Background: Medical research continues to focus overwhelmingly on biomedical interventions, such as drugs, devices, and procedures. The dysfunctional health care cultures and systems need more attention for quality of care to improve further.

Purpose: The existing health services management research has not used a systematic theoretical framework to predict the effects of organizational variables on clinical outcomes. This study tests the theoretical model proposed by N. Khatri, A. Baveja, S. Boren, and A. Mammo (2006).

Methodology: This study surveyed employees from hospitals in Missouri. The sample consisted of 77 respondents from 16 hospitals.

Findings: The control-based management approach (Management Control and Silos) was found to be positively associated with Culture of Blame and negatively with Learning From Mistakes. In contrast, the commitment-based approach (Fair Management Practices and Employee Participation) was negatively associated with Culture of Blame and positively with Learning From Mistakes, Camaraderie, and Motivation. Mediating variables of Learning From Mistakes and Camaraderie showed a significant negative relationship with Medical Errors. Learning From Mistakes, Camaraderie, and Motivation all showed a significant positive relationship with Quality of Patient Care. The mediating variables had much stronger relationships with Medical Errors and Quality of Patient Care than did the independent variables, lending support to the proposed mediation.

Implications for Practice: Health care organizations can improve the quality of care and reduce medical errors significantly by enhancing learning from mistakes and boosting camaraderie and morale of their employees. They can do so by breaking down silos in their structures, implementing just and fair management practices, and involving employees in decision making.
The reports of the Institute of Medicine (1999, 2001) generated much interest and a flurry of activity in the health care community aimed at improving clinical outcomes. Consistent with the tradition in health care of investing in technology to find solutions to clinical problems, health care organizations further intensified investments in technological solutions, and health care research continued its focus overwhelmingly on biomedical interventions such as drugs, devices, and procedures (Leape, 2004).

Although technology is critical in improving health care delivery, it cannot overcome adverse events arising from poor organization and management of the health care delivery process (Pearl, 2003). For example, research evidence suggests that two commonly touted technological solutions—computerized physician order entry systems and electronic medical records—are not able to prevent the majority of patient safety incidents that significantly contribute to preventable deaths and excess costs each year (Health Grades, Inc., 2004; Leape, 2004).

The current bias toward innovative technological solutions over those that require the transformation of current dysfunctional culture, management systems, and work processes in health care must be corrected if medical errors and quality of patient care are to be taken seriously (Tucker & Edmondson, 2003). Only approximately one third of adverse events are currently unpreventable in the sense that reducing them would require advances in medical sciences (Leape, Berwick, & Bates, 2002). The other two thirds have nothing to do with technical advances and can be addressed only by improving health care cultures and systems. Thus, further investments in technology alone, without considering organizational and management factors, may have limited impact on medical errors and quality of care (Khatri, Baveja, Boren, & Mammo, 2006).

## Theoretical Background

Based on a comprehensive review of 42 articles on clinical and health services management literature regarding the linkages between organizational factors, medical errors, and patient safety, Hoff, Jameson, Hannan, and Flank (2004) lamented that almost all used no systematic theoretical framework for predicting or explaining the effects of their organizational variables on clinical outcomes. Addressing the problem of patient safety requires a comprehensive framework that directs the entire organization to understand the rationale for a focus on patient safety (Koehoorn, Lowe, Rondeau, Scellenberg, & Wagar, 2002). To overcome the lack of such a framework, Khatri et al. (2006) developed a comprehensive model linking the overall management approach to clinical outcomes. This study examines the relationship between overall management approach and clinical outcomes using their theoretical model.

The model of Khatri et al. (2006) is an extension of McGregor’s (1985) notion of Theory X and Theory Y to health care organizations and is based on two alternative management theories on human motivation: (a) control based and (b) commitment based. The control-based view assumes (implicitly or explicitly) that people are incapable of self-regulating their behaviors and cannot be trusted. Consistent with this assumption, the natural emphasis of control-based management is on monitoring employee behavior closely via a variety of control mechanisms.

