



# Case Study

Keeping the Commitment: Progress in Patient Safety  
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## Sentara Healthcare: Making Patient Safety an Enduring Organizational Value

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**ABSTRACT:** Sentara Healthcare, an integrated health care delivery system serving parts of Virginia and North Carolina, has developed a systematic program to foster a culture of safety throughout its member hospitals, with the aim of reducing the potential for patient harm. During the past five years, Sentara has intensified and expanded the program by engaging the health system's physician group and other operating units in efforts to: 1) encourage employees to be mindful of the signals of inadequate care and act on those signals; 2) provide leaders with concrete methods of reinforcing employee behaviors that enhance patient safety; 3) reinforce bulwarks against medical error by instituting processes for learning from mistakes; and 4) reward the attainment of high standards of performance. The initiative has helped to reduce the measured rate of serious safety events at Sentara hospitals by 80 percent over seven years.



### OVERVIEW

In the decade since the Institute of Medicine (IOM) issued its landmark report, *To Err Is Human*, there have been a number of successful efforts to improve patient safety in the United States.<sup>1</sup> Nevertheless, the nation appears to be far from the goal of eliminating the harm inflicted on some patients by care that is meant to help them.<sup>2</sup> A series of Commonwealth Fund case studies conducted on the fifth anniversary of the IOM report identified several health care organizations that had taken promising steps toward realizing one of the IOM's key recommendations: creating an organizational culture of safety.<sup>3</sup>

This case study, part of a new series documenting the progress that can be achieved with sustained effort, provides a fifth-year update of one of the earlier site profiles: Sentara Healthcare.<sup>4</sup> In 2002, Sentara Healthcare, an integrated health care delivery system serving southeastern Virginia and northeastern North Carolina, launched an initiative aimed at reducing occurrences of harm to its

patients and employees by fostering an organizational culture of safety. The initiative focused on training frontline staff in error-prevention tools and behaviors that would improve communication, patient handoffs, and attention to detail.

Sentara's leaders recognized that to expand and sustain these improvements, they needed to extend the program beyond the system's hospitals to include its physician group, nursing homes, health plan, medical residents, and nursing students. Sentara also understood that it needed to provide managers and leaders with guidance and tools to reinforce safety behaviors in staff—to ensure that those behaviors would lead to enduring vigilance in operational safety. In the last five years, Sentara also has used a matrix of horizontal and vertical relationships—that is, supervisor-to-employee coaching and peer-to-peer mentoring—to reinforce the primacy of patient safety in its organizational culture.

The initiative has helped to reduce the reported rate of serious safety events at Sentara hospitals by 80 percent over seven years, including reductions of 42 percent in the rate of patient falls resulting in injury and 89 percent to 93 percent in the rate of health care–associated infections among patients in intensive care units (ICUs). This case study describes how Sentara's efforts have evolved over the past five years and highlights how the organization has enhanced and sustained the program's effectiveness by:

- adapting and applying core tenets to other care settings and operational units;
- involving physicians more closely in safety initiatives;
- giving leaders concrete methods and tools to reinforce safety behaviors;
- using metaphor and stories to make safety understandable and compelling; and
- linking safety to the patient's overall care experience.

## **ORGANIZATIONAL CONTEXT FOR PATIENT SAFETY IMPROVEMENT**

Sentara Healthcare is a not-for-profit integrated delivery system that serves an area populated by 2 million residents of southeastern Virginia and northeastern North Carolina. It operates more than 100 care sites including eight acute-care hospitals (ranging in size from 112 to 569 beds), seven nursing homes, three assisted-living centers, eight outpatient and diagnostic-imaging centers, and 120 physician offices (ranging in size from two to 40 physicians). The system also encompasses a home health care division, a health plan with more than 430,000 members, a medical group, a school of health professions, and a medical residency program affiliated with Eastern Virginia Medical School (Exhibit 1). Sentara employs 19,310 staff, including 380 primary care and specialty care physicians in the Sentara Medical Group. Another 3,000 community physicians have active medical privileges at Sentara facilities.

The information infrastructure is built around a systemwide electronic health record (EHR) and computerized physician-order entry system, called Sentara eCare, that helps integrate and improve the safety of care across an increasing number of Sentara's facilities, including all hospital emergency departments and the inpatient units of seven Sentara hospitals.<sup>5</sup> Implementation of an EHR has been under way in Sentara Medical Group physician offices since 2007. Patients of Sentara Medical Group physicians can access their medical information through an online portal. Sentara was one of the first health systems in the nation to adopt an “e-ICU” system that enables specialists to efficiently monitor patients in remote ICUs from a central location using televideo and telemedicine applications.

### **Laying the Foundation for Systemwide Improvement**

Sentara's patient safety initiative began in 2002 at its flagship Sentara Norfolk General Hospital, a 569-bed, level-one trauma center and major teaching hospital in Norfolk, Virginia. Frustrated that the institution was



not achieving greater progress in patient safety despite efforts to improve, the hospital's leaders saw the need to instill a stronger culture of safety, said Gary Yates, M.D., senior vice president and chief medical officer.

To advance its safety program, the hospital hired a consulting firm to conduct a baseline assessment of previous adverse events, safety culture, and error management systems. The assessment revealed a few common behaviors as the source of most errors: inadequate communication or attention to detail, noncompliance with policy, and failure to recognize high-risk situations or use error-reduction techniques.

With guidance from the consulting firm, which drew upon its expertise in developing safety programs for the nuclear power and airline industries, the hospital implemented a patient safety program encompassing four elements<sup>6</sup>:

- elevating safety to a core organizational value through goal-setting and leadership attention;
- encouraging all employees to adopt behaviors for error prevention, including general "safety habits" that can be applied in any situation (Exhibit 2) and "red rules" for specific situations, such as always identifying a patient before delivering care;

- focusing and simplifying work processes and procedures to account for human error and its prevention—for example, by developing and using checklists to standardize the steps in a process; and
- implementing rigorous root-cause and common-cause analysis methods to help staff identify and make long-lasting, systemic change.

The hospital provided training to help staff develop necessary skills and safety habits. It also created systems to measure, and ensure accountability for, results. These initiatives built on Sentara's existing capabilities, which included using technology to incorporate information and decision support into patient care; creating reliable processes using the findings of human factors research; and hiring, training, and retaining competent people.

Early results of these efforts at Norfolk General Hospital included the promising adoption of safety behaviors and a decline in health care-associated infections in ICUs, as documented in a previous case study.<sup>7</sup> Based on the success of this pilot program, Sentara expanded the safety initiative to five other system hospitals over a three-year period that started in late 2003. (The safety program subsequently was adopted by a seventh hospital that joined the system and is currently being instituted at another recently acquired hospital.)

