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Prescriptions for Excellence in HEALTH CARE

A COLLABORATION BETWEEN JEFFERSON MEDICAL COLLEGE AND ELI LILLY AND CO.

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Editorial

Hospitals Take Ownership for Quality Improvement and Patient Safety

By David B. Nash, MD, MBA
Dr. Raymond C. and Doris N. Grandon Professor of Health Policy
Chairman, Department of Health Policy, Jefferson Medical College

In September 2007, the inaugural issue of *Prescriptions for Excellence in Health Care* painted the national quality landscape with broad strokes, dealing with issues such as culture change in medicine and quality initiatives at the state level. In this issue, we narrow the focus to look at advances in patient safety and quality improvement in our nation's hospitals.

Improving patient safety continues to be an uphill battle on the hospital front. In its 4th Annual Patient Safety in American Hospitals Study (April 2007), HealthGrades, an organization that provides ratings and profiles of hospitals, nursing homes, and physicians, analyzed patient safety among Medicare patients in all US hospitals.[1] Looking at data from 2003-2005, they found that despite increased attention to improving quality and patient safety, approximately 1.16 million total patient safety incidents occurred in the course of over 40 million hospitalizations. These incidents were associated with $8.6 billion in excess costs. Moreover, 10 of 16 studied patient safety incident rates worsened by more than 11.5% on average; the 6 indicators that improved did so by 8% on average. Perhaps the most disturbing finding was that of the 284,798 deaths that occurred among patients who were affected by 1 or more patient safety incidents, 247,662 (or 87%) were potentially preventable.

The 2006 Agency for Healthcare Research and Quality (AHRQ) National Healthcare Quality Report assessing the state of hospital quality and patient safety[2] was similarly dispiriting. It concluded that positive change in quality outcomes has been modest and that variation in health care quality remains unacceptably high.

We have seen positive effects stemming from public reporting initiatives (eg, the Pennsylvania Health Care Cost Containment Council [PHC4]),[3] but the continued lack of any nationally

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Message from the Lilly Hospital Group Director

The Institute of Medicine reports of the past 15 years have revealed a range of opportunities for improvement in quality and safety in health care. In response to these reports, health care organizations and their leaders began to transform their approach to these 2 areas. To ensure that health care organizations were on board, key quality groups and payers created quality measures to promote awareness and foster organizational commitment to the goal of improving patient safety and health care quality in hospitals across the country.

The transformation of health care requires commitment to a common vision of what it can be, and a steadfast belief that lasting improvement in quality and patient safety can be achieved. There are still many obstacles to overcome and lessons to share. As a vehicle for communicating lessons learned and best practices, *Prescriptions for Excellence* is one way in which Lilly can help move this transformation forward. As we at Lilly work diligently to bring relevant products and information to the hospital market through the Lilly Hospital Group, we look forward to partnering with you to improve health care and patients' lives.

Becki Morison
Executive Director,
Lilly Hospital Group

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recognized system or structure for identifying, reporting, and sharing quality and patient safety information remains a substantial barrier to improvement in these vital areas.

In this issue, the authors describe successful quality improvement initiatives undertaken by 4 different hospitals: an innovative approach to eradicating methicillin-resistant Staphylococcus aureus (MRSA) at a Philadelphia medical center; a strong argument for redesigning hospital facilities in order to reduce human error, thereby preventing harm to patients; a comprehensive quality improvement plan involving an entire academic health center in western Massachusetts; and an intervention directed at decreasing turnaround time in a single department at a health system in Delaware.

Upcoming issues will be devoted to such topics as improving the quality of care in outpatient settings and the role of health information technology and public reporting. I hope that you will be as impressed as I am with the range and scope of the programs and initiatives described by the authors, as well as with the level of commitment represented by the work at their respective institutions. As always, I am interested in your feedback and you can reach me by email at david.nash@jefferson.edu.

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Methicillin-Resistant Staphylococcus Aureus (MRSA) Eradication and Positive Deviance: Experience at Philadelphia's Albert Einstein Medical Center

By Jeff Cohn, MD, MHCM

MRSA is a strengthening enemy. A minor health concern 50 years ago, it is a growing cause of morbidity and mortality in hospitals today. The organism now affects at least 46 of every 1,000 patients in hospitals and nursing homes.[1] Each year, MRSA infections are associated with billions of dollars in direct costs and thousands of patient deaths.

Although basic procedures for preventing infection have existed for decades, too often health care professionals fail to adhere to them. For example, we know that following Centers for Disease Control and Prevention (CDC) hand hygiene guidelines[2] is one of the most effective means for avoiding the spread of MRSA, but fewer than 50% of health care workers follow the guidelines of washing hands before and after entering patients' rooms.[3] Physician compliance is even lower.

A typical institutional response to this type of issue is to target people whose behavior needs to change and tell them what they need to do differently. Interventions

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often include educational efforts, changing policies, and/or providing data. While such strategies are useful, they fail to incorporate one of an institution's most valuable resources – staff members whose practices and behaviors might serve as models. The term used to describe these individuals and their practices is Positive Deviance (PD).

