Warning: Please be advised that this hospital uses manual, paper-based methods for tracking the process of your care and for implementing the orders of your care providers. Therefore, orders may not be carried out as written. As a result, you may regrettably receive the wrong medicine, the wrong dose of the right medicine, the wrong route of administration, or possibly the correct medicine at the wrong time.

A notice like this could be posted in the majority of hospitals. Fortunately, several key events in 2004 have initiated industry-wide activities with the potential to accelerate the implementation of technology to reduce the number of medical errors, cut costs, and improve patient care.

The Committee on Data Standards for Patient Safety published a report to provide a road map for the development and adoption of a comprehensive set of national healthcare information standards that support patient safety.2 The President’s Information Technology Advisory Committee began the year with a report to the president outlining recommendations for a 21st century healthcare information infrastructure that will revolutionize medical records systems. Health and Human Services Secretary Tommy Thompson appointed Dr. David Brailer as coordinator of National Health Information Technology and outlined a Framework for Strategic Action, thus launching the Decade of Health Information Technology.3

Handwritten medication orders create the potential for error, and deciphering handwriting can prove challenging. Medications with similar names, but different action classes, further complicate the medication management process. Frontline employees make high-risk decisions that require judgment and choices involving many variables with minimal system support.4

How extensive are medical errors? The National Committee on Vital and Health Statistics (NCVHS) reports the following statistics:

♦ One in 25 hospital admissions results in an injured patient.
♦ Three percent of adverse effects cause permanent disabling injury; of these, one in seven leads to a patient death.
♦ Preventable medical errors account for 12% to 15% of hospital costs.
♦ Approximately 23,000 hospital patients die each year from injuries linked to medication use.
♦ Eighty percent of nurses calculate dosages incorrectly 10% of the time, and 40% of nurses make mistakes more than 30% of the time.
♦ Approximately 180,000 unnecessary deaths and 1.3 million injuries occur from medical treatment in the United States.5

With an average cost of $4,700 per admission, adverse drug events (ADEs) account for more than 25% of all adverse hospital incidents. Further study also revealed that 56% are attributed to physicians, 34% to nurses, 6% to unit secre-
taries, and 4% to pharmacy staff. ADEs, the largest single category of medical errors, can be immediately impacted by information technology such as computer-based provider order entry (CPOE) and bar-coded medication administration. While technology is a critical component of patient safety management, it should also be a part of an organization-wide strategy that includes workflow process redesign. Decreasing the number of ADEs requires the combination of clinical workflow transformation along with selective implementation of technology. Systems and processes can be automated without solving the problem. Traditional workflows must also be reevaluated to harness technology and benefit from it.

**New to the scene**
The good news is that emerging technologies, if applied to medication management, are available to tap into these potential benefits for improving patient safety. Radio frequency identification (RFID), which has grabbed headlines for its application to inventory control and supply management, can also be implemented in a patient ID wristband system as a substitute for, or in conjunction with, bar coding systems for medication administration. Smart cards have the potential to store a patient’s clinical information, such as allergies, prescribed medications, and chronic conditions like asthma and diabetes.

Using these devices for quick but secure access to essential data can enhance timely clinician decision-making and save lives. Wireless technology can provide access to clinical information and knowledge resources via rolling carts or at the point of care, further reducing barriers to safe medication delivery.

**Moving forward**
Biometric technology, founded on the premise that a person’s physical characteristics are unique and always present, includes fingerprint readers. Other biometric tools include iris scanners, hand readers, and speech recognition systems. Implementation of biometric technology can reduce the labor-intensive tasks associated with managing passwords, thus streamlining the sign-on process. Speech recognition allows a computer to transcribe spoken words by comparing their sound to a database and displaying the matching word on the screen with nearly 99% accuracy.

Natural language processing, a form of artificial intelligence that applies computer-based reasoning,
attempts to grasp the meaning behind the words and their relationship to each other. This tool will allow us to reap the valuable data inside text documents, enhancing the user interface and linking different data sets to cross-examine findings, thus providing intelligent feedback to nurses and physicians at the time of the encounter.