## STRATEGIES AND TOOLS FOR CHANGE

Sentara employed a number of strategies to expand and intensify its early patient safety improvement results, such as:

- helping staff recognize and respond to signals of inadequate care by encouraging “mindfulness”—being highly attuned to how operations are affecting patient safety and how breakdowns in safety can be avoided;
- providing leaders with concrete methods of reinforcing behaviors that enhance patient safety;
- engaging physicians in patient safety programs;
- reducing susceptibility to error by instituting processes for learning from mistakes—which in turn requires fostering a “just culture” that avoids casting blame for honest mistakes; and
- setting high standards of performance and rewarding their attainment, including the elimination of avoidable harmful events.

### Encouraging Mindfulness to Address Patient Safety Concerns

Research on high-reliability organizations (HROs), such as flight operations on aircraft carriers, has convinced Sentara’s leadership of the need to encourage employees to view lapses and small failures as signals of larger systemic problems.<sup>8</sup> Detecting discrepancies and noting their importance require a high degree of mindfulness, especially in settings where health care operations are complex.

“There’s no way you could sit down and write an algorithm or a policy or procedures to cover every potential unsafe moment,” said Gene H. Burke, M.D., vice president and executive medical director for clinical effectiveness. Instead, employees must be able to detect small signs of failure, such as lack of follow-up on test results or malfunctioning equipment. “That’s what an HRO is all about: creating mindfulness as opposed to mindlessness. It’s really changing that perspective of everybody in the company, so that every

patient is surrounded by a sea of mindfulness. [That’s] how you begin to get toward being safer.”

To drive home the practical meaning of safety issues, Burke asks employees to consider what they would do if a family member came to the hospital for care. He invites them to make a list of the “favors” they would request on behalf of the family member during his or her stay. That list will reveal the systemic problems that need to be addressed for every patient, he said.

Sentara’s frontline staff—from nurses and nursing aides to therapists, technicians, and patient transporters—are trained to recognize and report safety issues as they encounter them, both to their immediate supervisors and to an online safety reporting system.<sup>9</sup> They also receive coaching in the use of error-prevention techniques reflected in defined “safety habits” that were developed by teams of frontline staff (Exhibit 2). Each month, safety specialists canvass a sample of employees—10 leaders and 20 frontline staff—in each hospital to determine their knowledge and practice of safety habits.<sup>10</sup> The results of these “pulse check” surveys act as an indicator of the workforce’s collective state of mind toward safety.

While safety habits are broad in scope, “red rules” are limited to a few critical processes for which the organization wants to emphasize 100 percent compliance. For example, there are red rules specifying that a patient must be identified in two ways before delivery of care and that a two-person check must be performed before administering blood or blood products, chemotherapy, or high-risk medications. These rules are not meant to be used for disciplinary purposes, but to help leaders judge whether the culture makes safety compliance easy. “The red rule is so clear and obvious to staff that their response ought to be, ‘Well, why wouldn’t I do that?’” explained Carol Sale, R.N., M.S.N., director of safety and performance excellence. Employees are instructed to stop and report to their supervisor if they cannot comply, which puts the burden on leaders to remove barriers to consistent observance.

Another tool Sentara adopted to raise situational awareness of operational safety among institutional

### Exhibit 2. Sentara Healthcare's Error-Prevention Toolbox

1. *Pay attention to detail*: Follow the “stop, think, act, review” (STAR) method to focus attention and think before initiating a critical task.
2. *Communicate clearly*: Use repeat-backs and read-backs and ask clarifying questions to ensure that you understand requests.
3. *Have a questioning attitude*: “That doesn't mean challenge everything,” Burke said. “It means, if I'm not really certain about exactly what you want me to do, ask for clarification.” It also means employees should heed their intuition. If something doesn't seem right, “Take time to figure out why.... Then go to an external source to get verification,” whether that source is a person, a textbook, or an online resource.
4. *Hand off effectively using a “5P” checklist*: To ensure that all elements of a successful transfer are followed, the handoff should identify the “5Ps”: patient/project, plan, purpose, problems, and precautions.
5. *Never leave your wingman*: This phrase, adopted from military aviation (which plays a prominent role in the local culture), refers to the need for peer checking and peer coaching as appropriate.

leaders is the daily “check-in” procedure that the nuclear power industry uses to monitor plant safety. Each Sentara hospital holds a 15- to 30-minute “huddle” every morning, either in person or by phone, in which senior staff review circumstances that may have created vulnerabilities for the institution over the previous 12 to 24 hours. They ask themselves the following questions:

- What in the last 24 hours has threatened our ability to provide safe care?
- What might we expect to arise in the next 24 hours that would threaten the safety of our care?
- How would we respond to what we think might happen?

For example, leaders might discuss what precautions would be needed in the care of patients admitted with severe latex allergies, or review the adequacy of backup procedures during planned downtime on information systems.

The daily check-in/huddle allows nurse managers, physician leaders, and hospital administrators to develop an anticipatory awareness about issues that may compromise safety and to set priorities for resolving them in an efficient manner. In many Sentara hospitals, these huddles have been expanded to include

departments such as pharmacy and maintenance that also play a part in patient safety. “Managers are expected to come to the meeting prepared to discuss any safety issues they have identified in their department or, if they have none, why that is the case. They can't just say everything is fine,” said Sale.

All significant safety problems identified during the huddle are assigned to a staff “owner,” who is accountable to an executive sponsor for developing and executing an action plan to correct it. The action plan defines the problem, the goal, the person responsible for each task, and the date for its accomplishment. Level 1 plans describe high-level actions, while level 2 plans flesh out the steps necessary to accomplish each action. Following the huddle, leaders may conduct “rounds” (described below) in hospital units where vulnerabilities were identified to assess and reinforce the primacy of safety. Together, these tools constitute Sentara's “Leadership Method for Performance Excellence” (Exhibit 3).

### Providing Leaders with Methods to Reinforce Safety Behaviors

Sentara's leaders believe that reinforcement of safety behaviors by managers is critically important for establishing expectations and ensuring accountability. To that end, the system's safety office provides managers on a monthly basis with a variety of educational

### Exhibit 3. Sentara Leadership Method for Performance Excellence

1. Daily check-in/huddle: to share and maintain situational awareness
2. Safety rounds: to identify problems and reinforce safety as a priority
3. Action plans: to manage and ensure accountability for improvement work

materials (“lessons in a box”) that help them demonstrate to frontline staff the importance of a safety behavior, such as maintaining a questioning attitude. Managers are supported in these efforts by departmental safety coaches, who in turn are trained to hold one-on-one conversations with peers about safety habits.

