“One of the elements of a high-reliability organization is a preoccupation with failure,” says M. Michael Shabot, M.D., Memorial Hermann’s chief medical officer. “If you ask me on any given day what I am worried about, it is our having a transfusion reaction.”

So now, the system is rolling out a project to add a unique bar code to each armband before the first draw leaves the room, all linked to the electronic health record system. “Even if a patient comes in unconscious, the bar code number stays with him,” Shabot says. “So we are improving a process that is already infinitely better than the one used in most U.S. hospitals.”

An all-in affair
The larger project, called the From the Board to the Bedside Initiative, involves all 21,500 health system employees, including approximately 7,500 nurses and 5,400 affiliated physicians. The board has approved tens of millions of dollars in spending on the project, with patient safety now the system’s only core value.

Memorial Hermann centralized its quality departments, trained all employees off-site in the principles of high reliability, and enforced the use of evidence-based protocols for most medical procedures, expanded its EHR to facilitate clinical decision support and rigorously documented performance with a dizzying array of data dashboards.

Some results are astonishing. In a recent month, one Memorial Hermann hospital received the system’s Certified Zero Award for having...
no central line-associated bloodstream infections for 12 months. Five hospitals had no ventilator-associated pneumonias for the same year. Six hospitals had no retained foreign objects. Seven had no serious pressure ulcers, one had no hospital-associated injuries, two had zero deaths among surgical inpatients with serious treatable complications and two had no birth traumas.

It has not always been smooth sailing, especially with the doctors. A number of high-volume physicians balked at new protocols and took their referrals elsewhere. Others lost their privileges, information that was shared with the National Practitioner Data Bank. Still others privately grumbled, and some continue to have reservations about the changes.

The system has few employed doctors, but 2,100 out of 5,400 physicians have joined its clinically integrated model. Those who join commit in writing to practice evidence-based medicine, help to develop care protocols and order sets, exchange information with the system EHR and publish quality and patient safety data monthly from their outpatient offices.

The System Quality Committee approves all standards, and medical staff chiefs who balk at carrying them out are summoned to explain their stance to the committee, which includes a number of senior physicians.

**Not exactly revenue neutral**
Another hit has been to the bottom line. In a payment system that continues to reward volume of services provided, many quality and safety initiatives reduce lengths of stay and complications — and in the process, reduce revenue.

For example, care for premature babies in the neonatal intensive care unit is the highest-margin service in the health system, even from Medicaid. And yet, because the system’s obstetricians and neonatologists have adopted a range of evidence-based protocols, in the past year a record percentage of the 26,000 babies delivered annually within the system came to full term. NICU admissions fell 23 percent and length of stay fell 30 percent.

“That’s great for the mothers and their babies. It’s great for society in terms of lower health care costs and a healthier population. It’s bad for hospital finances,” says Dan Wolterman, Memorial Hermann’s CEO. “Neonatal intensive care has gone from my most profitable service...”

M. Michael Shabot, M.D.
CMO, Memorial Hermann

“One of the elements of a high-reliability organization is a preoccupation with failure. If you ask me on any given day what I am worried about, it is our having a transfusion reaction.”
people there," Shabot says. "It was like, 'Oh my God, what is this?' Those goals became our mission, though."

Well, sort of.

“When I first heard about getting to zero, my first thought was, 'That will never happen,'” says Todd Wood, M.D., who was a general surgeon at Memorial Hermann Southwest at the time. “Depending on how narrowly you define zero, you might get close, but the point is to do everything you can to avoid preventable harm to patients. As a surgeon, I know that you can do everything right and still bad things can happen."

Now chief of staff at the hospital, Wood says he has come to appreciate the successes the system has had in vastly reducing medical errors. “I am a convert in that it is hard to disagree with the data, and they show many of these things have worked. And yet, as chief of staff, I have some reservations about the way that Memorial Hermann has achieved its success on patient safety.”

In particular, Wood says, “The sort of centralized command and control over quality, and pushing these protocols into the hospitals — that is what I’m struggling with currently. Medicine is still practiced locally. Yes, there are docs on the System Quality Committee and the various clinical practice committees, but no local control. I think if you come in and try something and it doesn’t work, patients pay for that. So you have to go a little more slowly with some of these things.”

Slow, however, is not the mantra of Board to Bedside. In the course of a year from 2007 to 2008, all system employees and thousands of physicians received classroom training in high reliability from experts in nuclear power and aviation. “Kitchen, clerical, maintenance staff, and volunteers were included because everyone working in a health care facility can prevent an accident,” Wolterman says.

Maria Roth, R.N., regional clinical effectiveness director of four Memorial Hermann hospitals, says the biggest change from the training is in the leadership of local hospitals. “They know quality; they own quality — to the extent that a hospital chief medical officer would. It’s hard for an administrator who is not clinical, but for them to know every event and what the root causes were and to be working every day to fix them has been so important.”

Among other safety behaviors, staff was trained to take a one-second stop before an action such as injecting a medication, because a one-second stop had been proven in other industries to reduce errors by 90 percent. The behavior is called STAR for stop, think, act and review.

