

HOSPITALS IN PURSUIT OF

Excellence

A GUIDE TO SUPERIOR PERFORMANCE IMPROVEMENT

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HOSPITALS IN PURSUIT OF *Excellence*

Ten years ago, the Institute of Medicine (IOM) shocked the health care field and the general public with its seminal report, *To Err is Human: Building a Safer Health System* (1999), in which it estimated that as many as 98,000 people may die each year from preventable harm in hospitals. Its follow-up report, *Crossing the Quality Chasm: A New Health System for the 21st Century* (2001), introduced the IOM Six Aims for Improvement: care that is safe, timely, effective, efficient, equitable and patient-centered (STEEEP). These reports were a call to self-examination and action by the nation's hospital leaders.

Since then, many hospitals have made impressive strides in improving care along the 6 IOM aims. However, the incidence of harm and the level of quality in the health care delivery system continue to come under scrutiny. Calls for action by consumers, employers, purchasers and payers over excessive variation, unsafe environments and escalating costs have not waned. Recognizing the high stakes and that hospitals deliver complex services in complex settings, progress must continue to be made and at an even faster pace.

Despite the advances made during the past decade, daunting problems still confront hospital leaders and clinicians as they work to make care better and safer. According to the Centers for Disease Control and Prevention, 1.7 million health care-acquired infections occur in hospitals alone each year. In a 2006 report, the IOM put the number of preventable drug-related injuries in hospitals at about 400,000 annually. The United States has the highest medical care costs in the world (Organisation for Economic Co-operation and Development), yet it ranks only 37th in quality of care (World Health Organization). Another study estimates that 30 to 40 cents of every dollar spent on health care in the nation is wasted because of poor system performance, which results in rework, unnecessary tests, excessive movement, treatment delays and staff workarounds¹.

Our country is on the road to health care reform. Hospitals play a critical role in our nation's health care delivery system and, as such, must play an important part in reform efforts. Hospitals WILL have a stronger voice in health reform:

- » **IF** they continue to make significant strides in performance improvement,
- » **IF** hospital leaders can accelerate their organizations' improvement efforts, and
- » **IF** proven practices are employed and clearly demonstrated to patients, families and other stakeholders that they are achieving performance excellence.

Hospital leaders who are in pursuit of excellence can help ensure the kinds of reforms that will result in better health and better health care. *Simply put, better hospitals make better advocates.*

The task of leading and managing hospitals and health systems has grown more challenging in light of heightened expectations for these institutions to demonstrate value, to be accountable for their actions and results and to increase transparency for stakeholders. But the urgency for hospitals to be dedicated to performance excellence—to make substantial progress toward meeting the 6 IOM aims—has never been greater.

WHAT IS HOSPITALS IN PURSUIT OF EXCELLENCE?

BETTER HEALTH. BETTER HEALTH CARE. BETTER VALUE.

Hospitals in Pursuit of Excellence is a permanent activity of the American Hospital Association (AHA). It provides an ever-expanding portfolio of resources to help hospital leaders, clinicians and staff accelerate the transformation of care and support processes to meet the 6 IOM aims. The mission is to bring field-tested practices, proven strategies, tools and education to engage, support and advance hospital leaders' ongoing efforts to improve the patient experience and outcomes. The goal is to smooth the path for hospitals to achieve excellence in clinical, operational and financial performance. This effort brings to bear the power of the AHA's connection to its more than 5,000 member hospitals, health systems and other health care organizations; its partners, such as state and allied hospital associations; and its 38,000 individual members. With these resources at hand, Hospitals in Pursuit of Excellence will shine the light on practices that have proven successful in helping hospital leaders transform their organizations into high-performing, highly reliable providers of care.

Hospitals in Pursuit of Excellence is NOT about adding more requirements for hospitals and health systems. Rather, it is designed to enable hospital leaders to easily understand and access coherent and proven strategies for implementing systemic improvements and for advancing specific practices in clinical and operational areas that have already been identified as keys to progress. It IS about building hospitals' capacity to internally improve and bring better results to their patients and communities.

The cornerstone of Hospitals in Pursuit of Excellence is the 6 IOM aims. With an approach that emphasizes systems thinking and process management, this effort seeks to help hospitals reduce waste and inefficiency, optimize the use of resources, and enhance their ability to deliver safe, high-quality and affordable patient care. Hospital leaders can achieve these goals by applying these Principles of Performance Excellence:

- » **Perfect the patient experience.** Care must be respectful of, and responsive to, individual preferences, needs and values.
- » **Create a high-reliability culture.** Organizational cultures must embrace the transformation of hospitals into places where each patient receives the best quality care, every single time.

- » **Manage organizational variability.** Some variables, such as scheduling of elective surgery, can be smoothed out to achieve more even patient flow.
- » **Remove waste.** This includes removing inefficiencies, such as unnecessary process steps, and can have a direct, positive impact on the bottom line.
- » **Eliminate defects.** Finding and resolving problem points will result in greater efficiency and better health outcomes.
- » **Reduce process variation.** Using quality tools and frameworks can increase consistency and reduce errors in both the clinical delivery of care and the policies and procedures that support care.

Applying these principles to specific areas that have proven to have a significant impact on the patient experience and outcomes can help hospitals and health systems provide care that meets the 6 IOM aims.

WHAT IS OUR INITIAL FOCUS?

A hospital's efforts to improve quality, safety, service and overall organizational performance are measured in years, not weeks or months. It is a journey that never ends. The ultimate goal never changes—care that is safe, timely, effective, efficient, equitable and patient-centered. Successful improvement efforts focus on specific areas of hospital care and operations that have proven to yield some of the greatest opportunities for improvement.

As such, Hospitals in Pursuit of Excellence will initially target four high-leverage areas:

- » **HEALTH CARE-ACQUIRED INFECTIONS**
- » **MEDICATION MANAGEMENT**
- » **PATIENT THROUGHPUT**
- » **PATIENT SAFETY**

The case studies in this guide illustrate that applying the Principles of Performance Excellence to these areas can produce substantial patient and operational value and help hospitals deliver care that meets the 6 IOM aims. By demonstrating specific actions and results, hospitals can share measurable progress and stories of improvement with key stakeholders, including their patients, their communities, payers, regulators and others. The AHA pledges to help all hospital leaders do that.

As Hospitals in Pursuit of Excellence continues, it will identify and focus on additional high-leverage areas, beyond these four, that offer the greatest opportunity for clinical, operational and financial improvement.

WHAT IS THE ROLE OF LEADERSHIP?

Hospitals have two types of leadership:

- » Executive leaders (administration, trustees and physician and nurse leaders) make decisions about system attributes and typically are removed from actual patient care delivery. These “contextual” leaders set the context for care delivery² and cultivate supportive environments that consider the human factor of work performed in these complex settings.
- » Leaders close to the patient, and the delivery of care and ancillary services, have specific process and content knowledge. These are the nurses, physicians, pharmacists, environmental care professionals, risk managers, engineers, dieticians and others with the skills and competencies to be “content” leaders.

Each type of leadership is critical to performance improvement, yet each has different perspectives and needs as they strive for excellence. A major goal of Hospitals in Pursuit of Excellence is to provide assistance to both types of leadership as they each play integral roles in efforts to meet the 6 IOM aims.

IS YOUR ORGANIZATION READY?

Organizations can take many paths to high performance. However, a predominant characteristic in all high-performing organizations is a triad of contextual leaders—executives, trustees and physician/nurse leaders—working together as a team. This group sets and communicates clear expectations about priorities and performance, creates a representative and responsive measurement system with feedback loops, establishes dialogue with content leaders to align efforts, and provides tools and resources to improve performance.

In seeking performance excellence, many organizations use the following questions to create a dialogue among trustees, executives, physicians and nurse leaders:

- Has your organization clearly established its vision and priorities?
- Having established “what is important,” has your organization determined the expected performance levels needed to address those priorities—particularly with regard to the 6 IOM aims?
- Has your organization developed a balanced measurement system?
- Has your organization’s existing performance been assessed?
- Has the business case for quality been clearly established across the organization?
- Are departments and functional areas aligned with the organization’s performance expectations?
- Are priorities for process improvement identified?
- Are appropriate tools and methods currently in use to bring about successful change and improved performance?
- Is the leadership team systematically, and on an ongoing basis, reviewing the status of improvement initiatives and tracking their progress and outcomes?

Through Hospitals in Pursuit of Excellence, the AHA is ready to be your performance improvement partner. The contents of this guide and its numerous case studies of high-performing hospitals are just the beginning. The AHA will be listening and counting on you to help set priorities, learn from hospitals across the country, and share that learning with the entire field as hospitals continue to accelerate the pursuit of excellence.

1. Reid, P., Compton, W., Grossman, J., and Fanjiang, G. “Building a Better Delivery System: A New Engineering/Health Care Partnership.” *The National Academies* (2005).
2. Shortell, S., Rundall, T., and Hsu, J. “Improving Patient Care by Linking Evidence-Based Medicine and Evidence-Based Management.” *JAMA*, vol. 298, no. 6, August 8, 2007, pp. 673-676.

TAKING ACTION

This guide describes how a cross-section of America's hospitals and health systems have successfully applied the Principles of Performance Excellence in the four initial focus areas of Hospitals in Pursuit of Excellence to improve the patient experience and align care with the 6 IOM aims. Organizations that employ the principles and methods described in this guide can achieve remarkable results in terms of improved patient outcomes, safety, patient and employee satisfaction, and organizational performance.

But this guide is just the first of the tools and resources the AHA will be making available to hospitals through Hospitals in Pursuit of Excellence. Hospitals will be most successful if they are able to come together and learn from each other. If your organization has developed a successful strategy or practice for improving the patient experience and moving toward care that meets the 6 IOM aims, let the AHA help you share it with your colleagues across the country. Through the AHA Quality Center's Web site, your proven and promising strategies and practices will be disseminated to others in the field. The AHA will help connect you to leaders who are working on similar improvement projects. Please visit the AHA Quality Center's Web site at www.ahaqualitycenter.org to access an online form.

In addition to the case studies, tools and resources available through the AHA, additional innovations and lessons learned will be highlighted in *Hospitals & Health Networks*, other AHA publications and educational programs. The AHA plans to expand its focus and welcomes guidance and suggestions for areas that represent major opportunities for improvement.

Contact to submit your case examples and suggestions:

www.ahaqualitycenter.org

ahaqualitycenter@aha.org

(877) 243-0027

HEALTH CARE —ACQUIRED INFECTIONS

Improving patient safety and quality is something we're committed to as an organization — any patient out there, whether they're our patient or not.

— Stephen L. Wallenhaupt, MD, CMO, Novant Health

HEALTH CARE— ACQUIRED INFECTIONS

Applying the Principles of Performance Excellence can reduce the incidence, costs and consequences associated with health care-acquired infection (HAIs). The hospitals featured in these case studies focus on various aspects of the principles to achieve care that meets the 6 IOM aims.

For example, a city hospital with limited resources was able to provide safe and timely patient care. For 19 months, one intensive care unit had no ventilator-associated pneumonia incidences. Hospital leadership supported the project by charging a group of caregivers with the responsibility to achieve this goal. Executive leadership did not dictate method. Instead, they allowed the content experts to decide how to best achieve and sustain the goal. This is a characteristic of high-reliability cultures—where organizational leaders defer to the person(s) with the most knowledge relevant to the issue they are confronting.

Another hospital decreased the mortality rate associated with severe sepsis by creating standard screening tools. Reducing process variation is another Principle of Performance Excellence and a known characteristic of high-performing hospitals.

Many of these techniques are not new. These hospitals applied tried-and-true best practices that have been tested in other hospitals. However, the reason for the success was an emphasis on applying the Principles of Performance Excellence to achieve the 6 IOM aims. Specific hospital actions demonstrated in the following case studies will reduce the incidence of infection.

HAI's AT A GLANCE

- » Data released by the U.S. National Nosocomial Infections Surveillance show that every year nearly 2 million patients in North America contract an infection in a hospital and about 100,000 die as a result of their infection. (CDC, 2007)
- » In 2007, approximately 880,000 patients contracted MRSA in a hospital. (APIC, 2007)
- » One of every 20 of the roughly 368,600 patients treated in U.S. hospitals in 2005 for MRSA died. (AHRQ 2007)
- » MRSA surgical site infections were associated with a mean adjusted additional \$41,274 in attributable charges, and \$28,891 in attributable cost per case. (Emerging Infectious Diseases, 2004)
- » Ventilator-associated pneumonia (VAP) occurs in 8 to 28 percent of patients receiving mechanical ventilation. The mortality rate for VAP ranges from 24 to 50 percent. (Am J Respir Crit Care Med. 2002)
- » Hospital-acquired infections cost the U.S. health system \$5 billion a year. (CDC, 2000)
- » VAP adds an additional estimated cost of \$40,000 to a typical hospital stay. (CDC, 2007)
- » 87 percent of hospitals don't consistently follow guidelines for preventing some of the most common HAIs, and only 35 percent of hospitals had full compliance with hand hygiene practices. (Leapfrog Hospital Quality and Safety Survey, 2007)
- » *Clostridium difficile* (*C. diff*) is the most common cause of infectious health care-associated diarrhea, occurring in about 20 percent of hospitalized patients with antibiotic-associated diarrhea. (APIC, 2008)
- » *C. diff* infections are occurring in hospitals at a rate up to 20 times greater than previously believed. (APIC, 2008)
- » On average, patients with *C. diff* were hospitalized almost three times longer than uninfected patients. The in-hospital death rate for patients with *C. diff* was 9.5 percent compared with 2.1 percent overall. (AHRQ, 2008)
- » On any given day, an estimated 7,178 patients in U.S. hospitals battle *C. diff* infections. (APIC, 2008)

RECOMMENDATIONS

Recommendations from the *Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals**

- » To prevent infections, health care providers will clean their hands with soap and water or an alcohol-based hand rub before and after caring for every patient.
- » Catheters will be used only when necessary and removed as soon as possible.
- » The skin in the area where the catheter will be inserted or the surgical site will be cleaned.
- » When appropriate, providers will wear hair covers, masks, gowns and gloves.

* A comprehensive list of specific recommendations for different types of infections can be found at www.preventinghais.com/index.php?sid=S20081205160719X3P6W0

ADDITIONAL AHA RESOURCES

Infection Control

The AHA Quality Center has resources from various sources on infection control. www.ahaqualitycenter.org

Infection Control: Managing Risk During Construction, Operation and Maintenance of Facilities

The American Society of Healthcare Engineering of the AHA presents a two-day conference highlighting best practices. www.ashe.org/ashe/education/ic/

The Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals

Released by the AHA, the Society for Healthcare Epidemiology of America, The Joint Commission, and the Infectious Diseases Society of America, it offers recommended practices for preventing six of the most common HAIs.

www.preventinghais.com

ATTACKING MRSA THROUGH POSITIVE DEVIANCE

ALBERT EINSTEIN MEDICAL CENTER

- ◆ Philadelphia, PA
- ◆ 440 beds
- ◆ www.einstein.edu

Albert Einstein Medical Center, a tertiary care hospital, with a Level I regional trauma center and a Level III neonatal intensive care unit, counts more than 600 primary care doctors and specialists on staff and 1,200 affiliated physicians. It is part of Albert Einstein Healthcare Network, which is a member of Jefferson Health System.

STEEEP

Safe

Prevention of health care associated infection.

Effective

Makes use of evidence-based guidelines.

THE PROBLEM

MRSA is a virulent bacteria that thrives in the health care setting, putting at great risk immuno-compromised patients. It is blamed for more than 18,000 deaths annually, according to the CDC. At Einstein, officials identified 107 cases of hospital-acquired MRSA in 2006, a rate of 0.535 infections per 1,000 patient days. Compared with matched patients who had not acquired MRSA, patients with MRSA infections had an 8.3 percent higher mortality, an increase in average length of stay of 19.75 days, and an increase of average variable costs of \$33,347. An internal analysis revealed that no routine surveillance cultures for MRSA colonization were being performed, and that reliable implementation of practices to combat MRSA was uncommon.

THE SOLUTION

In May 2006, the hospital undertook the “Stop MRSA Acquisition and Spread in our Hospitals” initiative, known by its acronym SMASH. Using a concept known as positive deviance, Einstein instituted a bundle of practices, including identifying colonized and infected patients, placing these patients in isolation rooms, adhering to contact isolation precautions through the use of gowns and gloves, and, especially, adherence to hand hygiene guidelines. Positive deviance says that for every group of people performing a similar function, there are certain individuals (positive deviants) whose attitudes, practices, strategies or behaviors allow them to accomplish tasks better than others.

RESULTS

- » The hospital-acquired MRSA infection rate declined 27 percent in the first quarter of fiscal year 2008, compared to 2006.
- » Alcohol-based gel use climbed from 65 cases per quarter to 125 cases per quarter.
- » Gown use has increased from 33,000 to 80,000 gowns per quarter.

BACKGROUND

Like many clinicians, Albert Einstein Medical Center officials were frustrated by the persistence of MRSA in their institution. The hospital had engaged in traditional infection control efforts. “We put up a lot of signs and told a lot of people what to do,” says Jeffrey Cohn, MD, Einstein’s chief quality officer. It was only when Cohn discovered the concept of positive deviance—which focuses on those who already perform the practices desired for all—that he saw a fresh opportunity to combat it.

“In every community there are people or groups who, because of some sort of uncommon practices, have figured out a way to have better outcomes—in whatever the context—than their peers around them, without access to any different or better resources,” Cohn says. Positive deviance has been used to combat childhood malnutrition in Vietnam, neonatal mortality in Pakistan, and HIV transmission in Myanmar. “Basically, it’s a way of solving a problem by identifying those who have already figured it out.”

Armed with a grant from the Robert Wood Johnson Foundation and with assistance from researchers at Tufts University, Cohn and his team identified evidence-based guidelines from the CDC, the Society for Healthcare Epidemiology of America, APIC, and the Institute for Healthcare Improvement. The team held a kickoff meeting with 300 clinical and administrative leaders to learn about the impact of MRSA on patients and about the concept of positive deviance. Cohn recalls that the process lacked structure at the start. “It was really amorphous,” he says. “As things evolved, a sense of organization came out of it.”

From the initial group, 50 individuals volunteered to support SMASH. Many of these individuals were positively deviant—they were already doing the right things. Four

TEAM MEMBERS

- » **Dottie Borton, RN**
Infection Control Nurse
- » **Barry R. Freedman**
President and CEO
- » **David Hares, MD**
Quality Manager
- » **Jeffrey Cohn, MD**
Chief Quality Officer,
Albert Einstein
Healthcare Network
- » **Joan T. Granberry**
Administrative Director of
Quality Management
- » **Jerry Zuckerman, MD**
Medical Director of Infection
Prevention and Control

units—surgical intensive care, medical stepdown, general medicine surgery (transplant and oncology), and rehab—volunteered as pilot units to begin performing surveillance cultures on admission and discharge. “These guys volunteered—they weren’t recruited by any stretch,” recalls Jerry Zuckerman, MD, medical director of infection prevention and control.

Positive deviance was implemented via regular “Discovery and Action Dialogues,” 15- to 30-minute opportunities for frontline staff to learn together what was working and what actions needed to be taken to improve. These dialogues led to a series of “ground-up” recommendations from frontline staff. Recommendations included ensuring that personal protective equipment, such as gowns and gloves, were readily available, simplifying signage in isolation rooms and notifying clinicians about patients that might have a positive culture.

In the process, a culture of trust among physicians and nurses, and among frontline caregivers and the administration, was born. “This was all about trust that people on the frontlines, who are the ones whose behaviors ultimately need to change, are the ones who can come up with the solutions to make it work,” Cohn says. “The model for health care traditionally has been us telling people what to do. This is much more about listening to them about what they need, and then it’s up to us to make it happen.”

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

SMASH has led to a culture change where all departments of the hospital—even those that rarely come into contact with the patient—are focused on the patient. “You’ve got people from the storeroom sitting down with nurses ordering supplies—that never happened before,” Cohn says. “The purpose of this project was not to change the culture, the purpose was to eradicate MRSA. Culture change has been a byproduct of the work that gets done.”

SMASH relies on encouraging people to do the right thing rather than telling them what to do. Call it the difference between influence and power; many leaders find they can achieve more with the former than with the latter. “The folks on the frontline have the wisdom to figure out the problems that are relevant to them,” Cohn says. “We just needed to let them do so.”

CONTINUAL IMPROVEMENT

In May 2007, Einstein committed to making SMASH a hospital-wide initiative, planning to screen all eligible admissions for MRSA colonization by the end of fiscal 2008. Not all units are engaged in formal positive deviance projects—for instance, it was decided that it wasn’t necessary in labor and delivery—but surveillance cultures are now conducted broadly.

The SMASH core leadership team continues to meet every other week, identifying issues that had not been considered before the initiative. One such instance arose in mid-2008 with elective procedures. These patients had been swabbed for MRSA just before surgery was to begin; if they tested positive, they would awaken from anesthesia in an isolation room being attended to by gowned clinicians, a disorienting and frightening experience that the surgeons disliked. With the surgeons’ assent, elective procedure patients are now swabbed pre-admission and they and their physicians can know what to expect before the surgery begins.

THE BUG STOPS HERE

ALLEGHENY GENERAL HOSPITAL

- ◆ Pittsburgh, PA
- ◆ 724 Beds
- ◆ www.wpahs.org/agh

Allegheny General is an academic medical center on Pittsburgh's north side, with a Level I shock trauma center. It is part of West Penn Allegheny Health System.

S T E E E P

Safe

Reduction of CLAB infections and the resultant harm.

Efficient

Quality data are used in near real time, not retrospectively.

Patient-centered

Infections are considered in terms of number of patients affected, not in terms of rates per 1,000 line days.

THE PROBLEM

Central line-associated bloodstream (CLAB) infections have vexed hospitals performing interventional care for years. While the rate at Allegheny General Hospital (AGH) was no worse than the national average, it was decided that meeting that goal was unacceptably low and that patients were being needlessly harmed by CLAB infections.

THE SOLUTION

Declaring “zero tolerance” for CLAB infections, the AGH Coronary Care Unit (CCU)—site of many such infections—embarked on an ambitious project to eliminate them. Working with the Pittsburgh Regional Healthcare Initiative (PRHI), the CCU team endeavored to obtain as close to real-time information and convened at the bedside to assess what went wrong whenever possible.

RESULTS

- » Within a year of introducing new protocols, the CLAB infection rate dropped by 87 percent.
- » The CCU has gone more than a year without a single patient suffering from a CLAB infection.

BACKGROUND

U.S. hospitals average between two and seven CLAB infections per 1,000 line days, according to the CDC's National Nosocomial Infection Surveillance System. At Allegheny General, that rate was four CLAB infections per 1,000 line days. However, even the method of quantifying infections took the focus away from the patient, recalls Jerome E. Granato, MD, medical director of the hospital's CCU. “Four infections per 1,000 line days—what does that even mean?” Granato asks. “It meant that 30 to 40 patients were getting infections from central-venous catheter every year, and one-third of them were dying. Once we started to look at infections, not in terms of the rate, but in terms of the number of people affected, the number quickly became unacceptable.”

With the help of the PRHI, the hospital undertook an extensive analysis of existing clinical practices and all levels of staff involvement surrounding the use and maintenance of central lines. It was found that there was little consistency with regards to the techniques, supplies and barrier precautions used during central-line insertion and dressing changes.

“PRHI did an observation and came back with a report, and that was a real eye-opener,” says Joy Peters, RN, nursing director of the CCU. “We found that all these things we had learned in nursing school had gone completely by the wayside. In some instances dressings were being changed every 24 hours, in some instances it was every shift. It was chaos.”

TEAM MEMBERS

- » **Ronnie Andrews, RN**
Infection Control Practitioner
- » **Connie E. Cibrone**
President and CEO
- » **Kimberly Curry, RN**
Coronary Care Unit Facilitator
- » **Diane Frndak**
Vice President of Organizational Excellence, West Penn Allegheny Health System
- » **Jerome E. Granato, MD**
Medical Director, Coronary Unit
- » **Cheryl Herbert, RN**
Infection Control Director
- » **Joy Peters, RN**
Nursing Director, Coronary Care Unit
- » **Richard Shannon, MD**
Chairman, Department of Emergency Medicine

Making use of infection data the moment it became available, rather than two months later as had been done previously, the AGH team succeeded in changing the paradigm for central-line utilization, creating a new, safer standard of care. This included using a clear “biopatch” over the point of insertion so caregivers could see it without having to change dressings; banning use of central lines in the femoral vein and groin; standardizing sterilization procedures; and standardizing dressing change procedures.

“When this program began there was a one in 25 chance that a critically ill patient at AGH would get a central-line bloodstream infection,” Granato says. “Our most recent data reflects a one in 527 chance.”

An additional benefit: reduction in CLAB infections saves money. “If patients don’t get infections, we get them out of the hospital faster, we turn the bed over faster and we can get the next patient in there—and, in the process, it’s better for the patient,” says hospital CEO Connie Cibrone. “We didn’t do this because of cost, we did this because it was the right thing to do; but, we actually save money doing it.”

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

The intervention’s success depended on buy-in from nurses in the CCU. Fortunately, that came quickly. “The infection-control nurse got on board right away—she was excited to be involved in a new way,” Peters says. “The nursing staff became very engaged. We’ve made infection control a team effort.” This is performed under a campaign called “The Bug Stops Here,” complete with promotional signs and t-shirts, designed to maintain the momentum for change and especially encourage new personnel to adhere to protocols.

Reducing Process Variation

The discovery that there was so little standardization with regard to treatment of central lines came as a shock. “Frontline caregivers are really keepers of the gate,” Peters says. “If they aren’t diligent, there’s a problem.” By implementing standardized protocols, AGH reduced variation and thus ensures that it adheres to a best practices standard.

CONTINUAL IMPROVEMENT

Procedures developed in Allegheny’s CCU were also tested in the intensive care unit (ICU) to demonstrate proof of concept. Once similar successes were shown in the ICU, they were taken hospital wide. The AGH CLAB infection project has prompted an equally aggressive focus on eliminating other common hospital-acquired infections like ventilator-associated pneumonia, MRSA and urinary-tract infections.

Ongoing education is important to the program’s success. All physicians are required to undergo 30 minutes of training with a mannequin to review how to prepare a patient for central-line insertion and how to don sterile clothing. Physician- and nurse-specific videos were created and are required viewing for staff. And, the hospital has received a grant from the APIC to create a series of training modules to develop these standards nationally.

FIGHTING ANTIMICROBIAL RESISTANCE

HUNTERDON MEDICAL CENTER

- ◆ Flemington, NJ
- ◆ 178 beds
- ◆ www.hunterdonhealthcare.org

Hunterdon Medical Center is community hospital and a teaching institution. Part of Hunterdon Healthcare System, it is affiliated with the University of Medicine and Dentistry of New Jersey – Robert Wood Johnson Medical School.

STEEEP

Timely

A three-day stop order on antibiotics prescribed prompts physicians and pharmacists to review cultures to make sure the most appropriate drug is being used.