Given that PD individuals have the same resources and are part of the same work "community," we wanted to know ***how*** these PDs managed to overcome the common barriers in order to achieve the desired outcomes. We determined that an answer may lie in observing, listening to, and learning from these PDs - then sharing those things the PDs found useful with other staff members.

The PD[4] approach is a process of self-discovery that promotes and facilitates positive behavior change within a work community. Steps in the PD process include:

- helping people define the problem
- helping the community identify the PDs (ie, the individuals who are already doing the right thing)
- learning about the practices, behaviors, and strategies that have enabled PDs to overcome the same barriers faced by everyone in the community. This involves listening to and observing the PDs, and creating a forum wherein the entire "community" can discuss the problem and potential solutions.
- helping the "community" design a method for spreading the PD practices throughout the organization.

Albert Einstein Healthcare Network (AEHN) was chosen as one of 6 beta sites in a Robert Wood Johnson-funded effort to eliminate transmission of MRSA by applying PD concepts to infection control. Six hospital units (the medical step-down unit, surgical ICU, transplant/oncology medical/surgical unit, the Drucker Brain Injury Unit at Moss Rehabilitation Hospital, the medical ICU, and a combined general medical/surgical unit) volunteered as pilot "communities" to test this new approach, called "**SMASH**" (**S**top **M**RSA **A**cquisition and **S**pread in our **H**ospitals).

Unit staff members are encouraged to observe, discuss, learn, and share with others. As a result, they identify problems, create solutions, and identify and learn from PDs.

A distinctive feature of the PD approach is the way in which ideas generated by those "touching" the patient are rapidly translated into actions. Each week multiple groups from our workforce meet for brief "Discovery and Action Dialogues (DADs)." Trained facilitators capture ideas generated by discussions and ask the key DAD questions, such as, "What does this mean to you?" and, "What would it take to make that happen here and now?" Concrete actions are formulated with specific responsibilities.

Who should be involved in the DAD process? One of the few "rules" of the PD process is: "Nothing about me without me." This means that all stakeholders must be represented in order for DAD participants to recommend an action. We now ask ourselves, "Who ***doesn't*** need to be involved?" We have begun to look beyond the usual suspects (ie, nurses and physicians) and involve, for example, patient transporters, the microbiology lab, radiology, physical therapy, hospital clergy, and translators.

Many DAD actions have been implemented and, cumulatively, we believe the application of these PD practices will lead to sustained organizational change. One example is the new approach to the storage of disposable gowns. People entering the isolation room of a MRSA patient are asked to don disposable gowns. Early in the DAD process, lack of availability of these gowns at the point of entry into these rooms was identified as a barrier to consistent behavior. The DAD determined that the storage cabinets – opaque structures located inside patient rooms - were contributing to the problem. A clinician preparing to examine a patient in isolation might enter the room, open the cabinet, find it empty, and have to search for a gown elsewhere – or, as often happened, become frustrated and perform the task without donning a gown. In a series of small steps, gowns were 1) moved from the cabinets inside the room to boxes on tables outside the room, 2) wrapped individually and stacked on those tables, and 3) stored in clear cabinets on the walls outside the room, making it easy to check on supply and to anticipate the need for restocking.

AEHN's pilot units have begun to do surveillance cultures during patient admission, transfer, and discharge. They receive data about MRSA prevalence, transmission, and compliance with hand hygiene and gown/glove use on a regular

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basis. Patients identified as being colonized with MRSA are flagged in the clinical information system and placed in contact isolation.

We have learned that over 20% of patients in some of our units are colonized with MRSA on admission; that multiple prior hospitalizations, residence in nursing homes, and being on hemodialysis are significant risk factors for colonization; and that hospital transmission is clearly preventable.

The PD process is helping AEHN attain its goal of caring for critically ill MRSA negative patients for many weeks at a time in an environment where other patients are colonized with MRSA - and have those patients **remain** MRSA negative at discharge. AEHN patients are already benefiting from the PD practices that the workforce community has put into action. Eventually, we will achieve the goal of SMASH - we will stop MRSA acquisition and spread in our hospitals.

Dr. Cohn is Chief Quality Officer at Albert Einstein Medical Center in Philadelphia, PA. He can be reached at cohnj@einstein.edu.

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Safe By Design

By John Reiling, PhD

To Err is Human: Building a Safer Healthcare System awoke the health care industry to the fact that many patients die from preventable conditions - and many more patients experience a preventable adverse event. One in every 30 patients admitted to a US hospital suffers from a preventable adverse event, and 1 in every 300 patients admitted to a US hospital dies from a preventable condition or circumstance.

Could a hospital facility's design, technology, and equipment affect the safety of patients? Could a hospital facility create conditions under which caregivers provide safer care?

