

Can a Centralized Healthcare Information Strategy Eliminate the ‘Root Cause’ of Medical Errors?

By Elizabeth A. Evans

The Institute of Medicine (IOM) raised the banner of patient safety when it published the report, “To Err Is Human,” in November 1999. It reported that between 44,000 and 98,000 Americans die each year as a result of medical errors. This ranks medical errors as the fifth cause of death — sandwiched between obstructive pulmonary disease and pneumonia at the upper end, and diabetes and auto accidents at the lower end.

“Eliminating the Root Cause”

Since its publication, controversy has swirled around whether the report exaggerated the number of deaths due to medical errors. Whatever the actual number, this does not discount the significance of those errors — after all, one death due to a medical error is one too many. The report does properly focus on the medical *system* in which the errors occur and on eliminating the root cause of each error — not on debating the numbers.

Donald Berwick, MD, President and Chief Executive Officer of the Institute for Healthcare Improvement, said: “Every system is perfectly designed for the outcome it produces.”¹ Today’s medical system is arguably designed with built-in failure points or “disconnects” in the care cycle, situations that occur when information created at one point of the care cycle is not available at all or not available when needed at the next care point.

The “Disconnect” Syndrome

For example, when a patient is non-compliant and does not follow the prescribed medication schedule, there is a “disconnect” between the patient and the care team. There is another disconnect when a patient sees an outside physician and the findings are not sent to the patient’s primary care team.

There are also disconnects between the acute and chronic (outpatient) settings that sometimes happen when medical documentation—including Admission, Discharge, Transfer (ADT) reports; consultation findings; and test results—is either delayed or not sent at all to the chronic setting. A disconnect between the physician and the pharmacy results when a written order is illegible. The same thing occurs between the lab and the care team when test results are delayed or otherwise not filed in a timely fashion. The delay or omission of any information from a patient’s medical record has the potential to compromise its validity because each component of the record is pivotal to the accuracy of the entire medical history.

Connecting the Communication Lines

The purpose of this article is to look at how a standard information infrastructure connects communication within the care team — the patient, physician, nurse, technician, dietitian, social worker, and the patient’s family — and across healthcare entities such as medical offices,

dialysis facilities, hospitals, testing labs, and pharmacies.

This article also explores the “hand-off” points within the care cycle where a communication breakdown is most likely to occur. It also examines how a centralized information strategy that is operationally distributive, such as the AMI TIME® System — **T**otal **I**nformation for **M**anaging **E**ffectively — can help bridge the communication disconnect within the care cycle.

“Centralized Information Strategy”

The centralized information strategy referred to is one that is operationally distributive (*i.e.*, information is consolidated, and technology distributes and leverages it within an one organization and across others). An example of a distributive technology is wireless technology on the Internet, alternately alluded to as web technology.

The benefits of distributed consolidation are several:

- Faster access to information;
- The ability to standardize on best practices; and
- An enlarged span of control in such areas as security.

Business organizations that have adopted a centralized information strategy with distributive components have experienced significant benefits similar to the healthcare community’s goals, namely optimized quality and operational efficiency. One such company is Sun Microsystems Inc.

“Patient safety is a serious, complex, and dynamic issue. It touches all who participate in the healthcare system—patients, caregivers, and family members. As such, patient safety is a shared responsibility, individually and collectively, for patients as well as all the other members of a healthcare team. More importantly, it is a societal responsibility.”

CFO Magazine paraphrases Andy Laverty, Director of Sun’s Americas Accounting Services Center: “In addition to cutting costs, Laverty says the quality of work has taken a big step forward. Error rates are lower, cycle times are faster, and employees can now execute many administrative tasks in minutes rather than days. ‘One huge benefit,’ Laverty says, ‘is that people who are paid to develop microchips or write software can spend more time doing that, versus being distracted by all kinds of paperwork.’”²

Extending “Common Benefits”

Although healthcare and business entities differ from each other, technology can extend common benefits. The IOM report states that healthcare has to look at medical errors not as a special case of medicine, but as a special case of error, and [should] apply the theory and approaches already used in other fields to reduce errors and improve reliability.”³

One such way is through information technology.

