

**Mount Auburn Hospital's Journey to Transformation:
The LEAD Program**

Momentum in Quality Is Fueled by Unprecedented Alignment

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Mount Auburn Hospital and the LEAD Program

Providing “patient-centered” care has been an aim of steadily increasing focus since the Institute of Medicine (IOM) popularized the notion in its 1999 report, “To Err is Human.” At Mount Auburn Hospital, Cambridge, MA, a remarkable alignment of hospital leadership, physicians, nurses, clinical support services and now, even payers, has fostered a transformation that puts patients at the center of the hospital and its activities.

The LEAD program, sponsored by Blue Cross and Blue Shield of Massachusetts, has brought together payers and providers to set audacious goals for quality that are transformational in character. The Leading Edge Acceleration of Design, Development and Delivery Program (LEAD) created an organizational challenge to learn, as well as attain, transformational health care goals. As one of only four invited participants, Mount Auburn enthusiastically accepted this challenge and jumped at the opportunity to accelerate the hospital’s quality and safety programs. As a result, caregiver teams and hospital leadership are working collaboratively with insurers to achieve the best possible outcomes for patients.

With approximately 200 inpatient beds and an outpatient network that spans 11 communities, Mount Auburn is a size that fosters personalized care. As an organization, it is nimble and steadfast in the way improvements are planned, implemented and built upon. Mount Auburn sits among many competing hospitals and health care organizations in the greater Boston area and must therefore be clear about its distinctive value. A focus on quality and on the overall patient experience, fueled by a disciplined approach to profitability, has led to its ranking as one of the most financially strong hospitals in Massachusetts. Indeed, Mount Auburn’s operating margin has placed it among the top seven hospitals in the state for the last five years.

The hospital’s culture has been shaped by a combination of factors that have prepared it to undertake rigorous work on quality and patient safety. Several individuals cite a distinctive pride in the institution that is enhanced from being affiliated with Harvard Medical School. As a result, its staff strives to meet rigorous clinical standards. Moreover, the hospital serves a highly educated patient population—individuals who have high expectations for their care and treatment.

Founded by a nurse in 1886, Mount Auburn Hospital established a tradition of nursing leadership that has been strengthened by the fact that both the CEO and COO are former nurses. Because minimal research is performed at Mount Auburn, it has essentially two missions—patient care and education—which allows the hospital to focus its energy and resources.

There is a marked longevity among the staff at Mount Auburn. Although physicians, nurses and employees tend to stay—often for decades—the fresh perspective of new arrivals is welcomed. Mount Auburn staff that arrive from having worked in other hospitals discover a cooperative spirit, especially among clinicians, who collaborate well on behalf of patients. A lack of bureaucracy results in immediacy; rather than schedule a meeting to discuss an issue, staff are more likely to talk it through right there, in the hallway or on a patient unit.

On her arrival as Chief Executive Officer in 1998, Jeanette Clough introduced changes that have further shaped the organization's culture. She communicates openly with all hospital staff, seeks their opinions, encourages teamwork and speaks regularly about the importance of maintaining a focus on the patient and setting high standards. Clough initially focused on two critical issues: creating cohesion among senior management, the medical staff and the Board of Trustees; and achieving a financial turnaround. The hospital had suffered several years of steep operating losses, but by Clough's third year at Mount Auburn, it was again profitable. The collaborative work that was required to implement a successful plan for steady growth and increased revenues helped establish trust and mutual respect among hospital leadership. This provided the solid foundation Mount Auburn needed to meet the challenges that lay ahead.

Few in the health care industry were prepared for the changes that arrived in 1999, when the IOM published "To Err Is Human," the landmark study of medical errors in the U.S. that stunned the public and put hospitals everywhere on high alert. According to those who were at Mount Auburn at the time, the hospital was ready to tackle medical errors. "When that gun was fired, we sprinted," says Robert Todd, Director of Information Systems.

Clough acknowledges that she put quality improvement on the hospital agenda immediately. "Our first quality initiatives were rudimentary—certainly compared to where we are now—but we knew what we didn't know, and we understood we had a long way to go," she says. The journey to 2006, when Mount Auburn was selected to participate in Blue Cross and Blue Shield of Massachusetts' LEAD Program, had several milestones, including:

- the commitment, made in 2001, to improving medication safety by initiating a strategic approach to the overall process of medication administration, including a commitment to computerized physician order-entry (CPOE) at a time when few hospitals had done so;
- the decision to create a new Department of Quality and Patient Safety and to establish a new Chair to work side-by-side with the other Department Chairmen in the pursuit of quality and safety improvement;
- the recruitment of Susan Abookire, MD, MPH, in 2004, who had a background in engineering, as well as internal medicine and quality, to be the Chair of Quality and Patient Safety; she established a department and infrastructure that supports measurement and process change;
- the ongoing investment in information technology and the involvement of IT staff in key committees and councils; and

- key sentinel events that were used as learning opportunities, so that physicians and staff became accustomed to disclosure and apology.

These institutional experiences, combined with a consistent endorsement of quality and patient safety initiatives by hospital leadership, positioned Mount Auburn to identify two formidable LEAD goals and achieve them in convincing fashion. The hospital succeeded in eliminating medication errors and resulting harm—something few staff originally thought was possible—and is accomplishing the same for infections. The number of ventilator-associated pneumonia, central bloodstream and *methicillin-resistant staph. aureus* (MRSA) infections have decreased extensively during the course of LEAD.

The LEAD goals were met not only because hospital leadership, physicians and staff participated together in transforming care. Mount Auburn has been methodical in creating systems that are designed to reduce *the opportunity for error*. “We have always spent time at board meetings discussing specific patient cases,” says Stephen Chubb, Chairman of the Board of Trustees. “Over time, we’ve taken the attitude that if we can measure it, we can manage it. The hospital is already very good, but everyone wants to get even better. That’s essential to achieving the kind of safety performance we now have.”

The hospital’s “can do” culture, which is marked by open and immediate communication, its track record of achievement in quality and the sense of accomplishment gained during the LEAD Program have produced optimism about the future. “We’ll sustain the changes we’ve made because they’ve been ‘baked in,’” says Clough. “They are not just processes and procedures; they are part of the culture now. When we hire staff, they are trained to provide care this way.”