The alternative view based on commitment has two underlying assumptions: (a) people are capable of self-discipline, and given the opportunity and developmental experiences, they will seek responsibility and exercise initiative; and (b) people work best when they are fully committed to the organization. The commitment-based management approach emphasizes creating an environment that encourages commitment to organizational objectives and provides opportunities for the exercise of initiative, ingenuity, and self-direction in achieving them.

Control-based management practices are best suited to prevent undesirable actions and behaviors from a small fraction of employees (McGregor, 1985). The close controlling and monitoring of behavior in control-based management is seen by employees to be constraining and demoralizing. An unintended but important consequence is the restriction it imposes on the initiative, creativity, and morale of the majority of the employees who would perform better in the absence of control. Control-based management undermines learning from mistakes and foments a culture of blame (Khatri et al., 2006).

On the other hand, openness, cooperation, coordination, and teamwork are natural organizational processes in a commitment-based management approach. These processes enhance clinical outcomes via improved communication, information sharing, and organizational learning, both formally and informally. The commitment-based management approach also provides the environment to achieve improved clinical outcomes by boosting employee morale and camaraderie.

## Hypotheses

The model proposed by Khatri et al. (2006) includes numerous independent, mediating, and dependent variables. It is mediated at two levels. The number of variables and two-level mediation processes make empirical testing of the entire model in a single study quite difficult.
As a result, we have adapted the most critical parts of the model for this study. The adapted model and hypothesized relationships are presented in Figure 1.

The adapted model in Figure 1 suggests that the current culture and systems in health care organizations are control based. The control-based model was developed...
in the industrial era and is more appropriate for manufacturing organizations. Health care organizations are not factories, however, and thus, a different approach is required to manage them. Health care is a high-contact human service, and new developments in customer involvement demonstrate that such a service lends itself to situations where customers take on very powerful roles. Unlike in manufacturing firms, customers of service firms typically interact with the production process. In doing so, customers inject a high degree of variability into the service production process. To meet this challenge of variability, service organizations need employees who are empowered and proficient at diagnosing problems, thinking creatively, and developing novel solutions.

The hypothesized relationships in this study are discussed in two parts. In the first part, the relationships between management approach and employee behaviors are discussed. The second part elucidates relationships that exist between employee behaviors and clinical outcomes.

**Management Approach and Employee Behaviors**

The basic management philosophy—imposing control on employees or eliciting commitment from them—impacts on employee behaviors through two effects: the **learning effect** and the **motivation effect** (Khatri et al., 2006).

**The learning effect.** The underlying argument is that a commitment-based approach is better than a control-based approach in learning from mistakes. Control-based management (tight management control in combination with silos in organization) hinders learning in the health care delivery process as it sets in motion a vicious cycle in which a greater incidence of medical errors leads to greater control and regulation of employee behaviors, further strengthening the culture of blame. The culture of blame in health care organizations exists because of the lack of supportive climate for reporting and low perceived psychological safety (Cannon & Edmondson, 2001). In a low-psychological-safety environment, individuals fear that error disclosure will bring rejection, embarrassment, or punishment. In the absence of any corrective action, the same medical errors keep reoccurring.

The commitment-based management approach (employee participation and just and fair management practices) increases learning from mistakes by inducing a virtuous cycle in which organizational members report all the medical errors and search extensively for the root cause of medical errors in an open and trusting environment. Employees working in a commitment-based environment assume more initiative and responsibility, have positive attitudes toward their work, and therefore become more actively engaged and committed to their work. Committed employees have a higher degree of trust, are more open to cooperation, and support teamwork, all of which are essential for a seamless health care delivery process.

Evidence that suggests that intensive employee participation in decision making in combination with just and fair management practices improves performance and morale of employees is emerging. For example, Southwest Airlines has achieved a high degree of excellence regarding flight departures occurring on time. The flight departures require a high degree of coordination of employees with a variety of skills and responsibilities—pilots, flight attendants, gate and ticket agents, mechanics, caterers, baggage and cargo handlers, and fuelers (Gittell, 2000). The flight departures have to proceed well despite uncertainty, interdependence, and time constraints because the departure process has significant impact on customer satisfaction, efficiency, equipment utilization, and profitability. The Southwest work environment is informal and egalitarian, where people address one another on a first-name basis and dress casually. The company believes that to achieve superior service, it must empower its employees with information so that they are more able to act like owners and take responsibility to make decisions. It hires employees based on their attitude and leadership skills rather than only their technical skills. In view of the above discussion, we hypothesize as follows:

**H1a:** The control-based management approach (management control and silos in organization) is positively associated with the culture of blame and negatively associated with learning from mistakes.

