Standardizing Data and HIM Practices for Interoperability

Save to myBoK

Despite the many advancements in health information technology (HIT) that the industry has seen in recent years, the interoperability of HIT applications continues to present a challenge. Implementing standards—a definition, set of rules or guidelines, example format, or other document that establishes uniform specifications, criteria, methods, processes, or practices that have been approved either by a recognized standards development organization (SDO) or in a de facto fashion by general industry use—is a critical step in ensuring the data quality, consistency, and integrity that are so important to trusted health information.

There are many SDOs that are involved in the development of standards at both the national and international levels. These standards are crucial to clinical information capture, sharing, and use in various HIT applications including electronic health record (EHR) systems and ancillary systems such as laboratory, pharmacy, payer, public health, and research.

Currently, healthcare organizations use various standards in their information systems, but standards are not adopted uniformly across organizations. This, combined with the proprietary implementation of organization- or vendor-specific data models, code systems, and other standards, makes seamless information sharing impossible.

This Practice Brief summarizes information about various HIT standards, standardization processes and entities, national and international standardization efforts working to enable health IT interoperability, and the role of AHIMA in developing HIM practice standards.

HIT Standards, Standardization, and Systems Interoperability—An Overview

In 2005, the Health Information Technology Standards Panel (HITSP) identified seven HIT standards categories:[1]

1. Data Standards (i.e., vocabularies and terminologies)
2. Information Content Standards (i.e., reference information models (RIMs), structured formats)
3. Information Exchange Standards (i.e., message-based and structured document-based)
4. Identifier Standards (i.e., specimen identifier)
5. Privacy and Security Standards (i.e., access control)
6. Functional Standards (i.e., workflow models)
7. Other Standards (i.e., business standards, Internet protocols, programming languages, etc.)

Appendix A contains examples of data and information content standards used in healthcare.

In addition to individual standards, HITSP also developed interoperability standards for the US during the 2004 to 2009 time period. Interoperability standards are a meta-standard, an assembly of individual standards meant for a specific use case. The development of international interoperability standards in healthcare is now led by the International Organization for Standardization (ISO), Technical Committee 215 Health Informatics (ISO/TC215).

Standardization Processes and Entities

SDOs, professional organizations and associations, industry, and government all represent entities that develop standards. Usually a group of subject matter experts (SMEs) organized in a workgroup, committee, or task force develops standards in a transparent, consensus-based process. The latter includes maintaining formal documentation of all versions of the standard as well as documentation (i.e., minutes, notes, recordings) during the standard development process. The draft of the standard undergoes a formal public comment process, during which stakeholders review and offer comments. These comments are then incorporated in a final standard via the documented comment reconciliation process.

HIT standardization for interoperability includes the following standardization phases:[2]

1. Identify HIT interoperability needs and priorities (use cases)
2. Develop and maintain individual standards by specific SDOs
3. Select and harmonize standards from various SDOs
4. Develop and maintain interoperability standard
5. Test interoperability standard
6. Certify interoperable standards-based HIT products
7. Deploy interoperable standards-based HIT products

Various public and private entities have been created to carry out these phases. The table below illustrates these entities and their corresponding phases of responsibility.

Health Information Technology Standardization Phases, Products, and Entities

HIT Standardization Phases	Identify HIT Interoperability Needs and Priorities (Use Cases)	Develop and Maintain Standards	Select and Harmonize Standards; Develop Interoperability Standards	Test/Trial Implementation of Interoperability Standards	Certify Interoperable Standards-based HIT Products	Deploy Interoperable HIT Products
Goals	*What should be accomplished?*	*What are the standards?*	*What standards to use?*	*Show what can be accomplished.*	*Certify standards-based products.*	*Deploy standards-based products.*
Responsible HIT Standardization Entities Examples	• HIT Policy Committee • HIT Standards Committee (formerly, American Health Information Community) • Professional associations	SDOs, such as HL7, SNOMED (IHTSDO), LOINC, ASC X12, NCPDP, WHO/ICD, ISO/TC215, and others	• IHE • ISO/TC215 (formerly, HITSP)	• IHE • National Institute of Standards and Technology (NIST) • ONC testing laboratories	Various certification entities (formerly, Certification Commission for HIT)	Proposed: deployment workshops Users: clinical and public health community at large
Standards Documents	Business Requirements, Checklists, Use Cases	Standards Implementation Guide, Technical Specification, Technical Report, Functional Profile	Interoperability Specification, Technical Framework, Integration Profile, Reference Standards Portfolio	Integration Statement, Implementation Report	Certification Criteria	Deployment Reports

Source for columns 1 and 2: Jacobs, Bradly and Katherine Gundling. *The American College of Physicians' Evidence-Based Guide to Complementary & Alternative Medicine.* Philadelphia: ACP Press, 2009.

