INTRODUCTION

The Institute of Medicine (IOM) has brought public awareness to the growing issue of medical errors with its focused research on the extent to which errors occur in healthcare organizations. Within the IOM, the Committee on Quality of Health Care in America laid out a vision for how the healthcare system and related policy environment must be radically transformed in order to close the chasm between what we know to be good quality care and what actually occurs. The initial IOM reports, *To Err is Human: Building a Safer Health System* and *Crossing the Quality Chasm: A New Health System for the 21st Century*, highlight the need to reduce medical errors and improve the quality of care.

When it comes to quality, we all know what a vital role nurses play – and the challenges they face – in providing safe, high-quality patient care. Recent studies have proven the link between nurse staffing levels and patient outcomes, including patient deaths.¹ A patient safety survey conducted by the Healthcare Information and Management Systems Society (HIMSS) and sponsored by the Information Solutions business of McKesson Corporation validated the central role that nurses play in patient safety initiatives, and cited nurses more often than any other constituency (95 percent) as participants on patient safety committees.²

In November 2003, the IOM further validated the role nurses play in patient safety with two new reports. The first report, *Keeping Patients Safe: Transforming the Work Environment for Nurses*, examined nurses’ work environment and recommended potential improvements in working conditions that would positively affect patient safety. The study focused on extended work hours and fatigue, workload issues, workplace environment issues, workplace systems, and workplace communication. Recommendations were made in the following areas:

- Organizational management practices
- Workforce deployment practices
- Work design
- Organizational culture

The IOM committee emphasized that each area is equally important and cautioned that a piecemeal approach to implementing the recommendations would not be effective.

The second report, *Patient Safety: Achieving a New Standard for Care*, draws attention to the need for a national health information infrastructure and information technology in order to significantly reduce the number of patient safety issues in healthcare today.
This white paper focuses on the work design of nursing. It identifies areas that information technology can substantially transform in order to help protect patients against medical errors. It should be noted that because of the complexity of medicine and the patient care process, together with the realities of human nature, medical errors will never be eliminated completely. But with the right technologies applied systematically with the appropriate process changes, preventable medical errors can and should be dramatically reduced.

**THE WORK DESIGN OF NURSING**

In this day and age, it is challenging for nurses to provide consistently safe, high-quality patient care when care processes are predominantly manual. In a manual environment, “silos” or barriers exist between the nurse, physician and other care providers resulting in less than adequate collaboration and communication, inefficiency, and an absence of an interdisciplinary approach. Today’s nurse faces an avalanche of paperwork and red tape that affects the amount of time available to spend caring for patients. However, the right information technologies and automation can streamline and improve the nursing process to help patients achieve the best outcomes in the safest possible way, and to better support nurses in caring for their patients.

Technology solutions can make a difference in the ability of nurses to ensure safe, high-quality patient care by enabling improvements in these areas:

- Patient assessment and care documentation
- Complex patient care processes
- Activities nurses perform that do not add value
- Medication administration

*Patient Assessment and Care Documentation*

Nurses spend a large portion of their workday documenting clinical data and the care that was delivered. Frequently, nurses complete this documentation hours after the fact, relying on their memory or scribbled notes for accuracy.

Point-of-care clinical documentation solutions enable nurses to focus more on the important patient care tasks at hand and less on documentation. Access to electronic documentation at the bedside also streamlines the care process and assists all clinicians in making better patient care decisions. Critical patient data, such as lab results and vital signs, is literally at the clinician’s fingertips. Additionally, vital signs and other clinical data can be recorded electronically through interfaces to patient monitors, further streamlining the documentation process. Communication between caregivers is enhanced since patient data is now available in real-time to any caregiver with access to the system.

Healthcare organizations that have implemented clinical documentation systems are finding that they can capture regulatory data as a by-product of charting activities. They do this by embedding regulatory requirements into the charting screens, simplifying required data capture.

For example, patient assessments are the foundation of patient care. Yet in a paper-based environment, the documentation of those assessments is often incomplete, inconsistent and not
done in a timely manner. When caregivers capture patient assessment data using a clinical
documentation system, the entire process is more efficient. Standard assessment and charting
screens that have been designed to adhere to care standards and regulatory requirements help
ensure the quality and completeness of documentation. When documenting care electronically, a
nurse can review admission history data from a previous visit, and, if still applicable, pull it
forward for the current visit, revising only those items that have changed. The organization can
flag specific data fields on the assessment screens as “required” so that the nurse must complete
assessment responses for critical documentation items such as functional and nutritional status.
As an added patient safety benefit, required fields also prompt the novice nurse to remember to
perform necessary tasks.

