Addressing Data, Information, and Record Quality Challenges Through Standards

By Anna Orlova, PhD

Data quality management has always been an area of focus for AHIMA. But the need for quality and integrity of data and information is greater than ever in all healthcare settings—especially with the growing adoption of health information technology (HIT), including electronic health record (EHR) systems.

The AHIMA Data Quality Management Model identifies data quality functions for data collection, application (including aggregation), warehousing, and analysis, as well as data quality characteristics (accuracy, comprehensiveness, currency, granularity, relevancy, accessibility, consistency, definition, precision, and timeliness).[1] In addition, AHIMA has recognized the need for education of health information management (HIM) professionals in data quality at the baccalaureate level in academic HIM programs, and through on-the-job training at healthcare facilities.[2]

EHR Quality Challenges

A five-year study recently published by the US National Institute of Standards and Technology (NIST) on usability of EHR systems identified new challenges with data, information, and record quality experienced by clinicians that may negatively impact patient safety. These challenges include:[3]

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

"Ultimately, NIST research demonstrated that patient safety is negatively affected when critical data quality and safety tasks are performed with the support of poorly designed EHRs," the report states. "As a result mistakes and errors frequently occur, with end users becoming frustrated and unwilling to trust the systems they are given and therefore are more likely to rely on potentially unsafe workarounds."[4]

These data, information, and record quality issues jeopardize EHR systems' interoperability today from both semantic and functional perspectives because senders and receivers of information cannot trust and/or interpret information they share across HIT systems. Table 1 below presents the list of EHR risk use areas related to data, information, record quality, and healthcare safety risks, as identified in the NIST report.

Table 1: Summary of Findings on Major Safety-Related Risk Areas and Possible Consequences

Areas of Critical Use Risk	Subcategories	Possible Consequences

Identification of Information Am I in the right place and doing the right thing? • For patient • For patient lists • For records • For medication/order	**Incorrect patient list** Who are these patients? • Wrong treatment • Wrong billing • Wrong charting of information	• Missed, omitted, delayed care • Care or billing activity conducted on the wrong patient • Have to pull up every patient chart • Wrong medication ordered
	Passing/sharing information What happens in the handoff? **Multiple EHRs used** What happens when EHRs don't coordinate?	• Data/information are not recorded in EHR • Misrecording or recording in wrong patient chart
	Fragmented information Data are often fragmented and found in multiple places	• Often no context for displayed information
Consistency of Information Why are things not listed and displayed in standardized ways? • For information • For organization • For format • For different systems • For draft vs. final versions • For omissions and/or changes	**Misidentified patient/chart** Where am I? Record number is incorrect/Patient name is misidentified	• Documentation/orders in wrong chart (often without knowing it)
	Supplements used Did I remember to transfer data to the EHR? Paper, whiteboards frequently used (reliance on memory) **Multiple EHRs used** Where do I find X on this EHR? **Functions and screens shift** Where is my information?	• Cannot find information when needed in the EHR • Reliance on memory for transfer of information/data
	Cannot find information Where is my information? Am I in the right place? • On screen • In file • In EHR	• Functions and screens shift • Information found in different places (including record number, patient name, medications prescribed, etc.)
	Standardization of where things are and what they are • Location and format of date • Location of record number • Location and format of name • Format of amount (i.e., metric vs. US) • Running list of current medications	• Notation in wrong record • Incorrect diagnosis or prescription • Incorrect medication or order or double vaccine

Integrity of Information Why and how are things changed, deleted, or omitted? • Lack of control over changes in dates, notes, units of measure • Inability to know what information is valid, relevant, and up-to-date	**Cannot figure out EHRs** How do I do this? • Navigation is difficult • Adding/deleting data is difficult • Scrolling through long notes is time-consuming	• More likely to just use whiteboard/paper and not put data in EHR, resulting in incomplete files/charts
	Draft vs. final version Is this a draft or final version? Often forget to finish a final version	• Omissions of data/information; notation of incorrect data/information • What happens if change in patient condition in interim?
	Changes to note/chart • You changed what? • Different user can change someone else's note/input	• Information lost • Inaccurate and/or incomplete data and charts
	Common references not there Why are height and weight not here (and other common data like vital signs)?	• Having to do things (input) multiple times or search multiple places

Source: US National Institute of Standardization 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." NISTIR 7804-1. http://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.7804-1.pdf.

