

Leadership for Quality Improvement in Health Care: Empirical Evidence on Hospital Boards, Managers, and Physicians

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This article explores factors promoting leadership from the top for hospital quality improvement (CQI/TQM). From literature on governance, quality improvement, and organization theory, working hypotheses were developed about the effects of physician and management involvement in governance on CQI/TQM adoption, board leadership for quality, and top management leadership for quality. Hypotheses were tested using a sample of 2,030 hospitals obtained by merging two national mailed surveys. Probit and logistic regression showed physician involvement in governance played a significant role in CQI/TQM adoption and board activity in quality improvement. Formal management involvement in governance demonstrated little effect on CQI/TQM adoption, board leadership for quality, or top management leadership for quality. Informal management involvement in governance, as reflected in opportunities to influence board composition, had negative effects on board and top management leadership for quality. Top management leadership for quality increased board leadership for quality. Implications are discussed.

The role of governance in leadership for quality has received little attention in the quality improvement (CQI/TQM) literature. In industrial settings, senior managers assume responsibility for demonstrating leadership from the

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top and constancy of purpose, two critical features of successful CQI/TQM implementation (Deming 1986; Juran 1988, 1989; Ishikawa 1985). Yet many health care organizations possess a more diffuse leadership structure due to the presence of an organized body of professionals who are not employees and a broader set of stakeholder accountabilities. Although a diffuse leadership structure may not lessen the importance of top management leadership, it does suggest the possibility that leadership for quality in health care may come from other sources, including boards of directors and physician leaders.

We explore this possibility by examining the following research questions: What role does the board play in CQI/TQM adoption? Does physician or management involvement in governance increase board quality monitoring or board activity in CQI/TQM? Does physician or management involvement in governance promote CEO participation in CQI/TQM? Finally, does CEO leadership for quality stimulate board leadership for quality? We develop several working hypotheses about the roles of boards, managers, and physicians by drawing on literature on governance, quality improvement, and organization theory. We test these ideas by merging and analyzing two existing data sets on hospital governance and quality improvement activities.

NEW CONTRIBUTION

This article reports the first empirical study of leadership for quality in health care. The extant health care literature on quality improvement (QI) is composed of (1) articles discussing the philosophy of QI, (2) papers offering conceptual models to guide implementation, (3) anecdotes describing QI implementation, and (4) research notes prescribing methods for adopting statistical quality control processes (Gann and Restuccia 1994). To date, no empirical study has examined who provides leadership for quality in health care organizations or what factors promote such leadership. Although exploratory, our analyses show that physician involvement in governance and informal management influence in board affairs—as reflected in opportunities to influence board composition—affect the degree to which boards and senior managers assume leadership for quality. Further, our results suggest that CEO participation in QI activities encourages boards to assume greater leadership for quality.

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CONCEPTUAL BACKGROUND

Industrial QI approaches travel under a variety of acronyms and encompass a wide range of philosophies, principles, and methods. In this study, continuous quality improvement (CQI) is defined as an ongoing effort to provide care that meets or exceeds customer expectations (Shortell, O'Brien, Carman, Foster, Hughes, Boerstler, and O'Connor 1995). Total quality management (TQM) is defined as a structured process for creating organization-wide participation in planning and implementing continuous improvement. CQI/TQM combines the application of statistical tools and scientific investigation with the organization's knowledge of work processes and customer requirements. This approach differs significantly from Quality Assurance (QA), wherein quality is defined as adherence to acceptable standards of patient care, behavior of individual providers is subject to retrospective peer review, and disciplinary or corrective action is taken when necessary (Weiner and Alexander, "Hospital Governance," 1993).

CQI/TQM implementation often involves extensive technical, structural, strategic, and cultural changes (O'Brien et al. 1995; Shortell, Levin, et al. 1995). Decision makers must demonstrate constancy of purpose and personal, visible leadership to guide the organization through a 5- to 10-year CQI/TQM change effort (Deming 1986; Ishikawa 1985; Juran 1988, 1989). Specifically, decision makers must articulate a long-range vision for total quality, develop an action plan, and inspire others to fulfill this vision. If they do not make quality a top priority and instill an organization-wide commitment to continuous improvement, the CQI/TQM effort is likely to fail.