Each of these entities is working to produce standards-related documents, such as practice checklists, use cases, and technical specifications, to ensure systems interoperability. The table above also illustrates the HIT standardization phases, along with examples of standardization entities and their products.

Defining Interoperability

In 2007, Health Level Seven (HL7) introduced the following definition of interoperability—with the addition of the work "capture" by the AHIMA standards subject matter experts:

> "Interoperability" means the ability to capture, communicate and exchange data accurately, effectively, securely, and consistently with different information technology systems, software applications, and networks in various settings, and exchange data such that clinical or operational purpose and meaning of the data are preserved and unaltered.[3]

HL7's approach to interoperability is based on the following three interoperability components, also known as pillars:

1. Semantic interoperability—shared content
2. Technical interoperability—shared information exchange infrastructure
3. Functional interoperability—shared rules of information exchanges (i.e., business rules and information governance)

Interoperable systems enable information to flow into and out of health information systems directly or via health information exchanges (HIEs), making information available to an authorized person, at the right time, at the right place, in the right format, and containing data that is accurate and complete.

It is important to emphasize that interoperability is achieved by multiple standards working collectively. Various standards must be assembled in the interoperability specification developed for a specific clinical need (use case) of information sharing. From 2005 to 2009, HITSP developed 18 interoperability specifications for various healthcare use cases, including laboratory reporting, biosurveillance, consultation and transfer of care, medication management, personalized care, quality, public health reporting, and maternal and child health.[4] The HITSP Biosurveillance Interoperability Specification (IS02) specified 107 standards that had to work together, including 28 data standards, 17 information content standards, 46 information exchange standards, 11 identifier standards, and five privacy and security standards.[5]

Today, the ISO/TC215 continues the development of interoperability standards, assembling various HIT standards together into a Reference Standards Portfolio (RSP). The Clinical Imaging RSP is currently under development by ISO/TC215. It specifies HIT standards that support information capture, sharing, and use for clinical imaging in the following clinical specialties (domains): radiology, cardiology, oncology, OBGYN, orthopedics, surgery, dentistry, and eye care.[6]

Efforts to Address EHR Usability Challenges with Standards

Today's EHR systems are not meeting the needs of clinicians and HIM professionals when it comes to information sharing. Quite simply, EHR systems just don't support effective interoperability at an adequate level. A five-year study by the US National Institute of Standards and Technology (NIST) on usability of EHR systems identified the following four issues with adoption that may negatively impact patient safety:[7]

1. Clinically relevant information is not available for the task at hand
2. Inadequate documentation
3. Inaccurate information
4. Irretrievable information

The AHIMA Standards Task Force, formed to address EHR usability challenges through standards, works with clinicians, standards developers, HIT vendors, and governmental agencies to guide the development of interoperability standards, with a focus on achieving semantic and functional interoperability in healthcare.

Achieving Semantic Interoperability through Clinical Content Standardization

The quality and safety of medical decision making relies on the accuracy of the data in medical records. Problems arise for automated interpretation of data by computers when:

- One term has multiple meanings
- When two or more terms refer to the same concept, but are not easily recognized as synonyms

- The same data element with the same meaning in the "sending" EHR for shared health information is entered in one section but the "receiving" EHR does not know this and cannot find this data element

Harmonizing information from various information systems requires resource-intensive data translation and mapping.

Employing data and information content standards in health documentation enables consistent, accurate, and reproducible capture and representation of clinical concepts in the information systems by using:

- Standardized terminology to describe clinical context (i.e, symptoms, disease diagnosis, and treatment plans)
- Standardized formats to locate data elements within the record

Semantic interoperability refers to the ability to interpret data according to its meaning between the sender and the receiver, and it is critical to successful and effective data sharing in the process of healthcare delivery. Though data standards, such as SNOMED CT, LOINC, and CPT, and information content standards, such as reference information models and HL7 message-based and document-based standards, have been developed with the intention of enabling semantic interoperability, the automated interpretation of data from the sender (or content creator) by the receiver (or content consumer) for clinical decision support is still a dream and not the reality.[8]

The main problem is that standardized data specifications (data sets) used to develop data and information content standards are often developed either for a very specific purpose (use case) or they are too general to properly support clinical context at a specific level of granularity needed at the point of care. This is because standards are usually developed by a special interest group of users for a specific need. Such specificity may not be relevant to another group of users. The attempt to agree on a "common data set" or "minimum data set," which drives the development of content models in HL7 implementation guides or IHE content profiles, does not help with achieving semantic interoperability because physicians need to capture a patient's specific data—not just those defined in the content models.

Standards for semantic interoperability should be developed with broader participation by various users, such as clinicians, HIM, and public health professionals, validating/constraining/expanding existing content model standards to address specific physician needs, organization needs, and jurisdiction needs for broader information usability and re-usability.

