more likely to engage in all forms of integration activities because systems are more likely to possess the staffing and financial resources to facilitate such integration, and because such activity promotes standardization and coordination of clinical activity across units in the system. This contention is supported by evidence that system hospitals in urban areas are more likely to form networks, provide services to physicians and integrate information (Morrisey, et al., 1997).

Table 1. Hospital Universe and Sample Data.

Region	Sole Community	Proprietary	Major Teaching	Other	Total
Population Distribution					
Atlantic	75	228	115	1,151	1,569
East Central	36	147	43	1,031	1,257
West Central	193	212	33	997	1,435
Far West	159	171	32	605	967
Total	463	758	223	3,784	5,228
Sample Distribution					
Atlantic	34	77	73	191	375
East Central	16	49	27	223	315
West Central	88	71	21	176	356
Far West	72	58	20	148	298
Total	210	255	141	738	1,344
Sample Distribution Adjusted for Nonresponse					
Atlantic	49	110	104	273	536
East Central	23	70	39	319	451
West Central	126	101	30	251	508
Far West	103	83	29	211	426
Total	301	364	202	1,054	1,921
Sampling Rates (Percentages)					
Atlantic	65	48	90	24	34
East Central	64	48	91	31	36
West Central	65	48	91	25	35
Far West	65	49	91	35	44
Total	65	48	91	28	—

The researchers expected that rural hospitals located close to urban areas may have been more likely to adopt integration strategies similar to those of urban facilities. First, rural hospitals often compete with nearby urban providers. As a result, they may adopt organizational strategies similar to those of their urban competitors in an effort to retain patient volume and to attract managed care contracts on the fringe of urban markets. Second, rural hospitals proximate to urban areas may have been part of formal or informal affiliations with their nearby urban counterparts and have accordingly adopted similar integration strategies.

Finally, it was anticipated that there would be differences in physician integration across regions and across markets with different population densities. Although hospitals in more sparsely populated regions or markets may be less affected by managed care, they may have to employ integration strategies aimed at providing incentives to physicians to practice in marginally profitable settings.

Methods

Sample and Data. Data for this study were drawn from four sources: the 1993 hospital-physician relationship survey conducted for the Prospective Payment Assessment Commission (ProPAC), the 1993 American Hospital Association (AHA) Annual Survey of Hospitals, the Area Resource File (ARF), and a file containing the latitude and longitude coordinates for all U.S. community hospitals. The ProPAC survey was the primary source of data on hospital-physician integration strategies. The survey consisted of 50 items, dealing with issues of physician participation in hospital management and governance, organizational and financial arrangements between hospitals and physicians, sources of hospital revenue and special questions targeted to multihospital systems and teaching hospitals. The hospital CEO or his designated representatives were responsible for completing the survey.

The AHA annual survey was used to obtain data on bed size, ownership, system membership and regional location. The ARF provided measures of population and population density. The file containing geographic coordinates was used to compute distances between hospitals.

The ProPAC survey was based on a disproportionate, stratified random sample of U.S. community hospitals. Sixteen strata were used based on combinations of the following variables: the four census regions and hospital type (sole community, investor owned, major teaching or other community). Hospital size was not used as a stratifying variable because the sampling approach accounted for adequate representation of all hospital sizes within the 16 strata. Table 1 provides a detailed breakdown of the population, sample and adjusted sample distributions and the sampling rates for all strata.

The overall study population consisted of all 5,228 nonfederal, short-term, general hospitals reported in the AHA annual survey. The sample size was based on the objective of obtaining accurate regional estimates within 5 percent with 95 percent confidence, after allowing for expected nonresponse. Of the 2,609 hospitals surveyed, 1,459 responded (57.3 percent). Investor owned hospitals responded at a rate of 39 percent, while teaching, sole community and other hospitals had response rates of 65 percent, 67 percent and 60 percent, respectively. All responding hospitals were weighted to be nationally representative, and these data were used to construct measures of physician-hospital integration. This was done to capture the full range of integration efforts in use in the population of community hospitals. Resulting integration strategies were compared between urban (n=681) and rural (n=669) hospitals, as well as among different types of rural hospitals.

Measures. Of primary interest in this study are the approaches used by rural hospitals to align the interests of affiliated physicians with those of the organization. Principal components factor analysis was used to empirically specify groupings of approaches to physician and clinical integration that shared a common variance structure and that differed from other groupings similarly specified. The items related to physician integration and the items related to clinical integration were factor analyzed separately. Both varimax and oblique rotations were employed because there was not a prior reason to expect that different physician and clinical integration approaches were either independent or associated. The SAS statistical software package (6.12) was used to perform these analyses. Both rotation methods produced identical factors, providing additional validation of the underlying data structure. Results of the varimax rotation are displayed in Table 1. Factors with eigen values greater than one were retained for further analysis. Factor loadings indicate the relative contribution of a variable to a particular factor and the relative weight given to that variable in the construction of the factor score index. Typically, loadings of 0.40 or greater are interpreted to represent a meaningful contribution to a factor.

