

Anytime, Anywhere Medical Records

The National Health Information Infrastructure (NHII)

by William Hersh, M.D.

Computerizing health records (will) reduce costs, improve care, and lower the risk of medical mistakes.

President George W. Bush
State of the Union address
January 20, 2004

Consider the following two information technology scenarios.

Two years ago, I traveled with my daughter to Beijing, China as a visiting professor at Peking Union Medical College & Hospital. We booked our airline tickets online. We received information about immunizations and health risks from the Centers for Disease Control Travel Web site (www.cdc.gov/travel). Once there, we easily connected to our internet service provider with a local phone call. This not only enabled us to keep in touch with family and friends, but also to email pictures of our visits to the Great Wall, Tiananmen Square, and other famous sites. I was also able to keep up with the courses and students that I teach online. In addition, I was easily able to walk down the street to access my bank account through an ATM, to obtain Chinese currency.

This experience contrasts starkly with the one I would have if I became acutely ill while on NW 23rd Street in Portland, Oregon, and was rushed to nearby Good Samaritan Hospital. The clinicians there would know little about my existing medical problems, despite the fact that that my regular physician had stored life-saving information in the OHSU clinical-information system just a few miles away. I could still consult electronically with

my Chinese colleagues halfway around the globe, while my medical information remained unavailable to the clinicians trying to save my life.

Researchers have identified such scenarios as a major cause of medical errors, reduced quality, and increased costs in healthcare. The Institute of Medicine (IOM) has documented these problems and proposed solutions, beginning with its publication *Crossing the Quality Chasm* and continuing in several follow-up reports. Of all the IOM publications, the one that received the most press was the *To Err is Human* report, which estimated that anywhere from 48,000 to 96,000 Americans die each year due to medical errors. Unfortunately, when members of the press and others quote these numbers, they often miss the real story. Clinicians make many errors in healthcare because they have neither the information tools needed to safely treat their patients nor the systems in place to avoid errors. Furthermore, we are burdened with a legal system that focuses more on determining retrospective blame for a small number of injured people rather than proactive efforts to identify and correct systemic flaws. (See the sidebar **Some Facts and Concepts About Malpractice and Patient Safety—Ed.**)

The growing recognition of these problems has led to a new initiative known as the National Health Information Infrastructure (NHII). The NHII aims to utilize healthcare information technology (HIT) to improve healthcare and reduce medical errors. Most efforts in the development of HIT have come from individual organizations and target improvements inside closed networks. However, the use of HIT must go beyond the boundaries of individ-



The Drivers

The National Health Information Infrastructure (NHII) concept was spawned in both working meetings and legislation. An agenda-setting meeting was held in Washington, DC in June 2003. The meeting was devoted to planning and consensus building in eight “tracks” that included privacy and confidentiality, architecture, standards and vocabulary, safety and quality, financial incentives, consumer health, homeland security, and research/population health. A follow-up meeting will take place in July 2004.

A number of other related initiatives have advanced the goals of the NHII. The Center for Medicare and Medicaid Services (CMS), which funds Medicare and oversees quality-of-care delivery, is promoting demonstration projects to improve care through healthcare information technology (HIT). The Doctors’ Office Quality Information Technology (DOQIT) project is funding quality improvement organizations to facilitate the use of HIT. Another federal effort is Consolidated Health Informatics (CHI), which aims to facilitate the adoption of interoperability standards for EHRs by all federal agencies involved in providing healthcare, e.g., FDA, DOD, VA, and Indian Health Service. A public-private partnership effort is Connecting for Health (www.connectingforhealth.org), promoting electronic health records, standards, and privacy/security.

ual health plans, hospitals, and physician offices because patients are “mobile” in many ways and most patients are notoriously bad at self reporting time frames and other vital information. They also switch plans, often at the behest of their employer, and they develop emergency-health problems away from their local physician’s office or hospital. There is, of course, a greater need in the public-health sphere for integrated information systems because of the growing threats of emerging diseases and bio-terrorism.

A key point about the NHII is that it includes more than just the technology infrastructure. It comprises “the set of technologies, standards, applications, systems, values, and laws that support all facets of individual health, healthcare, and public health.” Dr. William Yasnoff, the federal government’s senior advisor for

the NHII and a former official of the Oregon Health Division, has stated that its overarching goal is “anytime, anywhere access to clinical information” with appropriate authorization and authentication.

Information Technology: Part of the Solution

Information problems are not the only problems in healthcare and HIT is not the only solution. But, there is mounting evidence that an electronic health record (EHR), coupled with integrated decision support, improves the quality of care and reduces medical errors and costs. Research has also shown that properly designed EHR systems allow easier implementation of evidence-based practices, do not take more physician time, and can provide a positive return on investment in both inpatient and outpatient settings. Most of this research, however,

has been done in a small number of institutions with locally developed (i.e., non-commercial) systems, often fueled by grants or other external funding beyond what most institutions usually spend on information systems. Furthermore, this work has mostly been within closed-health systems and not across communities.

So how do we achieve the NHII? According to Dr. Yasnoff, the road to the NHII leads through the creation of local health information infrastructures (LHIIs). That is, a centralized effort by the federal government is unlikely to succeed. Instead, the onus is on local regions and states to build LHIIs, adhering to (and setting) standards for what is increasingly called “health-information exchange.”