Effective

The use of guidelines and the collaboration between pharmacists and doctors improved the prescribing of antibiotics and significantly lowered the drug resistance of several bacteria.

Efficient

\$157,000 saved in pharmacy costs in 2007.

THE PROBLEM

Antimicrobial resistance is a growing problem nationwide, caused, in part, by injudicious use of antibiotics. At Hunterdon Medical Center, some antibiotics were losing their ability to cure infections present in patients coming to the hospital. For example, the effectiveness of the broad-spectrum antibiotic Ciprofloxacin was declining against *E. coli*, *klebsiella pneumoniae* and *pseudomonas aeruginosa*.

THE SOLUTION

Hunterdon Medical Center in 2006 became the pilot site for the 'Bugs and Drugs' program developed by the hospital alliance VHA Inc. and John G. Gums, PharmD, professor of pharmacy and medicine at the University of Florida. This stimulated the development of the antibiotic stewardship program at the hospital. Hunterdon's effort involves regular evaluations of antibiotic resistance at the facility, guidelines for empiric use of antibiotics, and collaboration between physicians and doctors of pharmacy. The initiative focused heavily on Cipro.

RESULTS

From 2006 to the last half of 2007, susceptibility to Cipro went from:

- » 68 percent to 76 percent for *E. coli*
- » 26 percent to 51 percent for *klebsiella pneumoniae*
- » 54 percent to 74 percent for *pseudomonas aeruginosa*

BACKGROUND

In 2004, Robert Pickoff, MD, Hunterdon Medical Center's chief medical officer, began looking at how changes in drug utilization could help stem the tide of antibiotic resistance at the hospital. His preliminary efforts grabbed the attention of officials at VHA Inc., who were creating an antibiotic stewardship program. Hunterdon was selected as the test site for the hospital alliance's Bugs and Drugs program.

Hunterdon's effort was strengthened by David Adelman, director of pharmacy. After his arrival at the hospital in 2005, Adelman started a pharmacy residency program, which, along with Rutgers pharmacy student clinical rotations, assisted in increasing the number of doctorate-level pharmacists. With the support of hospital leadership, Adelman also boosted the number of clinical coordinators with PharmDs from one to four. These staff members partnered with the physicians in the campaign against antibiotic resistance.

The antibiotic utilization subcommittee of the hospital's pharmacy and therapeutics committee had found that in many cases, physicians were not choosing the best antibiotics for empirical therapy, which is drug treatment before a culture can identify the specific bacteria causing the infection. The group also found that once the bacteria cultures came back in three or four days, doctors were often not switching patients to a more effective antibiotic for that particular infection.

Hunterdon's first step in the Bugs and Drugs program was to share its data on antibiotic utilization and drug resistance with Gums. His analysis of the data showed that "the longer somebody is on the inappropriate antibiotic, the higher the rate of resistance," Pickoff says.

Gums made several recommendations. One of the most important, Pickoff says, was his advice to develop separate antibiograms – analyses of bacteria cultures for antibiotic

TEAM MEMBERS

» **David Adelman**
Director of Pharmacy

» **Robert Pickoff, MD**
Chief Medical Officer

» **Robert P. Wise**
President and CEO

resistance – not just for the entire facility, but for different areas of the hospital, such as the emergency department and intensive care unit. The antibiograms are posted on the hospital's intranet so that physicians and pharmacists can access them easily and use them when deciding which antibiotic to prescribe.

"What most hospitals do is take all of the cultures that are done and test them against all these antibiotics to see what they are sensitive to and report them altogether for the entire institution," Pickoff explains. However, "bacteria in each of the units of the hospital are really very different, and they actually have different sensitivities and resistances."

Based on the antibiograms' results, the hospital implemented guidelines for the empirical use of antibiotics in general, and in the various units of the hospital. They were posted on the intranet. Cipro, an overutilized broad-spectrum antibiotic, was targeted in particular. The guidelines recommend physicians order it empirically only for patients with diverticulitis or Crohn's Disease, Adelman says.

The hospital's formulary was not changed, both Pickoff and Adelman emphasize. To improve utilization, the program relies on the guidelines and the intervention of the doctors of pharmacy in cases where physicians prescribe outside the guidelines. The clinical pharmacists make rounds with physicians and give them advice on the spot. They also monitor prescribing habits from the pharmacy. So if a physician prescribes Cipro against the guidelines, "we would go and speak with the physician," Adelman says.

The stewardship program doesn't rely on rotation of antibiotics to preserve their effectiveness. "We talked about that," Pickoff says. "But that supposes continued injudicious use of antibiotics. We thought that while that [technique] has been shown to be successful at times, the best thing to do would be to get people to use antibiotics more judiciously."

The initiative has shown "that antibiotic stewardship works, and it works not because you put restrictive policies in place for physicians, but it works because of close monitoring of individuals," Adelman says.

PRINCIPLES OF PERFORMANCE EXCELLENCE

The Patient Experience

The antibiotic stewardship effort has had a huge impact on patient safety, Adelman and Pickoff note. "The board of trustees was able to see that if we kept going the way that we were going, we probably wouldn't be able to admit patients with infections to the hospital because the drugs were burning themselves out," Adelman says.

In the past when an antibiotic stopped working, hospitals and physicians simply switched over to the next one because a steady stream of new antibiotics was coming from the drug companies, Pickoff says. However, that stream has dried up. "We're now left with using the antibiotics we have more effectively." Through the stewardship program, "what we've done is reverse the tide of antibiotic resistance so that our armamentarium of antibiotics is still useful," Pickoff adds.

Creation of High-Reliability Culture

One of the unique features of Hunterdon's program is the close relationship that has developed between physicians and doctorate-level pharmacists. It wasn't completely smooth going at first. "Somebody just showing up and giving doctors advice isn't always welcome," Pickoff says. "These people had to prove their mettle and show that they knew what they were talking about." They did so quickly. "We evolved from the PharmDs chasing down the physicians to make recommendations to now the PharmDs get phone calls from physicians for advice," he says.

Initially, about 57 percent of pharmacists' suggestions were accepted, which is better than the national norm, Adelman says. "At most institutions, if we can get 40 percent of our recommendations accepted, it's pretty good." Now, the figure at Hunterdon is 89 percent. "To get it up to almost 90 percent was really an amazing thing."

CONTINUAL IMPROVEMENT

The antibiogram used to be reported only yearly, but under the stewardship program it is now reported to the antibiotic utilization committee twice a year and up to quarterly for the clinical pharmacy specialists so that any negative development can be addressed quickly. One change under consideration is to work with Gums to implement a computer program that would create daily antibiograms that would get down to the individual patient level, Adelman says. "We plug in what condition we think that patient came in on, and [the computer system] gives back to us the possible choices of antibiotics that we should use. Then we will make the selection. We're going to be able to do that on individual patients in real time."

WASHING HANDS SAVES LIVES: REDUCING MRSA RATES

NOVANT HEALTH

- ◆ Winston-Salem, NC
- ◆ 2,650 beds
- ◆ www.novanthealth.org

Novant Health is a not-for-profit, integrated health care system in western North Carolina that serves more than 3.5 million people in 34 counties from southern Virginia to northern South Carolina. It has nine hospitals, two nursing homes and senior residential facilities, nearly 350 physician clinics, outpatient surgery and diagnostic centers, rehabilitation programs, and community health outreach programs.

STEEEP

Safe

The program has led to reduced MRSA infection rates.

Effective

Compliance is defined using CDC hand hygiene guidelines.

Efficient

Hand hygiene monitors intervene on the spot when they see someone failing to use proper hand hygiene.

THE PROBLEM

MRSA accounts for more than 18,000 deaths annually nationwide, according to the CDC. The proportion of health care-associated staph infections due to MRSA has been increasing. In 1974, two percent of *S. Aureus* infections in U.S. intensive care units were MRSA. By 2004, that figure jumped to 64 percent. The most common mode of transmission is health care providers who don't wash their hands. At Novant, the MRSA infection rate was 0.54 per 1,000 patient days in 2005. Proper hand hygiene compliance was 49 percent.

THE SOLUTION

Novant Health initiated a system-wide hand hygiene program in 2004 after its executive committee chose compliance as a three-year corporate goal beginning in 2005. The target was 90 percent compliance. The major components of the campaign include internal and external marketing campaigns, staff education, the creation of two hand hygiene monitor positions, and department- and unit-level rapid-cycle improvement projects.

RESULTS

- » Hand hygiene compliance skyrocketed after direct feedback to the staff began in June 2006. System-wide performance reached 90 percent by November. As of October 2008, compliance was 99 percent.
- » Meanwhile, the MRSA infection rate fell from 0.54 in 2005 to 0.24 per 1,000 patient days at the end of 2008.

BACKGROUND

Shocked and saddened by the death of an infant from a MRSA infection in the hospital's neonatal intensive care unit, Novant Health President and CEO Paul M. Wiles started the hand hygiene campaign in 2004. That year, Novant's executive committee made hand hygiene compliance one of the system's 2005-2007 goals. A hand-hygiene committee, representing a cross-section of the organization, began meeting in 2005 and quickly decided a system-wide approach was necessary.

For data collection, the committee created two hand-hygiene monitor positions. Two nurses go to different units and facilities at different times of the day and night looking for instances when hand hygiene should be performed, explains Suzie Rakyta, RN, director for clinical improvement for the Charlotte market. Then they decide, based on specific criteria, whether employees used proper techniques and record the results. The monitors intervene to educate noncompliant employees. If that can't be done immediately (for example, in the middle of emergency treatment), they follow up later the same day. The monitors also make sure necessary resources, such as soap, sanitizing gel, paper towels and gloves, are on hand.

The effort was not without bumps. Initially, the monitors were licensed practical nurses (LPN). Early on, it was discovered that LPNs weren't confident challenging other caregivers and couldn't take heat from colleagues unhappy about being caught. So they were replaced with RNs. Arguments persisted. "We actually had to send out a memo that said if you mistreat the hand hygiene monitor, in essence you'll be fired," says James Lederer, MD, medical director of clinical improvement.

Now everyone is onboard, Rakyta says. There's friendly internal competition among departments and facilities to achieve the

TEAM MEMBERS

- » **James Lederer, MD**
Medical Director of Clinical Improvement
- » **Suzie Rakyta, RN**
Clinical Improvement Director for the Charlotte Market
- » **Stephen L. Wallenhaupt, MD**
Novant Health Chief Medical Officer
- » **Paul M. Wiles**
President and CEO
- » **Tom Zweng, MD**
Chief Medical Officer for the Charlotte Market

highest compliance, she says.

The hand hygiene committee also developed an internal and external awareness campaign. “Probably what makes this effort the most unique is the extent to which we involved marketing and communications,” Lederer says. The internal effort was hard-hitting and sober at first. One example is a poster featuring a photo of a young patient in a hospital bed. The accompanying text reads: “You could kill him with your bare hands.” Once the seriousness of the problem was recognized system-wide, some marketing materials became less somber, such as silicone wristbands inscribed with “Hand washing saves lives.”

The external campaign aims to build on the growing public awareness of MRSA. It ranges from billboards to real estate-type yard signs on hospital grounds to a message on hospital parking garage gates that reads, “It’s a dirty world out there. Wash your hands.”

“Madison Avenue would be proud of us and how we saturated the market with our campaign,” says Tom Zweng, MD, chief medical officer for Novant’s Charlotte market.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

Novant leaders’ compensation is tied, in part, to performance on the hand hygiene and other three-year goals. When it came to hand hygiene, the leadership principle set by the CEO is “it’s going to happen, and if we

don’t do it, people’s bonuses are going to be at risk,” Zweng says.

At the physician level, the hygiene monitors contact supervising medical staff when a doctor is not compliant. The physician leader then sends the doctor a letter that day describing the circumstance in which he or she was viewed as not performing proper hand hygiene. A copy of the letter is placed in the doctor’s credentials file. “We’ve had to send out a few letters,” Zweng says. “But we’ve never had to send the letter twice to the same physician.”

The compliance monitors follow up personal intervention with an e-mail to the employee’s supervisor that outlines the date, time and circumstances surrounding the instance of noncompliance. The supervisor is required to follow up with the employee within 24 to 48 hours, and a copy of the e-mail goes into the employee’s file.

The Patient Experience

Novant’s leaders want others to learn from the system’s success. “Improving patient safety and quality is something we’re committed to as an organization—any patient out there, whether they’re our patient or not,” says Stephen L. Wallenhaupt, MD, Novant Health chief medical officer. The system created an open Web site (www.washinghandsaveslives.org) where its campaign materials can be downloaded at no charge. “It’s important for us to improve for ourselves, but it’s also as important for us to help others improve,” Lederer says.

CONTINUAL IMPROVEMENT

“In health care if you don’t measure it, it doesn’t get attention,” Lederer says. “So our challenge is to continue to measure, to continue to make it real with the feedback to the employees.” Hand-hygiene compliance data is updated every month and shared in a variety of ways with leadership on down to the staff. The awareness campaign still is underway. “Marketing keeps mixing it up so we’re not thinking, ‘That’s a poster that was put up a year ago,’” Rakyta says.

In 2008, the hand-hygiene compliance goal was increased from 90 percent to 95 percent. Novant’s focus will broaden in 2009 and 2010 to include enhanced infection reduction measures, Lederer says. The system will track 12 indicators. MRSA rates and hand hygiene will be on the list, along with the incidence of such problems as ventilator-associated pneumonia, and urinary tract and bloodstream infections.

The system will stick with hand hygiene, Wallenhaupt says. “No one who does any kind of clinical work would think it is ever marginally appropriate to even consider giving a shot without prepping the skin with some kind of antiseptic. When we’ve reached that level of expectation among all of our caregivers, including ourselves, then that’s when we can back off. Until that time, we’ve got to continue to promote the critical importance of this.”

DRIVING DOWN *C. diff* INFECTIONS

SSM ST. JOSEPH HOSPITAL WEST (SJHW) AND SSM ST. JOSEPH HEALTH CENTER (SJHC)

- ◆ St. Charles and Lake St. Louis, MO
- ◆ 426 beds
- ◆ www.ssmstjosephwest.com and www.ssmstjoseph.com

SSM St. Joseph Health Center and St. Joseph Hospital West are the largest providers of health care in St. Charles, Warren, Lincoln and Pike counties. The facilities are members of SSM Health Care, the first health care winner of the Malcolm Baldrige National Quality Award. SJHC is a Level II trauma center. SJHC is a Level III trauma center, chest pain center and primary stroke center.

STEEEP

Safe

Strengthened procedures involving patient isolation, room cleaning and antibiotic use to drive down *C. diff* infection rates.

Effective

C. diff cases have plunged as the two hospitals have adopted some existing best practices and developed new ones.

Patient-centered

Thanks to process and behavior changes made by virtually every department and staffer, the hospitals are saving lives and significantly reducing *C. diff* infections.

THE PROBLEM

Clostridium difficile (*C. diff*) is one of the most dangerous antibiotic-resistant bacterium, with a newer and more virulent strain causing epidemics in the United States and other countries. On any given day, 7,178 patients in U.S. hospitals battle *C. diff* infections, according to APIC. With a total of 350 to 400 cases each year in the early 2000s, SJHW and SJHC were seeing much higher rates of *C. diff* overall and nosocomial *C. diff* infections than other hospitals in the SSM system. The two hospitals' mortality rate for *C. diff* infections was 10 to 15 percent.

THE SOLUTION

The St. Joseph hospitals embarked on a rigorous overhaul of their cleaning and care procedures to reduce the rate of *C. diff* infections by 50 percent. After researching best practices for *C. diff* reduction, the team spearheading the effort committed to some changes that exceeded the best-practice guidelines available at the time.

RESULTS

- » Reduced *C. diff* infections to 0.5 cases per 1,000 patient days from 3.5 cases in 2004.
- » Hospital-acquired cases at SJHC fell to fewer than 20 in 2008, a 10-fold decrease from nearly 200 in 2004.
- » Hospital-acquired cases dropped to fewer than 50 at SJHW in 2008, four times lower than nearly 200 infections in 2004.

BACKGROUND

The issue hit home at SJHW and SJHC in 2004. At the time, James Hinrichs, MD, an infectious disease specialist in a large practice that served four hospitals, was struck by how many *C. diff* patients he was being asked to see at SJHC. Working with the hospital's medical director, Hinrichs and infection control coordinator Becky Clapper, RN, discovered a severe *C. diff* problem at the hospital and its sister facility, SJHW.

They pulled together a team that included representatives from pharmacy, medical staff, critical care, nursing, infectious disease, housekeeping, laboratory services and nutrition to research best practices for reducing the incidence of *C. diff*. In a memo to the medical staff, the group laid out the problem, backed with hard data, and the case for change. The team then helped the two hospitals adopt new procedures in an aggressive effort to drive down *C. diff* rates.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reducing Process Variation

SJHC and SJHW focused on standardizing best practices in three areas: environmental controls, use of isolation and antibiotic stewardship. The changes were rolled out rapidly in the second half of 2004. "We didn't feel we could do the changes step by step," recalls Hinrichs. "We felt a pressing need and decided to do it all at once."

Using evidence-based models, the hospitals greatly stepped up the cleaning regimen for *C. diff* rooms, taking 20 to 40 minutes to clean not just the bathrooms but any surfaces the patients come into contact with, including phones, curtains and doorknobs. Because antiseptics don't kill *C. diff* spores, the housekeeping staff switched to a bleach solution that the hospitals make themselves. With *C. diff* patients moving throughout the facilities for tests and other procedures, the hospitals established a schedule to do a bleach-based cleaning in every room every six months.

In some cases, the team raised the bar on existing best practices. For example, CDC guidelines recommend moving *C. diff* patients from isolation after their bowel movements fall below six a day. The two St. Joseph hospitals have instituted a standard of keeping *C. diff* patients in isolation in a private room during their entire stay. They also move patients into isolation when *C. diff* is suspected rather than waiting for test results. And all staff, such as transporters and

TEAM MEMBERS

- » **Gaspere Calvaruso**
President of SJHC
- » **Becky Clapper, RN**
Infection Control Coordinator, SJHC
- » **Cheryl Drakesmith, RN**
Medical/Surgical Unit Nurse, SJHW
- » **Donna Gaffney, PharmD**
Pharmacist, SJHW
- » **Bobbie Grass, RN**
Infection Control Nurse, SJHW
- » **James Hinrichs, MD**
Clinical Director of Infection Control,
Both Hospitals
- » **Verna Meacham**
Interim President, SJHW
- » **Brandyn Romine**
Supervisor, Environmental Services,
SJHC

nurses, who enter a *C. diff* room is required to wear gowns and gloves, with fresh ones placed in easy reach on isolation carts outside of the patient's door.

Whenever possible, the hospitals have shifted to disposable items for *C. diff* patients, including blood pressure cuffs, thermometers, stethoscopes and mop heads. Another innovation is a sleeve that fits over the computer keyboard in every room that can be wiped with bleach.

The group formed an antibiotics stewardship committee that researched the best medications to treat patients with *C. diff*, changing order sets as needed. Because *C. diff* can grow out of control while patients are taking antibiotics, the team established stop dates on antibiotics and reinforces them by putting alerts in patient charts. The committee also rounds two times a week for every patient on an antibiotic, checking dose, frequency and length of therapy, explains SJHW pharmacist Donna Gaffney.

With all of the changes, "fairly immediately, we saw a downward trend," notes Hinrichs.

Creation of High-Reliability Culture

To quickly gain acceptance of the new approach, the hospitals used a variety of methods to educate the staff on the issue and explain the evidence-based standards. The committee placed articles in staff newsletters, presented at staff meetings, wrote up policy changes and met individually with professionals from radiologists to nurses.

Both hospitals quickly got behind the efforts to reduce *C. diff* infections. "Once we

presented the data on the problem to nursing and housekeeping, everyone was very interested in participating in solving it," says Clapper. "Some began isolating patients on their own initiative." Another step forward—at the nursing staff's recommendation, visitors began following the same isolation procedures as staff to minimize the chances of spreading the spores.

Not all the changes were initially welcomed, however, especially isolation techniques, such as gowns and gloves and washing hands with soap and water every time they left a *C. diff* patient's room, recalls Cheryl Drakesmith, a registered nurse on SSM St. Joseph Hospital West's medical/surgical unit where the most *C. diff* cases occur. "As time went on and they saw a difference in how effective the treatment was, they knew how important they were to follow."

The new standards "are really hardwired at both facilities," says Brandyn Romine, who has been an environmental services supervisor at both hospitals (now environmental services supervisor at SJHC).

The Patient Experience

Although the changes have added to the workload, the staff is enthusiastic about the positive impact they are making. "It's worth it," says Drakesmith. "We don't want to hurt our compromised patients."

That attitude is widespread. The housekeeping staff is "really engaged," says Romine. "They feel it's a better process and they are proud of it. It is their way of making a difference for patients."

To benefit more patients, the hospitals are actively promoting their bundle to the entire 20-hospital SSM system. They made a presentation about their *C. diff* effort at a SSM showcase and now are working with other hospitals to share best practices. As part of the effort, they are helping to standardize how data is collected across the health system.

CONTINUAL IMPROVEMENT

In its search for new insights about beating this bacterium, the hospitals treat any *C. diff* infection that causes significant morbidity or mortality as a sentinel event, following Joint Commission guidelines. They are investigated by the hospitals' sentinel event committees and the *C. diff* team, and the root cause analysis is shared with all staff.

"The next step is to take advantage of the new electronic health record system (EHR)," notes Hinrichs. The hospitals plan to build alerts in the EHR, that was installed in late 2008, to help physicians prescribe the recommended medications and follow guidelines for antibiotic duration.

Following a suggestion by the nutrition department and supported by a journal study on the promising benefits to *C. diff* patients, SJHW and SJHC are increasing the use of foods with probiotics. *C. diff* patients older than 50 without other exclusions are given DanActive twice a day and the staff recommends *C. diff* patients continue eating it after they are discharged.

"Our fragile population is still affected. We can't really relax our efforts," notes Hinrichs.

ROOTING OUT VAP AND VARIABILITY WITH INTENSIVISTS

SAINT ELIZABETH REGIONAL MEDICAL CENTER

- ◆ Lincoln, NE
- ◆ 257 beds
- ◆ www.saintelizabethonline.com

Saint Elizabeth Regional Medical Center, is a not-for-profit, tertiary care center affiliated with Catholic Health Initiatives.

S T E E P

Safe

Ventilated patients are far more likely not to develop VAP in the hospital's CCU than compared to most other hospitals.

Timely

Daily rounds ensure all evidence-based protocols in the ventilator bundle occur, as they should.

Effective

VAP rates are far superior to most hospitals.

THE PROBLEM

Ventilator-associated pneumonia (VAP) is a leading cause of death among all hospital-acquired infections. Hospital death rates for ventilated patients run between 24 and 50 percent. The condition increases length of critical care unit (CCU) and hospital stays, adding about \$40,000 to the typical hospital admission. While VAP rates in Saint Elizabeth's Critical Care Unit (CCU) were below national levels, hospital officials wanted to better care for its sickest adult patients, adopt nationally recognized standards for caring for critically ill patients and optimize throughput in the CCU.

THE SOLUTION

A patient-centered organization, Saint Elizabeth instituted an intensivist program and used the Institute for Healthcare Improvement ventilator bundle to reduce instances of VAP in the hospital's CCU.

RESULTS

- » As of December 8, 2008, the CCU has gone 1,000 days without a case of VAP.
- » Of the 1,782 ventilator days in the CCU in fiscal year 2008, Saint Elizabeth's had zero cases of VAP, compared to a CDC benchmark of 2.7 cases of VAP.
- » As of December 8, 2008, the neo-natal ICU had gone 183 days without a case of VAP.
- » The 4.9 percent VAP rate in Saint Elizabeth's burn care unit in FY 2008 was substantially lower than the national average of 12.3 percent as measured by CDC.

BACKGROUND

In 2004, Saint Elizabeth officials wanted to make care safer in its CCU. The CCU or ICU is a hospital's vulnerable spot—the sickest people are among the most vulnerable from getting sicker or dying from preventable events, such as VAP. About 200,000 patients die each year in U.S. hospital ICUs. Reducing a big preventable killer such as VAP was part of Saint Elizabeth's overall quality goals. It was at this time, the Leapfrog Group urged hospitals to staff ICUs with intensivists, doctors with specialized training in critical-care medicine. "That intrigued us," recalls Kim Moore, the organization's chief nursing officer. Intensivists are shown to reduce the risk of ICU patient mortality by 40 percent.

Tapping a local pulmonology group to staff the CCU with intensivists during daytime hours made sense. Saint Elizabeth leadership figured such an approach could deliver big results—lower mortality, cost, length of stay and improved patient outcomes. "We didn't have any protocols," says Barbara George, RN, director of the CCU. Unit nurses did many of the things that good medicine requires to prevent VAP, for example, but "nothing was set in stone," the way evidence-based protocols are. About one-quarter of roughly 250 patients that go through Saint Elizabeth's 16-bed ICU in a year wind up on ventilators. "The ICU patient has the most to gain, and the most to lose," says Bill Johnson, MD, intensivist and physician champion.

TEAM MEMBERS

- » **Nancy Exstrom, RN**
Educator and Program Lead
in the CCU
- » **Barbara George, RN**
Director of CCU
- » **Bill Johnson, MD**
Intensivist and Physician Champion
- » **Robert J. Lanik**
President and CEO
- » **Kim Moore, RN**
Chief Nursing Officer
- » **Jay Snyder**
Director of Respiratory Care

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reducing Process Variation

Saint Elizabeth clinicians found that significant hospital safety improvements can be found in solutions as mundane as a mechanic's checklist. For example, is the head of each ventilated patient's bed raised 30 degrees? Check. Has each of these patients received timely oral care and suction? Check. The checklist continues with the aim of ensuring that each ventilated patient is awakened each day, gets a daily attempt at being weaned off the ventilator, receives prophylaxis to prevent peptic ulcers, another to prevent blood clots and gets other timely evidence-backed care.

"The main goal is to use evidence-based care," says Johnson "For VAP, we developed protocols with every step." This included adopting the Institute for Healthcare Improvement ventilator bundle. Previously, it was common to see three different doctors ordering labs or medicine three different ways. Now things are standardized. "We took away the human-error aspect by developing protocols," Johnson says. The intent is to deliver consistent and quality care by limiting variability.

Even selecting who works on the team is important to reducing variability. "We identified 12 therapists out of 50 to work in the CCU," notes Jay Snyder, director of respiratory care.

"You don't rotate 50 people through." While the approach took getting used to, frontline workers were open to the changes, says Nancy Exstrom, RN, educator and program lead in CCU. "The nurse is all about getting the patients better," she says. Still, this new approach invoked discipline, with nurse and other frontline workers constantly learning and being asked to participate fully in the grand rounds. "Now, [the steps] are just second nature," Exstrom says.

Creation of High-Reliability Culture

The intensivist group implores a teamwork approach to care for CCU patients that includes physicians, nurses, respiratory therapists, physical therapists, dieticians, palliative and spiritual care advisers and others working together. "We try to set egos aside and try to take care of the patient without one person telling another what to do," Johnson says. "The teamwork approach, where everyone has the same goals in mind, helps to limit variability" in how patients are cared for, says Johnson.

