What Distinguishes Top-Performing Hospitals in Acute Myocardial Infarction Mortality Rates?

A Qualitative Study

Leslie A. Curry, PhD; Erica Spatz, MD; Emily Cherlin, PhD, MSW; Jennifer W. Thompson, MPP; David Berg, PhD; Henry H. Ting, MD, MBA; Carole Decker, RN, PhD; Harlan M. Krumholz, MD, SM; and Elizabeth H. Bradley, PhD

Background: Mortality rates for patients with acute myocardial infarction (AMI) vary substantially across hospitals, even when adjusted for patient severity; however, little is known about hospital factors that may influence this variation.

Objective: To identify factors that may be related to better performance in AMI care, as measured by risk-standardized mortality rates.

Design: Qualitative study that used site visits and in-depth interviews.

Setting: Eleven U.S. hospitals that ranked in either the top or the bottom 5% in risk-standardized mortality rates for 2 recent years of data from the Centers for Medicare & Medicaid Services (2005 to 2006 and 2006 to 2007), with diversity among hospitals in key characteristics.

Participants: 158 members of hospital staff, all of whom were involved with AMI care at the 11 hospitals.

Measurements: Site visits and in-depth interviews conducted with hospital staff during 2009. A multidisciplinary team performed analyses by using the constant comparative method.

Results: Hospitals in the high-performing and low-performing groups differed substantially in the domains of organizational values and goals, senior management involvement, broad staff presence and expertise in AMI care, communication and coordination among groups, and problem solving and learning. Participants described diverse protocols or processes for AMI care (such as rapid response teams, clinical guidelines, use of hospitalists, and medication reconciliation); however, these did not systematically differentiate high-performing from low-performing hospitals.

Limitation: The qualitative design informed the generation of hypotheses, and statistical associations could not be assessed.

Conclusion: High-performing hospitals were characterized by an organizational culture that supported efforts to improve AMI care across the hospital. Evidence-based protocols and processes, although important, may not be sufficient for achieving high hospital performance in care for patients with AMI.

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Mortality rates for patients with acute myocardial infarction (AMI) vary substantially across U.S. hospitals, even when adjusted for severity of the condition (1, 2). Despite national reductions in AMI mortality rates in the past decade (3), 30-day risk-standardized mortality rates (RSMRs) for patients hospitalized with AMI vary as much as 2-fold between the highest and lowest hospitals (1). Previous studies have identified hospital volume (4, 5), urban location (6), teaching status (1, 7), geographic region (1, 8, 9), safety net status (10), and patient socioeconomic status (11) as correlates of AMI mortality rates. However, even together, these factors leave much of the variation in RSMRs unexplained (11), and they are also not readily modifiable.

Previous studies have had important limitations. They have not had the ability to use a national outcomes measure (RSMR) to systematically identify hospitals with contrasting levels of performance. They also have not explored factors that could influence hospital performance but are difficult to measure quantitatively. The value of current evidence is therefore limited for clinicians and managers who seek interventions to reduce mortality among patients with AMI.

We sought to inform the development of hypotheses regarding what works inside a hospital to achieve better 30-day mortality outcomes for patients with AMI, using the positive deviance approach (12–14) (www.positivedeviance.org). A key component of this approach is to study positive deviants (organizations with exceptionally high performance) by using qualitative methods to identify factors that enable these organizations to achieve top performance. We examined complex work processes, social interactions, and organizational culture and norms, which are difficult to measure quantitatively (15–19) but have been important in literature outside health care (20–22) for distinguishing the outcomes of top-performing organizations.

METHODS

Study Design and Sample

We arrayed hospitals according to their RSMR, as reported by the Centers for Medicare & Medicaid Services

Context

The reasons for variation in mortality rates for patients with acute myocardial infarction (AMI) among hospitals are not well understood.

Contribution

This study of high- and low-performing hospitals found that hospitals with better mortality rates were characterized by shared organizational values and goals, senior management involvement, broad staff presence and expertise in AMI care, communication and coordination among groups, and problem solving and learning.

