

Healthcare Code Sets, Clinical Terminologies, and Classification Systems

Edited by Kathy Giannangelo, RHIA, CCS



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Note to Educators

Each chapter of this book contains “Check Your Understanding” questions for discussion and/or to help the reader focus on important points within the text. The answers to these questions are provided in appendix B.

Application exercises and review quizzes also follow each chapter. The answer key for the review quizzes is contained with other resources in the instructor guide for this book. The instructor guide is available to instructors in on-line format from the individual book pages in the AHIMA Book-

store or through the Assembly on Education (AOE) Community of Practice (CoP). Instructors who are AHIMA members can sign up for this private community by clicking on the help icon with the CoP home page and requesting additional information on becoming an AOE CoP member. An instructor who is not an AHIMA member or a member who is not an instructor may contact the publisher at publications@ahima.org. The instructor materials are not available to students enrolled in college or university programs.

Foreword

by James J. Cimino, M.D.

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Health care today has never been more information intensive. Whether discussing improvements in quality, reduction of errors, reining in of costs, or reaping the benefits of genomic discoveries, the underlying topic is always about information: collecting it, interpreting it, or bringing it to bear on problems. Computers, of course, can help immensely with such tasks, but in order to do so, the information has to be represented in a usable form. For most purposes, this means coding it using controlled terminologies. While healthcare informaticians have known this for decades, the rest of the healthcare community is only recently recognizing the importance of terminologies, and the need for standards.

Standards are critical, for example, for being able to collect data from disparate sites in order to merge them for population health studies. Standards also facilitate the development of systems for automated decision support, which must embody decision logic that is written in general terms (such as classes of drugs or patient conditions) but map to patient-specific information (such as particular medications or laboratory test results).

Some standards have been around for years, but were poorly attended to, while others have arisen more recently along with arguments for their acceptance. Yet, for the most part, these terminologies remained largely unknown or obscure. Developers of health information systems, collectors of data, and users of data sought out these

terminologies, but often did not know where or how to get information about them. Even today, in the age of the World Wide Web, such information is hard to come by. Try, for example, to find out what the controlled terminology acronym GALEN stands for. Or see if you can find the ICD-9-CM disease table on the Department of Health and Human Services' Web site. If you somehow succeed, try to find the ICD-9-CM procedure table. Then try to figure out why it has multiple codes for the same terms (for example, 366.04 and 743.33 for nuclear cataract).

The fact is that proper use of controlled terminologies remains an obscure art, and this has been part of the reason for their slow adoption. It is still often easier for information system developers or data collection protocol designers to create their own controlled terminology, rather than trying to comprehend and deal with something that was "not invented here." This resistance persists in the face of changing national policy towards standards adoption, as articulated in the Health Insurance Portability and Accountability Act (HIPAA) and the recommendations of the National Committee for Vital and Health Statistics (NCVHS).

A national attempt to address the perfusion of standard terminologies has been the National Library of Medicine's Unified Medical Language System (UMLS), which brings together over 100 terminologies and makes them freely available. The UMLS makes many terminologies publicly accessible for the first time, but it does not explain

what the terminologies should be used for or how to use them. And, in any case, understanding the UMLS itself presents additional challenges. As a result, adoption of controlled terminologies has progressed only slowly, despite 15 years of expansion in the UMLS.

The clear explanations of controlled terminologies, lacking in the UMLS, desperately needed by health professionals, health information management professionals, and health information system professionals, can be found at last in this book. Here, you can find clear definitions for terms that are all-too-often used interchangeably (and incorrectly), like “vocabulary”, “terminology” and “classification”. With clear definitions set forth, the book then proceeds to organize the available standards into those used for statistical and administrative functions and those used for clinical purposes.

Statistical and administrative functions have long been important motivators for coding health data, whether for reimbursement purposes or mandatory reporting. While we complain about their existence and their limitations, we should at least thank them for getting the health care industry on the road to computerization. The first section of the book provides detailed examinations of the history, structure, and use of each of these key terminologies in ways that could otherwise only be found in expensive, time-consuming tutorials and training classes.

