

## Leadership

# Getting the Board on Board: Engaging Hospital Boards in Quality and Patient Safety

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**R**ecent efforts to transform the quality of health care have focused considerable attention on the role that hospital leaders must play in this process. Guidance documents have been widely circulated to advise executive leaders on how to drive system improvement.<sup>1</sup> In 2004 the National Quality Forum issued a “Call to Responsibility” for members of hospital governing boards that provides concrete recommendations on how they can support improvement efforts.<sup>2</sup>

Active participation of chief executive officers (CEOs) and hospital board members is also assumed or required by major hospital quality improvement (QI) initiatives. Britain’s National Health Service (NHS) now makes CEOs directly responsible for the quality of care their patients receive.<sup>3</sup> The Institute for Healthcare Improvement’s (IHI’s) successful IMPACT collaboratives required the direct support and involvement of the CEOs of participating organizations.<sup>4</sup> Baldrige National Quality Program examiners have also attributed the success of Malcolm Baldrige National Quality Award-winning organizations in the health care category to the commitment of their senior leaders.<sup>5</sup> Finally, QI strategies such as executive leadership walk-arounds are offered as proof that active leadership can improve quality.<sup>6</sup>

Although information about leadership and quality is growing rapidly, much less is known about how hospital boards and executive leaders are responding to this emphasis. Such information is of considerable importance in assessing the impact of efforts to reach this critical audience. The body of literature specific to leadership and governance’s impact on organizational performance is growing, yet minimal in terms of peer-reviewed research.<sup>7</sup>

## Article-at-a-Glance

**Background:** Transformational change in health care calls on hospital boards of trustees to engage in quality at a level that has never been asked before. Yet little research has been conducted regarding the role of hospital governance in quality.

**Methods:** Interviews were conducted with chief executive officers (CEOs) and board chairpersons from a convenient sample of 30 hospitals, representing 14 states across the United States. The interviews were 30 to 45 minutes in length and included approximately 30 questions that were open-ended and ratings based.

**Results:** The level of knowledge of landmark Institute of Medicine (IOM) quality reports among CEOs and board chairs was remarkably low. Conversely, board chairs and CEOs were well attuned to public reporting of quality information. There were significant differences between the CEOs’ perception of the level of knowledge of their board chairs and the board chairs’ self-perception. There was a mild association between board engagement in quality and hospital performance as defined by their rates in their composite measure of heart failure, heart attack, and pneumonia.

**Discussion:** The engagement of hospital boards in quality can be enhanced by (1) increasing education on quality to increase the board’s quality literacy; (2) improving the framing of an agenda for quality; (3) more quality planning, focus, and incentives for leadership and governance for quality improvement; and (4) greater focus on the patients. Implementing these steps can improve a hospital’s overall performance.

This study was designed to answer three general questions about the views of hospital board chairs and CEOs on the role of governance and leadership in driving QI:

- We wanted to determine the extent to which hospital leaders understand safety and quality issues. If leaders are unfamiliar with major issues such as those raised in the Institute of Medicine (IOM) reports on patient safety and quality (*To Err is Human* and *Crossing the Quality Chasm*) or if they lack training or expertise in QI, their ability to lead organizational transformation will be limited.<sup>8,9</sup>

- We wanted to understand the actions that boards and CEOs are taking to drive QI in their hospitals. Including quality issues in meeting agendas, measuring key quality indicators, integrating quality and strategic planning, and involving patients in their planning processes are all important, but how often these activities take place is unknown.

- We wanted to determine whether board knowledge and board quality activities were associated with different outcomes. In addition to subjective outcomes such as board engagement, more progress toward quality goals, and cultural change, we also examined whether board engagement was associated with the hospital's composite measure for acute myocardial infarction, heart attack, and heart failure.

## Methods

### Study Population

As part of a larger study of hospital leadership, we interviewed CEOs and/or board chairs from 30 hospitals. These hospitals represent a convenience sample recruited by the investigators with the assistance of opinion leader groups, governance associations, state hospital associations, and board consultants. An initial mailed request to participate was followed by e-mail messages and phone calls to recruit hospital leaders and schedule interview appointments.