**H1b:** The commitment-based management approach (employee participation in decision making and just and fair management practices) is negatively associated with the culture of blame (positively associated with open and trusting culture) and positively associated with learning from mistakes.

**The motivation effect.** Employees are likely to have higher motivation in a commitment-based management approach than in a control-based management approach. The control-based management approach emphasizes lower level needs (e.g., salary and wages) and does not allow for the fulfillment of higher level needs (e.g., need for independence, self-confidence, and recognition). Consequently, control-based management makes people “sick” intellectually because it does not satisfy employees’ higher level needs. Unmet needs lead to high employee turnover and low morale.
In a control-based work environment, employees develop feelings of helplessness, frustration, and insecurity. The emphasis on compliance and obedience rather than on commitment does not permit the full utilization of the knowledge and emotional energy of the workforce. In short, control-based management unleashes negative emotional energy in employees (Khatari et al., 2006). Employees who work in a commitment-based organization are actively engaged in their work. They take pride in the organization and its mission and are empowered and fully energized. In a commitment-based organization, employee turnover is usually low and the utilization of human capacity is high. High employee morale generates a positive emotional energy. Hence, the following hypotheses:

H2a: The control-based management approach is negatively associated with camaraderie and motivation of employees.

H2b: The commitment-based management approach is positively associated with camaraderie and motivation of employees.

Employee Behaviors and Clinical Outcomes

The “safe” thing to do for health care professionals operating in a culture of blame is to hide a mistake when it occurs. If, however, the mistake surfaces despite the best efforts to hide it, the natural tendency for an employee is to blame it on others. In such a scenario, mistakes are underreported, and, if reported, they are not resolved properly.

Edmondson (1996) found that willingness to report errors influences the ability to detect errors in a unit. Specifically, interceptions of mistakes were more prevalent in units in which members were less concerned about being caught making a mistake. The nurse leadership behaviors—especially related to how mistakes are handled—were found to create an ongoing, continually reinforced climate of openness or of fear of discussing drug errors.

In an open and trusting culture, employees are not afraid to report and discuss a mistake thoroughly until the root cause of the mistake is identified and proper correction mechanism is adopted and applied. The commitment-based approach provides for a work environment with a focus on improving the process and ensuring that such a mistake does not occur in the future. In such a culture, an individual employee is not blamed for the event due to his or her negligence or deliberate intent.

H3a: The culture of blame is positively associated with medical errors. Alternatively, an open and trusting culture is negatively associated with medical errors.

H3b: Learning from mistakes is negatively associated with medical errors.

Empirical studies examining the relationship between management practices and service quality are proliferating (Gelade & Ivery, 2003; Manning & Brailsford, 2001) For example, Manning and Brailsford (2001) found that encounters of patients with hospital employees are an important driver of perceived service quality and patient satisfaction. Gelade and Ivery (2003) reported that human resource management practices impacted the performance of a bank branch both directly and indirectly. In its direct effect, understaffing and working overtime elevated job demand, causing stress and depressed individual performance. Indirectly, management practices influenced bank branch performance by affecting positively the work climate. The authors noted that satisfied employees radiate positive affect, producing an emotionally satisfying experience for the customer.

Prolonged exposure to jobs high in demands and low in controllability typical in health care organizations leads to stress-related mental and physical problems (Fox, Dwyer, & Ganster, 1993). Health care organizations should meet their employees’ needs to participate and make a contribution, provide psychological and economic security, offer opportunities for skill development, and have the right balance of job demands and resources to raise employee morale essential for delivering high-quality patient care (Koehoorn et al., 2002).

