Assessing and Improving EHR Data Quality (2015 update)

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Editor's Note: This Practice Brief supersedes the March 2007 [and March 2013] Practice Brief "Assessing and Improving EHR Data Quality."

The United States-based Institute of Medicine (IOM) reported in 1999 that "at least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies."[1] A new study published in 2013 by the *Journal of Patient Safety* states that four times as many people die from preventable medical errors than originally thought—as many as 440,000 a year.[2]

The delivery of quality healthcare depends on the availability of quality data. Poor documentation, inaccurate data, and insufficient communication can result in errors and adverse incidents.[3] Inaccurate data threatens patient safety and can lead to increased costs, inefficiencies, and poor financial performance. Furthermore, inaccurate or insufficient data also inhibits reimbursement, payments, and health information exchange (HIE), and hinders clinical research, performance improvement, and quality measurement initiatives. The impact of poor data on care will only increase with the implementation of ICD-10-CM/PCS, as well as the roll out of the "meaningful use" EHR Incentive Program. In addition, introduction of new payment reform models such as accountable care organizations (ACOs) and value-based purchasing emphasize the need for more specific and meaningful data collection, sharing, and reporting.

An electronic health record (EHR) has the potential to minimize medical errors if the data are accurate and meet quality criteria. The goal is for EHRs to help healthcare professionals use quality data for evidence-based knowledge management and decision making for patient care.

EHRs can have a positive impact on quality of care, patient safety, and efficiency. Without accurate and appropriate information in a usable and accessible form, however, these benefits will not be realized. Integrity of information is directly related to the organization's ability to prove that information is authentic, timely, accurate, and complete.

This Practice Brief discusses the challenges of maintaining quality data in the EHR and offers best practice guidance for ensuring the integrity of the healthcare data. It is designed to support and guide organizations, health information management (HIM) professionals, and providers to better assess, improve, and maintain the integrity of electronic health information.

New Focus on Data Capture Required

The ability of healthcare organizations to share electronic health information both internally and externally has been accepted as a method to improve the quality and delivery of care, according to AHIMA's Information Governance Principles for Healthcare.[4] Data integrity is critical to meeting these expectations. A single error in an electronic environment presents a risk that can be magnified as the data transmits further downstream to data sets, interfaced systems, decision support systems, and data warehouses.[5] Accurate data leads to quality information that is required for quality decision making and patient care.

The quality of clinical documentation at the point of entry is critical for all data flowing downstream. EHR quality is dependent upon the data collected at the source. Clinical documentation practices need to be developed and standardized to facilitate data quality, accurate data capture, and encoding. In an EHR, it is imperative these content standards are built into the foundation of the data being captured. Examples of content standards include the Health Level Seven (HL7) Reference Information Model (RIM), which is a visual representation of clinical content as discrete objects and data elements that can be generated, shared, and used in a lifecycle of events between participants.[6]

Practices such as repurposing data from the primary source may create redundancies throughout a patient's health information. Redundancies can cause navigation difficulty such as trying to find essential components like a specific date or time. EHR design and development should focus on "modular and reusable documentation components" which can improve

efficiency, eliminate duplicative documentation, and "reduce the effort" required to write and capture meaningful, useful, and pertinent documentation.[7]

For example, templates and scripts that are designed to contain a mixture of free-text fields and dynamic system data (i.e., a blood pressure result or lab value) discourage the copying of an entire narrative note repeatedly from day to day into the narrative section of an EHR, since the system data would become outdated and irrelevant.[8]

In addition, establishing consistent data models will ensure the integrity and quality of the data maintained in the EHR. A data model is a representation of the data to be stored in a database and the relationships between the tables and data fields which can then be carried out using object-oriented or entity relationship approaches.[9] Data models can describe the behavior of a system from a functional perspective and provide a common basis upon which EHR functions are communicated.[10]

Standardization of data definitions and structure for clinical content may include the use of smart text or text expanders and limit the use of free text as much as possible. These approaches will allow for a more robust analysis and utilization of the database tools and resources that make up these systems. Quality checkpoints coupled with traditional auditing procedures help ensure quality data is captured. Productivity and effectiveness of new tools such as natural language processing (NLP) and computer-assisted coding (CAC) can be enhanced when these controls are in place.