Leaders who agreed to participate represented hospitals located in 14 different states spread across the four major geographic regions in the United States. Hospitals ranged in size from 20 to 935 beds. Six of the hospitals were part of multihospital systems (ranging from 2 to 11 hospitals). For 17 of the hospitals, both the CEO and

board chair were interviewed. For 3 hospitals only the board chair was interviewed, and in 10 hospitals only the CEO was interviewed.

### Interview Procedures

Interviews with the board chairs and CEOs were scheduled and conducted separately between March and July 2005. Participants were promised confidentiality; responses from the board chairs and CEOs were not shared with each other. Four trained interviewers collected the information. Interviews were conducted in person or by phone and required between 30 and 45 minutes to complete.

### Survey Instrument

The survey was developed in consultation with experts in the fields of QI and executive leadership. A survey instrument investigators used for a smaller study in 2004 was expanded to include variables required to answer the key questions in this study. Selected questions from the 33-question survey instrument are provided in Table 1 (page 181).\*

Expertise and knowledge in QI was measured using six questions. Respondents were asked to report their familiarity, the familiarity of the board chair (CEO only), and the familiarity of all the board members with the IOM reports *To Err is Human* and *Crossing the Quality Chasm*. Response categories ranged from 1 (not at all familiar) to 10 (very familiar). Ten-point response categories were used to prevent all the responses from clustering into a single category at the top of the scale and because respondents were quite comfortable using a metric in which ten represents an absolute ideal that is rarely attained. Respondents were asked to report their level of understanding of publicly reported quality data for their hospital on a scale from 1 (very confused) to 10 (fully understand). CEOs and board chairs were also asked to rate the CEOs' level of improvement expertise on a 4-point scale ranging from 1 (novice) to 4 (master or black belt level). In addition, participants were asked to identify how many of their board members had expertise in quality and to describe their backgrounds.

\* The full survey is available by e-mail request from the first author.

**Table 1. Selected Questions from the Robert Wood Johnson Foundation (RWJF) Study Survey: Board Engagement in Quality (Board/CEO)\***

Engagement Dimension	CEO Questions	Board Chair Questions	Comments
Quality Literacy 1	On a 1 to 10 scale, how familiar are you with the 2 IOM reports: ■ <i>To Err Is Human</i> ■ <i>Crossing the Quality Chasm</i>	On a 1 to 10 scale, how familiar are you with the 2 IOM reports: ■ <i>To Err Is Human</i> ■ <i>Crossing the Quality Chasm</i>	1 = Not at all familiar 10 = Very familiar—they are well versed in the findings, the recommendations, the IOM aims
Quality Literacy 2	On a 1 to 10 scale, how familiar do you think the board chair is with the 2 IOM reports: ■ <i>To Err Is Human</i> ■ <i>Crossing the Quality Chasm</i>		1 = Not at all familiar 10 = Very familiar—they are well versed in the findings, the recommendations, the IOM aims
Quality Literacy 3	On a 1 to 10 scale, how familiar do you think ALL board members are with the 2 IOM reports: ■ <i>To Err Is Human</i> ■ <i>Crossing the Quality Chasm</i>	On a 1 to 10 scale, how familiar do you think ALL board members are with the 2 IOM reports: ■ <i>To Err Is Human</i> ■ <i>Crossing the Quality Chasm</i>	1 = Not at all familiar 10 = Very familiar—they are well versed in the findings, the recommendations, the IOM aims
Quality Literacy 4	On a scale of 1–10 how well do you feel you understand the data being publicly reported?	On a scale of 1–10 how well do you feel you understand the data being publicly reported?	1 = Very Confused 10 = Fully Understand <i>Note: This is not a question about accuracy of the data or the methodology of the data collection but just understanding what is reported.</i>
Quality Literacy 5	How many board members have an expertise in quality? What are their backgrounds?	How many board members have an expertise in quality? What are their backgrounds?	
Agenda Setting 1	How do patient perspectives get incorporated into the board's agenda for quality?	How do patient perspectives get incorporated into the board's agenda for quality?	
Agenda Setting 2	For a typical meeting, what are the major board standing agenda items? What % of the time is allocated to discussing each?	For a typical meeting, what are the major board standing agenda items? What % of the time is allocated to discussing each?	Probe into hours spent on each. Probe to get % on quality.
Agenda Setting 3	How often does the board discuss and approve high-level, measurable improvement goals?	How often does the board discuss and approve high-level, measurable improvement goals?	
Performance Tracking 1	How satisfied are you that the quality data the board reviews are the right measures for a comprehensive assessment of the organization's real quality performance?	How satisfied are you that the quality data the board reviews are the right measures for a comprehensive assessment of the organization's real quality performance?	1 = Not satisfied, uncertain 10 = Absolutely satisfied, confident