The staff has responded well to the challenges and triumphs that occurred during the two-year LEAD Program. “In many ways, we’ve gone beyond simply holding staff accountable for following best practices,” notes Deborah Baker, RN, Vice President of Nursing and Patient Care Services. “Now they improve processes and initiate change on their own.”

Mount Auburn was the first hospital to accept Blue Cross and Blue Shield’s alternative quality contract (AQC), which reimburses hospitals based on achieving an aggressive set of quality metrics. Clough believes that participating in LEAD has given the hospital the confidence to take on the next set of quality challenges, including the AQC. “It is exciting for us, because if we are successful, it means our quality is increasing while the cost of care is decreasing,” says Clough. “We believe it’s a move in the right direction to have the incentives aligned—literally—for better patient care.”

Mount Auburn: the Run-up to LEAD

Cambridge’s first hospital has a colorful history that is punctuated with numerous innovations.

Mount Auburn was one of the first area hospitals to establish a cardiac surgery program, to perform percutaneous coronary interventions—angioplasty procedures—and to open an intensive care unit. Medical giants from Mount Auburn’s history include Dwight Harken, MD, a world-renowned cardiac surgeon who established the hospital’s first ICU in 1951, and Richard Schatzki, MD, an internationally recognized radiologist who arrived in 1948 and brought the first Harvard medical students to Mount Auburn for training, paving the way for the hospital’s highly regarded residencies in medicine and radiology. The hospital’s Emergency Department was one of the first in the region to be directed by physicians who are board-certified in emergency medicine—an early sign that the medical staff would embrace the pursuit of clinical quality.

From the time she arrived, Clough established quality and safety as one of Mount Auburn’s three over-arching goals. She also developed organizational principles, including a commitment to measurement and benchmarking, transparency—sharing performance data within the hospital, the healthcare community and with the public—the well-planned use of technology, a willingness to learn from error and the linking of employee and physician satisfaction with the achievement of organizational goals.

The hospital’s clinical quality was already high. In 2000, Mount Auburn was selected as one of HCIA-Sachs Institute’s 100 Best Hospitals for excellence in providing cardiovascular care. A year later, the institute named it as one of the 100 Top Hospitals for Intensive Care; Mount Auburn was the only Boston-area hospital to be selected.

Along with having earned several impressive awards for high-quality care, Mount Auburn also experienced its share of sentinel events related to wrong-site surgery, infections and physician behavior. With Clough’s encouragement, these painful institutional events were turned into opportunities. “People became conversant relative to ‘never’ events, and we learned to deal with disclosure, apology and guilt,” she says. “The medical staff took the lead and set a ‘line in the sand,’ so to speak. They set standards and expectations for physician behavior that would be shared with every physician on staff and those applying for privileges; this became part of our credentialing process. With these criteria in place, we can see aberrant behavior much more clearly.” Clough published a journal article on Mount Auburn’s approach to physician credentialing, which established the hospital as a thought leader in this area.

“The sentinel events we experienced definitely strengthened us as a hospital,” adds Nick DiIeso, Chief Operating Officer. “We saw the profound impact a serious error can have—not just on the patient, but on the provider. It forced us to pause and ask ‘how will we prevent this from ever happening again?’”

Clough had led CareGroup’s Medication Safety Initiative team, which won a Premier Award

for quality in 2001. This work had revealed the numerous points of vulnerability in medication safety and laid the groundwork for what would follow. With medication safety on the front burner, Mount Auburn leadership made two important decisions: to install the Pyxis system, which assures correct dispensing of patient medications; and to initiate computerized physician order-entry (CPOE), which is designed to prevent medication errors at the ordering stage.

Introducing CPOE represented an enormous undertaking and underscored the seriousness that Mount Auburn was bringing to the issue. When the planning for CPOE began in 2001, fewer than 10 percent of U.S. hospitals had installed such systems, despite the fact that they had proven their value. In addition, Mount Auburn was one of the first hospitals using Meditech as its main medical information system for CPOE. The hospital was one of only five Meditech beta sites in the nation.

Well before Blue Cross and Blue Shield had conceived of the LEAD program, Clough posed a tough question to the staff: “what would it take for Mount Auburn to be the safest hospital in America relative to medication safety?” Many were hesitant to answer the question. The senior team felt the goal was laudable, the right thing to do and potentially reachable, but would require immense change in all areas of work and process. It would also require tremendous information technology resources. But the discussion itself, which focused on the need for system and technology upgrades, proved useful. “It produced a mindset change,” Clough recalls.

With the arrival of Abookire in 2004, Mount Auburn’s approach to quality became steadily more rigorous, and the pursuit of lofty goals began to seem less overwhelming. Abookire had worked on quality and patient safety in two other hospitals and, prior to attending medical school, had spent a decade as an aviation systems engineer. Her first goal was to establish ways to measure the hospital’s quality. “My initial message to the staff was that transparency—and therefore scrutiny—is a good thing, because the more time we spend looking at our outcomes, the better we’ll do,” says Abookire. “People got used to seeing metrics, and they realized they had a role to play.”

She set about building an organizational structure that would support a comprehensive strategy for quality and patient safety at Mount Auburn. This included revamping the existing Quality Review Committee, developing a Committee on Medical Safety and initiating Clinical Computing, which started small—just Abookire, DiIeso and Todd—but would grow in size. “Pyxis was in place, and CPOE had been rolled out in OB/GYN, but we didn’t have a specific medication strategy,” says Abookire, adding that implementing the strategy would require extensive IT resources. It made sense to align the hospital’s quality plan with its IT plan.

As the department took shape and gained credibility, Abookire initiated Mount Auburn’s medication reconciliation process—a Joint Commission mandate to compare and update the medications a patient is taking in one setting with the next setting. She also helped further accelerate CPOE rollout

and worked with IT staff to institute a hospital-wide on-line incident reporting system for staff to report medical errors, hazards and near-misses.

The rL system, as it is known, went live in 2006 and represented a huge culture change. “I told my staff that it almost didn’t matter what kinds of incidents were reported,” Abookire recalls. “What mattered was that staff heard back from us. If there is a hazard, we needed to show the person who reported that hazard—who is now engaged in the patient safety process—that we have eliminated that hazard. My goal was that our on-line reporting system ultimately would collect nothing but hazards—no errors. That would mean everyone was walking around with their eyes wide open.”

As the staff became comfortable with on-line incident reporting, which was designed to be ubiquitous and easy to use, its value became increasingly clear. “We started to receive aggregated data, which revealed holes in our medication delivery system,” says Gregory Sophis, Pharmacy Director. “For example, a number of hazards were related to how medications were stored in Pyxis.”