Caution

This qualitative study generates hypotheses but could not test them.

Implication

Studies that focus on guidelines, hospitalists, rapid-response teams, and other clinically oriented advances should consider the importance of the additional characteristics of top-performing hospitals identified in this study.

—*The Editors*

Hospital Compare from 2005 to 2006 and from 2006 to 2007, the most recent data available at the time. Hospitals that ranked in either the top or the bottom 5% of performance during both years were selected. Because we sought to inform the generation of hypotheses that could be transferred (23) to a broader range of hospitals, our sample hospitals were diverse in characteristics (18) previously shown to be related to RSMRs. We excluded hospitals that reported during screening that they did not have the capability to perform primary percutaneous coronary intervention to target hospitals with sufficient experience with ST-segment elevation myocardial infarction. Hospital selection continued until theoretical saturation, the point at which successive site visits generated no new concepts, was reached (24).

Data Collection

From December 2008 to December 2009, we conducted in-depth interviews with key hospital staff who were most involved with AMI care, with an average of 14 interviews per hospital. Our team had members with backgrounds in cardiology, emergency medicine, health services research, quality improvement, nursing, organizational psychology, and social work; all had experience in conducting in-depth interviews. Each site visit included 3 to 4 researchers. Interviews were typically 1 hour in duration, followed a standard discussion guide (**Table 1**), and were audiotaped and professionally transcribed. An organizational psychologist conducted formal debriefing sessions with each site visit team (18) to inform subsequent data analyses.

Data Analysis

A 6-member multidisciplinary team performed data analysis by using the constant comparison method (25, 26), in which essential concepts from interview data are coded and compared over successive interviews to extract recurrent themes across the data. Other team members reviewed coded transcripts for the site visits they had conducted. This process of refining codes and describing the properties of each continued until no new concepts emerged. Targeted analyses were performed to examine the consistency of the data within sites and to identify distinctions in coded themes between high-performing and low-performing hospitals.

We used ATLAS.ti Scientific Software, version 6.1 (ATLAS.ti, Berlin, Germany).

Role of the Funding Source

Our study was funded by the Agency for Healthcare Research and Quality, United Health Foundation, and the Commonwealth Fund. The funding sources had no involvement in the design or conduct of the study, data management or analysis, manuscript preparation, review, or authorization for submission.

RESULTS

Study Hospitals and Staff

The 11 participating hospitals varied in teaching status, size, geographic location, and socioeconomic status (27, 28) of their patients with AMI (**Table 2**). **Table 3** lists the characteristics of the 158 interviewed staff members.

Domains of Organizational Performance

Six broad domains characterized participants' experiences in hospitals with high and low RSMR performance: hospital protocols and processes for AMI care, organiza-

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Table 1. Interview Guide

1. Let's start by having you describe what you do here.
   Provide a comfortable, nonthreatening way into the interview; begin to establish a relationship; locate the person in the organization from his or her own perspective; and gain a sense of his or her role in the larger process of AMI care.
2. What happens to a patient with AMI who comes here? Can you walk me through the process?
   Elicit descriptions of hospital processes for AMI care. Give the interviewer the opportunity to explore a broad range of factors that the interviewee considers relevant to AMI patient care in this setting.
3. Have there been efforts to improve the care of patients with AMI here?
   Explore hospital QI efforts that were broadly conceived, both formal and informal. What got it started? How does the organization recognize problems or opportunities? How do you deal with setbacks? Can you describe things that needed to get ironed out along the way?
4. Now, let's hear about what happens to the patients after they leave the hospital. For the next month, what happens? What do they see, and how does that work?
   Encourage respondents to talk about all aspects of discharge for patients with AMI, things that occur within the hospital and in various postdischarge settings.
5. Has the process always worked this way? If it has changed, can you tell me about when that happened and how it went?

AMI = acute myocardial infarction; QI = quality improvement.