As part of its leadership method, Sentara also provides guidance to executives and managers on how to “round with intention” through the hospital or their departments, asking staff questions that illustrate sensitivity to safety in the unit’s operations. For example, a senior executive might ask a nurse about the use of toileting rounds to actively reduce the risk of patient falls. A unit manager might ask staff to share their knowledge and understanding of a bundle of nursing interventions that, when performed together, will reduce the likelihood of a patient acquiring a urinary infection from an indwelling catheter. Leaders also quiz staff to test their knowledge of safety habits and the application of those habits in their particular care setting.

The purpose of rounding with intention is to communicate the message that safety is a priority. “I’m asking these questions . . . to show you that [safety] matters. And if it matters to me, I think it’s going to matter to you,” said Burke, the executive medical director for clinical effectiveness. Without that clear intent, he said, the rounds can very quickly become focused on immediate operational issues, which detracts from the goal of reinforcing safety. Once managers grasp that purpose, “It helps them express their intention in an effective way,” said Yates, the senior vice president and chief medical officer. Rounding with intention builds on the principle that “attention is the currency of leadership,” he said, quoting author Ronald Heifetz.<sup>11</sup>

Positive reinforcement is another important element of the leadership method. Sentara’s leaders

are encouraged to maintain a ratio of five acknowledgments of excellence to each correction of staff as a basic tool of reinforcement and accountability. The organization collects stories of success and promotes them at a leadership level. “Reward doesn’t mean cash. Reward means accolade. Hold them out in front of their coworkers and say, ‘What a great job you did,’” Burke said.

Sentara routinely recognizes staff members who question the care of a patient out of concern for safety (see box below). “Your job is to do what’s right for the patient, and if you’re concerned that what you’ve been told to do may not be safe, we give you the authority to stop, challenge that, ask for independent validation of that, and then proceed,” Burke said. “We will support you in that because your intentions are good,” regardless of the outcome.

As an example, Burke pointed to a technician who was concerned about giving an MRI (magnetic resonance imaging) scan to a patient with a silver-coated central-line catheter. The technician called her supervisor at home, who said she had not heard of any issue with it. Still uncomfortable, she called the sales representative for the machine, who was also unaware of any issues and thought it would be okay. Unconvinced, she called the manufacturer, who said, “I’m so glad you called. Absolutely not. That should never go into an MRI,” and went on to explain that the metallic coating on the catheter could burst through the plastic.

What Sentara calls “safety success stories” like the one described in the box below become part of its “Shared Story” program and are included in the materials that managers may use to illustrate the system’s values to their staff. The benefit of sharing such stories became clear when a nurse prevented a patient from being exposed to risk of potential quadriplegia

### A Patient Safety Success Story

While caring for patients as a nurse in the intensive care unit at Sentara Williamsburg Regional Medical Center, Marsha Ruckle noticed that the weight on a patient's electronic health record was recorded in pounds, not kilograms. Because medication doses are calculated by weight, and weight (for dosing purposes) is typically measured in kilograms, Marsha realized she should exercise a questioning attitude to confirm what she was seeing in the Sentara eCare system. There would be serious patient safety implications if this error were not corrected on the record.

When Marsha called the Sentara eCare support team to notify them of the discrepancy in units of weight, they were able to make the change. The team also realized that the default weight setting had been changed throughout the system for all hospitals using Sentara eCare. Marsha's call was the only notice they had received, even though this setting had been changed for all the Sentara hospitals using eCare. As a result, they were able to make the fix for the entire system and avoid any potential medication errors.

Source: Excerpted from [www.sentarahealthcare.com](http://www.sentarahealthcare.com).

by refusing to take off his cervical collar as instructed by a physician and instead insisting that the physician perform a more thorough exam. She had heard through the Shared Story program of a similar incident in which a patient was harmed when the cervical collar was removed prematurely and she wanted to prevent it from happening again. To communicate to staff that this kind of response is a desired safety behavior, the nurse's action was formally commended in a ceremony conducted by the hospital's management team.

These stories also help to reduce employees' fear of retaliation for raising concerns or delaying care in addressing those concerns. To ensure that every employee knows how to escalate a safety concern, Sentara posts the supervisory chain of command and associated contact information in each unit or department.

### Engaging Physicians in Patient Safety Programs

In the first phase of its patient safety initiative, Sentara focused primarily on developing safety habits among nurses and other frontline staff. Physician-leaders incorporated behavioral expectations into a toolbox for medical staff (e.g., use clear, direct physician-to-physician communication to initiate each consultation). However, physicians in general received little reinforcement or auditing, except through the peer review process. The result proved problematic, as other employees perceived a double standard. Sentara leaders realized that physicians needed the same kind of training and reinforcement provided to other staff so that they would all be working toward a common goal.

Sentara is now training a core group of physicians who are both informal and elected leaders of the medical staff. These 65 "safety champion" physicians include primary care physicians (predominantly from the community), emergency department doctors, hospitalists, and surgeons. Selection is based on the physicians' potential to influence peers, not on whether they are employed by the system, Burke noted. They receive training in error prevention and leadership skills and are expected to participate in rounds to promote patient safety principles and initiatives (as described above). Sentara is expanding the training to include presidents of medical staffs at each hospital, intensivists, anesthesiologists, and interventional radiologists.

The goal of these training programs is to encourage influential physicians to reinforce safety habits, such as by exercising a questioning attitude toward their peers and, conversely, by being open to questions about their actions from other team members. When physicians understand that the goal is to improve care for the patient, they are less likely to perceive a questioning attitude "as an affront to their knowledge or their professionalism," Burke said.

The training also encourages mindfulness by asking physicians to consider the safety consequences of fast-paced care in critical situations, such as in the emergency department. "As an industry, when things get tough, we tend to speed up" the pace of activity,

#### Exhibit 4. Sentara's Safety-Related Organizational Performance Metrics

Leading indicator	Safety Culture Index
Real-time indicator	Manager/staff knowledge and application of safety habits
Lagging indicators	Serious safety events Malpractice claims and suits

Burke noted, “Yet our colleagues in other complex industries tell us that is exactly the moment you need to slow down and be more deliberate.”<sup>12</sup>

To overcome physicians’ resistance to participation, Sentara leaders use four approaches that address physicians’ concerns about the pressures of modern medical practice and perceived loss of professional respect. First, they frame safety efforts as a way for physicians to gain more control over their working environment and time. For example, taking a few minutes each day to practice safety habits can reap dividends by preventing costly mistakes and the downtime necessary to recover from them. Second, they argue that acting as a safety champion earns the respect of nurses, administrators, and other staff. Third, doctors who participate in the safety program receive public recognition via an icon that appears next to their name on the Sentara Web site. Finally, Sentara makes physicians aware that improving institutional performance can have a spillover effect on the reputations of those who practice there.