Edna Coutts, a nurse in a NICU, was about to administer a medication that came in both neonatal and adult strengths. The medication was properly placed into a computerized dispensing unit, and all the markings on the external package said “neonatal dose.” The EHR validated the medication bar code and the patient’s bar code as matching for right patient, right med, right dose, right route and right time. She withdrew the inner vial from the package and did her “STAR stop,” only then seeing the vial was labeled “adult dose.” It had been erroneously packaged by the manufacturer, and could have killed the infant.

Inside experts

Quick adoption often happens because of a uniform approach called robust process improvement, which uses elements of Six Sigma; Lean; and Plan, Do, Study, Act to solve safety and quality problems. Experts closest to the bedside lead performance-improvement processes that promote fast change across the system.

An effort to increase hand hygiene is one example. Infection control staff used to walk around units with clipboards, observing staff. Naturally, doctors and nurses would see the clipboards and wash rigorously. As a result, “compliance” was found to be higher than 90 percent.

The problem was, infections continued to increase. So Memorial Hermann trained staff to be “secret shoppers,” walking unobtrusively through units and quietly recording real behavior. It is now recording 10,000 secret shopper observations per month.

The actual hand hygiene-compliance rate turned out to be 44 percent, about the same as national studies have found in the typical hospital. Infection control professionals found there were a number of reasons for noncompliance, such as poor positioning of hand gel dispensers and a lack of places to put down meal trays before entering a room. With dozens of small physical changes, an education campaign and a protocol for washing at a sink or an alcohol dispenser for at least 15 seconds before entering and after leaving a patient room, the campaign has pushed compliance to a “real” 92 percent.

More importantly, as soon as compliance reached 90 percent, the rates of central line-associated bloodstream infections and ventilator-
Early on, quality leaders adopted “Red Rules,” simple safety procedures that cannot be ignored under any circumstances. The term comes from the nuclear power industry. If a nurse sees a doctor violating a Red Rule, he or she is empowered to “stop the line,” a Toyota Production System term meaning halt any procedure is under way.

In one case, a gynecologic oncology surgeon was completing a complex tumor removal and beginning to close the abdomen when nurses found there was a missing surgical sponge. The surgeon carefully checked the abdomen, stated the sponge wasn’t there, and continued to close.

Nurses told the surgeon that by policy, an X-ray had to be taken in the OR before the patient was closed. The surgeon was certain the sponge was elsewhere and did not want to stop. At that point, the nurses pulled all instruments back and covered them up, per the “Red Rule.” An X-ray was taken and the sponge was located in the patient’s abdomen.

Wood understands the importance of the rules, but rejects comparisons with highly engineered systems such as nuclear power. “When you build a nuclear reactor, you engineer systems to prevent a problem, so that if one arises, you have 15 backup systems. You can try to engineer systems in health care, but patients won’t do what you tell them to, they don’t follow instructions and will tell you wrong things about their history.”

Shabot begs to differ. “In health care, people put up goals like moving from 80 percent reliability to 85 percent. If American Airlines aimed for 85 percent completion of service items for their planes, what would happen? Planes would be crashing every week, if not every day.” That is precisely what happens in health care, he says, with the equivalent of two jumbo jets a week worth of patients dying needlessly for lack of proper procedures.

As further proof, Shabot points to computerized decision support, which was advocated by clinicians on the System Quality and Patient Safety Council. When a computer alert causes clinicians to cancel or modify a potentially deleterious order or action for at least a 24-hour period, it is tabulated as a “good catch,” something that occurs about 1,000 times per month. “Near misses are just as important as the actual events,” Shabot says. “We don’t wait for the same type of error to occur in the hospital down the street before taking action.” He brought up the example of iodine dye, used in many CT scans. The iodine solution is listed as a supply in the radiology department, not as a drug managed by pharmacy. As such, no alerts would be triggered if it were given to people who are allergic to iodine. In some cases, it can be fatal. So iodine was added to the decision support software, “and to our surprise, alerts went off 36 times in the first month.”

Not every error is trending toward zero. Urinary tract infections from mishandled catheters is a challenge. “It is very convenient for doctors and extremely convenient for nurses to have patients with catheters and not have to deal with urine output. Now we have a great appreciation for getting catheters out as soon as possible,” Shabot says. Still, there are as yet no EHR alerts when patients should have the catheter removed.

Even though most patients have never heard the phrase “from the board to the bedside,” they are aware of the safety efforts, says Mitzi Hernandez, R.N., a clinical nurse manager at Memorial Hermann Katy. “They see us scanning armbands and see the double checks. We tell patients when they are admitted to speak up if there is anything they see that tells them this not a safe environment, such as someone didn’t wash hands. They can feel it.”

\[A problem of incentives\]

Why aren’t more health systems following Memorial Hermann’s lead? “There are so many hospitals in this country fighting for financial survivability as costs continue to rise and reimbursements continue to get squeezed,” Wolterman says. “Just trying to survive in this climate, they can’t get their heads around this concept of improving safety as Job 1.”

Long term, the current move toward fixed payments under population health management is a source of hope that things might change, Wolterman says. His system has a commercial accountable care organization with Aetna as well as a Medicare Shared Savings Program ACO, but both are small scale (200,000 lives) compared with its total patient population.

‘Under capitation, most of the incentives that we have now will be reversed, so saving lives will mean helping your financial side,’ Wolterman says. “The problem is you can’t just flip the switch and achieve what we have achieved. This takes many years of working with your physicians and your employees.” — Todd Stoeane is a writer in Highland Park, Ill.