With medication safety being worked on, Mount Auburn began an organizational dialogue on infection rates. “The hospital had a good database and history of analysis,” notes Abookire, “but it needed to become transparent both within the hospital and to our external audiences, so we put all our data on the web site.” Abookire next hired a new Infection Control Manager, Lark Dupont, RN, and integrated that function into the Quality and Safety Department.

Robert Westlake, MD, also arrived in 2004 in order to establish an intensivist service in Mount Auburn’s two intensive care units. Once patients were being cared for by intensivists, who have combined expertise in pulmonary care and critical care, the measurable quality increased. “As a result of our daily, integrated approach to ICU care, within one year, the number of ventilator days had decreased by 30 percent,” says Westlake. “I saw how things happen fast at Mount Auburn, largely because we can get the ear of the administration. For example, when we want to take on ambitious cross-disciplinary projects, such as the development of new sepsis protocols or the creation of rapid response teams, the support is there.”

Baker arrived in 2006 and began developing the infrastructure required to pursue Magnet Designation, a distinction earned by only about 5 percent of hospitals. Achieving Magnet Designation, which Mount Auburn nursing leadership expects to occur in 2010, is recognition of quality patient care, nursing excellence and innovations in professional nursing practice. According to Baker, it also dovetails with the quality initiatives underway, as well as the stepped-up work required by LEAD.

“One of the forces of magnetism is quality improvement,” says Baker, referencing the characteristics that differentiate Magnet hospitals. “We created a Nursing Research Council and a Clinical Practice Council, both of which directly supported the LEAD Program initiatives.”

When Blue Cross and Blue Shield contacted Mount Auburn senior management about partici-

pating in the two-year LEAD Program in 2006, it did not take long for hospital staff to define their two goals. Clough suggested that the hospital circle back to the question she had posed about Mount Auburn becoming the safest hospital in America for medication safety. “Could we accomplish that in two years?—that was the question,” says Clough. “We understood the amount of change that success would require: the pharmacy would have to be renovated, new technology would need to be introduced, nurses would need to adjust to different types of records, and we’d have to further accelerate rollout of CPOE.”

By selecting a second set of goals related to infection, Mount Auburn would build on work performed in 2002 by a team that had implemented known best practices to reduce cases of ventilator-assisted pneumonia (VAP). Attacking central bloodstream infections would require, among other things, a relentless campaign for universal hand hygiene. Combating MRSA infections would require a multi-pronged approach.

“We were very pleased and honored to be selected for LEAD, and we felt an obligation to live up to a high standard,” says Clough. “So there was a sense of commitment because Blue Cross and Blue Shield had decided to invite us and invest in us, pride we had been chosen, and a true sense of accountability to set some goals and work like heck to achieve them.

“Because the hospital received a stipend, LEAD engaged people in a different way than previous initiatives had. I had been telling everyone that our investments in quality eventually would begin to bear fruit. It was true: for the first time, we were actually being paid for quality.”

After much discussion, the staff at Mount Auburn officially launched its LEAD Program initiatives in March 2007.

LEAD Takes Off, and Impressive Outcomes Appear

Goal I: No Harm from Medications

With a well-established quality structure in place, a supportive culture and an enthusiastic staff that knew how to make successful process change, Mount Auburn focused immediately on its two LEAD goals. Prior to LEAD, the clinical computing group led by Abookire and DiIeso had developed a strategic plan to implement technology along the medication delivery process’s lengthy continuum. The LEAD program catalyzed the group to complete the ambitious plan in an accelerated time frame.

For medication safety, the first step was acknowledging that a system has to be designed to eliminate the opportunity for errors at each stage of medication delivery. Technology systems would need to be linked, appropriate electronic alerts and triggers were necessary, and the entire clinical staff would need to be trained and cooperate fully. Automated dispensing cabinets for stocking medications had been implemented much earlier, and CPOE rollout was underway. But first, CPOE rollout had to

pick up speed.

The system had debuted in 2003 in OB/GYN, where Gary Goldsmith, MD, served as physician champion. “We learned something from each step in CPOE implementation,” says Goldsmith, who now works part-time in the Quality and Safety Department as a medical informatics specialist. “In addition to having IT staff on the floor 24/7 when a clinical unit was going live, we saw the importance of peer teaching. And top-down support is key. At Mount Auburn, the administration was whole-heartedly behind CPOE.”

Before LEAD began, about 60% of Mount Auburn physicians were using CPOE. “Outside of the downtown Boston hospitals, we were at the head of the pack,” says Sophis. “We saw the value of CPOE on a daily basis. While it used to take 90 minutes to process a written order, it takes 9 minutes on average with CPOE. We managed to accelerate CPOE rollout, but we did it the way Mount Auburn does things—get it done, but don’t rush it. In other words, get it done safely.” By the time LEAD was winding down, 90% of physicians were on CPOE, which steadily integrated enhanced tools for clinical decision support.

The hospital’s medication safety goal was truly transformational: Mount Auburn aimed to meet “six sigma” medication reliability by 2009—fewer than one defect, which was defined as harm from any medication error, per 10^6 medication deliveries. The hospital’s on-line incident reporting system provided the basis for tracking harm using the following error classification:

Level 0 – Near miss. The circumstances had the potential to cause harm or damage, but the event did not reach the patient.

Level 1 – No harm or damage. The event or error resulted in no harm or damage; follow-up may be required.

Level 2 – Temporary minor harm or damage. Additional monitoring or follow-up was required.

Level 3 – Major injury/functional impairment. The event or error resulted in major injury. Additional monitoring, a prolonged hospital stay and extensive follow-up were required.

Level 4 – Permanent impairment, disability or death. Extensive follow-up and investigation was required.

“LEAD asked that we choose an audacious goal, and eliminating harm from medications was clearly audacious,” says Abookire. “Using our on-line incident reporting system, we decided to plot every occasion where anyone was harmed by a medication error and aim for zero. By reaching 10^6 or six sigma, it would mean that every opportunity to administer a medication would be done correctly. As far as we know, this does not exist as a benchmark anywhere else.”

In order to move the needle on medication safety within the two-year LEAD timeframe, Mount Auburn installed smart pumps, which prevent administration errors related to all intravenous medications; began to deploy an automated medication administration record (EMAR), which monitors and documents the bedside administration of medications; and initiated the process of establishing a bar-

coding system, which would verify patient identity for every medication prior to administration.