CDI Programs as Classical Informatics Activity of Content Standardization

Clinical documentation improvement (CDI) is defined by the AHIMA Press book *Clinical Documentation Improvement: Principles and Practice* as "any manual or electronic notation (or recording) made by a physician or other healthcare clinician related to a patient's medical condition or treatment." CDI is a facility-wide activity that enhances "the quality of the clinical record, thus affecting patient care, reimbursement, severity and quality scores," with the goal of producing "legible, reliable, precise, complete, consistent, clear, and timely information."[9]

CDI programs have been employing informatics-based methods to enable facility-wide standardization of the representation of the clinical content in the EHR systems in case definition templates. Working together with clinicians, CDI professionals build case definition templates that derive from the clinical pathways—a description of care delivery steps (workflow) and the information generated within those steps (data flow). The clinical pathways are developed by clinicians and CDI specialists from the clinical guidelines, best practices, and peer-reviewed clinical literature (i.e., business practice standards).

Standardization of clinical pathways and case definition templates are fundamental steps towards electronic information capture, exchange, aggregation, use, and re-use via the means of interoperable HIT applications. The CDI approach is a classical informatics activity of defining user requirements for information capture and sharing.

The case definition templates developed by the healthcare organizations' CDI programs serve as data specifications aimed to support care delivery in a specific organization. In fact, they could represent the user-driven specificity in defining data requirements that have been long missing in the standards development process.

Tools for Content Standardization in Healthcare

As a parallel activity to CDI movement in healthcare organizations, various entities have been experimenting with online content assembly/management tools to streamline the development and maintenance of data specification and standardized

data representation using HL7 CDA and/or FHIR templates.[10] AHIMA has been working with standards developers, professional associations, and government agencies on assessing whether their tools for building standardized content templates can be suitable for healthcare organizations' CDI programs in building case definition templates.

In AHIMA's content standardization project, subject matter experts from the AHIMA Standards Task Force and CDI programs of several healthcare organizations participate in the assessment of various web-based tools that have the potential to expedite the development of the case definition templates for a specific healthcare organization. The task force is specifically looking for tools with the following capabilities:

- Easy to navigate and use by general user without an IT background
- Support the ability to develop case definition templates based on the business rules defined in the clinical pathways; this also includes the search for already developed templates that are stored in the tool's library for reuse
- Validate new templates for completeness and correctness
- Easily update earlier developed templates
- Maintain templates' versioning
- Maintain journaling function (notes from discussions with subject matter experts)
- Generate an electronic and printed copy of the template[11]

For a brief description of the web-based tools demonstrated from April to October 2016 for AHIMA's content standardization project, see Appendix B. HIM professionals are invited to participate in the survey to assess tool capability in supporting CDI programs. Demonstrations and survey instruments are available at http://engage.ahima.org/viewdocument/2016-ahima-content-s.

The AHIMA Standards Task Force will be selecting tools that CDI programs might be interested in using to streamline the development of case definition templates. The organization- and jurisdiction-specific templates developed by CDI programs could be further used to guide SDOs in the development of interoperable data and information content standards.

Achieving Functional Interoperability through Standardization of Information Management Practices in Healthcare

Functional interoperability, often referred to as "the rules of the road," is the ability to capture, preserve, share, and use the data available to the right person, at the right time, in the right format, and in the right context. It is based on standardized representations of organizational and jurisdictional regulations, rules, and policies and procedures that need to be built into the HIT applications to ensure the "machine" would know the "rules of the road." Examples of functional standards include specification of business requirements, practice checklists, and other documentation that describes user needs for HIT products.

With increasing focus on HIT adoption, along with financial incentives to demonstrate meaningful use of HIT and improve healthcare quality, there is an increased urgency to ensure that HIT standards and HIM practice standards—"rules of the road" for information lifecycle—are well aligned to support clinical, financial, administrative, and operational information created, used, or received by a healthcare organization, regardless of media, format, or source. This information includes internally and externally generated information received through information exchanges as well as patient-generated information.

AHIMA HIM Practice Standards

To address challenges that HIM professionals and clinicians documented while transitioning from a paper-based environment to an electronic environment, the AHIMA Standards Task Force established a cross-collaboration between HIM professionals, standards developers, and HIT vendors at IHE to ensure that:

1. Functional standards for HIM practices have been specified and communicated to standards developers for creating HIT standards
2. Standards-based HIT products support HIM practices
3. Standards are adopted in the HIT products and healthcare organizations

The AHIMA Standards Task Force identified the following types of HIM practice standards:

1. Business Requirements (for information management practices in healthcare)
2. HIM Practice Checklists (to-do lists by business requirement)
3. HIM Use Cases (description of HIM need(s) for a specific clinical function, such as patient registration)
4. Case Definition Templates (specific content derived from the use case)

To develop HIM functional standards, the AHIMA Standards Task Force conducted a detailed analysis of the HIM business requirements for information availability, integrity, protection, accountability, transparency, compliance, retention, and disposition. Furthermore, the task force identified a number of HIM use cases that describe best practices for documentation and information management. The table below shows AHIMA's HIM use cases completed in 2015 as part of a joint AHIMA-IHE white paper as well as the use cases under development in 2016.[12]