Patient transfers and hand-offs present another challenge in ensuring that there are no gaps in
patient care or hindrances to the ability to review critical patient information, especially when a
manual charting process is employed. When a patient moves from the emergency department to
the nursing unit, or to a critical care unit, the nursing staff must be able to retrieve up-to-date
information in order to provide the appropriate care. Having hospital-wide access to automated
patient records ensures that access to this information is always available.

Complex Patient Care Processes

Today’s nurse hurries between too many patients who tend to be sicker on average than in the
past. He or she has more complex medical technology to interact with and more regulatory
requirements related to care documentation to meet. The nurse is the focal point for patient care,
yet is often lacking essential information from other care team members and data sources to
ensure effective coordination. In this fragmented, overburdened, paper-dependent system,
preventable errors happen.

The clinicians providing care for a patient must be able to work as a multidisciplinary team of
professionals, efficiently communicating the patient information that individual team members
need to effectively do their jobs. Clinical information technology enables workflow changes that
streamline care processes and make it easier for clinical professionals to work together,
communicate and share their professional expertise. This in turn creates opportunities to provide
safer, more patient-focused care.

A point-of-care clinical documentation system also helps nurses organize their priorities by
displaying a patient list with nursing tasks and orders for patients. Nurses can check the system
frequently for any updates or additions, which helps them to feel more confident that they are
delivering appropriate care. Online flowsheet applications organize pertinent patient data and
assist all caregivers in identifying patient trends immediately so that clinically relevant patient
care decisions are delivered. Communication is facilitated between direct caregivers and
physicians, which leads to better patient outcomes.

Non Value-Added Activities

Nurses must be able to use their core competencies as clinicians by spending their time on
activities that promote patient healing and wellness. But too often they spend time on non value-
added activities that are not patient focused. Technology brings many opportunities to decrease this time.

For example, many nurses report that they spend an inordinate amount of time tracking down supplies. Point-of-use supply automation solutions can help ensure that nurses have what they need when they need it by electronically tracking inventory and automatically communicating restocking requirements.

Inefficient communication processes also waste valuable nursing time. New technologies that combine wireless phones, voice over IP networking, and a nurse call system with triage capabilities efficiently route a patient call to the appropriate caregiver. Nurses also use this technology to communicate directly with the physician and other members of the care team. These systems improve patient safety by streamlining response times to patient needs and decreasing the amount of time required to coordinate communication between the patient, the patient’s physician, and others. As an added bonus, this enhanced technology has been proven to increase patient satisfaction. 3

Computerized physician order entry (CPOE) also decreases the time nurses spend performing tasks that do not add value. How does CPOE help nursing? If all physicians are entering orders online, illegible orders due to poor penmanship are eliminated. In addition, if the CPOE solution includes clinical decision support, physicians are alerted to possible contraindications or patient alerts at the point the order is entered, eliminating errors or omissions in the order. Nurses no longer have to track down physicians to clarify an order because it is illegible, or to inform the physician that part of the dosing information is missing on a medication order.

Clinical documentation systems also help prevent the documentation of redundant and/or unnecessary information. Because patient information from previous encounters, such as the admission history, is available, nurses don’t have to re-enter the same information. They simply update only those items that have changed. In addition, allergy information is entered one time and is then available for all clinicians to view.

Medication Administration

With the growing awareness of the role that medication errors play in preventable patient deaths, nurses are under increased scrutiny and pressure to ensure medication safety. Medication administration is the last step in the medication use process, and the nurse administering that medication provides the final line of defense for the patient. Medication administration also occurs frequently, which increases the opportunity for error. The Adverse Drug Events Prevention Study Group reports that almost 40 percent of medication errors occur during medication administration. 4

Using point-of-care bar coding solutions during medication administration helps nurses ensure medication safety by automatically verifying that the “five rights” have been met — the right patient, medication, dose, time and route. Alerts based on these “rights,” along with previously captured patient data, are displayed to the nurse, who can then prevent medication errors before they can occur. Nurses can also be electronically “reminded” that medications are due.
Additional benefits include data capturing and reporting tools that satisfy quality-of-care requirements in monitoring medication safety for JCAHO, risk management or other quality initiatives. Near-miss data can be captured and analyzed in order to identify potential issues and develop a plan of action for resolution.

