

“Computer systems require relatively simple, definitive rules whereas healthcare is very complex.”

HIMSS *Standards Insight*, July 2005.

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## Information and terminology models

By Janet Martino, MD, Principal, CCI

Health care leaders continually ratchet up the demands on their information technology systems – needing to adapt them to expanding and changing business requirements. Two categories of tasks must be addressed to enhance the health information technology (HIT) system in order to have a shot at this moving target. The first set of tasks deals with information models and the second with terminology models.

### Information models

Information models address the way data are structured in an information system. The first challenge is to determine the appropriate fields. Think about this situation -- you assign two summer interns to each work up an Excel spreadsheet of your organization's holiday card list. Odds are that the finished products will be similar, but not identical. One intern might put all of the personal name information together in one column, while the second assigns first name, middle initial, and last name to separate columns. One might spell out the entire state name while the other uses the standard two-letter abbreviations for states, and so on. This simple example hints at the challenges of designing the much more complex structure of HIT databases to accurately define and capture all of the needed fields.

But it is no longer enough that the HIT is responsive to the needs of one organization – it is increasingly called upon to communicate with other systems. So, the second challenge is to create a means of facilitating interoperability, by which data can be exchanged between different organizations. In order to achieve any degree of interoperability, standardization is required. Work done by the Health Level Seven (HL7), a national organization charged with developing interoperability standards, has resulted in the creation of a model *reference information model* (RIM) which is a pictorial representation of clinical data.<sup>1</sup>

The health care organization's reference information model will change over time as business practices and medical knowledge evolve. In practice, the reference information model minimizes the need to tinker with the database's structure, which is a time-consuming and costly process. This is achieved by mapping the physical database structure to the RIM. Incoming data are also mapped to the RIM, allowing transformation of the data to a structure that fits the target database. This allows the target database to accommodate variations in the incoming data without having to change its structure. Modification of the physical database would be needed only to incorporate new concepts.

<sup>1</sup> Health Level 7: *What is HL7?* Full text free here: <http://www.hl7.org/> (accessed July 1, 2006)



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## Terminology Models

Terminology models and code sets address the meaning of the information that is actually entered into the data fields. In our holiday card example, the intern who used the two-letter abbreviations for states made a wise and obvious choice, since the US Postal Service long ago set this as a standard. However, one of the biggest challenges in the field is the extensive, complex, and evolving medical terminology. One provider refers to "hypertension", another to "elevated blood pressure", and a third to the equivalent term in Hebrew. These problems of semantic interoperability are already creating degradation of the quality of the data being collected.

Like the information model described above, there are two aspects of the terminology model – the one used in the internal structure of the internal application and database and a *reference terminology model* (RTM) used for mediating information interchange. The function of the RTM is to limit the impact of evolving terminology changes on the physical system in the same way that the reference information model does.

## Envisioning the goal

These enhancements would enable the health information system to become an industry standards-based global repository for personal electronic health records that draw information from many sources. In order to achieve this, a first step is to add the necessary data structures and standard code sets to the medical information tables. A second step is to develop the information exchange specifications and a translation service.

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## -- What's new in the literature? --

### Forrester: IT spending up 3.1%

Forrester Research, Inc., reports that information technology spending at large hospitals is expected to be 3.1% higher in 2006 than in 2005.

Source: Forrester Research: *Hospital IT Spending Trends for 2006*, March 21, 2006.  
Full text for sale here: <http://www.forrester.com/Research/Document/Excerpt/0,7211,39174,00.html> (accessed 08/06/06)

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### Hospital websites need beefing up

About 20 percent of online consumers have visited a hospital website, according to this first of a series from Forrester research. Those who do look at hospital websites tend to stick to basics like directions to the facility or visiting hours. The second report found that about 40% of those consumers who *do* visit a hospital website are satisfied with it overall, which is below the usual satisfaction level with retail websites. In a related study, only 13 percent of patients were found to visit the websites of their physicians.

Sources:  
Bishop L, et al.: *Hospital Web Marketing Takes Off: Consumers Still Stick to the Basics*. Forrester Research, June 19, 2006.  
Full text for sale here: <http://www.forrester.com/Research/Document/Excerpt/0,7211,37998,00.html> (accessed 08/06/06)  
Bishop L, et al.: *Hospital Web Sites Disappoint Visitors*. Forrester Research, July 12, 2006.  
Full text for sale here: <http://www.forrester.com/Research/Document/Excerpt/0,7211,39846,00.html> (accessed 08/06/06)  
Bishop L, et al.: *MD-Patient Online Contact Grows Slowly*. Forrester Research, June 15, 2006.  
Full text for sale here: <http://www.forrester.com/Research/Document/Excerpt/0,7211,39298,00.html> (accessed 08/06/06)

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## Profitable hospital call centers

Converting a hospital call center into a customer interaction center can add value beyond the usual physician referral function. Hospitals should consider expanding consumer access points beyond the telephone to include e-mail, live chat, and call-me-back services. Customer interaction centers might handle scheduling, preregistration and postdischarge information. Data mining systems can help staff with cross-selling opportunities tailored to the individual caller.

Source: Spiegelman P: Phoenix rising. *Health Management Technology*, May 2006; 27(5): pp 30+.  
Full text free here: [http://www.healthmgtech.com/archives/0506/0506phoenix\\_rising.htm](http://www.healthmgtech.com/archives/0506/0506phoenix_rising.htm) (accessed 08/06/06)

## How to develop a state-level RHIO

A process for developing a state-level Regional Health Information Organization (RHIO) is provided in this 68-page workbook. The workbook is based on a research project sponsored by the federal Office of the National Coordinator for Health Information Technology that studied best practices in RHIO development in 9 states. The steps include: assessing market characteristics; identifying champions and key stakeholders; determining the role of the RHIO; setting up the governance structure; obtaining funding; setting up financial models, policies, and operations; identifying priorities; and, reassessing original assumptions.