Quality experts usually assign top management primary responsibility for demonstrating leadership for quality (Deming 1986; Ishikawa 1985; Juran 1988, 1989). However, the hospital board also plays a critical role in creating a supportive corporate context for quality improvement (Arrington, Gautam, and McCabe 1995; James 1990; Weiner and Alexander, "Hospital Governance," 1993). In part, a leadership role for governance emerges from the board's legal accountability for quality of care. In health care organizations, board responsibility for quality is clearly delineated in statutory law, regulatory requirements, and accreditation standards (Orlikoff and Totten 1991).

More important, a leadership role for governance emerges from the board's position as a nexus for planning, implementing, and institutionalizing the hospital's QI effort. The board is often the only structural interface through which elements of hospital (and community) leadership can jointly establish, communicate, and evaluate the organization's quality vision. This favorable position gives the board considerable leverage to facilitate organization-wide

quality improvement. For example, the board can enhance the credibility of the CQI/TQM effort by linking it to the organization's mission and strategic objectives, allocating financial resources for CQI/TQM, revising executive compensation and performance evaluation criteria, and monitoring quality improvement efforts (Larson 1990).

Further, the board can play a key role in maintaining "continuity of purpose" in situations of executive turnover (Blumenthal and Edwards 1995; "Roundtable Discussion" 1992). CQI/TQM takes several years to yield significant cost savings and measurable quality improvement (Deming 1986; Juran 1988, 1989). Given the importance of leadership from the top and constancy of purpose, executive turnover represents a serious challenge (Berwick, Godfrey, and Reossner 1990). A defining feature of the hospital board, however, is its stability (Starkweather 1988). Active board involvement in CQI/TQM increases the likelihood that the hospital's quality focus will remain constant even in the absence of stability in executive positions. Steady, visible board leadership creates a climate of trust and assures staff and physicians of the hospital's unwavering commitment to CQI/TQM.

At the present time, neither the extent of board leadership for quality nor the factors contributing to its development are known. However, the literature on governance, quality improvement, and organization theory suggests that governance structure may be a critical determinant of both board and top management leadership for quality. For example, organization theorists propose that structural integration of management and governance fosters unity of command, shared vision, and common values among directors and managers (Alexander, Morlock, and Gifford 1988; Finkelstein and D'Aveni 1994). Management involvement in governance may clarify expectations about the importance and direction of the CQI/TQM initiative and tighten the degree of correspondence between strategic quality planning and goal deployment (Weiner and Alexander, "Hospital Governance," 1993). These benefits may not only facilitate adoption but also increase managers' personal commitment to CQI/TQM. Management involvement in governance may also strengthen the board's ability to exercise strategic quality control by allowing outside directors to take advantage of insiders' knowledge of organizational processes, problems, and resources. These observations suggest the following working hypotheses:

- H1: The greater the degree of management involvement in governance, the greater the likelihood of CQI/TQM adoption.*
- H2: The greater the degree of management involvement in governance, the greater the degree of board leadership for quality.*

H3: The greater the degree of management involvement in governance, the greater the degree of top management leadership for quality.

Physician involvement in governance may also promote board and top management leadership for quality. Physicians are not only key customers for hospital services but also critical elements of the hospital's production process. Hence they possess important information about the hospital's clinical quality gaps and work processes. Physician board members can play a valuable role in strategic quality planning and related governance activities by conveying customer requirements and offering clinical quality goals. Physician participation in governance may also enhance board quality monitoring by increasing nonphysician board members' comfort in evaluating clinical quality. For example, physician board members could help the board determine its information needs, interpret clinical quality data, and identify appropriate actions to improve quality (Weiner and Alexander, "Hospital Governance," 1993). Finally, joint participation in hospital decision-making may improve communication, clarify expectations, and build trust among senior managers, board members, and physicians (Rehm and Alexander 1986; Shortell 1991). Thus physician involvement in governance could encourage all three parties to demonstrate personal, visible leadership for quality. These observations suggest the following working hypotheses:

H4: The greater the degree of physician involvement in governance, the greater the likelihood of CQI/TQM adoption.

H5: The greater the degree of physician involvement in governance, the greater the degree of board leadership for quality.

H6: The greater the degree of physician involvement in governance, the greater the degree of top management leadership for quality.