Evidence in support of the commitment-based philosophy is slowly emerging in health care organizations. For example, a study of Veterans Health Administration hospitals found that teamwork culture was positively associated with inpatient satisfaction and that rule-based, bureaucratic culture was negatively associated with it (Meterko, Mohr, & Young, 2004). The positive relationship between teamwork and inpatient satisfaction was mediated by more effective coordination and greater cohesion among employees working toward the same goal. Similarly, a study of 283 Canadian nursing homes found that homes that had implemented more “progressive” management practices and reported a workplace climate that strongly valued employee participation produced better clinical outcomes (Rondeau & Wagar, 2001).

Quality of work life among health care workers has deteriorated to the point where it is impeding the capacity of the system to recruit and retain staff needed to provide effective care. It is unrealistic to expect a
tough fight from demoralized, hapless, and exhausted troops. Health care organizations must develop and implement cultures and management systems that empower employees to use their talents and skills fully in providing safe and high-quality patient care. Hence, the following hypotheses:

\[ H_{4a}: \text{Camaraderie in health care workers is positively associated with the quality of patient care they provide.} \]

\[ H_{4b}: \text{The motivation level of health care workers is positively associated with the quality of patient care they provide.} \]

### Method

#### Participants and Procedure

This study surveyed employees of hospitals in Missouri. The human resource directors were contacted via telephone and e-mail, and those who showed interest in the study were mailed five questionnaires to be distributed to five employees such that each employee represented a different department. The decision to limit the survey to five employees from each hospital was established in order not to overload and become a deterrent to hospital participation in the study yet provide a sufficient number of responses for data analysis.

Employees were chosen as respondents instead of senior managers because it is the employees who are impacted by the overall management approach. Research suggests that views of senior management can diverge from that of employees; senior managers may think they use a certain management approach that employees do not experience (Gabris & Giles, 1983).

In all, 200 questionnaires were mailed to the human resource directors at 33 hospitals for distribution to their employees. The questionnaires were coded, but the respondents were assured of the confidentiality of their responses. The respondents were provided with self-addressed prepaid business reply envelopes for returning the completed questionnaires directly to the research team. Seventy-seven completed questionnaires from employees of 16 hospitals were received, for a response rate of 38.5%. The distribution of the number of respondents per hospital was as follows: one hospital had one respondent, four hospitals had two respondents each, four hospitals had three respondents each, and five hospitals had four respondents each. In addition, one hospital volunteered to complete more than five questionnaires. We received 36 questionnaires from this hospital. The size of the hospitals in the sample varied from a hospital with 41 licensed beds to a hospital with 1,277 licensed beds. There were seven respondents from four large hospitals having 250, 274, 375, and 1,277 licensed beds. The remaining 70 respondents were from 12 hospitals with size ranging from 41 to 84 licensed beds. Thus, the study sample largely represents county hospitals with less than 100 licensed beds spread all over Missouri.

The largest number of respondents was from the surgery department, with 28 respondents. Eleven respondents were from the nursing department, 8 from the obstetrics/gynecology department, 6 from the intensive care unit, 5 from the laboratory, 4 from the emergency room, and the rest from other departments. The distribution of the titles of the respondents was as follows: 6 departmental heads, 7 nurse managers, 7 technicians, 30 registered nurses, 15 certified nursing assistants, 6 licensed practical nurses, 5 ward clerks, and 1 physical therapist. The average work experience of the respondents in the work unit was 5.8 years. Fifty-six respondents worked in the day shift, 12 in the night shift, and 9 in more than one shift.

#### Measures

Items in the scales are a combination of new items developed for this study, as well as items adapted from previous research (see Appendix A). All items used a five-point Likert scale format (1 = strongly disagree to 5 = strongly agree). The scales used to measure the four independent variables of Management Control (four items), Silos in Organization (three items), Just and Fair Practices (three items), and Employee Participation (five items) are all new. This study used four scales to measure mediating variables—Culture of Blame (two items), Learning From Mistakes (three items), Camaraderie (seven items), and Motivation (six items).

Medical Errors and Quality of Patient Care are the two dependent variables in the study. Research suggests that measurement of medical errors is quite complex. Hospitals can vary significantly in their definition and reporting of medical errors. To overcome this problem, we focused only on drug-related errors in this study. Drug-related errors are specific and cut across specialties. The respondents were asked to indicate their response on a scale of 1 (strongly disagree) to 5 (strongly agree) to the item “Drug-related errors occur frequently in this department.” The scale used to measure Quality of Patient Care had three items.