Five distinct factors corresponding to physician integration resulted from this analysis (Table 2): (1) salary and ownership—the extent to which the hospital has employment contracts with primary and specialty physicians and whether or not it owns physician practices; (2) networks and joint ventures—structures and activities established to create formal financial linkages between hospitals and physicians (e.g., PHOs, MSOs and ambulatory surgery centers); (3) physicians in management and governance—membership of physicians on the hospital board, in salaried administrative positions, or use of physicians as paid administrative consultants; (4) services to physicians—efforts to provide assistance to physicians in their private practices (e.g., recruiting assistance and practice management services); and (5) cost information sharing—increasing physician awareness of cost consequences of their practices by providing information about price of hospital services, providing hospital financial data to physicians and involving physicians in the capital budgeting process.

Table 3 displays the results of the factor analysis of survey items pertaining to clinical integration. Three distinct factors emerged from this analysis: (1) information integration—the integration of hospital clinical and financial information and the integration of clinical information across departments; (2) product line organization—organization structures that link all aspects of a patient's care under single authority and accountability; and (3) clinical guidelines—procedures to standardize care for specific diagnoses or conditions. All dimensions of physician and clinical integration were measured as factor score indices, where each index is the sum of the standardized variable values, weighted by the variable loadings of that factor.

To evaluate whether integration approaches differed between rural and urban hospitals and among different types of rural hospitals, seven categorical measures of organizational and market characteristics of rural hospitals were employed. For purposes of basic rural-urban comparisons, rural was defined as

Table 2. Descriptive Statistics and Factor Loadings of Variables Representing Physician Integration Activities.

Indicators	Indicator Mean	Indicator Standard Deviation	Factor Loadings[1] Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1:							
Salary and Ownership							
Primary care physicians on salary (percentage)	8.45	21.73	0.886[2]	-0.037	-0.002	-0.036	0.031
Specialty physicians on salary (percentage)	6.37	19.89	0.805[2]	-0.114	0.173	-0.097	0.043
Hospital-owned group practice	0.16	0.37	0.592[2]	0.300	-0.179	0.175	-0.009
Factor 2:							
Networking and Joint Ventures							
Presence of joint venture	0.49	0.50	-0.041	0.648[2]	0.201	0.079	-0.004
Presence of contracting vehicles	0.35	0.48	0.238	0.630[2]	0.182	0.046	0.010
Affiliated group practice	0.17	0.37	0.154	0.602[2]	-0.127	0.017	0.013
Physician liaison program	0.70	0.46	-0.138	0.409[2]	0.216	0.112	0.186
Factor 3:							
Physicians in Management and Governance							
Physician compensation for administrative consultation	0.28	0.45	0.046	-0.053	0.663[2]	0.178	-0.030
Presence of compensated physician positions	0.68	0.47	0.205	0.377	0.604[2]	-0.180	-0.009
Number of physicians on board	2.94	2.83	-0.197	0.321	0.494[2]	-0.015	0.029
Factor 4:							
Services for Physicians							
Recruiting assistance	0.74	0.44	-0.061	-0.053	-0.128	0.700[2]	0.087
Management services	0.48	0.50	0.135	0.248	0.040	0.669[2]	0.069
Loan program	0.18	0.39	-0.070	-0.023	0.294	0.587[2]	-0.080
Factor 5:							
Cost Information Sharing							
Physicians aware of prices	0.39	0.49	-0.013	0.023	-0.104	-0.039	0.739[2]
Financial data shared with physicians	0.71	0.45	0.061	-0.011	0.014	0.057	0.715[2]
Physicians participate in capital budgeting	0.94	0.25	0.010	0.065	0.356	0.086	0.390[2]
Eigenvalue			1.94	1.77	1.50	1.42	1.27
Communality Estimates: Total=7.90							

1. Factor loadings represented rotated factor solution using varimax rotation.
2. Loadings used to define the factors used in subsequent analyses.

any location outside a metropolitan statistical area. Hospital size was specified as fewer than 50 beds and 50 or more beds. Ownership was expressed as whether the hospital operated under investor-owned, private nonprofit or government control. Multihospital system membership was determined if a hospital was owned, leased or sponsored by a separate administrative entity accountable for two or more hospitals. Contract management was defined as a situation in which the management of a hospital was assumed by a firm other than the hospital or its parent organization. Census location was specified as one of the nine census divisions (excluding Puerto Rico and the Virgin Islands) in which the hospital operated. Population density was a

Table 3. Descriptive Statistics and Factor Loadings of Variables Representing Clinical Integration Activities.

Indicators	Indicator Mean	Indicator Standard Deviation	Factor Loadings[1] Factor 1	Factor 2	Factor 3
Factor 1: Information Integration					
Integrate clinical and financial data	0.47	0.50	0.884[2]	-0.037	-0.002
Integrate clinical data across departments	0.57	0.49	0.850[2]	-0.114	0.173
Factor 2: Product Line Organization					
Used in outpatient services	0.28	0.45	-0.041	0.821[2]	0.201
Used in inpatient services	0.20	0.40	0.238	0.780[2]	0.182
Department heads responsible for profit or loss	0.40	0.49	-0.138	0.485[2]	0.216
Factor 3: Clinical Guidelines					
Individual responsible for dissemination	0.36	0.48	0.046	-0.053	0.850[2]
Guidelines program	0.57	0.50	0.205	0.377	0.799[2]
Eigenvalue			2.19	1.29	1.09
Communality Estimates: Total=4.56					

1. Factor loadings represent rotated factor solutions with varimax rotation.
2. Loadings used to define the factors used in subsequent analyses.

county level measure using two categories: five people or fewer per square mile and more than five people per square mile. Finally, distance to the closest urban hospital was based on the straight line distance between a rural hospital and its closest urban neighbor. Straight line distance was computed as the number of miles between latitude and longitude of ZIP code centroids of all rural hospitals in the sample and their closest urban neighbors. Sample size and data limitations precluded using road miles to capture such distances. Two categories defined distance: 20 miles or less and more than 20 miles.