Finally, we include several hospital and market characteristics that serve as control variables for hypothesis-testing purposes and merit consideration in their own right as predictors of leadership for quality. Studies show that board-management-physician relationships vary as a function of board size, hospital size, hospital performance, multihospital system membership, teaching status, ownership type, market competition, and regulatory climate (Alexander 1990; Alexander, Morlock, and Gifford 1988; Weiner and Alexander, "Corporate and Philanthropic Models," 1993). Further, research suggests that several of these factors also affect the nature, extent, and effectiveness of hospital quality improvement efforts. Hospital size, for example, has been found to significantly and positively predict CQI/TQM adoption, use of clinical algorithms or critical pathways among CQI/TQM adopters, and cost

savings attributable to CQI/TQM efforts (Barsness et al., 1993a, 1993b). We include these contextual factors as control variables to rule out plausible, alternative explanations for the relationship between governance structure and leadership for quality. In keeping with the exploratory nature of the study, we also examine the direct effects of these contextual factors on leadership for quality.

METHODS

DATA FILES

Data for this investigation were obtained from two national mailed surveys of U.S. community hospitals sent by the American Hospital Association and the Hospital Research and Educational Trust. The first supplied data on board composition, board structure, board-physician relations, and board-CEO relations. Mailed in 1989, the survey was completed by the CEO and key board members such as the board chairperson. The second provided data on hospital quality improvement efforts. Mailed in 1993, the survey was completed by the CEO and the person responsible for the hospital's overall quality improvement effort.

Response rates to the surveys were approximately the same (60%, or 3,200 hospitals), with 2,030 hospitals responding to both. These common respondents formed the study group. The 4-year lag between surveys was not expected to influence study results since hospital board composition changes little over time (Alexander 1990; Alexander, Fennell, and Halpern 1993; Starkweather 1988). The effective size of the sample was reduced in analytic models to 1,870 hospitals due to casewise deletion for missing data. Compared to the population of U.S. acute-care community hospitals, the analytic sample overrepresented larger hospitals and underrepresented investor-owned hospitals. No significant differences existed for multihospital system membership, urban location, or census region.

Merged with the survey file were data from three other sources: 1989 American Hospital Association Annual Survey of Hospitals, 1989 Medicare Cost Report, and 1986 regulatory stringency data. The Annual Survey of Hospitals supplied data on hospital size, hospital ownership type, multihospital system membership, teaching hospital status, and market concentration. The Medicare Cost Report furnished information on hospital financial performance. Regulatory stringency data were compiled by the Hospital Research and Educational Trust.

MEASURES

Dependent Variables. Two dimensions of a hospital's quality effort were examined: CQI/TQM adoption and leadership for quality. Hospital adoption of CQI/TQM was measured as a binary variable indicating whether a hospital was formally and behaviorally committed to CQI/TQM. A hospital was classified as a CQI/TQM adopter if its quality effort incorporated all five of the following components: (1) philosophy of continuous improvement of quality through improvement of work processes, (2) use of structured problem-solving processes incorporating statistical methods and measurement to diagnose problems and monitor progress, (3) use of QI teams including employees from multiple departments and different organizational levels as the major mechanism for introducing improvements in organizational processes, (4) empowering employees to identify quality problems and improvement opportunities and to take action on these problems and opportunities, and (5) an explicit focus on "customers"—both internal and external.

Two sources of leadership for quality were studied: top management leadership for quality and board leadership for quality. Top management leadership for quality was measured as the number of CQI/TQM activities in which the CEO personally participated. Thirteen activities were examined to capture CEO participation in CQI/TQM (e.g., participating in the quality improvement management council). A complete list of activities is provided in the appendix.

Board leadership for quality was captured by board quality monitoring and board activity in quality improvement. Board quality monitoring was measured as the number of quality-related reports received by the board. Ten quality-related reports were studied (e.g., QI project results). The appendix provides the full list of reports. Board activity in quality improvement was measured as the number of actions taken by the board over the past 12 months to improve quality. Three board actions were examined: requesting that additional quality of care data be collected, initiating a special study of a specific quality problem, and taking corrective action on an identified problem. Both measures were constructed as additive scales.