The Internet

The Internet distributes information in a way that no other technology has been able to do before. The benefits it extends to the patient’s medical record are real. They include:

- The care team may use it virtually any time and anywhere — it is ubiquitous and virtually immediate.

- A standard platform, the Internet is also a common communication tool so that a barrier to access it is essentially removed, an enormous advantage to organizations with legacy systems using different application platforms.

- The barrier to entry is low because the Internet requires no special infrastructure. From the hosting

standpoint, the entry requirements are straightforward — a PC environment, an inexpensive browser, and an Internet Service Provider (ISP) such as AOL, AT&T, or others. From the user standpoint, the entrance fee is access to a PC, an inexpensive browser, and an ISP.

- Equally significant is the Internet’s low transaction fee — it is economical to use.

- The Internet is a bridge and an enabler to an information-intact care cycle.

Notwithstanding the benefits, there are drawbacks to the Internet, including occasional bottlenecks that cause delays and instances of security breaches. These, however, are more the exception than the norm. The American Medical Association (AMA), Computerized Patient Record Institute (CPRI), the American Society of Nephrology (ASN), and other professional organizations as well as government agencies such as the US Health Care Financing Administration (HCFA) have scrutinized the pluses and negatives of the Internet. The result is the creation of guidelines healthcare organizations can use as starting points for their information strategies. Even now, many organizations are just getting started making effective use of the Internet, and its use by healthcare organizations is growing.

Health Information Resource

Interestingly, the fastest growing segment of patients who are beginning to use the Internet are those 65 years and older, a significant age group in the dialysis patient population. One of the fastest growing content segments of the Internet is that of healthcare.

In 1999, a Deloitte & Touche survey found that 43% of American

Internet users sought health information on the Internet. That same year, a Harris poll found that Americans go on-line to seek information about medical conditions to evaluate the quality of their care. In effect, Americans are finding that they no longer have to solely rely on their physicians for medical information or other information about the quality of their care. The shift to the Internet for medical content is also an indication of a paradigm shift in the healthcare model of care.

A Safety Issue “Spur”

The IOM report has been a spur to the patient safety issue and has sparked patients’ interest in managing their own healthcare. We believe that the model of healthcare will ultimately evolve to a patient-centered continuum of care model in which caregivers and patients have access to a common medical record.