Table 2. **Hospital Sample Characteristics**

Hospital Identification Number	Census Region	Staffed Beds, *n*	RSMR, %		Performance in 30-Day RSMR, July 2005–June 2007	Teaching Hospital	Cases of AMI in 2-Year Period, *n*	Patients With Low Socioeconomic Status, %*
			2005–2006	2006–2007				
1	Pacific	855	13.4	13.4	High	Yes	211	8.1
2	East North Central	491	13.8	12.8	High	Yes	243	30.7
3	Middle Atlantic	703	13.4	13.3	High	Yes	96	14.0
4	New England	632	13.1	13.3	High	Yes	307	19.4
5	New England	557	13.3	13.4	High	Yes	365	5.6
6	Middle Atlantic	317	14.0	13.2	High	Yes	147	1.5
7	East North Central	398	11.4	14.0	High	No	222	4.9
8	South Atlantic	454	18.6	19.1	Low	Yes	135	44.2
9	South Atlantic	190	17.9	18.7	Low	No	142	25.3
10	West South Central	324	20.9	19.6	Low	No	88	20.8
11	East North Central	481	20.6	19.9	Low	No	115	0.00

AMI = acute myocardial infarction; RSMR = risk-standardized mortality rate.
* Percentage of patients with AMI in that hospital who were from ZIP codes rated in the lowest quintile of socioeconomic status, as measured by the Socioeconomic Status scale (27, 28).

tional values and goals, senior management involvement, broad staff presence and expertise in AMI care, communication and coordination among groups, and problem solving and learning (**Table 4**). High-performing and low-performing hospitals differed markedly in 5 of these domains; however, we found no systematic differences in hospital protocols and processes for AMI care between high-performing and low-performing hospitals. Here, we describe the domains and key themes, with representative quotations from study participants for selected themes. The **Appendix Table** (available at www.annals.org) contains additional quotations.

Hospital Protocols and Processes for AMI Care

All participants described concrete protocols and practices undertaken by hospitals to reduce mortality among patients with AMI. None of these practices was consistently present in the high-performing hospitals or consistently absent in the low-performing hospitals. Rather, participants from all hospitals reported using a range of practices in varying combinations and degrees of intensity and form. No single practice or set of practices emerged as key to reducing AMI mortality. As the Director, Quality Management, of hospital 9 reflected after an external audit of performance problems in AMI care, "There was no 'Ah ha!' . . . We spent years trying to find the silver bullet that would fix everything, and . . . there is no one issue [in which] we were doing something glaringly wrong."

Organizational Values and Goals

Staff at high-performing hospitals expressed shared organizational values of providing exceptional, high-quality care. These values were reflected in "a common vision and purpose," referred to as the "glue" (cardiologist, hospital 7) and "the driving force behind everything" (case manager, hospital 3). A nurse manager from hospital 4 described this pursuit of excellence: "[We are] constantly resetting that bar. . . . [I]f you aim for As, you get As, and if you accept Zs, that's what you get. We don't accept anything less than the very best." Clin-

ical and administrative staff recognized that aligning multiple goals was central to fulfilling this vision and viewed achieving high-quality patient outcomes as consistent with achieving positive financial outcomes for the organization.

A shared vision of excellence in clinical care was not readily apparent in low-performing hospitals, as observed by the Medical Director of hospital 9: "The hospital likes to get disease-specific certification . . . [and] to advertise it. . . . [T]hey formed the committee and tried to check off all the boxes on the list of what they're supposed to do. . . . [T]he administration . . . is concerned about the bottom line."

Senior Management Involvement

Senior management and governing boards in the high-performing hospitals demonstrated unwavering commitment to high-quality AMI care by providing adequate financial and nonfinancial resources. Senior management also relied on quality data in strategic planning efforts and resource allocation decisions and strove to "create a culture where, where [data are] embedded" (Chief of Medicine, hospital 4). By using data openly and consistently, management fostered staff accountability for poor performance and recognized staff for high performance.

