

"We live in a moment of history where change is so speeded up that we begin to see the present only when it is already disappearing."

R.D. Laing

1927-1989

Scottish psychiatrist & author

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Multiple I.T. paths to address medical errors

By Michael R. Cohen, Principal, CCI

A hospitalist at a prominent teaching hospital was bold enough to publicly share the details of an actual medical error incident. An infant was brought to the emergency room, accompanied by his mother, and was treated by a senior medical resident. The patient was given a dose of medication 10 times the generally recommended dose for a patient of that age and weight. There were no serious complications, but the doctor immediately recognized they had dodged a bullet. Though he was not on duty at the time, the physician was the attending MD of record, and the resident was operating under his supervision. Noticeably shaken by the incident, he took it upon himself to objectively investigate the root cause of the incident. What he discovered was a series of errors and a breakdown in the system of manual checks and balances used at many hospitals today. Specific errors he uncovered were:

1. The **registration system** had the wrong birth year, computing the patient's age as 12 months too old. This made the higher medication dose look more reasonable to anyone not knowing the true age of the patient.
2. The patient's **mother** informed the medical staff that the patient was currently being treated with a drug on an outpatient basis, which she had with her. She emphatically stated the dose. It was later discovered she was wrong. The **outpatient/retail pharmacy** did not have dosing instructions affixed to the home medication. They were handed out separately and not brought with the patient to the ER.
3. The **resident** did not **check safe-dosing** guidelines. He ordered the home medication, at the dose specified by the mother, to be administered on the floor.
4. **No route** of administration was specified.
5. The **ordering nurse** did not check safe dosing.
6. **An inpatient pharmacist** questioned the dose, but it was at shift end and no one followed up.
7. **The administering nurse** did not check safe dosing guidelines.

Bottom line – at least seven people could have intervened to avert the error, but did not! Obviously concerned about the breakdown in the manual system,



Frank Cavanaugh



Everett Hines



Sam Schultz II
Ph.D.



Tony Duminski



Jean Joslyn



Richard Dick,
Ph.D.



Fred Mills



Bill MacFarlane

the doctor began looking for solutions to the problem.

DIFFERENT SOLUTIONS AND APPROACHES AROUND

If you were faced with this situation, you would have a number of alternative paths to consider. Here are a few.

The hospital described above had success following a low-tech, short-term solution with plans to move into a more information systems intensive solution as money becomes available within the next 2 to 3 years. Using common sense and the leverage that comes from working with residents in a teaching hospital, they decided a reasonable solution was to mandate and enforce more complete manual orders. With little cost, they designed new order sheets, and required the following data to be completely and accurately filled in for each order:

- Patient Name
- Dose per KG weight
- Route
- Interval
- Indication for ordering the drug

This simple solution has had very positive results in the first few months of implementation in a pilot unit. Incomplete orders were reduced by almost 50 percent. By assuring all the appropriate information was readily available for the ordering physician and any other health care professional reviewing the order (attending MD, pharmacist, and nursing) the manual checks and balances already in place were working much more effectively. While they hope to get more automated assistance, eventually leading to a Computerized Physician (or Provider) Order Entry system (CPOE), they are happy with their first steps, and learned valuable lessons they can apply to future CPOE implementation.

CPOE

With the current attention being given to patient safety, especially medication errors, many providers investigate CPOE as a high priority option. While there is no generally agreed upon definition of such systems, they can be characterized as sophisticated information systems aimed at having the direct care provider personally enter key clinical orders (pharmacy, lab, radiology, etc.) directly into the computer. Ideally, the order will include clinical edits and alerts to assure the order is appropriate based on patient diagnosis, clinical information and prior orders/medications for the patient. Some providers even include financial edits, such as disclosing an option for a less expensive medication, test or procedure that has been demonstrated to be clinically equivalent. These are often part of a larger, integrated set of clinical systems, and may have many other features such as charting, clinical notes, bar coding, medication administration, etc., embedded in them. Such systems have tremendous promise of reducing errors and improving the quality and cost effectiveness of care. There are many such products on the market today, but less than 5 percent of hospitals and physician offices have deployed them. Major constraints to growth are high cost, difficulty getting physician acceptance, and the lack of clinical standards, though these barriers are gradually being diminished.



Dennis Belter



Mike McGill, Ph.D.