All learning and teaching takes place in the interdisciplinary rounds that occur daily. The teamwork has also boosted morale. RN turnover runs less than 7 percent in the CCU, below Saint Elizabeth's overall RN turnover and lower than the 10 to 12 percent turnover in the area. "It's just made a huge difference having the same people together," says Exstrom.

Saint Elizabeth holds everyone in the organization accountable via its "4 Cs Report," reporting on measures around costs, capacity, customer service and clinical quality. Performance around VAP is one of seven strategies the organization focuses on to reduce mortality. "Each month, everyone sees how we're doing," Moore says. Half of all employee merit raises are based on quality and financial performance, reflected on the 4 Cs Report.

CONTINUAL IMPROVEMENT

In the CCU, the team is looking to have unit nurses certified as critical-care nurses. The CCU approach has been expanded to the neo-natal intensive care unit and the burn unit. Meanwhile, following its success with the ventilator bundle, the hospital is "doing that same attack with sepsis," Moore says.

REDUCING SEPSIS MORTALITY

STONY BROOK UNIVERSITY MEDICAL CENTER (SBUMC)

- ◆ Stony Brook, NY
- ◆ 540 beds
- ◆ www.stonybrookmedicalcenter.org

SBUMC is the only academic medical center on Long Island. Comprised of Stony Brook University School of Medicine and Stony Brook University Hospital, it is the only tertiary care hospital and Level 1 trauma center in Suffolk County.

STEEEP

Safe

New processes and training identify potential sepsis patients faster and begin treatment sooner.

Timely

Start antibiotics, fluids and central venous line for delivering vasopressors to maintain adequate blood pressure faster than in the past.

Equitable

All ICU patients are screened for sepsis.

THE PROBLEM

Severe sepsis is one of the most significant challenges in critical care. Although Stony Brook's sepsis mortality rate of 26.7 percent was below the national average, reducing these deaths became a priority to enhance critical care. Additionally, Margaret Parker, MD, SBUMC's acting chair of the department of medicine and director of the pediatric intensive care unit (ICU), was president of the Society of Critical Care Medicine when it joined with other groups to create the international Surviving Sepsis campaign in 2005.

THE SOLUTION

In 2006, Stony Brook committed to meeting the Institute for Healthcare Improvement (IHI) and the Surviving Sepsis campaign's goals of reducing sepsis mortality by 25 percent by 2009. It also set a goal of achieving a 95 percent compliance rate by May 2009 for adhering to a set of best practices for early recognition and treatment of severe sepsis, also recommended by IHI.

RESULTS

- » Mortality for severe sepsis cases fell 33.7 percent, from 26.7 percent in 2006 to 18 percent in late 2007.
- » The average length of stay for severe sepsis patients admitted through the ED has decreased an average of 19 percent, or three days.
- » Apart from charges, hospital cost savings per room range from \$3,500 to \$8,500 per severe sepsis patient.

BACKGROUND

As with most hospitals across the nation, Stony Brook is confronting a steady increase in patients with severe sepsis and septic shock. With most arriving through its ED, SBUMC now treats between 15 and 37 sepsis patients a month, an increase in detection from 12 patients a month in 2006.

In early 2006, SBUMC assembled a 15-person sepsis steering committee representing all affected services including its ICU, ED, nursing, quality and pharmacy. The steering

committee was chaired by the acting division chief for infectious disease. The group started by establishing a baseline for severe sepsis at Stony Brook, including its mortality rate.

Best practices show that implementing two bundles, one for resuscitation within six hours of initial presentation and a second management bundle within 24 hours of initial presentation, significantly improve outcomes. Working from that foundation, the steering committee oversaw efforts to apply the guidelines at Stony Brook.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reducing Process Variation

Although it is actively engaging in both bundles, SBUMC put most of its energies into implementing and increasing compliance with the sepsis resuscitation bundle. It is widely thought that the resuscitation bundle—consisting of six steps completed in a specific order—is crucial for the successful treatment of sepsis.

SBUMC standardized the medical center's approach to dealing with all suspected sepsis patients by implementing the resuscitation bundle:

- » Determining serum lactate levels as a method of early detection;
- » Collecting blood cultures prior to administration of antibiotics;
- » Starting a broad-spectrum antibiotic within one hour of onset for inpatients and three hours for ED patients;
- » Administering a fluid bolus of 20 ml per kilogram, double the rate most doctors would prescribe; and
- » Inserting a central venous access device:
 - To measure the adequacy of fluid resuscitation and to apply vasopressors for hypotension if needed.
 - To measure central venous oxygen saturation (ScvO₂) and central venous pressure (CVP) to obtain goals of ScvO₂>70 percent and CVP >8mm Hg.

Each department then set up its own sepsis team to apply and monitor compliance to the

TEAM MEMBERS

- » **Richard D. Dickinson, MD**
Attending Physician,
Emergency Medicine
- » **Kimberly Fenton, MD**
Pediatric ICU
- » **Debbie Fitzgerald**
Surgical ICU
- » **William H. Greene, MD**
Chief Quality Officer
- » **Christine McMullan**
Assistant Director
for Continuous
Quality Improvement
- » **Barbara Mills**
Rapid Response Team
- » **Paul Murphy**
Data Analyst, Continuous
Quality Improvement
- » **Margaret Parker, MD**
Acting Chair, Department of Medicine
and Director, Pediatric ICU
- » **Paul Richman, MD**
Director, Medical ICU
- » **Marc Shapiro, MD**
Director, Surgical ICU
- » **Jeralyn Sigwart, RN**
Nurse Manager,
Pediatric ICU
- » **Steven L. Strongwater, MD**
CEO
- » **Debbie Tlockowski, RN**
Nurse Educator, Emergency
Department
- » **Bernadette Valente, RN**
Nurse Manager, Medical ICU
- » **Peter Viccellio, MD**
Associate Chair of
Emergency Medicine

guidelines. “It was an iterative process. The actual modifications were done at the service levels, with a lot of back and forth between the team members and quality management,” notes William Greene, MD, chief quality officer.

Each department and service line modified its approach to applying the bundle to ensure success. For example, after experimenting in the ED with performing point-of-care testing on blood lactate, it became evident that tests performed in the lab were more accurate. This became more practical when the lab agreed to prioritize those tests ordered from the ED. In contrast, in the ICUs it was evident that lactate tests could be run timelier if the respiratory therapist could perform them on the units. Therefore, Stony Brook purchased adapters for its blood gas analyzers to make this possible.

The ED developed some tools to streamline the assessment and initial treatments. For example, Stony Brook built a sepsis screen into the triage assessment process and a sepsis fever panel with order sets. These panels are printed on the first page of a patient’s chart to guide a physician’s initial assessment, notes Richard Dickinson, MD.

Although all ED tests are handled stat and are usually back within an hour, lactate tests higher than four require a call from the lab to a nurse or physician. A lactate over four is also used to trigger an immediate ICU consult.

Creation of High-Reliability Culture

The steering committee reached out to the entire clinical staff to make the case

for change, explain the interventions and reinforce use of the best practices. Stony Brook held numerous grand rounds on sepsis focusing on instituting the new order sets developed by the steering committee. The nursing division rolled out formal training, while quality professionals discussed specific sepsis cases at department and service line meetings, providing feedback as close to the events as possible. Medical residents also receive a formal presentation about sepsis as part of their training.

Some changes took longer than others, says Dickinson. “It’s hard getting physicians to order antibiotics without knowing the source of infection. In medical school, we are trained to wait to identify the source and then treat it,” he explains.

The Patient Experience

SBUMC has put in place many steps that have enhanced patient safety, care and outcomes. For one, Stony Brook screens all critical care patients for lactate. It even took the initiative to a local veterans’ home, whose residents are often transferred to Stony Brook for hospitalization. SBUMC staff made a presentation at the home to help its nursing staff recognize the early signs of sepsis and to encourage them to transfer residents sooner to the hospital for treatment.

CONTINUAL IMPROVEMENT

SBUMC continues to refine its protocols. It is piloting a requirement to insert a central line if a patient’s lactate continues to be greater

than 4 despite two to three hours of fluid resuscitation and treatment. To facilitate timely central-line insertion, ED residents are given the option of calling Stony Brook’s trauma service for a back-up to place the central line.

In addition, each blood screen that tests positive for the elevated lactate level is faxed to the quality management department, which conducts a timely chart review to determine whether the bundles have been appropriately applied, explains Christine McMullan, assistant director of continuous quality improvement. During monthly morbidity and mortality conferences, ED residents may be called to present sepsis cases where the bundle was not followed. To keep compliance visible, metrics depicting adherence to the sepsis bundle are updated at least monthly on performance dashboards for each service line and department.

In late January 2009, Stony Brook recently gained a new tool for helping with compliance—computerized provider order entry system. The system automatically provides standardized order sets. In addition, the order sets specify preferred antibiotics for treating suspected organisms based on the likely origin of the infection, such as pneumonia or urinary tract infection.

Stony Brook also encourages compliance by celebrating its successes. “Surviving Sepsis: Increasing Detection and Standardizing Care” presented at the New York Presbyterian Healthcare System’s quality symposium received the 2008 Quality Award for Merit.

A DIVIDE-AND-CONQUER APPROACH TO VAP PREVENTION

WOODHULL MEDICAL AND MENTAL HEALTH CENTER

- ◆ Brooklyn, NY
- ◆ 378 beds
- ◆ home2.nyc.gov/html/hhc/html/facilities/woodhull.shtml

Woodhull Medical and Mental Health Center is a municipal acute care hospital serving north Brooklyn. It is part of the New York City Health and Hospitals Corporation. It has an academic affiliation with the New York University School of Medicine.

STEEEP

Safe

VAP rates have decreased significantly.

Timely

Compliance with the IHI bundle, checked several times daily, means patients are taken off the ventilator as soon as possible.

THE PROBLEM

Pneumonia accounts for approximately 15 percent of all hospital-acquired infections and 27 percent of all infections acquired in the medical intensive care unit (ICU), according to the CDC. Mortality rates of 20 to 33 percent have been reported. The primary risk factor for hospital-acquired bacterial pneumonia is mechanical ventilation, with its requisite endotracheal intubation. Woodhull has focused on preventing ventilator-associated pneumonia (VAP) since 1999. Efforts, although successful, could be expanded using the latest guidelines.

THE SOLUTION

In 2005, Woodhull adopted the Institute for Healthcare Improvement (IHI) ventilator bundle. Because of Woodhull's earlier quality improvement initiatives, its VAP prevention program exceeds the IHI bundle by including such measures as performing oral care, using proper hand hygiene and checking patients for stomach over-distension.

RESULTS

In 2004, the year before implementation, the unit had three VAP cases, a rate of 0.56 per 1,000 ventilator days. In 2005, there were no cases. There was one case in 2006, a rate of 0.17, and one in 2007, a rate of 0.28. As of October 2008, the unit hadn't had a VAP case in 19 months. These rates all fall under the 10th percentile for a medical/surgical critical care unit in the National Nosocomial Infections Surveillance System.

BACKGROUND

In February 2005, the New York City Health and Hospitals Corporation launched the Critical Care Collaborative in its 11 hospitals, including Woodhull Medical and Mental Health Center. The multi-year effort involves setting aggressive, measurable goals to reduce such preventable events as hospital-associated infections. These 11 hospitals established expert teams focused on fighting central line infections, ventilator-associated pneumonia and sepsis. The VAP prevention component requires hospitals to implement the IHI ventilator bundle.

At Woodhull, the ICU staff has focused on using evidence-based measures to improve ventilator patient care since 1999. The unit folded the IHI bundle into its existing measure set.

A goal was not only to prevent VAP, but to get patients off the ventilator as soon as possible. "If we were not able to liberate the patient from mechanical ventilation within the first two to four weeks, we would have to take care of the patient on the regular medical/surgical ward," says Jose Mejia, MD, chief of the Department of Medicine. "The mortality for those patients on prolonged mechanical ventilation was more than 50 percent, and they die after two or three months on the medical/surgical ward due to sepsis secondary to such conditions as VAP or blood stream infections. It was very alarming. Something had to be done."

The critical care team decided each person would be responsible for one measure. For example, the pharmacist takes care of medication, making sure ventilator patients are receiving drugs to prevent blood clots and ulcers, while nurses handle head elevation, oral care and prevention of gastric distension.

TEAM MEMBERS

- » **Albert Ayvazyan**
Senior Clinical Pharmacist
- » **Diony Banez, RN**
ICU Nursing Supervisor
- » **Cheryl Cruz, RN**
Infection Control Officer
- » **Fritz Gardiner**
Case Manager
- » **Rosalie Giardina**
Director of Infection Control
- » **Roxanna Jimenez, MD**
Pulmonary Critical Care Physician,
ICU Attending
- » **Iris Jimenez-Hernandez**
Executive Director
- » **Gilberte Jolin**
Respiratory Therapist
- » **Maria Maritato**
Chair of Infection Control
- » **Jose Mejia, MD**
Chief of the Department of Medicine

These measures are all items of daily nursing goals. “Since then, there was a dramatic change in the outcomes,” Mejia says. “As everybody was championing one measure, it became ingrained in our practice and it was a culture change.”

Respiratory therapist Gilberte Jolin oversees the effort. Each morning she visits all of the ICU ventilator patients. She brings a checklist of measures that she marks and places in the patients’ charts. She tracks and collects them for data analysis. The nursing staff also checks twice a day to make sure the bundle is being followed, says Diony Banez, RN, ICU nursing supervisor.

The initiative has led to another major change: combining the medical and surgical ICUs and switching to the closed model. The combined unit, which is still two locations of 12 beds, is overseen by a critical care trained attending physician. All bundles and protocols are followed in all settings, as well as with both medical and surgical patients. The change has helped to further decrease VAP rates, says Roxanna Jimenez, MD, pulmonary critical care physician and ICU attending.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

Not only did the HHC embark on the system-wide critical care collaborative, it supports individual hospital’s efforts to change, even though finances are tight. “We definitely wouldn’t be able to do it without their support,” Mejia says. “One day we went to the Woodhull administration and said, ‘Listen, the pulmonologist alone cannot control ventilator-associated pneumonia, it needs to be a team. They were very gracious and assigned each one of the champions some time to dedicate to this program.’”

But resources are limited. We didn’t have a dedicated person for the data collection and tabulation, Jimenez says. “That we did ourselves. We gave our time because we want the best for our patients.” Today, there is a process supported by the hospital to collect, aggregate and analyze the information.

Changing the culture took some time and wasn’t always easy. Initially there was argument against those championing the measures. For example, the infectious disease officer took some heat for reminding people to wash their hands. But now staff members watch out for each other and keep one another on track. “We remind each other because it is teamwork,” Jimenez says. “We cannot do it one person alone.”

Eliminating Defects

The critical care team uses the hospital’s electronic medical record system to support its efforts. “I can review all the orders that the doctor put in,” says Albert Ayvazyan, senior clinical pharmacist. “Based upon all the clinical data presented to me in the computer, I can make a clinical assessment as far as optimum drug therapy.”

CONTINUAL IMPROVEMENT

Since the project began, team members have been flexible about adapting the way they do things to get the best results. “Everyone is ready to come up with suggestions,” Mejia says. Maintaining results requires constant education. All new personnel are taught the components of the bundle and the processes used. The team also has to keep up with the medical literature, Mejia notes. This is particularly important for stress ulcer and DVT prophylaxis as drugs and therapies change.

MEDICATION MANAGEMENT

*Medication errors should not occur.
By working together with your teams,
hospitals can build systems to reduce
medication error rates and provide our
communities with the safest, most-efficient
and patient-centered care available.*

— Joan Magruder, president,
Missouri Baptist Medical Center

MEDICATION MANAGEMENT

Most medication errors are not caused by individual carelessness, but rather by faulty processes that lead people to make mistakes or fail to prevent the mistakes from occurring in the first place. Too many times, hospital leaders will apply information technology (IT) solutions to these poorly crafted processes hoping the technology will prevent errors. Unfortunately, this approach results in failed IT and frustrated clinicians. When the focus is on improving the process in medication management, hospital leaders see a decline in medication errors. A further decline can usually be achieved when technology is employed to these improved processes.

Unfortunately the adoption of technology, such as computerized physician order entry and bar-coding systems that help clinicians improve standards in medication management, has been out of reach for certain hospitals. Only about 10 percent of hospitals in the United States use CPOE, and 20 percent use bar coding, leaving the majority to rely largely on human memory and paper-based systems.

Therefore, the emphasis needs to be on redesigning the process. The following case studies will illustrate how application of the Principles of Performance Excellence can reduce the incidence, costs and consequences associated with medication errors. These hospitals focused on process change first and then added appropriate technology to achieve the 6 IOM aims.

For example, one hospital has integrated multiple technologies to reduce medication errors while painstakingly implementing workflow and process redesign to maximize each technology's ability to keep patients from medication-related harm. By doing so the hospital has not had a serious medication error resulting in permanent impairment, disability or death for more than five years.

Another hospital adopted and embraced a non-punitive culture of patient safety in conjunction with consistently implementing known safety practices to improve medication safety for their patients. Their investments in unit dosing, standardization of prescribing and dosing rules, medication reconciliation and other efforts were geared toward mitigating medication errors before they occur and have resulted in a nearly 20-fold decrease in medication-related patient harm.

MEDICATION MANAGEMENT AT A GLANCE

- » Medication errors harm at least 1.5 million people every year. (*Preventing Medication Errors: Quality Chasm Series*, IOM, 2007)
- » Each year, medication errors cause at least 400,000 preventable injuries and deaths in hospitals, this is likely to be underestimated. (*Preventing Medication Errors: Quality Chasm Series*, IOM, 2007)
- » 11 percent of hospitalized children experience a medication problems, and 22 percent of them were preventable. (*Pediatrics*, Vol. 121, No. 4, April 2008, pp. e927-e935)
- » 32 percent of medication errors in children in the operating room involved the wrong dose, compared with 14 percent in adults. (Joint Commission)
- » The extra medical costs of treating drug-related injuries occurring in hospitals alone conservatively amount to \$3.5 billion a year, not taking into account lost wages and productivity or additional health care costs. (*Preventing Medication Errors: Quality Chasm Series*, IOM, 2007)

RECOMMENDATIONS

IOM Recommendations to Health Care Organizations

All health care organizations should immediately make complete patient-information and decision-support tools available to clinicians and patients. Health care systems should capture information on medication safety and use this information to improve the safety of their care delivery systems. Health care organizations should implement the appropriate systems to enable providers to:

- » Have access to comprehensive reference information concerning medications and related health data. electronically. By 2008, all prescribers should have plans in place to implement electronic prescribing.
- » Communicate patient-specific medication-related information in an interoperable format. » Subject prescriptions to evidence-based, current clinical decision support.
- » Assess the safety of medication use through active monitoring and use these monitoring data to inform the implementation of prevention strategies. » Have the appropriate competencies for each step of the medication-use process.
- » Write prescriptions electronically by 2010. Also by 2010, all pharmacies should be able to receive prescriptions » Make effective use of well-designed technologies, which will vary by setting.

ADDITIONAL AHA RESOURCES

American Hospital Association-McKesson Quest for Quality Prize

The American Hospital Association-McKesson Quest for Quality Prize—a yearly prize awarded to hospitals committed to achieving the 6 IOM aims. www.hhnmag.com/hhnmag_app/hospitalconnect/search/article.

<http://www.aha.org/aha/news-center/awards/quest-for-quality/overview.html>

Pathways for Medication Safety initiative

The Health Research and Educational Trust and the Institute for Safe Medication Practices, in collaboration with the AHA, have developed three important tools to assist hospitals in reducing medication errors via the Pathways for Medication Safety initiative.

www.hret.org/hret/programs/medpathways.html

Risk Management Pearls for Medication Error Reduction

The American Society for Healthcare Risk Management, a personal membership group of the AHA, has produced a “string of pearls.” These nine pocket guides summarize risk management tips, including one dedicated to medication error reduction.

www.associationstores.org/OA_HTML/ibeCCtpltmDspRte.jsp?minisite=10024&item=500&ref=ibeCCtpltmDspRte.jsp

IMPROVING MEDICATION RECONCILIATION

CONTRA COSTA REGIONAL MEDICAL CENTER (CCRMC)

- ◆ Martinez, CA
- ◆ 143 beds
- ◆ www.cchealth.org/medical_center

CCRMC is a county hospital in the San Francisco-Oakland Bay Area.

STEEEP

Safe

Reduced opportunities for medication errors.

Effective

Developed by frontline clinicians with first-hand experience.

Patient-centered

Enhanced the coordination of patient care at transition points.

THE PROBLEM

Medication reconciliation—comparing a patient’s medication orders to all medications the patient has been taking—helps to avoid medication errors such as omissions, duplications, dosing errors and drug interactions. The Institute for Safe Medication Practice estimates that 50 percent of medication errors and 20 percent of adverse medical events could be eliminated with proper medication reconciliation.

For CCRMC, CEO Jeff Smith, MD, recognized in late 2004 that the hospital’s current quality improvement methodologies from the 80s and 90s were insufficient to achieve higher levels of improvement. With this level of executive sponsorship, Steven Tremain, MD, chief medical officer, was asked to develop a team to help redesign clinical processes. A top priority of redesign was meeting the requirements for medication reconciliation. director of ancillary services Stephanie Bailey was asked to lead a team in the rapid development of a medical reconciliation process that would quickly be adopted by physicians and nurses and establish a standard for on-going process improvements.

THE SOLUTION

CCRMC set out to establish a reliable process for medication reconciliation at all points of hospital-based care. At the same time, CCRMC sought to develop a repeatable process and an organizational mindset for continually developing and improving clinical activities and systems—quickly and effectively.

RESULTS

For longer than two years, more than 1,000 physicians, nurses and pharmacists across the hospital have adopted the new medication reconciliation process:

- » The proportion of pre-admission medications not reconciled on admission decreased from 25 percent at project initiation to 4 percent after full adoption of the new process.

- » The proportion of medications not reconciled at transfer dropped from 12 percent to 4 percent.
- » The proportion of patients with any hospital medication not reconciled at discharge was reduced from 36 percent to 2 percent.

The process for rapidly developing new systems has also been adopted by clinicians, along with the establishment of a mindset for continual improvement across all disciplines. For example:

- » At the initiative of a respiratory therapist, who clearly demonstrated the potential for leaks around a balloon seal, physicians and nurses were quick to adopt critical bundle elements in the efforts to prevent ventilator-associated pneumonias.
- » Staff nurses and physicians, on their own initiative, redefined the process for ensuring administration of Pneumovax at admission and achieved 94 percent compliance with the new process.

BACKGROUND

As the quality improvement champion for CCRMC, Tremain introduced the IHI’s 100,000 Lives Campaign to the CCRMC’s performance improvement committee, who then sponsored all six recommended interventions:

- » Rapid response teams;
- » Acute myocardial infarction care reliability;
- » Medication reconciliation;
- » Surgical site infection bundles;
- » Ventilator bundles; and
- » Central venous line bundles.

Tremain also applied for and received a grant from Blue Shield of California. He used 80 percent of the grant money to send team members to IHI meetings and classes and used the balance to backfill the floor nurses who would participate in the design of interventions.

Six months into the medication reconciliation project, Tremain submitted a progress report to Blue Shield of California Foundation.

TEAM MEMBERS

- » **Shideh Atai, PharmD**
Pharmacy Director
- » **Stephanie Bailey**
Director of Ancillary Services,
Team Leader
- » **Dana Colomb, RN**
- » **Mary Grace Costa**
Pharm Technician
- » **Oliver Graham, MD**
Hospitalist
- » **Terri Horvath, RN**
Clinical Informaticist
- » **Lisa Massarweh, RN**
Chief Nursing Officer
- » **Sung Park**
Pharmacist
- » **Jeff Smith, MD**
CEO
- » **Steven Tremain, MD**
Chief Medical Officer, Chief Medical
Information Officer, Senior Medical
Director, Contra Costa Health Services

PRINCIPLES OF PERFORMANCE EXCELLENCE

Eliminating Defects

To improve medication reconciliation, Tremain pulled together a team of frontline clinicians, including a nurse champion, a physician champion, the chief of pharmacy and a pharmacist. This team had the experience and insight needed to develop a practical system for reconciling medication errors, as well as serve as credible champions for change.

Bailey led the team as they created a new process for reconciling medication at each transition of care, from admission to transfers across inpatient care units to discharge. Their development process followed these key guidelines:

- » Design tools and systems for preventing errors based on the assumption that errors will occur. Even the most talented and knowledgeable humans make mistakes.
- » Medication reconciliation is a physician function, not a nurse function. Only physicians can order and change medications; they own the outcomes of adverse events arising from unreconciled medications.
- » Use a rapid-cycle improvement process, specifically the Plan-Do-Study-Act (PDSA) process.
- » Hold no more than one meeting per week, lasting no longer than 45 minutes; focus time on testing the new system on the floor, beginning with very small sample sets.

Using the rapid-cycle PDSA process, the team's work proceeded as follows:

1. The team developed a paper-based form for medication reconciliations so they could begin testing it at once, rather than

beginning with an electronic form that would extend the development time.

2. The team tested the form on one patient—the first admission on a Monday morning. Because this was just a test, not an actual implementation, no approval was needed.
3. The form did not work well, and the team revised it.
4. Over the next two weeks, the team tested and revised the form on one unit, revising it eight times in 14 days before full implementation on that unit.
5. At the end of the month, the team then implemented the form on a second unit. Before this implementation was complete, a third unit demanded that it be rolled out for them, ahead of schedule.

Because so much of the work to develop the new system was performed on the floor in testing, the total time investment for each of the team members was just one hour per week.

Reducing Process Variation

The new process has reduced process variation as it has reduced work. For example, the new medication reconciliation form doubles as an order form, simplifying work for the physician. Nurses no longer need to develop a new medication list from scratch for each patient admitted to the unit. Working off the same form also ensures consistency.

The new system also includes several elements that make it easy for staff to use while making it difficult or impossible to use the old system. For instance, the discharge summary form has been left the same, but the section for discharge medications is stamped out, with instructions for using the new, prepopulated medication form

The Patient Experience

CCRMC sought to deepen its organization-wide focus on the patient by helping physicians and the board recognize the significant impact that unreconciled medication orders have on patient safety. For physicians, stories helped to ignite their passion, such as stories of a patient who continued on an old prescription of a beta blocker while starting a new one and returned to the hospital with a critically low heart rate, or a patient with diabetes who added new insulin while continuing the old one and returned with hypoglycemia.

Having received recognition from the Institute for Healthcare Improvement, the Joint Commission, and Harvard Medical International, CCRMC now has a much greater share of attention from the hospital board of elected county supervisors. This has served the hospital well at budget time as it seeks the resources needed to continue to improve patient safety and quality of care.