> If there's something that's out of line, we're not bashful about sending a quality letter to that individual and asking them to explain the variance. . . . When people do the right thing, we send out a letter from our Medical Director. . . . [Y]ou have to have the accountability on one side and then the recognition on the other. (Medical Director, Emergency Services, hospital 7)

Sporadic involvement of senior management was common in low-performing hospitals, in part because of frequent turnover, as reported by this case manager from hospital 11: "I have been here only seven years; this is the third

CEO [chief executive officer], the second medical director, and the third VP [vice president] of nursing." Participants reported that insufficient resources were allocated to accomplish quality goals, data were used intermittently or ineffectively to guide management decisions, and management did not create an environment in which ownership of performance problems was encouraged. In this context, accountability was uneven and corrective feedback did not always result in plans for improvement.

Broad Staff Presence and Expertise in AMI Care

Staff in high-performing hospitals reported the presence of physician champions and empowered nursing staff, pharmacist involvement in patient care, and high qualification standards for all staff. A senior administrator from hospital 2 described the "passion on the part of physician leaders to continually hit that mark and for the best outcomes in the world." Nurses in these hospitals were also central to improvement efforts and were empowered to challenge the status quo.

> I started writing my consult notes in the physician progress notes. . . . [O]ver the years it's just become the standard. . . . That was a way of my breaking into the culture saying, "This is my note; I want you to read it. It's not in the nurse's section. I have some ideas . . . and I'm open to talking about it." (Nurse manager, hospital 5)

Similarly, pharmacists were closely integrated into care processes in most high-performing hospitals, and they actively informed and influenced clinical decisions. A recurring theme was that staff had high qualification standards and fit with organizational norms. The Chief Executive Officer of hospital 2 said:

> [Staff here have] a very, very strong work ethic. . . . [I]f you didn't intend to work in a similar fashion, this [isn't] a good place for you. . . . [T]hey are very careful in their selection from the very beginning. Success breeds success. . . . [Y]ou have to fit into the culture.

In low-performing hospitals, physician presence in championing AMI quality improvement efforts was weak or nonexistent. The Medical Director of Emergency Services at hospital 9 described the consequences of the lack of physician leadership on an AMI committee as follows: "[T]here's not enough physician leadership on the committee. . . . [T]he people who are in charge . . . often show up and there's no doc there, and they . . . try to implement changes. . . . Every once and a while they get it a little bit wrong."

Nurses in low-performing hospitals were not consistently treated as valued members of a team and were typically expected to simply carry out physician instructions.

> It is just real discouraging to the nurse . . . that whole medication reconciliation . . . and just having that doctor–nurse conversation. Sometimes cardiologists are a

Table 3. Type of Staff Interviewed at Study Hospitals

Type of Staff	Interviews, n
Physicians	
Emergency medicine physician	7
Interventional cardiologist	6
Cardiothoracic surgeon	1
Cardiac fellow	2
Hospitalist	3
Nurses	
Nurse manager	13
Cardiovascular manager	3
Cardiac nursing director	5
Emergency department nurse	8
Catheterization laboratory nurse	4
Critical care nurse	8
Clinical nurse specialist	6
Cardiac research coordinator	3
Nursing educator	1
Cardiac rehabilitation nurse	1
Administration	
Chief medical officer	4
Chief nursing officer	3
Chief quality officer	1
Chief of cardiology services	6
Division chief of hospital medicine	1
Director of cardiac rehabilitation	1
Director of critical care	1
Director of cardiology	6
Director of catheterization laboratory	7
Director of pharmocotherapy	3
Director of quality management	8
Director of emergency medical services	7
Chair of cardiology	1
Chair of emergency medicine	5
Vice presidents and presidents	9
Administrative director of cardiac services	1
Administrative director of nursing operations	1
Clinical staff	
Quality management staff	9
Pharmacy	8
Worker	5
Total	158

little bit of bears and are not the kindest, and so nurses will call about meds and they say: "I gave you orders, and what are you calling me again for?" (Critical care nurse, hospital 9)

Similarly, pharmacist roles were typically narrowly circumscribed, and they had limited participation in clinical decisions. In general, low-performing hospitals faced substantial challenges in attracting and retaining skilled and experienced clinical staff, as observed by a critical care nurse at hospital 10: "I have a large majority of nurses that aren't intensive care–trained, and so I'm trying to hire some that are more experienced, but right now . . . it [is] difficult to get someone to come here."

