Data Standard Time: Data Content Standardization and the HIM Role

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by the AHIMA e-HIM® Workgroup on EHR Data Content

To successfully share health information, computers need to do more than just talk to each other; they need to understand each other. They need standards for the data they share.

Among the challenges for broad adoption of the electronic health record (EHR) is ensuring high-quality electronic data that can be effectively exchanged with other computer systems. This is critical for both an organization's internal operations and for external cooperation with other healthcare organizations.

To efficiently and accurately share clinical information, EHRs must be interoperable—the IT systems and software applications used by various facilities and made by different vendors must be able to communicate so that usable data can be exchanged accurately, effectively, and consistently.[1] Standards for capturing, defining, and transmitting data are key to interoperability.

A variety of organizations create standards, and additional initiatives are currently under way to align duplicative and overlapping standards. HIM professionals have an important role in that process and in the standardization of EHR content.

The Importance of Standards

In the same way that the paper health record is only as good as the documentation contained therein, the EHR is only as good as its data content. And the demands on data quality in the EHR will be great. EHRs are expected to be accessed on a much wider scale than paper records. Physicians, nurses, and other healthcare professionals within and across healthcare organizations will tap into EHR data. Even patients may get controlled access. Unaffiliated facilities such as labs, pharmacies, physician offices, and hospitals will exchange patient data. Reporting agencies will request data for compliance and comparison purposes. This ability to share electronic health information will improve quality of care, patient safety, and delivery efficiency, and it will help control rising healthcare costs.

However, none of these benefits can be realized if the data contained in EHRs are not accurate, complete, consistent, and universally understood by all users. In order that they are, and can be used with confidence, electronic health information must be precisely defined, captured, and communicated in a timely manner. In other words, data content must be standardized. Without standards, "information technology systems built over the coming decades will be inadequate to support the delivery of safe and effective care," the Institute of Medicine notes.[2]

Standardizing EHR data content is a difficult task within an organization where the EHR system is comprised of multiple, disparate information systems and applications, as well as various types of hardware and software. Each system may call the same data element by a different name or may refer to data elements with different definitions by the same name, all while contending with differing technical requirements and constraints. Circumstances are also made complex by multiple data owners, each with individual needs. Without careful planning and management, inconsistency and lack of clarity in data content thus hinder the benefits of the EHR system.

Consider for example the multiple terms that may be used to describe a physician's role in caring for a patient: attending physician, primary care provider, consultant, surgeon, and specialist, to name a few. The physician's role typically determines which physicians receive test results and other clinical information that require follow-up care. Accurate and timely routing of this information may be critical for proper care coordination and patient safety. This concept seems simple, but the execution is

not. Do the inpatient and outpatient systems work together smoothly to allow the exchange of this information? Will the outpatient system route this information to the physician designated as the attending physician in the inpatient system? Should the designation of primary care provider in the outpatient system equal the designation of attending physician in the inpatient system?

Any data element that may be interpreted in more than one way leaves room for misunderstanding and potential error in patient care. For example, in an integrated healthcare delivery system a patient's medication list may reside in the patient's renal dialysis record, the home health record, the pharmacy department record, the inpatient record, and other records. Each medication list is maintained in a separate departmental information system or module within the larger EHR. Collectively, the list of medications from multiple departments should be integrated, and these data elements should be contained in the EHR. Ideally, the medication list should be the same for a given patient if accessed in any one department's system. However, lack of standardization in how the various systems define the medication data can create obstacles to integrating these data into one complete and accurate list. These inconsistencies can result in compromised patient safety. Significant time is required to reconcile the lists into one.

Standardization of data content is also critical within an organization and across organizations for reporting purposes. When data are aggregated for organizational reporting of quality indicators used for compliance reports showing quality of care levels, the organization must have confidence that its data can be compared "apples to apples" with data from other organizations. If two organizations have different definitions or values for a given field, the lack of standardization can lead to misunderstanding, incorrect data interpretation, and inability to compare results and outcomes. The result may be incorrect rates for outcome measures. This may even become a financial concern if pay-for-performance is instituted based on conformance with specified quality indicators.

If achieving standardization of data within an organization sounds formidable, it is an even more difficult task to standardize nationwide. If an organization uses only its own data definitions, it will be very difficult for it to relay critical information to a partner. Healthcare organizations constantly collaborate with other industry stakeholders in order to operate. A hospital exchanges patient information with pharmacies, labs, and outpatient clinics. For example, it exchanges claims data with health plans for reimbursement. Unless data content is standardized, the result could be difficulties and dilemmas for the healthcare industry, including compromised patient care and delayed payment collection.

In November 2005 the Department of Health and Human Services awarded four contracts to healthcare and technology groups to help accelerate the nationwide exchange of health information. The groups will create and demonstrate prototypes for a nationwide health information network (NHIN), the architecture that will enable secure, widespread sharing of patient clinical information within communities and across the country. The NHIN, made up of regional organizations, is often called a network of networks. At the core will be interoperable EHRs. At the core of interoperable EHRs will be data standards.