HIM Checklists and Use Cases for HIT Standards	
2015 AHIMA-IHE White Paper	**2016 AHIMA Use Case Specification**
• All documents in the episode of care record are accounted for • Episode of care record is complete and closed • Release of information (ROI) to external requestor • Audit for the episode of care record • Audit for the ROI	• Patient registration • Record and data quality • Copy and paste • Patient matching • Transition of care

The HIM use cases specify:

- Business actors (persons involved in the process of care and information management) and technical actors (HIT systems)
- HIM practices in the context of the clinical workflow
- Record components and specific data elements generated within the clinical/HIM workflow steps

In addition, AHIMA is in the process of developing HIM Practice Checklists for several use cases—specific HIM "to-do lists" for data, information, document, and record management.

The development of the business requirements, use cases, and checklists for HIM practices is a part of the collaborative informatics-based approach for translating HIM practices into HIT standards that was originated in the 2015 AHIMA-IHE white paper "HIT Standards for HIM Practices," available online at http://qrs.ly/lb4vec0.

HIM professionals interested in joining AHIMA's Standards Task Force to lead the development of HIM practice standards for interoperable standards-based HIT solutions should contact AHIMA's Diana Warner at diana.warner@ahima.org.

Appendices Available Online

Three appendices accompany this Practice Brief. These are:

- Appendix A: Examples of Data and Information Content Standards
- Appendix B: Content Standardization Tools in Healthcare, AHIMA Content Standardization Project, and CEU Opportunities
- Appendix C: Resources on HIT Standardization

Notes

[1] Orlova, Anna. "Overview of Health IT Standards." *Journal of AHIMA* 86, no. 3 (March 2015): 38-40.

[2] Ibid.

[3] Health Level Seven EHR Interoperability Work Group. "Coming to Terms: Scoping Interoperability for Health Care." February 7, 2007.

[4] Health Information Technology Standards Panel (HITSP). Home page.

[5] Orlova, Anna. "Overview of Health IT Standards."

[6] Glickman, Michael and Anna Orlova. "Building Interoperability Standards and Ensuring Patient Safety." *Journal of AHIMA* 86, no. 11 (November 2015): 48-51.

[7] US National Institute of Standards and Technology (NIST). "Technical Evaluation, Testing, and Validation of the Usability of Electronic Health Records: Empirically Based Use Cases for Validating Safety-Enhanced Usability and Guidelines for Standardization." October 7, 2015.

[8] Health Level Seven International. "Structured Documents: Clinical Documentation Architecture (CDA) Release 2." 2005.

[9] Hess, Pamela. *Clinical Documentation Improvement: Principles and Practice*. Chicago, IL: AHIMA Press, 2015.

[10] Orlova, Anna and Kenneth Salyards. "Understanding Information in EHR Systems: Paving the Road for Semantic Interoperability through Standards." *Journal of AHIMA* 87, no. 9 (September 2016): 44-47.

[11] Ibid.

[12] Ibid.

Appendix A: Examples of Data and Information Content Standards

According to the Public Health Data Standards Consortium, data standards are "documented agreements on representations, formats, and definitions of common data. Data standards include vocabularies, terminologies and classifications that enable codification of data fields and values in a meaningful, comprehensive, and actionable ways in the course of doing business."[1]

Information content standards specify the content of information. There are two levels of information content standards to consider:

- First-level information content standards define the structure and organization of content in the electronic message/document/form/web screen. An example of a first-level information content standard is the Health Level Seven (HL7) Reference Information Model (RIM), which is a pictorial representation of the data organization in a domain of care. RIMs are shared models of data organization between domains and, as such, are the models from which all domains create information content for data capture, sharing, use, and re-use.
- Second-level information content standards define a "package" of content (message/document/form/web screen) that includes data specification and data representation built from the RIM. An example of a second-level information content standard is the HL7 Continuity of Care Document (CCD)/Clinical Document Architecture (CDA) standard.[2] HL7 CCD/CDA Implementation Guides and Integrating the Healthcare Enterprise (IHE) Content profiles are the constraint data specification and data representation for a specific message/document/form/web screen.