Communication and Coordination Among Groups

Strong communication and coordination were apparent across both disciplines and departments at high-

Table 4. Domains and Key Themes in Organizational Performance in 30-Day Risk-Standardized Mortality Rate for Patients With AMI

Domain	Key Themes in High-Performing Hospitals
Hospital practices and protocols to improve AMI care	Clinical guidelines and order sets, rapid-response teams and other risk-mitigation strategies, quality improvement committees, use of information technology, case management and discharge planning practices, hospitalists, medication reconciliation practices, cardiac rehabilitation and support programs, patient and family education programs, coordination with pre- and posthospital providers, and participation in quality collaboratives and campaigns
Organizational values and goals	Shared values to provide exceptional, high-quality care and alignment of quality and financial goals of the organization
Senior management involvement	Provision of adequate financial and nonfinancial resources, use of quality data in management decisions, and holding staff accountable for quality
Broad staff presence and expertise in AMI care	Sustained physician champions, empowered nurses, involved pharmacists, and high qualification standards for staff
Communication and coordination among groups	Diverse skills and roles, recognizing interdependencies, and smooth information flow among groups
Problem solving and learning	Adverse events as opportunities to learn, use of data for nonpunitive learning, innovation and creativity in trial and error, and learning from outside sources

AMI = acute myocardial infarction.

performing hospitals. Staff repeatedly voiced a shared commitment to ensure effective communication and co-ordinated, seamless transitions in care, because they recognized their interdependencies.

> Everyone in this hospital from the housekeeper to the CEO plays a role. . . . The housekeeping needs to know why it's important for them to go out and do their job. . . . No one has an insignificant role in it. . . . So everybody needs to be educated. Everyone. (Director, Catheterization Laboratory, hospital 2)

> If I miss something, there are four other people in the room . . . and each one of those four people backs me up. Whereas if the nurse only knows the nursing role and the tech only knows the tech role, and the RT [radiology technician] only knows the RT role, there may not be four pairs of eyes backing you up. . . . [But here] it happens a lot that they find something, observe something, read something, hear something that prompts you to stay out of trouble. (Interventional cardiologist, hospital 5)

The flow of information was constrained in low-performing hospitals by poor structural supports (such as irregular committee meetings or inefficient information technology) and inadequate transparency. Lack of respect for diverse roles was expressed in multiple ways, and participants described staff isolation rather than interdependencies.

> I actually saw a physician . . . walk into a room to examine a patient and hand his suit coat to a nurse who stood in the corner . . . while he examined the patient. I thought, you've got to be kidding me. . . . I think that that has the potential to get in the way of patient care. (Director, Emergency Department, hospital 9)

> . . . everybody retreats back to their own, "me-me-me" mentality. . . . The hospital [is] feeling pressure, so ev-

erybody is kind of not in this teamwork attitude. . . . Everybody wants to know that they have their nests feathered. (Chief Nursing Officer, hospital 10)

Problem Solving and Organizational Learning

Staff in high-performing hospitals described routinely having positive experiences with problem solving and organizational learning. Adverse events were viewed as opportunities to analyze root causes, learn from experiences, and improve care. Participants reported incorporating data feedback into the organizational culture with a nonpunitive approach to problem solving, which focused on learning rather than blaming. As the Chief Executive Officer of hospital 2 reported:

> There are 4 stages in dealing with adverse events: The data are wrong; the data are correct but it's not a problem; the data are correct and it's a problem, but it's not my problem; the data are correct and I own the responsibility to fix the problem. . . . [T]his organization [is at] the level of "the data are correct and I own the responsibility to fix the problem." I think that's really the key.

Quality improvement team members characterized their teams as thriving on innovation and creativity as they persevered in trial-and-error efforts. In addition, staff frequently sought expertise outside the hospital to solve problems and learn new approaches.