Source: American Health Information Management Association: *State-Level RHIO Development Workbook*, Version 1.0, July 11, 2006.  
Full text free here: [http://www.staterhio.org/conference/documents/workbook\\_v1.0\\_071206.pdf](http://www.staterhio.org/conference/documents/workbook_v1.0_071206.pdf) (accessed 08/06/06)

## Successful implementation of EHR

Considerations in implementing an electronic health record are discussed in this AHIMA practice brief. Of particular concern is leadership and fostering the types of conditions that will help employees be more open to change. Tactics to help implement change are itemized. Obtaining buy-in from the health care professionals can be much more challenging than dealing with the technology-related issues.

Source: Fenton S, et al.: Essential people skills for EHR implementation success. *Journal of AHIMA*, June 2006; 77(6): pp 60A-60D.  
Full text free here:  
[http://library.ahima.org/xpedio/idcplg?IdcService=GET\\_HIGHLIGHT\\_INFO&QueryText=xPublishSite+%3csubstring%3e+%60BoK%60+%3cAND%3e+%28xSource+%3csubstring%3e+%60AHIMA+Practice+Brief%60+%3cNOT%3e+xSource+%3csubstring%3e+%60AHIMA+Practice+Brief+attachment%60%29&SortField=xPubDate&SortOrder=Desc&dDocName=bok1\\_031551&HighlightType=HtmlHighlight&dWebExtension=hcssp](http://library.ahima.org/xpedio/idcplg?IdcService=GET_HIGHLIGHT_INFO&QueryText=xPublishSite+%3csubstring%3e+%60BoK%60+%3cAND%3e+%28xSource+%3csubstring%3e+%60AHIMA+Practice+Brief%60+%3cNOT%3e+xSource+%3csubstring%3e+%60AHIMA+Practice+Brief+attachment%60%29&SortField=xPubDate&SortOrder=Desc&dDocName=bok1_031551&HighlightType=HtmlHighlight&dWebExtension=hcssp) (accessed 08/06/06)

## How did the implementation go?

Experiences of implementing major information technology projects at four hospitals are described in these interviews with hospital managers. Banner Estrella Medical Center (Phoenix, AZ) is a new paperless hospital that opened in 2005. Buy-in from physicians and other health professionals was obtained through visioning conferences and other regular meetings. Saint Vincent Health System (Erie, PA) implemented a new document imaging system through a process that also involved soliciting the support of stakeholders. Children's Hospital and Health Center (San Diego, CA) moved to electronic records and developed training programs and competency exams for physicians. Northwestern Memorial Hospital (Chicago) viewed the buy-in process through the lens of a marketing project.

Source: Duggan C: Implementation evaluation: HIM professionals share their experiences bringing health IT online. *Journal of AHIMA*, June 2006; 77(6): pp 52-55.  
Full text free here:



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## Phased approach vs. big bang

Deployment of computerized physician order entry (CPOE) systems in a phased roll-out has been the approach taken by more hospitals than a one-time approach. Variation in the interest level and commitment among different physicians makes a big-bang implementation difficult. Different stages of CPOE implementation are explored in this article, including: planning, mining vendor knowledge, implementation and rollout. Activities of the Illinois Foundation for Quality Healthcare in helping 27 hospitals prepare for CPOE and bar coding are reported.

Source: Briggs B: CPOE: setting the stage. *Health Data Management*, August 2006;14(8).

Full text free here:

<http://www.healthdatamanagement.com/html/current/CurrentIssueStory.cfm?articleId=13769>  
(accessed 08/06/06)

## Computer carts: buy easy rollers

Considerations in purchasing computer carts, which cost from \$2,000 to \$8,000 each, are discussed in this cover story. Many hospitals are looking to standardize cart purchases to one or two models. Cart manufacturers offer a variety of options, including battery packs to make them self-contained. Ergonomics are particularly important to nurses, including ease of rolling and of adjusting cart height.

Source: Martin Z: Finding the right computer cart. *Health Data Management*, August 2006;14(8).

Full text free here:

<http://www.healthdatamanagement.com/html/current/CurrentIssueStory.cfm?articleId=13765>  
(accessed 08/06/06)

## Outsourcing: is it working?

Health care organizations that outsource information technology functions often negotiate service level agreements (SLAs) to govern the performance of the outsource vendor. Typical SLAs and performance targets are discussed in this article based on the experiences of M\*Plan (Indianapolis, HMO), Crittenton Hospital Medical Center (Rochester, MN), Central Maine Healthcare Corporation, Lucille Packard Children's Hospital (CA), Gwinnett Hospital System (Lawrenceville, GA), and Colorado West Mental Health (Glenwood Springs, CO).

Source: Goedert J: Measuring outsourcing's effectiveness. *Health Data Management*, July 2006;14(7): pp 50+.

Full text free here:

<http://www.healthdatamanagement.com/html/current/PastIssueStory.cfm?ArticleId=13637&issuedate=2006-07-01> (accessed 08/06/06)

## Commonwealth Fund: IT is lacking

Established in 2005, the Commonwealth Fund's Commission on a High Performance Health System examined key attributes of the US health care system and found that information systems such as electronic medical records are vastly underutilized. Support for expansion of interoperable information technology is stated.

Source: Commission on a High Performance Health System: *Framework for a High Performance Health System for the United States*. Washington, DC: The Commonwealth Fund, August 2006.

Full text free here:

[http://www.cmwf.org/usr\\_doc/943\\_commission\\_framework\\_high\\_performance.pdf](http://www.cmwf.org/usr_doc/943_commission_framework_high_performance.pdf)  
(accessed 08/06/06)