AHIMA's Data Quality Management Model discusses the business processes that ensure the integrity of an organization's data throughout the information lifecycle—from collection, application, and warehousing to analysis.[11] The model is available online in AHIMA's HIM Body of Knowledge at www.ahima.org.

Ensuring Data Accuracy

The EHR is a compilation of clinical and clinically-related information and is used as the primary communication tool for planning and delivering patient care. Quality patient care and safety improvement goals can be enhanced and better achieved through the application of documentation guidelines and data standards.

Documentation and data content within an EHR must be accurate, complete, concise, consistent, and universally understood by data users, as well as support the legal business record of the organization by maintaining these parameters. It is critical that both structured and unstructured data meet a standard of quality if they are to be meaningful for internal and external use, such as for continuum of care and secondary purposes. Factors such as ease of use and design can facilitate adherence to documentation guidelines and standards.[12] For more information, refer to AHIMA's Practice Brief titled "Fundamentals of the Legal Health Record and Designated Record Set."

Documentation policies and guidelines must be established in compliance with governmental, regulatory, accreditation, and industry standards—including those for accuracy, timeliness, and copy functionality—and should apply to paper and electronic formats. Strong facility controls and governance can help ensure documentation guidelines are followed and compliance requirements are met. For example, consider the varying use of abbreviations and acronyms across facilities and states. The phrases below all have multiple meanings for the same acronym:

- ABG—"aortic bifurcation graft" OR "aortobifemoral graft" OR "arterial blood gases"
- ASCVD—"arteriosclerotic cardiovascular disease" OR "arteriosclerotic cerebrovascular disease"
- CHD—"congenital heart disease" OR "congestive heart disease" OR "coronary heart disease"
- DOA—"date of admission" OR "dead on arrival"

It is imperative that abbreviations are used in the same manner throughout documentation so that the patient is treated appropriately. Healthcare organizations should have an approved abbreviation list as part of their internal policies and procedures. It should be noted that some organizations are going to an "unapproved" list. For example, The Joint Commission has a "Do Not Use" abbreviation list.[13]

Data integrity policies and procedures must be followed. These policies may include (but are not limited to) registration processes, standards for handling duplicate records, and processes for addressing overlays. It is important to implement policies and procedures to maintain the integrity of the data throughout the patient encounter for all information entered into the EHR, whether by people or systems. Individuals dedicated to the continuous auditing of the record, as well as EHR correction

processes that monitor the system proactively and correct errors as they are identified, play an important role in fine-tuning processes and ensuring the overall quality of the data.

Data Quality Best Practices

To further assist the industry in the combined goals of improving quality of care and ensuring the financial integrity of the organization, the following best practices for ensuring quality healthcare data are recommended. An accompanying illustrative case study is included in the online version of this Practice Brief in AHIMA's HIM Body of Knowledge, titled "Appendix A: How One Hospital Improved Healthcare Data Quality in its EHR."

Role-based access, or role-based security, to the data—sometimes referred to as create, read, update, and delete authority—must be defined, enforced, and built into system security functionalities. Clear policies on what information access is needed by a specific role or relationship to patient types must be developed. For example, only staff who work in the psychiatric clinic would have access to those patients seen in that clinic as opposed to enterprise-wide patient access. This is determined by the role and location of staff. The healthcare professional identifies the roles and what access is given based on the Health Insurance Portability and Accountability Act's (HIPAA) minimum necessary standards, which states that staff should only have access to the information they need to do their job. Technology can assist with access control, but there still needs to be coordination with individual stakeholders and processes to ensure accuracy and availability of the data for patient care.

A data dictionary should exist for each health information system, with standard data field definitions for each data element. For example, the naming convention field on the front end where the user sees it could be "Patient Age," while back end database users may see "PT_AGE" or something else completely different. The data dictionary typically captures other information such as a definition. For instance, "Age of the patient calculated by using most recent birthday attained before or on same day as discharge." The data dictionary will also include many other details of how to capture each data field such as data type, format, field size, values, source system, date first entered, and why the item is included.

The key focus of the data dictionary is to support and adopt more consistent use of data elements and terminology to improve the use of data in reporting. An up-to-date data dictionary will aid in better reporting and maintaining the quality of data. These definitions should be clearly communicated to all staff accessing the record; especially those responsible for reporting data. The data dictionary can also be built into various information systems in an effort to remain compliant throughout the enterprise. In support of information governance, ongoing ownership and maintenance of the data dictionary should be established.

