

# Patient Safety: A Cure For What Ails Us?

An unprecedented focus on reducing medical errors is mobilizing healthcare facilities around the world to improve patient safety. Two U.S. hospitals are leading the way, utilizing information technology to inspire continuous learning and proven outcomes.

by Jennifer Klock

*In November 2005, an 18-year-old girl agreed to undergo chemotherapy, hoping it would cure her lymphoma. Instead, it killed her — a preventable medication error at the hands of hospital personnel. This patient was mistakenly given another patient's medication, a cancer-fighting drug called Vincristine, injected into her spine. An intravenous treatment, Vincristine is frequently fatal when administered via alternative methods. She died three days later, a victim of an adverse "wrong route" drug error.\**

Unfortunately, this patient is only one of an estimated 98,000 patients who die each year as a result of preventable medical errors. In 1999, the Institute of Medicine (IOM) released an industry wake-up call in its landmark

report, *To Err is Human: Building a Safer Health System*. The report cited medical errors as the eighth leading cause of death in the U.S., killing more people per year than breast cancer, AIDS, or motor vehicle accidents. More recently, new data from The Commonwealth Fund, a private, nonpartisan foundation supporting independent health and social issues research, found that one-third of U.S. patients have experienced medical mistakes or medication errors first-hand — the highest rate of six nations surveyed.

Given such staggering statistics, it's not surprising that today's healthcare industry places an unprecedented focus on reducing medical errors, mobilizing a groundswell of activity and support among hospital leaders to improve patient safety. For two leading health-

\*Adapted from a real-life story, <http://www.mercurynews.com/mld/mercurynews/living/health/1308936.htm>.



Dr. Quinn and Mannion, who together led Meridian's CPOE system development, review information records in the hospital's data center.

care systems, McLeod Regional Medical Center (McLeod) and Meridian Health (Meridian), this movement has inspired a new culture of accountability, continuous learning, and implementation of information technology (IT) solutions.

## Pursuing Perfection

Responding to the call to action for a superior health system that achieves the promise of high quality medical care, South Carolina's McLeod has crossed the chasm between the quality of care that is and the quality of care that should be. Five years ago, McLeod, the main care center of the private, not-for-profit healthcare organization, began a hospital-wide program to improve quality. Renam-

ing its quality assurance department "clinical effectiveness," the facility set out to establish physician-led, data-driven, and evidence-based initiatives to decrease length of stay, reduce costs, and increase positive outcomes such as patient safety.

In 2002, McLeod was one of seven facilities nationwide selected to lead America's battle cry for improving healthcare quality through *Pursuing Perfection: Raising the Bar for Healthcare Performance*, a \$21 million grant program to help hospitals improve patient outcomes in their major care processes. Funded by the Robert Wood Johnson Foundation and led by the Institute for Healthcare Improvement (IHI), this initiative provided \$1.8 million and served as the financial catalyst in fulfilling McLeod's vision of medication safety.



McLeod's staff meets at a nurse's station to discuss the medication procedures that are at the heart of the hospital's patient safety program, *Pursuing Perfection: Raising the Bar for Healthcare Performance*.  
Photo courtesy of McLeod Regional Medical Center

"Our goal is to perfect our medication delivery system so that it is safe for every patient, every time, while making it easy for caregivers to do the right thing and impossible to do the wrong thing," explained Marie Segars, chief nursing officer of McLeod. Challenged by its ambition to eliminate adverse drug events (ADE), McLeod aimed to simplify and standardize workflow by automating its entire medication process. Through IT integration, McLeod became the first U.S. healthcare facility to implement full closed-loop medication process-

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ing using a Siemens Medical Solutions portfolio that includes Med Administration Check™ (MAC), Pharmacy and INVISION® Computerized Physician Order Entry (CPOE).

"Our patients need to be able to count on receiving healthcare that is safe," explained Janice Fraley, chief information officer of McLeod. "To accomplish this, we needed a system that not only prevents errors, but one that helps us learn our lessons when those unfortunate errors do occur. Siemens IT solutions were a facilitator in helping make this happen."

## IT to the Rescue

Not long ago, the idea of supporting healthcare initiatives with IT solutions seemed inconceivable. But now, IT automation capabilities play a leading role in the reduction of medical errors. Two such IT applications, bar code technology and CPOE, are revolutionizing the clinical care process and dramatically improving patient safety across the enterprise.

CPOE systems are growing in popularity as healthcare facilities begin to recognize their paramount capacity to reduce medication errors. KLAS Enterprises, a research firm specializing in monitoring healthcare IT performance, recently reported a significant increase for 2005 in CPOE implementation across the industry, marking a 163 percent growth in CPOE adoption among non-teaching facilities and a 60 percent increase among teaching hospitals since 2003.