> . . . the performance improvement team . . . identifies action steps, the plan is put in place, and then we continue to measure to see if it's working or not working. . . . [Y]ou identify, you intervene, you improve, you monitor, you tweak, and that's the model that they've been using for 10 years. (Director, Quality Management, hospital 4)

> We send our staff from the east coast to the west coast to see what the latest technology is. . . . [W]e can either improve upon that or say that that's not the right thing

for us. . . . [W]e're always out to try new things. (Manager, catheterization laboratory, hospital 2)

Participants at low-performing hospitals described minimal or very recent use of formal problem-solving tools, such as root-cause analysis, and variable interest in data. The approach to problem solving was generally less constructive, and finger-pointing was more commonplace. As the Vice President of Quality Improvement at hospital 8 noted:

[In quality improvement meetings, you hear] "What can I do about that stupid ED [emergency department]? They can't get anything done." Too often those kinds of discussions really become about finger-pointing.

Low-performing hospitals did not uniformly encourage innovation by frontline staff or learning from others within the organization; the Director of Performance Improvement at hospital 10 commented that "the biggest challenge is getting 'buy-in' for something very new, from the ground floor. . . . that always seems to take months." Participants also indicated an inadequate emphasis on learning from other hospitals; the Chief of Cardiology at hospital 8 expressed this as, "I would like to see more collaboration between different hospitals . . . [d]o QA [quality assurance] on everybody's procedures . . . [and see] more collaboration between smaller places in our state."

DISCUSSION

To our knowledge, this is the first qualitative study of hospitals at different ends of the performance spectrum of publicly reported mortality measures for AMI. We found marked differences in their organizational approaches in terms of organizational values and goals, senior management involvement, broad staff presence and expertise in AMI care, communication and coordination among groups, and problem solving and learning. Protocols and processes for AMI care did not differ between high-performing and low-performing hospitals. The implication of our findings is that challenges for performance improvement in the broad outcome measure of RSMR are complex and, in the absence of a supportive organizational culture, specific interventions may not be sufficient for achieving the highest performance in care for patients with AMI. Our findings differ from those of many previous studies, which identified specific determinants of high performance in other measures of AMI quality, such as β-blocker use or door-to-balloon time (29, 30); this research led to extensive efforts to adopt the best practices and reduce delays nationally (31, 32).

What are the mechanisms by which these organizational features might reduce risk for death within 30 days of admission for patients with AMI? First, having

clear values and goals to be the best, coupled with the strong engagement from staff members of diverse disciplines, senior management, and staff, focuses attention and resources on the issue of quality of care. Second, medical errors and preventable deaths occur in part because of poor communication (33–35) or "dropping the ball" during transitions of care (36), which suggests that strong communication and coordination among groups probably limit errors in transitions and enable a more reliable and safe environment at a hospital. Finally, solving problems in a way that seeks and addresses root causes, a practice that was endemic in the top-performing hospitals, may ensure that difficulties in processes are addressed swiftly and routinely and reduce the risk inherent in the hospitalization and complex clinical care of patients with AMI.

Although we used recommended techniques (15, 18, 37, 38) to enhance the rigor of our findings, our study has limitations. First, we visited hospitals at a single point in time. The low-performing hospitals could have been on a trajectory toward improvement that was not captured in our data. However, we did compute RSMRs over a 3-year period among selected hospitals and found little movement in rank among them. Second, social desirability response bias (39), in which participants misrepresent their improvement efforts to provide desirable answers, may have occurred. We interviewed several staff members in each hospital, used scripted probes to elicit details that would be difficult to misrepresent, and instructed respondents to share both positive and negative experiences. Third, hospitals could not be blinded to the reason for selection, which could have led to response bias, such as low-performing hospitals highlighting more negative aspects of care. We found no evidence of such bias in the organizational practices domain, and it seems unlikely that bias would occur only in selected domains. Fourth, although we included high-performing hospitals in lower socioeconomic settings and low-performing hospitals in high socioeconomic settings, we could not explore the potential role of financial resources on RSMR. Finally, our study identified conceptual domains that we hypothesized would influence RSMR; specific measurement of these concepts is needed to test these hypotheses quantitatively in future studies with a larger, representative sample of hospitals.