*continued*

**Table 1. Selected Questions from the Robert Wood Johnson Foundation (RWJF) Study Survey: Board Engagement in Quality (Board/CEO)\* (continued)**

Engagement Dimension	CEO Questions	Board Chair Questions	Comments
Accountability 1	Is there variable compensation for the CEO linked directly to quality? If yes, what %?	Is there variable compensation for the CEO linked directly to quality? If yes, what %?	
Accountability 2	On a scale of 1 to 10 how well do you think the organizational quality planning is integrated with the overall strategic planning?	On a scale of 1 to 10 how well do you think the organizational quality planning is integrated with the overall strategic planning?	1= Not at all 10 = Visibly integrated using a clear model.
Value-Added 1	On a scale of 1 to 10 how satisfied are you that the board adds value through its efforts in quality? Give an example of how.	On a scale of 1 to 10 how satisfied are you that the board adds value through its efforts? Give an example of how.	1 = Not at all 10 = Brilliant impact <i>Cue: Only a few more questions left</i>
Overall 1	What is the most effective thing you have done in getting the board more engaged in quality?	What is the most effective thing you have done in getting the board more engaged in quality?	
Overall 2	What one thing would you want to do/will do to get the board more engaged in quality?	What one thing would you want to do/will do to get the board more engaged in quality?	
Overall 3	What has been the greatest barrier in getting the board's engagement in quality?	What has been the greatest barrier in getting the board's engagement in quality?	
Overall 4	Rate your level of improvement expertise.	Rate the CEO's level of improvement expertise.	1 = Novice 2 = Strong (understands and practices quality improvement in business processes) 3 = Well-experienced (understands and participates proactively) 4 = Master, black-belt level
Overall 5	What one thing would improve quality the most for the hospital?	What one thing would improve quality the most for the hospital?	
Overall 6	On a 1 to 10 scale, how satisfied are you with how your hospital is progressing in improving quality?	On a 1 to 10 scale, how satisfied are you with how your hospital is progressing in improving quality?	1 = No progress 10 = Fast and impressive progress
Overall 7	On a 1 to 10 scale, how engaged is the board in quality?	On a 1 to 10 scale, how engaged is the board in quality?	1 = Not at all engaged 10 = Unbelievably engaged, active, and gets it

\* CEO, chief executive officer; IOM, Institute of Medicine.

**Table 2. CEO and Board Expertise and Knowledge\***

	Familiarity of CEO with IOM Reports <sup>†</sup>	Familiarity of Board Chair with IOM Reports <sup>†</sup>	Familiarity of All Board Members with IOM Reports <sup>†</sup>	Level of Understanding of Publicly Reported Data <sup>†</sup>	CEO Expertise in Quality <sup>‡</sup>	Board Members with Quality Expertise <sup>§</sup>
CEO ( <i>n</i> = 27)	7.44	4.92	4.16	8.48	2.70	5.70
Board Chair ( <i>n</i> = 20)	N/A	6.30 <sup>  </sup>	5.37	8.75	3.35 <sup>#</sup>	9.80 <sup>  </sup>

\* CEO, chief executive officer; IOM, Institute of Medicine.

<sup>†</sup> Response range from 1 (low familiarity) to 10 (high familiarity).

<sup>‡</sup> Response range from 1 (novice) to 4 (master level).

<sup>§</sup> Response reflects the number of board members with quality expertise.

<sup>||</sup> CEO and board chair responses differ at  $p = .06$ .

<sup>#</sup> CEO and board chair responses differ at  $p < .01$ .

Engagement in quality was assessed using six questions. Participants reported the percentage of time in board meetings spent discussing quality-related issues. They reported how satisfied they were that the quality data the board reviews are the right measures for a comprehensive assessment of the organization's real quality performance. Response categories ranged from 1 (not satisfied) to 10 (absolutely satisfied). We asked on a 10-point scale ranging from 1 (not at all) to 10 (visibly integrated using a clear model) how well organizational quality planning is integrated with overall strategic planning. Because incentives are regarded as an important driver of change, respondents were asked whether variable compensation for the CEO was linked directly to quality, and, if so, what was the percentage. Participants also reported how engaged the board was in quality on a scale range from 1 (not at all) to 10 (unbelievably engaged). Finally, because including patients in quality planning can help drive improvement, CEOs and board chairs were asked to explain how patient perspectives were incorporated into the board's quality agenda.