Current Efforts on Standardization

Over the years, dedicated standards development organizations (often referred to as SDOs), associations, government agencies, and nongovernmental organizations, working independently, have developed an array of data standards that address multiple areas in healthcare. Some of the common standards in use today are listed in the Standards Sampler below.

Different types of standards are necessary to accomplish the various functions needed for interoperability. Messaging standards, for instance, are critical for one system to communicate and transport clinical data to another system. If a hospital sends an order for a microbiology culture to a reference laboratory, the laboratory computer must receive and extract the specimen description, test type, patient ID, and accession number. Subsequently, the hospital computer receives back the result type, result description, patient ID, and accession number.

However, messaging standards alone are insufficient for accurate and consistent exchange of clinical data. The data structure and content within the messages must also be standardized. For example, a message transmitted according to the HL7 messaging standard follows specific formats for data structure, data type, data units, and terminology.

A data content standard may leverage a terminology standard to simplify and unify the data presentation. For example, an HL7 message sent from a reference lab may contain information encoded with LOINC. LOINC provides universal identifiers for lab and other clinical observations to present the results in a manner that can be commonly understood.

In the exchange of data between two systems, each value exchanged must be associated with a data element. Mutual understanding of exchanged data requires mutual understanding of the definitions of data elements. Mutual understanding of data element definitions requires data content standards and precise mapping between standards. A data content standard is often defined in the form of a data dictionary, a "descriptive list of the names and definitions of data elements to be collected in an information system or database whose purpose is to standardize definitions and ensure consistency of use."[3] [For more on mapping, see "Data Mapping" (*Journal of AHIMA*, Feb. 2006. For more on data dictionaries, see the practice brief, "Guidelines for Developing a Data Dictionary (*Journal of AHIMA*, Feb. 2006.]

The variety of data standards must work together seamlessly to facilitate the exchange and reporting of EHR data. Standards harmonization is the process that enables standards to become compatible with each other. Initiatives for standard harmonization are welcomed by many major standards development organizations, and a number of initiatives are under way, including:

- HL7 and ASTM recently indicated they will work together to synchronize HL7 and CCR.
- HL7 and SNOMED International, a subdivision of the College of American Pathologists, have signed an agreement to enable SNOMED CT to work with HL7 and to drive the harmonization between SNOMED CT and the HL7 Reference Information Model.
- Recognizing the importance of standards harmonization in enabling widespread interoperability among healthcare IT, the Department of Health and Human Services awarded a contract to the American National Standards Institute (ANSI) in fall 2005. ANSI convened the Healthcare Information Technology Standards Panel to demonstrate a consensus-based process for setting standards in the healthcare industry. For more on this effort, see "HITSP Goes to Work" below.

HITSP Goes to Work: HHS Contract Calls for Standards Recommendations by September 29

The most ambitious and comprehensive effort to choose the standards for information exchange is operating under a contract from the Department of Health and Human Services (HHS). HHS considers data standards harmonization a priority in promoting interoperable EHRs and a nationwide health information network (NHIN).

The standards harmonization contract went to the American National Standards Institute, the nonprofit organization that promotes US voluntary standards, and 18 other partners. Standards development organizations, vendors, and privacy and consumer advocates are eligible to participate in the harmonization activities. At last count, more than 140 such organizations had registered. Collectively they form the Health Information Technology Standards Panel, or HITSP.

Setting the Standards

"It is not a lack of standards that we face," says John Halamka, MD, HITSP's chair. "It is generally the fact that there are competing standards, redundant standards, or so many versions of a given standard that it is unlikely you can get data across the street in Boston let alone get it from state to state or country to country." HITSP's task is to develop and demonstrate a process for identifying, reviewing, and selecting the standards to get data flowing freely.

HITSP's work directly supports other HHS initiatives. Once HHS announced contracts for NHIN projects in November of last year, Halamka and HITSP staff began combing through the prototypes to identify the standards required in each. HITSP will then review the needs and make sure it can come up with an implementation guide for each project.

HITSP will embark on a similar review process for the American Health Information Community, which will select three areas of focus that present breakthrough opportunities in health IT, such as biosurveillance or consumer empowerment. HHS contractors will develop use cases in those areas, which will also require standards harmonization. HITSP is operating under a three-year contract, renewable each year, with an option for a fourth year.

"The panel will have rich discussion, I'm certain, about how to reconcile competing and redundant standards," Halamka predicts. Harmonizing existing standards will be the bulk of the panel's work. Some requirements, such as the exchange of medication lists, may be relatively simple given that the number of standards in use is relatively low, Halamka says.

Halamka, CIO of CareGroup Healthcare System in Boston and CIO of Harvard Medical School, notes that HITSP's recommendations will not be law. HITSP doesn't have the authority to "go to HL7 and [the Consumer-Purchaser Disclosure Project] or any other standards organization and say, 'Thou shalt' or 'Thou must,'" Halamka says. "But it does have the authority of consensus." If HITSP can demonstrate a viable method that brings together stakeholders, reviews needs and resources, and selects implementation guides, he says, the result will be harmonized standards the industry can rally around.