The installation of 271 smart pumps controlled by wireless technology was an important centerpiece of Mount Auburn’s medication safety work within LEAD. “We had considered installing smart pumps in 2004 but decided to shelve the idea and wait for the technology to advance,” DiIeso explains. “In three years’ time, smart pump technology had evolved quite a bit.”

With LEAD resources, the timing was right to undertake a year’s worth of work to set safety limits on the administration of the medications that are associated with the most devastating errors. “We built a library of drugs, determined safe administration rates, established an alert system and trained the staff,” says Sophis. “It was a huge undertaking—and well worth it. Selecting wireless technology was key. Now, if we need to update anything, we can go into the system, make the change once

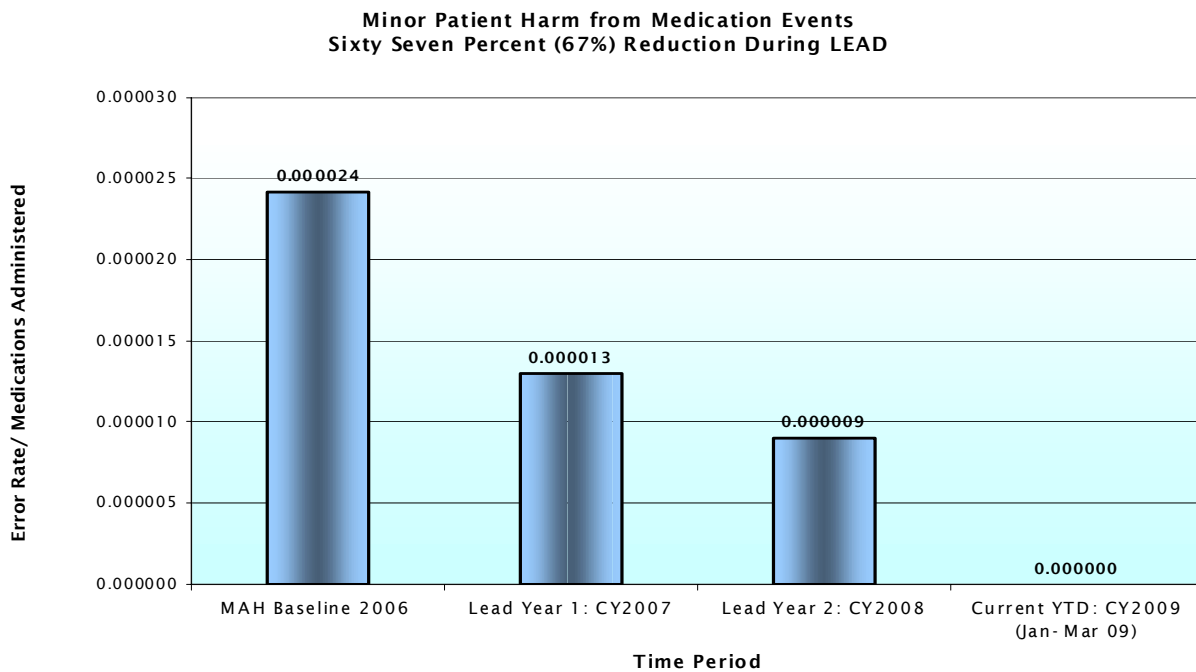


Exhibit 1

and send it out to all pumps, everywhere in the hospital.”

To Baker, the smart pump project exemplified the productive partnership among Mount Auburn’s nursing, pharmacy and the Quality and Safety departments. “The arrival of smart pumps meant a lot to the nursing staff,” she says. “It was evidence that we were truly building an environment where the systems support our ability to provide outstanding patient care.”

One year into LEAD, medication events that caused minor patient harm decreased significantly. Over the course of LEAD, they fell by 67% (see Exhibit 1).

About halfway through LEAD, Mount Auburn completely renovated its pharmacy and installed the Talyst system, which automates medication ordering, receiving, stocking and bar-coding. Again, LEAD provided the impetus to take on a comprehensive project that hospital staff had been discussing for some time. “We were required to have a clean room dedicated to mixing intravenous medications,” notes DiIeso. As a result of that renovation, the pharmacy lost 40 percent of its storage, which made the Talyst system’s just-in-time inventory essential. It also paved the way for bar-coding—considered to be essential to medication safety.

“The day I went to see the pharmacy renovation and new Talyst system, I realized we were going to get there,” says Clough. “We had been talking about bar-coding for years, but there were so many other steps to accomplish first. Now bar-coding was within sight.” Mount Auburn’s bar-coding pilot was launched in Spring 2009.

By then, the hospital had made remarkable strides in achieving its LEAD goal of eliminating harm from medication error. Indeed, the days between Level 2 and 4 medication events had begun to stretch out (see Exhibit 2). The “six sigma” graph that tracks

Mount Auburn’s progress shows a steady decline, beginning in early 2007, in incidents that caused