Results

The first research question focused on how rural hospitals differed from urban hospitals in their approach to physician and clinical integration. Table 4 displays results of differences between these two groups of hospitals on each of the five dimensions of physician integration and the three dimensions of clinical integration. Analysis of Variance (ANOVA) was used to compare integration strategies between urban and rural hospitals. Sampling weights from the stratified sample were incorporated in such comparisons to ensure that any differences detected reflected differences in the population (Cochran, 1977). The General Linear Model procedure in the SAS statistical software package (6.12) was used to perform these analyses. Of the five measures of physician integration, three showed no statistically significant differences between rural and urban hospitals: salary and ownership, physician services, and cost information sharing. Two physician integration approaches—physicians in management and governance and networking and joint ventures—were practiced with greater frequency among urban hospitals compared with rural hospitals ($P<0.001$).

Comparisons between rural and urban hospitals on the three measures of clinical integration yielded more consistent findings. As expected, all three measures of clinical integration—information integration and product line organization and use of clinical guidelines—were practiced with greater frequency among urban hospitals relative to rural hospitals ($P<0.001$).

Table 4. Comparisons of Physician and Clinical Integration Factor Scores Between Rural and Urban Hospitals.

Integration Factors	Rural Sample (N=669)	Urban Sample (N=681)	Test of Difference
Physician Integration[1]			
Salary and ownership			
Mean	-0.09	-0.11	t=-0.45
Standard deviation	±1.47	±1.71	
Joint venture and networking			
Mean	-0.37	0.41	t=-15.75*
Standard deviation	±1.35	±2.00	
Physicians in management and governance			
Mean	-0.42	0.39	t=-16.11*
Standard deviation	±1.49	±1.91	
Physician services			
Mean	0.07	0.01	t=1.04
Standard deviation	±1.70	±1.97	
Cost information sharing			
Mean	0.01	-0.05	t=1.13
Standard deviation	±1.84	±1.92	
Clinical Integration[2]			
Information integration			
Mean	-0.14	0.16	t=-5.80*
Standard deviation	±1.72	±1.97	
Product line organization			
Mean	-0.15	0.11	t=-4.90*
Standard deviation	±1.52	±2.08	
Clinical guidelines			
Mean	-0.21	0.13	t=-6.62*
Standard deviation	±1.67	±1.98	

* $P<0.001$.

1. A factor score represents the weighted average (by factor loading) of values for all physician integration variables for a given observation. Weights (loadings) vary by factor, but the variable set is constant.
2. A factor score represents the weighted average (by factor loading) of values for all clinical integration variables for a given observation. Weights (loadings) vary by factor, but the variable set is constant.

Physician and Clinical Integration Among Rural Hospitals. The previous analysis compared rural and urban hospitals in terms of their propensity to use different approaches to physician and clinical integration. Although findings suggest both differences and similarities between these two types of hospitals in terms of their integration activities, such comparisons do not acknowledge that differences among rural hospitals and markets also may affect the type of physician and clinical integration strategies employed. The issue was addressed by comparing physician and clinical integration approaches among rural hospitals differentiated on the following dimensions: bed size, ownership, system membership, contract management, regional location, population density, and distance to closest urban hospital.

Table 5 displays results of comparisons among rural hospitals on physician integration activity. Size of the rural hospital displayed a significant association with four of the five physician integration strategies.

Relative to small rural hospitals, rural hospitals with 50 or more beds were more likely to engage in physician joint ventures and networks, have physicians in paid management or governance positions, and offer support services to physicians and their practices. Large rural hospitals, however, were less likely than their smaller counterparts to integrate physicians through salary and ownership of practices. Small and large rural hospitals were equally likely to integrate through information sharing with physicians.

Three of the five physician integration strategies were differentiated by ownership category. Rural hospitals under government control were less likely than both investor-owned or private, nonprofit rural hospitals to joint venture and network with physicians, place physicians in management or board positions, and provide support services to physicians. No statistically significant differences were obtained across ownership categories for the physician integration strategies of salary and ownership and information sharing.

Multihospital system membership was found to have a statistically significant association with three physician integration strategies. Relative to freestanding hospitals, system members were more likely to have physician joint ventures and networks, physicians in management and governance, and to offer physician support services. No differences between system and nonsystem hospitals were observed for information sharing or salary and ownership.

Contract management, a looser form of external affiliation, was associated with only one physician integration approach—salary and ownership. Those rural hospitals managed under contract with an outside organization were more likely to integrate physicians through salary and practice ownership than self-managed rural hospitals.

Several interesting differences in physician integration approaches were observed across regions. Rural hospitals located in the sparsely populated mountain region appear to be more likely to integrate via salary and ownership of physician practices and through providing support services to physicians than most other regions of the country. By contrast, those rural hospitals in New England appear more active in the areas of joint ventures and networks, physicians in management and governance, and physician services. These findings suggest that the heterogeneity across certain rural environments may give rise to different approaches to physician integration.

