# Advancing HIE: ONC Works to Harmonize Standards and Elements to Foster Health Data Exchange



By Allison Viola, MBA, RHIA

As the meaningful use program marches forward, the Office of the National Coordinator for Health IT (ONC) continues to sharpen its focus on health information exchange (HIE). One of the main components in the HITECH Act mandated "the use of certified EHR technology for electronic exchange of health information to improve the quality of health care." As such HIE will become more prevalent in future meaningful use stages.

In order to support current HIE efforts under way and those in development, standards must be harmonized and implemented. Several organizations have been actively promoting the use of standards for data exchange. For example, Health Level Seven (HL7) and the Council for Affordable Quality Healthcare have worked to foster standards harmonization and integration to enable healthcare data exchange.

## PCAST's HIE Recommendations

Another group working to foster HIE is the President's Council of Advisors on Science and Technology (PCAST). In December 2010 PCAST issued a report strongly encouraging the use and integration of metadata-tagged data elements.

"Tagged data elements can be extracted by special software (known as middleware) from existing clinical systems. Or they can be produced from enhanced versions of those systems, or by completely new and innovative applications," according to the report. "In this way, all data could be exchanged among all systems no matter the origin or internal record formats of the data, and without the necessity of replacing existing legacy software."[1]

However, consideration needs to be given regarding what "metadata" entail and how metadata and their tagged elements can improve the exchange of healthcare data.

## Redefining Metadata for HIE

Traditionally metadata has been described as "data about data," but as HIE becomes more widespread, the ability to support metadata becomes increasingly complex as electronic health records continue to improve and be implemented. As EHR implementations increase through federal incentives and other approaches, understanding the origins, sensitivity, and context of data is significant to maintaining data quality and integrity.

Tagged data elements are individual pieces of data that accompany each data unit that describe the attributes, provenance, and required security protections of the data. Therefore, during exchange of data the tagged data element is protected against unauthorized access or data integrity issues. These tags are then associated with metadata tags, which group by attribute.

An updated definition of metadata can describe:

- **Data**, including where it is stored, what elements it contains, when it was created, when it was changed, and who created it
- **Information**, including a description of what it contains and how it is linked to other metadata
- **Knowledge**, including its importance, whether it is used extensively, where it is used, and what will happen if the resource is not there[2]

## ONC's Recommended HIE Standard

In response to PCAST's recommendations, ONC's Health Information Technology Standards Committee formed a metadata analysis power team to identify metadata elements and standards for the categories of patient identity, provenance, and privacy. After investigating several options for standards the team proposed using the HL7 Clinical Document Architecture Release 2 (CDA R2) header syntax.

The CDA R2 is a "document markup standard that specifies the structure and semantics of a clinical document (such as a discharge summary or progress note) for the purpose of exchange. A CDA document is a defined and complete information object that can include text, images, sounds, and other multimedia content. It can be transferred within a message and can exist independently, outside the transferring message."[3] The standard allows for flexibility and scalability to support increased information exchange.

The power team believed the following data elements were the most appropriate in accurately selecting a unique patient from a population: patient name, date of birth, current zip code, patient identifiers, and address.

Additional recommendations were suggested to modify the HL7 CDA R2 to add a display name element to accommodate different naming conventions and the use of a uniform resource identifier as used in different cultures.

The team recommended the following provenance metadata elements: tagged data element identifier, time stamp, actor, actor's affiliation, and actor's digital certificate. Additional suggestions included use of an X.509 certificate to digitally sign the envelope contents and additional optional metadata fields.

The team recommended the following privacy metadata elements: policy pointer (e.g., URL poining to current privacypolicy) and content metadata, which stores information about a piece of content. Additional suggestions included expanding the HL7 standard sensitivity vocabulary to tag data elements with detailed attributes conveying patient privacy preferences.

ONC approved the team's recommendations and believes the adoption of metadata standards can rapidly advance electronic HIE despite the various system architectures implemented. In order to be effective, the standard would need to be updated to reflect metadata requirements.

In August, ONC issued an advance notice of proposed rulemaking seeking public input on metadata standards to support nationwide electronic health information exchange, with an immediate scope focusing on summary care records. The rule is available at www.gpo.gov/fdsys/pkg/FR-2011-08-09/pdf/2011-20219.pdf.

## Example of Metadata Elements Using HL7 CDA R2

| Metadata Element | CDA R2 Example | Extensions |
|---|---|---|
| **Envelope** | <?xml version="1.0" encoding="UTF-8"?><br><br><ClinicalDocument xmlns="urn:hl7-org:v3"> | |
| **Provenance-TDE ID** | <id extension="http://stelsewhere.com/id/12345"<br><br>assigningAuthority="St. Elsewhere Hospital"/>www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-health-it-report.pdf | |
| **Privacy-Content** | <code code="34788-0" displayName="Psychiatric Consult note" codeSystemName="LOINC"/> | |

| | | |
|---|---|---|
| **Data Type** | | |
| **Provenance-Timestamp** | <effectiveTime value="20011217093047"/> | |
| **Privacy-Content Sensitivity** | <confidentialityCode code="PSY"/> | The power team discussed extending the current set of allowable codes |
| **Boilerplate** | <recordTarget><br><patientRole> | |
| **Patient ID-ID** | <id extension="1234567"<br>root="http://www.nh.gov/safety/divisions/dmv/'"/> | Note that in a CDA R2 header, the root attribute would typically be an OID |

Source: ONC HIT Standards Committee. "Metadata Analysis Power Team Recommendations to HITSC." http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__health_it_standards_committee/1271.

## Notes


1. President's Council of Advisors on Science and Technology. "Report to the President Realizing the Full Potential of Health Information Technology to Improve Healthcare for Americans: The Path Forward." December 2010. www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-health-it-report.pdf
2. "Metadata Management Definition-What Is Metadata?" www.executionmih.com/metadata/definition-concept.php.
3. Dolin, Robert H. et al. "HL7 Clinical Documentation Architecture, Release 2." Journal of the American Medical Informatics Association 13, no. 1 (Jan-Feb 2006): 30–39. www.ncbi.nlm.nih.gov/pmc/articles/PMC1380194.


Allison Viola (allison.viola@ahima.org) is director of federal relations at AHIMA.

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