Six Sigma: Minor Medication Harm Events per Million Medications Administered

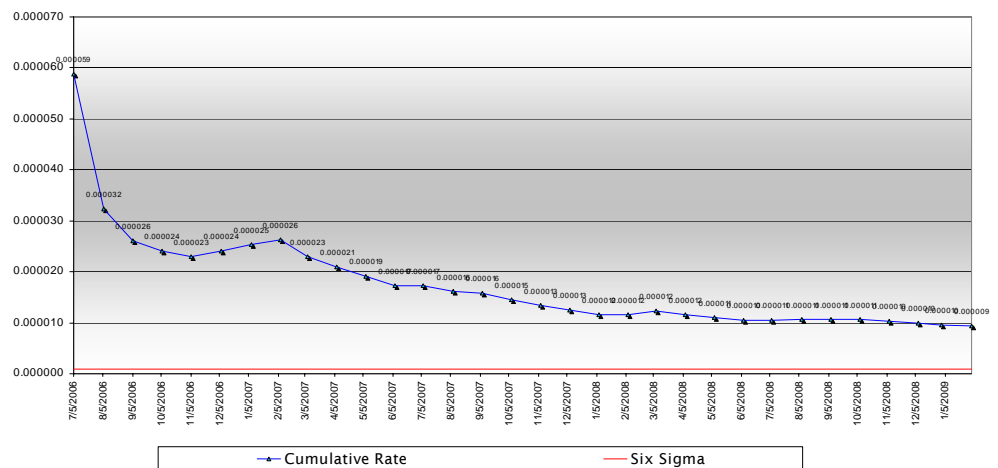


Exhibit 2

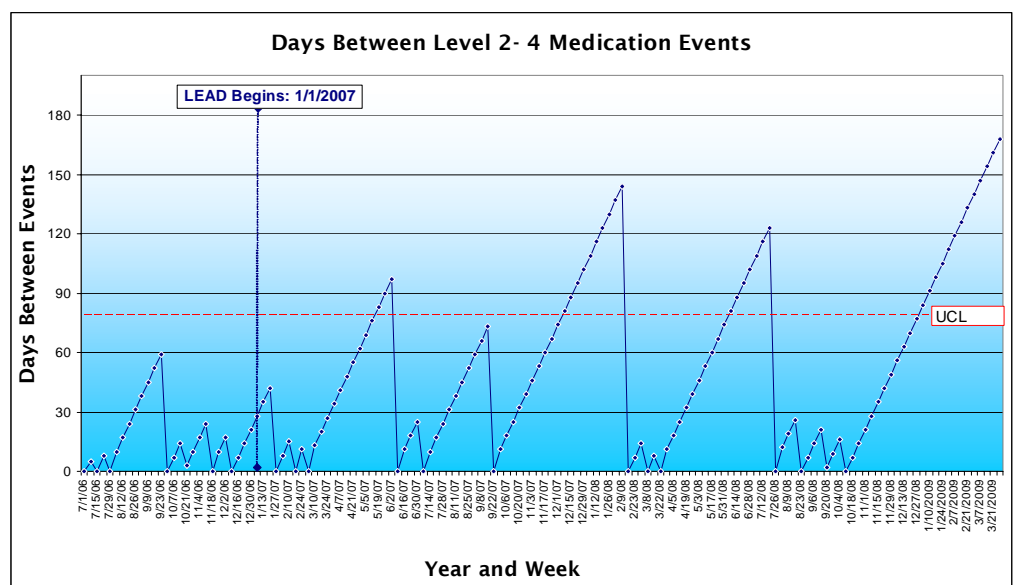


Exhibit 3

harm. “The hospital went four months with absolutely no harm caused by medications,” says Abookire. “We’ll continue to strive for perfection.” Based on current trends, the hospital will hit “six sigma reliability” during 2009 (see Exhibit 3).

“When I look at the six-sigma graph, I say ‘we’re not done yet,’” says Sophis. “Is there an opportunity to improve our medication systems? The answer is yes. But we’ve certainly seen that if you can automate it—and take the human error out of it—you’re better off.”

The last phases of medication delivery—electronic medication transcription and bar-coded medication administration—are rolling out in 2009. EMAR works in tandem with CPOE and will add

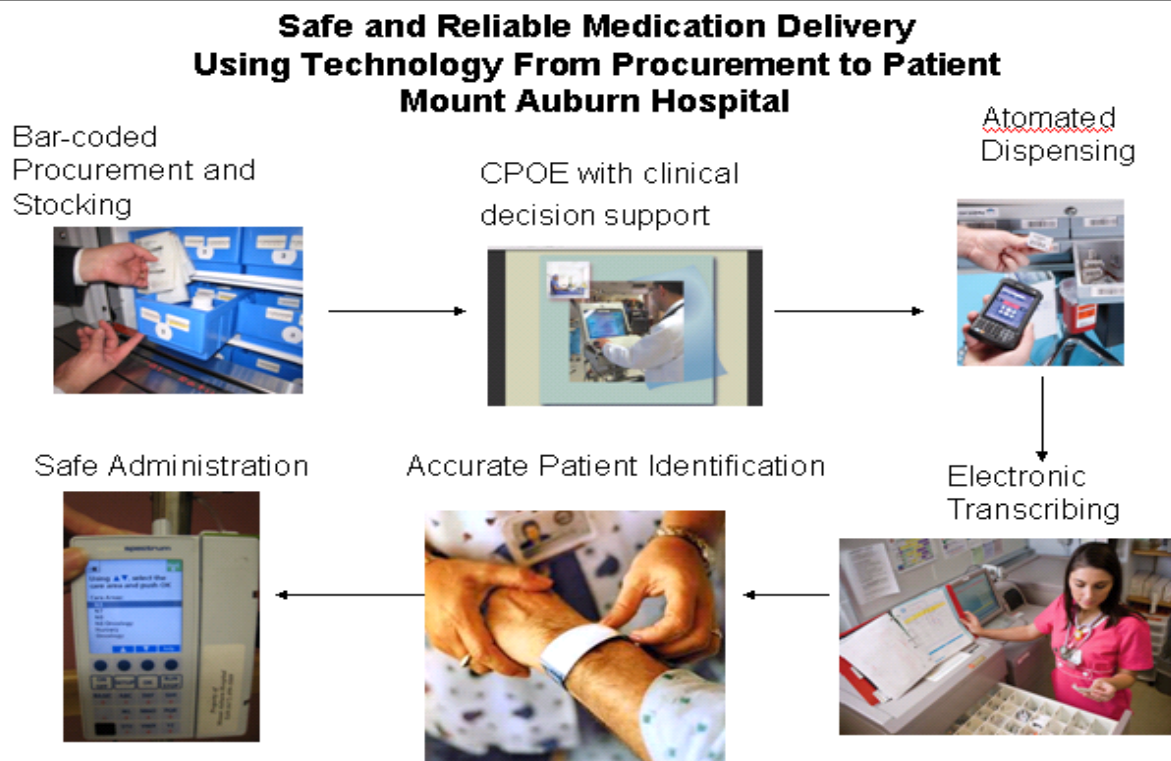


Figure 1

another layer of safety to medication administration, essentially by automating the information transfer from ordering medications to recording administration. This includes BMV—bedside medication verification—a process whereby the bar-coded medication is scanned and the system produces a forced stop if there are any mistakes, thus preventing an error. At every step, the medication safety team applied the tools of failure-mode analysis in order to adapt the technology to the clinical workflow and meet the organization’s high patient safety standards (see Figure 1).

Goal II: Eliminating Harm from Infections

Relative to infections, Mount Auburn set a goal of achieving six-sigma—less than 1 in 10^6 —reliability in reducing VAPs in its intensive care units, reducing central bloodstream infections to less than 1 in 10^6 central line days, and developing an effective strategy to identify, cohort and decontaminate to achieve six-sigma reliability of healthcare-associated MRSA—all by 2009.