#### **Commitment to Resilience: Learning from Error**

Based on a review of practices in other industries, Sentara developed the “Lessons Learned” program in 2006 to systematically relate safety events and corrective actions across the organization. The program was modeled after the Institute for Nuclear Power Operations’ Significant Event Evaluation Information Network, which helps spread learning about safety among personnel at nuclear power plants.

When a serious safety event or issue surfaces in a Sentara facility—such as the placement of a knee implant in the wrong leg or the discovery of an unclear medication label—the safety director sends a “safety

event alert” to all Sentara facilities as deemed appropriate, suggesting possible vulnerabilities to review. The alert constitutes an opportunity for managers and staff to focus their attention on potential risks and hazards in their own facilities. Upon completion of a root-cause analysis, the safety director disseminates to managers throughout the system a standard safety-event action report with lessons learned from the event. Within 30 days, each facility must report back, via its intranet, that it has taken recommended actions to prevent the event from recurring. This process demonstrates the advantage of learning from the experiences of other facilities so that errors are not repeated, a process that a multihospital system such as Sentara can accommodate, Burke noted.

For example, Sentara went through such a process when the pharmacy noticed a trend of oversedation of patients after surgery. In response, all vice presidents of medical affairs, nurse executives, and hospital administrators came together to review the records. The investigation revealed that physicians did not appear to understand the pharmacokinetic action of Dilaudid—a pain reliever that is both safer and more potent than previously used drugs such as Demerol—and were administering it similarly to morphine. In response, the system established a policy of no longer accepting orders for more than a small dose (one milligram) of Dilaudid, and refined its order sets accordingly. Sentara has gone four years without a recurrence of this event, according to Burke.

In extraordinary circumstances, Sentara’s CEO may institute a “stand-down” procedure (adapted from the U.S. Navy) that requires urgent attention to address a critical vulnerability and avoid the potential for harm. For example, Sentara used a stand-down when it learned that there was a need to strengthen its

implementation of the Joint Commission's universal protocol, which requires operating room staff to take a "timeout" before surgery to verify critical information about the patient and procedure. To ensure accountability, the stand-down defines deadlines by which each facility must promptly report back on its actions to correct the identified issue.

Sentara holds a clinical quality and safety meeting once a month to review serious safety breaches that have occurred in that month and to discuss lessons learned to prevent future occurrences. (These same safety events are reported to the medical affairs committee of the board.) The two-hour meeting, led by the medical director for clinical effectiveness, draws staff from across the organization and high-level leadership, including the chief executive and chief operating officers. In each meeting, two executives talk about how they are using Sentara's leadership method to reinforce patient safety in their own facilities (Exhibit 3). This process promotes cross-facility sharing of best practices among leaders of Sentara's home health operations, long-term care facilities, hospitals, and health plan.

To ensure that lessons on patient safety improvement have reached beyond the leadership group and are consistently applied in practice, Sentara audits departments to see if they are acting on recommendations for precautions. The system tracks corrections identified in root-cause analyses of safety lapses and audits those processes every six months for a period of about two years to verify that corrections are sustained. "It isn't enough to simply tell people what to do; you've got to make sure they are doing it," Burke said. "You've got to give them feedback and you've got to be persistent." The audits are performed by quality coordinators in partnership with safety coordinators in each facility.

## **Ensuring a Just Culture to Promote Learning from Mistakes**

A serious safety event triggers as many as three investigations. One team of trained hospital staff—nurses, quality improvement coordinators, safety specialists, respiratory therapists, and department managers—conducts a root-cause analysis, constructing a timeline of events to determine contributing factors. If necessary, a second team, comprising physicians, conducts a medical staff peer review. To ensure rapid learning from the subset of cases submitted to the peer-review team, a physician member of that team may join the root-cause analysis team to provide an understanding of what happened, from a medical staff perspective.

The manager of the involved employee(s) reviews the event separately using a decision tree that applies the principles of a "just culture" incorporated in Sentara's philosophy of fairness. That philosophy holds that employees should not be blamed for honest mistakes that may signal system failures (including deficiencies in training), since the organization wants to learn about and correct such failures. On the other hand, employees are held accountable if they have engaged in willful misconduct, have incurred unacceptable risk, or have a history of unsafe acts. To guard against "scapegoating" employees, the supervisor uses a substitution test to determine whether another similarly situated individual would have committed the same act in the same circumstances.

Likewise, the tone of the peer review is collegial. "Our job is to help you see that you are a highly trained, well-intended professional and you could do better. Unless you have a history of repeated mistakes of this kind despite attempts to improve, this is a good person caught in a bad moment. We need to help you identify ways to improve your performance," Burke said.

## Setting High Goals and Rewarding Staff for Meeting Them

Across its system, Sentara sets high goals for performance on patient safety, including the elimination of all avoidable harmful events and the achievement of top-10 percent performance wherever national quality and patient safety benchmarks exist. For example, one goal is to eliminate all wrong-site surgeries (and similar errors such as wrong patient and wrong procedure) in operating rooms throughout the system. “Our board is really clear,” said Yates, Sentara’s senior vice president and chief medical officer. “They want zero events...[and] until we get to zero, we’re not there.”

Sentara’s board sets one-year and three-year goals for financial, quality, and safety performance, which it aligns with organizational performance metrics and with performance incentives for employees. Incentives also reflect performance on department-specific goals (Exhibit 4). When Sentara factors in results from patient safety initiatives, it ties the bonus to performance in the early years of a patient safety initiative to call attention to it.

For Sentara’s top 100 leaders, 40 percent of their variable pay is directly linked to quality and safety performance. Leadership bonuses are also based on employees’ evaluation of the company, which is assessed through a work environment index derived from an annual companywide survey administered by the Jackson Group (Sentara scores above the group average for performance and employee participation among organizations using the survey). For frontline staff, half of the performance measures in Sentara’s gain-sharing program are based upon quality and safety performance. On average, the bonus can be worth up to an extra two weeks’ pay.

Each Sentara hospital calculates the number of days since the last occurrence of a serious safety event in that facility; the system uses the results for the worst-performing hospital as its systemwide number. The data are shared among hospital leaders at the monthly quality and safety meeting to encourage dialogue on how better performance can be achieved.

