

# Data Quality Management Model (Updated)

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*Editor's Note: This practice brief supersedes the March 1998 "Checklist to Assess Data Quality Management Efforts" and the June 1998 "Data Quality Management Model" practice briefs.*

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Healthcare leaders face many challenges, from the ICD-10-CM/PCS transition to achieving meaningful use, launching accountable care organizations (ACOs) and value-based purchasing programs, assuring the sustainability of health information exchanges (HIEs), and maintaining compliance with multiple health data reporting and clinical documentation requirements—among others. These initiatives impacting the health information management (HIM) and healthcare industries have a common theme: data.

As electronic health record (EHR) systems have become more widely implemented in all healthcare settings, these systems have developed and employed various methods of supporting documentation for electronic records. Complaints and concerns are often voiced—whether via blogs, online newsletters, or listservs—regarding the integrity, reliability, and compliance capabilities of automated documentation processes. Several articles in the Journal of AHIMA establish guidelines for preventing fraud in EHR systems. Documentation practices are within the domain of the HIM profession, for both paper and electronic records.<sup>1</sup>

As a result, the need for more rigorous data quality governance, stewardship, management, and measurement is greater than ever.

This practice brief will use the following definitions:

**Data Quality Management:** The business processes that ensure the integrity of an organization's data during collection, application (including aggregation), warehousing, and analysis.<sup>2</sup> While the healthcare industry still has quite a journey ahead in order to reach the robust goal of national healthcare data standards, the following initiatives are a step in the right direction for data exchange and interoperability:

- Continuity of Care Document (CCD), Clinical Documentation Architecture (CDA)
- Data Elements for Emergency Department Systems (DEEDS)
- Uniform Hospital Discharge Data Set (UHDDS)
- Minimum Data Set (MDS) for long-term care
- ICD-10-CM/PCS, Systemized Nomenclature of Medicine—Clinical Terms (SNOMED CT), Logical Observation Identifiers Names and Codes (LOINC), RxNorm

**Data Quality Measurement:** A quality measure is a mechanism to assign a quantity to quality of care by comparison to a criterion. Quality measurements typically focus on structures or processes of care that have a demonstrated relationship to positive health outcomes and are under the control of the healthcare system.<sup>3</sup> This is evidenced by the many initiatives to capture quality/performance measurement data, including:

- The Joint Commission Core Measures
- Outcomes and Assessment Information Set (OASIS) for home health care
- National Committee for Quality Assurance's (NCQA) Health Plan Employer Data and Information Set (HEDIS)
- Meaningful Use-defined core and menu sets

## Key Terms

Understanding of the following term definitions is key to ensure clarity in this article.

**Data Quality Management:** The business processes that ensure the integrity of an organization's data during collection, application (including aggregation), warehousing, and analysis.

**Data Quality Measurement:** A quality measure is a mechanism to assign a quantity to quality of care by comparison to a criterion. Quality measurements typically focus on structures or processes of care that have a demonstrated relationship to positive health outcomes and are under the control of the healthcare system.

These data sets will be used within organizations for continuous quality improvement efforts and to improve outcomes. They draw on data as raw material for research and comparing providers and institutions with one another.

Payment reform and quality measure reporting initiatives increase a healthcare organization's data needs for determining achievement of program goals, as well as identifying areas in need of improvement. The introduction of new classification and terminology systems—with their increased specificity and granularity—reinforce the importance of consistency, completeness, and accuracy as key characteristics of data quality.<sup>4</sup> The implementation of ICD-10 CM/PCS will impact anyone using diagnosis or inpatient procedure codes, which are pervasive throughout reimbursement systems, quality reporting, healthcare research and epidemiology, and public health reporting. SNOMED CT, RxNorm, and LOINC terminologies have detailed levels for a variety of healthcare needs, ranging from laboratory to pharmacy, and require awareness of the underlying quality from the data elements.

Healthcare data serves many purposes across many settings, primarily directed towards patient care. The industry is also moving towards an increased focus on ensuring that collected data is available for many other purposes. The use of new technologies such as telemedicine, remote monitoring, and mobile devices is also changing the nature of access to care and the manner in which patients and their families interact with caregivers. The rates of EHR adoption and development of HIEs continue to rise, which brings attention to assuring the integrity of the data regardless of the practice setting, collection method, or system used to capture, store, and transmit data across the healthcare continuum of care.

The main outcome of data quality management (DQM) is knowledge regarding the quality of healthcare data and its fitness for applicable use in the intended purposes. DQM functions involve continuous quality improvement for data quality throughout the enterprise (all healthcare settings) and include data application, collection, analysis, and warehousing. DQM skills and roles are not new to HIM professionals. As use of EHRs becomes widespread, however, data are shared and repurposed in new and innovative ways, thus making data quality more important than ever.