Intensivists and respiratory therapy staff were already applying the VAP “bundle”—proven best practices, including elevating the head of the bed, taking the patient off sedation on a daily basis, treating the patient to prevent both peptic ulcer disease and blood clots, and practicing oral care. With LEAD, the VAP bundle was given greater prominence. Abookire suggested it be placed on the intensivists’ daily rounding sheet, and brightly colored signs were posted in the ICUs to serve as reminders.

The respiratory therapy staff, who work 24/7, didn’t stop with the fastidious application of the VAP bundle. They systematically introduced a number of research-based technical adjustments. “We used to change the ventilator circuits every ten days, which meant disconnecting the patient for a few minutes,” explains Ali Mahdi, a respiratory therapist and member of the hospital’s VAP Committee. “When we learned that research showed it put the patient at risk, we stopped doing that—except when absolutely necessary.” In addition, in-line suction catheters are no longer automatically changed, the endotube cuff is now checked for mouth secretions, and a new level of hygiene has been brought to handling the resuscitation bag. Because mouth secretions can produce VAPs, the respiratory therapists also now perform more aggressive mouth care.

“Every time a patient developed a VAP or even came close, we performed a root cause analysis,” says Abookire. “We worked closely with the staff, using a quality tool to ask structured questions, provide feedback and send the actions back to the intensive care leadership. Each time an infection occurred, we found that the VAP bundle had not been fully applied.”

As a result of the heightened vigilance and obsessive use of best practices—the VAP bundle, as well as the technical improvements—Mount Auburn’s ICU patients went for 18 months without developing any VAPs—an impressive achievement. During LEAD, VAPs plummeted by 50% from the hospital’s 2006 baseline (see Exhibit 4). “Once the staff realized what was going on—maybe three months along—they really got into it,” says Dee Teso, Director of Respiratory Therapy. “All the things they did were working. We saw how the LEAD project, which made the VAP team’s work an official, hospital-wide goal, served as a motivator.”

“What motivates me is the care of the individual patient,” says Mahdi. “But LEAD taught us a lot about practice improvement. More than ever, we encourage each other, because you can’t let your guard down. You need to focus on these things every day.” As a result of their exemplary work, the VAP Committee was presented with Mount Auburn’s first annual patient safety award.

With the hospital focused on infections, the hospital environment received scrupulous attention. When an infection occurred in the ICU, Abookire suggested that the team perform a root cause analysis. The exercise, she says, represented a turning point. “Because it appeared that the infection moved from the patient in bed one to the patient in bed six, we decided to look at all the ‘ordinary’ things that occur everyday in the ICU—how the sheets are given to the laundry, how IV poles and EKG machines move between rooms, and what happens when a patient who is supposed to be in isolation goes to x-ray,” says Abookire. “Working together, we identified 38 action items—things that were staring us in the face.”

Abookire then watched as the Environmental Services and Transport staff, led by Robert Wood, Director, systematically changed the way they perform their work. “The infection hadn’t been a sentinel event, yet they tackled everything—the way they purchase curtains, terminally clean rooms and transport people,” she says.

“We’re results-oriented,” says Wood. “Our goal is to solve problems, not make excuses, so we’re willing to change and improve our protocols. For us, it’s about keeping things inside the box. The box is the patient’s room, and anyone who goes into that room needs to protect the patient and themselves.” New standards and processes emerged during LEAD relative to contact precautions, isolated patients and how respiratory therapists, cardiology technicians and housekeeping staff move in and out of patient rooms.

Wood cites the strong collaboration between Infection Control and Environmental Services. “Lark Dupont and her team attend our department meetings regularly, and together we educate the Environmental Services staff so that they feel accountable,” he says. “We provide instruction in multiple languages as necessary, always stressing the importance of their role. Then we monitor how effective the staff education has been.”

John Silva, Manager of Environmental Services and Transport, contends that LEAD didn’t change life all that much. “It’s true that preventing infections became more of a team effort, but the mindset to continually improve things was already there,” he says. “For example, we were already using bleach to clean the rooms of patients with *C. difficile*—not a common practice. It’s more work, but it’s the right thing to do. The longer I work at Mount Auburn, the more I see how people collaborate really well, and they’re open-minded.”

Throughout the ICUs and the rest of the hospital, the hand hygiene drumbeat became louder. “I reminded people that, in the OR, hand hygiene is so well-established that no one considers it optional,” says Dupont. “The challenge was to make it so that hand-washing is accepted and done properly everywhere by everyone.”

Several physicians, including those in leadership positions, made hand hygiene a prominent

issue. Russell Nauta, MD, Chair of Surgery, John Tully, MD, Chief of Infectious Disease, and Stephen Zinner, MD, Chair of Medicine, have each been vocal and supportive. As a result, a culture of safety—where it is acceptable to remind providers who lapse, regardless of egos—has grown. “When you work in a place where the infection control nurse can speak up comfortably to the director of the ICU for not wearing gloves, that’s a healthy thing,” says Westlake.

This evolution in Mount Auburn’s culture has contributed to the plummeting infection rate, including for central bloodstream infections (CBI), which decreased by 68% during LEAD (see Exhibit 5). The staff has also initiated the use of maximal barrier precautions, chlorhexidine skin antisepsis, use of the optimal catheter site and daily review of line necessity, followed by prompt removal of unnecessary lines.

Preventing MRSA presented a challenge. Mount Auburn staff started by performing an MRSA risk assessment to define both high-risk patients and high-risk procedures. They agreed that the strategies to eliminate VAPs and CBIs—many of which are caused by MRSA—the hand hygiene campaign and the ongoing collaborative work of Environmental Services with Infection Prevention staff would lay the groundwork for a step-wise approach that included:

- culturing all patients on admission and discharge from ICUs
- establishing an active surveillance program for all hospitalized patients, including checking for infection 30 days post-discharge
- instituting decontamination of all colonized patients according to known practices
- establishing an aggressive program of identification and isolation

“It is difficult to know what the correct approach to MRSA is, but thanks to our participation in LEAD, we defined our own clear path,” says Tully. “Infections across the board, including those caused by MRSA, have decreased markedly.