## RESULTS

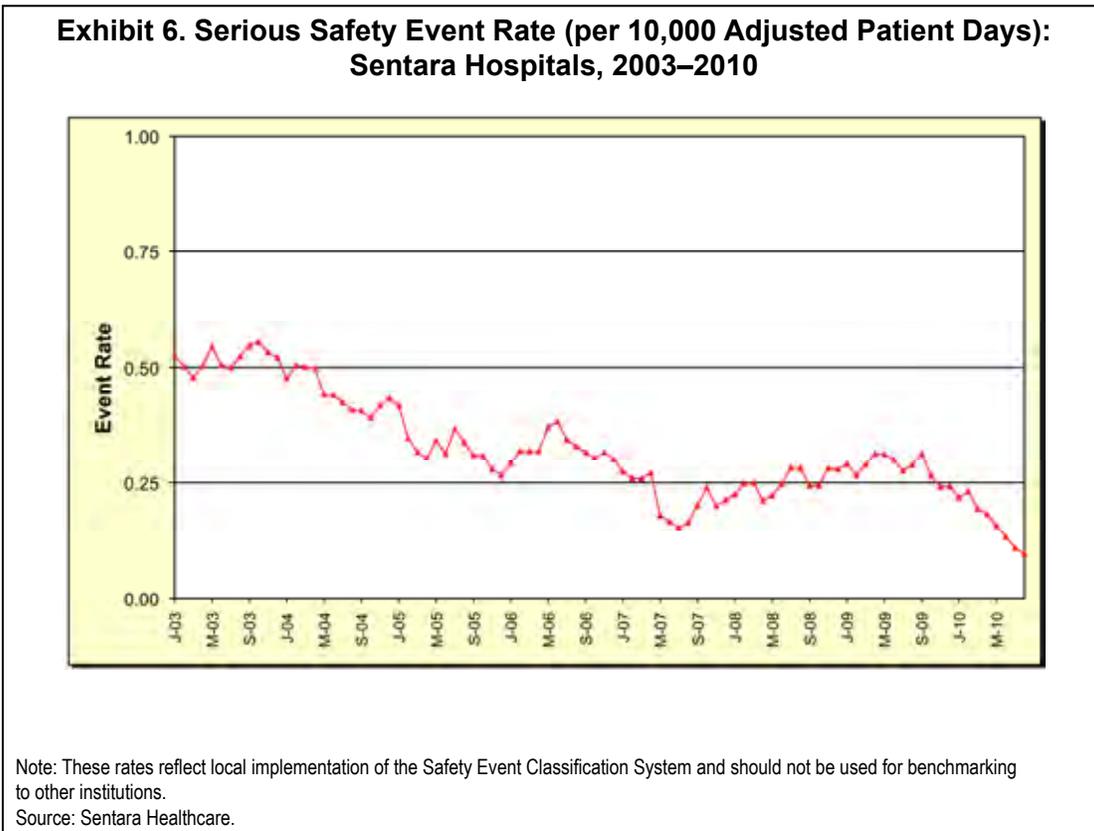
Sentara uses the Serious Safety Event Rate (SSER) to monitor its improvement in eliminating preventable events of harm. The measure was developed by the consulting firm Healthcare Performance Improvement (in which Sentara has an ownership stake) and is calculated as a rolling 12-month rate of serious safety events per 10,000 adjusted patient days. A serious event is defined using a “safety event classification” as a deviation from expected performance or the standard of care resulting in significant (moderate to severe) harm to the patient, including death, permanent loss of function, or injury (Exhibit 5). Examples include misdiagnoses, medication errors, hospital-acquired infections, wrong-site surgery, and falls with serious injury.<sup>13</sup>

Sentara reports that the serious safety event rate declined about 80 percent across its hospitals from 2003 to 2010 (Exhibit 6). (Because these rates reflect Sentara’s implementation of the Safety Event Classification System, they should not be used for benchmarking to other institutions.) During this time, in-hospital mortality for all conditions declined 23 percent across seven Sentara hospitals from 2003 to 2008, when it reached a level almost 50 percent lower (better) than expected after taking into account patients’ severity of illness (Exhibit 7).

Sentara cites the cumulative effects of multiple safety initiatives as contributing to these improvements, including the role of<sup>14</sup>:

- innovative technology such as the eICU tele-monitoring system and barcoding technology for bedside medication verification;
- dedicated hospitalist physicians to care for inpatients and multidisciplinary teams for patient rounding in ICUs; and
- medication error prevention techniques, such as the use of unit-based clinical pharmacists and electronic clinical pharmacy alerts.

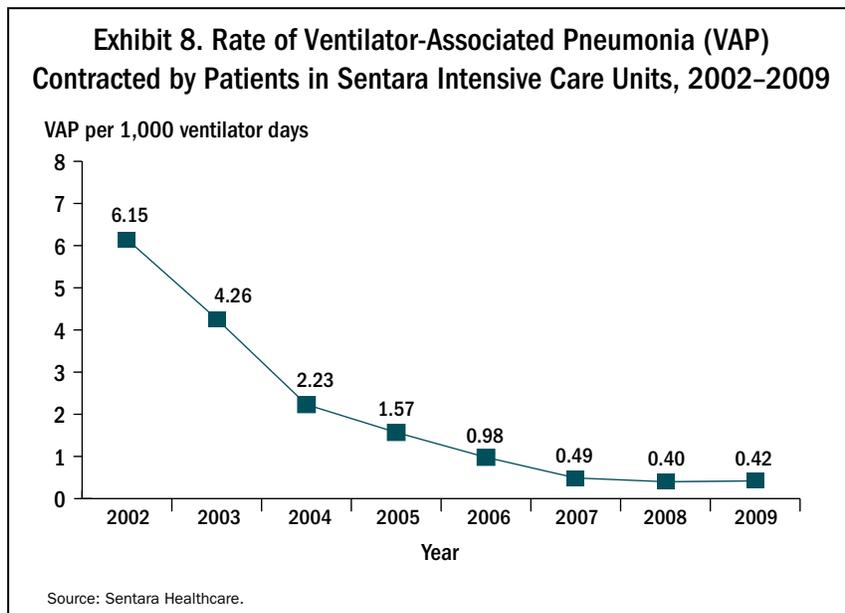
Within Sentara’s ICUs, multidisciplinary teams—which may include physicians, nurses, respiratory therapists, pharmacists, dieticians, infection





control experts, and case managers—conduct patient rounds to help ensure consistent delivery of evidence-based best practices to prevent health care–associated infections, such as pneumonia in patients on mechanical ventilation and bloodstream infections among patients with a central-line catheter.