Jim Cusick



Gary Johnson



Mike Glickman



**Leo van der Reis
M.D.**



**Connie Berg, R.N.,
M.B.A.**



Mike Cook

ORDER ENTRY/RESULTS REPORTING CLINICAL INFORMATION SYSTEMS

For providers still relying primarily on manual orders, an intermediate step between manual systems and CPOE is to implement an order entry/results reporting clinical system. These systems are characterized by the ability to electronically enter clinical information and orders, as well as perform a host of additional information storage, communications and analysis. Such systems have been available and productively used, especially in hospitals, since the late 1970s. According to the Dorenfest Market Share Report, over 85 percent of US hospitals over 100 beds already have order entry/results reporting systems in place. The biggest drawback to such systems in the medication error scenario is that they are typically geared more towards use by nursing and office staff than by physicians. Even so, they can be very effective in securing accurate orders, checking for incompatibilities between drugs (as well as with diet, lab, etc.), and having key clinical information available when needed. When tied to decision support tools, they can also be used to determine appropriateness of care, cost effectiveness of ordered medications and tests, and outcomes analysis. While difficult to document and prove, many experts believe prudent implementation can lead to significant cost and length of stay reductions.

ELECTRONIC MEDICAL RECORDS

Electronic medical records (EMR); also frequently called Electronic Health Records (EHR), Computer-based Patient Records (CPR), Automated Patient Records (AMR) and more, have been the holy grail of medical informaticists since the 1970s. The concept is simple – have virtually all patient information that may be needed for caregivers available in electronic form. This has the potential to virtually eliminate many of the inherent problems of manual paper records; such as illegibility of orders/notes, lost or missing records, the ability for the chart to be in only one place at a time, and the high costs of chart storage and duplication. EMRs are typically considered a more advanced and sophisticated application of the order entry/ clinical information systems described above. In fact, it is not uncommon for vendors to have a migration path to upgrade older systems to an EMR. Further blurring the lines of distinction between the continuum of products, many believe that CPOE systems are most effective when bundled or embedded into an EMR.

NICHE SOLUTIONS

The solutions described above are generally most effective when highly integrated with other clinical systems and deployed throughout the health care provider organization. Depending on the specific problem you need to address, there are a variety of niche solutions available. Here are a few.

- Bar Coding is frequently used within the medication cycle to enforce the mantra of right patient (bar code the patient wrist band), right drug and right dose (bar code the drug label) and right time. As a byproduct of use during the medication administration, it also helps create an accurate and complete automated medication administration record. The same technology can also be very effectively deployed in many other clinical and non clinical areas of the organization
- Pharmacy only physician order entry solutions are available, many of them using portable units such as PDAs. They can be effective in dealing with certain medication errors and often have instantaneous prompts and alerts for the ordering physician.



Mike Cohen



Steve Henkind,
M.D., Ph.D.



Alton Brantley,
M.D. Ph.D.



Steven Roth



Walt Zerrenner



Thomas F.
Shubnell, Ph.D



Bob DeMarco

- Document Imaging can be an effective tool to eliminate some of the inherent problems of paper records, such as storage and accessibility. Several hospitals have won the prestigious Davies award from the Computer-based Patient Records Institute (CPRI – now part of HIMSS) for achieving excellence in health care quality, cost, and accessibility through the use of an EMR, by basing their EMR on this technology. When combined with the work flow management tools that are available with many of the higher end products, they can also be very effective in simplifying the number of steps, and cost in routing information throughout the organization.
- Robotics can be very effective in handling many of the labor intensive production tasks in large, high volume pharmacies, reducing labor costs and pharmacist errors in filling and dispensing medication.
- Highly specialized products are available for use in specific clinical processes. For example, there are products specifically designed for maximum value in cardiology, to decrease potential medical errors with infusion pumps, or for use exclusively within ICU/CCU.

In many ways, health care information technology is still a cottage industry. For example, there are over 450 companies claiming to an EMR. You need to clearly define and understand the problems you are trying to address. Depending on your needs you can implement a comprehensive integrated systems solution, a more limited solution, or a highly specialized niche product. In some cases this can come from an upgrade to your current systems. Depending on your needs and your budget, a manual solution focused on modifying work flow and documentation requirements may also solve your problem. Let's not minimize the importance of process changes. Regardless of which solution you embrace, the implementation and ultimate success is going to be highly dependent on tailoring the system, revising work flow/processes and managing the change process.

Cardinal Consulting, Inc. adds two new principals

Chicago, IL, November 29, 2004 – Cardinal Consulting, Inc. (CCI) announced the addition of two new Principals during the past five months, bringing the total number of principals to twenty-three. Joining as Principals are Thomas F. Shubnell, Ph.D., in Dallas and Robert N. DeMarco in northern California.