### Outcomes

Board engagement in quality should support cultural transformation, lead to added value from the board, and facilitate more rapid QI. We asked how well the hospital culture fosters interdisciplinary collaboration on quality and safety improvement, using a 10-point scale ranging from 1 (not at all) to 10 (we consistently see amazing results from interdisciplinary collaboration). We also asked CEOs and board chairs to report their level of satisfaction that the board adds value through its efforts in quality. Response categories ranged from 1 (not at all) to

10 (brilliant impact). Finally, we asked the level of satisfaction with hospital progress in improving quality, using a 10-point scale ranging from 1 (no progress) to 10 (fast and impressive progress).

In addition to these subjective responses, we used a composite measure of clinical quality based on data from the 10 clinical measures originally reported on <http://www.medicare.gov>, known as the 10 starter set clinical measures.<sup>10</sup> These 10 measures represent clinical indicators in heart failure, heart attack, and pneumonia. The composite for each hospital was calculated on the basis of a weighted average of the indicators based on the number of patients in each of the three clinical domains.

### Analyses

Comparisons between CEOs and board chairs were tested using independent t-tests available in commercially available software. We used paired t-tests to determine whether some responses by CEOs and board chairs differed from other responses they provided. Pearson's correlations were used to explore potential relationships between knowledge, leadership activities, and designated outcomes.

## Results

### Expertise and Knowledge of QI

Table 2 (above) summarizes CEO and board chair responses to the six questions related to expertise and knowledge. CEOs reported greater familiarity with the IOM reports than board chairs or all board members ( $p < .01$ ). CEOs also indicated that board chairs are less familiar with the IOM reports than reported by the board chairs themselves ( $p = .06$ ). Despite considerable



**Table 3. Board Engagement in Quality\***

	% of Board Agenda on Quality	Using Right Measures to Drive Quality Improvement <sup>†</sup>	Integrating Quality Planning and Strategic Planning <sup>†</sup>	CEO Variable Compensation Linked to Quality Improvement	Board Engagement in Quality <sup>†</sup>	Board Uses Patient Satisfaction Surveys
CEO ( <i>n</i> = 27)	35%	6.22	7.67	67%	7.58	70%
Board Chair ( <i>n</i> = 20)	27%	7.45 <sup>‡</sup>	8.85 <sup>‡</sup>	45%	8.10	65%

\* CEO, chief executive officer; IOM, Institute of Medicine.

<sup>†</sup> Response range from 1 to 10. Higher numbers reflect greater satisfaction.

<sup>‡</sup> CEO and board chair responses differ at *p* < .01.

publicity for both of the IOM reports, a substantial number of board chairs reported only limited familiarity with the reports and felt that other board members know even less about the reports.

In contrast, both CEOs and board chairs reported significantly higher levels of understanding of publicly reported quality data versus the IOM reports (*p* < .01). This suggests that hospital leaders understand and are monitoring these data and that efforts to publicly report quality information are succeeding in gaining the attention of hospital leaders.

Responses to the final two questions regarding CEO and board member expertise in quality reflect two important patterns. First, CEOs are less likely than board chairs to attribute QI expertise to themselves or to board members. CEOs rated their own expertise in QI significantly lower than CEO expertise was rated by board chairs (*p* < .01). CEOs also regarded fewer board members as having expertise in QI (5.7 versus 9.8, *p* = .06). Collectively, these results suggest that substantial progress is still needed in educating hospital leadership about QI and in recruiting board members with expertise in this area.

### Engagement in Quality

Table 3 (above) summarizes results for board engagement in quality. CEOs and board chairs report that about one-third of board meetings are devoted to discussing quality issues. Board chairs tended to be more confident than CEOs that they were using the right measures to drive QI (7.45 versus 6.22, *p* < .05) and that they were effectively integrating quality and strategic planning (8.85

versus 7.67, *p* < .05). Mean assessments of board engagement in quality did not significantly differ. Of these three measures, the greatest opportunity for improvement appears to be in developing and using measures to support QI efforts at the organizational level. Because CEO scores were lower in these categories than those of board chairs, CEOs may need to work closely with their board chairs to establish the need for continued improvements in what is measured and in integrating quality planning with strategic planning.