Inconsistent naming conventions, definitions, varying field length for the same data element, and/or varied element values can all lead to problems including poor data quality and misuse of data in reporting. For example, the date of a patient's admission may be referred to as the "date of admission" in one system and "admit date" in another.

In addition, the distinction between ethnicity and race should be understood and consistently applied during the registration process. Selection options for these fields should be limited to choices that are in adherence with the data dictionary.

EHRs are comprised of many different technologies, although there may be many modules purchased together from one vendor to create an EHR. For all of these systems that feed the EHR, clear policies, standards, procedures, and functionalities should be established to define who owns and has responsibility for maintaining and creating the data dictionary for each system and module. Having a single owner over the various dictionaries is helpful in reducing reporting errors. The consistent capture of standardized key data, whether demographic or statistical, is crucial.

A standardized format is used to ensure consistency. For example, to satisfy requirements of the federal "meaningful use" EHR Incentive Program, the problem list must be developed using SNOMED CT to record current, active, and past diagnoses. Additionally, the use of standardized templates, data collection forms, or patient record forms should be required to the greatest extent possible for provider documentation. This too can be built into the functionality within a system, but should be developed with the appropriate key stakeholders and with compliance input.

Use of structured standardized data or use of auto-format functionality is important to enable the sharing and exchange of health information with HIEs and other organizations. For example, consider entering information, such as vital signs, as discrete data into correctly formatted fields, versus allowing free text entry of the vital signs into a field. It does not matter

which system is used to enter a temperature or blood pressure; the format is always the same and can be more easily shared across systems. If the information was entered as free text, the formatting might be lost and the information misinterpreted.

State and federal laws and regulations; accreditation standards; medical staff bylaws, rules, and regulations; and organizational policies and procedures mirror standardization decisions and should be followed by designated staff. The Joint Commission's Information Management and Record of Care standards, HIPAA standards, Centers for Medicare and Medicaid Services' (CMS') Conditions of Participation, and Federal Rules of Civil Procedure related to electronic discovery are just a few of the standards that should be kept in mind when developing one's own facility standards and procedures.

Awareness Factors for EHR Data Quality

In order to fully leverage the potential of an EHR system's ability to improve data quality, and to understand the potential limitations a particular system might have, it is imperative that the HIM professional have a thorough understanding of their specific EHR system functionality as well as a broad understanding of EHR functionality in general. Data strategies and an effective data quality program that incorporate data integrity processes must be in place to ensure optimal data quality.

In addition to the importance of an information governance program and the necessity of executive sponsorship, consideration should be given to the following areas for data quality monitoring.

1. Patient Identification

Ensuring that health information is associated with the patient to whom it pertains is a key component to ensuring patient safety. EHR systems should have alerts and prompts that notify the user when the potential for an incorrect association exists. For example, the EHR system should alert users when several patients have similar names and dates of birth, such as in the case of multiple birth siblings. Access controls strictly limiting who can enter and update/change key enduring demographic elements (such as name, date of birth, or place of birth) must also be in place. Capabilities to limit medical identity theft must also be implemented.

Simply matching demographic information supplied by the patient is not sufficient. Additional identifiers or biometrics, such as patient photographs, palm vein scanning, or fingerprinting should be utilized when possible. Standardized naming convention policies or formats for using the patient's legal name must also be developed and employed (i.e., standardizing the spelling of suffixes such as "Jr.," "Junior," and "JR") to help minimize the risk for error. Policies and procedures for baby naming, for unidentified emergency patients, for the use and exclusions of hyphens, and for handling celebrities or notable individuals (and the additional complication of considering whether to use an alias for the patient) should also be developed.

Thorough training for all front-end users—especially those in registration and scheduling roles—and proactive surveillance by data integrity analysts for any patient identification errors should be given the utmost attention to ensure proper patient identification.

For more information on patient identification and patient matching, refer to the Practice Brief "Managing the Integrity of Patient Identity in Health Information Exchange," available online in AHIMA's HIM Body of Knowledge, or the white paper "Patient Matching in Health Information Exchanges," published in *Perspectives in Health Information Management*.