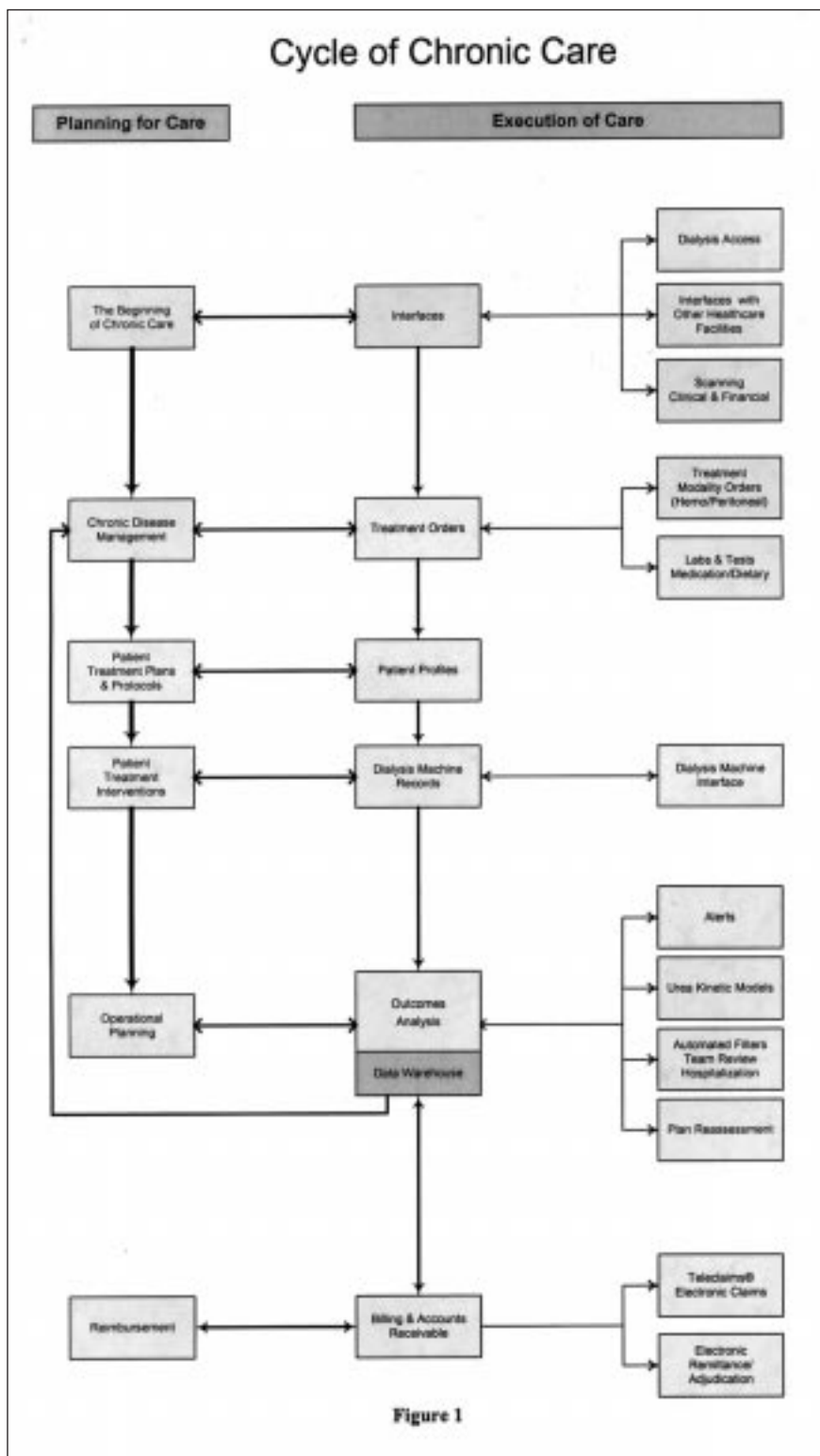
As the National Kidney Foundation (NKF) exhorts patients to know their numbers and patients demand information access, physicians are also asking more and more for fast, easy access to patient information such as problem lists, orders, test results, and allergies. Not only are physicians asking for fast, easy access, they are insisting that it be available wherever it is needed — often where the physician is located. A centralized information strategy that includes the Internet is appropriate to the communication “hand-off” requirements embedded within the cycle of care.

Cycle of Care

In a dialysis setting, the cycle of care is the sequence of events that take place, beginning with the dialysis access and including plan reassessment, hospitalizations, orders, test results, scanned documents, office visits, and team reviews. By virtue of its diversity, the cycle of care is a multi-site event — the physician’s office, the dialysis facility, the patient’s home, the hospital, the testing lab, and the pharmacy. Each site of care generates its own set of clinical information that is intrinsic to a complete medical record. As such, a centralized information strategy is fundamental to a complete medical record.

In addition to a centralized information strategy, a complete medical

Cycle of Chronic Care



record assumes specific characteristics. It is assumed that the record is *longitudinal* (one extending over the patient's lifetime), and *comprehensive* (all inclusive and current)—timely communication must take place across the sites of care. A communication breakdown is more likely to happen during the hand-off points during the care cycle. This is the

time when one member of the care team passes the baton of care to another member regardless of where the next member is located. This is the time when a single data point can be pivotal to safe care.

Making a Difference

It is here that information technology can make a difference. Its inte-

gration of medical documentation into the process of care minimizes the possibility of data omission during the hand-off period.

As a result, medical documentation becomes a progressive process, automatic and ubiquitous. It is progressive because it is electronically recorded at each step of the care process. It is automatic because data generated during the care process is electronically transferred into the patient's medical record and permanently saved. It is ubiquitous because it is electronically shared with authorized staff regardless of their location and at all times. Integrating the medical documentation into the process of care minimizes the role of human intervention that is required during the hand-off.

Figure 1 depicts the cycle of care and the contact points during the hand-off process

Each contact point (between orders and interventions, for example) is a hand-off to another member of the care team that has the potential for a communication breakdown.

Data Standards

Common data standards are the foundation of a standard information infrastructure and are mandatory to effective data-sharing among information systems so important to the hand-off process. Diversity of standards and variation within a standard are *verboten* not only to the precision of the hand-off but also to the core of the process — data accuracy. A common, unambiguous data standard enables accurate, reliable data transfer, an absolute requirement for complete communication and safe, quality care.