Time to Adopt Quality Management System Standards in HIT

With the level of dissatisfaction and frustration of clinicians and HIM professionals with the current HIT applications and patient safety risks highlighted in NIST report, the time is now to apply quality standards used by other sectors to the healthcare sector in relation to their data, information, and records.

The International Organization of Standardization (ISO) developed "families" of standards related to quality management systems (ISO 9000 series)[5] and data quality (ISO 8000 series)[6] . Table 2 below provides the list and brief description of the standards in these series.

Table 2: Overview of ISO 9000 and 8000 Standards Series

Standard's Name	Description
ISO 9000 *Quality management systems—Fundamentals and vocabulary*	Defines the terms, definitions, and concepts used; provides background for the proper understanding and implementation of this international standard; forms the foundation of the quality management systems requirements.

ISO 9001 *Quality management systems—Requirements*	Specifies requirements aimed primarily at (a) giving confidence in the products and services provided by an organization and thereby enhancing customer satisfaction; as well as (b) achieve other organizational benefits, such as improved internal communication, better understanding and control of the organization's processes.
ISO 9004 *Managing for the sustained success of an organization—A quality management approach*	Provides guidance for organizations that choose to address a broader range of topics that can lead to improvement of the organization's overall performance, including guidance on a self-assessment methodology for an organization to be able to evaluate the level of maturity of its quality management system.
ISO/TS 8000-1, *Data quality— Part 1: Overview*	Provides an overview of data quality.
ISO/TS 8000-2, *Data quality— Part 2: Vocabulary*	Defines terms and definitions for data quality.
ISO/TS 8000-3, *Data quality— Part 3: Taxonomy*	Defines concepts of data quality taxonomy.
ISO 8000-99, *Data quality— Parts 1-99: General Data Quality*	Defines general concepts of data quality.
ISO 8000-100, *Data quality— Parts 100-199: Master data quality*	Defines and describes individuals, organizations, locations, goods, services, processes, and regulations related to master data; characteristics that define master data quality including syntax, semantic encoding, conformance to requirements, provenance, accuracy, completeness, and data governance; and characteristics of master data message to ensure reliable communication of information between sender and receiver.
ISO/TS 8000-200, *Data quality— Part 200-299: Transaction data quality*	Identifies and describes events in time that involve individuals, organizations, locations, goods, services, processes, rules, and regulations as well as characteristics that define transaction data quality including syntax, semantic encoding, conformance to requirements, provenance, accuracy, completeness, and data governance; specifies characteristics of business requirements to ensure reliable communication of information between a sender and a receiver.
ISO/TS 8000-300, *Data quality— Part 300: Product data quality*	Defines a measure of the accuracy and appropriateness of product data combined with the timeliness with which those data are provided to all the people who need them, where product data are all those data required from product conception to manufacturing. Product data includes not just computer-aided design data, computer-aided manufacturing data, computer-aided engineering data, product data management data, and other. Promotes efficient collaborative product development by eliminating rework on the data receiver side.

According to the ISO 9000 standard, the overall goal of quality management system implementation in an organization is "to enhance customer satisfaction by meeting customer requirements." This is exactly what HIT customers do not find in HIT or EHR products today.

The ISO 9000 standards define information as a product of an organization's activities. Specifically, they define the terms of "information," "documented information," "document," "documented procedures," and requirements to "maintain documented information." The term "records" is used "to denote documents needed to provide evidence of conformity with requirements expressed as a requirement to "retain documented information."