“The biggest change is that infection prevention is now tied to organizational goals. As a result, infection prevention and control is no longer considered to be the ID department’s job; everyone is invested. Now hospital staff approach ID staff to discuss what they’re doing, and we share our research with front-line staff.” Infections became increasingly rare events during LEAD (see Exhibit 6).

Success in bringing down specific types of infections spilled over into other areas. “Our *C. difficile* infection rate is much improved,” says Abookire, “and it wasn’t even one of our LEAD goals.”

Lessons Learned During LEAD

As the LEAD Program drew to a close, Mount Auburn’s work on quality and patient safety marched on, powered by a decade of momentum and the confidence gained from having achieved several formidable goals. “LEAD was a giant lesson in process change for Mount Auburn,” says Clough.

“We came alive, realized our potential and made immense progress.”

It takes leadership at all levels to transform care in 24 months, Clough adds. “The work requires continued investment in technology and innovation, so it is critically important to have the leadership fully invested in providing the resources necessary to meet and sustain the goals. We know our current equipment will need to be updated, upgraded and supported over time.

“But when you’re putting major change in place, you also need leadership in the trenches,” she notes. “Today we have leadership in a lot of different corners of the hospital. Our staff has done a great job of holding each other accountable for quality and patient safety.”

If the hospital staff needed encouragement along the way, they received it. For example, Westlake is struck by the praise that was showered on the hard-working respiratory therapy staff. “They were initially asked to present their new research-driven VAP protocol to the Quality Review Committee, then the Medical Staff Executive Committee and finally to the Board of Trustees,” Westlake recalls. “That meant a lot, because they knew that the whole hospital was behind them.”

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From her perspective, Abookire observed a striking sea change among hospital staff. “Before LEAD, many people doubted we could eliminate harm,” she says. “Now it’s no longer naïve to say that we can prevent harm from either medication errors or infections.” When a Level 2 medication event—something that caused no more than temporary, minor harm to a patient—was discussed at length at a Board of Trustees meeting, it represented a milestone. “It was a joy to see the Board spending time discussing and dissecting a Level 2 event that, pre-LEAD, would never have merited that kind of detailed attention.

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Goal II: Eliminating Harm from Infections

Relative to infections, Mount Auburn set a goal of achieving six-sigma—less than 1 in 10⁶—reliability in reducing VAPs in its intensive care units, reducing central bloodstream infections to less than 1 in 10⁶ central line days, and developing an effective strategy to identify, cohort and decontaminate to achieve six-sigma reliability of healthcare-associated MRSA—all by 2009.

Intensivists and respiratory therapy staff were already applying the VAP “bundle”—proven best practices, including elevating the head of the bed, taking the patient off sedation on a daily basis, treating the patient to prevent both peptic ulcer disease and blood clots, and practicing oral care. With LEAD, the VAP bundle was given greater prominence. Abookire suggested it be placed on the intensivists’ daily rounding sheet, and brightly colored signs were posted in the ICUs to serve as reminders.

The respiratory therapy staff, who work 24/7, didn’t stop with the fastidious application of the VAP bundle. They systematically introduced a number of research-based technical adjustments. “We used to change the ventilator circuits every ten days, which meant disconnecting the patient for a few minutes,” explains Ali Mahdi, a respiratory therapist and member of the hospital’s VAP Committee. “When we learned that research showed it put the patient at risk, we stopped doing that—except when absolutely necessary.” In addition, in-line suction catheters are no longer automatically changed, the endotube cuff is now checked for mouth secretions, and a new level of hygiene has been brought to handling the resuscitation bag. Because mouth secretions can produce VAPs, the respiratory therapists also now perform more aggressive mouth care.

“Every time a patient developed a VAP or even came close, we performed a root cause analysis,” says Abookire. “We worked closely with the staff, using a quality tool to ask structured questions, provide feedback and send the actions back to the intensive care leadership. Each time an infection occurred, we found that the VAP bundle had not been fully applied.”

As a result of the heightened vigilance and obsessive use of best practices—the VAP bundle, as well as the technical improvements—Mount Auburn’s ICU patients went for 18 months without developing any VAPs—an impressive achievement. During LEAD, VAPs plummeted by 50% from the hospital’s 2006 baseline (see Exhibit 4). “Once the staff realized what was going on—maybe three months along—they really got into it,” says Dee Teso, Director of Respiratory Therapy. “All the things they did were working. We saw how the LEAD project, which made the VAP team’s work an official, hospital-wide goal, served as a motivator.”

“What motivates me is the care of the individual patient,” says Mahdi. “But LEAD taught us a lot about practice improvement. More than ever, we encourage each other, because you can’t let your guard down. You need to focus on these things every day.” As a result of their exemplary work, the VAP Committee was presented with Mount Auburn’s first annual patient safety award.

With the hospital focused on infections, the hospital environment received scrupulous atten-

tion. When an infection occurred in the ICU, Abookire suggested that the team perform a root cause analysis. The exercise, she says, represented a turning point. “Because it appeared that the infection moved from the patient in bed one to the patient in bed six, we decided to look at all the ‘ordinary’ things that occur everyday in the ICU—how the sheets are given to the laundry, how IV poles and EKG machines move between rooms, and what happens when a patient who is supposed to be in isolation goes to x-ray,” says Abookire. “Working together, we identified 38 action items—things that were staring us in the face.”

Abookire then watched as the Environmental Services and Transport staff, led by Robert Wood, Director, systematically changed the way they perform their work. “The infection hadn’t been a sentinel event, yet they tackled everything—the way they purchase curtains, terminally clean rooms and transport people,” she says.

“We’re results-oriented,” says Wood. “Our goal is to solve problems, not make excuses, so we’re willing to change and improve our protocols. For us, it’s about keeping things inside the box. The box is the patient’s room, and anyone who goes into that room needs to protect the patient and themselves.” New standards and processes emerged during LEAD relative to contact precautions, isolated patients and how respiratory therapists, cardiology technicians and housekeeping staff move in and out of patient rooms.

Wood cites the strong collaboration between Infection Control and Environmental Services. “Lark Dupont and her team attend our department meetings regularly, and together we educate the Environmental Services staff so that they feel accountable,” he says. “We provide instruction in multiple languages as necessary, always stressing the importance of their role. Then we monitor how effective the staff education has been.”