- Rates of ventilator-associated pneumonia in Sentara’s ICUs declined by 93 percent from 2002 to 2009, placing Sentara among the top 10 percent of hospitals reporting to the Centers for Disease Control and Prevention (Exhibit 8).
- Five Sentara hospitals reported that they had prevented all ventilator-associated pneumonia infections in their ICUs during the most recent one-year reporting period (July 2009 to June 2010); Sentara’s Williamsburg Regional Medical Center has done so for more than six consecutive years.<sup>15</sup>
- The rate of central line–associated bloodstream infections among ICU patients declined by 89 percent from 2002 to 2009 across Sentara hospitals (Exhibit 9). During 2009, two hospitals



reported zero infections and five had standardized infection ratios that were 32 percent to 91 percent lower than predicted, based on national rates (Exhibit 10).<sup>16</sup>

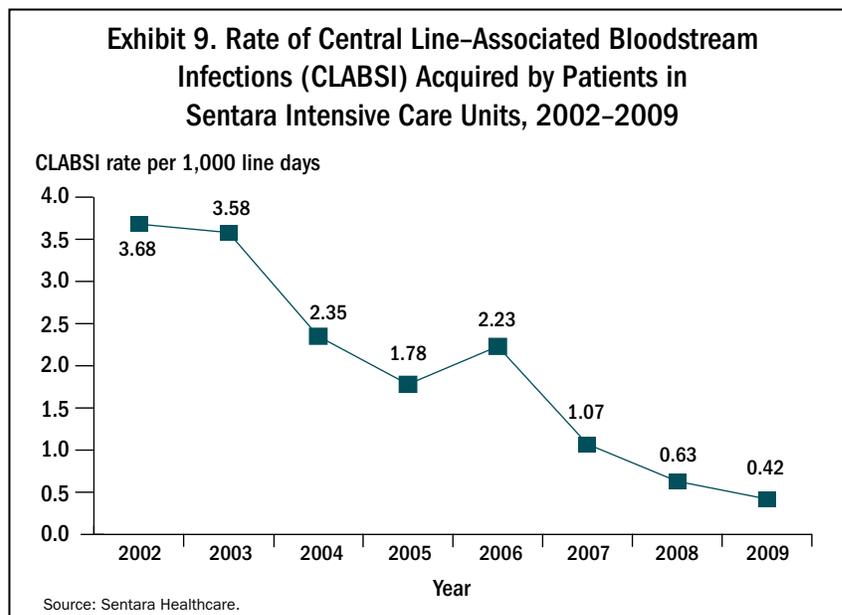
Other patient safety-related results include the following:

- Reported knowledge and practice of safety habits increased from about 40 percent of staff and managers surveyed in 2008 to 91 percent in 2010.
- The rate of patient falls with injuries declined 42 percent from 0.99 per 1,000 patient days in 2003 to 0.57 per 1,000 patient days in 2009.
- The rate of employee injuries and illnesses declined 30 percent from 2003 to 2008.
- Hand-hygiene compliance improved from 39 percent to 96 percent of observations across Sentara hospitals from 2001 to 2009.
- The system’s annual rolling-average number of malpractice suits and claims declined by 43 percent from 2003 to 2009; their frequency and severity (cost) per hospital bed is also substantially below national and state averages.

In the Leapfrog Group’s voluntary annual survey of hospital patient safety practices, the majority of Sentara hospitals either fully met Leapfrog’s standards or exhibited substantial progress in doing so for five of the seven rating categories that Leapfrog measures: preventing medication errors, staffing the ICU with intensivists, taking steps to avoid harm, reducing in-hospital injuries, and reducing ICU infections.<sup>17</sup>

On a composite measure of clinical quality of care, Sentara’s hospitals performed better than national and state averages for the care of patients treated for heart attack, heart failure, and pneumonia, and for the prevention of surgical infections, based on data reported to the federal government for calendar year 2009. Performance on some specific measures in some hospitals reached or exceeded the top 10 percent of hospitals. Patients’ overall rating of their hospital care experience exceeded national and state averages at Sentara Norfolk General Hospital in 2009.<sup>18</sup>

As anecdotal evidence of increasing awareness of harm among staff, Gene Burke, Sentara’s vice president and executive medical director for clinical effectiveness, cited the example of a lost test specimen. In years past, a lost specimen would have been treated as an inconvenient but inevitable occurrence. The physician would have repeated the test, most likely without acknowledging the reason to the patient or



**Exhibit 10. Central Line–Associated Bloodstream Infections in Sentara Intensive Care Units: Standardized Infection Ratios, 2009**

Hospital	Standardized Infection Ratio	# of Infections	Central-Line Days
Sentara Bayside Hospital	0	0	1,815
Sentara Leigh Hospital	0	0	2,483
Sentara Virginia Beach General Hospital	0.09	1	6,706
Sentara Norfolk General Hospital	0.17	4	14,027
Sentara Careplex Hospital	0.28	2	4,255
Sentara Obici Hospital	0.68	2	1,778

Source: [www.whynotthebest.org](http://www.whynotthebest.org) based on hospital-reported data collected by *Consumer Reports Health* and the Leapfrog Group.  
 Note: A standardized infection ratio (SIR) of 1 means that the hospital's ICUs reported CLABSIs at the same overall rate as would be predicted from national rates. An SIR of < 1 implies it had fewer infections than predicted. For example, a hospital with an SIR of 0.70 reported 30 percent fewer infections than national rates for its mix of ICUs.

investigating the problem. Now, employees recognize this kind of event as a symptom of a systemic problem that puts patients at risk. The patient would be informed of the reason that a new test is needed, the event would be investigated, and the patient would find out the results of that investigation.

**THEMES AND INSIGHTS**

Sentara’s recent experience illustrates how an organization can build on safety improvement efforts to strengthen a culture of safety. Sentara continues to hold to the lessons noted at the beginning of its journey: make safety a priority, exhibit “measured impatience” for change, and make error prevention a reliable process by translating behavioral expectations into specific techniques.

During the last five years, the organization has accumulated new learning about additional critical success factors, including:

- adapting core tenets to other care settings and operational units;
- involving physicians more closely in safety initiatives;
- giving leaders concrete methods and tools to reinforce safety behaviors;
- using metaphors and stories to make safety understandable and compelling; and

- linking safety to the overall patient experience of care.

**Balancing Central Tenets and Local Adaptation**

As it spread the safety program throughout the diverse operations of its integrated delivery system, Sentara sought to maintain common principles, but learned that each site needed to adapt the initiative to achieve common aims in its particular work environment. Although the scope of the company created a challenge to implementing wide-scale change, Sentara turned this to its advantage by adapting its approach to new areas as it gained experience about principles that could be applied to any setting.

“You don’t have to be touching a patient to benefit from safety habits, such as a questioning attitude, good handoffs, and peer coaching,” Burke said. “What they do is reduce the frequency of error,” whether in processing insurance claims, delivering accurate test results, or administering proper medications. “The details are modified by the leadership group, but the concept is exactly the same,” he noted.