Two variables related to the geographic situation of rural hospitals were examined—population density of the hospital market and distance to the closest urban hospital. Rural hospitals in more sparsely populated areas and those located farther away from urban facilities were more likely to use salary and ownership as the method for integrating physicians. However, rural hospitals in low-density markets were significantly less likely to involve physicians in management and governance compared with rural hospitals in higher-density markets. Similarly, proximity to an urban hospital was significantly associated with information sharing as an integration strategy.

Table 6 displays results of comparisons between type of rural hospital for the three dimensions of clinical integration—information integration, product line organization and clinical guidelines. In general, the organizational and environmental attributes that differentiate among rural hospital types exhibited a weaker association with clinical integration approaches than they did with physician integration approaches. Size, ownership, system membership and region were weakly related to specific types of clinical integration. Contract management, population density and distance to closest urban hospital were unrelated to clinical integration. Information integration was more prevalent in smaller rural hospitals, investor-owned hospitals and in the mid-Atlantic, South Atlantic and mountain regions. Clinical guidelines were more widely employed among investor-owned hospitals, system hospitals and among rural hospitals operating in the mid-Atlantic region. Product line organization was not associated with any of the organizational or environmental attributes.

Discussion

To date, the health services literature has paid little attention to the issue of physician-hospital and clinical integration in rural settings. These analyses have documented not only that such practices do exist in rural areas but also that they vary by type and frequency as a function of characteristics of rural communities and hospitals. Whereas clinical integration practices, such as use of guidelines, product line organization and integration of clinical and financial information are clearly practiced with less frequency in rural relative to urban hospitals, many physician integration strategies are adopted by rural institutions as frequently as they are in urban hospitals. In particular, the use of salaried physicians and ownership of group practices, along with sharing of financial data with physicians and providing support services to physicians are equally common to both rural and urban hospitals.

The clinical integration results are not surprising. These strategies often are implemented in response to managed care pressures to standardize treatment and

Table 5. Physician Integration Factor Scores by Characteristics of Rural Hospitals[1].

Characteristics	Salary and Ownership Mean (Standard Deviation)	Joint Venture and Networking Mean (Standard Deviation)	Physicians in Management and Governance Mean (Standard Deviation)	Physician Services Mean (Standard Deviation)	Information Sharing Mean (Standard Deviation)
Size					
Fewer than 50 beds	0.04 (1.69)	-0.49 (1.14)	-0.69 (1.37)	-0.04 (1.61)	0.10 (1.90)
50 beds or more	-0.17 (1.31)	-0.30 (1.45)	-0.24 (1.47)	0.15 (1.75)	-0.06 (1.79)
Test of difference	t=3.29**	t=-3.18**	t=-7.27***	t=-2.59**	t=1.96
Ownership					
Investor-owned	-0.23 (1.28)	-0.22 (1.50)	-0.34 (1.35)	0.25 (1.97)	0.23 (1.98)
Private nonprofit	-0.04 (1.63)	-0.29 (1.45)	-0.22 (1.51)	0.18 (1.67)	-0.00 (1.72)
Government	-0.10 (1.35)	-0.49 (1.15)	-0.65 (1.36)	-0.08 (1.67)	-0.02 (1.94)
Test of difference	F=1.19	F=7.11***	F=22.80***	F=6.97**	F=1.28
Multihospital Member					
Yes	-0.07 (1.81)	-0.26 (1.48)	-0.24 (1.51)	0.29 (1.67)	0.12 (1.73)
No	-0.09 (1.81)	-0.42 (1.32)	-0.47 (1.45)	0.02 (1.71)	-0.01 (1.87)
Test of difference	t=0.3	t=2.36*	t=3.04**	t=3.13**	t=1.45
Contract Management					
Yes	0.06 (1.75)	-0.43 (1.39)	-0.33 (1.48)	0.18 (1.59)	0.10 (1.61)
No	-0.13 (1.39)	-0.36 (1.35)	-0.44 (1.47)	0.05 (1.74)	-0.00 (1.90)
Test of difference	t=2.44*	t=0.99	t=1.36	t=1.38	t=1.13
Census Region					
New England	-0.06 (1.12)	-0.05 (1.80)	0.14 (1.38)	0.27 (2.20)	0.07 (1.76)
Mid-Atlantic	-0.08 (1.49)	-0.28 (1.52)	0.38 (1.20)	-0.39 (2.15)	-0.22 (1.46)
South Atlantic	-0.24 (1.25)	-0.33 (1.32)	-0.28 (1.55)	0.03 (1.93)	-0.05 (1.98)
Northeast Central	-0.22 (1.06)	-0.34 (1.45)	-0.22 (1.52)	0.16 (1.82)	0.02 (1.82)
Southeast Central	-0.15 (1.37)	-0.36 (1.28)	-0.51 (1.26)	0.10 (1.86)	0.02 (2.01)
Northwest Central	0.05 (1.86)	-0.49 (1.23)	-0.62 (1.47)	0.09 (1.37)	0.00 (1.94)
Southwest Central	-0.23 (0.89)	-0.44 (1.15)	-0.67 (1.42)	-0.13 (1.71)	0.14 (1.94)
Mountain	0.17 (1.48)	-0.31 (1.32)	-0.52 (1.37)	0.44 (1.37)	0.00 (1.52)
Pacific	0.22 (2.07)	-0.30 (1.56)	-0.27 (1.19)	0.03 (1.61)	-0.10 (1.71)
Test of difference	F=3.23**	F=1.29	F=8.95**	F=2.92**	F=0.49
Population Density					
Five or fewer people/sq. mile	0.30 (1.66)	-0.42 (1.02)	-0.80 (1.17)	0.07 (1.23)	-0.05 (1.74)
More than five people/sq. mile	-0.13 (1.40)	-0.37 (1.39)	-0.39 (1.50)	0.08 (1.77)	0.02 (1.87)
Test of difference	t=3.97***	t=-0.52	t=-3.71***	t=-0.00	t=-0.42
Distance to Closest Urban Hospital					
20 miles or closer	-0.23 (1.11)	-0.39 (1.33)	-0.34 (1.49)	0.05 (1.79)	0.16 (1.91)
More than 20 miles	-0.02 (1.58)	-0.38 (1.34)	-0.45 (1.48)	0.08 (1.68)	-0.05 (1.81)
Test of difference	t=-2.87**	t=-0.14	1.52	t=-0.33	t=2.30*