Applied to almost any kind of order a physician may make, including prescriptions, laboratory tests, diagnostic imaging, and a variety of therapies, CPOE automates and double-checks the ordering process, putting all of the data into a digital world. Physicians can access patient charts remotely and enter orders based on real-time test results and information within the patient's medical record. Meanwhile, the phar-

macist, radiologist, physical therapist, nurse, and the emergency room doctor can all view the same information through the system when they need it, without ever having to search for a paper-based chart or record.

CPOE systems further aid clinicians in making informed decisions when ordering medications, avoiding potentially serious problems, diminishing rejected claims, and minimizing duplicate testing. Flagged alerts immediately warn of possible drug interactions, dosing irregularities, or inconsistencies with patient factors such as allergies or pregnancy. Additionally, these systems minimize misinterpretation of handwriting, decimal points, or abbreviations.

Similarly, bar code technology enables clinicians to automate, track, and assure quality throughout the medication management process from order entry through administration. According to the U.S. Food and Drug Administration (FDA), bar coding has helped reduce medication error rates in hospitals by as much as 85 percent by bringing the data entry process to the bedside.

Bar code systems scan the nurse's identification badge and the drug to be administered and then matches the codes with a computerized list, automatically validating and documenting the medication orders and culminating with scanning the patient's wristband. This automates the administration process by cross-checking what healthcare professionals call the "five patient rights": right drug, right dose, right route of administration, right time and right patient.

In the anecdote at the beginning of this article, bar code technology would have sent a red flag to the administering nurse, warning that both the medication and route were incorrect for that particular patient. Had a bar code system been in place, that patient's life may have been saved.

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U.S. Health and Human Services press release, February 2005, "HHS Announces New Requirements for Bar Codes on Drugs and Blood to Reduce Risks of Medication Errors"



A large acute-care hospital founded in 1906, McLeod Regional Medical Center in Florence, SC, is nationally recognized for its successful patient safety program founded on a data-driven and evidence-based approach to clinical care.

*Photo courtesy of McLeod Regional Medical Center*

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## Innovative Solutions

Meridian, a three-hospital health system in New Jersey and winner of the



Becki Weber, chief information officer and vice president, is a passionate supporter of information technology integration in healthcare, helping to lead Meridian's patient safety initiatives.

2005 John M. Eisenberg Patient Safety and Quality Award, is a passionate advocate of IT integration in healthcare.

To achieve its IT goals, Meridian used CPOE as the primary foundation and enhanced the solution with its own embedded evidence-based best practice guidelines. Using IT to capture and communicate critical knowledge at the point of care, Meridian leveraged CPOE as an interactive decision-support resource.

“Meridian's CPOE system has built-in intelligence that prompts physicians to follow national best practice protocols or to document their reasons why not,” explained Margaret Quinn, M.D., chief medical information officer of Meridian. “The result is a valuable interactive tool for physicians and an added layer of quality assurance for the patient.”

Recognized as a pioneer in the global journey toward improving patient safety, Meridian reports that among its clinicians using the CPOE solution, compliance with protocol-supported Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Core measures, which include acute myocardial infarction, heart failure, pregnancy and related conditions, and community acquired pneumonia, is 100 percent.

## Culture of Change

Technology is only part of the initiative to make the nation's health system a safer one. Another significant factor is the human element, requiring a culture of safety and active participation of all healthcare professionals within the hospital. Today, McLeod and Meridian are IT success stories, but the results were not immediate. While technology enabled the implementation of numerous safety measures at both hospitals, cultural change within the facilities was vital to providing safe medication processes.

“When you make far-reaching changes, acceptance is always slow at first,” said Becki Weber, chief information officer and vice president of IT at Meridian.

“Once the clinicians began seeing the difference IT was making, the rate of acceptance quickened.”

She offered an anecdote from Meridian’s trauma center as confirmation: “A comatose patient was admitted to the emergency room. Without any family available to give the patient’s medical history, the nurse convinced the doctor to use the hospital’s CPOE system. Within seconds, the doctor had the patient’s medical record at her fingertips. The patient was previously treated at another Meridian location so an allergy alert immediately red-flagged a standard medication. Erring on the side of safety, the doctor chose an alternative medicine, saving the patient’s life and making the doctor a true believer and CPOE user.”

“Instead of telling doctors and clinicians why, we show them how,” emphasized Weber. “Meridian’s CPOE program is successful because the entire patient care team works together to achieve the best possible results for our patients. All it takes is preventing one error to make it worthwhile.”

Fraley of McLeod agrees. “The best technology in the world is guaranteed to fail if the hospital doesn’t work together to implement it and if the doctors don’t believe in it.”