The Learning Lab Experience

To answer these questions and others, SynergyHealth St. Joseph's Hospital of West Bend, WI, convened a National Learning Lab in April 2002. More than 100 people attended, the major participants being high-level leaders from key organizations involved in the patient safety movement, including: American Hospital Association (AHA), American Medical Association (AMA), American Pharmaceutical Association (APhA), American Society for Quality (ASQ), Institute for Healthcare Improvement (IHI), Institute for Safe Medication Practice (ISMP), The Joint Commission (JCAHO), Medical Group Management Association (MGMA), National Patient Safety Foundation (NPSF), Patient Safety Institute (PSI), University of Minnesota (U of MN), University of Wisconsin-Milwaukee (UW-Milw), Veterans Administration, Midwest Patient Safety Center of Inquiry (VA), Veterans Healthcare Administration (VHA), and Wisconsin Hospital Association (WHA).

The multiple presentations that formed the background for The Learning Lab focused on human error and its causes, and James Reason's theories of latent conditions and active failures.

"To err is human. Fallibility is an inescapable part of the human condition."[1] *"Correct performance and systematic errors are two sides of the same coin."*[2] Human error has been studied for many years by many different professionals. The collective work of cognitive psychologists James Reason, Jens Rasmussen, and Donald Norman forms the basis of a widely accepted theory of why humans err. This work has inspired environmental designs that minimize the occurrence of errors and the harm they can cause. Lucian Leape describes this as "the pathophysiology of error."[3]

The organizational issues that create the conditions for error are called **latent conditions**. According to Reason, "These latent conditions are adverse consequences which may lie dormant within the system for a long time, only becoming evident when they combine with other factors to breach the system's defenses."[1] Examples of latent conditions are poorly designed facilities, including their technology and equipment, system design issues, training gaps, staff shortages or improper staffing patterns, and poor safety culture. These are what Reason describes as "blunt end" occurrences.

Errors made by doctors, nurses, pharmacists, and other personnel at the point of service are called **active failures**. Reason describes these as "sharp end" occurrences,

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and their effects are felt almost immediately.[1] Examples are incidents such as a nurse delivering the wrong medication, or a physician performing wrong-site surgery.

Latent conditions are present in all organizations and are usually created by upper management by way of their responsibility for design systems, staffing, and policies. Active failures are committed by employees as they interface with patients and the systems or facilities. Active failures happen one at a time; latent conditions can precipitate multiple adverse events. Eliminating or minimizing latent conditions has a greater impact on human error than focusing on an individual active failure.

Hazards are inherent in health care as with any complex organization. In *Managing the Risks of Organizational Accidents*, James Reason developed a model of error reduction. Defenses could include technology, equipment, well-designed facilities, systems with standardized protocols, or human checks of a process. The more complicated or linked (tightly coupled) the defenses are, the more likely the defenses will fail.[4]

Multiple defenses exist in most health care processes; for example, most medication systems have multiple checks (eg, physician orders, nurse checks, pharmacist checks, nurse rechecks). Potential errors that could result in the wrong drug being delivered to the wrong patient are generally caught at one of the checkpoints. This method for catching an error before it causes harm is defined as a "near miss."

Errors periodically escape all the defense checks, resulting in an active failure and/or adverse event. Analysis of active failures or adverse events suggests that the root causes are latent conditions. Figure 1 shows how the various causes of error can penetrate defenses and result in error. This model also illustrates how decreasing latent conditions and active failures would lower error rates that lead to harm, thus raising the level of patient safety.