The hypothesized relationships in Figure 1 were tested using path modeling. Two standard assumptions underlying conventional methods of path analysis are that the observed data represent a random sample from a multivariate normal distribution and that the sample size is sufficiently large to justify the asymptotic normality of the parameter estimates (Bollen, 1989). Similarly, the chi-square goodness of fit also requires a large sample...
size to be strictly valid. In this study, the normality assumption cannot be satisfied due to the ordinal nature of the response variables, and the sample size may not be sufficient to rely on asymptotic standard errors for testing the path coefficients. To address both issues, bootstrap methods (Efron & Tibshirani, 1993) as implemented in the software package Mplus v3.13 (Muthén & Muthén, 2004) were used to provide tests of the path coefficients. The bootstrap is a resampling-based method that does not require specific distributional assumptions for valid inference. It allows the structural equation modeling analyses to be performed even on sample sizes ranging between 50 and 60 (Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005).

### Results

The descriptive statistics and zero-order correlations are presented in Table 1. Reliability and factor analyses were performed for checking the reliability and validity of scales. The Cronbach’s α for scales measuring the four independent variables of Management Control, Silos in Organization, Just and Fair Practices, and Employee Participation was .71, .58, .90, and .77, respectively. Reliabilities of scales, with the exception of Silos in Organization, are all good. The low reliability of the scale on Silos may be attributed partly to fewer items in the scale (three items), diverse content of the items, and reverse coding of items. Factor analysis showed that items in the four scales loaded unambiguously on the four corresponding factors, thus providing evidence for convergent and divergent validities of the scales (Finkelstein, 1992; results of the factor analysis can be obtained from the authors).

Table 1 shows the results of the factor analysis. The four mediating variables of Culture of Blame, Learning From Mistakes, Camaraderie, and Motivation revealed four factors with items loading clearly on the corresponding factors. The Cronbach’s α for both Camaraderie and Motivation scales was .86. The reliability coefficient for the Culture of Blame was not computed because it had only two items. The Cronbach’s α for Learning From Mistakes was .53. We believe that the α for the scale is satisfactory in view of the diverse content of the items, fewer items (only three items), and one of the three items being reverse coded. The scale to measure the dependent variable of Quality of Patient Care showed satisfactory reliability (Cronbach’s α = .68).

For path analysis, we started with the original model in which each of Culture of Blame, Learning From Mistakes, Camaraderie, and Motivation was regressed on Management Control, Silos in Organization, Just and Fair Practices, and Employee Participation, and Medical Errors and Quality of Patient Care were regressed on each of the independent and mediating variables, giving us a model of both direct and indirect effects of management approach on Quality of Patient Care and Medical Errors. Because there is no generally agreed upon best measure of fit for structural models, it has become customary to quote several measures of fit. For this study, we present the chi-square goodness of fit test along with the Tucker–Lewis Index (TLI; Tucker & Lewis, 1973) and the root-mean-square error of approximation (RMSEA; Browne & Cudeck, 1993). For the full model, the values of three goodness-of-fit indices were as follows: $\chi^2 = 12.26$ with $df = 6$, TLI = .75, and RMSEA = .12.

To achieve a better fitting and more parsimonious model, we removed the paths that were not statistically