Various standards development organizations (SDOs), as well as professional organizations, develop a variety of data and information content standards for specific domains in healthcare. Examples of these SDOs and their products are listed below:

- **ICD** - International Statistical Classification of Diseases of the World Health Organization (WHO) that develops and maintains families of international classifications (FIC) including ICD and other international classifications. ICD is the principle classification used for epidemiology, health management, and clinical purposes.[3]
- **SNOMED** - Systematic Nomenclature of Medicine of the International Health Terminology Standards Development Organisation (IHTSDO). SNOMED CT is a clinical health terminology used to represent clinically relevant information consistently, reliably, and comprehensively as part of producing electronic health information.[4]

- **LOINC** - Logical Observations Identifiers Names and Codes of the Regenstrief Institute. LOINC specifies universal identifiers for laboratory and other clinical observations to facilitate exchange and storage of clinical results or vital signs for patient care.[5]
- **RxNorm** - Developed and maintained by the National Library of Medicine (NLM), RxNorm is a normalized naming system for generic and branded drugs; and a tool for supporting semantic interoperation between drug terminologies and pharmacy knowledge base systems. It provides a catalog of the standard names given to clinical drugs and drug delivery devices in the United States to enable interoperability and clear communication between electronic systems regardless of software and hardware compatibility.[6]
- **NCPDP** - The National Council for Prescription Drug Programs (NCPDP) develops standards for the pharmacy industry. They include standards for the pharmacy data dictionary, product identifiers, pharmacy and/or combination ID card, formulary and benefits, benefit integration, financial information reporting, universal claim forms, audit, and more.[7]
- **X12** - The Acredited Standard Committee, now known as X12 International, develops standards of business transactions for the electronic data interchange (EDI).[8] X12 standard examples include Health Care Eligibility Benefit Inquiry and Response, Health Care Claim Status Request and Response, Health Care Services Review - Request for Review and Response, Health Care Fee Schedule, Health Insurance Exchange: Enrollment, Health Care Claim family of standards, Health Care Predetermination family of standards, and more. Insurance and remittance data standards are a focus of the Accredited Standards Committee.
- **DICOM** - Digital Imaging and Communications in Medicine develops and maintains standards to create, distribute, and view diagnostic images.[9]
- **HL7** - Health Level Seven (HL7) International develops information exchange standards known as HL7 messaging standards versions 2.x and 3.0 (v2.x and v3). To specify data in these messages, various HL7 workgroups develop domain analysis models (DAMs) and implementation guides for specific healthcare domains. DAMs and implementation guides define data requirements (specifications) and data representation in the following formats:

    - Message-based format using HL7 v2.x and v3 messaging standards
    - Document-based format using the Continuity of Care Record (CCD) standard in the Consolidated Clinical Document Architecture (C-CDA) format
    - Short messages format using the Fast Healthcare Interoperability Resources (FHIR) format[10]

- **HL7 CDA** - Based on the HL7 v3 Reference Information Model (RIM), data types, and vocabularies. The CDA standard represents data captured in clinical documents from scanned, word processed, dictated, computer-entered, or electronically generated reports. CDA documents consist of a document header and a document body. The document header "contains information such as when the document was written, who wrote it, for what organization, which patient it applies to and the description of the visit or the encounter for which it describes healthcare services." The body of the document contains sections of human-readable narrative text and machine-readable entries. The narrative text can be stored in a separate file such as a word processing document or scanned image, or it may appear in a structured format using CDA extensive markup language (XML) narrative format."[11] A CDA document can be represented by the templates. A template is an expression of a set of constraints on the RIM that is used to define a portion of data (a content module). The template requires the presence of the section templates which, in turn, requires sub-section templates or entry templates or both. CDA allows the breaking up of a large document into smaller reusable parts, thus supporting consistent representation of the content in the HIT application. A CDA document is a container concept, or a "snapshot" authored at one specific point in time. Template examples include:

    - Consultation note
    - Diagnostic imaging report
    - Discharge summary
    - History and physical
    - Operative note
    - Procedure note
    - Progress note
    - Unstructured document

- **IHE** - Integrating the Healthcare Enterprise (IHE) develops interoperability standards for information exchanges (send-receive transaction), known as integration profiles, as well as information content, known as content profiles. IHE

develops these standards for various healthcare domains including Patient Care Coordination, Cardiology, Dentistry, Eye Care, Pathology and Laboratory Medicine, Patient Care Devices, Pharmacy, Quality, Research and Public Health, Radiation Oncology, Radiology, and IT Infrastructure.[12] The IHE profile is a coordinated set of individual standards (i.e., DICOM, HL7, SNOMED, LOINC, etc.) constrained to address specific clinical information sharing need(s) in support of optimal patient care. IHE conducts annual testing events of interoperability standards called IHE Connectathons around the globe.[13]

- **ISO/TC215** - Technical Committee 215 Health Informatics, International Organization of Standardization (ISO/TC215) operates the Work Group 3 Semantic Content that develops standards for data specifications, data representation, knowledge representation, and meaning retention. They include standards for health informatics glossaries, value set definitions, metadata, data mapping, terminology models and structure, implementation of terminological services, and others.
- **ASTM** - Committee E31 on Healthcare Informatics, Association for Standards and Testing Materials (ASTM) International publishes specifications and practice guides, terminologies, and classification standards for healthcare. ASTM E1384 and E31.25 (2013) Standard Practice for Content and Structure of the Electronic Health Record describes a logical data organization and content (common data model) of an EHR.[14]
- **UMLS** - The National Library of Medicine's Unified Medical Language System links more than 100 terminologies available for a variety of use cases in healthcare.[15]

Coordination of standards development activities across various SDOs is carried out in the US by the Standards Coordination Committee (SCC) and globally by the Joint Initiative Council (JIC).