About half of the respondents indicated that CEO variable compensation was linked to quality (mean amount of compensation linked, 15%; range, 0–100%). In response to the question about the involvement of patients in board quality activities, approximately two-thirds of respondents reported using patient satisfaction surveys. These results show that recommended practices regarding CEO compensation and the inclusion of patient perspectives are being incorporated into the practices of about two-thirds of the hospitals in our survey. However, because approximately one-third of hospitals do not provide incentives to CEOs to improve quality or examine patient satisfaction survey results, more efforts are clearly needed to promote these activities.

### Outcomes

To explore the relationship between leadership knowledge/expertise and outcomes, we constructed a composite measure that represented the mean responses for all available knowledge/expertise measures except for the question about the number of board members with quality expertise (which was uncorrelated to the other

measures). Cronbach's alpha for the composite measure was .71 for CEOs and .73 for board chairs. The board engagement measures were not sufficiently correlated to construct a composite measure. As a result, we chose to use the single question about the extent of board engagement as the most appropriate measure for this construct.

Separate correlations were performed on CEO and board chair responses. For CEOs, the composite knowledge measure was significantly correlated with board engagement ( $r = .52, p < .01$ ). The knowledge measure also was positively related to both rate of progress in improvement and assessments of a culture that supports progress (both  $r$ 's = .38,  $p = .06$ ). Neither knowledge nor engagement was linked to either the appropriate care measure (ACM), composite quality measure, or risk-adjusted mortality.

For board chairs, the relationship between the composite knowledge measure and board engagement was also positive, although somewhat smaller ( $r = .30, p = .19$ ). Knowledge was not related to any of the outcome measures. However, board engagement was positively associated with perceptions of the rate of progress in improvement ( $r = .44, p = .05$ ). Engagement was marginally associated with ACM scores ( $r = .41, p = .07$ ).

## Discussion

This study provides valuable insights into how hospital leadership and boards view key issues related to engagement in QI. Although the number of interviews we conducted was relatively small, results come from a broad cross section of hospital CEOs and board chairs drawn from 14 states, single hospitals and multihospital systems, and hospitals of varying sizes. Because hospital leaders who agreed to participate may be more sensitive to quality issues than those who chose not to respond, it is possible that our survey overstates the extent of leadership involvement. Social desirability bias also may have created a somewhat more positive picture than actually exists.

Because only 17 of the hospitals in our survey provided data for both the CEO and the board chair, it is possible that the results might reflect differences between hospitals that only had a response from one of these leaders rather than differences in the perceptions of leaders from the same matched set of hospitals. To rule

out this possibility, we limited the data to these 17 hospitals with both CEO and board chair responses. For all the reported results, the same pattern of differences was observed between the responses of the two groups. However, primarily because of decreased sample size, the difference between CEO and board chair perceptions of the board chair's familiarity with the IOM report was not statistically significant (CEO mean = 5.59, chair mean = 6.12,  $p = .53$ ). Results from these analyses support the interpretation that, even within the same hospitals, CEOs and board chairs differ in their perceptions.

Despite these limitations, the interviews we conducted provide valuable insights into the extent to which hospital leaders are engaged in efforts to transform their organizations to improve quality and safety. Although sampling and response biases may have inflated estimations of expertise and engagement, responses still point to areas where substantial improvements are needed.

This study builds on a smaller study conducted in September–December 2004. The authors interviewed CEOs and board chairs from 14 hospitals on a previous version of the board engagement in quality survey. Two hospitals that participated in the previous smaller study were also part of the sample for this current study. We do not believe it is likely that reinterviewing these hospital would have had a positive or negative impact because the survey instrument changed from the first study and the interval between the two studies was more than six months. The findings from that study demonstrated that the board's engagement in quality (defined by the organization's self-assessment of how engaged in quality they were) was correlated with the hospital's risk-adjusted mortality rate (using two different mortality rates).<sup>11</sup> The difference in mortality rates was statistically different for those hospitals more engaged in quality versus those hospitals less engaged in quality. Thus, there is some evidence that suggests that the level of board engagement in quality can positively affect organizational performance.