HHS has rapidly accelerated a harmonization process that has largely languished on its own, Halamka says. It took 30 years to put the ATM network together for banks, he notes, whereas HITSP's recommendations are due within a year, by September 29. "Suddenly these major issues that have not been moving for a decade are being given deadlines."

—Editors

The Roles for HIM Professionals

Standardization of EHR data content is a challenge that demands expertise in fields including clinical medicine, information systems, HIM, data warehousing, medical informatics, and clinical coding. Data management and informatics are terms often used to describe various data-related functions, such as data modeling, database design and build, standardization of data content, data dictionary development and maintenance, and data mapping. In some organizations these functions may be the responsibility of a distinct department that is a combination of technically and clinically skilled staff.

These data-related areas can benefit from the expertise HIM professionals bring to organizations through direct task performance or interaction with others who perform them. HIM professionals serve as liaisons between the clinical, technical, and administrative areas of an organization as they provide the domain knowledge and expertise and bridge the gaps between organization functions.

The level of data content knowledge required from an HIM professional depends on the role. Some HIM professionals manage data content at the day-to-day operations level within an HIM department. Others may have an understanding of several information systems within the organization and be involved in standardizing data content and its communication between systems.

HIM professionals have an opportunity to take advantage of the global pressure to implement EHRs. HIM professionals can facilitate decisions regarding the content of the EHR based on internal and external needs and existing standards. While we await the outcome of standards harmonization efforts at the federal level, it's not too early to advocate for standardized data content within individual organizations. Possible activities for HIM professionals include:

- **Advocate** and obtain leadership endorsement that standardization of data content is a strategic aim of the organization
- **Educate** and transfer knowledge of data content standards within the organization and to vendors:

  - Develop and distribute a handbook of currently available standards
  - Lead study groups on data content standards
  - Distribute articles on why data standards are important

- **Start initiatives** to include specific data standards or other applicable issues related to data standardization efforts, such as selection criteria for purchasing (or designing) new applications
- **Lead the organization** in data dictionary development and data mapping (see "Guidelines for Developing a Data Dictionary," the practice brief in this issue and available online in the FORE Library: HIM Body of Knowledge at

www.ahima.org)

- **Lead project groups** for data content definitions based on the standards.
- **Initiate and coordinate collaboration** among all key individuals to establish mechanisms for ensuring ongoing management of the data dictionary
- **Coordinate activities** related to data integration between systems
- **Work with vendors** toward standards compliance
- **Serve as liaison** with clinical staff to facilitate adoption of data content standards
- **Help organizations participate** in local and regional interoperability efforts such as regional health information organizations
- **Bridge** clinical and technological knowledge domains
- **Be the domain expert** for health information standards

Clearly, numerous roles and responsibilities are emerging for work related to EHR data content. Opportunities to help shape the substance of EHR and improve the nation's health await HIM professionals who educate themselves and become the experts in efforts to standardize EHR data content.

Standards Sampler

Standards development organizations, associations, government agencies, and nongovernmental organizations, working independently, have developed an array of data standards addressing multiple areas in healthcare. Some of the common standards used today include the following:

- Health Level 7 (HL7)
  Messaging, data content, and document standards to support the exchange of clinical information, developed by HL7, a healthcare standards development organization (www.hl7.org/ehr)
- Continuity of Care Record (CCR)
  Data content and document standard for relaying a patient's core data set upon transfer, developed by ASTM International (originally known as the American Society for Testing and Materials) (www.astm.org)
- National Council for Prescription Drug Programs (NCPDP)
  Data dictionary and data content standards for pharmacy data, developed by NCPDP, a standards development organization in the pharmacy sector (www.ncpdp.org/frame_standards.htm)
- Digital Imaging and Communications in Medicine (DICOM)
  Messaging standard for digital images, produced and managed by the DICOM Standards Committee, which consists of vendors, user organizations, government agencies, and trade associations (http://medical.nema.org/dicom)
- Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT)
  Reference terminology for clinical concepts from the College of American Pathologists (www.snomed.org)
- Logical Observation Identifiers, Names and Codes (LOINC)
  Naming system for lab tests and observations, developed by the Regenstrief Institute, an informatics and healthcare research organization, and the LOINC committee (www.openclinical.org/medTermLoinc.html)
- International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)
  Classification system for diagnoses and procedures managed by the National Center for Health Statistics—a US clinical modification of the World Health Organization's system ICD-9 (www.cdc.gov/nchs/icd9.htm)
- Current Procedural Terminology (CPT)
  Terminology standard for medical services and procedures owned and published by the American Medical Association (www.ama-assn.org/ama/pub/category/3113.html)

Notes

1. National Alliance for Health Information Technology. "What Is Interoperability?" 2005. Available online at www.nahit.org.

2. Institute of Medicine. *Patient Safety: Achieving a New Standard of Care.* Washington, DC: National Academy Press, 2003.

3. AHIMA e-HIM Workgroup on EHR Data Content. "Guidelines for Developing a Data Dictionary." *Journal of AHIMA* 77, no. 2 (2006): 64A–D.

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