Web-based Patient Record Systems: Opportunities for Best Practices

by Deborah Kohn, MPH, RHIA, FHIMSS

Because the World Wide Web has become a popular place for healthcare users to browse and search for information, it offers healthcare providers, payers, and patients access to the widest range of healthcare information as well as the ability to disseminate information. As a result, the healthcare industry needs to make sense of the fundamental and irrevocable changes in the way it can conduct business in relation to the Web.

The Web and its derived technologies are being used to accomplish several information technology (IT) objectives, particularly to revolutionize the development and implementation of healthcare information systems (HISs). This is in response to the need to implement IT solutions and realize benefits from IT investments in healthcare. The technology is also being used to implement components of the elusive computerized patient record (CPR). Combined with the overwhelming commercialization of the Internet in recent years, the Web and its derived technologies are enabling "the Net" to become the health information network everyone in healthcare is waiting for.

The key to best practices is that these technological revolutions are occurring in a dynamic, cost-effective and expedient manner. They are changing the ways in which HISs and components of CPR systems are being created, sent, stored and retrieved.

The Web's Influence on HIM

The mass introduction and acceptance of the Internet, Web, and their derived technologies are forcing HIS companies to make a transition to Web browser-based architectures. This requires a lot of time and money in terms of company research and development and in every case, it demands a total rewrite of the systems' code.

Many established HIS companies, such as those with "legacy" and/or client server-based systems, no longer can afford or are terribly reluctant to make the next transition. Instead, many of these companies are moving to browser-based architectures by "Web-enabling" their existing systems and products.

With Web-enabling, the HIS companies are not spending the time and money in research and development to rewrite all their systems' code in the newer, Web-based programming languages, such as HTML, SGML, XML, or Java and its derivatives. Instead, when an authorized user logs onto the system, the user is presented with a Web page. From the Web page, the companies' systems applications (written in, for example, Microsoft's 32-bit Visual Basic) are launched.

Browser-based systems are more complex. These are systems in which companies have either written or rewritten their systems' code using one or more of the Web-based programming languages. In browser-based systems, the browser acts as the primary desktop interface for access to data and document repositories and is used to display and query information stored in databases as quickly as client server-based systems.

For comparison purposes, in Web browser-based systems, the retrieval application typically resides on the server. In client server-based systems, the retrieval application typically is loaded on each workstation. Browser-based systems accept data inputs from other systems and send them to other databases over the network using plug-ins or display controls, such as Active X or CORBA. They are online transaction processing (OLTP) systems, not just read-only (content) systems. These systems are proven to reduce network administration and workstation maintenance costs.

Whether the systems are part of an organization's intranet or extranet and are Web-enabled or browser-based, patient care providers like Web-based patient record systems. Plain and simple, Web-based patient record systems are easier to use than

other types of systems. They also provide healthcare organizations with sociological leverage. The Web and its derived technologies, especially the browser interface, are familiar to almost everyone and reduce the chance of employees saying they don't understand how to use the systems. In short, implementing these systems in healthcare organizations is proving to be more successful than previous attempts, and these systems are achieving organizational benefits.

However, in order for the Web and its derived technologies to continue to evolve and become a source for best practices, the technologies must support a viable business model. In healthcare, that model must result in identifying means of saving expenditures for healthcare services. The key to this is successfully implementing Web-based IT solutions and achieving benefits realization from Web-based IT investments.

VPRs Maximize Web Benefits

Virtual patient records (VPRs) are one of the few infrastructure-based applications poised to make full use of the Web paradigm. Therefore, they are being explored by a number of healthcare organizations.

VPRs can be thought of as the Web-compliant infrastructure components of the CPR. They can be intranet or extranet-based. They can be Web-enabled systems, in transition, or their architectures can be browser-based.

VPRs integrate data from hospitals, clinics, insurers, and ancillary service providers. They are intended to create a single view of patient data from potentially dozens of disparate healthcare sources. They are also intended to gather transactions from the disparate healthcare sources and pass the information to the Internet's Web interface.

Each user of the VPR has a customized or filtered view of the data, depending on the user's needs. For example, the VPR allows physicians to determine if their patients have followed instructions and are compliant about prescriptions, based on VPR pharmaceutical records. The VPR allows administrators to view reimbursement rates and gather data for cost analysis.

Integrating patient data from multiple systems within or between organizations is neither easy nor inexpensive. However, the alternatives to using VPRs are cost-prohibitive and practically unattainable. Such alternatives include standardizing on one vendor's suite of products (and, thus, often having to replace many of an organization's existing health information systems) or attempting to connect many diverse systems.

On the other hand, by creating an intranet-based architecture, implementing application servers to take basic information from each of an organization's disparate systems, and passing the data into a browser window, an entire new set of applications can be created without altering existing systems. This has proven to be a cost-efficient and effective IT alternative and, as such, is a successful best practice approach.

For example, one East Coast integrated delivery network (IDN) capitalized on Web-derived technologies and integrated its data for a VPR without eliminating or integrating its systems. Instead, the IDN "consolidates" data from its diverse systems using Web technologies. Prior to the installation of a Web-based clinical information system at another IDN, care providers had to access up to 10 different systems to retrieve the information they needed to take care of patients, which did not work well because the end users had to enter the same patient data into each of the systems. By providing end users a VPR with a Web-based single point of entry to multiple information systems, end users can simply click on icons to get information from each of the organization's individual systems.

How Can HIM Professionals Contribute?

Despite the current mood of technological supremacy, such projects still stumble because of unreliable, fragmented, and nonstandardized patient medical, financial, and administrative data. HIM professionals understand that almost every aspect of record keeping is difficult to standardize and, therefore, difficult to automate. And, because data quality is erratic, HIM professionals understand why many organizational stakeholders will not trust others enough to share information freely. Further, implementing Internet technologies and Web-based patient record systems requires organizational support, good technology management, and a great deal of planning. It is the HIM professional who can meet these requirements by gathering all the necessary inputs and resolving data modeling issues.

For example, HIM professionals are able to answer critical database management questions like, "How does the radiology department record information about tests and patients? How compatible is that to the way it is done in the computerized

scheduling system?" In addition, HIM professionals are able to present data in a fashion that is certifiable when questions of replicating data are offered.

HIM professionals must continue to examine the dynamics of the workplace, the communication methodologies of the staff, and the current processes in place. First, we can determine what really needs to be accomplished as opposed to "how it has always been." Then, we can review the processes with the project's team and adapt them to the development and ongoing maintenance of the systems. By planning Web-based patient record systems at their organizations, HIM professionals can take advantage of the opportunity to create a successful organization best practice.

Deborah Kohn *is the principal of Dak Systems Consulting, a national healthcare information technology advisory consultancy. She can be reached at dkohn@daksystcons.com.*

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