Creation of a High-Reliability Culture

Today, three years from the launch of the first meeting, the change process has become embedded in the organization. Multidisciplinary teams continue to develop new systems to solve once-recalcitrant problems that challenged the hospital in the delivery of safe, quality patient care. Management has set safety and quality improvement as a goal; frontline staff are making the goal a reality.

CONTINUAL IMPROVEMENT

CCRMC now operates with a culture for identifying problems and taking the initiative to find solutions. Clinicians have embraced the rapid cycle improvement process and continue to develop new systems for improving patient care.

IMPROVING MEDICATION SAFETY

MISSOURI BAPTIST MEDICAL CENTER (MBMC)

- ◆ St. Louis, MO
- ◆ 489 licensed beds
- ◆ www.missouribaptist.org

Missouri Baptist Medical Center is part of BJC HealthCare, St. Louis' largest health care system.

S T E E P

Safe

20-fold decrease in medication-related patient harm in a little more than seven years.

Timely

Investment in systems geared toward mitigating ADEs before they occur.

Effective

Follows and implements best practices for high hazard drugs.

THE PROBLEM

Adverse drug events (ADE) occur in as many as 10 percent of hospitalized patients, with thousands of patients dying each year from drug-related injuries, according to the Institute for Healthcare Improvement (IHI). A single ADE can cost as much as \$7,000. Narcotics, anticoagulants and insulin are among the highest risk medication categories when it comes to ADEs. Missouri Baptist sought to significantly reduce medication mistakes and sustain the results.

THE SOLUTION

Missouri Baptist set out to implement known safety practices—including unit dosing, standardization of prescribing and dosing rules, medication reconciliation and other efforts—to reduce ADEs and improve medication safety for patients on a consistent basis.

RESULTS

- » Nearly a 20-fold decrease in medication-related patient harm from January 2001 to June 2008.
- » Reduced ADEs per 1,000 patient days from 2.2 average in 2001 to 0.12 as of June 2008.
- » 78 percent reduction in use of reversals associated with narcotic PCAs.
- » 88 percent of critical care patients have a blood glucose in 70 to 150 range versus 76 percent in 2006.
- » 100 percent of medications reconciled on admission on average, while 97 percent are reconciled at discharge.

BACKGROUND

The first thing to understand about Missouri Baptist's achievements in reducing medication errors by some 20 fold is that it's not a flavor-of-the-month approach. Results have been achieved through hard work, including changing the organization's culture into a patient safety-oriented atmosphere. The hospital embraced and adopted a non-punitive culture in order to make significant and lasting gains in its safety initiatives. Without that construct, "you would not be able to get very far," notes John Krettek, MD, the hospital's chief medical officer.

Hospitals need to come clean and talk openly about errors. A hospital's top brass needs to walk the walk on patient safety, not just talk about it. A full-time patient safety officer was tapped, safety champions were culled from the medical and frontline staffs to lead most initiatives, and the leaders invested in technology and systems to help staff lower errors. "I like to think of our near misses as gifts," says Nancy Kimmel, the hospital's patient safety officer. "It's okay to speak up and stop the line and to truly talk about it...because the bottom line is to keep patients safe here."

Even before the 1999 IOM report, Missouri Baptist embarked on cultivating a patient safety culture. It was in conjunction with that process that improving medication management was undertaken. Adverse drug events are the most common type of errors occurring in hospitals. About 80 percent of all ADEs are tied to certain drugs: narcotics and sedatives, anticoagulants and insulin. Targeting ADEs became one of the first interventions Missouri Baptist ran through its patient safety culture shift.

TEAM MEMBERS

- » **Dennis Bouselli, PharmD**
Pharmacy
- » **Cathy Flora, RN**
Clinical Information Systems
- » **Joan Magruder**
President
- » **Michael Murphy, MD**
MBMC Medication Safety Team
Chairman
- » **Nancy Kimmel**
Patient Safety Officer
- » **John E. Krettek MD**
Vice President Medical Affairs,
Chief Medical Officer
- » **Jana Royer, RN**
Clinical Education Specialist
- » **Caryn Rosen, RN**
Staff Nurse

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of a High-Reliability Culture

Efforts focused on empowering frontline workers so that they could “stop the line” if something was amiss. An array of strategies were used, including sharing of stories among frontline staff of near misses and regular walk-arounds that Kimmel takes with different executives, including the CFO and human resources, so that the issues on workers’ minds reach executives’ ears.

Committees were formed, including one on high hazard medicines, to look at processes, standardization and patient education. Medical and frontline staff participated, with committees taking ownership of their issues. Change recommendations from IHI and Institute for Safe Medication Practices were used to evaluate current processes associated with targeted medicines. Such processes were mapped to find where risks lurked and how processes could be improved. Using rapid-cycle analysis, the high hazard medicines team tested an alternative process, including standardizing order sets and putting protocols in place. New processes were tested on a small scale and slowly expanded, refined 18 times over six months before being rolled out hospital wide. The process was empowering, observes oncology nurse Caryn Rosen. “The nurses think they can ask more questions to the physicians; are you sure this is the dose you want?”

Processes were reworked but Missouri Baptist officials knew that constant monitoring of high hazard drugs was crucial to continually reduce ADEs. For instance, critical care patients’ blood glucose is tightly controlled or the need for reversal agents for narcotic patient-controlled analgesia is mitigated. Use of reversals associated with narcotics patient-controlled analgesia, for example, has been reduced by 78 percent since 2005. That meant investing in an array of pharmacy and decision-support systems, as well as trigger tools. For example, ADEs related to IV infusion are among one of the greatest medication harm threats. Hospital leaders invested in new “smart pumps,” containing sophisticated drug libraries outfitted with alerts and other safety devices, allowing medicinal delivery at appropriate rates, not too fast or slow. Costing about \$8,000 a piece, the hospital didn’t just buy a handful of smart pumps, it purchased 420 of them. “It’s that kind of commitment by leadership,” Krettek notes to highlight leadership’s seriousness.

The Patient Experience

Too often patients are discharged or transferred from hospitals without an accurate or complete accounting for the medications they’ve been prescribed in the hospital and what they take at home. This can lead to medication errors. “We’re an organization that puts patients first,” says Kimmel. “We want our patients to be part of our health care team.” Along these lines, Missouri Baptist officials realized the lack of awareness among the public of the importance of an updated medication list. Hospital officials

started an education program, going out to nursing homes, rotary club luncheons and other venues to preach the importance of and hand-out updatable medication lists.

Medication reconciliation begins at Missouri Baptist with a patient interview upon admission. Nurses ask each for the drugs they take, frequency and doses. Patient physician and pharmacist names are collected. Copies are sent to hospital physicians and pharmacists, who then call each patient’s personal doctor. New medications prescribed in the hospital are added and the list travels with the patients. At discharge, physicians reconcile the medicines for safety purposes, noting ones that should be continued or discontinued. Nurses provide the updated cards to patients and do face-to-face education. Nearly all medications are reconciled upon patient discharge or transfer.

CONTINUAL IMPROVEMENT

The hospital has invested heavily in technology and systems, including bar coding and smart pumps in the last two years, in order to reduce ADEs further. “This [effort] is all related to mortality,” says Kimmel. The hospital has seen a 54 percent reduction in mortality between 2005 and 2007. Missouri Baptist leaders want clinicians to be aware of patients, identify potential problems early and intervene in a timely fashion. Hospital officials also are looking to apply the lessons taken from medication management and reconciliation to reduce incidence of pressure ulcers and falls.

FUSING TECHNOLOGY WITH REWORKED PROCESSES

MOUNT AUBURN HOSPITAL

- ◆ Cambridge, MA
- ◆ 205 beds
- ◆ www.mountauburn.caregroup.org

Mount Auburn Hospital is a not-for-profit regional teaching hospital closely affiliated with the Harvard Medical School.

STEEEP

Safe

Medication errors have been reduced significantly, with the overwhelming majority causing no harm.

Efficient

Hospital patients typically get a medication within nine minutes of it being ordered.

THE PROBLEM

Medication errors are among the most common medical errors, harming at least 1.5 million people every year, according to the Institute of Medicine (IOM). The extra medical costs of treating drug-related injuries occurring in hospitals alone amount to approximately \$3.5 billion a year, without accounting for lost wages, productivity or additional health care costs. When Jeanette Clough took the helm at Mount Auburn Hospital in 1998, she made medication safety an organizational priority.

THE SOLUTION

The hospital has put in place a number of systems—including a medication administration system, computerized physician order entry, smart pumps and bar coding—to reduce medication errors. With that technology, hospital officials painstakingly implement workflow and process changes before and after a system is put in place to maximize technology’s ability to reduce human error and keep patients from harm.

RESULTS

- » Medication events per million medications administered fell from 0.000059 in July 2006 to 0.000011 in July 2008, with more than 95 percent of events classified as near misses or resulting in no harm; the remainder were events resulting in temporary minor harm, or Level 2 events.
- » Mount Auburn Hospital has not had a Level 4 medication event (an error that results in permanent functional impairment, disability or death) in more than five years or a Level 3 event (an error resulting in major injury or functional impairment) in more than three years.

BACKGROUND

Mount Auburn Hospital President and CEO Jeanette Clough has no tolerance for medication errors. “Patients who come to our hospital are already worried about their health. They should not have to cross their fingers hoping that they will not be harmed by a medication error,” Clough states. Because of the prevalence of medication errors, Clough figured she could make an impact in changing processes and personnel workflows, while using technology to further reduce this threat.

In the last 10 years, Mount Auburn has been trying to snuff out medication-related mishaps, spending about \$3 million on medication administration, ordering and other systems so that physicians have all pertinent patient information in one place when ordering a medication to reduce potential prescribing errors. It also minimizes the number of steps in the process where errors can occur—including transcribing handwritten orders, faxing orders to pharmacy and dispensing mix-ups.

Mount Auburn’s approach to reducing drug-related errors includes: mapping processes; flowcharting steps and looking at errors; prioritizing opportunities to improve; getting pharmacy to review every medication order; and using and prioritizing technologies that can help reduce error risks.

TEAM MEMBERS

» **Susan Abookire, MD**
Chair, Department of
Quality and Patient Safety

» **Jeanette Clough, RN**
President and CEO

» **Eileen Dillon, RN**
Executive Director of
Performance and Quality
Improvement

» **Mary Lark-Dupont, RN**
Manager of Infection
Prevention

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reducing Process Variation

Before medication-related systems were put in place, the hospital implemented several steps to minimize human mistakes. “I believe in uniting technology with processes so the risk of human error is minimized,” Clough says. “Having the technology has made a huge difference but it is the people who design the system that make the technology effective,” observes Eileen Dillon, RN, executive director of performance and quality improvement.

One of the first things Mount Auburn did was boost the presence of its existing multidisciplinary medication safety team by adding physicians. That led to protocols for the use of certain high-risk medications, such as heparin. The protocols guided physicians in issuing orders for certain medications and for nurses, for example, getting patients’ labs drawn, Dillon says. The hospital also began reviewing and classifying medication errors on a 0-to-4 scale, with 0 representing a near miss with no harm to 4, which involves death or severe harm.

Before automating inpatient medication administration, hospital officials “flow charted” the entire medication delivery process. “It was more than 85 steps from order-to-mouth,” Clough says. Approximately half of those steps were cut from the process. One big area of reduction was no longer having anyone take, write or transcribe orders, thanks to CPOE. “Reducing the number of steps reduces potential errors,” Clough says.

Before implementing CPOE, for example, the hospital undertook a “Never Guess Again” initiative, which allowed nurses and others to stop the line if they could not read a physician’s order. “Nurses would ask each other, ‘what do you think the doctor meant,’” Dillon recalls. “It was unacceptable for nurses or secretaries to try to guess what the order said,” Clough says. As part of the effort, nurses and secretaries could beep or call physicians for clarification. “It gave the staff a sense of empowerment,” Clough recalls. “It gave medical staff a sense of medication safety within the organization.”

When implementing a medication delivery system, CPOE, smart pumps or bar coding, hospital officials redesign processes to encourage automation, as well as obviate potential harm and provide sequential reliable delivery. When the Pyxis medication management system was implemented, for example, double checks were instituted at points of the drug administration process, such as when patients received intravenous drips; two nurses have to verify the drug, patient and amounts before medication is given.

Eliminating Defects

The medication safety team reviews near misses and identifies improvement opportunities as each new technology is implemented. A failure mode effects analysis is conducted to predict what could happen and to assess whether or not the technology matches the workflow. When the medication distribution system went live on all floors, for example, the pharmacist would receive the orders electronically before filling the

trays that would be put into the automated distribution system. While the system reduced the chances of nurses providing the wrong patient the wrong medicine, there was no guarantee the pharmacist didn’t put a medicine in the wrong box. “That was a potential failure of the new system,” Clough says. Meanwhile, the team also facilitates conversations at all levels of the organization so that staff have occasions to provide feedback. While implementing a new process or technology, the team debriefs every morning and provides feedback to staff.

CONTINUAL IMPROVEMENT

The processes the team has implemented each time workflow is reorganized or a technology is implemented illustrate Mount Auburn’s commitment to continuous improvement of medication safety. Hospital officials aren’t done yet with automating the medication delivery process. Mount Auburn is converting to new patient wristbands in order to enhance its bar coding and medication administration systems. Clough also says the hospital continues to encourage reporting of errors or near misses. “If we have near misses or errors, it is critical we know where they are,” she says.

THE HARD WORK BEHIND TECHNOLOGY

VANDERBILT UNIVERSITY MEDICAL CENTER

- ◆ Nashville, TN
- ◆ 840 beds
- ◆ www.mc.vanderbilt.edu

Vanderbilt University Medical Center is a principal referral center for physicians and patients throughout the region surrounding Nashville. It includes an acute care hospital, a children's hospital, a cancer center, a trauma and burn center, clinics and a medical school.

STEEEP

Safe

Bar code-enabled medication administration is widely considered safer for the patient.

Efficient

The new technology is used to improve workflows, and the information is analyzed to discover other ways to improve processes.

THE PROBLEM

Vanderbilt's project didn't address a problem so much as it focused on a goal: to become the safest hospital in the United States. It decided to focus on medication errors, which harm at least 1.5 million patients in U.S. hospitals each year and cost \$3.5 billion annually, the IOM estimates.

THE SOLUTION

Vanderbilt was an early adopter of computerized provider order entry, building its own system in 1994, to attack the biggest contributor to medication errors: illegible or incorrectly written prescriptions. After a number of years working with that system, Vanderbilt officials decided it was time to focus on the next biggest contributor to errors—medication administration errors—by implementing a bar coding system. Officials committed to this in 2006, when a majority of drugs finally carried bar codes on their labels.

RESULTS

- » Officials are measuring success by usage, and report that 92 percent of medications administered were scanned into the system by September 2008. (The hospital tracks error rates but does not consider this a reliable indicator of success because it is anticipated that the hospital's new reporting system will actually lead to the reporting of more errors, not fewer.)

BACKGROUND

Vanderbilt University Medical Center is a large teaching hospital. It stepped into information technology (IT) early, building its own computerized provider order entry system in 1994. (In fact, that system was purchased by its IT vendor, McKesson, in 2001.) But Vanderbilt does not jump on the latest-and-greatest information technology bandwagon. It chooses new systems carefully, and fastidiously analyzes systems and processes to squeeze the best use and information out of technology before moving on to the next project.

As part of that process, in 2005, the organization turned its attention toward nurses, adding nursing documentation to an existing electronic medical record system. Because the hospital's vendor specialized in drug delivery systems, it made sense to add the bar coding piece of the puzzle around the same time, explains Russ Waitman, assistant professor of biomedical informatics and director of the clinical IT effort at Vanderbilt.

With support from associate vice chancellor for strategy and transformation Bill Stead, MD, and Harry Jacobson, MD, vice chancellor for health affairs, a bar-coding team was assembled, including Carol Eck, RN, who runs the Cancer Patient Care Center, project manager Kathy Moss, RN, and Karen Hughart, RN, director of system support services. There were also key people from pharmacy: pharmacy informatics manager Fred Hargrove and informatics pharmacists Phillip Stewart and Carly Feldott, PharmD.

The bar coding system was launched in summer 2007 with one nursing unit each week, then adding the children's hospital, oncology, pediatric intensive care unit and dialysis.

TEAM MEMBERS

- » **Carol Eck, RN**
Administrative Director,
Cancer Patient Care Center
- » **Carly C. Feldott, PharmD**
Informatics Pharmacist
- » **Fred Hargrove**
Pharmacy Informatics Manager
- » **Karen Hughart, RN**
Director of System Support Services
- » **Harry Jacobson, MD**
Vice Chancellor for Health Affairs
- » **Kathy Moss, RN**
Project Manager
- » **Bill Stead, MD**
Associate Vice Chancellor for
Strategy and Transformation
- » **Phillips W. Stewart, PharmD**
Informatics Pharmacist
- » **Russ Waitman**
Assistant Professor of
Biomedical Informatics

It wasn't always easy. For instance, nurses had to get accustomed to their medication schedules being more public and subject to analysis of whether they gave a drug according to schedule. Staff nurse Donna Collins, RN, a "superuser" on the bar code project, says it was difficult for many nurses to surrender the right to judge timing of medication doses. "I do think it's worthwhile and do think it reduces medication errors," Collins says. But bar coding takes more time than tracking doses on paper as nurses had done previously, she says, particularly if the nurse deviates from the schedule and has to justify the decision. "We do need to be accountable for why we don't do things in the time" set in the order, she adds.

The systems team sought ways to pull information from the system to improve the quality of care. For instance, the team wanted physicians and nurses to see both dosing and patient status in real time, so they could see how the patient reacted to a medication as the reaction occurred. The team built a means to see quickly when the order was entered and when the medication was given; it also modified the system so it was easy to see the actual dose of a drug was administered.

The bottom line is a system that makes medication administration safer, in part by providing feedback faster than a paper chart audit could, Waitman says. By being as responsive as possible to nurses, he says, scan rates have stayed above 90 percent. "In some units every single medication is being scanned by nursing staff," he says. That compares with typical bar code usage rates below 80 percent, according to Stead.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reducing Process Variation

One of Vanderbilt's five organizational goals is to improve the quality of health care delivery. Unfortunately, a significant amount of money spent on health care goes toward unnecessary or inappropriate care, and it is up to health care providers to change that, Jacobson says. "There are a whole variety of tools that need to be developed and applied for health care improvement," he says.

"Health care is the last great cottage industry," Jacobson continues. "We allow lots of independent artisans to practice in an independent fashion when we understand that doesn't lead to high quality, and it doesn't lend itself particularly well to productivity improvement either."

Three goals feed into the organization's top-level quality improvement goal. First is a focus on mortality rates and the factors that go into them; second is a goal of hitting all publicly reported quality measures at least 90 percent of the time; and third is reducing adverse drug events.

CONTINUAL IMPROVEMENT

Vanderbilt's focus on improving processes rather than relying on IT to solve problems will continue, as both caregivers and informatics specialists analyze how the bar coding system is used and what information they need to understand the care they deliver. Some of that will be done through number crunching from the system, Waitman says, but that doesn't replace regular rounding on the floors to see what happens daily with clinicians and patients.

USING CPOE TO DRIVE PRESCRIBING CHANGE

WINTHROP-UNIVERSITY HOSPITAL

- ◆ Mineola, NY
- ◆ 591 beds
- ◆ www.winthrop.org

Winthrop-University is a not-for-profit teaching hospital and Level 1 regional trauma center, located on Long Island, New York.

STEEEP

Safe

Medication errors and error severity have decreased significantly.

Effective

CPOE allows Winthrop clinicians to provide evidence-based care.

Efficient

Nurses and others are not spending time clarifying or trying to interpret physician orders, rather they are focused on direct patient care.

THE PROBLEM

More than one million serious medication errors occur each year in U.S. hospitals. The IOM attributes at least \$3.5 billion in extra costs a year to such errors, not counting lost wages and productivity. About 10 years ago, Winthrop administrative and clinical leaders began an initiative to reduce its medication-related mishaps.

THE SOLUTION

As part of an ambitious plan to prevent medication errors, Winthrop changed the prescribing culture by initiating systemic changes. A linchpin of the effort was implementing a computerized provider order entry (CPOE) system.

RESULTS

- » In 2002, 28 patients suffered moderate (temporary harm requiring intervention) or severe or permanent patient harm from medication errors. In 2007, only five patients suffered moderate harm from medication errors; none suffered severe harm.
- » High-risk anticoagulation drug errors that reached patients and had the potential to cause harm fell from 50 percent to 14 percent between 2001 and 2008.
- » Of errors reaching patients in 2008, none caused patients any degree of harm, versus 22 percent of such errors in 2001 that caused moderate harm, 14 percent resulted in major harm and 14 percent reached the patient but caused no harm.

BACKGROUND

Few U.S. hospitals have fully implemented CPOE; the process for doing so is not standardized. Before purchasing its CPOE system, Winthrop officials spent years creating a vision for it, saving for it, and preparing for—not reacting to—the changes that accompany implementation of the technology. This includes changing order sets, processes and workflow. Additionally, information technology (IT) director Nick Casabona and Peter Cunningham, associate

director of communications and planning made sure a redundant network information technology system was put in place before CPOE was rolled out.

Winthrop's journey to a successful CPOE implementation came on the heels of the 1999 IOM report. The report prompted the hospital to form a multidisciplinary medication safety team that focused on improving the entire medication-use process. Meanwhile, Winthrop's former chief financial officer, John F. Collins, now its chief operating officer, inherited the hospital's IT department. With the newfound responsibility, Collins toured the hospital looking at the organization's IT capacity. "I was concerned at the manual processes in place," he said. "Physician orders were extremely difficult to read because of illegible handwriting and the reliance on faxed orders is not an acceptable solution to the problem." At the same time, a nursing shortage gripped Long Island, with the hospital paying a premium in agency fees. Too much of nursing time, however, was unnecessarily spent tracking down doctors to clarify written orders.

Hospital officials started by projecting ahead to 2010, envisioned a medication-safe facility, and developed a plan from that vision. That plan will be capped off with an electronic medical record that will automate the entire medication use process—prescribing, transcribing, dispensing, administering and measuring outcomes. CPOE was the linchpin. "To me, quality and CPOE are integrally connected," Collins said.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of a High-Reliability Culture

"Winthrop had a strong foundation from which to work, as it had instituted a non-punitive culture prior to release of the 1999 IOM report," says Daniel P. Walsh, president and CEO. The hospital enhanced its no-blame atmosphere after the report. For example, an "escalation" policy, promulgated by Walsh,

TEAM MEMBERS

- » **Nick Casabona**
Director, Information Technology
- » **John F. Collins**
Executive Vice President
and Chief Operating Officer
- » **Peter Cunningham**
Associate Director of
Communication and Planning
- » **Steven Fishbane, MD**
Associate Chair of the Department of
Medicine Quality Initiative Program
- » **Maureen Gaffney, RN**
Chief Medical Information Officer
- » **Brian Malone**
Director, Pharmacy,
Co-Chair of the Medication
Safety Team
- » **Kerry O'Brien, RN**
Clinical Information Systems
Coordinator
- » **Suzanne Parker**
Director, Quality Management
- » **Valerie Terzano, RN**
Vice President, Nursing
- » **Daniel P. Walsh**
President and CEO

encourages workers to raise issues of patient concern so they are addressed, not dismissed or overlooked.

Around 2000, the hospital took extra pains to enhance a non-punitive environment, resulting in more open reporting of errors, which increased the number of errors. "It was important for the board of directors, senior executives and frontline staff to understand that an increase in medication error reporting was not necessarily a bad thing," says Valerie Terzano, RN, vice president of nursing. "Identifying actual medication errors, as well as near misses, helped us to identify process problems—how the errors were occurring—and gave us an opportunity to develop systems to prevent errors in the future. More medication error reporting, coupled with a lower severity rate, is indicative of a culture that encourages and supports staff reporting and embraces patient safety as a top priority."

The environment facilitated the team approach to fixing problems. "Inherent to this improvement process is the ability of each department involved not to look at its own processes and variances in silos, but instead to investigate the root cause across departments, disciplines and processes," says Suzanne Parker, Winthrop's director of quality management. "Comprehensive medication management is a multidisciplinary process."

Reducing Process Variation

Early on, it became evident that "the clinical staff wanted to move to CPOE," Collins says. "We let the clinicians drive the process," Collins adds. "The hospital did not earmark the

\$25 million for CPOE and other technologies all at once. This was a phased expenditure of dollars consistent with an orderly implementation process as technology needs were identified," he says. "There are many obstacles that stand in the way of automating the process, but we knew that CPOE had to be the prime directive."

While Collins was strategizing to secure CPOE, the hospital's quality oversight committee saw a trend in bleeding complications in patients receiving therapeutic anticoagulation. "Case review revealed human errors, system failures, educational deficits and variability in care," Parker says. This finding in 2000 and resulting efforts to reduce such problems was a cornerstone in how Winthrop eventually implemented CPOE.

The crux of the issue is common, says Steven Fishbane, MD, associate chair of the department of medicine's quality improvement program: high-risk medicines are used cautiously after initial approval, but over time they hit a tipping point when they are more commonly used. Unfortunately, classic education about the problem wasn't working. So the team tried something new. A checklist was added to anticoagulation prescribing in order to force prescribers to balance the risks and benefits of treatments. "Doctors weren't consistently looking at the risks," Fishbane notes. "By taking these steps, we kept the awareness of risks high in the mind of clinicians."

Physicians grumbled initially, not over automation, but the checklists. "That very much goes to the heart of physician fears of cookbook medicine," Fishbane notes. Encour-

agement from physician leadership, nursing, pharmacy and the quality department help make the process standard practice. "We approached other challenges with the same method," says Maureen Gaffney, chief medical information officer.

The Patient Experience

Improving patient safety was the ultimate goal of the CPOE program. CPOE became a critical step in efforts to improve the safety of the prescribing process, the first component of the medication use process. The result: CPOE has created transparency in ordering, as intentions of prescribers are clearly specified so nurses and pharmacists no longer have to "translate" orders.

"Ordering pathways with embedded decision support such as prompts, lab data, mandatory selections and order sets based upon best practice guidelines, national initiatives and hospital priorities maximize the benefit of a systematic approach to medication management and have facilitated a change in the prescribing culture," Gaffney notes.

CONTINUAL IMPROVEMENT

Winthrop expects to complete the rollout of CPOE in the ED, medical intensive care unit and the rest of adult general medicine by early 2009. Meanwhile, after implementation of CPOE in the medical/surgical unit, the hospital spent \$3.5 million on smart pumps for medication administration. Collins says that after spending money on CPOE ordering piece, he wanted to assure the automation effort could not be undone because other components of the medication system were not yet automated.

PATIENT THROUGHPUT

We can do this together. Get everyone's input, trust and respect. Educate them about the processes, give them the evidence and then let them take control over the situation.

— Ann Errichetti, MD, CEO,
Advocate South Suburban Hospital

PATIENT THROUGHPUT

Patient care is the business of the hospital, and when care processes are inefficient, business is inefficient. A hospital's ability to optimize capacity is largely determined by how efficiently their processes and operations are managed.