Professional associations play a crucial role in standards development activities. Together with the governmental entities, they are involved in identifying needs and priorities for standards as well as developing standards. For example, AHIMA has been participating in the WHO to develop ICD standards. In addition, the AHIMA Standards Task Force is participating in HL7, IHE, and ISO to develop HIM practice standards and guide the development of HIT standards to support HIM needs. AHIMA also has been leading the development of the semantic content standards and interoperability standards at ISO/TC215. AHIMA also provides the Secretariat to the ISO/TC215 as well as to the US Technical Advisory Group (US TAG) of ISO/TC215 that serves as the US delegation to ISO/TC215.

Notes

[1] Public Health Data Standards Consortium. "Data Standards." Health Information Technology Standards web resource center. 2013.

[2] Public Health Data Standards Consortium. "Information Content Standards." Health Information Technology Standards web resource center. 2013.

[3] World Health Organization (WHO). "International Standard." World Health Organization wesbite.

[4] International Health Terminology Standards Development Organisation (IHTSDO). "IHTSDO Leading Healthcare Terminology, Worldwide."

[5] LOINC from Regenstrief. "Origins of LOINC."

[6] The National Library of Medicine. "RxNorm Overview."

[7] The National Council for Prescription Drug Programs. "NCPDP Standards Information."

[8] Accredited Standards Committee (ASC) X12. "ASC X12 Examples."

[9] Ibid.

[10] Health Level Seven (HL7). "Introduction to HL7 Standards."

[11] Boone, Keith W. The CDA Book. Springer-Verlag London, 2011.

[12] Integrating the Healthcare Enterprise. "IHE Domains."

[13] Integrating the Healthcare Enterprise. "About IHE."

[14] ASTM International. "Committee Scope." Committee E31 on Healthcare Informatics.

[15] US National Library of Medicine. "Fact Sheet: Unified Medical Language System." March 2013.

Appendix B: Content Standardization Tools in Healthcare, AHIMA Content Standardization Project, and CEU Opportunities

As a part of the AHIMA Content Standardization Project, from April through August 2016 AHIMA hosted webinar demonstrations of various content standardization tools (see list below) to survey if these tools may support the development of case definition templates at the clinical documentation improvement (CDI) programs of the healthcare organizations. Demonstrations are available here. Individuals will receive one CEU credit for listening to each of the webinars and completing the associated survey.

Content Standardization Tools in Healthcare, listed alphabetically:

ART DÉCOR: An open source tool used by European countries to build document templates in healthcare.

caDSR Data Element Browser: A centralized resource with web-based tools developed by the US National Cancer Institute (NCI) for documenting and sharing human- and machine-readable data descriptions, metadata, NCI's repository of common data elements (CDEs), and data standards.

Content Assembly Mechanism (CAM): An open source tool developed by OASIS , a standards development organization, for specifying machine-processable information content templates of business transactions and the associated rules.

The College of American Pathologists, Electronic Cancer Checklist (CAP eCC): Used to build structured pathology cancer reports.

MDHT: An opensource Model Driven Health Tool used to edit and review clinical information models, with terminology value set constraints, while remaining focused on the clinical content. https://projects.eclipse.org/projects/modeling.mdht

NIH Common Data Element (CDE) Resource Portal: Provided by the US National Institute of health (NIH) and National Library of Medicine (NLM) to enable access to information about NIH-supported CDEs, as well as tools and resources to assist investigators developing protocols for data collection.

NLM Value Set Authority Center (VSAC): Provided by the US National Library of Medicine (NLM), in collaboration with the Office of the National Coordinator for Health Information Technology (ONC) and the Centers for Medicare and Medicaid Services (CMS) to enable downloadable access to all official versions of vocabulary value sets contained in the 2014 US Clinical Quality Measures (CQMs).

Open EHR: A virtual international community working on means of "turning health data from the physical form into electronic form" and ensuring universal interoperability among all forms of electronic data. The openEHR approach is multi-level, single source modeling within a service-oriented software architecture, in which models built by domain experts are in their own layer.

PHIN-VADS: The US Centers for Disease Control and Prevention (CDC) Vocabulary Access and Distribution System (VADS) provides capabilities to access, search, and distribute standards-based vocabularies used within the US public health Information network (PHIN) to local, state, and national PHIN partners.

T-Rex: An open-source Report Template Editor provided by Karos Health and Radiology Society of North America (RSNA) that lets providers select data elements for their radiology report templates and store these reports in the RadReport Open

Template Library.