## Strategies and Tactics for Improving Hospital Leadership and Governance Engagement

The results of the research point to several opportunities, as identified from an analysis of the qualitative comments

**Table 4. Strategies and Tactics for Hospital Board Engagement in Quality\***

**Increase the Board's Quality Literacy**

- Educate the board on salient quality issues beyond public reporting.
- Initiate discussion with the board on what defines a quality expert and consider adding quality experts to the board.
- Use retreats for having in-depth dialogue on quality and quality improvement projects within the hospital and nationally.
- Have board members attend quality conferences.

**Frame an Agenda for Quality**

- Initiate discussion between the board chair and CEO on the status of quality improvement in the hospital. How is the hospital progressing? What are the barriers? What are the strengths? How can the board support improvement?
- Ensure that discussion of quality on the board agenda gets equal billing with other important agenda items.

**Quality Planning, Focus, and Incentives**

- Create a vision for quality for the hospital with long-term outcome measures and goals. These outcome measures may include aggregate quality measures such as mortality rates.
- Review the hospital's quality plan and ensure it is aligned with the overall hospital strategic plan.
- Ensure the quality measures the board reviews are assessed annually and are well understood by board members.
- Integrate the quality measures into the overall board performance metrics and board strategic milestones.
- Analogous to financial responsibility, ensure that the CEO is considered ultimately accountable for the overall quality of the organization.
- Link incentive compensation of leadership to quality metrics.

**Patient-Centeredness**

- Share patient stories at board meetings to further increase focus on patient-centeredness.
- Ensure that patients are involved in improvement, such as by having patients participate on improvement teams.

\*CEO, chief executive officer.

and the numerical ratings, in improving hospital leadership and governance engagement in quality and thus improving hospital performance. The effectiveness of these strategies and tactics, as listed in Table 4 (left), needs to be studied.

The pay-for-performance pilot programs and other efforts underway at the public and private sector level<sup>12,13</sup> should further illuminate the role that leadership and governance will play in promoting health care improvement.

**Quality Literacy**

- More education of CEOs and especially board members about quality and safety is warranted, particularly about broader issues such as those raised in the IOM reports. This can be achieved through retreats focused on quality as well as continuing education for board members on quality. As an example, respondents noted that they sent board members to the IHI National Forum.
- Hospitals should continue to recruit board members with expertise in quality. Even though most respondents said their board had several quality experts, the credentials identified for these experts were sometimes limited or weak.

**Framing a Quality Agenda**

- Board chairs and CEOs should meet periodically to discuss their assessments of the quality-related strengths and weaknesses they observe. The results showed consistent differences between CEO and board chair responses, with CEOs tending to be less positive about board expertise and engagement in quality. Open discussions of these issues may help hospitals achieve full board and CEO buy-in for systemwide QI initiatives.
- Board meetings vary substantially in the amount of time devoted to quality issues. All hospitals need to make quality issues a substantial agenda item in their board meetings. Developing tools and ideas for using this time most effectively is an important need. Framing board agendas to include more interaction and dialogue on quality issues will facilitate the board's engagement in quality.<sup>14</sup>

**Quality Planning, Focus, and Incentives**

- Considerable progress is still needed in developing effective measures for hospitals to track the overall



quality and safety of care. Many hospitals also lack integrated quality and strategic planning. Hospital leadership should discuss how they can enhance their measures and planning processes to achieve these goals. Developing and publicizing effective measures and processes will fulfill an important need.

■ Linking CEO compensation with quality is becoming the norm within hospitals. Hospital boards that do not incentivize quality through CEO compensation should consider doing so. Hospitals and other relevant health-care delivery organizations should next focus on identifying the most effective ways to structure CEO incentives to support transformational change.

### Patient-Centeredness

■ Most hospital boards use patient satisfaction surveys to inform their decision making and those who do not should. Some boards and CEOs also use other strategies to ensure the patient viewpoint is reflected in QI planning. Hospital leadership

should formalize processes for representing patients that go beyond patient satisfaction surveys or informal feedback from board members or their families. Examples of patient-centeredness programs and activities include executive walk-arounds, senior leaders adopting improvement projects, patients telling their stories at board meetings, and board members shadowing clinicians to better understand systems issues. ■

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