The average time that hospital emergency room patients wait to see a doctor has grown from about 38 minutes to almost an hour over the past decade, according to the CDC. This is due to a number of factors. Emergency department (ED) visits are up, from 90 million in 1996 to 119 million in 2006. Many hospital EDs have closed. The result is that many EDs are either at or above capacity.

Hospital leaders struggling to do more with less are looking to optimize patient throughput. Unfortunately, many hospitals attempt to improve patient throughput by focusing on the ED. This misses the larger picture—patient flow is a property of the entire system and can only be optimized at the system level.

Successful hospital leaders also realize that employee engagement is essential. These leaders rely on the expertise of frontline staff to create and implement new processes. They set up the expectation and provide the resources.

In the next few pages you will read examples of hospitals optimizing their EDs and other departments. One characteristic they all have in common—all included other departments of the hospital to optimize the ED. You will learn how improving patient throughput achieves care that meets the 6 IOM aims and how application of the Principles of Performance Excellence can increase operational efficiency, throughput and capacity while reducing costs and consequences to patients, staff and organization.

For example, one hospital applied Lean/Six Sigma methodologies to reduce patient wait times on their inpatient rehabilitation unit. By streamlining their process steps from 31 to 17, patients are now moved to therapy as therapists are available. It also brought down the walls between departments and shifted the focus from what a department 'does' to what does the patient 'need and want'.

An innovative ED physician practice manager utilized Lean to transform an ED that is now seeing approximately 300 patients a day, without waiting. During the same time, the ED has experienced a 50 percent increase in volume and it was able to decrease the length of stay by 25 percent.

PATIENT THROUGHPUT AT A GLANCE

- » 91 percent of EDs responding to a national survey reported overcrowding as a problem; almost 40 percent reported that overcrowding occurred daily. Overcrowding induces stress in providers and patients, and can lead to errors and impaired overall quality of care. (IOM 2007)
- » In a nationwide survey of nearly 90 EDs across the country, conducted on a typical Monday evening, 73 percent of hospitals reported boarding two or more patients. (IOM 2007)
- » Nearly half of EDs are “at” or “over” capacity. (AHA 2007)
- » Nearly one in eight urban hospital ED was on diversion more than 20 percent of the time. (AHA 2007)
- » 42 percent of hospitals reported an increase in boarding behavioral health patients in ED. (AHA 2007)

RECOMMENDATIONS

IOM Recommendations to Health Care Organizations

- » Hospital chief executive officers should adopt enterprise-wide operations management and related strategies to improve the quality and efficiency of emergency care.
- » By applying variability methodology, queuing theory and the inputs—transformation—outputs model, hospitals can identify and eliminate many of the patient flow impediments caused by operational inefficiencies.
- » By smoothing the inherent peaks and valleys of patient flow, and eliminating the artificial variabilities that unnecessarily impair patient flow, hospitals can improve patient safety and quality while simultaneously reducing hospital waste and cost.
- » Tools developed from engineering and operations research have been successfully applied to a variety of businesses, from banking and airlines to manufacturing companies. These same tools have been shown to improve the flow of patients through hospitals, increasing the number of patients that can be treated while minimizing delays in their treatment and improving the quality of their care.

ADDITIONAL AHA RESOURCES

Asset Stewardship and the Board's Tools for Understanding and Improving Operational Efficiency

The AHA's Center for Healthcare Governance asset stewardship white paper outlines the issue for hospital trustees.

www.americangovernance.com/american-governance/resources/CLT/CLT3.pdf

Improving Patient Throughput Hospitals & Health Network's produced foldout detailing common patient throughput problems and solutions.

www.hhnmag.com/hhnmag_app/jsp/articledisplay.jsp?dcrpath=HHNMAG/PubsNewsArticle/data/2006November/0611HHN_FEA_Gatefold&domain=HHNMAG

Patient Flow Platform

AHA Solutions has education and other resources to improve hospital performance.

www.aha-solutions.org/aha-solutions_app/ControllerServlet?action=displayPlatform&platformID=330678353

ED IMPROVEMENTS LED BY TEAM

ADVOCATE SOUTH SUBURBAN HOSPITAL

- ◆ Hazel Crest, IL
- ◆ 289 beds
- ◆ www.advocatehealth.com/ssub/

Advocate South Suburban Hospital is an acute care facility that serves Chicago's south suburbs. It is part of Advocate Health Care, an integrated eight-hospital health care system.

STEEEP

Timely

Left without treatment, average LOS, and housekeeping room turnover rates improved by 50 percent or greater.

Efficient

Standardized mini-registration and mobile-bedside registration; implemented a quick-triage process.

Patient-centered

All processes were redesigned from the patient's point of view and all associates are trained to view procedures from the patient's perspective.

THE PROBLEM

When the performance improvement team began to take stock of the situation in Advocate South Suburban's ED, they found some dismal metrics. Patients waited more than six hours for treatment, with nearly six percent leaving without treatment. Additionally, patient satisfaction measures were low and staff and physicians were frustrated. The December 2007 initial measurements were:

- » 393 minutes—average length of stay (LOS), overall
- » 203 minutes—LOS, fast track
- » 5.76 percent—left without treatment, overall (industry best practice <2 percent)
- » 3.3 percent—left without treatment, fast track length
- » 16 percent—patient satisfaction rate
- » 256 minutes—housekeeping room turnover, regular
- » 52 minutes—housekeeping room turnover, STAT clean

THE SOLUTION

The eight-hospital Advocate Health Care system is undergoing performance improvement enhancements. "Advocate Performance Enhancement" is heavily influenced by Lean methodology, with doses of Six Sigma and other tools. It is being rolled out slowly throughout the entire system. In December 2007, South Suburban began to look at its ED and brainstormed ways to improve service. The program is designed to be an overall system transformation rather than a series of process improvement programs.

RESULTS

Not only have metrics improved dramatically, South Suburban CEO Ann Errichetti, MD, used the performance improvement as a vehicle for cultural transformation. She sought input from staff members to get them involved and vested in the process improvement. "You're asking the people doing the job to make the changes," she says. As of October 2008, improvements included:

- » 198 minutes—average LOS, overall
- » 76 minutes—LOS, fast track
- » 1.72 percent—left without treatment, overall
- » 0.92 percent—left without treatment, fast track length
- » 95 percent—patient satisfaction rate
- » 40 minutes—housekeeping room turnover, regular
- » 26 minutes—housekeeping room turnover, STAT clean

BACKGROUND

Leadership at every level was key to the success South Suburban had in turning around its ED. Besides the context leader/CEO Errichetti providing resources and the urgency to make changes, Airica Steed, RN was brought in as performance enhancement director. Her charge was to gather input from the frontline staff on how to improve patient care and, in turn, empower them to change the processes. This type of leadership was essential to transform the ED staff into a patient-centered culture.

Advocate Performance Enhancement uses Lean methodology to make quick improvements. Steed instructed the team to stand in the patient's shoes and go through the ED the way a patient would. First, the team looked at triage and registration. By employ-

TEAM MEMBERS

- » **Sharon Balark**
Manager of Environmental Services
- » **Brad Daniels, RN**
Clinical Operations Assistant,
Emergency Department
- » **Nichia McDowald**
Administrative Fellow
- » **Eric Medina**
Tech II Emergency Services
- » **George Miller, DO**
Medical Director, Emergency Services
- » **Patricia Pamon**
Manager of Clinical Operations
- » **James Richardson, MD**
Associate Director,
Emergency Services
- » **Jane Robinson**
Manager of Registration
and Central Scheduling
- » **Brenda Rocha**
Manager, Emergency Department
- » **Sue Serio, RN**
Clinical Operations Assistant,
Emergency Department
- » **Airica Steed, RN**
Director of Performance
Enhancement
- » **Karl Storch**
Information Services Analyst,
Emergency Services
- » **Sadie Westring, RN**
Emergency Department
- » **Rita Westrom, RN**
Emergency Department
- » **Carmen Zopetti, RN**
Charge Nurse, Emergency
Department

ing a variety of tools—rapid improvement events, workouts, special projects and change acceleration process—the team standardized a “mini-registration” and “mobile-bedside registration.” These processes took registration to the patient instead of the patient having to get up several times. It also streamlined the processes.

Additionally, a quick triage process of less than three minutes was implemented. This required a paradigm shift from triage being performed in a specific location to a process that is flexible according to the patient’s needs. Finally, the team decided to implement diagnostic tests in the ED. Cardiac profiles and imaging are now done either at the point of care or in the newly established imaging center within the ED.

PRINCIPLES OF PERFORMANCE EXCELLENCE

The Patient Experience

Like other EDs, so many of the previous processes centered around the physician’s workflow, not how they are perceived by the patient. By focusing on patient perception, South Suburban created care processes that were patient centered. Patients no longer have to wait to be registered or wait to be triaged. The ED team instituted a “pull system.” Pull systems use signals to advance the patient to the next step in the care process, instead of having clinicians dictate the next step. It structures the system so that everyone knows what resources are available and can advance the patient through the hospital.

CONTINUAL IMPROVEMENT

Advocate’s performance enhancement incorporates process changes into everyday work. Employees and physicians are encouraged to look for better ways to accomplish tasks. To guarantee that improvements will be sustained, daily scorecards are reviewed; bi-weekly senior leadership meetings and weekly core team member meetings are held. All results are posted on signs, bulletin boards and in break rooms. This fuels a sense of competition among staff and a sense of pride throughout the whole ED. Additionally, the ED staff isn’t done with improving processes. Collectively, they agree that communication has been improved and trust and respect have been re-established. They see a journey of continually tweaking and tightening processes to come up with a good system. “We have direction from the top, buy-in from the bottom,” explains James Richardson, MD, associate director of emergency services. “We are heading in the right direction.”

DOOR TO DOC

BANNER HEALTH

- ◆ Phoenix, AZ
- ◆ 3,060 beds
- ◆ www.bannerhealth.com

Banner Health operates in seven states and is a leading provider in the Phoenix region. The system features 22 hospitals and health care facilities.

STEEEP

Safe

Decrease in left without treatment rate.

Timely

ED wait time and LOS were reduced.

Efficient

ED beds were used only by patients who needed them.

THE PROBLEM

Emergency departments (ED) were at capacity or beyond it, extending wait times. This resulted in a dissatisfied patient population and a patient safety issue, as many patients left before receiving treatment. One literature review study showed that 46 percent of ED patients who left without seeing a physician were judged to need immediate medical attention, and 11 percent who left were hospitalized within the next week. At follow-up, patients who left without being seen were twice as likely as those who were seen to report that their pain or the seriousness of their problem was worse.

THE SOLUTION

With the help of industrial engineers at Arizona State University, Banner Health redesigned its ED flow by pioneering a process it called “Door-to-Doc,” or D2D. The goal of D2D was to have patients see a physician sooner and free up bed space by keeping “less sick” patients ambulatory.

RESULTS

- » Reduced average door-to-doc time (from when a patient entered a facility to first seeing a physician) from 117 to 49 minutes, a 58 percent improvement
- » Reduced average left without treatment rate from 7.1 percent to 1.7 percent, a 76 percent improvement
- » Reduced average length of stay (LOS) in the ED from 310 to 268 minutes, a 14 percent improvement

BACKGROUND

Phoenix is one of the nation’s fastest growing cities, and Banner Health is one of Phoenix’s leading providers. Unfortunately, the system’s physical growth has not kept up with the city’s population. Visits to the ED hit 110,000 per year by the mid-1990s, and Banner’s facilities could not handle the demand. “We were trying all sorts of things to make patients feel good about the experience, like putting coffee in the waiting rooms, but that was totally inadequate,” says Chris Price, MD, medical director at Banner Gateway Medical Center. “Wait times were easily a couple of hours, the triage nurses were going crazy, and the waiting rooms were like battlefields—and people within the ED itself had no idea any of this was going on. Here we were thinking everything was fine, and outside it was chaos.”

The chaos spread all over. Press Ganey scores declined and the left without treatment rate spiked. This was regarded as a patient safety issue, as typically a high number of left without treatment patients would return later with their conditions having worsened.

Late in 2002, the system undertook an experiment with industrial engineers from Arizona State University led by Jeffrey K. Cochran. “These guys had never worked in health care, so they didn’t have the preconceived notions about how things should be done,” recalls Twila Burdick, the system’s vice president for organizational performance. “We started telling them about how patients would bottleneck because there just weren’t enough beds available, and they would ask, ‘Why?’”

This essential question led to the analysis of the kinds of patients coming into the ED. Ultimately, the D2D design team classified patients into two types: “less sick,” who needed only brief treatment (such as that for a broken arm) and “more sick,” who required

TEAM MEMBERS

- » **Rhonda Anderson**
Pediatric Administrator, Banner Children's Hospital; Pediatric Service Line Administrator, Banner Health
- » **Richard A. Andrews**
Management Engineering Director, Banner Desert Medical Center
- » **James Broyles**
PhD student, Arizona State University
- » **Mary Ellen Bucco**
Management Engineering Director, Banner Gateway Medical Center
- » **Twila Burdick**
Vice President for Organizational Performance, Banner Health
- » **Jeffery K. Cochran**
Professor Emeritus of Industrial Engineering, Ira A. Fulton School of Engineering, Arizona State University at time of project
- » **David Datz**
Management Engineering Director, Banner Health Western Region
- » **Peter S. Fine**
President and CEO, Banner Health
- » **John Hensing, MD**
Senior Vice President and Chief Medical Officer, Banner Health
- » **Jill Howard**
Performance Improvement Director, Banner Health Arizona Region
- » **Steven C. Kisiel**
Management Engineering Director, Banner Health Arizona Region
- » **Chris Modena, RN**
Door-to-Doc Project Coordinator, Banner Health
- » **Kevin Roche**
PhD student, Arizona State University
- » **Kathie Orlay**
Organizational Development and Learning Director, Banner Health
- » **Chris Price, MD**
Medical Director, Banner Gateway Medical Center

more treatment and were more likely to be admitted to the hospital. The bottleneck, it was observed, was bed space; less sick patients were taking up beds that they didn't really need.

The design team devised a "split flow" model, getting the more sick patients into beds while ensuring the less sick patients could be treated and released as quickly as possible. This meant keeping the less sick patients dressed and ambulatory whenever possible. "This made it possible to see a lot more patients with the same space and the same bed count," Burdick says.

The system implemented the change in 2005 at the ED at Banner Mesa Medical Center, where overcrowding in the ED was particularly acute. It wasn't an easy change to make because it countered the traditional notion of how an ED should be run. "There was a lot of resistance at first, both from doctors and nurses," Price recalls. "It took strong nursing leadership especially to achieve this." Once implemented, though, the split flow model proved immediately popular both with patients and providers. The left without treatment rate went down almost immediately and patient satisfaction scores rose.

PRINCIPLES OF PERFORMANCE EXCELLENCE

The Patient Experience

If patients have to wait, it's not a matter of poor customer service. It's a patient safety issue. Increased wait times lead to a higher left without treatment rate. In human terms, this translates to patients who may really need care leaving before they receive it—only to show up in the ED with their condition exacerbated later.

Removing Waste

Do all ED patients need a bed? No—but under the traditional conception of the ED, all patients are given one. This is a tremendous waste of health care resources, because a bed takes up a tremendous amount of room and needs to be cleaned following use, no matter the nature of that use; and, an occupied bed likely means that a patient who needs it is waiting for it. By keeping less sick patients ambulatory and dressed, Banner's D2D system ensures that beds are occupied only by those patients who really need them.

CONTINUAL IMPROVEMENT

Banner Mesa has been closed since D2D was implemented, being replaced by a new facility, Banner Gateway Medical Center. The ED at Banner Gateway was designed specifically to accommodate the split-flow model. The innovation has been brought to Banner facilities system wide and to other service line units, such as obstetrics.

Additionally, with assistance from a grant from the federal Agency for Healthcare Research and Quality, Banner worked with Arizona State to develop a toolkit on implementing D2D, which the system shares with other health care providers. (The toolkit is available on Banner Health's Web site at www.bannerhealthinnovations.org/DoortoDoc/About+D2D.htm.) In doing so, the system talks with other providers to assist them. "We learn from each other," says Rhonda Anderson, pediatric service line administrator for Banner Health.

Finally, Banner convenes a system-wide D2D group that meets monthly to review progress on throughput and make sure there is no backsliding. "We didn't land on this just to say, 'OK, we've made the change, that's it,'" Anderson says. "We're constantly tweaking it."

AUTOMATED PATIENT TRACKING IN THE ED

CHRISTIANA HOSPITAL

- ◆ Newark, DE
- ◆ 860 beds
- ◆ www.christianacare.org

Christiana Hospital is a regional, independent, academic medical center within the Christiana Care Health System. Located in a suburb of Wilmington, the Delaware ED is a Level I trauma center with more than 100,000 visits a year.

STEEEP

Safe

Location of patient can be determined at any point in real time.

Efficient

Lean techniques removed wasteful steps.

Patient-centered

All changes added value for the patient.

THE PROBLEM

At any one time, more than 100 patients are in this busy and complex ED. Historically, staff actively tracked patients with manual entry of a patient's location into a computer system. Keeping track of such a high number of patients in real time was clearly a challenge given the ongoing movement of patients in and out of bays and off for tests. Some of those patients could not be located without multiple phone calls and walking tours. Clerical staff often spent a great deal of time locating charts to place lab and diagnostic reports. This information was critical for infectious disease management and staff prophylaxis. Christiana Hospital's aim was to develop a tracking program that would be 100 percent effective in real time and would be accepted by all levels of personnel.

THE SOLUTION

Christiana Care chose to implement an automatic tracking solution—a “passive” system that does not require staff to input information manually. The ED selected an automatic patient and asset tracking software system in conjunction with an infrared sensory network and locating hardware. Infrared badges for patients, staff, and assets and in-room sensors “passively” collect real-time locations. Significantly, the system interfaces with the hospital's information systems. For example, it interfaces with the hospital's bed management system to streamline patient admissions from the ED, which account for approximately 60 percent of all hospital admissions.

RESULTS

- » 100 percent of patients can be immediately located at any given time
- » Average length of stay (LOS) decreased by 45 minutes for patients treated and released
- » Average LOS decreased by 35 minutes for admitted patients
- » Average LOS for low acuity patients reduced from more than 2 hours to less than 60 minutes
- » Low acuity patients leaving without treatment decreased from 4.5 percent to 2.5 percent

- » Patient satisfaction levels among low acuity patients rose from the 73rd percentile to the 99th percentile on the Press Ganey scale

BACKGROUND

With its new automatic patient tracking system, Christiana Care did more than install a new piece of technology. Work began with a multidisciplinary team involved in redesigning all the processes using Lean methodology around patient tracking—physicians, nurses, technicians, clerks, IT staff, quality assurance staff and executive sponsors. Wiping the slate clean eliminated dysfunctional processes, and the team was free to envision and define an ideal state to be integrated with the technology. Dubbed “business process planning,” this approach is now the standard for any major IT implementation in the organization.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Removing Waste

Staff no longer waste time chasing down patients in the large ED. Each new patient receives an infrared badge that is read by infrared sensors in the ceilings throughout the ED and radiology areas. Staff also wear badges, and whenever staff and patients come together under a sensor, the interaction is captured by the system. A map view of the department shows the status of every bed, helping triage nurses immediately place patients (see Figure 1). Status views of the areas throughout the ED provide detailed information on the patient, including the status of lab and radiology results. This information makes the day's work more efficient and helps staff manage fluctuations in patient volume. It also provides data for enhanced resource allocation and further optimization of patient flow processes.

Reducing Process Variation

A complete redesign of the patient tracking process and integration of the new technology has drastically reduced process variation and the data the system captures provide the means to spot and resolve any variances.

Over the course of five months, the team worked to document the current state of manual patient tracking and chart out the

TEAM MEMBERS

- » **Vernon Alders**
Director of Operational Excellence
- » **Michelle Campbell**
Corporate Director of Patient Safety and Accreditation
- » **Nigel Hartell**
Senior Systems Analyst
- » **Linda Laskowski-Jones, RN**
Vice President of Emergency Trauma and Aeromedical Services
- » **Robert J. Laskowski, MD**
President and CEO
- » **Charles Reese, MD**
Chairman of Emergency Medicine
- » **Karen Toulson, RN**
Emergency Department Nurse Manager
- » **Kim Turner**
Emergency Department Administrative Coordinator

future state of automatic patient tracking. Nurse participation was essential to identify all workarounds and informal, undocumented processes to be integrated, revised, or eliminated. High-level project decision makers helped to drive system change when necessary. Staff from admitting, the bed board and patient escort departments participated to ensure improved communication and inter-departmental work flow processes.

Involving nurses and other staff in the design, thorough staff training and an easy-to-use tracking system resulted in widespread staff acceptance. All hospital staff involved in the treatment and movement of patients in the ED have fully embraced the operational changes without backsliding into previous workflows that lead to project variability and inefficiencies.

The Patient Experience

Throughout the process redesign, the team sought to ensure that every step in the new process added value for the patient. The data that is now available through the system support ongoing process and staffing changes that enhance patient care and the patient experience. In turn, measurements of patient satisfaction, wait times and patient perception of how well informed they are kept have all improved.

This new ability to truly focus on the patient—knowing where a patient is at any given time, the status of test results and the overall status of the emergency department—has improved staff satisfaction and contributed to strong staff retention. And, with this information instantly at hand, nurses have more time to spend with patients.

CONTINUAL IMPROVEMENT

Christiana Care's investment in a robust technology solution has generated a rich set of data for continually improving the performance of the ED. Data is now supporting

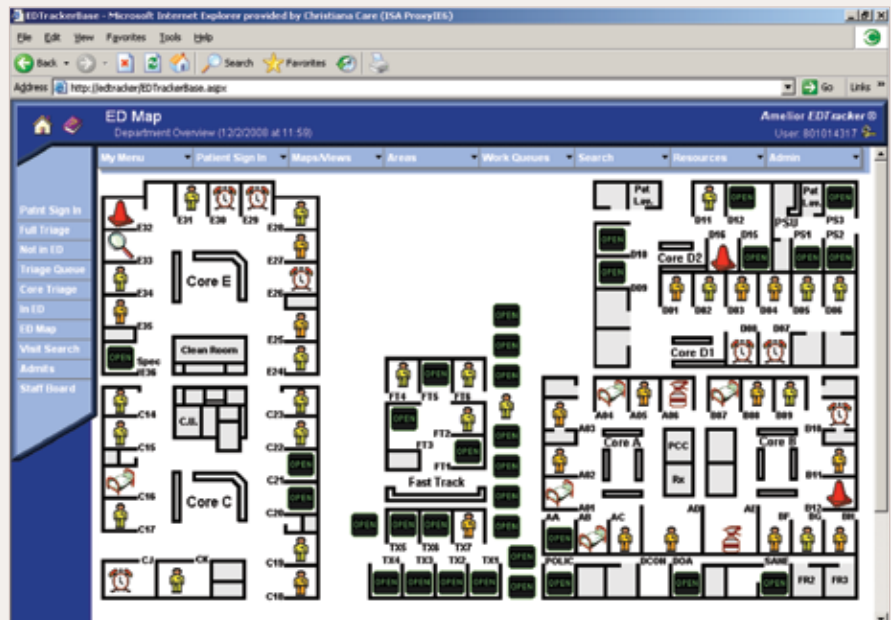


Figure 1. Map view of the ED

Note: Patient clothing color indicates acuity level. The bed indicates a patient to be admitted to the hospital. The magnifying glass indicates a patient currently in the ED who is posted for observation status in a hospital bed. The cone indicates a room assigned but not yet occupied by a patient. The alarm clock indicates a patient whose length of stay exceeds 4 hours. The spray bottle indicates a room to be cleaned.

process improvements to reduce the length of stay for high acuity patients.

The following key performance indicators on the department's home page are refreshed every 15 minutes and alert staff to issues that may affect patient throughput; over time, they indicate opportunities for improvement and support decision making for changes in staffing, capacity, and other resources:

- » Hospital census;
- » ED census;
- » Patients at triage;
- » Number of admitted patients in the department;
- » ED arrivals in the past hour; and
- » Patients leaving the ED in the past hour

As an example of how the data has supported staffing changes, Christiana Care turned to the system's database to help identify the cause of patient back-ups during the night. With no data, the answer might have been to add nursing staff to the night shift. With an analysis of the data from the system, it became apparent that the problem took seed during the day. The issue was resolved by reallocating staff to better cover the day and evening shifts. For Christiana Care, a rich set of data, the ability to analyze that data for meaningful information, and a culture that eagerly drives change have come together to pursue ongoing transformations for the ED.

ONGOING TRANSFORMATION OF THE ED

MARY WASHINGTON HOSPITAL

- ◆ Fredericksburg, VA
- ◆ 417 beds, 50 ED beds
- ◆ www.medicorp.org/mwh/

Mary Washington Hospital is the main hospital within Medi-Corp, a not-for-profit regional system of 28 healthcare facilities and wellness services in the Fredericksburg, Va., area. The ED at Mary Washington Hospital has 22 physicians, 50 beds and more than 100,000 patient visits annually.

STEEEP

Safe

Every patient, regardless of severity of condition, is seen without waiting.

Timely

Significantly reduced overall wait times and length of stay.

Patient-centered

All steps designed to minimize patient wait times.

THE PROBLEM

According to a study published online by *Health Affairs* on January 15, 2008, the median wait time before seeing a physician for all emergency department (ED) patients rose to 30 minutes in 2004, a 36 percent increase from 22 minutes in 1997.

As recently as 2003, visitors to Mary Washington Hospital's ED often endured excessively long waits before seeing a physician. Roughly 14 percent found the wait intolerable and walked out before receiving treatment. As an example of just how bad the waits could be, on one particularly bad day, December 2, 2003, 44 of the 50 ED beds were taken up by patients waiting for an inpatient bed, leaving six ED beds for the 75 people in the waiting room.

THE SOLUTION

Leaders in the ED envisioned a "No Wait ED," by incorporating tools and concepts of operations management. Specifically, Lean methodology allowed the team to begin to view health care from the patient's perspective. Looking at operations in the ED through this lens, a multidisciplinary team turned the focus on developing strategies to eliminate waste and create patient value.

To begin the transformation of the ED, the team came together to develop a super track system for level 4 and 5 patients as defined by the Emergency Severity Index (ESI). At that time, 30 percent of the ED's 50 beds were dedicated to these low acuity patients. Looking at operations from the patient's perspective, the team readily identified opportunities to reduce the number of steps and providers involved in managing and treating these patients. The team defined a new process—one that gets patients to physicians and on the way home much more efficiently, with fewer beds and fewer staff and ultimately reducing the length of stay.

With this system, patients are in a bed just long enough to assess their treatment needs. They are then treated and released or sent to the next area of need, such as X-ray. These low acuity patients are no longer treated as if they were emergency patients; they are now treated with the same speed as if they were in a physician's office.