2. Copy Functionality

In early 2014, the Department of Health and Human Services' Office of Inspector General (OIG) highlighted copy and paste as a common practice in EHR documentation practices, noting that it can lead to adding false or irrelevant documentation.[14]

Since bringing this to light, many EHRs have started evaluating and addressing copy/paste functionality. The importance of strong information governance and internal policy and procedures regarding the use of copy and paste is critical. Organizational policies and procedures should be developed for proper use of EHR documentation to ensure compliance with governmental, regulatory, and industry standards, including acceptable copy/paste practices. Such practices include identification of origin and author of copied information, provider responsibility, error notification, and sanctions for violating copy/paste policies.[15]

Use of copy functionality (also known as "copy/paste," "copy forward," or "cloning") has been promoted in the clinician's EHR workflow to improve the ease of consistent use of static health information, such as past medical history. But when misused, copy functionality can lead to redundant, misleading, inaccurate, irrelevant, inconsistent, and unnecessarily lengthy documentation that may jeopardize quality of care, increase risk for medical error, or result in allegations—and even charges—of fraud.

For example, problems occur when a clinician copies and pastes progress notes from the patient's first day of care to the second day of care and does not take the time to review and edit out procedures, medication, treatments administered, and/or documents specific to that specific date of service (DOS). In addition to the impact on care quality, dangers extend to the audit arena where retrospective case reviews may focus on the high frequency of copy/paste use, which can indicate possible fraud.

The ability to limit copy functionality in an EHR system is vital for the accuracy of data. Limitations of copy functionality must include measures such as:

- Clearly labeling the information as copied from another source
- Limiting the ability for data to be copied and pasted from other systems
- Limiting the ability of one author to copy from another author's documentation
- Allowing a provider to mark specific results as reviewed
- Allowing only key predefined elements of reports and results to be copied or imported
- The ability to monitor a clinician's use of copy and paste
- Monitoring the EHR audit trail

More information on policies and procedures related to copy functionality is available in the "Copy Functionality Toolkit" in AHIMA's HIM Body of Knowledge.

3. Corrections and Amendments

Policies must outline who may amend records, when record amendments can be made, and how records may be amended (not amendments related to patient requests under HIPAA). Each organization may develop specific guidelines that outline what the HIM staff may amend versus what must be sent back to the provider for correction. For example, HIM staff may be allowed to change demographic data such as a date of birth upon verification, but all clinical amendment requests must be sent back to the provider for updates.

Regardless of the type of change, any amendments to the content of the health record must be approved by the provider and previous versions should be accessible through a revision history or audit process. More information on policies and procedures related to corrections and/or deletions is available in AHIMA's "Amendments in the Electronic Health Record Toolkit," available online in AHIMA's HIM Body of Knowledge.

4. Standalone Devices

Whenever possible, quality information from standalone devices should be incorporated into the EHR. However, certain devices or equipment that contain health data might not interface with the EHR. The lack of availability of health information contained in standalone devices can potentially impact data quality by restricting certain types of data from view or making the viewing of data difficult. In such cases it is important to assess what standalone data is not integrated into a single EHR view and ensure those who have a need to know such information have the ability to access it.

Organizations must closely monitor standalone systems to ensure data quality and accuracy between the EHR and the standalone system. For example, scanning results into a document imaging system for viewing, or possibly embedding a link from the EHR directly to the standalone system, may be considered to ensure that all the data is available when needed. Having information in disparate systems with no link or viewing ability could lead to patient safety concerns.

5. Legacy Systems

Legacy systems must be carefully evaluated before undergoing a data transmission to the EHR. Many organizations have legacy systems that contain patient information or that feed information into the current EHR. Prior to retiring a legacy system, a thorough assessment of stored data must be undertaken and a plan to transition required data elements must be developed. A legacy system may also feed data to an EHR or be retired via converting data into an EHR to eliminate system redundancy.

When errors in data are discovered, they must be corrected at the source as well as in any and all systems that contain the erroneous data, such as a data mart or data warehouse that feeds other information systems in the enterprise. Clear policies and procedures for determining the source of truth when differences exist between interfaced and integrated systems is critical. This includes any legacy systems that have not been evaluated, cleansed, and converted.

6. Hybrid Health Record

The move toward a more integrated EHR may be occurring in stages, due to the cost and significant impact a "big bang" implementation can have on an organization. This creates inconsistent methods for inputting documentation—with some residing in the EHR and some remaining on paper. Providers locating documentation for patient care and other staff performing data review, data abstraction, and coding of services also face inconsistency in finding pertinent information. In such cases, a concise training plan must be established to clearly communicate and manage the data while in a hybrid state.