One example of this local structure, and a leader in using health-information exchange, is

Bumps in the Road

Despite the evidence of the effectiveness of healthcare information technology (HIT), considerable challenges remain. Tommy Thompson, Secretary of Health & Human Services, has lamented the poor state of HIT and called for acceleration of the definition and functional specifications for the electronic health record by the Institute of Medicine (IOM) and Health Level Seven (HL7, <http://www.hl7.org>). The two most notable challenges are financial incentives and lack of technical expertise, especially in small practices and organizations. The financial problems reflect the unique characteristics of HIT and the general problem of an under-capitalization in healthcare. One serious financial misalignment is that those who benefit from HIT (e.g., insurers, laboratories, and even patients) are not necessarily those who pay for it (e.g., physicians and hospitals). Furthermore, even if the financial problems are overcome, HIT still requires technological expertise that small practices and organizations might not have.

Additional challenges for HIT relate to the technology. A lack of standards for representing and interchanging data, make interoperability of systems costly. Lack of interoperability traps health data in “silos,” that are difficult to move or re-use. This glitch actually benefits vendors of electronic health record (EHR) systems, because customers are less able to change vendors. The organization responsible for setting HIT standards of operability for healthcare is HL7, and a considerable effort is being made to develop such standards as well as the environment in which customers will demand them.

the Indiana Network for Patient Care (INPC). INPC data includes everything required for patient care from diagnoses to test results (laboratory and radiology) and dictated reports. In the INPC, authenticated clinicians can access any data in any system from any location. Security is obviously paramount, and the INPC utilizes a secure network, encryption, and strong authentication. For the most part, data is stored in a decentralized fashion, mainly in the enterprise systems of participating institutions. Patient records are linked by an automated algorithm.

Just as implementation of electronic health records in individual practices has political and financial barriers, so do health-information exchanges. Indeed, how can practices, insurers, hospitals, and so forth who compete for business be willing to share a strategic resource as important as clinical information? One approach is to get this community to buy into the concept that they will compete on other aspects of their businesses, such as patient outcomes and satisfaction, but not clinical data or information systems. The INPC has been built on a community-wide agreement that information is a "utility" for the entire healthcare system. The Center for Information Technology Leadership estimates that a ten-year implementation of a national-scale standardized health information exchange will break even by the fifth year and thereafter save \$87 billion annually. Cost savings accrue to all participants in the system, including clinicians, payers, labs, radiology centers, and pharmacies.

Probably the main lesson learned to date is that the biggest challenges in implementing a health information system like

INPC are political and not technical. Saving lives and dollars will not be enough; stakeholders will need to come to the table and prepare to share in the effort. Some key questions are still unanswered: Who will fund these systems? How can communities share in the costs? Who owns the electronic health record data and how does the patient access it?

Think Globally, Act Locally: Can We Achieve the NHII Goals in Oregon?

If it is correct that the road to the NHII leads through LHII's, then it will be essential to develop a broad-based process in Oregon. Hoping to build on the state's history of collaboration in healthcare quality and data sharing, a group attending the NHII meeting has decided to pursue this agenda locally. The Oregon Health Information Infrastructure (OHII) group members have instituted a planning process focused on collaboration and buy-in. OHII aims to couple achievable but modest early goals with an eye to scalability and replicability. This Oregon process will also incorporate a solid business model for stakeholders: patients, providers, purchasers, and public sector. The OHII Web site (www.ohii.org) is the best place for up-to-date information about this rapidly moving process.

While health information technology will not solve all of healthcare's problems, it will certainly play a significant role. It is reasonable to think that with proper technological development, community consensus, and funding, a patient who usually obtains their care in Pendleton can release his or her medical records to other appropriately authorized clinicians while visiting Ashland. Likewise, it is con-

ceivable that such a system will facilitate clinical research to develop evidence-based practices and improve public health surveillance of emerging diseases and other potential threats.

Editors Note

An extensive list of references supporting Dr. Hersh's article is available upon request from jay-hutchins@comcast.net.



Dr. Hersh is Professor and Chair of the Department of Medical Informatics & Clinical Epidemiology in the School of Medicine at Oregon Health & Science University (OHSU) in Portland, Oregon. Working at OHSU since 1990, Dr. Hersh has developed research and educational programs in medical informatics and is internationally recognized for his contributions to the field. Dr. Hersh is a Fellow of the American College of Medical Informatics and a Fellow of the American College of Physicians. Email: hersh@ohsu.edu Web site: www.billhersh.info

U.S. Standing

Similar to many other health-care measures, the U.S. considerably lags behind when it comes to the electronic health record or EHR. The United Kingdom, Australia, and numerous Western European countries have made much greater strides in EHR penetration. In Australia, general practices went from 15-percent use in 1997 to 70-percent use in 2000, with government giving financial support to purchase computers, creating incentives to submit claims electronically, and providing technical support. The United Kingdom has achieved near 98-percent usage through financial and technical assistance from the National Health Service (NHS). Furthermore, the NHS is now funding a large investment in HIT infrastructure.

Despite the lack of overall progress in the U.S., there are some exemplars. Kaiser Permanente, despite some costly failures, is moving forward now with a plan to follow the lead of its Colorado and Northwest regions that have been most successful with HIT. They have an essentially paperless medical records infrastructure and use technologies like electronic prescribing to reduce drug errors. Another leader is the U.S. is the Department of Veterans Affairs, which has developed a comprehensive EHR system whose source code is all in the public domain.