* $P<0.05$.

** $P<0.01$.

*** $P<0.001$.

1. A factor score represents the weighted average (by factor loading) of values for all physician integration variables for a given observation. Weights (loadings) vary by factor, but the variable set is constant.

Table 6. Clinical Integration Factor Scores by Characteristics of Rural Hospitals[1].

Characteristics	Information Integration Mean (Standard Deviation)	Product Line Organization Mean (Standard Deviation)	Clinical Guidelines Mean (Standard Deviation)
Size			
Fewer than 50 beds	0.08 (1.74)	-0.19 (1.38)	-0.26 (1.58)
50 beds or more	-0.24 (1.63)	-0.12 (1.61)	-0.19 (1.72)
Test of difference	t=2.28*	t=-1.05	t=-0.90
Ownership			
Investor-owned	0.03 (1.76)	0.00 (1.95)	0.15 (2.04)
Private nonprofit	-0.04 (1.77)	-0.19 (1.50)	-0.18 (1.64)
Government	-0.29 (1.59)	-0.14 (1.50)	-0.32 (1.60)
Test of difference	F=6.67**	F=1.17	F=6.09**
Multihospital Member			
Yes	-0.04 (1.79)	-0.11 (1.67)	-0.08 (1.78)
No	-0.14 (1.69)	-0.16 (1.48)	-0.26 (1.63)
Test of difference	t=1.12	t=0.65	t=2.08*
Contract Management			
Yes	-0.21 (1.70)	-0.13 (1.44)	-0.32 (1.62)
No	-0.09 (1.72)	-0.16 (1.55)	-0.18 (1.68)
Test of difference	t=-1.38	t=0.39	t=-1.53
Census Region			
New England	-0.20 (1.53)	-0.22 (1.70)	-0.13 (1.66)
Mid-Atlantic	0.16 (1.73)	-0.44 (1.31)	0.28 (1.98)
South Atlantic	0.17 (2.10)	-0.05 (1.95)	-0.10 (2.03)
Northeast Central	-0.20 (1.68)	-0.17 (1.55)	-0.25 (1.72)
Southeast Central	-0.23 (1.59)	-0.16 (1.66)	-0.30 (1.52)
Northwest Central	-0.29 (1.61)	-0.10 (1.46)	-0.37 (1.56)
Southwest Central	-0.27 (1.59)	-0.28 (1.44)	-0.13 (1.72)
Mountain	0.03 (1.59)	-0.08 (1.31)	-0.30 (1.44)
Pacific	-0.12 (1.74)	-0.12 (1.22)	-0.20 (1.36)
Test of difference	F=2.92**	F=1.06	F=2.13*
Population Density			
Five or fewer people/sq. mile	-0.33 (1.38)	-0.20 (1.19)	-0.27 (1.39)
More than five people/sq. mile	-0.14 (1.74)	-0.15 (1.56)	-0.21 (1.71)
Test of difference	t=-1.52	t=-0.49	t=-0.49
Distance to Closest Urban Hospital			
20 miles or closer	-0.04 (1.87)	-0.09 (1.63)	-0.28 (1.69)
More than 20 miles	-0.19 (1.64)	-0.18 (1.48)	-0.20 (1.65)
Test of difference	t=1.83	t=1.24	t=-1.09

* $P<0.05$.

** $P<0.01$.

1. A factor score represents the weighted average (by factor loading) of values for all clinical integration variables for a given observation. Weights (loadings) vary by factor, but the variable set is constant.

provide more cost-effective care. To the extent that such managed care pressures are not as palpable in rural areas, hospitals and physicians are unlikely to engage in clinical integration. Beyond the role of managed care, however, much of clinical integration is premised on the objective of rationalizing clinical practice in large, complex delivery systems. The costs incurred in developing clinical integration strategies (e.g., sophisticated information systems) are supposedly recovered through cost savings and improved management of a large volume of procedures and patients. These conditions are rarely, if ever, present in rural hospital markets, and rural hospitals simply cannot justify the capital costs of developing such technology-intensive practices. Similarly, the small size of most rural hospitals makes reorganization equally impractical. Product line organization, for example, is thought to be an effective means of pushing down responsibility for costs to the production level, but it also requires a sufficient number of providers and support personnel to staff different product lines. Because of their relatively small size, rural hospitals are typically organized to create as many economies in clinical staffing as possible and, therefore, cannot afford the staffing duplication that often accompanies product line organization. It may be the case that clinical integration does, in fact, exist among rural hospitals, but it occurs through more personal rather than through formal organizational structures or technology-intensive means.