HIM and Many Others Now Ensure EHR Data Quality

The healthcare industry is made up of diverse professions that look at the issue of data quality from different perspectives. However all agree that quality data is critical for patient care and safety, reimbursement, accreditation, quality initiatives, and research. Yet there has been little discussion about who in healthcare is responsible for ensuring data quality in the electronic environment.

In the past, the data quality role has fallen largely on HIM professionals as the custodians of the paper record. In the electronic environment, everyone from administrative and support staff responsible for specialty applications to direct caregivers who document inpatient records will be tasked with ensuring data quality. It is a break in tradition that each individual in the array of caregivers that treat and interact with a patient has a role in creating and maintaining quality data in the patient's record.

The importance of HIM contributions to development decisions cannot be overstated. HIM professionals will continue to be regarded as the data stewards, coordinating the multidisciplinary approach to EHR development and education. One design decision can potentially impact release of information integrity, regulatory compliance, and/or reimbursement denials due to inadequate documentation. These are not always factors clinicians will readily recognize. In addition, data entry now occurs in many different non-traditional forms (i.e., telephone encounters, patient portal messaging, and e-mail), which must find a place in the organization's legal health record. Maintaining integrity through an information governance plan is critical.

The Ripple Effect

In a networked environment, health record data affects a myriad of internal data sets, operational and transactional systems, repositories, external databases, and shared networks. For example, consider when an organization's EHR interfaces with an affiliate EHR. Decisions on what data are brought into the main organization's EHR and whether the interfaces are bidirectional will have a significant impact on how much auditing and maintenance is required by the data integrity team. In the instance where a patient name change creates inconsistencies, the importance of stringent policies and standardized workflows is critical. For instance, if one organization uses the insurance card to validate a patient's name, and an affiliate uses the patient's driver's license. Educating personnel who collect patient data at all points of entry is crucial to data integrity. Evaluating the various approaches of collecting data and ensuring there are policies and standardized workflows are important as well as validating compatibility with information system upgrades.

With the constantly changing and growing healthcare environment, ensuring the quality and integrity of the data moving through multiple systems has never been more important. EHR technology enables HIM and other healthcare professionals to improve the quality of patient care through influence over quality design and quality improvement functions.

The health record is progressing from paper to electronic at a time when attention to quality of care is intense. Traditional quality improvement programs and new quality measurement initiatives and regulations have helped healthcare professionals focus on process and workflow. The Joint Commission and CMS' survey approach have supplemented this focus on quality with attention to record completeness. But a move to more point-of-care observation and documentation is needed. Other healthcare professionals are beginning to understand what HIM professionals have known all along—that the quality and integrity of the health record depends on the front-end collection of quality data.

HIM's Evolving Role

The role of the HIM professional is evolving from managing the content of the health record to contributing to EHR data standardization and harmonization, both inside and outside their organizations. The future role of the HIM professional will involve the development of information governance programs, EHR quality models within the organization, and performing auditing and monitoring checkpoints. Audit programs will help identify points throughout the data collection process that are at risk. HIM professionals will facilitate resolution by providing ongoing feedback and taking a more active role in root cause analysis. EHR audits at the organizational level will provide valuable information for inter- and intra-organizational data harmonization efforts that affect health information exchange. HIM professionals can contribute positively to all these efforts through their understanding of the processes underlying the clinical and financial data streams that comprise the EHR. Many HIM professionals will continue to find a natural migration to leadership roles in technology departments or vendor environments to contribute their knowledge from another perspective.

HIM professionals have always worked to ensure that data in the health record meets quality standards for accuracy, timeliness, consistency, and completeness. The ability to use these skills in the electronic environment elevates the importance of HIM engagement in auditing and monitoring documentation practices contributing to critical EHR design decisions, as well as discussions surrounding data output and reporting. Information governance functions and stewardship ensure the use and management of health information is compliant with jurisdictional law, regulations, standards, and organizational policies. As stewards of health information, HIM roles and functions strive to protect and ensure the ethical use of health information.[16]

HIM professionals can now leverage their knowledge in clinical content and EHR data quality to help organizations define governance programs and understand the front-end and throughput processes that create EHR data. The migration of healthcare records from paper to electronic puts HIM professionals in a unique position to lead efforts to evaluate and improve EHR data, which will be central to the acceptance of the EHR and the migration to a future state with new technologies and interoperability.

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