Independent Variables. Two dimensions of governance structure were chosen to reflect the board's position as the nexus for planning, implementing, and institutionalizing CQI/TQM. The first, physician involvement in governance, was measured by two variables: (1) number of active-staff physicians on the board and (2) number of physicians-at-large on the board. The second, management involvement in governance, was measured by three variables: (1) number of hospital management personnel on the board, excluding the CEO;

(2) CEO role on the board; and (3) CEO tenure. CEO role on the board was measured by a 4-point ordinal scale ranging from *CEO does not attend board meetings* to *CEO serves as chairperson*. CEO tenure reflects the degree of informal management influence in board affairs. Informal management influence increases with tenure because over time CEOs gain the loyalty of others and indirectly shape board composition through the director nomination process (Finkelstein and D'Aveni 1994). CEO tenure was measured as the number of years the incumbent held office.

Control Variables. Measures of organizational context and market environment were included in analyses as both control variables and potentially interesting predictors in their own right. Time involved in CQI/TQM was measured on a 3-point scale indicating whether the CQI/TQM initiative was less than 2 years old, 2 to 4 years old, or more than 4 years old. Board size was measured as total number of board members. Hospital performance was measured by cash flow and adjusted admissions. Cash flow, measured as the ratio of net income and depreciation to total assets, reflects the efficiency with which a hospital is using its financial resources. Adjusted admissions, normalized by hospital size, reflects the ability of a hospital to acquire a critical resource from the environment.

Organizational context was captured by hospital size, multihospital system membership, teaching status, and ownership type. Hospital size was measured as the log transformation of the number of beds set up and staffed for use. Multihospital system membership was measured as a binary variable. A multihospital system was defined as two or more hospitals owned, leased, or sponsored by a separate administrative entity. This definition excludes contract management. Teaching status was measured as a binary variable indicating Council of Teaching Hospitals membership. Ownership type was measured as a binary variable indicating private ownership.

Two dimensions of market context were studied: market concentration and regulatory climate. Market concentration was measured by the Herfindahl-Hirschman Index (HHI), or the sum of the squared market shares for all hospitals in a market. Markets were defined by county lines. Market share was defined for each hospital by the number of other hospitals in the focal hospital's market and the distribution of admissions among the focal hospital and its competitors. HHI ranges from 0 to 1. Higher values indicate more concentration (i.e., less competition).

Regulatory climate was captured by two scales reflecting the stringency of certificate of need (CON) and rate review programs. Stringency of CON was measured on an additive scale constructed from five variables: 1986 threshold levels for capital expenditures, major medical equipment, and new institu-

tional services; 1984 state planning agency budgets per nonfederal hospital; and 1984 percentage of CON hospital application approvals. Stringency of rate review was measured by assigning states into one of three ordered categories based on the status of hospital reimbursement legislation in effect in each state by the end of 1985. Descriptive statistics for all variables are shown in Table 1.

ANALYTIC STRATEGY

Four models were tested using probit and logistic regression analyses. The first model examined the effects of management and physician involvement in governance on the probability of CQI/TQM adoption. Significant, positive coefficients for variables measuring these constructs would demonstrate support for Hypothesis 1 and Hypothesis 4.

The second model examined the effects of management and physician involvement in governance on top management leadership for quality. Only a subset of hospitals adopted CQI/TQM. Therefore, Heckman's two-stage modeling approach was used to account for possible selection bias (Kmenta 1986). A selection bias parameter (λ) was generated from the probit analysis of CQI/TQM adoption, summarizing information about factors affecting CQI/TQM adoption. The parameter was then included in all subsequent models to control for selection factors. Significant, positive coefficients for variables measuring management and physician involvement in governance would represent support for Hypothesis 3 and Hypothesis 6.

Finally, the third and fourth models tested the effects of management and physician involvement in governance on the two dimensions of board leadership for quality: board quality monitoring and board activity in quality improvement. Significant, positive coefficients for variables measuring these constructs would represent support for Hypothesis 2 and Hypothesis 5. Although no explicit hypothesis was formulated, CEO participation in CQI/TQM was included in both models. The inclusion of this variable permits an exploratory analysis of whether top management leadership for quality stimulates board leadership for quality.

RESULTS

CQI/TQM ADOPTION

Seventy percent of sample hospitals reported their QI effort involved CQI/TQM. Of those involved in CQI/TQM, 73.9% had been so for less than 2 years, 22.4% for 2 to 4 years, and 3.7% for more than 4 years.