Trifolia Workbench, HL7 Web Edition: Developed by Lantana Consulting Group, it provides a CDA template repository, structured template tool to develop HL7 CDA templates, HL7 CDA templates for the HL7/IHE Health Story Consolidation Project, as well as a publishing tool.

About AHIMA Content Standardization Project

Over the last decades, standards development organizations (SDOs) have been standardizing content using data and information content standards by creating data specifications and standardized data representations in implementation guides, content profiles, etc. Built upon these efforts, various professional associations, governmental agencies, SDOs, and vendors developed various web-based tools to streamline the development and re-use of standardized content from these implementation guides and content profiles for information exchanges.

AHIMA has a vital interest in getting standards deployed at healthcare organizations as part of the goal of achieving interoperability. One strategy for this deployment is to encourage the use of content standardization tools that take advantage of data and information content standards.

A key health information management (HIM)/informatics activity at each healthcare organization that adopted Electronic Health Record (EHR) technology is the creation of case definition templates to enable documentation and care. Built from clinical pathways defined by clinicians (providers and nurses) based on the clinical guidelines, best practices and peer-reviewed medical literature, case definition templates define how data will be captured in the record using EHR technology. The case definition templates are developed by the clinical documentation improvement (CDI) specialists in collaboration with clinicians-the creators and users on information in EHR systems.

In 2016, AHIMA launched a content standardization project to assess capabilities of online content standardization tools with regards to supporting the development of standardized documentation-case definition templates built from clinical pathways-in healthcare organizations. From the perspectives of the primary target audience for this project, HIM/CDI specialists involved in the development of the case definition templates, we are looking for tools with the following capabilities:

- Easy to navigate and use by non-IT users
- Support the development of case definition templates based on the business rules defined in the clinical pathways
- Search and re-use of already developed templates that are stored in the tool's library
- Validate new templates for completeness and correctness
- Easily update earlier developed templates
- Maintain templates' versioning
- Maintain journaling function (notes from discussions with subject matter experts)
- Generate electronic and printed copy of the template

From April to August 2016, AHIMA conducted webinar demonstrations of various content standardization tools (see list above).

For more questions about the project, please contact Diana Warner at diana.warner@ahima.org.

Appendix C: Resources on HIT Standardization

A variety of organizations and governmental entities provide resources about health information technology (HIT) standards. The following sections contain lists of informational resources, webinars and training courses, and readings related to HIT standardization.

Informational Resources

Agency for Healthcare Research and Quality (AHRQ), United States Health Information Knowledgebase (USHIK): An online, publicly accessible registry and repository of healthcare-related metadata, specifications, and standards.

Agency for Healthcare Research and Quality (AHRQ), Principles for the National Quality Strategy (NQS): A strategy for promoting "national standards while supporting local, community, and state-level activities that respond to local circumstances. The NQS also works to align quality efforts among commercial and government activities, and across federal agencies.

Centers for Medicare and Medicaid (CMS), Research, Statistics, Data & Systems: A list of data resources including standard terms and abbreviations that promotes naming and semantic consistency.

National Institute of Standards and Technology (NIST), Publication Portal: A database of NIST publications and standards.

Public Health Data Standards Consortium (PHDSC), Web-based Resource Center: HIT Standards. Please note that PHDSC merged with AHIMA in 2014 to unite efforts on standardization of clinical and public health information.

Webinars and Training Courses

AHIMA Webinar, Achieving Interoperability in Healthcare

AHIMA Webinar, Standards for the Learning Health System

AHIMA Content Standardization Project, Semantic Content Standardization Tools, Webinar Demonstrations

Healthcare Information and Management Systems Society (HIMSS), Standards 101

Health Level Seven (HL7), Education Portal

Health Level Seven (HL7), Webinars

Integrating the Healthcare Enterprise (IHE), International Educational Series-Develop,Ttest and Implement Standards

Johns Hopkins Opencourseware, HIT Standards and Systems Interoperability, Course 600.904 and 315.708.81, Offered by the Division of Health Sciences Informatics, School of Medicine and School for Public Health, Instructor Dr. Anna Orlova PhD

National Institute of Standards and Technology (NIST), Training Courses on Standards

Office of the National Coordinator (ONC), Stage 2 Meaningful Use Rule and Standards Training

Standards Developing Organizations, Training Courses on Standards

Readings

AHIMA. "Assessing and Improving EHR Data Quality (Updated)." Journal of AHIMA.86(5): 58-64. May 2015.

AHIMA. Data Mapping Best Practices. November 2013.

AHIMA. "Data Quality Management Model (Updated 2015)." Journal of AHIMA 86(10), October 2015.

AHIMA HIE Practice Council. Ensuring Data Integrity in Health Information Exchange. AHIMA Thought Leadership Series. 2012.

AHIMA. "Managing a Data Dictionary." Journal of AHIMA 83(1): 48-52. January 2012.

Alakrawi, Z. "Clinical Terminology and Clinical Classification Systems: A Critique Using AHIMA's Data Quality Management Model." Perspectives in Health Information Management. July 2016.