Data quality begins when EHR applications are planned. For example, data dictionaries for applications should utilize standards for definitions and acceptable values whenever possible. For additional information on this topic, please refer to the practice brief "Managing a Data Dictionary."<sup>5</sup>

The quality of collected data can be affected by both the software—in the form of value labels or other constraints around data entry—and the data entry mechanism whether it be automated or manual. Automated data entry originates from various sources, such as clinical lab machines and vital sign tools like blood pressure cuffs. All automated tools must be checked regularly to ensure appropriate operation. Likewise, any staff entering data manually should be trained to enter the data correctly and monitored for quality assurance.

For example, are measurements recorded in English or metric intervals? Does the organization use military time? What is the process if the system cannot accept what the person believes is the correct information?

Meaningful data analysis must be built upon high-quality data. Provided that underlying data is correct, the analysis must use data in the correct context. For example, many organizations do not collect external cause data if it is not required. Gunshot wounds would require external cause data, whereas slipping on a rug would not. Developing an analysis around external causes and representing it as complete would be misleading in many facilities. Additionally, the copy capabilities available as a result of electronic health data are likely to proliferate as EHR utilization expands. Readers can refer to AHIMA's Copy Functionality Toolkit for more information on this topic.<sup>6</sup> Finally, with many terabytes of data generated by EHRs, the quality of the data in warehouses will be paramount. The following are just some of the determinations that need to be addressed to ensure a high-quality data warehouse:

- Static data (date of birth, once entered correctly, should not change)
- Dynamic data (patient temperature should fluctuate throughout the day)
- When and how data updates (maintenance scheduling)
- Versioning (DRGs and EHR systems change across the years—it is important to know which grouper or EHR version was used)

Consequently, the healthcare industry needs data governance programs to help manage the growing amount of electronic data.

## **Data Governance**

Data governance is the high-level, corporate, or enterprise policies and strategies that define the purpose for collecting data, the ownership of data, and the intended use of data. Accountability and responsibility flow from data governance, and the data governance plan is the framework for overall organizational approach to data governance.<sup>7</sup>

## **Information Governance and Stewardship**

Information governance provides a foundation for the other data-driven functions in AHIMA's HIM Core Model by providing parameters based on organizational and compliance policies, processes, decision rights, and responsibilities. Governance functions and stewardship ensure the use and management of health information is compliant with jurisdictional law, regulation, standards, and organizational policies. As stewards of health information, HIM professionals strive to protect and ensure the ethical use of health information.<sup>8</sup>

The DQM model was developed to illustrate the different data quality challenges. The table "Data Quality Management Model" includes a graphic of the DQM domains as they relate to the characteristics of data integrity, and "[Appendix A](#)" includes examples of each characteristic within each domain. The model is generic and adaptable to any care setting and for any application. It is a tool or a model for HIM professionals to transition into enterprise-wide DQM roles.

## **Assessing Data Quality Management Efforts**

Traditionally, healthcare data quality practices were coordinated by HIM professionals using paper records and department-based systems. These practices have evolved and now utilize data elements, electronic searches, comparative and shared databases, data repositories, and continuous quality improvement. As custodians of health records, HIM professionals have historically performed warehousing functions such as purging, indexing, and editing data on all types of media: paper, images, optical disk, computer disk,

