Data Transmission: A World of Possibilities

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by Deborah A. Smith

In a landscape of regulation and consolidation, healthcare providers must find new, cost-effective ways to communicate sensitive data with partners. Observations, lab results, and admission-discharge-transfer data must be shared accurately, confidentially, and in a timely manner with other providers, researchers, and regulators. This is a challenge around the world, and worldwide, organizations are contributing to the testing and development of technologies that help address this requirement.

There are very few technologies that will have greater impact on healthcare management than the integration of electronic medical records. A system for secure and seamless sharing of records would provide compelling benefits to patients through increased speed and accuracy and would enable tremendous economies for the healthcare facility. This need has encouraged organizations to move forward and smooth the way to progress by working together as a collective. This article looks at three countries where peers are joining together to test products, hold demonstrations, and educate on the value of standardization while encouraging new technologies to find a solution where everybody wins.

Canada

In Canada, the Canadian Institute for Health Information (CIHI) is the national, independent, and not-for-profit organization responsible for coordinating the development and maintenance of the country's health information system. CIHI must conform to the Personal Information Protection and Electronics Documents Act, which governs the commercial collection, use, and disclosure of personal health information. CIHI's pledge to "to respect personal privacy, safeguard the confidentiality of individual records, and provide a secure environment for information systems under its management" is now under the watchful eye of the Canadian government.

In CIHI's search for the perfect electronic medical record solution, it initiated and reviewed a test project that involved automating data exchange between three remote health-related organizations and CIHI's Toronto office. The three participating facilities were located in Toronto, Halifax, and Vancouver. Each of these facilities used a different set of healthcare applications and databases, and the technology they used mapped each system to standard templates in extensible markup language (XML), allowing documents to seamlessly transfer from one location to another. This success caught the eye of other major Canadian services that are also tracking innovative ways of transferring data securely over the web. According to Cal Marcoux, manager of applications development at CIHI, "Secure, real-time data transfer using open standards is key to the advancement of health information integration. Harnessing this technology will lead to more timely and accurate information and, ultimately, the better measurement, monitoring, and management of the healthcare system." The institute is also launching several other key technology initiatives as it assumes a leadership position in health information.

United Kingdom

The same issues exist in the United Kingdom where, in an effort to catch up with the latest technologies, the government has invested $725 million into the National Health Service for the sole purpose of taking advantage of the Internet as a way to exchange information. These funds will start to renovate current haphazard patient databases and find ways of transferring information securely between hospitals, clinics, and offices. Britain's Data Protection Act is the country's watchdog and touts the security of patient records. To find solutions, technologies such as XML, public key infrastructure (PKI), and Java are now being seriously reviewed due to this new demand.

North America

In North America, an industry consortium called the Clinical Information Systems Interoperability Network (CISTERN) is pushing for results and achieving remarkable breakthroughs. In a demonstration at the XML 2000 conference in Washington,

DC, CISTERN proved that a system for sharing complex healthcare data can be implemented more quickly and easily and at a fraction of the cost of traditional approaches.

CISTERN gives vendors a platform for testing and demonstrating interoperability from any Internet-enabled location. Healthcare facilities can also use CISTERN servers to determine if the products they are considering will be truly interoperable with their legacy systems.

There is no formal membership and no meetings schedule; CISTERN is simply a collaboration of progressive vendors that support open standards such as XML, HL7 (Health Level Seven), and PKI. New vendors are encouraged to link their systems to CISTERN for any period of time at no cost. The consortium's primary goal is to raise awareness and build demand for integrated business applications that offer plug-and-play interoperability.

CISTERN has created a core suite of XML document type definitions (DTDs) based on the HL7 standard and these 15 DTDs simplify the process of transporting standard healthcare data across a broad range of applications and between widely dispersed business partners.

At the XML 2000 trade show, CISTERN demonstrated that the time needed to integrate a secure system for sharing healthcare data can be slashed from weeks or months to a matter of hours, that the learning curve for integrators can be squashed nearly flat, that private networks are on the verge of obsolescence, and that products and services from a wide range of suppliers can be swapped in and out with full interoperability. In essence, it means that for the first time, the promise of XML and the Internet with low-cost and secure messaging has been realized. The XML 2000 demonstration showcased products that act as plug-in Internet components. By using an XML implementation of HL7 messages along with PKI security, CISTERN was able to show how patient data messages can be exchanged transparently across the Internet between multiple sites running a broad range of hardware and software. The demonstration showed how the combination of XML, HL7, and PKI will enable healthcare providers and integrators to cut costs, develop new solutions, ensure interoperability, and improve patient care.

The tools now available are mature enough to make XML the universal standard for transporting health data messages. They can significantly reduce the complexity of routing schemes for messages and provide an excellent method for packaging data and metadata. Standard libraries for socket-based communications, PKI, and XML make it easy for vendors to speak the same language regardless of the operating system, environment, or platform they use. Effective interoperation can be readily demonstrated to the extent that the participant systems and middleware are equipped with Web-based user interfaces.

HL7 is a forerunner in trying to eliminate enterprise boundaries via its clinical document architecture standard, its use of XML encoding and HL7-compliant DTDs, and its version 1.2 of the Clinical Content Object Workgroup (CCOW) standard. HL7 has teamed XML encoding with the semantic content provided by the HL7 reference information model to produce clear, ANSI-standard tag names and definitions that will be used consistently across different healthcare messages. According to HL7, "Many stakeholders have invested significant effort in the development of electronic claims standards, and expertise in this area is growing, providing the cornerstone for moving ahead in subsequent standards-related activity."

Breaking Down Barriers

The implications for the healthcare industry are staggering. Whereas the previous technological and financial barriers were enough to discourage communication between even large partners, it has now become feasible to roll out integrated data exchange with tiny and remote clinics, distant laboratories, independent researchers, and the offices of health practitioners. This demonstration convinced many that physicians' offices would eventually be interconnected using the Internet. This is particularly essential in Canada, a country that has both a widely dispersed population and an integrated healthcare system that requires more sharing of data. With the use of the systems and standards demonstrated at XML 2000, geography, technology, and cost will no longer be barriers. Further, with stable and standardized XML DTDs, a combination of previously independent participant systems can quickly and effectively be made to interoperate in near-real time over the Internet.

Cooperation is the answer. As key players work together creating peer-to-peer networks, astounding results unfold, opening up worlds of possibilities. Working together as a worldwide team will yield amazing results.

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