It is particularly important to note that even the physician integration approaches that rural hospitals share with their urban counterparts may be undertaken for different reasons. For example, both urban and rural hospitals were found to employ salaried physicians and group practice ownership. Urban hospitals may engage in such integration practices to increase loyalty of physicians in highly competitive markets, to influence the clinical behavior of physicians, or to develop a primary care network to enhance their competitive position under managed care. Rural hospitals, however, may be more apt to provide a salary contract to physicians to lessen the risk of income loss in tenuous rural markets, or as an income guarantee to attract physicians to remote rural areas. Similarly, practice support services may be used by urban hospitals to free physicians from the hassle of dealing with managed care organizations and to encourage the formation of physician groups with which the hospital can more easily deal. Rural hospitals, by contrast, may utilize practice management services to lower the office costs faced by physicians, thereby, increasing the attractiveness of practicing in a rural community. Although the conditions leading to the use of these integration approaches may differ between urban and rural hospitals, the larger aim is similar—to bind the physician economically to the hospital. However, differences in the motivations for integration between rural and urban hospitals may have important implications for other types of integration. For example, the researchers found that clinical integration activity was much less common in rural than urban hospitals. This may suggest that physician integration in rural hospitals may not lead to clinical integration in these hospitals but rather is pursued for other reasons—most notably survival.

Two physician integration approaches were decidedly more common in urban relative to rural hospitals—ventures and networks, and physicians in hospital management and governance. The finding regarding low prevalence of joint ventures between rural hospitals and physicians is consistent with previous research, indicating that rural physicians distrust the idea of joint venturing with hospitals, preferring instead that hospitals assume the financial risk for services and products (Boissoneau, 1987). Equally important is the reality that joint ventures, by definition, require a sharing of financial risk between two parties. Because of the small size of most physician practices in rural areas, it is not likely that many possess the financial wherewithal to significantly engage in joint ventures with a rural hospital. If anything, this study's results indicate that the rural hospital more typically assumes primary financial responsibility for physician integration. This certainly is consistent with the prevalence of salaried physicians and ownership arrangements and management support services provided to physicians by rural hospitals.

The relative absence of physicians in paid management and governance positions is more puzzling. Obviously, the relative lean administrative structure in rural hospitals makes it less likely that physicians will fill such positions. Urban hospitals, by contrast, typically are more complex organizationally and often have paid medical directors, product line managers (physicians) and other administrative roles created specifically for physicians. Moreover, physician managers serve an important role in larger, more complex urban hospitals. They act as an intermediate link between the medical staff and the management of the hospital, sometimes serving as a translator or buffer between these two groups. In rural hospitals, however, organizational complexity typically does not separate physicians and management. The need for formal

physician managers in linkage roles is rendered unnecessary by the largely informal ties between managers and physicians. Finally, rural physicians often are "spread too thin" in their clinical practices, making it difficult, if not impossible, to devote any time to extra management and governance responsibilities. The finding that rural hospitals are much less active than their urban counterparts in integrating physicians through formal management and governance roles is, nonetheless, a source of concern. Specifically, other research has shown that physician leadership in hospitals is an important facilitator of clinical integration (Weiner, et al., 1997). Although such leadership can be exercised through informal means, placing physicians in formal decision and policy-making roles within the hospital organization provides a linkage between the physician and the organization and additional leverage for promoting profound change in the technical core of the organization.

These same arguments do not apply, however, to physicians in governance. Clearly, physicians in policy-making roles may further the integration of hospitals and physicians by sharing power over critical decisions that affect the hospital directly and physician practices indirectly. Additional research is needed on why rural physicians are not more active in hospital governance.

This discussion of general differences in physician integration practices between rural and urban hospitals needs to be qualified by the findings that considerable variation in these practices was observed across rural hospitals. Taken as a whole, these findings indicate that particular integration approaches are systematically related to the organizational and market conditions under which rural hospitals operate. Although beyond the scope of the current study, one might speculate that rural hospitals choose approaches to physician integration that fit with the constraints and opportunities afforded by their organization and environment. Rural hospitals are not, in other words, indiscriminately adopting the approaches to physician integration taken by their urban counterparts or even by other rural hospitals. Given the "faddish" nature of this industry, this observation is not as trite as it sounds. Several examples of selective adoption by rural hospitals are particularly revealing. First, this study found that hospital size was generally associated with greater physician integration, possibly indicating that the differentiation and complexity associated with large size creates the need to integrate as well as provide the means to do so. Small rural hospitals were more likely than their larger rural counterparts to integrate physicians via salary and ownership, corroborating the authors' previous argument that such financial security may be required to induce physicians to practice in smaller, high-risk hospitals.