John Silva, Manager of Environmental Services and Transport, contends that LEAD didn’t change life all that much. “It’s true that preventing infections became more of a team effort, but the mindset to continually improve things was already there,” he says. “For example, we were already using bleach to clean the rooms of patients with *C. difficile*—not a common practice. It’s more work, but it’s the right thing to do. The longer I work at Mount Auburn, the more I see how people collaborate really well, and they’re open-minded.”

Throughout the ICUs and the rest of the hospital, the hand hygiene drumbeat became louder. “I reminded people that, in the OR, hand hygiene is so well-established that no one considers it optional,” says Dupont. “The challenge was to make it so that hand-washing is accepted and done properly everywhere by everyone.”

Several physicians, including those in leadership positions, made hand hygiene a prominent issue. Russell Nauta, MD, Chair of Surgery, John Tully, MD, Chief of Infectious Disease, and Stephen

Zinner, MD, Chair of Medicine, have each been vocal and supportive. As a result, a culture of safety—where it is acceptable to remind providers who lapse, regardless of egos—has grown. “When you work in a place where the infection control nurse can speak up comfortably to the director of the ICU for not wearing gloves, that’s a healthy thing,” says Westlake.

This evolution in Mount Auburn’s culture has contributed to the plummeting infection rate, including for central bloodstream infections (CBI), which decreased by 68% during LEAD (see Exhibit 5). The staff has also initiated the use of maximal barrier precautions, chlorhexidine skin antisepsis, use of the optimal catheter site and daily review of line necessity, followed by prompt removal of unnecessary lines.

Preventing MRSA presented a challenge. Mount Auburn staff started by performing an MRSA risk assessment to define both high-risk patients and high-risk procedures. They agreed that the strategies to eliminate VAPs and CBIs—many of which are caused by MRSA—the hand hygiene campaign and the ongoing collaborative work of Environmental Services with Infection Prevention staff would lay the groundwork for a step-wise approach that included:

- culturing all patients on admission and discharge from ICUs
- establishing an active surveillance program for all hospitalized patients, including checking for infection 30 days post-discharge
- instituting decontamination of all colonized patients according to known practices
- establishing an aggressive program of identification and isolation

“It is difficult to know what the correct approach to MRSA is, but thanks to our participation in LEAD, we defined our own clear path,” says Tully. “Infections across the board, including those caused by MRSA, have decreased markedly.

“The biggest change is that infection prevention is now tied to organizational goals. As a result, infection prevention and control is no longer considered to be the ID department’s job; everyone is invested. Now hospital staff approach ID staff to discuss what they’re doing, and we share our research with front-line staff.” Infections became increasingly rare events during LEAD (see Exhibit 6).

Success in bringing down specific types of infections spilled over into other areas. “Our *C. difficile* infection rate is much improved,” says Abookire, “and it wasn’t even one of our LEAD goals.”

Lessons Learned During LEAD

As the LEAD Program drew to a close, Mount Auburn’s work on quality and patient safety marched on, powered by a decade of momentum and the confidence gained from having achieved several formidable goals. “LEAD was a giant lesson in process change for Mount Auburn,” says Clough. “We came alive, realized our potential and made immense progress.”

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New Goals and the Alternative Quality Contract

All agree that Mount Auburn has been changed for the better through its participation in the LEAD program. “Our culture has continued to evolve,” says Clough. “LEAD has given us the confi-

dence to take on more audacious goals—and maybe things that are a little harder to do. A lot of work remains. In a way, it feels like we’re at the end of the beginning.”

Because she believes that quality is indeed a strategic imperative, Clough continues to pose tough questions. “We need to look at patient falls, urinary tract infections and *C. difficile*, despite the fact that our *C. diff* rate is down 40% over last year,” Clough says. “We’ll also take a harder look at surgical site infections and probably divide the data between those that are hospital-acquired vs. those picked up on 30-day follow-up. Now that CPOE is rolled out fully for inpatient care, we’ll move to the outpatient side and look at outpatient medication delivery in the hospital and office practices.”

Reconfiguring the hospital to make all rooms private is another ambitious goal—one that will have further impact on Mount Auburn’s decreasing infection rate. The ICU staff is setting its own new goals, including developing an initiative aimed at decreasing the number of ventilator tube dislodgements, which can occur when a patient is being turned.

The alignment of hospital leadership, physicians, nurses and clinical support services with Blue Cross and Blue Shield in pursuit of health care transformation not only propelled the LEAD work, but it has led to a new and important opportunity. The work of the LEAD program, along with Mount Auburn’s strong culture, prepared the hospital and its physicians to enthusiastically execute Blue Cross and Blue Shield’s performance-based provider contract known as the “AQC,” or the alternative quality contract. It is a risk-based contract with a capitated budget for managing approximately 25,000 HMO Blue covered lives. The AQC combines an extensive set of quality metrics with substantial payment for achieving “audacious” levels of performance that require the hospital and the physicians to closely manage care. The contract is designed to emphasize the efficient and effective use of resources while achieving significant inpatient and outpatient quality and safety metrics. A cost analysis shows that Mount Auburn’s focused efforts on infection prevention and medication safety saved close to \$2 million (see Exhibit 7).

With the Obama administration’s plans for health care reform as a backdrop, Massachusetts health policy thinkers are watching the AQC with interest. In January, Mount Auburn began caring for 25,000 patients under the AQC and has already made substantial infrastructure commitments that will help to achieve the goals.

“I think we’re all optimistic about the AQC because our safety scores are already above average,” says DiIeso. “We’ll be challenged in some areas, but the timing is perfect. Thanks to LEAD, we’ve invested in important technology and initiatives, and we’ve gained a strong sense of pride in what we’ve accomplished so far. Quality and safety are in Mount Auburn’s heart and soul.”

Peter Semenza, Chief Financial Officer, believes the AQC represents the key to Mount Auburn sustaining its quality gains and funding further improvements. “I expect we’ll achieve this through per-

formance incentives and by gaining market share,” says Mr. Semenza. “At this point, we are known throughout the region—by medical groups and other organizations—as a high-quality, affordable hospital partner.”

By asking health care organizations to transform care and then supporting their efforts to do so, Blue Cross and Blue Shield has forged collaborative partnerships that would be difficult to imagine a few brief years ago. It is a healthy development, says Chubb. “Our organizations are working for the same objective now, which is how it should be,” he says.

LEAD has catalyzed a significant advance in the alignment of payment with quality. With payers and providers working as partners towards excellence in patient care and aligning financial resources with quality outcomes, everybody wins—especially patients.

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