Recent research suggests that the implementation of clinical technology, including bar-coded medication management, is a top priority for healthcare organizations. The Healthcare Information and Management Systems Society’s 15th Annual Leadership Survey, for which data was collected in late 2003/early 2004, showed that clinical applications are expected to be the most important applications in organizations over the next several years. The top four choices identified by respondents—bar-coded medication management, clinical information systems, electronic medical records, and CPOE systems—were narrowly separated by less than two percentage points; each one was identified by approximately half of the respondents.11

Despite the increasing focus on the implementation of clinical technology, progress has been slow. National estimates of CPOE implementation hover around 5%.12 A recent study from the American Society of Health-System Pharmacists identifies the rate of implementation of bar code technology used to check and document doses administered at the bedside at 1.5%.13

We’re under increasing pressure to streamline the documentation of care delivery and apply technology in a way that supports the clinicians’ workflow. The added challenge of staff shortages that limit recruitment of physicians, nurses, and pharmacists has encouraged efforts to increase the availability and accessibility of data and augment clinical practice with knowledge resources and clinical decision support.14 Recognizing and using the expanding role of clinical informaticians is a critical component of successful implementation of innovative solutions.15

**Your role**

Clinicians remain on the front line of patient care and have the most to gain from the implementation of clinical systems. A recent study indicates that the primary responsibility for patient safety is placed on nurses.16 Indeed, mistakes typically thought of as related to care delivery are often attributed to nurses. Implementing clinical technology, such as bar-coded medication management, can alleviate some of this pressure.

You play a crucial role in the successful implementation
of clinical systems within your organization. In a recent survey of nurse informaticists, two-thirds of respondents (67%) indicated that systems implementation, which includes training, supporting, and preparing users, was one of their top job responsibilities. In addition, more than half of respondents identified systems development, including the customizing/updating of a vendor system or creating/updating an in-house system, as a top job responsibility.17

Confirming the importance of the clinical role in IT, the CIO respondents in the Healthcare Information and Management Systems Society Leadership Survey identified the need for staff in the IT department to address clinical issues. Clinical transformation, clinical champions, and clinical informaticists were among the top issues noted.18

The ideal patient care-delivery system enables increased productivity, better outcomes, and more time for direct care activities. This delivery system must include information technology that replaces the paper-based tasks with a point-of-care electronic health record. Stakeholders can work together in removing the barriers and using innovative solutions to enhance patient safety and support the work of clinicians. Nurses, administrators, and industry leaders must collaborate to transform care delivery. 

References
9. Ibid.
15. Ibid.
18. Ibid.

About the author
Joyce Sensmeier is the director of professional services at the Healthcare Information and Management Systems Society, Chicago, Ill.

IDENTIFICATION BANDS
EPS offers ShrinkSafe ID Bands to help reduce medication errors involving look-alike meds. ShrinkSafe easily wraps around virtually all 10 ml vials containing paralytic agents. The band’s bright orange color immediately calls attention to itself and alerts practitioners that this particularly wrapped medication requires special handling. A quick exposure to heat shrinks the ShrinkSafe band to the vial’s shape and still permits easy viewing of the manufacturer’s label. And, dispensing is easy; peel the band’s pull-tab and the medication is ready to use.

For more information, contact EPS, Inc., at 1-800-523-8966 or http://www.medi-dose.com.
MOBILE CART
Lionville Systems’ iCart blends the needs of nursing and information technology to provide a workstation for mobile computing, point-of-care medication administration, and bar code scanning. Its point-of-care features are flexible technology platform, high capacity power solution (optional), maneuverability, and ergonomics. Its nurse-friendly features are ample work surface with optional cup dispensers, night-light, waste bin, sharps disposal, I.V. pole, customizable patient medication and supply storage, and advanced keyless entry and automatic relocking system to ensure regulatory compliance.

For more information, contact Lionville Systems, Inc., at 1-800-523-7114 or http://www.lionville.com/.

MEDICATION MANAGEMENT
A key component of Siemens Medical Solutions’ medication management offering, Med Administration Check, closes the loop on the medication use process by automatically validating and documenting medication administration. Using bar code technology, the system scans each medication and the patient’s ID bracelet, and alerts nurses in real time to potential administration errors of drug, dose, route, time, or patient. Clinical checks such as allergies, drug-lab and drug-drug interactions can be performed at the time of administration and documented in an electronic MAR. Administration and assessment details are captured at the point of care and automatically documented in the patient’s electronic health record.

For more information, contact Siemens Medical Solutions at 1-888-826-9702 or http://www.siemensmedical.com.