**Involve Physicians Early and Closely in Safety Initiatives**

As Sentara prepared to extend its safety program to a hospital that had recently joined the system, it looked back on its early efforts and realized that progress slowed when physicians were not key participants.

“What we’ve learned is that, when you start this journey of safety, if you identify lead physicians and have them become champions and leaders in creating safer circumstance, you’re more likely going to get a faster improvement and a more durable improvement than if you did what we did, which was surround the physicians with safety-minded people,” Burke said.

### **Creating a Method for Leaders to Reinforce Safety**

Sentara also learned that it is not sufficient to simply exhort leaders to support patient safety efforts. When Sentara began its safety journey, leadership expectations were a “clever expression of ‘make it real, make it happen, make it stick,’” Burke recalled. While acknowledging that this “sounded really good,” he said it left leaders wondering what they were supposed to do. To fill this void, Sentara developed concrete tools that would form a structure or method that leaders could follow consistently (Exhibit 2).

Sentara also wielded its organizational structure as a strength by letting leaders at different facilities learn from one another. For example, it arranged for hospital leaders who were new to the leadership method to listen in on the daily check-in call at a facility that exemplified the best practice within the system. This peer observation allowed the “novice” site to comprehend more readily the value of the approach and thus created internal motivation for take-up and effective use of the tool.

Sentara’s safety leaders attribute the sharp reduction in safety events over the past two years (Exhibit 6) in large part to the concerted effort to raise the visibility of safety through the feedback of performance data in combination with the application of leadership tools. An increase in the serious safety event rate prior to 2009 galvanized everyone’s attention to focus on reenergizing and deepening safety efforts, said Sale, the director of safety and performance excellence. The leadership tools helped to embed an improvement method in the day-to-day work of frontline managers “so that they could apply desired behaviors to the work of each department,” she said.

### **Metaphor and Story Bring Safety to Life**

Carefully chosen metaphors help to convey messages about safety in ways that staff can understand. According to Sale, something that is familiar to the staff makes it a bit easier for them to grasp how safety works in a complex system. “We want staff to understand that changing culture is a journey—it’s not a sprint that happens overnight but a marathon that takes time, investment, and energy to accomplish.” By way of illustration, Sale related an analogy often used by Sentara’s CEO, Dave Bernd. “When an aircraft carrier captain wants to turn that vessel, he needs to start four miles before . . . the place where he wants to turn because it takes that long to turn a vessel that size. [Likewise,] Sentara is a large organization and we need to realize it takes time to change culture. We need to stay the course because we’re still working our way through the turn.” As a practical outgrowth of that insight, Sentara has learned to introduce only one red rule (patient identification) when initiating the safety program in a new hospital.

Personalized stories of success and failure also help drive home the importance of safety by humanizing the impact of safety lapses as well as efforts to prevent them, Burke noted. For example, Sentara added names of patients who had been injured or had died to its run chart of serious safety events and showed it to employees and the board. “When you make people’s mouths go dry and recognize that it’s their lives, their families at risk—that is a very powerful moment. Every institution has those stories,” Burke said.

Selecting terminology that resonates with staff also helps them internalize safety concepts. For example, Sentara initially referred to safety habits as “behavior-based expectations” for safety but later realized that this terminology conveyed the wrong message about the locus of responsibility for safety. Meeting expectations implied an external motivation for adopting safety practices. Reframing the concept as developing habits communicated that each staff member is personally responsible for safety, Sale observed. Developing a common language of safety also promotes reinforcement among staff. When staff members

use the same catchphrases to express intentions about safety in different environments, it indicates that they are developing a shared mindfulness about safety, Burke noted.

### **Demonstrate to Staff That Patient Safety Is an Integral Aspect of Patients' Experience of Care**

Sentara's safety efforts are guided by the principle that safety will be a nonevent for the patient when the system works successfully to prevent safety events from occurring. What the patient sees simply as good customer service results from the integration that occurs behind the scenes between safety and service. Conversely, a lapse in safety can mar the patient's experience, no matter how good the service. "It's not that we only do safety and we only do service. We really do them together as a patient experience," Sale said.

### **CONCLUSION**

In summary, Sentara's leaders noted three interrelated strategic objectives that health care organizations must address to create a culture of safety: 1) process redesign—purposefully striving for highly reliable operations; 2) human performance—making it as easy as possible for everyone in the system to accomplish their work objectives; and 3) human factors integration—designing technology and machines with an understanding of human error and how to prevent it.

Despite the progress that Sentara has made, its leaders are humble about how far they have come and the challenges still to be met. "There's so much we don't know. An analogy we've used is, if a marathon is 26 miles, maybe we know what the five- or six-mile post looks like," said Yates, the senior vice president and chief medical officer. He identified three traits, or techniques, necessary for organizational leaders to be successful at the patient safety journey: perseverance, focus, and a willingness to undertake a portfolio of complementary interventions that gradually deepen the organization's engagement in safety.

A summary of findings from all case studies in this series, *Keeping the Commitment: A Progress Report on Four Early Leaders in Patient Safety Improvement*, will be available in spring 2011 on [www.commonwealthfund.org](http://www.commonwealthfund.org).