Following the success of the super track system, a second, bigger, more complex, multidisciplinary team developed the RATED system—Rapid Assessment, Treatment, and Efficient Disposition—for ESI level 3 patients. By definition, the acuity and treatment needs of these patients are difficult to determine. At Mary Washington's ED, these patients, immediately identified by a pivot nurse at triage, are seen by a physician and nurse within roughly 15 minutes of arriving. Any waiting takes place after a physician and nurse have evaluated the patient, ordered testing, and initiated the specific treatment.

RESULTS

- » Approximately 300 patients are now seen per day and without waiting.
- » Walk-out-rate among walk-ins has been reduced from a peak in 2003 of 14 percent down to 2 percent.
- » Time from treat to release has been reduced from more than 4 hours to fewer than 3 hours, even as the number of visits increased from 72,000 to more than 100,000 per year.
- » Press Ganey patient satisfaction scores improved from raw scores of 68 to consistently above 80.

TEAM MEMBERS

- » Rhondi Anderson, RN
Staff Nurse
- » Louise Fletcher, RN
Staff Nurse
- » Kelly McDonough, RN
ED Nursing Director
- » Jody Crane, MD
ED Physician, Business Director
- » Sarah McDonald, RN
Staff Nurse
- » Cheryl Perdue, RN
- » Ramil Reluya, RN

BACKGROUND

In 2005, the ED at Mary Washington Hospital adopted Lean concepts to tackle the problems with wait times and the dissatisfaction among patients. The resulting approach uses teams of people who touch the process to redesign the process—not staff from management or administration. The people on these teams work together as a community of scientists, identifying the root causes of a problem, developing a solution, and then rapidly testing and revising the solution as many as four or five times before rolling it out.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Removing Waste

The success of the new super track and RATED systems has instilled a culture that focuses on continually driving out waste. Every patient that walks in the door at Mary Washington Hospital's ED receives the same quality of care without waiting—regardless of severity of condition or ability to pay. Level 1 and 2 patients naturally are seen at once; level 3 patients flow through the RATED system; level 4 and 5 patients immediately move to super track rooms.

With the RATED system, the triage nurse identifies level 3 patients at arrival and they move immediately into one of five intake rooms. These patients are then seen simultaneously by a physician, nurse and scribe within minutes. The result is a single provider experience and immediate ordering of services needed. Patients who need further evaluation or extensive care move to a bed

within the main ED; patients determined to need minimal care are treated and released. Resources are all at hand to begin executing physician orders within the intake rooms at once: phlebotomist, X-ray, CT scan prep cart. This ability to consistently follow timely processes has significantly reduced length of stay for these patients.

Reducing Process Variation

ED staff have been trained in Lean concepts and the application of queuing theory to establish consistency in patient flow as well as to eliminate steps that are wasteful or do not add value. The intent is to always have a bed available for the next patient that walks through the door. At Mary Washington Hospital, the ED accomplishes this even with fewer than the 80 beds typical of an ED of its size. With the consistent application of timely processes, the ED at Mary Washington now sees 100,000 patients a year with just 50 beds. This bed efficiency translates into staffing efficiency, placing it in the upper 25th percentile for this metric.

Creation of High-Reliability Culture

The team of nurses, technicians and physicians that developed the award-winning RATED system began the roll-out with a mocked-up ED to demonstrate the new flow—under its own initiative. Every person who worked in or “touched” the ED moved through the simulated ED as a patient. This served to educate staff on the new process as it dispelled negative myths about the process and its outcomes, bringing most naysayers into the fold. The ED at Mary Washington Hospital has achieved the

creation of an organization that embraces change as it seeks to continually improve the patient experience through active participation in recommendations for modifications to the process. The team members recognize that they as well as patients benefit from the process, giving them ownership of the process and improving intent to stay.

Perhaps the feedback from patients is the best indicator of the success of the transformation to date. Negative letters from patients have not surfaced in years, but many positive letters have.

CONTINUAL IMPROVEMENT

The transformation of the ED at Mary Washington Hospital is ongoing. At any one time, two to three teams of roughly 15 staff are working as a community of scientists to resolve problems and improve processes. The organization has clearly embraced ongoing change and improvement to a level that many other ED organizations have found difficult to achieve. Jody Crane, MD, who facilitates this ongoing transformation at the ED, explains, “For health care organizations, sustaining a change mindset has been very, very difficult, especially among emergency departments.” Yet at Mary Washington's ED, staff have taken full ownership of finding solutions and implementing change. In fact, on the day that RATED was fully implemented, Crane was out of town.

CUTTING PATIENT WAIT TIMES, WASTE BY BEING LEAN

ST. JOHN'S MERCY MEDICAL CENTER (SJMMC)

- ◆ St. Louis, MO
- ◆ 859 beds
- ◆ www.stjohnsmercy.org

SJMMC is a not-for-profit teaching hospital, part of St. John's Mercy Health Care, a member of the Sisters of Mercy Health System.

STEEEP

Timely

Wait times for physical and occupational therapy have been slashed.

Efficient

New process for providing therapy services has cut wasteful steps.

Patient-centered

Scheduling therapy revolves around patient readiness.

THE PROBLEM

Wait times in the hospital's inpatient rehabilitation center were unacceptable; some patients were refusing physical and occupational therapy as a result. Patient satisfaction scores reflected the frustration patients felt.

THE SOLUTION

Using Lean methodology, St. John's turned patient therapy scheduling on its head, coordinating scheduling among acute therapy, nursing and transportation staffs, putting the patients' needs first.

RESULTS

- » Median wait times for acute therapy dropped 54 percent from 24 minutes in January 2008 to 11 minutes by September 2008.
- » Transportation cancellations upon transporter arrival to a patient's room were reduced by 78 percent between January and September 2008.
- » Press Ganey scores increased from 64 percent in January 2008 to 81 percent in November.
- » Number of steps in providing patients with acute therapy was cut by 61 percent, from 31 to 12.

BACKGROUND

Waiting stinks. SJMMC patients who receive therapy after an accident, stroke, surgery, or other condition were used to waiting, an average of 24 minutes from the time they reached the inpatient rehab unit until they returned to their room. "Some patients could wait up to an hour," recalls Kandi McClellan, a hospital physical therapist. "Patients were very dissatisfied." The result—a chaotic atmosphere where therapists felt pressured and some patients missed visits. "We do know patients were declining visits," says Joan Frost, RN, Six Sigma Black Belt.

"Visually, it was pretty evident," says CEO Denny DeNarvaez, who also heard patients' frustration in the "Dear Denny" letters she encourages patients to write her about their experiences. The rehab unit tried several times to address the issue. "Ultimately, everything would kind of go back to being the same," DeNarvaez says. The issue: therapy staff made changes within its silo, independent of nursing and transportation personnel.

A permanent fix came from a new board member, an executive from Boeing, who suggested hospital officials apply Lean methodology to the bottleneck in inpatient therapy. Used by Boeing to improve its processes, Lean focuses on providing exactly what the customer wants or needs, eliminating waste in associated process to meet customers' needs better.

Boeing officials mentored a SJMMC multidisciplinary team, some of whom were trained in Lean and Six Sigma improvement techniques. Boeing officials worked with the SJMMC team on value stream mapping and serve as technical advisers. The team discovered quickly a lack of coordination among therapists, nursing and transportation. The new approach—a pull system in which therapists pull the trigger for patients rather than having patients pushed on them—"is very different from anything we've ever done," McClellan says. "It's about very direct communication."

TEAM MEMBERS

- » **Denny DeNarvaez**
President and CEO
- » **Joan Frost, RN**
Six Sigma Black Belt
- » **Laura Johnston**
Manager, Inpatient Therapy Services
- » **Michelle Lowe**
Acute Therapy Occupational Therapist
- » **Kandi McClellan**
Acute Therapy Team Leader
- » **Diana Moore**
Director of Central Transportation/
CARE Center
- » **Jan Simms, RN**
Nurse Manager Neuroscience
- » **John Wood**
Six Sigma Master Black Belt

PRINCIPLES OF PERFORMANCE EXCELLENCE

The Patient Experience

Upon taking the helm in 2005, DeNarvaez introduced a holistic “total healing environment” concept, seeking to make the complicated and impersonal system work better for patients and their families, at least within the hospital’s walls. DeNarvaez instituted her “Dear Denny” letters to patients and staff, and in each room her cell phone number is posted so she gets feedback on her hospital’s care and service.

What was happening in rehab “wasn’t in sync with what we are about,” Frost says. Examining the process using Lean tools and concepts, it became apparent the system wasn’t working. Patients waited at three key points: to get initial therapy; to get the second part of that therapy, as most patients receive both physical and occupational therapy at the same visit; and to get back to their room. Lack of coordination around scheduling became obvious too. Inpatient rehab scheduled roughly 100 patients throughout the day, but appointments weren’t always conducive to the patients or to the nurses caring for them. Early morning patients ran late; by mid-morning a crush of patients was left waiting to see a handful of therapists. Therapy resources from other areas of the hospital had to jump in to meet the demand. The same scenario was repeated in the afternoon.

“The issue was scheduling and coordination of scheduling,” DeNarvaez says. “The big ‘aha’ moment—realizing we had to stop pushing patients down to therapy... and pull the patient based on their readiness.” Staff created a new system—the central piece being coordination among therapy, nursing and transport staffs—where a therapist contacts a scheduler to “pull” for the next patient about 20 minutes before the therapist finished with a current patient. This prompts a call to a nurse about a patient’s readiness. Work is now standardized for the therapy scheduler, transportation and nursing so that each discipline knows its role and duties to get the patient to therapy at the right time.

It took a while to figure out the pull system. While Lean is customer focused, SJMMC’s pull system had to be based around the readiness of both patient and therapist. If a nurse determines a patient can’t be ready within 10 minutes, a call for another patient goes out. “Keeping it in the forefront, keeping it from backsliding, takes work,” Frost says. Remembering to pull for the next patient 10 minutes before finishing with the current one was hard at first, McClellan says. A good reminder is what’s posted on a white board in the therapy center: “the previous day’s wait time is right in front of us,” McClellan says.

Removing Waste

The value stream mapping effort revealed an arduous 31 steps from the time a therapy order was written to the point at which the patient returned to his or her room. Patient contact didn’t happen until about half way through the process. Ultimately, the number of steps in the process was sifted to 12. Boeing officials were particularly helpful in highlighting workflow issues, but “it was the frontline workers who made the big decisions” about revamping the system to make it more efficient, McClellan says.

CONTINUAL IMPROVEMENT

The pull system continues to be refined, and has been rolled out to weekend staff, as well as smaller satellite therapy gyms located at different places in the organization. More importantly, SJMMC has rolled out the Lean method to improve process in the discharge process and in ancillaries, including CT scan and ultrasound.

IMPROVED THROUGHPUT IN THE LABORATORY

ST. LUKE'S HOSPITAL

- ◆ Cedar Rapids, IA
- ◆ 560 beds
- ◆ www.crstlukes.org

St. Luke's Hospital serves the five-county area surrounding Cedar Rapids, Iowa. It offers a wide range of patient care services with strengths in cardiac care, obstetrics, neonatology, pediatrics, rehabilitation, behavioral health, general surgery, trauma care, and senior services. This project focused on its clinical laboratory services department.

STEEEP

Safe

One patient's specimen labels are issued at a time to reduce labeling errors.

Timely

All morning lab results posted by 7am with 90 percent reported within 45 minutes of collection.

Efficient

Improvements even with two less phlebotomists collecting specimens (total number of phlebotomists has dropped by one and one phlebotomist is now working solely as a swarm leader).

THE PROBLEM

The results of blood tests are crucial to physician decision making. At St. Luke's, physicians expect to have lab test results available for morning rounds as early as 6 am. However, the phlebotomy team was regularly challenged to complete the early morning collection of blood specimens in a timely manner.

THE SOLUTION

Led by the laboratory's Lean coordinators and supported by Dean Bliss, the members of the phlebotomy team applied Lean tools to analyze their current processes from the time the specimen is collected until the time the result is available. This provided the insight to develop more efficient processes that also improved patient safety. Rather than having eight phlebotomists working floors independently across 15 different patient care areas, six phlebotomists and a leader "swarm" one floor at a time to collect specimens as a team. For even greater efficiency and to eliminate labeling errors, phlebotomists now use "one-piece flow," with one patient's specimens collected, labeled, and sent to the lab at a time. This practice levels out the workflow of specimens to the lab and has helped reduce the bottlenecks that arose from batching the specimens.

RESULTS

- » Collect-to-receipt time: reduced from a high of 28 minutes to 10 minutes or less.
- » Receipt-to-report time: within 23 minutes, 97 percent of the time.
- » Collect-to-report time: within 45 minutes, 90 percent of the time.

BACKGROUND

Early morning specimen collections began at 4 am, with two of the lab's phlebotomists collecting independently for the intensive care, critical care and surgical units. Additional phlebotomists arrived at five and six, again collecting specimens independently. Each phlebotomist carried labels for seven to 15 patients at a time and sent specimens to the lab, via pneumatic tube, in batches following the blood collection from three to four patients. These batches created bottlenecks and back-ups within the receiving and testing areas, delaying the posting of results. It generally took two hours from specimen collection to result reporting. Missed, rejected, add-on and stat specimens were difficult to fit in, with results often arriving too late for the physicians to view on their morning rounds.

The lab team applied Lean tools to analyze the current processes from the time the specimen is collected until the time the result is available. This led to the development of a swarm approach using one-piece flow.

TEAM MEMBERS

- » **Julie Behr**
Quality Assurance Supervisor
- » **Carol Collingsworth**
Director, Laboratory Services
- » **Tammy Peterson**
Lean Coordinator
- » **Dean Bliss**
Director of Lean Improvements
- » **Elaine Kemmerer**
Lean Coordinator
- » **The St. Luke's phlebotomy team**

PRINCIPLES OF PERFORMANCE EXCELLENCE

Reduce Process Variation

The redesigned process uses six phlebotomists and a leader all swarming one unit at a time. Each phlebotomist carries a tray and the leader uses a cart that is equipped with additional collection supplies. After a patient's blood is drawn, the phlebotomist takes those specimens to the swarm leader. The swarm leader provides the phlebotomist with labels for the next patient and sends the specimens to the lab. The swarm team uses wireless communication technology to stay in touch with the main lab and each other.

Unexpected variations in the number of specimens to be collected from day to day were exacerbated by missed, rejected, add-on and stat specimens. With a team of phlebotomists on a single unit, the swarm leader can now easily deploy phlebotomists to handle recollection of rejected specimens, add-ons and stats that were once difficult to complete before rounds. Because the swarm works together as a team, a second phlebotomist is always available to collect a missed patient. And, with the swarm leader sending down a steady stream of specimens rather than batches, the lab is able to operate much more efficiently.

Removing Waste

The Lean team found that the time from collection to receipt in the lab was the longest in the overall collect-to-report process. By analyzing all the steps in the process, the team developed a new process to reduce this time, as well as a new staffing model. This model rotates phlebotomists to serve as the swarm leader. The swarm leader directs the work of the phlebotomists from the cart, which serves as a hub. This leaves one less phlebotomist collecting specimens, yet the new process overcomes this shortage with gains in efficiency.

Counter intuitively, having phlebotomists return to the swarm leader's cart after every draw—part of the one-piece flow process—has reduced the time from collect to receipt from 28 minutes to 10 minutes or less. The swarm leader now spends time managing labels, determining sequence and sending specimens to the lab. With this new approach, lab results are posted on patient charts in time for the physicians to review during morning rounds.

Eliminating Defects

The one-piece flow has eliminated the chance of mislabeling a patient's specimen. When phlebotomists carry labels with them for more than one patient, the opportunity for mislabeling specimens with the wrong patient labels is always there. The swarm leader dispenses one patient's labels at a time to each phlebotomist. Phlebotomists do not receive labels for the next patient until the specimens for the previous patient are out of their hands.

CONTINUAL IMPROVEMENT

The process redesign work began two years ago. The project team visited two outside labs to observe their application of Lean principles. The success of the new approach for collecting specimens for morning rounds has been well received by phlebotomists, nurses and physicians alike. Phlebotomists recognize a greater sense of fairness with the swarm leader dispensing labels rather than allowing a more pick-and-choose approach that often favored some with a less demanding workload.

This success has developed a strong sense of camaraderie within the lab and an eagerness to continue the work of improving processes. A team is now working on applying the one-piece flow to the rest of the day's work to see that results are available within 45 minutes of collection regardless of priority 24 hours a day. Additionally, St. Luke's is working on plans to implement additional wireless technology using hand-held computers with label printing at the bedside to further streamline specimen collection and receipt processes.

BETTER FLOW VIA SIX SIGMA

ST. VINCENT'S MEDICAL CENTER

- ◆ Jacksonville, FL
- ◆ 528 beds
- ◆ www.jaxhealth.com

St. Vincent's Medical Center is a general acute-care hospital serving northeast Florida and southeast Georgia. It has 684 affiliated physicians. It is part of Ascension Health.

STEEEP

Safe

Emergency patients receive care more quickly.

Timely

ED wait times have fallen, and inpatient beds are available sooner.

Efficient

Processes, such as handling labs and inpatient room cleaning, have been streamlined.

THE PROBLEM

The average ED length of stay was 413 minutes (6 hours, 53 minutes). Fourteen percent of ED patients left before being seen, 40 percent of these had waited more than four hours. The hospital was losing about \$7 million in revenue annually as a result.

THE SOLUTION

In June 2006, St. Vincent's launched a Six Sigma initiative to improve ED throughput. Teams were created to address an array of factors contributing to ED delays. Among the approximately 12 projects were those looking at the time the ED ordered a test to the time the lab received the specimen, the time it took to clean a discharged patient's room, time from triage to ED bed, time from inpatient bed ready until arrival of the ED patient to that bed, and the percentage of discharges by 2 pm.

RESULTS

- » The ED's left-without-being-seen rate dropped dramatically, to 1.8 percent as of October 2008.
- » The average ED length of stay decreased from 413 minutes to 286 minutes as of October 2008.

BACKGROUND

In 2006, St. Vincent's Medical Center officials were dismayed that 14 percent of ED patients were leaving without being seen due to long wait times. That equated to \$7 million of revenue walking out the door annually, according to hospital estimates. Scott Whalen, the facility's chief operating officer at the time and now its president and CEO, had positive experiences with the Six Sigma methodology at another hospital and instituted the program at St. Vincent's.

The hospital brought on Lynne Sisak, a master black belt in Six Sigma, who analyzed the various processes that affect ED length of stay to determine which ones would have the biggest impact if changed. Based on the results of that review, a number of teams were assigned. "Everybody took a small piece of the whole

puzzle," says Beckie Watson, manager, performance improvement, master black belt.

Six Sigma was more effective than previous efforts. "In the past we would have said, 'length of stay is too high in the ED, fix it.' Nobody knew where to focus," Watson says. "Now we have a better way of targeting our projects and really making those incremental improvements. If 10 teams have statistically significant improvement, then it's going to impact that whole process."

Once the project got started, it became a hospital-wide effort because so many departments affect ED wait times. Teams included staff from various areas of the hospital. This was essential because the ED personnel believed the patient floors were causing the problem and vice versa, says Kathy Courtney, ED nurse manager. "We had to come to an agreement and be able to walk in each other's shoes." The process helped the staff as a whole "to see there are a lot of different variables. The ED staff saw the problems they have upstairs, and the people upstairs saw the problems we have downstairs," she adds.

The focus on measuring data dispelled some preconceived notions about the cause of ED delays. For example, Watson says, "the floors were saying that the ED was holding patients and not taking them up until change of shift. They said if the ED would just stop waiting until change of shift when we are busy receiving report, then we wouldn't bottleneck. When we ran the data, we found that patients were being transported all during the day and shift change was not the time that patients were going up. That was a real surprise to some of the teams."

Six Sigma, with its focus on rapid-cycle interventions, led to immediate results on many metrics. One example is the time between when an inpatient bed was vacated to when it was clean and ready for an ED patient. In June 2006, the average was 132 minutes. At that time whoever was available on the environmental services staff was paged and went to the room. The vacate-to-clean team tracked one environmental services worker and measured how much backtracking that

TEAM MEMBERS

- » **Kathy Courtney, RN**
Emergency Department
Nurse Manager
- » **Diane Fox, RN**
Emergency Department
Clinical Resource Coordinator
- » **Lorraine Keith**
Director, Critical Care/Telemetry
and Emergency Department,
Six Sigma Black Belt
- » **Christopher Noll**
Ortho/Neuro Nurse Manager,
Six Sigma Green Belt
- » **Barbara Potter**
Director, Performance Improvement,
Six Sigma Master Black Belt
- » **Melissa Scot**
Manager, Bed Board,
Six Sigma Black Belt
- » **Beckie Watson**
Manager, Performance Improvement,
Six Sigma Master Black Belt
- » **Scott Whalen**
President and CEO,
St. Vincent's Health Care,
Six Sigma Green Belt

person did between floors and units and how much time was wasted on the elevator. The team decided to switch to a zone system, with staff assigned to particular floors or units to cut down travel time. With that one change, the team met its goal of turning around rooms in 45 minutes in the project's first 100 days. "They really didn't need to do anything else after that," Watson says.

Another quick success was decreasing the time from when tests were ordered in the ED to when samples got to the lab. That team came up with the idea of putting red clothespins on charts with lab orders as a visual cue for technicians and nurses that a specimen was needed. The time dropped from 90 minutes to 36 minutes in 100 days and remains there.

The various process changes had the desired effect. The percentage of ED patients who left without being seen dropped from 14 percent to 1.8 percent as of October 2008—slightly below the hospital's goal of 2 percent.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

Past quality improvement efforts didn't involve frontline staff. "We had people like me or managers sitting around and trying to figure it out," says Barbara Potter, director of performance improvement and Six Sigma master black belt. "This was different. We were asking the people who were doing the work what they thought. It was different for us to have a housekeeper on a team working on an improvement."

Staff involvement proved invaluable when teams examined processes and developed flow charts of them. "The only way to really know what steps are being done is to talk to the actual employee doing the work," says Christopher Noll, ortho/neuro nurse manager, Six Sigma green belt. "You define every little step, and you start to identify rework loops or double-work. You start to see the inefficiencies and start to address them through rapid-cycle testing, eliminate them and hopefully have a better end result."

Six Sigma has changed the entire hospital's approach to quality improvement, says Noll. The benefits have spilled over to projects that aren't Six Sigma. "We needed to implement some things for the Joint Commission, and we needed to make rapid changes for that. Around the hospital, people were accustomed to it. That was not true 24 months ago," he says. The idea for the project started in the hospital's leadership ranks, with then-COO Whalen. Managers and directors gave frontline staff time to participate on teams. They also put resources into staff. Extra triage and admitting nurses and a doctor were added at peak periods to decrease patient wait times.

CONTINUAL IMPROVEMENT

Although most ED throughput projects are completed, the teams plan to keep measuring and reporting performance. "We're going to have to keep this in front of people until it becomes hardwired and people are doing it without thinking about it, which takes a long time," Potter says.

One metric in particular still requires more work. In November 2008, only 38 percent of discharges were completed by 2 pm, well short of the 80 percent goal. Several remaining holdups involve the medical staff. With so many physicians involved in each patient's care, it's difficult to get them all to sign off on discharge. Also, physicians aren't making their rounds early enough to patients who are likely to be discharged that day. "Most doctors are trained in medical school to see their sickest patients first," Watson says. "The people who are actually going out the door don't get seen until noon or after. We would like to try to get the physicians to change their behavior and see first those patients who can be discharged."

Some physicians have expressed interest in Six Sigma, so one possibility is creating a team of doctors to address the 2 pm discharge issue, Watson says. Also under consideration is changing hospitalists' contracts to require that they make rounds or write discharge orders by a certain time.

In November 2008, St. Vincent's HealthCare used national benchmarks to reorganize for operational efficiencies. Under this new structure, Watson says there will be opportunities to use the tools of Six Sigma to analyze current processes, monitor revised processes and create new processes that are efficient, safe and deliver quality patient care. "It is exciting to think about what we are going to be able to do in the next year utilizing our organization's knowledge and experience with Six Sigma."

PATIENT SAFETY

We believe we can distinguish ourselves through great patient care and lower the cost of care and improve the health of our communities.

— Jeffrey Thompson, MD, CEO,
Gundersen Lutheran Health System

PATIENT SAFETY

The Institute of Medicine's definition of patient safety is "freedom from accidental injury due to medical care, or medical errors." The reality is that health care delivery is complex and sophisticated, allowing for many errors. Yet many errors can be prevented by making sure systematic processes are in place. Trying to get every physician or nurse to remember to do five things to prevent falls and seven things to prevent decubitus ulcers is an ineffective method. Successes have come from systematization of preventive activities.

In recent years, hospitals have reported significant improvement in the prevention of pressure ulcers by developing and implementing a systematic approach to the identification of patients at risk of developing pressure ulcers and implementing standardized actions for at-risk patients.

The following case studies illustrate eight hospitals' attempts to eliminate many of these injuries. For example, an innovative hospital's C-suite empowered frontline nurses to redesign inefficient patient care processes, resulting in nearly double the amount of time nurses spend at the bedside in direct patient care and also decreased the average medical/surgical unit admission time by 75 minutes. By having more time to spend with patients, more education is done and patients feel more prepared for discharge. This resulted in improved patient safety and decreased Medicare readmission rates.

Another hospital utilized Six Sigma methodology to develop a comprehensive program to identify all patients at risk of pressure ulcers and to reliably implement standardized prevention strategies for all at-risk patients. As a result, it was able to reduce its incidence of pressure ulcers by more than 60 percent.

Another hospital implemented a collaborative fall prevention program with pharmacy and nursing to generate a medication-specific fall risk score for each patient upon admission, resulting in a nearly 50 percent reduction in total falls, a 36 percent reduction in the number of falls leading to injuries, and an a cost savings of almost \$400,000 annually.

PATIENT SAFETY AT A GLANCE

- » Up to 98,000 deaths a year attributed to medical error. (*To Err is Human: Building a Safer Health System*, IOM 1999)
- » \$700 per case to treat decubitus ulcers. (CMS 2006)
- » A study reviewing 18 types of medical events concluded that medical errors may account for:
 - 2.4 million extra hospital days
 - \$9.3 billion in excess charges (for all payers)
 - 32,600 deaths. (CMS 2006)
- » There were 257,412 cases of Stage 3 or 4 pressure ulcers acquired after admission to a health care facility, costing \$43,180/hospital stay. (MedPAR data, 2007)
- » Adverse patient outcomes account for 3 percent of hospital inefficiency. Investigators have found that hospitals on average could increase admissions and patient visits by 27 percent by eliminating inefficiency. (Health Services Research, 2008)
- » 2.5 million patients are treated for pressure ulcers in US health acute-care facilities each year. (JAMA, 2006)
- » Patient falls compose the largest single category of reported incidents in hospitals. (Joint Commission, 2005)

RECOMMENDATIONS

IOM Recommendations to Health Care Organizations

Health care organizations should make continually improved patient safety a declared and serious aim by establishing programs with defined executive responsibility. Patient safety programs should:

- » Provide strong, clear and visible attention to safety;
- » Implement non-punitive systems for reporting and analyzing errors;
- » Incorporate well understood safety principles, such as standardizing and simplifying equipment, supplies and processes; and
- » Establish interdisciplinary team training programs for providers that incorporate proven methods of training, such as simulation.