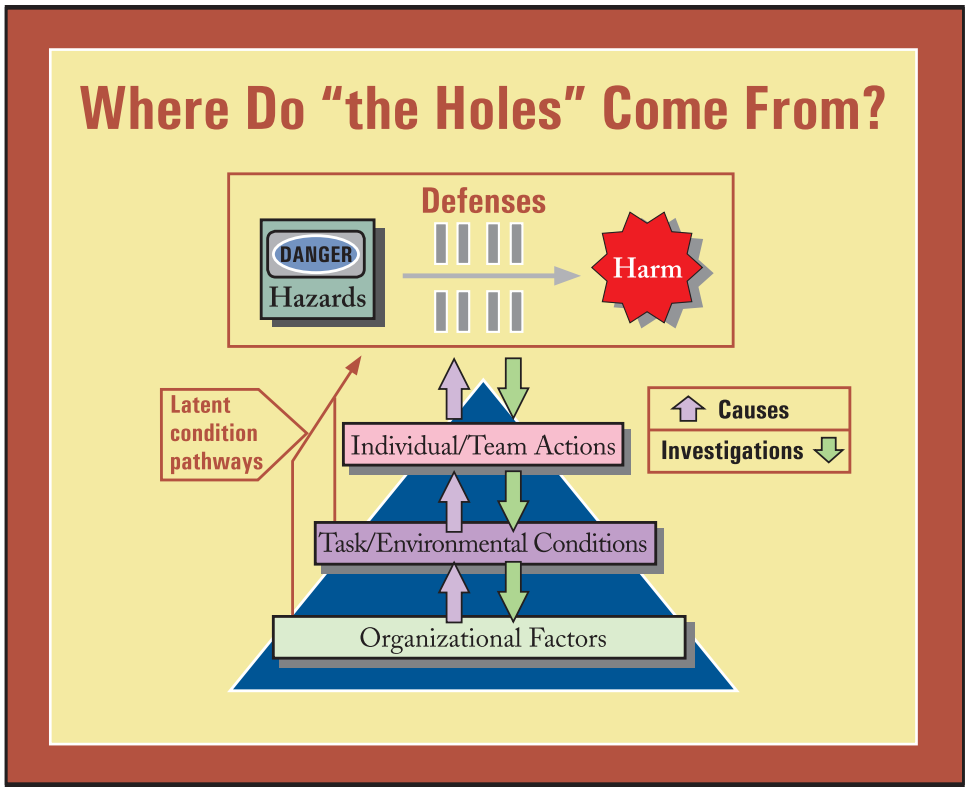

Figure 1. Where Do "the Holes" Come From?
Source: Adapted by John Wreathall, from James Reason, *Managing the Risks of Organizational Accidents* (Aldershot, England: Ashgate Publishing, 1997)

Patient safety will be enhanced by improving human factors through facility design that minimizes the latent conditions and cognitive failures that lead to adverse events. This will entail developing a strong safety culture, and redesigning systems or facilities - including their equipment and technology - with a focus on either eliminating the conditions of cognitive errors or helping caregivers correct an error before it leads to harm.

Translating Theory into Practice

The Learning Lab participants believed that facilities, with their technology and equipment, could affect the safety of patients and the caregiver's ability to deliver safe care. They recommended designing around specific latent conditions and specific active failures with the goal of lowering harm to patients by creating conditions wherein safe care can be delivered. They recommended other nontraditional approaches throughout the facility design process (Table 1). Finally, the Learning Lab participants recommended that the facility design process be engineered to enhance or create a safety culture that they defined.

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Table 1. Design Recommendations

Design Recommendations

Latent Conditions

- Noise Reduction
- Scalability, Adaptability, Flexibility
- Visibility of Patients to Staff
- Patients Involved with their Care
- Standardization
- Automation Where Possible
- Minimizing Fatigue
- Immediate Accessibility of Information, Close to the Point of Service
- Minimizing Patient Transfers/Handoffs

Active Failures

- Operative/Post-op Complications/Infections
- Inpatient Suicides
- Correct Tube – Correct Connector – Correct Hole Placement Events
- Medication Error-Related Events
- Wrong-Site Surgery Events
- Oxygen Cylinder Hazards
- Deaths of Patients in Restraints
- Transfusion-Related Events
- Patient Falls
- MRI Hazards

Safety Design Process Recommendations

- Matrix Development (post Learning Lab)
- Failure Mode and Effect Analysis (FEMA) at each Stage of Design
- Patients/Families Involved in Design Process
- Equipment Planning from Day 1
- Mock-ups from Day 1
- Design for Vulnerable Patients
- Articulation of a Set of Principles for Measurement
- Establishment of a Checklist for Current/Future Design

Safety Culture Recommendations

- Shared Values and Beliefs about Safety Within the Organization
- Always Anticipating Precarious Events
- Informed Employees and Medical Staff
- Culture of Reporting
- Learning Culture
- Just Culture
- Blame-Free Environment Recognizing Human Fallibility
- Physician Teamwork
- Culture of Continuous Improvement
- Empowering Families to Participate in Care of Patients
- Informed and Active Patients

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The Learning Lab results are being applied in many facilities design processes. To date, the institution that has most fully implemented the recommendations of the National Learning Lab is SynergyHealth St. Joseph's Hospital of West Bend. In redesigning their medical/surgical room, they applied the design process recommendations, taking into account latent conditions and active failures. Personnel who provide patient care were integral to the design process. Using mock-ups and Failure Mode and Effect Analyses (FMEA), they focused on standardization, visibility, and prevention of medication errors, infections, and falls in the room design.

Conclusion

Hospitals can become safer places. A focus on safety by design can create conditions wherein care is delivered safely and patients are harmed less often.

Dr. Reiling is President and CEO of Safe by Design. He can be reached at jreiling@safebydesign.net.

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Improving Quality and Safety at an Academic Health Center

By Evan M. Benjamin, MD, FACP

Health Center Profile

Baystate Health is a 3-hospital health system in Western Massachusetts. Its flagship hospital, Baystate Medical Center, is a 650-bed tertiary care referral center on the Western Campus of Tufts University School of Medicine. The medical center has a 1200-member medical staff with more than 250 full-time faculty physicians. In 2006, the medical center had more than 41,000 admissions and 27,000 surgeries.

Strategic Plan

Ten years ago, Baystate Health created a long-term strategic plan that has quality and patient safety at its core. The leadership recognized that providing the highest quality and safest care was the right thing to do – for our community *and* for ensuring growth of the institution.

The Board's priorities were to build a robust quality and patient safety improvement infrastructure (Figure 1) and to form a *Quality Committee*, comprising clinicians and quality improvement experts, to oversee performance improvement, health care quality, and patient safety activities. The *Performance Improvement Council* is responsible for operational measurement and improvement of all service lines. Each service line, in turn, has a *Performance Improvement Team* that is co-chaired by an operational leader and a physician leader (usually the department chairman) and includes a performance improvement expert and a multidiscipline staff within that service line. These Performance Improvement Teams have fixed agendas based on specific goals to improve effectiveness, patient safety, mortality rates, and patient satisfaction.