## NOTES

- <sup>1</sup> D. M. Berwick, D. R. Calkins, C. J. McCannon et al., “The 100,000 Lives Campaign: Setting a Goal and a Deadline for Improving Health Care Quality,” *Journal of the American Medical Association*, Jan. 18, 2006 295(3):324–27; and P. J. Pronovost, G. A. Goeschel, E. Colantuoni et al., “Sustaining Reductions in Catheter Related Bloodstream Infections in Michigan Intensive Care Units: Observational Study,” *BMJ*, Feb. 4, 2010 340:c309.
- <sup>2</sup> R. M. Wachter, “Patient Safety at Ten: Unmistakable Progress, Troubling Gaps,” *Health Affairs*, Jan. 2010 29(1):165–73; and C. P. Landrigan, G. J. Parry, C. B. Bones et al., “Temporal Trends in Rates of Patient Harm Resulting from Medical Care,” *New England Journal of Medicine*, Nov. 25, 2010 363(22):2124–34.
- <sup>3</sup> D. McCarthy and D. Blumenthal, *Committed to Safety: Ten Case Studies on Reducing Harm to Patients* (New York: The Commonwealth Fund, April 2006); and D. McCarthy and D. Blumenthal, “Stories from the Sharp End: Case Studies in Safety Improvement,” *Milbank Quarterly*, March 2006 84(1):165–200.
- <sup>4</sup> For a synthesis of findings across sites, see D. McCarthy and S. Klein, *Keeping the Commitment: A Progress Report on Four Early Leaders in Patient Safety Improvement* (New York: The Commonwealth Fund, forthcoming). Information for the case study was collected from interviews and discussions conducted during a site visit to Sentara Healthcare, supplemented by telephone and e-mail communications, presentations, internal documents, and published materials including: G. R. Yates, R. F. Hochman, S. M. Sayles et al., “Sentara Norfolk General Hospital: Accelerating Improvement by Focusing on Building a Culture of Safety,” *Joint Commission Journal on Quality and Safety*, Oct. 2004, 30(10):534–42; G. R. Yates, D. L. Bernd, S. M. Sayles et al., “Building and Sustaining a Systemwide Culture of Safety,” *Joint Commission Journal on Quality and Patient Safety*, Dec. 2005 31(12):684–89; and G. H. Burke, G. B. LeFever, and S. M. Sayles, “Zero Events of Harm to Patients: Building and Sustaining a System-Wide Culture of Safety at Sentara Healthcare,” *Managing Infection Control*, Feb. 2009:44–50.
- <sup>5</sup> Sentara’s information technology capabilities have earned several distinctions including the “Most Wired” designation from the American Hospital Association’s *Hospitals & Health Networks* magazine as well as the Health Information and Management Systems Society’s Davies Award of Excellence and the HIMSS Analytics Stage 7 Award for EHR adoption. Sentara reports that eCare has contributed to clinical improvements such as reductions in average length of hospital stays and rates of hospital readmissions, more timely bed assignments and medication administration, and the prevention of potential medication errors (<http://www.sentara.com/News/NewsArchives/2010/Pages/sentara-receives-2010-himss-davies-award.aspx>).
- <sup>6</sup> G. R. Yates, “Zero Events of Harm: Lessons Learned from High Reliability Industries and Their Application in Healthcare,” presentation at the Institute for Healthcare Improvement Annual Forum, Orlando, Fla., Dec. 7, 2009, <http://www.softconference.com/ihf/sessionDetail.asp?SID=194339>.
- <sup>7</sup> D. McCarthy and D. Blumenthal, “Accelerating Patient Safety Improvement by Strengthening the Culture of Safety—Sentara Norfolk General Hospital,” *Committed to Safety: Ten Case Studies on Reducing Harm to Patients* (New York: The Commonwealth Fund, April 2006).
- <sup>8</sup> For a general application of high-reliability theory, see: K. E. Weick and K. M. Sutcliffe, *Managing the Unexpected* (San Francisco: John Wiley & Sons, 2007). For a description of Sentara’s experience through the lens of high-reliability theory, see: S. Hines, K. Luna, J. Lofthus et al., *Becoming a High Reliability Organization: Operational Advice for Hospital Leaders*, AHRQ Publication No. 08-0022 (Rockville, Md.: Agency for Healthcare Research and Quality, 2008).
- <sup>9</sup> Staff reports of safety issues constitute one part of a broader effort that also encompasses defined “trigger events” such as unexpected returns to surgery, interoperative mortality, surgical errors (e.g., retained foreign objects), hospital-acquired infections, and others, which may be directly observed or identified through a review of billing records.

- <sup>10</sup> The survey encompasses four verbal questions: 1) How many safety habits do we have? 2) What are the safety habits? 3) Can you tell me one error-prevention tool for each of these habits? 4) Where have you used or seen another coworker use one of these tools?
- <sup>11</sup> R. Heifetz, *Leadership Without Easy Answers* (Cambridge, Mass.: Harvard University Press, 1998).
- <sup>12</sup> For additional perspective on this phenomenon, see: C. A. Moulton, G. Regehr, L. Lingard et al., “Slowing Down to Stay Out of Trouble in the Operating Room: Remaining Attentive in Automaticity,” *Academic Medicine*, Oct. 2010 85(10):1571–77.
- <sup>13</sup> The Serious Safety Event Rate is being used by 100 hospitals, according to the consultant Healthcare Performance International. However, Sentara’s rates may not be directly comparable to those of other organizations because of the potential for subtle differences in the application of those organizations’ classification systems, according to Sentara. For methodology, see C. Throop and C. Stockmeier, *SEC & SSER Patient Safety Measurement System for Healthcare*, HPI White Paper Series (Virginia Beach, Va.: Healthcare Performance Improvement, 2009), <http://www.hpireresults.com/resources.html>.
- <sup>14</sup> Sentara Healthcare, *Quality and Patient Safety Report*, 2008, [www.sentara.com](http://www.sentara.com).
- <sup>15</sup> See J. Kaiser and K. McCoy, “Consistently Achieving Zero Events of Ventilator-Associated Pneumonia: Five Years and Counting,” presentation at the Institute for Healthcare Improvement Annual Forum, Orlando, Fla., Dec. 9, 2009, <http://www.soft-conference.com/ihi/sessionDetail.asp?SID=191862>.
- <sup>16</sup> The risk of infection varies across different types of intensive care units (ICUs). Therefore, CLABSI data are reported as standardized infection ratios (SIRs), a measure developed by the Centers for Disease Control and Prevention to summarize comparisons of data from an individual hospital’s ICU to national infection rates for that particular type of ICU. This analysis adjusts for the fact that the Leapfrog Group and states collect data from varying ICU mixes, requiring comparisons to different average infection rates. For more information, see: [www.whynotthebest.org/methodology](http://www.whynotthebest.org/methodology).
- <sup>17</sup> The Leapfrog Group describes itself as “a national membership organization that mobilizes purchasing power of the private sector to alert America’s health industry that big leaps in health care safety, quality, and customer value will be recognized and rewarded.” See the Leapfrog Group’s Web site for disclaimers accompanying its data: [www.leapfrog-group.org](http://www.leapfrog-group.org).
- <sup>18</sup> Performance data on hospital clinical quality and patient experience measures were derived from [www.whynotthebest.org](http://www.whynotthebest.org), which compiles data from the federal Hospital Compare Web site. Overall rating of care means a rating of 9 or 10 (on a 10-point scale) among adult respondents to the national Hospital Consumer Assessment of Healthcare Providers and Systems survey.

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The aim of Commonwealth Fund–sponsored case studies of this type is to identify institutions that have achieved results indicating high performance in a particular area of interest, have undertaken innovations designed to reach higher performance, or exemplify attributes that can foster high performance. The studies are intended to enable other institutions to draw lessons from the studied institutions' experience that will be helpful in their own efforts to become high performers. It is important to note, however, that even the best-performing organizations may fall short in some areas; doing well in one dimension of quality does not necessarily mean that the same level of quality will be achieved in other dimensions. Similarly, performance may vary from one year to the next. Thus, it is critical to adopt systematic approaches for improving quality and preventing harm to patients and staff.