McLeod drove its cultural change by tapping into the needs and thoughts of key players. A brain trust of 14 hand-selected physicians helped improve the IT process by developing queries of needed information that were then interlaced into the programs, customizing the technology and increasing value for its users.

“It took about eight months to get everyone on board,” said Fraley. “But, there’s no turning back now – the clinicians love having the ability to take care of their patients while viewing clinical records at the same time.”



A nurse at McLeod Regional Medical Center scans the bar code of a patient’s armband to check medication safety. McLeod staff, pictured from left: Marie Segars, vice president of Patient Services; Donna Isgett, vice president of Clinical Effectiveness and nurse Lawanda Williams.

*Photo courtesy of McLeod Regional Medical Center*

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## Eliminating Medical Errors: A Long-term Global Challenge

- An average of one in every ten patients hospitalized throughout the world suffers some form of preventable harm that can result in severe disability or even death.  
– 2004 statistic from the World Health Organization (WHO)
- An estimated 7.5 percent of patients admitted to Canadian hospitals in 2000 experienced one or more adverse events. One-third of the events were highly preventable.  
– 2004 article in *Journal de l'Association Medicale Canadienne*
- An estimated 12.9 percent of public hospital admissions in New Zealand were associated with an adverse event.  
– 2002 article in *The New Zealand Medical Journal*
- Almost every tenth patient in European hospitals suffers from preventable harm and adverse events related to his or her care.  
– 2000 report from *Hospitals for Europe (HOPE)*
- Adverse events harm an estimated 10 percent of patients admitted to NHS hospitals in England, at a rate in excess of 850,000 a year.  
– 2000 report from the *Department of Health, United Kingdom*
- Medical errors cause between 44,000 and 98,000 deaths every year in United States hospitals, resulting in annual costs of \$17 to \$29 billion.  
– 1999 report from the *Institute of Medicine, United States of America*
- An estimated 16.6 percent of Australian hospital patients — 230,000 people — experienced a preventable adverse event in 1992. Up to 14,000 preventable deaths would have occurred.  
– 1995 article in *The Medical Journal of Australia*
- Four percent of patients suffer some kind of harm in hospitals; 70 percent of the adverse events result in short-lived disability, while 14 percent of the incidents lead to death.  
– 1991 article in *The New England Journal of Medicine*

Source: World Alliance for Patient Safety Forward Program

## Proven Outcomes

When it comes to patient safety, IOM's *To Err is Human* concluded, "the status quo is no longer acceptable."

"By creating a culture built on a foundation of clinical and executive leadership, process change, and IT solutions, we have dramatically improved patient safety, reduced errors, and saved lives," said Fraley of McLeod.

"Everything we do is data driven," she continued. "Technology has helped us reduce our error rate to an all time low." To illustrate, in 2001 McLeod's rate of harm, defined as the percentage of harmful events per 1,000 medication doses, was 3.5, well within the national average of 2.0 to 8.0. Today, it is 0.36, a record low achieved with the help of essential IT solutions such as CPOE and bar coding.

Additionally, from 2002 to 2004, McLeod:

- Decreased the steps in the medication administration process from 17 to five
- Decreased the time from medication order entry to administration from 92 minutes to seven
- Saved an estimated 157 lives

"The outcomes are priceless and could not have been accomplished without technology," said Fraley. "We champion the cause because we know it works."

## A Long Way to Go

Since IOM's groundbreaking *To Err is Human* report, the healthcare industry has acknowledged with increasing honesty that it needs to do a better job preventing medical errors. But admitting the problem was just the first step. Now, the challenge is finding solutions and implementing them across every segment of the enterprise.

Initiatives to encourage less error-prone systems are now spreading throughout every corner of healthcare, driving hos-

pitals and clinicians to double their efforts. Report cards by states and private organizations, better medical management techniques, and implementation of technologies such as CPOE and bar coding are all reducing errors at the ground level.

But while patient safety appears to be improving, the industry admits that it has a long way to go and must continue to learn from its mistakes.

In the words of a mother whose child died because of a medical error, "I want you [the healthcare industry] to honor my son's memory. I want you to learn from him so that this never happens to anyone else's son." \*

*\*Source: USA TODAY, article by Liz Szabo, "Global goal: Reduce medical errors," Aug. 23, 2005.*



Meridian Health is a pioneer in the use of information technology to improve patient safety. Pictured: Jersey Shore University Medical Center, one of Meridian's three hospitals in New Jersey. Photo courtesy of Meridian Health.



Dr. Frederick DePaola of Meridian utilizes the hospital's CPOE program to electronically place an order and document a patient's care, dramatically reducing the possibility of an adverse error.