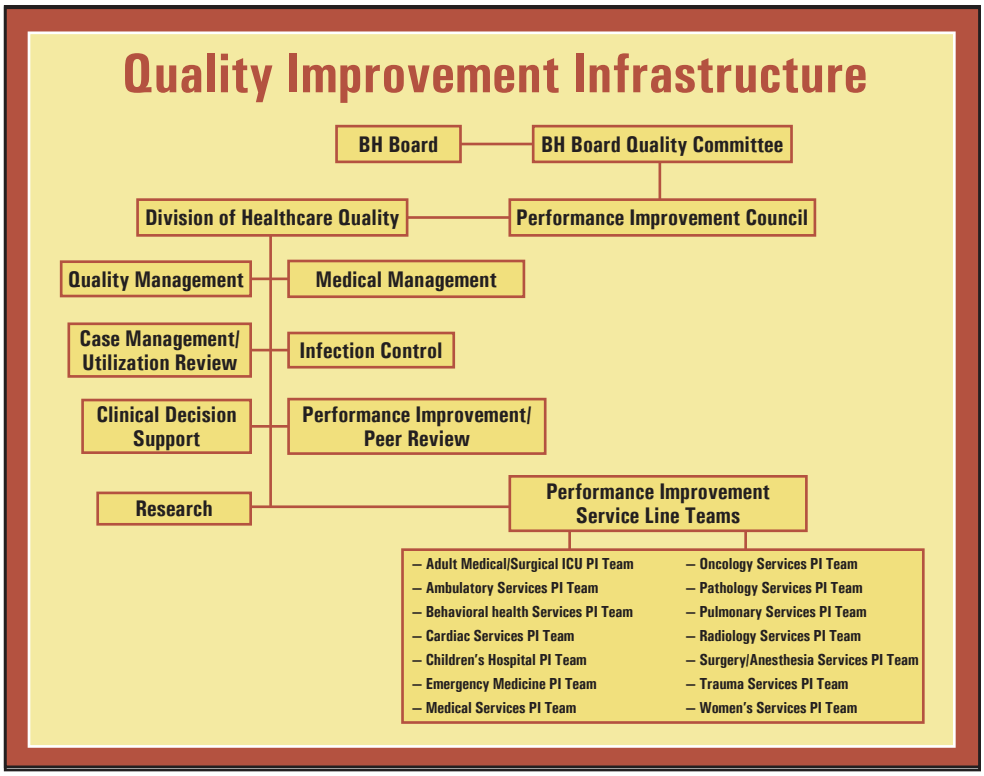

Figure 1. Quality Improvement Infrastructure

Led by a physician vice president with other medical staff functioning in full- and part-time roles, the Division of Healthcare Quality (DHQ) helps to align all quality management, case management, infection control, performance improvement, and clinical decision support functions. When annual objectives are set for health care quality, the DHQ sets specific goals to drive change and improvement at the medical center.

Personnel at all levels – from full-time faculty and medical staff to senior leaders – must be engaged in advancing quality and patient safety. Senior leaders in particular must understand that the "business case for quality" focuses on the benefits of quality improvement (eg, good reputation, increased service volume), but also recognizes that poor quality is costly to the health system because it increases the likelihood of readmissions, complications, and untimely death, and is associated with longer lengths of stay and higher costs. Early on, Baystate's senior leadership supported the strategic plan by investing in new ways to reduce practice variation and improve quality and patient safety. That investment has resulted in improvement of the bottom line *and* the system's reputation. In addition to the quality and safety initiatives mentioned, the system has improved efficiency by lowering 1) inpatient and outpatient costs, 2) length of stay, and 3) inpatient and outpatient pharmacy costs through a reduction in practice variation.

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Strategies for improvement

The 4 major improvement strategies that continue to guide Baystate's quest for performance excellence are 1) information technology, 2) measurement and reporting, 3) organizational change, and 4) process redesign and reliability.

1. *Information Technology (IT)*. The information infrastructure was improved to support an electronic medical record (EMR) and computerized physician order entry (CPOE) system. This robust information infrastructure has supported efforts to reduce medical errors and practice variation by allowing guidelines and order sets to be imbedded in the CPOE system, providing medical decision support in real time, prompting consistent choices in health care delivery, and enabling the longitudinal data collection necessary for understanding care outcomes. IT also supports a non-punitive safety culture via an online safety reporting system that allows staff to enter data on all errors and "near-misses" in the health system.

2. *Measurement and Reporting*. Process and outcomes measurement is essential for fostering open discussions about quality and patient safety. The performance improvement system uses data from all service lines to assess and improve care based on best practices and benchmarking. Updated reports on processes, mortality, and costs as compared to national benchmarks are used to drive Baystate's performance. One area of focus has been reducing hospital complications and hospital-acquired infections by targeting the prevention of surgical-site infections, ventilator-associated pneumonia, and bloodstream infections.