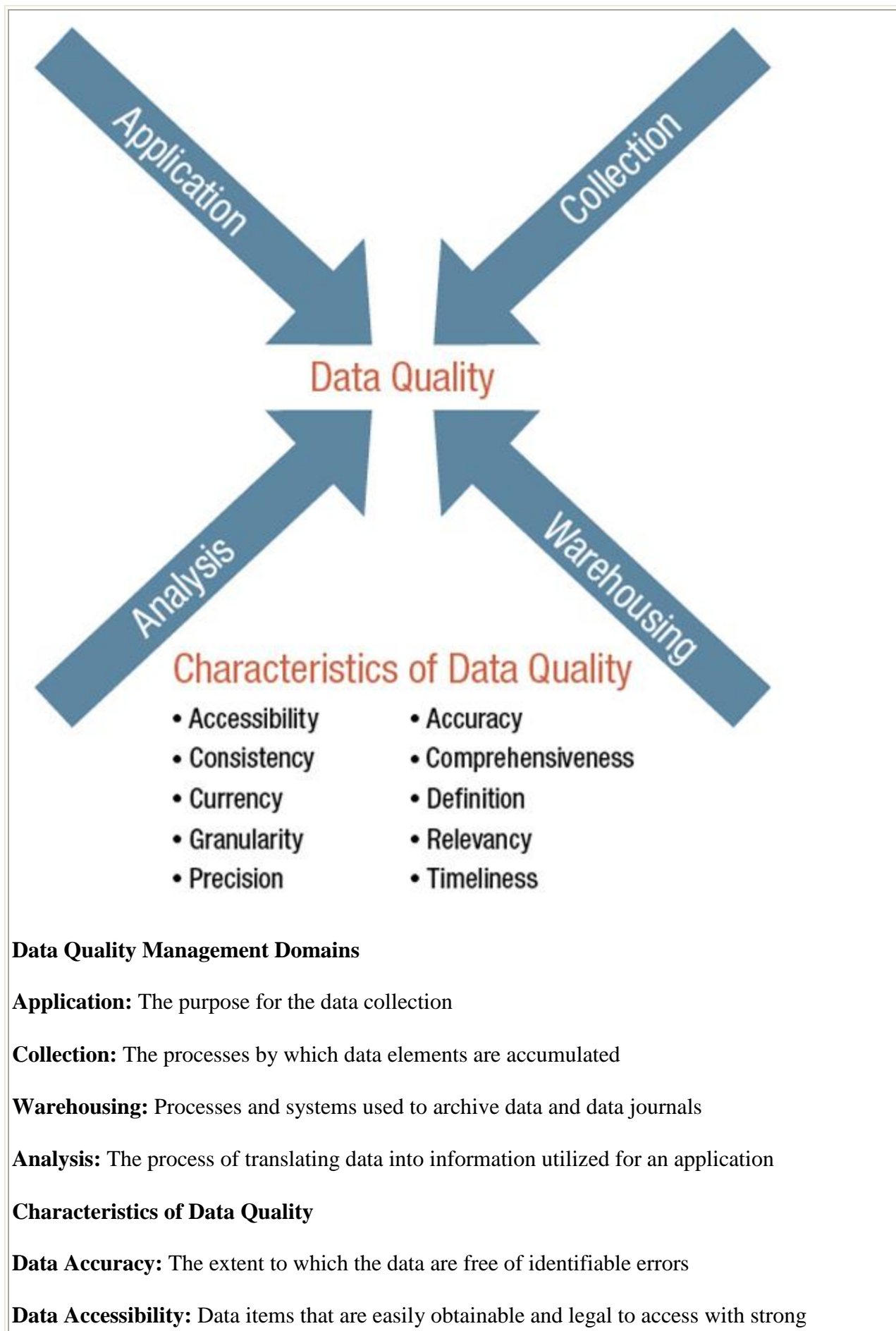
microfilm, and CD-ROM. In addition, HIM professionals are experts in collecting and classifying data to support a variety of needs. Some examples include severity of illness, meaningful use, pay for performance, data mapping, and registries. Further, HIM professionals have encouraged and fostered the use of data by ensuring its timely availability, coordinating its collection, and analyzing and reporting collected data. To support these efforts, "Checklist to Assess Data Quality Management Efforts" on page 67 outlines basic tenets in data quality management for healthcare professionals to follow.

With AHIMA members fulfilling a wide variety of roles within the healthcare industry, HIM professionals are expanding their responsibilities in data governance and stewardship. Leadership, management skills, and IT knowledge are all required for effective expansion into these areas.

Roles such as clinical data manager, terminology asset manager, and health data analyst positions will continue to evolve into opportunities for those HIM professionals ready to upgrade their expertise to keep pace with changing practice.

### **Data Quality Management Model**

The Data Quality Management Model was developed to illustrate the different data quality challenges. Definitions for the terms within the model are included below.<sup>9</sup>



protections and controls built into the process

**Data Comprehensiveness:** All required data items are included—ensures that the entire scope of the data is collected with intentional limitations documented

**Data Consistency:** The extent to which the healthcare data are reliable and the same across applications

**Data Currency:** The extent to which data are up-to-date; a datum value is up-to-date if it is current for a specific point in time, and it is outdated if it was current at a preceding time but incorrect at a later time

**Data Definition:** The specific meaning of a healthcare-related data element

**Data Granularity:** The level of detail at which the attributes and values of healthcare data are defined

**Data Precision:** Data values should be strictly stated to support the purpose

**Data Relevancy:** The extent to which healthcare-related data are useful for the purposes for which they were collected

**Data Timeliness:** Concept of data quality that involves whether the data is up-to-date and available within a useful time frame; timeliness is determined by manner and context in which the data are being used

## Direct link between HIM and Patient Outcomes

The quality of healthcare across the continuum rests on the integrity, reliability, and accuracy of health information. The various methods of documentation in electronic health records can be unreliable for patient care if documentation guidelines and best practices are not followed. HIM professionals have intimate knowledge of these documentation guidelines and are invaluable resources when it comes to helping providers determine how they will create templates, formats, notes, and other data elements in the EHR.

For example, a study of 60 randomly selected patient records with 1,891 notes from the Veterans Health Administration's computerized patient record system found that 84 percent of notes contained at least one documentation error, with an average of 7.8 documentation mistakes per patient.<sup>10</sup> Data integrity and quality are important, but new technology can—and does—produce new, real challenges.