ADDITIONAL AHA RESOURCES

Patient Safety Leadership Fellowship

A yearlong intensive learning experience that develops leadership competencies and promotes breakthroughs in safety practices.

www.ahaqualitycenter.org/ahaqualitycenter/documentDetailServlet?contentId=10363&contentTypeDesc=Review

Role of the Nurse Executive in Patient Safety: Guiding Principles Toolkit

The American Organization of Nurse Executives, a subsidiary of the AHA, produced guiding principles to assist the nurse executive in safety initiatives.

[www.aone.org/aone/pdf/Role percent20of percent20the percent20Nurse percent20Executive percent20in percent20Patient percent20Safety percent20Toolkit_July2007.pdf](http://www.aone.org/aone/pdf/Role%20of%20the%20Nurse%20Executive%20in%20Patient%20Safety%20Toolkit_July2007.pdf)

Strategies for Leadership: Hospital Executives and their Role in Patient Safety

A self-assessment tool of leadership strategies.

www.ahaqualitycenter.org/documents/AHAs-trategies.pdf

STEPPING IT UP: REDUCING PRESSURE ULCERS

FAIRFIELD MEDICAL CENTER

- ◆ Lancaster, OH
- ◆ 222 beds
- ◆ www.fmchealth.org

Fairfield Medical Center is a general acute care facility serving southeastern and central Ohio. The hospital has more than 2,000 employees and more than 250 physicians.

STEEEP

Safe

Floor nurses are provided additional training on wound evaluation improving the prevention and treatment of pressure ulcers.

Timely

Standing orders were initiated so floor nurses could begin pressure ulcer prevention and treatment immediately during the hours when tissue therapy nurses were unavailable.

Efficient

The Six Sigma project improved documentation. The Lean initiative cut the amount of time tissue therapy nurses spent on paperwork.

THE PROBLEM

Although Fairfield Medical Center had a fairly low rate of pressure ulcers, officials believed the incidence could be reduced further to improve patient care and prepare for Medicare's decision to stop reimbursing for hospital-acquired Stage III and IV pressure ulcers as of October 2008. Problems included inconsistent implementation of pressure ulcer prevention protocols and poor documentation of skin assessments.

THE SOLUTION

In October 2007, the hospital began a Six Sigma project, led by Andrew Murry, MD, that aimed to improve documentation, enhance use of the pressure ulcer prevention protocols, and reduce incidence rates. Then in August 2008, Fairfield started a Lean project, led by Mike Tobin, to address the increased paperwork burden the initial effort caused for tissue therapy nurses.

RESULTS

- » The Stage II, III and IV pressure ulcer incidence rate fell from 6.5 per 1,000 inpatient admissions to 3.2 per 1,000 admissions.
- » Compliance with the pressure ulcer protocols went from 42 percent to 84 percent.
- » Physician documentation of present-on-arrival pressure ulcers went from 50 percent to 100 percent.

BACKGROUND

Fairfield Medical Center had long had a pressure ulcer prevention program, but in late 2007, hospital leaders "felt like they need to step it up a bit" to prepare for the Medicare no-pay policy that started in October 2008, says Amy Smith, tissue therapy nurse. Another goal was to improve use of the treatment and prevention protocols. So the medical center launched a Six Sigma project on pressure ulcer prevention.

One area of focus was documentation. Pressure ulcers weren't always noted in patient charts—an oversight that would have significant financial ramifications once Medicare stopped reimbursing for treatment of severe pressure ulcers acquired in the hospital. It became imperative that physicians improve documentation of ulcers that were present on admission. So the team created stickers that wound therapy nurses place on the charts of patients who have present-on-admission pressure ulcers. Physicians have to sign the stickers, and then the tissue therapy nurses e-mail hospital coders so the ulcer can be billed and coded properly. Coders verify that the physician signed the sticker in the chart and follow up with the physician if needed.

Another problem the Six Sigma team identified was that because the tissue therapy department isn't on 24 hours a day, seven days a week, care was delayed for patients who came in during off hours. The solution was to create standing orders for the regular nursing staff so they could initiate prevention and treatment protocols if necessary when tissue therapy nurses weren't working.

TEAM MEMBERS

- » **Tina Cass**
Assistant Manager,
Fourth Medical/Surgical Unit
- » **Dora Metzger**
Fourth Medical/Surgical Unit,
Tissue Therapy
- » **Andrew Murry, MD**
Infectious Disease Specialist
- » **Amy Smith**
Tissue Therapy Nurse
- » **Martha Taylor**
Tissue Therapy Nurse
- » **Mike Tobin**
Master Black Belt, Six Sigma

The hospital's policy is for the regular nursing staff to assess every inpatient using the Braden Scale within four hours of admission and daily after that. Nurses electronically document Braden scores of less than 16 and are to order a tissue therapy consult for that patient. However, it was discovered that nurses were sometimes letting the consult orders fall through the cracks. To solve this, the team created a computer program that pulls all the low Braden scores into a daily report for the tissue therapy nurses. "We're catching a lot of [patients who need consults] that the nurse never put in," says Martha Taylor, tissue therapy nurse.

The process changes, while improving patient care and documentation, increased tissue therapy nurses' workloads. A Lean project was launched in August 2008 to address that issue.

"The thing was, we were doing a better job of monitoring these patients, but our nurses didn't have enough time to get to all of them because they were spending all of this time on manual paperwork," says Mike Tobin, Six Sigma master black belt. The tissue therapy nurses kept a paper log of every patient they saw, what they saw that person for, what treatment was performed and if follow-up was needed.

Nursing manager Dora Metzger called Tobin. Together with the tissue therapists, they mapped out the process and found that the

manual log was inefficient. They decided to make it electronic. The change cut the time tissue therapists spend daily on paperwork by about an hour. "The number of patients we're able to see has gone up by at least 25 percent a day," Smith says.

The switch to an electronic log wasn't all smooth sailing. A couple of tissue therapy nurses were uncomfortable with computers. But the system is easy enough that they picked it up after a little training, Smith says. Then, the first week the program went live, there was a computer system outage, and the tissue therapists couldn't get any of their reports. Now at the end of each day, a tissue therapist backs up the log on a local PC.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Removing Waste

Because the electronic patient log is so much more efficient, the tissue therapists now have time toward day's end to see patients with low Braden scores who were admitted that day, rather than having to wait until the next day, Tobin says. The creation of standing orders also means off-hour patients get care sooner.

Creation of High-Reliability Culture

Tobin worked closely with the tissue therapy staff when developing the program for the electronic log. "Rather than getting all the requirements, going and building something

and then giving them a finished product, you work with them through the process so that you can get at what they want and you can add the functionalities that they need," Tobin says. "Actually, you end up with a much better product." He has continued to collaborate with the tissue therapists when addressing glitches. For example, in November 2008, the team was working on a process to delete duplicate consult orders created when a patient is flagged as needing attention both because the system has captured the patient's low Braden score and a nurse specifically ordered a consult.

CONTINUAL IMPROVEMENT

The Lean team will continue to work on the electronic log to address any bugs that pop up. "We need to make it more efficient so that the nurses can get to the job that they were hired to do, and they weren't hired to do paperwork," Tobin says. The team plans to keep adding functionality to the program. It will follow up with a general review of the process in March 2009.

HOSPITAL COMPARE: ROAD MAP TO EXCELLENCE

FLOWERS HOSPITAL

- ◆ Dothan, AL
- ◆ 235 beds
- ◆ www.flowershospital.com

Flowers Hospital has served Dothan, AL, for more than 50 years and also functions as a major referral center for south Alabama, southwest Georgia, and northwest Florida. Dothan is a city of 65,000 people in the southeast corner of the state.

STEEEP

Effective

Improving the numbers requires an unflinching look at how every process on the clinical side is carried out and whether it is effective in reaching patient care goals.

Patient-centered

The hospital has a team devoted to improving patient satisfaction. Its work has helped boost satisfaction numbers directly, while efforts around avoiding infections and providing top-quality care result in more patients leaving with better outcomes.

THE PROBLEM

Flowers wanted to improve its performance on the 28 quality measures that are featured on the Hospital Compare Web site. The hospital's CEO, Keith Granger, made it an organizational goal to get performance "as close to perfection as we can get."

THE SOLUTION

Granger made improvement in publicly reported quality measures a focus of the hospital's strategy in 2005. From there, the solution became multifaceted as separate teams tackled the main categories of Hospital Compare measures: heart attack, heart failure, pneumonia, surgical care and mortality.

The teams were overseen by a multidisciplinary group called the Hospital Quality Alliance (HQA), an internal group that addresses issues around Hospital Compare (not to be confused with the national public-private collaboration of the same name). Flowers' HQA includes team leaders, the chief quality officer and representatives from surgical specialties, anesthesiology, pharmacy, surgical floor nursing and management. The group meets every two weeks to discuss the latest numbers and process changes, and the team leader reports to the CEO once a month to present all the cases that kept a measure from hitting 100 percent.

RESULTS

- » Flowers is the top-performing hospital in Alabama, based on Hospital Compare, and number 2 in the nation. The hospital hit 100 percent on 25 of the 28 measures in the second quarter of 2008.
- » Improvements were seen in the provision of ACE inhibitors for heart attack. From the first quarter of 2005 to the second quarter, Flowers improved from 67 percent compliance to 100 percent and continues to maintain that

achievement. Another example was the timing of primary percutaneous coronary intervention, which went from 40 percent to 92 percent in one year.

- » The hospital also improved in areas beyond Hospital Compare measures. The hospital reduced catheter-associated urinary tract infections by 20 percent between 2007 and 2008. MRSA infections were reduced by 25 percent, and surgical site infections are down 20 percent.

BACKGROUND

Flowers Hospital officials recognized that theirs was a hospital-wide challenge when they sought perfection in publicly reported quality measures. The effort touched a wide range of staff members, from surgeons to nurse's aides, and required them to change the way they thought about their own work. It called for sophisticated analysis of their work processes.

The hospital's HQA uses rapid-cycle performance improvement projects to bring the numbers to desired levels. It conducts root-cause analysis and maps the processes. This goes along with a focus on processes rather than individuals. The non-punitive environment for errors is meant to encourage openness, but is balanced by a "no excuses" policy that requires staff members to take responsibility for their part of the process.

Culture change occurred across the board. New staff members receive educational materials about Hospital Compare measures, and performance improvement permeates everyone's workday. "We said it's got to become an everyday topic and everyday focus," Granger says. "Every meeting and every event in this organization has to be around 'how do we improve care and performance for our patients.'"

Physician support has been essential. The chief of staff and chief of surgery have been

TEAM MEMBERS

- » **Amy Butler, RN**
Chief Quality Officer
- » **Dan Combe**
Chief Nursing Officer
- » **Keith Granger**
President and CEO
- » **Lori Louis**
Associate Nursing Director
- » **Andrew Osborne, MD**
Chief of Staff
- » **Calvin Reid, MD**
Chairman,
Quality Improvement Council
- » **Darla Silavent, RN**
Infection Control Director
- » **Jon Vuckovich, MD**
Chief of Surgery
- » **Suzanne Woods**
Senior Vice President

involved and supportive by championing the process changes with their colleagues. Surgeons receive report cards on their performance that are discussed one-on-one with the operating room director. Physicians found some of the changes cumbersome but recognized that they would improve patient care, says Calvin Reid, MD, an internal medicine physician who heads the hospital's Quality Improvement Council, a group of senior physicians, nurses and administrators. But two factors made the difference: leadership from administration and physician champions.

Physicians sometimes grumbled about the methodology behind some standards, but Reid would remind them that the measures were nationally accepted. "We present it like a 13-inch ruler," Reid says. "The methodology may never be perfect and in any system there are flaws in the collection of data. But we're all being measured by the same ruler. It may not be an accurate ruler, but it's the same one for all of us."

To reduce infections, Flowers followed the Institute for Healthcare Improvement's bundles approach along with CDC guidelines. This led to standardized bedside care of lines and a daily needs assessment to end the use of lines that are no longer needed.

Flowers also sought high performance with additional outcomes measures that are part of the Surgical Care Improvement Project, even though some are not currently part of Hospital Compare, says infection control director

Darla Silavent, RN. By working with surgeons and anesthesiologists, the team was able to achieve significant reductions in surgical site infections. Other infection control efforts center on reminding physicians and staff to think about things such as flu vaccine to pneumonia patients on discharge, Silavent says. "Reminders, protocols and consistency are a huge part of this," she says.

She uses a computerized system that tracks lab results reporting certain types of infections to look for nosocomial infection markers. When the number of markers goes up, she knows it's time for more reminders of staff on proper infection control procedures.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

Flowers Hospital's commitment to the best possible performance on clinical quality measures came directly from CEO Keith Granger. He gets a monthly update from team and quality leaders about performance and any variation, with discussion about why that variation occurred. "We need to be very visible leaders in this process," Granger says.

Physician leaders are invested in the project and work with members of the medical staff one-on-one to focus on specific processes and protocols. Quality team leaders, for example, consulted with surgeons who questioned changes meant to reduce surgical site infections and discuss the pros and cons.

"Overall they came on board and supported us," Silavent says.

Flowers' approach is to focus on systems and processes, but to hold staff members accountable. "There are no excuses," Granger says. The analysis of a problem is straightforward and examines how it happened and how to stop its recurrence. "That mindset really goes a long way across the entire organization," he says. "We're clearly focused on accountability."

Managing Organizational Variability

Flowers Hospital chose the Hospital Compare measures as a road map in part because it was clearly becoming the standard for consumers, as well as the industry as a whole, Granger says. "We're working within the system, rather than resisting and trying to assume our opinion is greater than the wisdom of others," he says. At the same time, the organization reports back to measurement designers when they see a useful adjustment.

CONTINUAL IMPROVEMENT

The organization continues to stay on top of Hospital Compare measures by keeping close track of the numbers and responding quickly when they fall off. An additional staff member was hired so the organization could carry out concurrent review seven days a week of all Hospital Compare measures; that person educates staff and notifies department managers regularly about performance.

FOCUSING ON PATIENTS TO REDUCE FALLS

GUNDERSEN LUTHERAN HEALTH SYSTEM

- ◆ La Crosse, WI
- ◆ 325 beds
- ◆ www.gundluth.org

A physician-led health system, Gundersen Lutheran is comprised of a hospital, a multi-specialty group medical practices, 42 regional community clinics, four nursing homes, home care, behavioral health services, vision centers, pharmacies and air and ground ambulances. As a tertiary referral center, Level II trauma and emergency center and teaching hospital, Gundersen Lutheran cares for patients in 19 counties throughout western Wisconsin, northeastern Iowa and southeastern Minnesota.

STEEEP

Safe

New processes, from hourly rounding to new safety signage in every room and bathroom, as well as staff training and patient education, are driving down the incidence of falls.

Timely

Staff-initiated safety huddles address immediate issues to prevent falls or pinpoint what led to a patient fall, leading to an individualized care plan that will reduce the potential for a fall or second incidence.

Effective

To keep momentum and remove any barriers, the falls team met with senior management team twice monthly to report on progress and ask for help or changes.

THE PROBLEM

After examining hospital data to pinpoint opportunities to improve, Gundersen Lutheran focused on patient falls. Patient falls made up the second-largest category of reported incidents for Gundersen Lutheran, after medication events. “It was clear everyone was trying hard, but there was no systemic or organization-wide approach to falls,” says Kathy Klock, senior vice president of operations.

THE SOLUTION

Gundersen Lutheran launched a formal program in 2008 to lower the number of patient falls, with an initial focus on achieving no falls with harm, says Jeffrey Thompson, MD, Gundersen Lutheran’s president and CEO. For the first year, it set a stretch goal of 30 percent reduction in the actual number of falls, including assists to the floor, which Gundersen Lutheran categorizes as falls.

RESULTS

- » In less than one year, Gundersen Lutheran was approaching its goal of 30 percent fewer patient falls, from a mean of 4.2 per 1,000 patient days to 3 per 1,000 patient days.
- » Falls reporting has increased, demonstrating Gundersen Lutheran’s culture of safety and no blame.
- » Compliance on hourly rounding, a key 2008 initiative to avert falls, rose from 39 percent in May to 88 to 90 percent by October in the medical/surgical units that piloted the initiative.

BACKGROUND

Patient falls are among the most significant adverse events in hospitals, negatively affecting length of stay, function, physical and emotional health, independence and quality of life. Without changes to improve prevention, the incidence of patient falls in hospitals is poised to increase as the U.S. population ages. To reduce this likelihood, in 2008, Medicare began denying reimbursements for treating falls.

In 2007, a team of Gundersen Lutheran physicians, nurses, pharmacists, quality professionals, a patient falls expert and other hospital disciplines set out to build a systematic approach to preventing inpatient falls. Drawing on best practices from other organizations and research, it focused on five major areas that could affect the incidence of falls:

- » Medication—Pharmacy made recommendations for specific conditions, when possible, to minimize dizziness, confusion and other symptoms associated with falls
- » Patient and family education—A patient education sheet about the risks of falls and preventative measures was developed. A registered nurse reviews the sheet with patients and families on admission and reinforces the information each shift
- » Safe room setup—Includes an environment that is free of obstacles and clutter and a patient’s call light and personal items are within reach.
- » Safety signage—Caution posters that encourage patients to call for help are displayed in all patient rooms and bathrooms.
- » Rounding—Created a log that nursing staff fills out each hour with time and initials that confirms staff checks for pain, bathroom needs and positioning and room order.

Gundersen Lutheran initiated the falls project in one medical/surgical unit that treats a large number of elderly and other patients who are at high risk for falls. Inpatient falls were trending upward on the unit. It had recently added a nurse educator and a quality nurse. The addition of these roles provided support in the initiation of this project. To roll out the new approach, the hospital held training at the medical/surgical unit’s monthly staff meetings. Training is also built into the new-hire education. To track progress, the unit’s quality nurse keeps a record of each fall and measures compliance to each of the implemented changes. This information is shared at monthly staff meetings.

TEAM MEMBERS

- » **Sarah Archer, RN**
Nurse Educator,
Nursing Staff Development
- » **Tracey Benedict, RN**
Clinical Manager,
Medical Oncology
- » **Kari Hamson-Kalis, RN**
Advance Practice Nurse,
Medical Oncology
- » **Kathy Klock**
Senior Vice President
of Operations
- » **Kathy Koehne, RN**
Nursing System Specialist
and Patient Falls Expert
- » **Jean Krause**
Chief Quality Officer
- » **Michelle La Fleur, RN**
Director of Quality Improvement
and Patient Safety
- » **Sandra Seibel, RN**
Medical Oncology Quality Nurse
- » **Jeffrey Thompson, MD**
CEO
- » **Cheryl Uffelman, RN**
Director of Patient Safety

PRINCIPLES OF PERFORMANCE EXCELLENCE

The Patient Experience

Commitment to improving patient care starts right at the top at Gundersen Lutheran. To keep up momentum and remove barriers, the falls team met with senior management twice a month to report on its progress and discuss issues. “We believe we can distinguish ourselves through great patient care and lower the cost of care and improve the health of our communities,” says Thompson.

The health system involved its patients directly in the project to prevent falls. The patient advisory group was consulted and provided detailed feedback in the development of the falls reduction initiative. The medical/surgical unit also requested feedback on its safety signs to make necessary changes. For example, patients told them the signs were too wordy and they didn’t like the stick-figure illustrations. So the unit went back to the drawing board to revise the posters, resulting in a sign with less clutter and more clarity.

Creation of High-Reliability Culture

To encourage behavior and process changes, Gundersen Lutheran developed training and explained the research that supported these best practices. “Our nursing staff had a mindset that fall occurrences are realistic when a patient is at risk to fall,” notes Kathy Koehne, RN, a nursing system specialist and patient safety falls expert. “We had to change the mentality from patient falls being acceptable to falls are preventable and must be prevented.”

As the changes took hold and falls declined, the nursing staff became increasingly committed to lowering falls even more. A registered nurse and certified nursing assistant, for example, suggested making signs of patient aids, such as walkers and gait belts, backed with Velcro that could be affixed to each patient’s wall as appropriate. With these helpful guides in each room, “whoever answers a call light, without knowing the patient, can assist the patient,” says Sarah Archer, RN, nurse educator. “Patients get whatever they need more quickly.”

In an effort to further empower staff, in 2008, Gundersen Lutheran began encouraging the use of safety huddles for falls and other events. Now, some units huddle after every fall to see if there was anything that could have been done to prevent the fall. If an event or near-miss happens, anyone from a pharmacist, nurse, respiratory therapist, nurse assistant or resident can call a safety huddle with the care-giving team to discuss what happened, why and how it can be prevented in the future.

“One of the critical levers to quality improvement is staff engagement,” says Klock. “One of our key strategies for improving the workplace is to move beyond staff satisfaction to staff engagement.”

The medical/surgical unit began holding a huddle every time a fall that caused harm occurred. The staff identified a pattern: Some patients with confusion or developmental disabilities who had been asked if they needed to go the bathroom declined but then fell when they attempted to go on their own. So the staff changed its approach with rounding with these patients; staff would assist patients to the bathroom instead of simply inquiring about their bathroom needs.

Managing Organizational Variability

After making numerous changes during the pilot phase in the single medical/surgical unit, Gundersen Lutheran began implementing the refined approach to its other medical/surgical units in 2008. These best practices are being standardized across the organization and there has been a reduction of patient falls on these units as well.

Success begets more success. From May to October 2008, the compliance rate with hourly rounding rose from 39 to 88 percent. Additionally, there was one low-bed request in February 2008. By July, that number had climbed to 182. These measures show that not only is staff working to reduce falls, but also prevent them from occurring in the first place.

CONTINUAL IMPROVEMENT

The implementation of hourly rounding, patient education and the use of caution signs has been successful in eliminating some patient falls. Gundersen Lutheran continues to study other factors that contribute to falls and refine and expand its approach. It recently instituted continuous observation, accompanied by a behavioral log that results in the creation of an individualized plan of patient care with patient-specific fall reduction interventions. “Hourly rounding is great for patients who can talk and respond, but there are lots that can’t,” notes Kari Hamson-Kalis, RN, advance practice nurse, medical oncology.

The health system also plans to hold more education for its nursing staff on bedside assessments of patient handling needs. It wants to encourage its staff to implement a plan of care that reflects an individualized patient and family-centered approach.

TACKLING PROBLEMS USING THE ABCS

HAZLETON GENERAL HOSPITAL

- ◆ Hazleton, PA
- ◆ 150 beds
- ◆ www.ghha.org

Hazleton General Hospital is a 150-bed community hospital with a medical staff of approximately 100 physicians. It is part of the Greater Hazleton Health Alliance.

STEEEP

Safe

Performance on the five measures has increased markedly and has stayed high.

Timely

Several of the pilot projects, such as CT scans for stroke patients and antibiotics for surgery patients and ED patients with pneumonia, focused on carrying out interventions in a timely manner.

Efficient

The ABC process focuses on rapid-cycle interventions. Data were assessed weekly and process changes were made immediately after weekly meetings identified an opportunity for improvement.

THE PROBLEM

Hazleton General Hospital officials were unhappy with their performance on a number of core measures, many of which are on posted on the Hospital Compare Web site. Previous quality improvements efforts didn't always involve teamwork among affected departments, data would be collected for months before any action was taken, interventions were delayed and quality targets weren't always met.

THE SOLUTION

In January 2007, 14 people from across many disciplines at Hazleton began rigorous training in Baylor Health Care System's Accelerating Best Care (ABC) quality improvement process. The method focuses on three steps:

- » breaking problems down into small pieces;
- » quickly analyzing the situation through data collection; and
- » implementing rapid-cycle interventions.

During training, the Hazleton team settled on five areas in need of improvement—heart failure discharge instructions; antibiotic administration for ED patients with pneumonia; pneumococcal vaccinations; CT scans for stroke patients; and prophylactic antibiotics for particular types of surgery.

RESULTS

The hospital has shown sustained improvement in all five categories. From January 2007 to June 2008, compliance rose from:

- » 79 percent to 92.9 percent for heart failure discharge instructions;
- » 70 percent to 95.7 percent for timely antibiotic administration for ED patients with pneumonia;
- » 85 percent to 91.5 percent for pneumococcal vaccination of inpatients who meet the criteria;

- » 13 percent to 100 percent for CT scans within 20 minutes for stroke patients presenting to the ED; and
- » 20 percent to 83.3 percent for prophylactic antibiotics given to patients within an hour of particular types of surgery.

BACKGROUND

The idea for Hazleton's quality improvement project came from an unusual source—a state lawmaker, who secured a \$400,000 state grant for the hospital to implement the ABC quality improvement methodology. "Our core measures back then were not where they are today," says Anthony Valente, MD, vice president of medical affairs. "They were horrible, to be blunt."

President and CEO Jim Edwards, Valente and other hospital leaders already were eager to bring their numbers up, and they quickly made the decision to participate.

The 14 people trained in the ABC process settled on five pilot projects. The goal: to meet 100 percent compliance on each of the five measures. Multidisciplinary teams were created for each measure. These teams collected data and met weekly for 20 to 30 minutes to go over the results and brainstorm interventions that were applied immediately. "One of the nicest parts of this type of set up is that everything is immediate, and you can see where you're making your progress," says Gwen Boyle, RN, who participates on the prophylactic surgical antibiotic team. "You're not waiting and collecting data for months on months. It was really exciting as a staff person."

Boyle's team, with help from frontline staff, developed a process for carrying out and tracking the prophylactic surgical antibiotic measure in the short-procedure unit. When orders were processed the day before surgery, a pink sticker was placed on the chart noting the patient needed an antibiotic. A

TEAM MEMBERS

» **Andrea Andrews, RN**

Director
Quality Case Management
and Hospital-Wide
ABC Facilitator

» **Gwen Boyle, RN**

Case Manager

» **Jim Edwards**

President and CEO

» **Anthony Valente, MD**

Vice President of Medical Affairs
and Vice President in Charge
of the ABC Process

form was placed at the top of the chart that identified the antibiotic to be given. It also was used to document the time the antibiotic was given, whether it had been given within an hour of incision, and if not, the reason why. The form would go to the operating room with the patient, come back with the patient and then be placed in a folder for data collection and weekly analysis.

The ABC process is “light years different” from other quality improvement efforts, Valente says. “A lot of quality initiatives are drawn out or burdensome. They don’t produce results in a timely manner or don’t get you to the goal because they’re just a shotgun approach. They try to fix the whole problem hospital-wide or system-wide before you’ve taken baby steps.” In the ABC process, teams identify areas where they can get the biggest bang for the buck, he says. “You work those leverage points, see the results, and if it works, you continue. If it doesn’t, you move on.”