A second finding of note was that public rural hospitals were, in general, less active than their private counterparts in physician integration. It is suspected that public hospitals may be more constrained by local accountabilities and tax support in terms of the integrative options they have available to them. For example, private joint ventures between a public hospital and private physicians may be prohibited by the state, by local procurement and contracting statutes, or by elected board members who wish to avoid the risk of failure in such ventures. Private rural hospitals, by contrast, may have considerably more latitude in pursing a variety of physician integration strategies.

Finally, this study found that rural hospitals that were members of health care systems and those that were located in more populated, urban-proximate markets were more likely to engage in a wider variety of physician-integration activities. The one exception to this pattern was, again, increased use of salary and ownership in more rural areas. The authors think that the systemic goals of multihospital systems and proximity to urban markets provides both the impetus and necessary support for engaging in physician integration. For example, health care systems may encourage physician integration among their rural providers to advance coordination and efficiency within the system as a whole. Further, these systems frequently can provide the technology and staff expertise to design and implement these strategies, resources not available to many freestanding rural hospitals. Importantly, these findings also may have implications for the future integration efforts of more loosely structured rural health care networks. Specifically, the integration of core functions in these networks may require the strategic and administrative direction of more formal, hierarchically based arrangements. Partners in voluntary arrangements such as networks may be reluctant to cede their core functions to a larger entity for fear of losing both organizational autonomy and identity. The experience of so-called vertically integrated systems tells us that meaningful integrative activity, even within the same organizational system, is difficult to achieve (Alexander, et al., 1996a; Shortell, 1991b).

Like a number of investigations that have preceded it, this study has examined variation in structures and practices of rural and urban hospitals by environmental and organizational characteristics (Hart, et al., 1990; Mick, et al., 1990; Mick, et al., 1993; Seavey, et al.,

1992; Smith, et al., 1992). Unlike previous studies, this investigation has contributed to the literature on rural health care delivery by systematically identifying a broad range of potential physician and clinical integration approaches that rural and urban hospitals and clinicians pursue, and the conditions under which they are most likely to do so. Whereas rural health care networks involving combinations of hospitals, physicians, and other providers and insurers are becoming more prevalent in rural areas, most such networks have not integrated their core functions with other members (Moscovice, et al., 1991; Moscovice, et al., 1997). Physician-organization integration, if it occurs, still is most likely to focus on the rural hospital and rural physician. Such integration may well provide the foundation for larger integration efforts such as those occurring among multiple entities in rural areas.

This paper has examined only the approaches through which clinical practices, physicians and hospitals are integrated in rural and urban areas. It is important to acknowledge, however, that physicians themselves are organizing, often into Independent Physician Alliances (IPAs). These groups may provide a platform for further integration with hospitals or health care systems through a physician-hospital organization. In some cases, these IPAs may even bypass the delivery organization and deal with managed care firms directly. Although IPAs often are subsidized and supported by delivery organizations to promote hospital-physician integration, future research should examine these physician organizations (along with group practices and other forms of physician organizations) as increasingly important integration vehicles in their own right.

This study's findings have raised as many questions as they have provided answers. To what extent are the different integration approaches in rural hospitals successful in increasing physician loyalty to rural communities and rural hospitals? Can integration approaches currently eschewed by certain types of rural hospitals be successfully introduced in these institutions? Should they be? Why have efforts at clinical integration, with their promise of improved quality and efficiency, been predominantly implemented in only urban areas? Is it because there is little demand for the integration of clinical and financial data or for clinical guidelines? Or, is it that the methods by which these tools have been implemented have not been appropriate to rural hospitals? Of course, the fundamental research question is whether the adoption or nonadoption of physician and clinical integration efforts make a difference to hospital efficiency, quality and survivability in diverse rural markets.

References

Alexander, J, Burns, L, Zuckerman, H, Vaughn, T, Andersen, R, Torens, P, & Hilberman, D. (1996a). An exploratory analysis of market-based, physician-organization arrangements. *Hospital and Health Services Administration.* 41(3), 311-329.

Alexander, J, Morrisey, M, & Shortell, S. (1986). The effects of competition, regulation and corporatization on hospital-physician relationships. *Journal of Health and Social Behavior,* 27(3), 220-235.

Alexander, J, Vaughn, T, Zuckerman, H, Burns, L, Andersen, R, Torrens, P, & Hilberman, D. (1996b). Organizational approaches to integrated health care delivery: A taxonomic analysis of physician organization arrangements. *Medical Care Research and Review,* 53(1), 70-93.

Boissoneau, R. (1987). The medical staff role: Management in rural hospitals. *Hospital and Health Services Administration,* 32(2), 161-169.

Burns, L, Morrisey, M, Alexander, J, & Johnson, V. (1998, Fall). Managed care and processes to integrate physicians/hospitals. *Health Management Review,* 23(4), 70-80.

Burns, L, & Thorpe, D. (1997). Physician-hospital organizations: Strategy, structure and conduct. In R Conners (Ed.), *The organization and management of physician services: Evolving trends* (pp. 351-371). Chicago, IL: American Hospital Publishing.

Campion, DM, & Dickey, DF. (1995). Lessons from the essential access community hospital program for rural health network development. *The Journal of Rural Health,* 11(1), 32-39.