Dr. Tom Shubnell has over thirty-five years experience in information technology and healthcare information systems. He has developed and led many strategic planning efforts and has developed and participated in numerous IT assessments, vendor selections, and implementations. His extensive background includes CIO and CEO duties for healthcare entities and senior consulting positions with "Big Four" professional services firms as well as Regional Director duties for a leading health care software vendor. Prior to joining Cardinal, Dr. Shubnell was a Senior Solutions Director for a prominent healthcare IT consulting firm. Prior to that, he served as Senior Manager and Regional Director for PricewaterhouseCoopers LLP, with responsibility for developing and implementing effective healthcare solutions for clients, conducting engagements, and directing staff. Before that, he served as a Senior Manager with Ernst & Young LLP, where he conducted healthcare

Cardinal Consulting, Inc.
14060 King Road
Homer Glen, IL 60491

Phone:
(708) 645-1235

Fax:
(708) 645-1436

E-mail:
editor@cardinalconsulting.org

We're on the Web!
CardinalConsulting.ORG

management consulting that encompassed strategic planning, vendor selections and negotiations, and application software implementations.

Mr. Bob DeMarco has over 30 years healthcare clinical and financial consulting, operations and information technology experience in organizations ranging from large integrated delivery systems and managed health care plans, to long term care, home health, and rural health care facilities. Emphasis on operations and IT project management including in-depth healthcare operations analysis, information technology development, implementation, testing, and production support, and sales and marketing of integrated software solutions. Expertise in Project Management, Business Process Re-design, Long Range Planning, Application Design and Development, Quality Assurance Testing, Solution Selling, Information Systems Integration, Packaged Software Implementation, Customer Service and Support, Sales, Marketing, and Business Presentations, and Clinician Mobility Solutions.

Detailed resumes for the two new Principals are available on the Cardinal Consulting, Inc. web site.

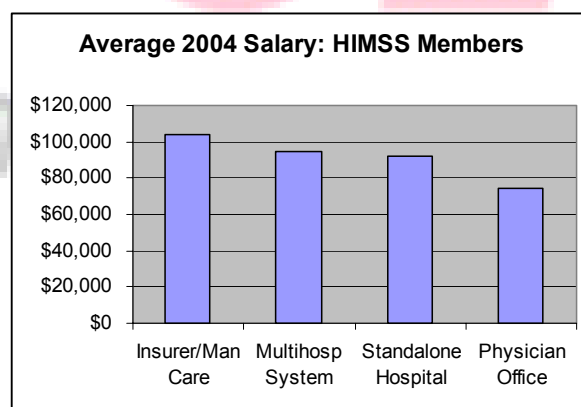
Even though CCI is a very experienced firm, it is small, privately held, and very client-focused. Therefore, client-billing rates are competitive, especially compared to the large consulting firms.

Cardinal Consulting, Inc. has consultants based in or near Ann Arbor, Atlanta, Boca Raton, Chicago, Columbia (MO), Columbus, Dallas, Indianapolis, New York City, Salt Lake City, San Antonio and San Francisco.

Visit our web site at www.cardinalconsulting.org for information about CCI's knowledgeable staff and consulting services, or call Frank Cavanaugh at (708) 645-1235.

HIMSS: Average '03 raise was 4.8%

Health care IT professionals received an average raise of nearly 5 percent as of January 1, 2004, according to a newly-released HIMSS survey. The highest average salary was reported by those working for consulting firms and vendors. IT professionals employed by hospitals earned an average \$92,200 to \$94,600, depending on whether they are employed by standalone hospitals or multi-institutional systems. An executive summary of the salary survey is available to anyone; HIMSS members can also access the full results plus job descriptions.



Source: Healthcare Information and Management Systems Society: 2004 HIMSS compensation survey reports salary increases for health IT professionals. *Press Release*, September 16, 2004. Full text free here: www.himss.org/asp/ContentRedirector.asp?ContentID=55691

HIPAA: Industry compliance survey

Progress towards compliance with HIPAA standards is reviewed based on this semi-annual survey of providers, payers, vendors, and clearinghouses.

Summer 2004 survey results show that relatively complete compliance with the privacy requirements will be achieved in the near future. However, difficulty was discovered in complying with the Transactions and Code Sets (TCS) requirements. About two-thirds of responding providers, payers, and clearinghouses reported that they are fully compliant with the TCS regulations, which went into effect October 16, 2003. Data on HIPAA 2003 and 2004 budgets for different types of health care organizations are included in this report.

Source: Healthcare Information and Management Systems Society: *U.S. Healthcare Industry HIPAA Compliance Survey Results: Summer 2004*. [19 pp.] Full text free here: www.himss.org/content/files/HIPAACompliance_SummerSurvey2004.pdf

PACS: Different requirements in OR

Considerations in adding a picture archiving and communications system (PACS) to an operating room are discussed based on the author's experiences at **Geisinger Medical Center** (Danville, PA). A key decision involves placement of the monitor so that it can be easily viewed by the surgeon. Advantages and disadvantages of several different display options are compared. Another important consideration is the inclusion of a back-up system in case of equipment problems. Hands-free PACS control will be a welcome innovation in the future.