Amatayakul, Margret. Electronic Health Records: A Practical Guide for Professionals and Organizations, Fifth edition. Chicago: AHIMA Press, 2013.

Bailey-Woods, L. et al. "Guiding the Development of Health Information Technology Standards for HIM Practices." Journal of AHIMA 86(8): 40-43. August 2015.

Bhattacharyya, S.B. and D. Warner. "Semantic Content in EHR Systems." Journal of AHIMA 87(6): 38-39. June 2015.

Cook, Jane. "HIM's Expanding Role in Clinical Data Analysis and Mapping." Journal of AHIMA 83(9): 54-55. September 2012.

Giannangelo, Kathy. Healthcare Code Sets, Clinical Terminologies, and Classification Systems, third edition. Chicago: AHIMA Press, 2015.

Glickman, M. and A. Orlova. "Building Interoperability Standards and Ensuring Patient Safety." Journal of AHIMA 86(11): 48-51. November 2015.

Integrating the Healthcare Enterprise (IHE). Information Technology Infrastructure (ITI) Technical Framework (TF) Supplement. HIT Standards for HIM Practices. White Paper. 2015.

Kuhl, Joy. Health Story Data Standards Included in Meaningful Use Program. November 2012.

Lusk, K. "Clinical Definition Standards Case Study." Journal of AHIMA 86(7): 42-43. July 2015.

Lusk, K. "A Decade of Standardization: Data Integrity as a Foundation for Trustworthiness of Clinical Information." Journal of AHIMA 86(10): 54-57. October 2015.

Office of the National Coordinator (ONC). Interoperability Standards Advisory. Best Available Standards and Implementation Specifications. 2016.

Orlova, A. and K. Salyards. "Understanding Information in EHR Systems: Paving the Road for Semantic Interoperability through Standards." Journal of AHIMA 87(9): 44-46. September 2016.

Orlova, A. "Informatics and HIM: Enabling Semantic Interoperability and the Learning Health System." Journal of AHIMA 86(9): 46-49. September 2015.

Orlova, A. "Overview of Health IT Standards." Journal of AHIMA 86(3): 38-40. March 2015.

Orlova, A. and H. Lehmann. "Informatics Education for HIM Professionals in the Era of Interoperable Standards-Based HIEs." Journal of AHIMA 86(2): 48-51. February 2015.

Orlova, A., L. Spellman, and D. Warner. "Supporting Health IT Standardization Across the Globe." Journal of AHIMA 85(11): 58-61. November 2014.

Public Health Data Standards Consortium. Health Information Technology Standards.

Sayles, N et al. Health Information Management Technology: An Applied Approach, fifth edition. Chicago: AHIMA Press, 2016.

Selsky, D. "Transforming Data into Meaning: Standards-based Capabilities to Bring Disparate Data Sources Together." Journal of AHIMA 87(3): 38-39. March 2016.

Taylor, Lisa Brooks. "Show Me the Data." Journal of AHIMA 84(9): 60-61. September 2013.

Thune, J. et al. Reboot: Re-Examining the Strategies Needed to Successfully Adopt Health IT. White Paper. US Senate. April 13, 2013.

US National Institute of Standardization and Technology. Technical Evaluation, Testing, and Validation of the Usability of Electronic Health Records: Empirically Based Use Cases for Validating Safety-Enhanced Usability and Guidelines for Standardization. NISTIR 7804-1.

Prepared By

Anna Orlova, PhD
Harry Rhodes, MBA, RHIA, CHPS, CDIP, CPHIMS, FAHIMA
Diana Warner, MS, RHIA, CHPS, FAHIMA

Acknowledgements

Beth Acker Moodhard, RHIA
Cecilia Backman, MBA, RHIA, CPHQ, FHIMSS
Elisa R. Gorton, RHIA, CHPS
Marjorie Greenberg, MA
Aviva Halpert, RHIA, CHPS
Pamela Heller, RHIA, CCS-P, FAHIMA
Riki Merrick, MPH
Melanie Meyer, MHA, RHIT, CCS, CPHQ
Neysa Noreen, MS, RHIA
Patricia Powles, RHIA
Lori L. Richter, MA, RHIA, CPHIT, CPEHR, CHPS
Jennifer Teal, MS, RHIA, CCS, CPC

Read More

The Standards Strategies Column "Connecting Functional and Semantic Interoperability—The HIM Professional's Role in HIT Standardization" in this issue presents HIM solutions to enable interoperability through standards, and defines the role of HIM in adopting standardized, interoperable HIT products in healthcare. This Practice Brief is closely related to that piece.

Article citation:
Orlova, Anna; Rhodes, Harry B.; Warner, Diana. "Standardizing Data and HIM Practices for Interoperability" *Journal of AHIMA* 87, no.11 (November 2016): 54-58 [web expanded version].