TABLE 1 Study Measures and Descriptive Statistics

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>Standard Deviation</i>
Hospital quality effort			
Hospital involved in CQI/TQM	Hospital has organized CQI/TQM effort (0 = no, 1 = yes)	0.69	0.46
Leadership for quality			
CEO involvement in CQI/TQM	Number of CQI/TQM activities in which CEO is personally involved (range 0-13)	7.31	2.91
Board quality monitoring	Number of quality-related reports received by board (range 0-10)	6.92	2.00
Board activity in quality improvement	Number of quality improvement actions taken by board in past 12 months (range 0-3)	1.04	1.09
Governance Structure			
Physician involvement in governance	Number of directors who are active staff physicians at hospital	2.20	2.20
Management involvement in governance	Number of directors who are physicians-at-large	0.30	0.86
	Number of directors who are managers at hospital (excluding CEO)	0.15	0.59
	Formal CEO role on the board (0 = CEO does not attend board meetings, 1 = observer, 2 = ex officio, nonvoting member, 3 = voting member, 4 = chair or vice chair of the board)	2.36	0.75
	CEO tenure (in years)	6.38	6.87
Control Variables			
Time involved in CQI/TQM	Number of years involved in CQI/TQM (1 = less than two years, 2 = two to four years, 3 = more than four years)	1.29	0.53
Board size	Number of members on hospital board (natural logarithm)	2.49	0.55
Hospital performance	Cash flow (net income + depreciation/total assets)	0.08	0.13
	Adjusted admissions (normalized by hospital size)	32.44	12.00
Hospital size	Number of beds set up and staffed for use (natural logarithm)	4.91	0.93
MHS member	Hospital owned, leased, or sponsored by a MHS (0 = no, 1 = yes)	0.29	0.45
Teaching status	Hospital a member of Council of Teaching Hospitals (0 = no, 1 = yes)	0.07	0.26
Private ownership	Hospital operates under private control (0 = no, 1 = yes)	0.73	0.26
Market concentration	Herfindahl-Hirschman Index (HHI) of market concentration based on total community hospital admissions in county	0.51	0.45
Regulatory climate	CON stringency scale (range 0-15)	7.46	3.60
	Rate review stringency scale (range 0-2)	0.81	1.55

NOTE: MHS = Multihospital system

TABLE 2 Probit Regression Analysis of Governance Structure on Hospital CQI/TQM Adoption^a

<i>Constructs</i>	<i>Variables</i>	<i>Model 1 CQI/TQM Adoption</i>
Intercept		-1.52****
Governance structure		
	Clinical MD representation on board	0.59*
	MD at large representation on board	-1.23*
	Management representation on board	-0.57
	CEO role on board	0.03
	CEO tenure	-1.7E-3
Control variables		
	Board size	0.05
	Cash flow	-0.22
	Adjusted admissions	6.5E-03****
	Hospital size	0.28****
	Private ownership	0.08
	MHS membership	0.28***
	Teaching hospital	-0.01
	Market concentration	0.06
	CON legislation	0.03
	Rate review	-5.5E-3
	Selection parameter (lambda)	—
Log-likelihood normal		-1054.4

NOTE: MHS = Multihospital system; CON = Certificate of need.

a. Unstandardized coefficients are reported. $N = 1,870$.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. **** $p < 0.0001$.

Table 2 reports results for CQI/TQM adoption. Management involvement in governance did not significantly predict CQI/TQM adoption. Hence no support was obtained for Hypothesis 1. However, interesting results emerged for physician involvement in governance. Active-staff physician involvement in governance significantly and positively predicted CQI/TQM adoption, while physician-at-large involvement in governance significantly and negatively predicted CQI/TQM adoption. Hence support for Hypothesis 4 depends on the type of physicians involved in governance. Among the hospital and market characteristics examined on an exploratory basis, hospital size, hospital performance, and multihospital system membership significantly and positively predicted CQI/TQM adoption.