3. *Organizational change*. Physicians and clinicians work in teams that care for populations over time. We have begun to teach specific team skills that incorporate human factors principles and cultural change to improve quality and patient safety. The goal of teamwork training is to introduce tools and strategies to improve communication and teamwork, thereby reducing the chance of error and providing safer care. Another important organizational change concept is understanding safety as a system property. We have used the AHRQ Team STEPPS curriculum as a foundation for our teamwork training (http://www.usuhs.mil/cerps/TeamSTEPPS.html).

4. *Process Redesign using reliability principles*. Reliability can be defined as a failure-free operation over time. The Institute of Healthcare Improvement's innovation team has developed a failure rate vocabulary to describe processes in health care[1]; for instance,

- 10^{-1} reliability = approximately 1 defect per 10 process opportunities. It is generally associated with inconsistent processes that lack human factors principles in their design.
- 10^{-2} reliability = approximately 1 defect in 100 opportunities. This reliability designation indicates the use of human factors design principles.
- 10^{-3} or better performance indicates the use of human factors design principles with a specific framework to further mitigate failure.

To achieve truly reliable care of 10^{-2} reliability or better, our health care system must employ concepts of human factors design principles with a framework to mitigate failure.

Baystate's Quality Improvement Process

Areas of opportunity are detected through a measurement and benchmarking process. Quality action teams (formed by Performance Improvement [PI] Teams at the medical center) consisting of key physician champions review processes and work with performance improvement experts to help adapt and develop evidence-based clinical practice guidelines. The quality action teams attempt to redesign processes to achieve a 10^{-2} reliability rating. Using improvement tools, PI teams measure and track progress, accelerating improvement through cycles of the Plan-Do-Study-Act (PDSA) processes. Recommendations are disseminated through mailings, grand rounds, pocket cards, and handheld electronic devices (eg, PDAs), as well as in the EMR and IT infrastructure. The CPOE is used to communicate guidelines and order sets for standardizing care. Finally, Clinical Effectiveness Nurses and Hospital Case Managers form a "quality safety net," working with physicians to promote adherence to best practices guidelines.

Outcomes

Multiple processes were redesigned by adopting reliability principles. Standardization of care based on evidence has resulted in reduced practice variation, increased reliability of processes, and improved outcomes. A newly developed quality dashboard (Figure 2) is shared with the Board Quality Committee to aid in tracking our "big dots" of Effectiveness, Mortality, Safety, and Patient Satisfaction. The "effectiveness score" is a composite score of more than 60 process measures throughout the health system, including publicly-reported core measures and numerous processes in key clinical areas. Aggressive benchmarks are used to assure performance in the top decile nationally.

Mortality is tracked by population, by service line, and overall. Risk-adjusted mortality rates have remained stable or declined in the health system over the past 10 years. "Patient safety score" (ie, a roll-up score of hospital-acquired infections and postoperative complications such

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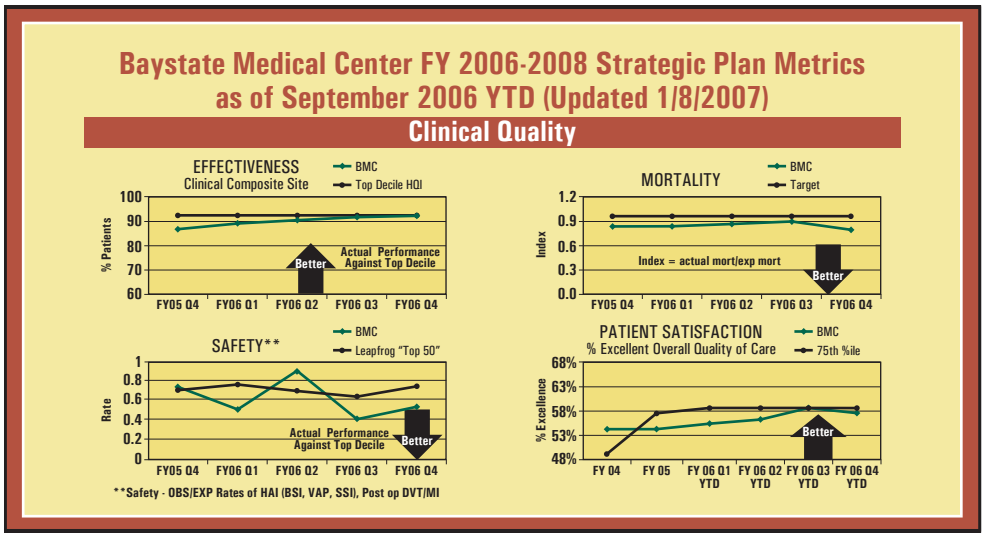

Figure 2. Quality Dashboard

as venous thromboembolism and myocardial infarction) are tracked against a national benchmark to gauge progress and performance compared to peers. Patient satisfaction is also tracked against a national benchmark and reported to senior leadership on the clinical quality dashboard.