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### Table 1

Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Management Control</td>
<td>3.19</td>
<td>.80</td>
<td>.71</td>
<td>.26*</td>
<td>-.23*</td>
<td>-.46**</td>
<td>.56**</td>
<td>-.17</td>
<td>-.26*</td>
<td>-.33**</td>
<td>.16</td>
<td>-.05</td>
</tr>
<tr>
<td>2. Silos in Organization</td>
<td>2.48</td>
<td>.74</td>
<td>—</td>
<td>-.58</td>
<td>-.22</td>
<td>-.30*</td>
<td>.42**</td>
<td>-.33**</td>
<td>-.51**</td>
<td>-.28*</td>
<td>.22</td>
<td>-.36**</td>
</tr>
<tr>
<td>3. Just and Fair Practices</td>
<td>3.86</td>
<td>.81</td>
<td>—</td>
<td>—</td>
<td>.90</td>
<td>.37**</td>
<td>-.41**</td>
<td>.31</td>
<td>.24</td>
<td>.28</td>
<td>-.11</td>
<td>.32**</td>
</tr>
<tr>
<td>4. Employee Participation</td>
<td>3.70</td>
<td>.60</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.77</td>
<td>-.34**</td>
<td>.27</td>
<td>.41**</td>
<td>.46**</td>
<td>-.11</td>
<td>.40**</td>
</tr>
<tr>
<td>5. Culture of Blame</td>
<td>2.76</td>
<td>.87</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>-.14</td>
<td>-.36**</td>
<td>-.23*</td>
<td>-.23*</td>
<td>-.17</td>
<td></td>
</tr>
<tr>
<td>6. Learning</td>
<td>3.59</td>
<td>.71</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.53</td>
<td>.30**</td>
<td>.19</td>
<td>-.30**</td>
<td>.38**</td>
</tr>
<tr>
<td>7. Camaraderie</td>
<td>3.66</td>
<td>.72</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.86</td>
<td>.46**</td>
<td>-.30**</td>
<td>.53**</td>
</tr>
<tr>
<td>8. Motivation</td>
<td>4.14</td>
<td>.64</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.86</td>
<td>-.07</td>
<td>.52**</td>
</tr>
<tr>
<td>9. Medical Errors</td>
<td>2.37</td>
<td>1.16</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>-.32**</td>
</tr>
<tr>
<td>10. Quality of Care</td>
<td>4.08</td>
<td>.66</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.68</td>
</tr>
</tbody>
</table>

Note. Reliabilities (Cronbach’s α) are reported in italics in the diagonal.

*Significant at $p < .05$.

**Significant at $p < .01$.  

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significant \((p < .05)\). The resulting model with significant paths is presented in Figure 2. For this model, the fit indices were as follows: \(\chi^2 = 22.8\) with \(df = 23\) \((p = .51)\), TLI = 1.0, and RMSEA = .00, with the significance level for the test of close fit based on RMSEA being .73. Collectively, the fit measures suggest an excellent fit for the model displayed in Figure 2. Although the number of cases is small \((N = 77)\), the fit indices and bootstrapping analyses dispel any major concern that usually arises when the sample is small.

Management Control and Silos in Organization indicated the extent of the control-based management, whereas Employee Participation and Just and Fair Practices indicated the extent of the commitment-based approach. Management Control and Silos in Organization showed a significant positive relationship with Culture of Blame. Silos also had a highly significant but negative relationship with Learning From Mistakes. Together, these findings support Hypothesis 1a (“The control-based management approach is positively associated with the culture of blame and negatively associated with learning from mistakes”). Just and Fair Practices showed a negative relationship with Culture of Blame and a positive relationship with Learning From Mistakes. Employee Participation was, however, not significantly related to either Culture of Blame or Learning From Mistakes. These findings thus provide partial support to Hypothesis 1b (“The commitment-based approach is negatively associated with the culture of blame and positively associated with learning from mistakes”).

Hypothesis 2a, which states that the control-based management approach is negatively associated with camaraderie and motivation of employees, received partial support in that only Silos showed a significant negative relationship with Camaraderie. Management Control had no significant relationship with either

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**Figure 2**

The best-fitting path model linking management approach to clinical outcomes
Discussion

Unsurprisingly, silos in organizational structure, arising from a confluence of factors (control-based management philosophy and many specialties and professional cultures in health care), turned out to be one of the most significant variables in the study. Silos result in a stronger culture of blame and finger pointing. Even more important, they diminish learning and camaraderie in the workplace, the two mediating variables that have a large impact on medical errors and quality of patient care. Silos are symptomatic of a dysfunctional organization and have a negative effect on organizations, leading to turf wars, power struggles, and personality conflicts, all of which result in poor teamwork and cooperation. Silos create an environment in which the personal and departmental interests of managers take precedence over the well-being of the organization. The reasons for the formation of silos in hospitals include an organizational structure rigidly designed around functional areas, corporate culture, and traditions that do not encourage collaboration; lack of cooperation/participation in cross-functional teams; poor departmental leadership; inadequate interpersonal skills; poorly designed reward systems; and policies that make cooperation difficult (Stone, 2004). A classic example of the adverse consequences of silos is the intelligence failures that occurred allowing for terrorist attacks now known as the 9/11 disaster. The familiar phrase of failing to “connect the dots” is nothing but intelligence remaining stuck in silos created by boundaries of various departments and agencies involved in intelligence gathering.