TABLE 3 Logistic Regression Analysis of Governance Structure on Top Management and Board Leadership for Quality^a

<i>Constructs</i>	<i>Variables</i>	<i>Model 2: CEO Participation in CQI/TQM^b</i>	<i>Model 3: Board Activity in CQI/TQM^c</i>	<i>Model 4: Board Quality Monitoring^d</i>
Governance structure				
	Clinical MD representation on board	0.42	1.08**	-0.17
	MD at large representation on board	-0.23	-0.83	-1.73
	Management representation on board	0.86	-1.52	-1.61
	CEO role on board	0.09	0.06	0.15
	CEO tenure	-0.02**	0.03****	-0.01*
Leadership for quality				
	CEO involvement in CQI/TQM	—	0.12****	0.08****
Control variables				
	Time involved in CQI/TQM	0.70****	0.06	0.30***
	Board size	0.08	-0.09	-0.27*
	Cash flow	-0.25	-0.79	0.64
	Admissions	0.01	0.01	4.7E-3
	Hospital size	0.08	0.36	0.21
	Private ownership	-0.06	0.13	0.38**
	MHS membership	0.37	0.10	0.08
	Teaching hospital	-0.41**	0.34	-0.62***
	Market concentration	0.32	0.31	-0.06
	CON legislation	0.01	0.26**	0.17**
	Rate review	0.01	0.01	0.01
	Selection parameter (λ)	1.72	0.95	-0.15
	Log-likelihood chi-square	81.62****	93.0****	96.22****
	(df)	(17)	(18)	(18)

NOTE: MHS = Multihospital system

a. Unstandardized coefficients are reported. Intercept values available from authors.

b. $N = 1,225$.c. $N = 1,207$.d. $N = 1,225$.* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. **** $p < 0.001$. ***** $p < 0.0001$.

TOP MANAGEMENT LEADERSHIP FOR QUALITY

Table 3 shows the effects of management and physician involvement in governance on top management leadership for quality. Physician involvement in governance had no significant effect on CEO participation in CQI/TQM. Thus Hypothesis 6 received no support. However, interesting results emerged for management involvement in governance. While no sig-

nificant effects were obtained for senior management involvement in governance or formal CEO role on the board, CEO tenure showed a significant, negative relationship with CEO involvement in CQI/TQM. The longer a CEO's tenure, and by implication the greater his or her informal influence in board affairs, the less extensive the CEO's participation in CQI/TQM. Thus Hypothesis 3 was not supported. If anything, management involvement in governance decreases, rather than increases, CEO leadership for quality.

Among the variables examined on an exploratory basis, teaching hospital status had a significant, negative effect on CEO participation in CQI/TQM. However, CEO participation in CQI/TQM increased significantly as the hospital's CQI/TQM effort matured.

BOARD LEADERSHIP FOR QUALITY

Table 3 also shows the effects of management and physician involvement in governance on board leadership for quality. As in the case of top management leadership for quality, CEO tenure, a measure of informal management influence in board affairs, had a negative effect on board leadership for quality. In hospitals where CEOs had long tenure, boards took significantly fewer actions to correct quality problems or improve quality and, to some extent, engaged in less quality monitoring. Thus Hypothesis 2 received no support. If anything, management involvement in governance decreases, rather than increases, board leadership for quality.

Active staff physician involvement in governance showed a significant, positive effect on board activity in quality improvement, even after controlling for the positive effect that this type of physician involvement has on the decision to adopt CQI/TQM. However, active-staff physician involvement in governance showed no significant effect on board quality monitoring. Further, physician-at-large involvement in governance demonstrated no significant effect on either measure of board leadership for quality. Thus Hypothesis 5 received only partial support.

While no hypothesis was formally offered, it appears that top management leadership for quality stimulates board leadership for quality. Personal CEO participation in CQI/TQM activities significantly increases the extent of both board quality monitoring and board activity in quality improvement. Time also plays a key role in enhancing board quality monitoring.

Several hospital and market characteristics also predicted board leadership for quality. Stringency of CON legislation demonstrated a significant, positive effect on both measures of board leadership. Teaching status demonstrated negative effects on board quality monitoring and, to a lesser extent, board activity in quality improvement. Finally, board activity was significantly and

positively related to hospital size and hospital performance, while board quality monitoring was significantly and positively related to private ownership.

DISCUSSION

This study represents a first attempt to develop and apply a theoretically grounded conceptual framework about the effects of governance structure on the development of leadership for quality improvement. Given the limited status of scientific knowledge of CQI/TQM, it is not surprising that few of the working hypotheses received consistent support. Because its origins lie outside the academic world, CQI/TQM's connections to management theory have yet to be made explicit (Dean and Bowen 1994; Hackman and Wageman 1995). While intriguing, the observed counterintuitive results may signal a need for theoretical refinement. For example, results could be interpreted to suggest that personal commitment and informal relationships contribute more to the development of leadership for quality than formal, structured relationships among boards, managers, and physician leaders. Alternatively, the low support for working hypotheses may simply reflect the limitations of using existing data sets designed for other research purposes. That is, the notion that governance structure affects the development of leadership from the top may be theoretically sound but imperfectly captured by available measures. Other governance features that might be relevant, but could not be studied, include management and physician involvement in the board's executive committee or quality improvement committee, and board member and physician leader involvement in the organization-wide quality steering committee.