Conclusions

- Improving quality and patient safety is the result of strategic planning with a specific vision and investment in infrastructure.
- The organization must understand the rationale for quality improvement *and* the business case for quality.
- An intentional strategy that helps to align numerous departments across the organization is necessary for success.
- It is important to have a quality improvement infrastructure that combines expertise in improvement methods, knowledge of reliability science, and concepts of the system properties of patient safety.
- Physicians play a pivotal role as champions and leaders in improving health care quality.
- A culture of openness is vital to the success of an organization's quality and safety program.
- Forums to discuss quality of care and medical errors must exist in the organization.
- Specific strategies - including IT, a robust measurement system, openness to change, redesign based on human factors, and teamwork - are vital to success.

Dr. Benjamin is Vice President, Chief Quality Officer at Baystate Health and Associate Professor of Medicine at Tufts University School of Medicine. He can be reached at: evan.benjamin@bhs.org.

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Quality Improvement Project to Decrease Inpatient Radiology Turnaround Time: Experience at Christiana Care Health System

By Paula L. Stillman, MD, MBA
with Robert E. Garrett, RT and Stephanie A. Cooper, BS, RT

This quality improvement project was an intervention designed to decrease radiology turnaround time. Success factors included the use of elegant technology and frequent public feedback to the radiologists until the desired results were achieved.

The radiology group at Christiana Care Health System is a private practice group consisting of 32 members who have an exclusive contract with the health network for inpatient and outpatient imaging services.

In 2004, the inpatient radiology turnaround time* at Christiana Care Health System was excessive. A quality improvement project was implemented with the following goals:

- improve radiology report turnaround time
- have reports available on patient's chart in a shorter time period
- decrease length of stay
- reduce transcription costs.

** Time from order of exam to report verification*

Baseline data collected between January and April 2004 revealed that imaging report turnaround time averaged 50 hours. The "gold standard" for report turnaround is 24 hours or less.[1] In April 2004, only 16% of imaging reports were completed in 24 hours or less. The quality improvement team mapped the current process flow (Figure 1) and determined that the greatest opportunity was to shorten the times

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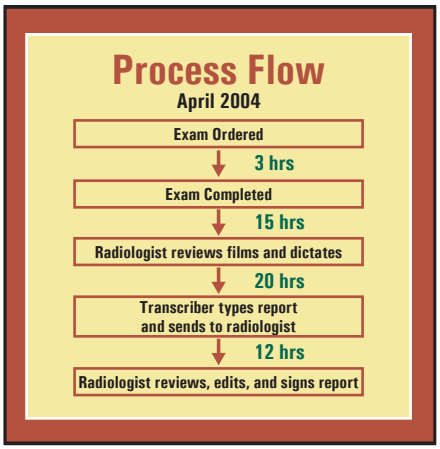

Figure 1. Process Flow

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between the radiologist reviewing the films, dictating the report, editing the report, and having the report available on the nursing unit.

Phase 1 – Speech Recognition Software

The first step in redesigning the process was purchasing Powerscribe© speech recognition software and installing it in 2004. The assumptions were that:

- The system will deliver 95% accuracy for speech recognition.
- The radiologists will accept the new system.
- The radiologists will self-edit their reports.
- Adequate workstations will be available.
- Speech recognition software will interface with existing network software and hardware.

The radiologists were trained over a 2-month period from April to May 2004. The transcriptionists were trained to edit rather than type reports. Workstations were installed in all film reading areas. Increased information technology (IT) services support was made available, especially during peak hours, and several radiology support staff were trained to be "super users."

By June 2005, 74% of exams were completed in 24 hours or less.

Phase 2 – Picture Archival Computer System

The next process improvement was the implementation of a picture archival computer system (PACS) for computerized tomography (CT) and magnetic resonance imaging (MRI) in September 2005. This technology allowed images to be viewed at individual workstations. By January 2006, 78% of exams were completed in 24 hours or less; by January 2007, 88% of exams were completed in 24 hours or less, performance that was maintained through May 2007.