The study findings indicate that camaraderie and learning from mistakes are two important mediating (or process) variables. Both had a highly significant negative relationship with drug-related errors and a positive relationship with quality of patient care. Thus, reduction of medical errors and enhancement of quality of patient care require an open trusting culture and a spirit of cooperation and teamwork in the workforce. The current control-based management approach leads to a culture of blame and suppresses both camaraderie and openness. Hospitals need to employ a commitment-based approach by fostering employee participation in decision making and establishing just, fair, and egalitarian management practices. Both camaraderie and learning from mistakes are relatively unexplored constructs. However, given their pivotal role in affecting clinical outcomes, they need much more attention from health care management scholars.

Employee participation in decision making was significantly and positively related to camaraderie and motivation of employees. It is the only independent variable having a significant positive impact on the motivation (and satisfaction) of employees. This finding is perhaps not surprising given the consistent links between participation in decision making and job satisfaction in the health services management literature (Cavanaugh, 1992). Thus, employee participation is of chief importance in improving the morale and camaraderie of the workforce.

Unexpectedly, we found a significant positive relationship between management control and quality of patient care. Although this finding seems contrary to what is expected in a highly professionalized environment such as health care, several studies have found relationships between control and quality to the extent...
that control leads to standardized processes that ensure consistent quality in some settings (Bijisma-Frankema & Koopman, 2004). As such, this finding may have been the result of perceived consistency in patient care from a management system that strictly enforces procedures for care. This consistency may have been interpreted in terms of a higher quality patient care.

In addition, we did not find the expected relationship between a culture of blame and medical errors. An interesting finding was that these two variables were correlated ($r = .23, p < .05$), but their relationship was not significant when the other variables in the model were considered simultaneously. This suggests the possibility that methodological limitations (e.g., sample size and relatively high correlations between variables in the model) suppressed the relationship between culture of blame and errors.

This study has several limitations. First, although fit indices and bootstrapping analyses indicate that the small sample was not a major weakness of the study, the data collection was limited to hospitals in Missouri. Thus, to test and increase the generalizability of the findings, data from a national sample of hospitals need to be gathered and analyzed. Second, responses of individuals in hospitals may not be necessarily different from one another. Statistically, this becomes an issue because responses from multiple individuals within the same institution may not be independent. Assuming independence when, in fact, responses are correlated can produce a downward bias in standard errors, thereby producing false significance levels. Finally, the data collected were cross-sectional in nature. Future research that confirms these findings using longitudinal methods may be better suited for making causal claims regarding the relationships among the variables.

**Implications for Practice**

The study findings have important implications for practitioners. Currently, the efforts of most health care organizations are limited to measuring and fostering satisfaction of their employees using quantitative measurement tools such as the Press Ganey Survey. This research suggests that although the role of employee satisfaction in affecting clinical outcomes may be significant, other variables such as learning from mistakes and camaraderie also play a critical role in determining medical errors and quality of patient care. Employee satisfaction is a component of motivation in this study, and motivation had a significant positive relationship with quality of care but no direct relationship with medical errors. Thus, if health care organizations want to improve their clinical outcomes, they should not only be focused on employee satisfaction but also pay attention to learning from mistakes, camaraderie, and motivation of their workforce.

Health care organizations are making concerted efforts in improving the quality of care. Unfortunately, most quality improvement initiatives are implemented in a highly control-based context. Consistent with the control-based management approach, management has created a separate “quality assurance” department or unit to address the issue. By creating yet another department by management sends an inadvertent signal to other departments that actually deliver health care that they are not directly accountable for medical errors and quality of care. Quality of care cannot be managed by creating a separate quality assurance department; it must be integral to the health care delivery process. A commitment-based management approach by emphasizing employee participation, cooperation, information sharing, and teamwork focuses on quality of care quite naturally without a separate department or mandate.