Many hospitals have already realized benefits from implementing bar-code technology. The University of Wisconsin Hospital and Clinics performed a direct-observation study of medication errors before and after the implementation of a bar-code medication administration solution. The hospital demonstrated that medication administration errors decreased by 87 percent with the use of bar codes. The study also showed that overall nursing satisfaction was increased by 42 percent.\(^5\)

New technology that combines smart infusion pumps with bar-code medication administration reduces the potential for errors in the high-risk area of IV therapy administration. IV medications have been associated with up to 54 percent of potential adverse drug events (ADEs)\(^6\) and 56 percent of medication errors.\(^7\)

Unit-dose dispensing can also provide an extra measure of safety against medication errors by tracking and verifying all medications dispensed and retrieved. These systems alert nurses to possible drug interactions and provide access to complete drug information. They also streamline the inventory process, automatically tracking medications and eliminating the need to do manual narcotic counts.

While there are many useful technologies to help reduce errors during medication administration, it should be noted that many errors occur “upstream” in the medication management process — that is, during the steps of prescribing, transcribing or dispensing. To improve medication safety, healthcare organizations must take a system-wide approach to reduce errors at every one of these steps.

**KNOWLEDGE AND DECISION SUPPORT**

Nurses and physicians face an overwhelming challenge in trying to keep up with the latest scientific information on which to base the patient care they provide. For example, in an average year, more than 200,000 peer-reviewed journal articles are published on clinical medicine. More than 48 percent of all currently prescribed drugs have been released in the last decade. Keeping up with this flood of information about new and innovative medical practice is such an enormous task that it is realistically impossible. Without access to an electronic patient record, clinicians often lack important information and may even make decisions based on misinformation.

The type of decision support that is most useful to nursing consists of reminders or recommendations based on patient-specific data. For example, when performing a nutritional assessment, the system should take a cue from patient-specific information charted to suggest a dietary consult if appropriate. Alerts that are generated based on the patient’s condition and other parameters are crucial, so the nurse or physician doesn’t have to constantly monitor the complex set of patient data that is continually changing.
Using information technology to support clinical guidelines (sometimes referred to as clinical pathways) promotes interdisciplinary collaboration for a patient’s care, as all caregivers have access to the patient’s individualized guideline. It also helps improve the quality of care by ensuring that a standardized care process is being used.

For physicians, the right clinical decision support technology can bring best practices and new research findings to the point of order entry, helping them to make more informed and safer care decisions.

**THE ROLE OF TECHNOLOGY IN CREATING AND SUSTAINING A CULTURE OF SAFETY**

The November 2003 IOM report, *Patient Safety: Achieving a New Standard of Care*, emphasized the importance of an electronic health record (EHR) with regard to patient safety. The EHR improves the quality and timeliness of decision-making by providing nurses, physicians and other clinicians with comprehensive and up-to-date information, and it provides a source of data for error reporting and analysis. In order to detect and prevent adverse events as well as near misses, a healthcare organization must be able to collect information about these events.

In addition, to make the best treatment decisions, nurses, physicians and other caregivers must have access to the most updated patient information at the point of care, as well as any other supporting clinical data and pertinent information. Clinical decision support combined with system-generated reminders and alerts contribute to the delivery of safer, higher quality patient care. Manual processes will not succeed. Information technology that uses standards to support data interchange formats, medical terminologies and knowledge transfer must be employed.

**CONCLUSION**

Because nursing plays such a central role in patient safety, transforming the nurse’s work environment must be a critical part of every healthcare organization’s patient safety efforts. A wide range of technology solutions are available today that can enhance the accuracy and efficiency of the many tasks that make up nursing work. When applied within the framework of appropriate process analysis and change, these technologies reduce opportunities for error, provide more comprehensive and timely information for clinical decision-making, and reduce time spent on administrative activities that can better be spent on direct patient care. All of these improvements contribute to a safer care environment for patients.

**REFERENCES**