In summary, protocols and processes for AMI care are likely to be central to improving outcomes; however, our findings suggest that achieving high performance may require long-term investment and concerted efforts to create an organizational culture that supports full engagement in quality, strong communication and coordination among groups, and the capacity for problem solving and learning across the organization.

From Yale School of Public Health, Yale University School of Medicine, and Yale-New Haven Hospital, New Haven, Connecticut; Mayo Clinic, Rochester, Minnesota; and St. Luke's Hospital, Kansas City, Missouri.

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Current Author Addresses: Drs. Curry and Bradley: 60 College Street, Box 208034, New Haven, CT 06520-8034.
Drs. Spatz and Krumholz: 1 Church Street, Suite 200, New Haven, CT, 06510.
Dr. Cherlin: 2 Church Street South, Suite 409, New Haven, CT 06520.
Ms. Thompson: 47 College Street, Suite 104, New Haven, CT 06510.
Dr. Berg: 146 McKinley Avenue, New Haven, CT 06515.
Dr. Ting: 200 First Street Southwest, Rochester, MN, 55905.
Dr. Decker: 4401 Womall Road, HI-5, Kansas City, MO, 64111.

Author Contributions: Conception and design: L.A. Curry, H.M. Krumholz, E.H. Bradley.
Analysis and interpretation of the data: L.A. Curry, E. Spatz, E. Cherlin, J.W. Thompson, D. Berg, H.H. Ting, C. Decker, H.M. Krumholz, E.H. Bradley.

Drafting of the article: L.A. Curry, E. Cherlin, E.H. Bradley.
Critical revision of the article for important intellectual content: L.A. Curry, E. Spatz, E. Cherlin, J.W. Thompson, D. Berg, H.H. Ting, C. Decker, H.M. Krumholz, E.H. Bradley.
Final approval of the article: L.A. Curry, E. Spatz, E. Cherlin, J.W. Thompson, D. Berg, H.H. Ting, C. Decker, H.M. Krumholz, E.H. Bradley.
Administrative, technical, or logistic support: E. Cherlin, J.W. Thompson, E. Spatz.
Collection and assembly of data: L.A. Curry, E. Spatz, E. Cherlin, J.W. Thompson, D. Berg, H.H. Ting, C. Decker, H.M. Krumholz, E.H. Bradley.