The rapid-cycle interventions showed results quickly. Early success spurred the hospital to take the ABC process facility-wide in July 2007. As of January 2008, all quality improvement projects follow the methodology. Hazleton has approximately 40 ABC teams in place. “Now when you have an issue or a problem, the first thing everybody thinks of is ‘let’s put an ABC team in place,’” says Andrea Andrews, RN, director of quality case management.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

Although the idea to use ABC came from hospital leaders, the staff quickly embraced the method. Frontline staff constantly brought ideas to the five core measure teams. The interventions “all came from going to the staff and saying, ‘if this is what we need to do, how do you think we could do it?’” Boyle says.

The ABC program empowered the staff, Andrews says. “Many times in the past people were afraid to say anything for fear of sounding inept. This process allows you to become involved and say what you are really thinking because your idea could be the best one of all.”

The program stressed rewards and recognition. If an ABC team performed well, they might receive a pastry tray or congratulatory balloons, says Andrews. “That little bit of gratitude meant all the world to the team.” Staff members were happy to know that they were involved in the process and felt good knowing that people realized it, Boyle says. “It helped them to buy into the process.”

Removing Waste

A financial analysis estimated the ABC program would produce efficiencies, as well as improve quality. For example, hospital officials calculated that if they complied with the surgical antibiotic measure 100 percent of the time, it would save \$292,200, prevent 638 hospital days and save two lives each year.

That last figure is the most important, Valente says. “If you’re looking at saving a life or two every year by our improvement in

pneumonia, and another couple of lives by our improvement in antibiotic prophylaxis, if you have multiple of projects going on, before you know it, you’re in double-digits [number of lives saved],” he says. “For a hospital our size, it’s really nice to think about because we’re a small community.”

CONTINUAL IMPROVEMENT

Compliance rates vary from month to month, and although they’re high, they haven’t continuously hit 100 percent. The staff will continue to keep the numbers up and strive for perfection.

Meanwhile, the ABC process is being applied beyond the initial five measures. For example, the methodology is being used to try to lower Hazleton’s average length of stay from 4.7 days to 4.0 days. Using the ABC approach of breaking a problem down into small pieces, the hospital initially focused on one physician with high volume and a high LOS. In two months his average dropped to two days. The hospital is now gradually expanding the effort, Valente says.

REDUCING FALLS

MERCY HEALTH CENTER

- ◆ Oklahoma City, OK
- ◆ 351 licensed beds
- ◆ www.mercyok.com

Mercy Health Center is a full-service tertiary hospital that serves a six-county area with a 1.04 million population. It is part of Sisters of Mercy Health System

STEEEP

Safe

Decrease in number of patients falling and associated injuries.

Timely

Pharmacists on the floors can consult with doctors and nurses more readily.

Efficient

Money saved from decreased fall rate.

THE PROBLEM

Falls are a serious problem for older people, composing the largest single category of reported incidents in hospitals, according to the Joint Commission. Falls pose an even greater risk for older hospitalized patients. Even with daily fall-risk assessments, Mercy Health Center had more than twice the rate of injury-related falls than other hospitals of its size—2.4 injury falls per 1,000 patient days in late 2004 versus 1.1 for similar hospitals.

THE SOLUTION

The solution was to improve the hospital's fall prevention program by assessing the pharmacological effects of patient medications on fall risk. The Pharmacy Fall Prevention Program, where clinical pharmacists and nurses work collaboratively to generate a medication-specific fall risk score for each admission, is designed to reduce medication-related falls and their associated injuries and improve quality of care.

RESULTS

- » 49 percent decrease in total falls.
- » 36 percent decrease in falls leading to injury.
- » Nearly \$400,000 saved annually.
- » Injury falls decreased from an average of 1.7 percent in October 2005 to 0.88 percent per 1,000 patient days for the medical/surgical units by December 2006.

BACKGROUND

Some hospitalized patients are at high risk for falling, which can adversely affect their quality of life. Mercy Health Center was experiencing about twice the rate of patient falls than other similar-sized institutions, despite having a falls and restraints committee in place and nurses assessing patients for fall risk each day. In 2004, Teri Round, RN, director of specialty services, suggested a clinical pharmacist be appointed to the falls committee.

Hospital pharmacist Burl Beasley joined the committee and quickly suggested patients be assessed for fall risk based on their medications. Several medication classes commonly given in the hospital are recognized to contribute to the risk of falls by causing sedation, dizziness, altered gait and balance and impaired cognition. Older patients, who may be weaker and who suffer from multiple conditions or are on multiple medicines, are at particular risk.

The notion: search the literature to find a tool to rate medicines in terms of fall risk and supplement the hospital's current way of assessing fall risk. "The problem was nobody had done that before," says Beasley, who scoured the literature and developed a way to classify medications, along with a screening system. The result was the Medication Fall Scale, a summary of a patient's risk of falling due to medicines in a single numeric value. The hospital tested the tool and the project was designed to comply with the Joint Commission's National Patient Safety Goals of reducing the risk of patient harm resulting from falls.

TEAM MEMBERS

- » **Burl Beasley**
Chair, Clinical Pharmacist
- » **Linda Fanning, RN**
Nursing Administration
- » **Donna Poole, RN**
Informatics Nurse
- » **Frederick Delafield, MD**
Physician Liaison,
Falls and Restraints
- » **Keith Madison, PharmD**
Pharmacy Director
- » **Teri Round, RN**
Nursing Administration
- » **Edna Patatanian, PharmD**
Associate Professor

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of a High-Reliability Culture

Sometimes you just need a different perspective to fix a problem. Bringing in a clinical pharmacist made sense for several reasons, says Round. First, “when you look at the falls literature, medication pops out,” she says. Second, having pharmacists educate nursing staff was critical, she says, “nurses responded to them, it was interactive.” Physicians also quickly bought into the expertise the pharmacists provided.

Pharmacist Beasley saw the problem and by working with nursing and information technology departments, designed a daily computerized report that calculated a Fall Risk Medication Score (MFRS). As part of nurses’ daily effort to assess patient fall risk, a new admission, a change in medication or a newly ordered one, triggers a MFRS. The computer tallies results based on numeric value assigned to medications in database, and reports are generated to clinical pharmacists for patients with a 6 or greater MFRS. About 15 percent of patients receive full medication reviews by a pharmacist, who then makes recommendations to physicians on how to reduce fall risk, including suggested changes in drugs, doses, laboratory monitoring and increased patient and family education.

Adding the MFRS into the nurses’ daily patient fall risk assessment went smoothly. “It was adapted very easily,” says frontline nurse, Emily Eriksson. “Pharmacy was doing all the work. It was very beneficial to the nurses.” After all, even with nurses previously assessing fall risk with the Morse Fall Scale, Mercy’s fall rate still was high. One important reason why the introduction of this intervention went without hitches was a change Mercy made previously—decentralizing the role of pharmacists. “To do this program, you have to be on the floor,” Beasley says. Mercy’s clinical pharmacists are on the units; they work with nurses and physicians daily, rather than being stationed in the basement of the hospital. As a result, the pharmacist and the nurse already worked together in establishing automatic medication dispensing and bar coding. “It’s a cultural revolution,” notes Keith Madison, Mercy’s pharmacy director. “This is change management.” When you have clinicians on the floor at the point of care, information is collected on a real-time basis and potential problems can be solved then, Round agrees.

“This program is huge for patient safety,” says Eriksson. “It’s huge for nursing and it’s huge for the patient. We can advocate keeping patients safe. We’re also much more aware of a patient at risk for falling now.” If a patient is at risk for falling, nurses complement the pharmacists’ recommendations with practical strategies, from lowering a patient’s bed, outfitting patients with green armbands, placing “Look at Me Please”

magnets on patient doors, setting bed alarms and other strategies to alert others of the patient’s risk. “We look at patients individually, not en masse,” says Round.

CONTINUAL IMPROVEMENT

Decentralizing clinical pharmacy was a huge step for Mercy Health Center. “Decentralization is a natural progress for what we need to do,” says Round. After pharmacy and nursing worked to implement automatic dispensing, bar coding and other early wins on patient units, it made sense to target patient falls. More recently, Mercy has targeted assisted falls, or falls involving both a patient and someone assisting a patient. This involved increased education and equipment to help keep patients and staff safe. Adding a sitter program—hospital volunteers or others to come in and sit with patients at-risk for falls—could also be in the offing.

The team also is looking to adapt the effort to fit within the emergency department and outpatient areas. Additionally, the falls prevention program is being considered for implementation in other Mercy system hospitals. “If things are getting stale, step back and look at it differently,” says Round. “And get the right people involved.”

SAVE OUR SKIN: PREVENTING PRESSURE ULCERS

OSF ST. FRANCIS MEDICAL CENTER (SFMC)

- ◆ Peoria, IL
- ◆ 616 beds
- ◆ www.osfsaintfrancis.org

OSF St. Francis Medical Center serves a 37-county area. Owned by the Sisters of the Third Order of St. Francis, SFMC is a teaching hospital and has a Level I trauma center. It is part of OSF Healthcare System.

STEEEP

Safe

Substantially lowered pressure ulcer incidence rate.

Timely

Every two hours each adult patient is repositioned to prevent pressure ulcers from developing.

Effective

1,700 fewer SFMC patients a year develop pressure ulcers.

THE PROBLEM

Nearly one million people develop pressure ulcers each year, and 60,000 U.S. hospital patients die annually from complications related to pressure ulcers. The treatment costs can be significant; treating a pressure ulcer can run \$2,000 to \$70,000 per wound. The national incidence of hospital-acquired pressure ulcers averages from seven to 10 percent. At 9.4 percent, SFMC found its rate unacceptable.

THE SOLUTION

SFMC developed a comprehensive program, called Save Our Skin (SOS), to reduce the incidence of pressure ulcers among patients. The key elements of the program incorporates evidence-based practices and includes upgrading mattresses, clarifying staff roles and protocols and improving measurement and communication of pressure ulcer performance data.

RESULTS

- » SOS reduced the incidence of pressure ulcers from 9.4 percent in 2001 to 1.5 percent in 2006, the end of the official study period.
- » Progress continues, as the rate dropped to 0.6 percent as of September 2008.

BACKGROUND

When SFMC officials committed to pressure ulcer prevention in 2001, the institution was becoming a Six Sigma organization and its corporate office was looking at nursing quality across the system. “Pressure ulcers are a key indicator of nursing care,” says Bevette Griffin, RN, a certified wound ostomy nurse. Yet pressure ulcers were far too common at the hospital.

Why was the rate so high? As with many hospitals, pressure ulcers weren’t prominent on the radar at SFMC, even though guidelines for their prevention exist. Pressure ulcer prevention protocols often aren’t followed because the problem falls down the pecking order of duties of nurses, who typically need to deal with more acute patient problems.

“We put the evidence-based practice in place, but we did not have a process to support our efforts” says Hoa Cooper, then a Six Sigma black belt. To develop such processes, SOS champions were assigned on each patient care unit to provide education and support; a measurement tool was put in place so each unit could assess progress; a policy of turning patients every two hours was enacted with follow-up medical record documentation; pressure-redistribution mattresses were purchased; and the SOS effort was made public as each unit’s quarterly results are published.

“We put accountability back into the system,” Cooper says. A “quick win” was crucial for staff to see progress. Pressure ulcer prevalence was cut by half within five months; this initial success provided momentum, but sustaining the effort required other changes. These include playing part of the Olympic theme song over the hospital speaker system every two hours as a reminder to nurses, sending nurses a page message every two hours to prompt them to reposition their patients, conducting regular chart audits, and placing SOS signage on at-risk patients’ doors.

TEAM MEMBERS

- » **Susan Campbell, RN**
Chief Nursing Officer
- » **Lynn Folkerts, RN**
SOS Champion
- » **Melissa Klyber, RN**
CWOCN
- » **Hoa Cooper**
Operations Director
for the Hospitalist Services
- » **Bevette Griffin, RN**
Certified Wound Ostomy Nurse
(CWON)
- » **Deborah Schimmelpfenning, RN**
CWON
- » **Mike Cruz, MD**
Vice President
for Quality and Safety
- » **Cassy Horack, RN**
Director of Quality and Safety
- » **Keith E. Steffen**
CEO

The effort wasn't flawless, and some nurses resisted. "They thought it was too basic," recalls Susan Campbell, RN, chief nursing officer. The perception among nurses was that they were already doing the things to prevent pressure ulcers. But that wasn't the reality. "Nurses will respond to science and evidence-based care," notes Griffin. After showing them the facts, the message was while you may be doing it, doing it consistently is what matters.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Eliminating Defects

SOS gave the initiative leaders a reason to step back and examine why pressure ulcers were frequent events. "We realized some started in surgery," says Campbell. The reason: patients were in the same position for up to several hours. "Trauma patients also were discovered to be at risk, because many lie prone on a backboard for extended periods. Other units, from cardiac care to orthopedics, were examined in order to get a better sense of the root causes of pressure ulcers.

Patients themselves were more thoroughly assessed. The hospital was admitting older and sicker patients. Poor nutrition is also another contributor to pressure ulcers. Traditional hospital mattresses contributed to pressure ulcers. Identifying root causes of pressure ulcers allowed SFMC to address the problem more effectively.

Creation of High Reliability Culture

Commitment starts with leadership. The decision to purchase pressure redistribution mattresses sent the message to staff that administration at SFMC was committed to improving patient care and serious about the effort. "This showed that SFMC leadership was committed to high quality care that is safe for their patients," says Cassy Horack, director of quality and safety.

Giving frontline workers ownership of SOS was essential. Confronting some initial hesitation, managers and SOS champions worked with nurses to identify and address perceived barriers. Once the tools and basic processes were in place to guide nurses, a good thing happened—SOS became a priority among staff. Suddenly, lift teams sprouted to turn certain patients, for example. Keeping patients pressure ulcer free has become a badge of honor. When the orthopedic unit suffered its first patient pressure ulcer in three years, Lynn Folkerts, RN, an SOS champion, called it "devastating."

While nurses were given more ownership, accountability was also built into the initiative. Monthly chart audits were done until a 90 percent compliance rate was reached; now audits are done quarterly. Four indicators are measured: initiation of prevention protocol; providing patient/family education; documenting patient repositioning every two hours; and putting SOS signs on patient

doors. Units that didn't meet the targets have to develop action plans and return to monthly audits.

CONTINUAL IMPROVEMENT

"It's been a journey," says Campbell. "We keep fine-tuning and fine-tuning." When lift teams were instituted, the incident rate fell lower. Every bit helps, not only in terms of preventable patient harm, but it helps SFMC financially. Compared to its baseline pressure ulcer incidence rate, the hospital now saves about \$4 million annually. Those savings became important in October 2008, when Medicare stopped paying hospitals for hospital-acquired pressure ulcers. Meanwhile, SFMC continues to seek to prevent pressure ulcers, even scrutinizing units not traditionally thought of as sources for the condition, such as the pediatric intensive care unit.

CUTTING WASTE SO NURSES CAN BETTER CARE FOR PATIENTS

PRAIRIE LAKES HEALTHCARE SYSTEM

- ◆ Watertown, SD
- ◆ 81 beds
- ◆ www.prairielakes.com

Prairie Lakes Healthcare System is a rural hospital serving 85,000 people in a seven-county service area in northeastern South Dakota.

STEEEP

Safe

Workflow and technology enhancements around medication administration helps provide safer care with fewer interruptions during the administration process.

Efficient

Significantly improved the HPPD productivity performance.

Patient-centered

Dramatic increase in the amount of time nurses spent in direct patient care.

THE PROBLEM

Administrative burdens and inefficient processes left nurses spending just one-third of their time caring for patients on the 52-bed medical/surgical unit. Most of their time was doing paperwork, hunting down supplies, documents and people and other non-direct care activities. Nurses likened working on the unit to hard labor. Nurse turnover was 65 percent.

THE SOLUTION

Patient-centered care, as the IOM points out, is a foundational domain of high quality health care. To provide such care, nurses need to be able to spend more time providing direct patient care. Nurses undertook wide-ranging steps—including technological, workflow and communication changes—in order to get nurses back to what they do best, caring for patients.

RESULTS

- » Nearly doubled the amount of time medical/surgical nurses spent directly caring for patients, from one-third of a typical shift in 2001 to approximately 60 percent today.
- » Reduced nurse turnover rate from 65 percent in 2000 to less than 10 in 2008.
- » Admission time decreased from an average of 90 minutes to 15 minutes.
- » Readmission rates continue to drop; 30-day medical/surgical readmission rates dropped from 7 percent in 2006 to 5 percent in 2008. (National rates are approximately 18 percent.)

BACKGROUND

Taking good care of our neighbors was an impetus for removing waste and barriers in the hospital's patient care processes, Prairie Lakes' CEO Paul Hanson says. The goal—getting nurses back to providing direct patient care. Doing so would bring returns for the hospital, leaders figured, including reducing nurse turnover rates. But how an organization implements this can spell the difference between success and failure.

"It really comes down to understanding and trusting the nurses," Hanson says. "We in the C-suite have to trust our line staff, and we did."

With that trust, the nurses shook up the medical/surgical unit. "The work intensity was too great on the unit, and nurses didn't want to be there," recalls Jill Fuller, RN, the hospital's chief nursing officer. A new organizational structure was needed. First, the nursing leadership was reorganized. The nurse manager who oversaw both the medical/surgical and obstetrics units was assigned to manage only the obstetrics unit. In 2001, a full-time manager was assigned to medical/surgical and assistant manager positions for both obstetrics and medical/surgical were eliminated. "That was the first change," notes Cindy Ruedebusch, RN, hospital resource nurse.

The medical/surgical nursing team studied the tasks a nurse had to perform in just the first hour of a shift. They found that paperwork was overwhelming and that nurses constantly were working around barriers or mending system breakdowns. The hunting and gathering for supplies, equipment, documents and people was endless. Communication breakdowns were common.

"The bottom line is we had an unhappy workforce," Fuller says. And, leaders observed, an unhappy workforce often leads to unhappy patients.

TEAM MEMBERS

- » Penny Eickholt, RN
- » Jill Fuller, RN
Chief Nursing Officer
- » Paul A. Hanson
CEO and President
- » Cindy Ruedebusch, RN
- » Shelly Turbak, RN
Medical/Surgical Director

At the same time, hospital leaders established productivity goals. It gave nurses a context for redesigning systems. “Our mantra was we’re going to do less with less,” Fuller says—meaning less of the non-patient care tasks that amounted to busywork.

With that mindset, the nurses led a medical/surgical redesign that ultimately changed the admissions process, care planning, medication administration, patient care documentation, information management systems, clinical procedure protocols, patient and family education and the discharge process.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

The change in organizational structure on medical/surgical unit was followed by several other changes. The nurses set out to change the care delivery model. The unit implemented a team-based model, with every nurse touching patients. Starting with a 10-bed pilot project in 2002, the charge nurse position was dissolved and replaced by a resource nurse. The primary role of the resource nurse was to be an admission partner to assist bedside nurses. “It decreased the work intensity around admissions,” Ruedebusch says. The pilot was successful and these changes in nursing roles were sustained. The key to success was letting frontline staff drive change. “There are four degrees of separation from myself and a nurse,” Hanson says. “The C-suite can make decisions...and think they are good for the unit, but without staff input and direction, we can be way off base.”

Reducing Process Variation

Moxie and technology helped the medical/surgical staff redesign processes around patient care documentation, supplies and equipment, medication administration and communication. “We blew up our old medical record,” Fuller says. A transition to an electronic health record allowed staff to redefine the patient record and eliminated redundancies, and made changes that enhanced patient care. For example, pharmacists create the patient’s electronic medication administration record, a task that had been done by nursing and unit secretaries.

It made no sense for nurses to conduct the requisite hunting and gathering expeditions for supplies and equipment. Over time, medical/surgical beds were converted to those with built-in scales. “We set up a standard so each room had a consistent set-up,” Fuller says. Rooms were fitted with “servers,” a special cupboard that can be stocked from the hallway and can be accessed from a patient’s room. Working with materials management, supplies are regularly restocked in this server. “Nurses also developed ‘grab and go’ bins that contain supplies for commonly performed procedures,” she says.

To improve efficiency and safety, medication administration was changed. Medications are in a locked drawer in the server in each patient room, so nurses can prepare medicines at the bedside without the distractions that come with preparing medicines at a central station. “Nurses used to experience up to seven interruptions before,” says Shelly Turbak, RN, medical/surgical director. “That’s very unsafe.” Now, pharmacy techs stock routine scheduled medicines in the server. A

unit-based pharmacist stocks urgently needed medicines following an order and flags the server cabinet to alert the bedside nurse of the replenishing. The medication administration record is pulled up on the wireless laptop in the room.

Several communication-related changes were made—among the most basic and most helpful to nurses has been the addition of walkie-talkies. “Instead of wandering around looking for help, we use walkies now,” says Penny Eickholt, RN. All of these changes allow nurses to spend more time with patients. “There is more education done,” Eickholt says. “Patients feel more prepared for discharge.”

CONTINUAL IMPROVEMENT

The team is continually improving the work environment and processes on the medical/surgical unit. Patient care documentation systems are modified on an ongoing basis to improve efficiency. New projects—including current implementation of bar code medication verification—are introduced with special attention to workload so productivity improvements are sustained and nurses can spend more time with patients. The hospital benefits too. For example, the reduction in paid nursing hours was possible because of work redesign efforts that decreased time nurses spent managing paperwork and inefficient systems. “We also have less overtime and less staff turnover which has improved our productivity” notes Fuller. “The staff on this unit spend more time in direct care and value-added activities and, as a result, are more productive.”

EMPOWERING NURSES TO REDUCE FALLS

SOUTHEASTERN REGIONAL MEDICAL CENTER (SRMC)

- ◆ Lumberton, NC
- ◆ 403 beds
- ◆ srmc.org

SRMC is an acute care hospital southeastern North Carolina, offering cardiac and cancer care, along with hospice and long-term care. It serves as a referral center for a large swath of rural southeastern North Carolina.

STEEEP

Safe

The falls prevention project at Southeastern is a major component of its patient safety efforts.

Timely

With hourly rounding, patients are checked on in a timely manner.

Patient-centered

The falls project increases the attention given to patients to ensure their wellbeing.

THE PROBLEM

The organization was recording more patient falls than its leadership considered acceptable; approximately 25 falls each month. The nursing performance improvement department tracked falls and reported them to the Quality Indicator Project, a project of the Maryland Hospital Association, whose data center helps hospitals maintain, analyze and compare their quality data. SRMC found that its rate of falls was higher than average in the project's database. Falls prevalence was one of the metrics included in the nursing performance improvement dashboard adopted by the hospital in 2004, and that tool indicated that falls was an issue that needed special attention.

THE SOLUTION

The hospital's multidisciplinary patient care council named a falls task force to analyze each incident, examining root causes. The work group consisted of 10 clinical managers and directors, staff representatives from the units and the patient practice and quality councils. As a result, the hospital instituted hourly rounding to check on patients, particularly those identified as fall risks. All staff were taught to be vigilant of these patients, identified with an orange armband and a fall-risk star on the outside of their rooms.

RESULTS

- » Falls have declined from 25 per month to an average of 11.5, and that includes falls assisted by a caregiver (the pre-project count included only non-assisted falls). This places Southeastern below the 25th percentile on falls in the Maryland database.
- » Patient satisfaction has risen from 91 percent to 93 percent overall and by five to 10 points in units that had low satisfaction rates. (Southeastern gauges patient satisfaction using a survey designed by a regional vendor.)

BACKGROUND

Given their hands-on role in patient care, nurses are considered critically important for improving quality at Southeastern Regional and were given a starring role in the hospital's quality improvement effort.

In 2004, the hospital instituted a nursing performance improvement dashboard to track quality indicators, including falls. This dashboard rolls into bigger, organization-wide quality measures that are reported to management and the board of directors. Comparing its performance on those metrics with the Maryland-based Quality Indicator Project, the hospital found that it was above the 50th percentile on falls and sought answers why.

To do so, the organization assembled a task force that included frontline staff, nursing assistants and management. "Every time we had a fall they would drill down and see how the fall occurred retrospectively," recalls Teresa Barnes, vice president of patient care services.

TEAM MEMBERS

- » **Joann Anderson, RN**
President and CEO
- » **Teresa Barnes, RN**
Vice President
of Patient Care Services
- » **Pamela Jackson, RN**
Director, Medical/Surgical Services
- » **Donna Kinlaw**
Assistant Director of Nursing,
Performance Improvement
- » **Ruth McCallister**
Nursing Assistant
- » **Magenta Smith, RN**
Performance Improvement
Coordinator
- » **Beverly Taylor, RN**
- » **Beth Thorsten**
Survey Readiness Coordinator

The task force, meeting regularly for nearly two years, concluded that most of the falls were the result of a patient needing to use the restroom. Sometimes the patient is confused and doesn't seek help before getting out of bed. Even though the hospital was using an automated bed exit system that sent out an electronic alert when the patient got up, that didn't allow enough time to get someone in the room to help.

The first step in resolving the problem was creating a turn team, which consisted of a team leader and two nursing assistants going into the room every two hours to assist the patient in going to the bathroom. "That greatly reduced our number of falls," notes Pamela Jackson, director of medical/surgical services. The number of falls decreased by 45 percent. But the improvement group wanted to do better, so it went to checking on patients every hour. It does not yet have figures on the impact of that change.

The team instituted standardized protocols to prevent falls. Patient risk of falls is assessed every shift, and those with a high risk are given an orange armband and a "falling star" sign outside their rooms. Housekeeping and other ancillary departments are taught what that means so their staff can serve as extra surveillance. Nursing assistants are educated about how to be sure every patient has easy access to a call button and the telephone. Bed rails are kept up except for one side.

In addition to cutting its falls rate by more than half and seeing patient satisfaction increase, managers are getting positive feedback from patients who appreciate being checked on regularly, reports Beth Thorsten, the hospital's survey readiness coordinator. Anecdotal evidence indicates that call light use is down as well, although that is not yet supported by data.

PRINCIPLES OF PERFORMANCE EXCELLENCE

Creation of High-Reliability Culture

The falls project is part of an initiative to empower nurses. The hospital spent two years seeking the American Nurses Association's Magnet Hospital status, which was achieved in February 2008.

This goal filters down through the organization by tracking quality measures at both the top level of the hospital and within the nursing department, where a nursing quality improvement dashboard gets regular attention.

CONTINUAL IMPROVEMENT

Nurses fill out an incident form when there is a fall and report whether someone was there to assist the patient, where the patient was found, the patient's vital signs and what the patient said happened. Review of the form allows the improvement team to find out whether the falls risk assessment score predicted the fall. The incident reports also go to the risk department, where they are quantified.

The rate of falls is and will remain a benchmark on the nursing improvement dashboard, and hourly rounding will remain the standard to keep the number of falls low. "Hourly rounding has been hard wired into our daily nursing practice," Thorsten explains.

The patient care council looks at every case where a fall resulted in an injury and analyzes whether everything had been done to prevent it. The improvement team also analyzes trends to find opportunities for improvement, and presents these as education in each unit. Units are monitored for the number of falls each month and the unit manager uses that information to immediately communicate with staff to shore up support for falls measures.

"Not all falls are going to be prevented," Barnes says. "But we want to be sure we've done everything in our power to keep them from happening."

NOTES



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