Source: Scopelliti J: PACS in the OR. *Healthcare Informatics*, September 2004;21(9):pp 42+. Full text free here: www.healthcare-informatics.com/issues/2004/09_04/scopelliti.htm

Cardiologists add remote access

Cardiology of Tulsa (OK, 19 physicians) made a number of attempts over the years to find the technology capable of providing cardiologists with remote access to patient information. The system that eventually proved successful was **NextGen EMR** coupled with **IMPACT.MD**, a scanning solution to the input of existing paper records. Cardiologists can now access patient data anytime. Among other workflow improvements, the practice has cut transcriptionist staff by 62 percent.

Source: Nelson N: Solving the remote access challenge. *Healthcare Informatics*, August 2004;21(8):p 40. Full text free here: http://www.healthcare-informatics.com/issues/2004/08_04/case_nelson.htm

Telecom in the hospital of the future

Advances in telecommunications technology applications for the hospital of the future are discussed in this brief article by a member of the **Sprint Concept Realization Center**. Among these applications will be patients' ability to forward home and cell phone calls to their hospital room, improvements in translation services via videoconferencing, better wireless networking, and radio frequency security systems.

Source: Parker B: The Hospital of tomorrow. *Healthcare Informatics*, September 2004; 21(9):p 73. Full text free here: www.healthcare-informatics.com/issues/2004/09_04/shoptalk_parker.htm

Redcoats help implement CPOE

When the **Hospital of Saint Raphael** (New Haven, CT, 511 beds) added computerized physician order entry features to an existing computer-based patient record system, physicians' buy-in was more difficult to obtain than that of nurses. The hospital assigned "redcoats," expert users visible in their red

jackets, to be available on the nursing units at all times to help physicians learn to use the CPOE. The IT department also created special order sets for individual physicians and groups. Today, nearly all medication orders are entered online and the time needed for pharmacist order entry has plummeted by 83 percent.

Source: Davidson G, Riordan C: Keys to successful CPOE implementation. *Health Management Technology*, September 2004. Full text free here: www.healthmgttech.com/archives/0904/0904keys_to_successful.htm

CPOE cuts medication errors 35%

Cincinnati Children's Hospital Medical Center (324 beds) upgraded an existing **Siemens Medical Solutions' INVISION** system to include CPOE and implemented it hospitalwide in 8 months. Over 27,000 orders are now entered weekly with 90 percent entered directly by physicians or advanced practice nurses. Verbal orders, which had been identified as a frequent cause of medical errors, have been cut by 55 percent. Overall, a 35 percent reduction in medical errors has been attributed to implementation of the CPOE system.

Source: Jacobs B: Hardly child's plan: implementing a pediatric-specific integrated CPOE system. *Health Management Technology*, August 2004;25(8):pp 30-32. Full text free here: http://www.healthmgttech.com/cgi-bin/arttop.asp?Page=0804/0804hardly_childs.htm

Standardization: who's doing what?

Initiatives of seven organizations involved in health care informatics standardization activities are described in this overview article. These organizations or initiatives include: ASTM E31 Committee, DICOM, HL7, ISO, LOINC, SNOMED, and WEDI. Each profile briefly identifies the meaning of these acronyms and reports on the progress that the workgroups are making.

Source: Tessier C: Standards work. *Healthcare Informatics*, September 2004;21(9):pp 47+. Full text free here: http://www.healthcare-informatics.com/issues/2004/09_04/standards.htm

Space planning: data centers

Considerations in designing the physical facility that houses a health care data center are discussed in this brief article. Many data centers are greatly oversized and underutilized – as well as being plagued with bad wiring. New concepts in sizing the network-critical physical infrastructure are reviewed.

Source: Donovan J: Data center upgrade essential to enhanced patient care. *Health Management Technology*, October 2004;25(10):pp 38+. Full text free here: http://www.healthmgttech.com/cgi-bin/arttop.asp?Page=1004/1004data_center.htm

Federal strategic plan for health IT

In May 2004, Dr. David Brailer was appointed the first National Coordinator for Health Information Technology and was tasked with preparing a framework for strategic action to move towards nationwide adoption of electronic health records. This 178-page document, which incorporates contributions from the Department of Defense, the VA, and the Office of Personnel Management, was required to be submitted within 3 months of Dr. Brailer's appointment.

Source: Brailer DJ: *The Decade of Health Information Technology: Delivering Consumer-Centric and Information-Rich Health Care: Framework for Strategic Action*. Washington, DC: US Department of Health & Human Services, July 21, 2004. Full text available free here: <http://www.hhs.gov/onchit/framework/hitframework.pdf>