Domain and Theme	Quotes
Organizational values and goals	
Shared values to provide exceptional, high-quality care	[We are] constantly resetting that bar, retooling every single thing. . . . [I]f you aim for As, you get As, and if you accept Zs, that's what you get. We don't accept anything less than the very best. (Nurse manager, hospital 4)
Alignment of quality and financial goals of the organization	I think they made the case very strongly to the hospital partners that this was, you know, very good for the public health. It was good for the hospital from a position of being known nationwide and then financially it was very good. That always helps, especially with the CFO [chief financial officer], and we're spending resources and making investments. (Administrator, hospital 2)
Senior management involvement	
Provision of adequate financial and nonfinancial resources	Administration was overwhelmingly supportive of the needs of the staff and the departments to say, "What do you need to get this done?" And that truly . . . they set the guidelines and the standard to say, "This is not acceptable and this is where we need to go." In my opinion, I think that was huge. (Cardiologist, hospital 7)
Use of quality data in management decisions	I pay attention to all that data that comes out in real time and view it as my job to, to intervene but also not just the person intervene but manage it from the top down but to create a culture where, where in fact that is embedded. (Vice President, Quality, hospital 4)
Holding staff accountable for decisions	If there's something that's out of line, we're not bashful about sending a quality letter to that individual and asking them to explain the variance. . . . When people do the right thing, we send out a letter from our Medical Director. . . . [Y]ou have to have the accountability on one side and then the recognition on the other. (Medical Director, Emergency Services, hospital 7)
Broad staff presence and expertise	
Sustained physician champions	We have a pretty structured process-improvement mechanism. We have a culture of sort of getting along, sharing, and sort of raising the bar. We have some pretty exacting people that do this. We have a huge process champion in [X]. It helps to have the chief of the department be an interventional cardiologist. It's what his research interest is; it's what he does clinically, and sort of the people that have, under him over the years, sort of looked up at the structure he's created, and we've built upon that with a lot of successes. (Cardiologist, hospital 5)
Empowered nurses	I started writing my [nursing] consult notes in the physician progress notes. . . . [O]ver the years it's just become the standard. . . . That was a way of my breaking into the culture saying, "This is my note; I want you to read it. It's not in the nurse's section. I have some ideas . . . and I'm open to talking about it." (Nurse manager, hospital 5)
Involved pharmacists	The pharmacy department . . . has put a system in place where each order needs to be verified by a pharmacist, so a pharmacist needs to review each prescription order, look at the drug, the dose, and the route. And then if everything sort of checks, the dose and drug gets verified. So, that's one system that has been put into place to help, hopefully to prevent medical errors. (Pharmacist, hospital 3)
High-quality standards for staff	[Staff here have] a very, very strong work ethic. . . . [I]f you didn't intend to work in a similar fashion, this [isn't] a good place for you. . . . [T]hey are very careful in their selection from the very beginning. Success breeds success. . . . [Y]ou have to fit into the culture. (Chief Executive Officer, hospital 2)
Communication and coordination among staff	
Valuing diverse roles and skills	Everyone brings something to the table; the nurse has great patient assessment skills; the radiologic technologist is great with my equipment and tweaks that so that works; the cardiovascular technologist is great with the hemodynamics and some of the recording stuff; and they've all been cross-trained to prepare the drugs, administer the drugs, monitor the patients, sit in any one of the roles in the room. (Cardiologist, hospital 5)
Recognizing interdependencies	I walk into this cath lab and I can't tell who's a nurse and who's a tech because they all work together as a team. So I thought that was like . . . that's a really good compliment because you would be able to see the differences if they didn't work as a team, if each one worked in a different pocket. But she was so new and just seeing how everybody worked together with the patient it was like I can't tell who's who here. Everybody works as a team. (Cardiac program manager, hospital 6)
Smooth information flow	There's a nursing leadership group and all this information is shared. And you know they're pretty open to doing what's best for the patient. (Nursing manager, hospital 7)
Problem solving and learning	
Use of adverse events as opportunities to learn	There are 4 stages in dealing with adverse events: The data are wrong; the data are correct but it's not a problem; the data are correct and it's a problem, but it's not my problem; the data are correct and I own the responsibility to fix the problem. . . . [T]his organization [is at] the level of "the data are correct and I own the responsibility to fix the problem." I think that's really the key. (Chief Executive Officer, hospital 2)
Use of data for nonpunitive learning	We'll do an e-mail to everybody and say, "These are the things we did well at, and these are the things that we missed the mark on." And then we'll go through, because we've documented to see which person we need to contact, and then either . . . it's usually the unit-based educator will contact those people and say, "Look, you did great here. Just what we're noticing, and we want to make sure that you know this, that you have to document restraints every two hours by hospital policy. It's not punitive at all. It's just, we want to make sure you know this. (Nurse manager, hospital 5)
Innovation and creativity in trial and error	I think one of the reasons that it's been successful is it makes clinical sense to the people given the care and it's not a fancy 6-sigma. It's just like how they care for patients every day. You know? You look. You do something. Did it work or not? You tweak the system and that's why we've been very successful. (Director of Quality, hospital 4)
Learning from outside sources	We send our staff from the east coast to the west coast to see what the latest technology is. . . . [W]e can either improve upon that or say that that's not the right thing for us. . . . [W]e're always out to try new things. (Manager, catheterization laboratory, hospital 2)