EHRs consist of both structured and unstructured data, leaving a variety of opportunities for error. With recent government initiatives, such as meaningful use, there is increasing pressure for healthcare entities and providers to attest to quality healthcare data. In addition, the data should be trusted to support clinical, financial, and administrative decisions.

Data quality is dependent upon secure housing as well as efficient and effective accessibility when needed. These critical factors impact the overall data quality process that enables continuous improvements toward quality patient care.

Integrity of health information is an obligation of HIM. Findings from the HIM Core Model<sup>12</sup> work identified several near-future and future roles (including chief knowledge officer and health record advocate) for health information managers. HIM professionals must assume a leadership role in

transforming these functions. Now is the time to analyze and visualize documented and undocumented intra- and interdepartmental HIM functions to understand the current and future state of the HIM department while ensuring HIM best practices and standards are consistently maintained.

## **Data Quality and Patient Care**

With health information technologies such as EHRs, HIEs, mobile health devices, smart room technology, computerized provider order entry, meaningful use criteria, and core measures, data is accessed with greater ease and thus must at all times be of the highest quality.

The following story illustrates how essential the quality of data is to patient care:

*Regina lost her husband, Fred Holliday, to kidney cancer at a young age. During a period of time where his main oncologist was out of town, Fred was hospitalized. Regina attempted to obtain health information about his case with little success. She knew that if she had good quality data, she would be able to help in his care and hopefully help get him better. She asked for a copy of Fred's inpatient health record so she could try and understand what was happening, and was told it would take 21 days and would cost 73 cents per page. The next day she was told her husband would be sent home on a Patient-Controlled Anesthesia (PCA) pump. She and her husband were totally distraught. However, Regina tried to get a second opinion.*

*Once her husband was transferred, they were given an old and incomplete health record and transfer summary. The new facility where they went to seek a second opinion spent 6 hours trying to recreate his record so that they could provide proper care, which meant that her husband had to wait for 6 hours before care was provided. The physician from this new facility sent Regina back to the old facility to obtain her husband's health records. She received them only because she was now considered a courier. Her new healthcare team read the record and then Regina read the record. It was full of what Regina calls "actionable data" and if she would have had this quality data, she knows her husband would have received better care.*

*Regina Holliday is a major patient advocate, traveling the world and speaking about the importance of the Electronic Health Record and health IT and how good quality data is so important for providing good quality care.<sup>11</sup>*

## **Notes**

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### **Acknowledgements (Updated)**

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 Julie Dooling, RHIT  
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## **Checklist to Assess Data Quality Management Efforts**

Use the checklist below to assess overall data quality management efforts within an organization or for an application.

### **Application**

The purpose for data are collection.

- The application's purpose, the question to be answered, or the aim for collecting the data is clear
- Boundaries or limitations of data collected are known and communicated
- Complete data are collected for the application
- Value of the data is the same across applications and systems
- The application is of value and is appropriate for the intent
- Timely data are available

### **Collection**

The process by which data elements are accumulated.

- Education and training is effective and timely
- Communication of data definitions is timely and appropriate
- Data source provides most accurate, most timely, and least costly data
- Data collection is standardized
- Data standards exist
- Updates and changes are communicated appropriately and on a timely basis
- Data definitions are clear and concise
- Data are collected at the appropriate level of detail or granularity
- Acceptable values or value ranges for each data element are defined; edits are determined
- The data collection instrument is validated
- Quality (i.e., accuracy) is routinely monitored
- Meaningful use is achieved via the evaluation of EHR data

### **Warehousing and Interoperability**

Processes and systems used to archive data and data journals.

- Appropriate edits are in place
- Data ownership is established
- Guidelines for access to data and/or systems are in place
- Data inventory is maintained

- Relationships of data owners, data collectors, and data end users are managed
- Appropriate conversion tables are in place
- Systems, tables, and databases are updated appropriately
- Current data are available
- Data and application journals (data definitions, data ownership, policies, data sources, etc.) are appropriately archived, purged, and retained
- Data are warehoused at the appropriate level of detail or granularity
- Appropriate retention schedules are established
- Data are available on a timely basis
- Health information exchange is achieved as a result of interoperability of EHRs

## **Analysis**

The process of translating data into information that can be utilized in an application.

- Algorithms, formulas, and translation systems are valid and accurate
- Complete and current data is available
- Data impacting the application are analyzed in context
- Data are analyzed under reproducible circumstances
- Appropriate data comparisons, relationships, and linkages are displayed
- Data are analyzed at the appropriate level of detail or granularity

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**Article citation:**

AHIMA. "Data Quality Management Model (Updated)." *Journal of AHIMA* 83, no.7 (July 2012): 62-67.