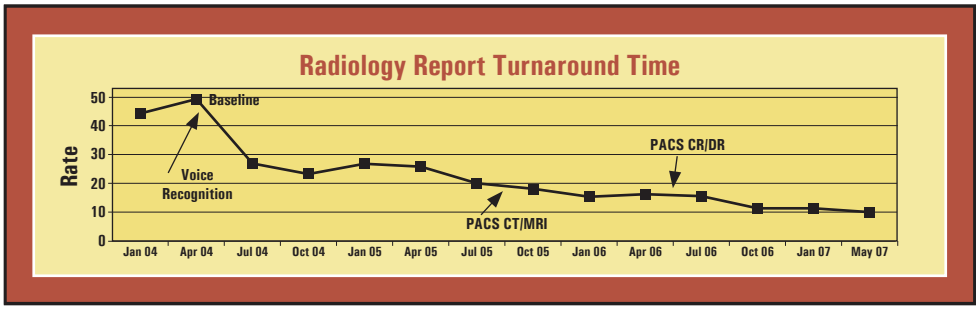

Figure 2. Report Turnaround Time

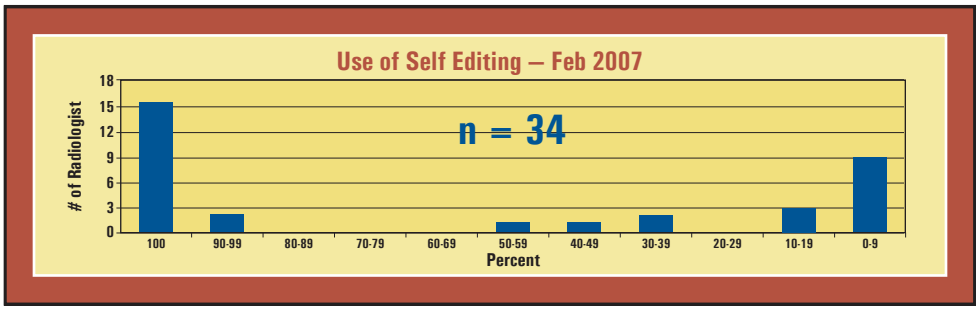

Figure 3. Self-Editing Usage

Figure 2 illustrates the change in mean radiology report turnaround time over the past 3.5 years. Although each of the technologies positively affected the turnaround time when introduced, the greatest decrease occurred with the introduction of voice recognition software. An added benefit of this process improvement effort was the cost savings realized from a reduction in the use of transcriptionists. Preimplementation, 14 full-time transcriptionists were employed and an additional $200K per year was spent for outsourcing. Postimplementation, the number of full-time transcriptionists was decreased to 5, and outsourcing was unnecessary. The transcriptionist's role changed from a transcriber of dictation to an editor of transcribed material, resulting in annual cost savings of more than $550,000.

During the installation phase, initial software problems resulted in the loss of some reports, causing frustration among the radiologists. Several issues remain unresolved. Although all radiologists have accepted speech recognition technology, several resist self-editing. Figure 3 displays this bimodal distribution for compliance with self-edits among radiologists. Transcriptionists continue to be employed to do initial reports or edits for the noncompliant physicians.

Several radiologists speak with accents that cause the voice recognition software to misinterpret words. Some

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radiologists are also reluctant to use templates, which could significantly reduce the dictation time.

Attempts to resolve these issues include:

- retraining voice files for radiologists who continue to have voice recognition difficulties
- weekly posting of each radiologist's use of voice recognition and self-edits in an attempt to use peer pressure to increase use of self-edits
- positive reinforcement and continued communication with our radiologists
- external pressure from the Radiology Department Chairman to increase the use of templates.

There have been sporadic complaints from radiologists and referring physicians that radiology reports are less accurate with the new system. To address this concern, periodic audits are conducted to evaluate the accuracy of reports by comparing the results of self-edits vs. transcriptionists' edits.

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1. Seltzer SE, Kelly P, Adams DF, et al. Expediting the Turnaround of Radiology Reports: Use of Total Quality Management to Facilitate Radiologists' Report Signing. *American Journal of Roentgenology*. 1994;162:775-781.

Quality Improvement/Patient Safety Meetings of Interest in 2008

February 13-15
American Health Quality Association (AHQA): **2008 Annual Meeting and Technical Conference, San Francisco, CA**
➤ http://www.ahqa.org/pub/inside/158_672_2428.cfm

February 20-23
American College of Medical Quality (ACMQ) **Annual Meeting** presented in conjunction with the American College of Preventive Medicine, **Austin, TX.**
➤ http://www.preventiemedicine2008.org/

May 5-7
Quality Institute for Healthcare, American Society for Quality: **World Conference on Quality and Improvement, Houston, TX.**
➤ http://www.qihc.asq.org/

May 15-16
National Patient Safety Foundation (NPSF): **10th Annual Patient Safety Congress,** Gaylord Opryland Resort/Convention Center, **Nashville, TN**
➤ http://www.npsf.org/npsfac/

August 24-27
7th Annual Quality Colloquium, Harvard University, **Cambridge, MA.**
➤ http://www.qualitycolloquium.com

September 18-19
The Joint Commission: Annual Infection Control Conference, Chicago, IL.
➤ http://jcrinc.com/26580/

November 20-21
The Joint Commission: National Conference on Patient Safety and Quality. Chicago, IL.
➤ http://jcrinc.com/26580/

December 8-11
20th Annual National Forum on Quality Improvement in Health Care. Nashville, TN.
➤ http://www/ihi.org/IHI/Programs/ConferencesAndSeminars

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Share Your "Best Practices" with Readers

Have you implemented an innovative quality improvement program at your hospital, health plan, or clinical practice that has had a positive impact on patient access, outcomes, or satisfaction? *Prescriptions for Excellence* welcomes submissions of articles up to 1200 words in length. To submit an article, or for more information, contact Jan Clarke at Jefferson's Department of Health Policy at (215) 955-9997 or Janice.Clarke@jefferson.edu.

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