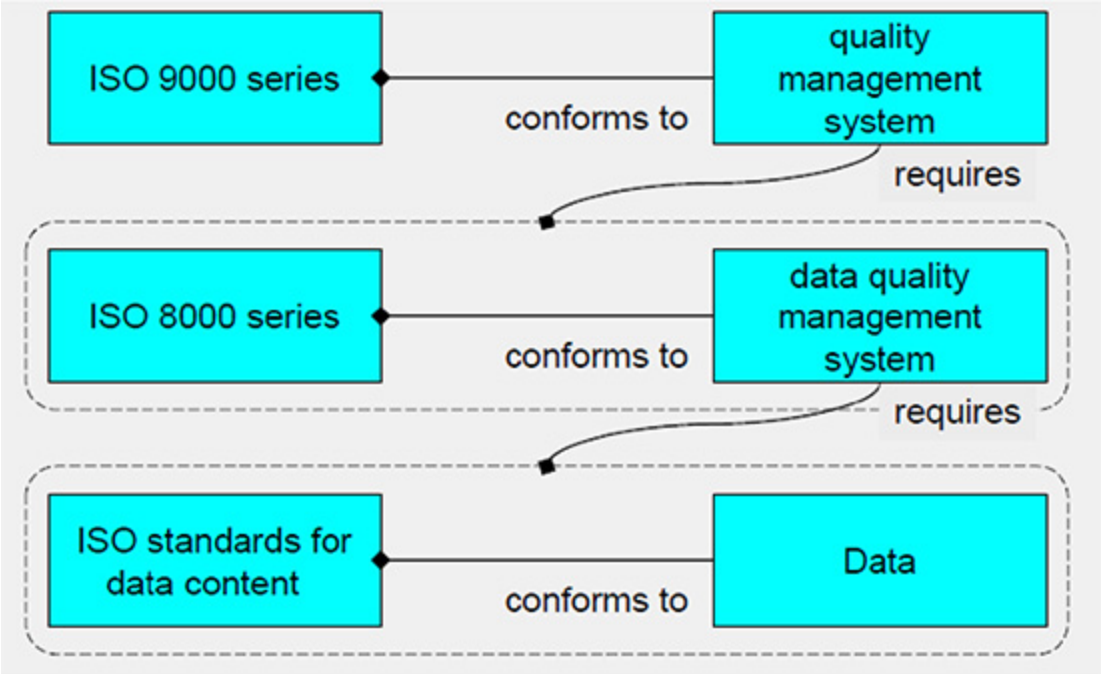
According to the standard, potential organization benefits of implementing a quality management system include the ability to:

- Consistently provide products and services that meet customer and applicable statutory and regulatory requirements
- Enhance customer satisfaction
- Address risks and opportunities associated with its context and objectives
- Demonstrate conformity to specified quality management system requirements

The ISO 8000 standards specify that "the ability to create, collect, store, maintain, transfer, process, and present data to support business processes in a timely and cost effective manner requires both an understanding of the characteristics of the data that determine its quality, and an ability to measure, manage, and report on data quality."

According to ISO 8000 standards, data quality is defined as the degree to which data meets user requirements (needs). Since currently HIT-generated data does not fully meet user needs, it is important to use ISO 8000 standards as it contains specifications for the declaration of the conformance to stated data requirements. This allows a user to request data that meets its requirements and to determine if received data meets its requirements. A characteristic of data is its portability from one system to another. Syntax and semantic encoding determine whether data is portable in a reliable way. ISO 8000 standards specify requirements for the declaration of syntax and semantic encoding as well (see Table 2 above).

Figure 1: Quality Stack of ISO Standards[7]



The ISO 8000 standards provide frameworks for improving data quality. These frameworks can be used independently or in conjunction with quality management systems specified in the ISO 9000 standards. Figure 1 (above) presents the relationship between ISO 8000 and 9000 standards series.

As a part of developing HIM practice standards, the AHIMA Standards Task Force has been working on specifying several HIM practice use cases, including the Data Quality Use Case. In this use case, the task force anticipates applying ISO 8000 and 9000 standards to develop health data quality requirements, framework(s), and measures of data quality for information management in healthcare. Please contact Diana Warner at diana.warner@ahima.org for more information about the AHIMA Standards Task Force's activities and, specifically, about participation in the development of AHIMA use cases.

Notes

[1] Davoudi, Sion et al. "Data Quality Management Model (2015 Update)." *Journal of AHIMA* 86, no. 10 (October 2015): expanded web version. http://bok.ahima.org/doc?oid=107773.

[2] White, Susan E., and Sandra L. Nunn. "Two Educational Approaches to Ensuring Data Quality." *Journal of AHIMA* 85, no. 7 (July 2014): 50-51.

[3] US National Institute of Standardization 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." NISTIR 7804-1. October 7, 2015. http://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.7804-1.pdf.

[4] Ibid.

[5] International Organization of Standardization (ISO). "Technical Committee 176 Quality Management and Quality Assurance. International Standard. 9000 Series. Quality Management Systems." www.iso.org/iso/home/standards/management-standards/iso_9000.htm.

[6] International Organization of Standardization (ISO). "Technical Committee 176 Quality Management and Quality Assurance. International Standard. 8000 Series. Data Quality." www.iso.org/iso/search.htm?qt=8000&sort_by=rel&type=simple&published=on&active_tab=standards.

[7] Galinski, C. "Accessibility Requirement and Content Interoperability." Presentation by the ISO Technical Committee 37 Terminology and Other Language and Content Resources, Meeting of Memorandum of Understanding Management Group (MOUMG). June 1 to June 2, 2016. Geneva, Switzerland.

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