Despite these potential limitations, several interesting findings emerged. A key result is that active-staff physician involvement in governance raises both the probability of CQI/TQM adoption and the degree of board activity in quality improvement. This finding is striking given reports that hospital leaders face substantial barriers in gaining clinical involvement in CQI/TQM (Blumenthal and Edwards 1995; Shortell, O'Brien, Carman, Foster, Hughes, Boerstler, O'Connor, and Gillies 1995). Physicians are apparently reluctant to participate in CQI/TQM due to distrust of hospital motives, lack of time, and fear that emphasis on reducing variation in clinical processes will compromise their ability to tailor care to meet individual patients' needs. Yet results suggest physicians who participate in strategic planning, policy making, and related governance activities champion rather than resist CQI/TQM.

This divergence may reflect a bifurcation of attitudes and values between physician leaders and other medical staff members (Shortell 1991). Among the

medical staff at large, a general distrust of hospital motives may exist. Yet physician leaders may develop through frequent contact over many years a shared vision and common set of values with managers and board members. Consequently, physicians involved in governance may feel a sense of ownership in the CQI/TQM effort. Their knowledge of the hospital's strengths and weaknesses, familiarity with patient perceptions, and commitment to the institution may make them active supporters of CQI/TQM. Further, their presence on the board may spur board activity in quality improvement by helping nonphysician board members feel comfortable requesting that additional quality of care data be collected or taking corrective action on a specific quality problem. In sum, physician leadership appears to play a key role in launching and sustaining CQI/TQM efforts.

Results show, however, that not all forms of physician involvement in governance are equally helpful. Physician-at-large involvement in governance not only lowered the probability of CQI/TQM adoption but also had no significant effect on leadership for quality. Such physicians may favor traditional methods for ensuring quality of care (e.g., quality assurance, utilization review, risk management) or hold an agenda that does not rank CQI/TQM as a high priority. For example, they may view establishing linkages with medical group practices as more important than CQI/TQM. As outsiders, they may have little interest or investment in internally generated efforts to improve quality as long as the hospital meets externally mandated requirements.

Contrary to expectations, formal management involvement in governance did not promote CQI/TQM adoption or leadership for quality. However, CEO participation in CQI/TQM activities strengthened both board quality monitoring and board activity in quality improvement. It seems that the emergence of board leadership for quality depends more on the CEO's personal commitment to CQI/TQM than on the exercise of formal managerial influence in board affairs. While structural integration of governance and management may be instrumental in promoting unity of command, shared vision, and common values, senior managers may be more successful in creating a united front for quality improvement by leading through personal example.

The negative effect of CEO tenure on top management leadership for quality was also unexpected. It may be the case that CEOs who have long held office are simply less receptive to the notion of applying industrial QI methods to health care delivery. Management theory and research suggests that CEOs are most open-minded about how an organization should be run at the outset of their tenure. As time passes, they become committed to a given paradigm about how the environment behaves, what strategic options are available, and

how an organization should be run (Rubin and Brockner 1975; Miller and Friesen, 1984). Alternatively, long-tenured CEOs may be receptive to CQI/TQM yet lack either the skills to practice a new management philosophy or the credibility to establish new relationships with physicians and staff as a result of entrenched cognitive or behavioral patterns. In any event, board members and physician leaders seeking to implement CQI/TQM should examine closely whether the incumbent CEO is willing and capable of exhibiting personal, visible leadership for quality.

CEOs not only play an important role in CQI/TQM implementation but also exercise substantial informal influence over the board. Consequently, the observed negative effect of CEO tenure on board leadership for quality is potentially unsettling, especially in light of the finding that CEO tenure also has a negative effect on top management leadership for quality. It seems that the cool reception long-tenured CEOs give to CQI/TQM biases the board against playing an active role in monitoring and improving quality. The result may be a self-reinforcing leadership vacuum if, in the absence of board pressure, long-tenured CEOs feel less motivated to assume a personal, visible leadership role in the hospital's quality improvement effort.