Cochran, WR. (1977). *Sampling techniques.* New York, NY: Wiley and Sons.

Cordes, SM. (1989). The changing rural environment and the relationship between health services and rural development. *Health Services Research,* 23(6), 757-784.

Crandall, LA, Dwyer, JW, & Duncan, RP. (1990). Recruitment and retention of rural physicians: Issues for the 1990s. *The Journal of Rural Health,* 6(1), 19-36.

Emmons, DW. (1988). Changing dimensions of medical practice arrangements. *Medical Care Review,* 45(1), 101-128.

Gillies, RR, Shortell, SM, Anderson, DA, Mitchell, JB, & Morgan, KL. (1993). Conceptualizing and measuring integration: Findings from the health systems integration study. *Hospital & Health Services Administration,* 38(4), 467-489.

Glandon, GL, & Morrisey, MA. (1986). Redefining the hospital and physician relationship under prospective payment. *Inquiry,* 23(2), 166-175.

Goes, J, & Zhan, C. (1995). The effects of hospital-physician integration strategies on hospital financial performance. *Health Services Research,* 33(2), 507-530.

Grayson, MA, & McCormick, B. (1989). Outpatients: A source of M.D./hospital conflict. *Medical Staff Leader,* 18(3), 1-8.

Hart, LG, Amundson, BA, & Rosenblatt, RA. (1990). Is there a role for the small rural hospital? *The Journal of Rural Health,* 6(2), 101-118.

Mackesy, R. (1993). Physician satisfaction with rural hospitals. *Hospital and Health Services Administration,* 38(3), 375-386.

Mick, SS, & Morlock, L. (1990). America's rural hospitals: A selective review of the 1980s research. *The Journal of Rural Health,* 6(4), 437-466.

Mick, SS, Morlock, L, Salkever, D, de Lissovoy, G, Malitz, F, Wise, C, & Jones, AS. (1993). Horizontal and vertical integration—diversification in rural hospitals: A national study of strategic activity, 1983-1988. *The Journal of Rural Health,* 9(2), 99-119.

Morrisey, M, Alexander, J, Burns, L, & Johnson, V. (1996). Managed care and physician hospital integration. *Health Affairs*, 15(4), 62-73.

Morrisey, M, Alexander, J, Burns, L, and Johnson, V. (in press). The effects of managed care on physician and clinical integration in hospitals. *Medical Care*.

Morrisey, M, Alexander, J, & Ohsfeldt, R. (1990). Physician integration strategies and hospital output: A comparison of rural and urban institutions. *Medical Care*, 28(7), 586-600.

Moscovice, I, Christianson, J, Johnson, J, Kralewski, J, & Manning, W. (1997). *Rural hospital networks*. Ann Arbor, MI: Health Administration Press.

Moscovice, I, Johnson, J, Finch, M, Grogan, C, & Kralewski, J. (1991). The structure and characteristics of rural hospital consortia. *The Journal of Rural Health*, 7(5), 575-588.

Moscovice, I, Christianson, J, & Wellever, A. (1995). Measuring and evaluating the performance of vertically integrated rural health networks. *The Journal of Rural Health*, 11(1), 9-21.

Moscovice, I, & Rosenblatt, R. (1985). A prognosis for the rural hospital Part I: What is the role of the rural hospital? *The Journal of Rural Health*, 1(1), 29-40.

Movassaghi, H, & Kindig, D. (1989). Medical practice and satisfaction of physicians in sparsely populated rural counties of the United States: Results of a 1988 survey. *The Journal of Rural Health*, 5(2), 125-136.

Rural Health Research Center. (1997). *Rural health networks: Forms and functions*. Minneapolis, MN: University of Minnesota School of Public Health.

Seavey, JH, Berry, DE, & Bogue, RJ. (1992). The strategies and environments of America 's small rural hospitals. Chicago, IL: The Hospital Research and Educational Trust, American Hospital Association.

Shortell, SM. (1991a). Revisiting the garden: Medicine and management in the 1990s. *Frontiers of Health Services Management*, 7(1), 3-32.

Shortell, SM. (1991b). *Effective hospital-physician relationships*. Ann Arbor, MI: Health Administration Press.

Shortell, S, Gillies, RR, Anderson, DA, Morgan-Erickson, K, & Mitchell, J. (1996). *Remaking healthcare in America: Building organized delivery systems*. San Francisco, CA: Jossey-Bass.

Smith, HL, & Piland, NF. (1990). Strategic adaptation to PPS by rural hospitals: Implications for theory and practice. *The Journal of Rural Health*, 6(2), 140-160.

Smith, HL, Piland, NF, & Funk, MJ. (1992). Strategic planning in rural health care organization. *Health Care Management Review*, 17(3), 63-80.

Smith, HL, Reid, HA, & Piland, NF. (1990). Managing hospital-physician relations: A strategy scorecard. *Health Care Management Review*, 15(4), 23-33.

Weiner, BJ, Shortell, SM, & Alexander, J. (1997). Promoting clinical involvement in hospital quality improvement efforts: The effects of top management, board, and physician leadership. *Health Services Research*, 32(4), 491-510.

Zismer, DK, & Hoffman, DC. (1995). A 10-point strategic checklist for rural health care systems. *The Journal of Rural Health*, 11(1), 53-59.