The theory and practice underlying the control-based approach is relatively simple, and conventional human resource practices perpetuate control-based management in health care organizations (Khatri et al., 2006). The commitment-based management approach is more complex to implement than control-based management and requires emotionally intelligent managers to be placed at all levels in the organization. Health care organizations must build internal human resource capability to implement a commitment-based management approach (Khatri, 2006).

**Conclusion**

The predominant thinking in health care organizations is that technology can solve all its problems. Time is growing shorter as to how long medical costs can continue to rise. We argued and provided evidence that the answer to further improvements in clinical outcomes does not lie in further investments in technology alone but also in improvements in the organization and management of health care delivery process. The management culture and systems in health care remain entrenched in the control-based model, which is consistent with the old industrial model of management. However, health care organizations are not factories. They are highly knowledge-intensive and service-oriented entities and thus require management culture and systems premised on the commitment of employees to achieving the highest level of quality of patient care. Health care organizations need to move away from controlling employees to involving them in decision making and providing them a just and fair work environment. Health care organizations need to break down silos that exist in their structures and embrace
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References


## Appendix 1

The scales used in the study

### Independent variables

**Management Control** ($\alpha = .71$): (1) It is generally safer to say that you agree with management even when you don’t really agree. (2) In my department, it is difficult to make decisions without an approval from higher authority. (3) In my department, bureaucratic procedures generally govern what people do. (4) Various professional groups (e.g., nurses, physicians, administrators, and technicians) perceive significant status differences between them.

**Silos in Organization** ($\alpha = .58$): (1) I would characterize the communication between various employee groups or units in my department as good (reverse coded). (2) I think that communication between physicians, nurses, managers, and other health care professionals in my department is good (reverse coded). (3) Various employee groups or units in my department pursue goals and priorities that are inconsistent with overall departmental goals and priorities.

**Just and Fair Practices** ($\alpha = .90$): Recall the most recent evaluation of your job performance and circle the response that most accurately describes your view about the following statements: (1) I received the evaluation that I deserved, (2) the evaluation reflected the quality of my performance, and (3) an independent observer from outside the organization would have made a similar judgment about my performance.

**Employee Participation** ($\alpha = .77$): (1) Employees are given opportunity to suggest improvements in the way clinical services are provided. (2) Employees have a feeling of personal empowerment and ownership of work processes. (3) Employees have the authority to make decisions required by their day-to-day work problems. (4) I am able to contribute to decision making that affects my job. (5) Employees are kept informed about departmental goals and priorities and involved in achieving those goals and priorities.

### Mediating (or process) variables

**Culture of Blame**: (1) There is a culture of blame in my department. (2) The response to medical errors in my department focuses primarily on the individuals at fault.

**Learning from Mistakes** ($\alpha = .53$): (1) In my department, we often spend time in analyzing and discussing medical errors with a view to preventing them from happening again. (2) The same sort of medical errors keep happening again and again because the system within which they occur doesn’t change (reverse coded). (3) Most of the medical errors in department get reported.

**Camaraderie** ($\alpha = .86$): (1) The employee morale is high in my department. (2) The members in my department trust each other. (3) People in my department enjoy working together. (4) A spirit of cooperation and teamwork exists in my department. (5) There is a lot of unpleasantness in members of this department (reverse coded). (6) Employees in my department are very productive. (7) I can say with confidence that employees in my department try to do their best.

**Motivation** ($\alpha = .86$): (1) There are things about working in this department that encourage me to work hard. (2) This department inspires the very best in me. (3) I am satisfied with the kind of work I do. (4) Overall, I am satisfied with my job. (5) I talk up this department to my friends as a great department to work for. (6) I am proud to tell others that I am part of this department.

### Dependent variables

**Medical Errors**: (1) Drug-related errors occur frequently in this department.

**Quality of Patient Care** ($\alpha = .68$): (1) I would rate the technical (or clinical) quality of patient care in my department as outstanding. (2) I would rate the service quality of patient care in my department as outstanding. (3) Patients often complain about how this department functions (reverse coded).

All the scales used a five-point Likert scale format (1 = strongly disagree to 5 = strongly agree).