There is still progress to be made in order to increase the scope and precision of data standards across the continuum of care. The AMI design philosophy advocates greater data sharing among health-care information systems; this requires a standard data format with unambiguous data definitions. To increase the scope of data sharing among systems, there must be a common standard in which data formats and definitions are precisely defined. This is a goal to which standards organizations, such as Health Level 7 (HL7) and the

American Society for Testing and Materials (ASTM), as well as administrative organizations such as HCFA, aspire.

Cycle of Care

The "To Err Is Human" report states: "Preventing errors means designing the health care system at all levels to make it safer."⁴ Of all the members of the care team, no one has a greater stake in the quality and safety of healthcare than the patient. Therefore, the focus becomes twofold:

(1) Design the patient and each member of the care team into the cycle of care as active participants; and

(2) Eliminate as many of the problem issues that crop up during the hand-off as possible.

Exploring the first part of the focus is pivotal to the hand-off issues. Designing the patient into the cycle of care involves actively including that patient into the continuum of care. Integrating convenience into the process and making the important things easy to do are ways to accomplish this. Convenience is key to minimizing the information disconnect between the patient and the care team.

Timely Test Results

Few would argue that test results are important to the continuity of patient care. Automatically downloaded from the laboratory as they become available and permanently stored into the patient's medical record, results are potential trigger data for timely disease management interventions.

Test results are gauges by which a patient's health status can be judged. Depending on the individual results and the patient's list of active problems, intervention may include counsel and a change of orders.

Having timely test results online is convenient: they are available at any time and can be accessed as often as necessary. They may be displayed in several formats, including a high-level summary format of normal results, a format exclusive to out-of-range results, or a list of all results.

When important things, such as on-

line access to test results, are easy to do, the care team is more likely to have the correct information to take the right action. Connecting clinical information within the context of care has the potential to create a virtual care team that is as real as it is effective.

"The Foundation of Safe Care"

Equally important to the care cycle is what occurs externally to each cycle. The information generated by a hospitalization, a dialysis treatment, or a primary care visit is essential to a complete medical record. Having complete information at any point of the cycle of care is enabled by a centralized information strategy that provides a single contact point during each phase of the cycle. Complete information at the point-of-need is the foundation of safe care. It provides a complete set of facts instead of having to rely on anyone's memory or merely believing it to be correct.

Today, information derived from each segment of the care cycle is frequently unavailable to the patient's electronic medical record. This results in an incomplete set of facts. A practical solution involves a two-part vision:

(1) A patient updates a subset of his/her medical record. This will become a more dominant model of care as patients assume more control of—and responsibility for—their own healthcare. Although not yet available in general application, a patient health record will come of age. As it does, patients will become more sensitive to the completeness and accuracy of their records. In effect, they will become partners in safe, quality care.

(2) A standard system of interfaces that operates universally throughout the healthcare system.

Pharmacy Factor

Prescription writing is one of the most criticized components of medical care. It has become the focus of wide media attention since the publication of the IOM report. Illegible scripts and inappropriate medication orders can cause serious medical errors.

In addition to legible orders, the issues of prescription renewal monitoring and unobtrusive in-process drug-drug interaction checking are patient safety issues. Prescription renewal monitoring relates to patient compli-

ance while drug-drug interaction checking is important to correct medicating.

Despite the movement to safer medication ordering, the cost of a drug-drug interaction knowledge base is often uneconomical for healthcare providers. Currently, there is limited acceptance of real-time, on-line drug-drug interaction checking despite the fact that many acknowledge its value.

A Conclusion in Transition

Patient safety is a serious, complex, and dynamic issue. It touches all who participate in the healthcare system—patients, caregivers, and family members. As such, patient safety is a shared responsibility, individually and collectively, for patients as well as all the other members of a healthcare team. More importantly, it is a societal responsibility.

Adopting an information strategy consistent with a standard information structure is a starting point for making safe care easier, more convenient, and more realistic. In principle, the issue of patient safety has the potential to bond the care team into a clinical process so that practicing medicine within an electronic infrastructure becomes the practice of information within a model of healthcare in transition.

References

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