Several organizational and market characteristics play an important role in CQI/TQM adoption. The significant, positive effects of organizational size and performance suggest that hospitals most likely to adopt CQI/TQM possess a strong reputation or leadership position in the industry. Further, they imply that hospital adoption of CQI/TQM depends on the availability of resources to support extensive cultural and operational changes. Quality improvement does not come free (Juran 1988, 1989). Acquiring detailed information about costs, work processes, and outcomes demands substantial investment. So too does widespread training in QI philosophy and methods. Notwithstanding several publicized examples of CQI/TQM helping ailing industrial firms recover lost market share and return to profitability (e.g., Motorola, Xerox), poor performance does not appear to be a driving force behind CQI/TQM adoption in health care.

Study results do not confirm reports that hospitals adopting CQI/TQM face intense competition for patients and see CQI/TQM as a way to distinguish themselves from competitors (Blumenthal and Edwards 1995). In fact, exploratory analysis (not shown) indicates market competition has a significant, negative effect on the length of time a hospital has been involved in CQI/TQM. Low competitive pressure may permit a hospital to commit greater time, attention, and resources to a multiyear CQI/TQM campaign.

This may also explain the significant, positive effect of CON legislation on CQI/TQM adoption. Originally intended to slow the rate of growth in health care capital expenditures, CON programs have the effect of reducing market pressure by acting as a barrier to entry for alternative delivery systems.

There are several areas for future research. First, research might examine whether physician involvement in governance promotes clinical involvement in CQI/TQM. Physician involvement in governance may not only improve communication among physicians, managers, and boards but also build trust by assuring clinical staff that their professional values and goals are represented in policy decisions (Shortell 1991; Rehm and Alexander 1986). Through their involvement in governance, physician leaders can shape the hospital's quality vision and directly influence decisions about implementation and cost-quality trade-offs. This, in turn, may increase the receptivity and involvement of clinical staff in hospital CQI/TQM efforts.

Second, research might examine whether board leadership for quality increases the long-term viability of a CQI/TQM effort. As noted earlier, boards can institutionalize an organization-wide commitment to continuous improvement by linking CQI/TQM to the hospital's mission, allocating financial resources for CQI/TQM, revising executive compensation and performance evaluation criteria, and actively engaging in quality control. Boards can also sustain "constancy of purpose" in situations of executive turnover and build external support for CQI/TQM.

Finally, research might examine whether combined CEO-board-physician leadership for quality enhances CQI/TQM implementation and effectiveness. In an earlier review, we propose that the information demands and systems focus of CQI/TQM will require greater coordination and cooperation among boards, managers, and physicians (Weiner and Alexander, "Hospital Governance," 1993). Others too suggest that "successful institutions will see leadership as a critical mass that brings together components from governance, management, the medical staff, and patient services" (Chapman-Cliburn 1988, 48). Thus hospitals that develop a united front for CQI/TQM may achieve higher quality at lower costs than institutions where leadership for quality comes from one source.

APPENDIX

CEO participation in CQI/TQM was measured using 13 possible activity domains:

(1) participating in the quality improvement management council or steering committee, (2) teaching CQI/TQM to others, (3) participating in quality improvement teams, (4) using CQI/TQM techniques in working with senior management team, (5) using CQI/TQM techniques in working with secretary and/or other administrative support staff, (6) participating in organization-wide improvement work with suppliers and customers, (7) regularly reporting the results of CQI/TQM activities to the organization's board, (8) helping collect and/or analyze data, (9) using CQI/TQM techniques in doing strategic planning, (10) revising the organization's statement of mission and philosophy to reflect CQI/TQM emphasis, (11) setting quality improvement goals for the organization, (12) applying CQI/TQM philosophy, principles, and methods to professional life, and (13) applying CQI/TQM philosophy, principles, and methods to personal life.

Board quality monitoring was measured in terms of 10 quality-related reports: (1) overall mortality rates not adjusted for severity of illness, (2) overall mortality rates adjusted for severity of illness, (3) condition-specific mortality rates adjusted for severity of illness, (4) infection rates, (5) medication error rates, (6) results of special studies, (7) results of quality improvement project teams, (8) results of patient satisfaction studies, (9) unscheduled readmissions to hospital or treatment unit within hospital, (10) other critical incident or adverse event data (e.g., patient falls).

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