Computer systems that serve administrative functions have often been adapted for clinical purposes, usually with mixed results. Consider, for example, systems that partition patient data according to visit, rather than make it available to clinicians in a longitudinal manner. As these systems have evolved to become more clinically oriented, they have developed needs for coding data at levels of detail not possible with administrative terminologies. As a result, clinical terminologies that have lurked for decades outside of the mainstream of health care are finally getting appropri-

ate attention, while others are being created *de novo* to fill gaps not covered by preexisting terminologies. Many of these terminologies have their origins in the informatics research world and are therefore frequently described in the published, peer-reviewed literature. Nevertheless, trying to understand them from the published pieces is a bit like the blind men trying to describe the elephant. Within these pages, though, you will find eight chapters that bring together the published work on each terminology and organize them into coherent descriptions, again including history, structure and use.

Terminologies for electronic health records can be a dry subject if taken in the abstract. True understanding does not come until one examines the applications in which terminologies are used. An important bridge between standard terminologies and these applications is the set of standards used for storing and exchanging data; both of these topics are covered in respective chapters in the third section of the book.

Readers who master the first three sections will be ready to put all the pieces together. For this, they will need to understand how to access terminologies through the available terminology databases, such as the Unified Medical Language System (UMLS), and how the terminologies are actually used in health care applications. Both of these topics are covered in the final section.

This book covers a lot of ground. Its six authors bring many years of experience with health data and health information systems to the table and have collected a thorough bibliography of published work that can serve as a secondary resource. Most importantly, they have brought together information that has heretofore been scattered and inaccessible to form a coherent whole. The result is a book that will be a valuable resource for anyone trying to understand the end-to-end chain of health information coding systems and their use in electronic health records: a book that is unmatched by any other current book or class.

Chapter 1

Introduction

Kathy Giannangelo, RHIA, CCS

The coding of healthcare encounters has been one of the core functions of health information management (HIM) almost since the beginning of the profession. According to Sheehy (1991), many consider the function of identifying and organizing clinical data to be the essence of the profession. Given this observation, what better way is there to name and arrange medical content than through vocabularies, terminologies, and classifications.

Eight years ago, the American Health Information Management Association (AHIMA) appointed the Coding Futures Task Force to study the likely futures of HIM professionals in the domain of coding practice. The group concluded that HIM professionals must be educationally prepared to go well beyond the assignment of diagnostic and procedural codes and into broader areas of formalization that will ensure a leading position in the development of algorithmic translation, concept representation, and mapping among clinical nomenclatures and reimbursement methods (AHIMA 2000).

Today, HIM professionals deem the Health Insurance Portability and Accountability Act (HIPAA) standard code sets as the systems of significance for cataloguing diseases and procedures. These code sets include the following:

- *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM), volumes 1–3

- Current Procedural Terminology, Fourth Edition (CPT®)
- Code on Dental Procedures and Nomenclature (CDT)
- National Drug Codes (NDCs)
- The Centers for Medicare and Medicaid Services (CMS) Healthcare Common Procedure Coding System (HCPCS)

However, although HIM professionals need to learn these key systems, they also need to become cognizant of and knowledgeable about many other vocabulary, terminology, and classification systems in order to prepare for the adoption of electronic health record (EHR) systems. Among others, these include:

- MEDCIN®
- Logical Observation Identifiers Names and Codes (LOINC®)
- Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT®)
- International Classification of Functioning, Disability and Health (ICF)

In addition to broadening their perspective on vocabularies, terminologies, and classifications, HIM professionals need to understand data standards

in a more global way. The Committee on Health Data Standards of the Data Council of the Department of Health and Human Services (HHS) states: “One of the biggest issues for health data today is the lack of shared data standards. The lack of shared standards increases paperwork and data collection burdens, and reduces the analytic potential of health data. Without consistent use of data standards, there is little ability to make multiple uses of or link data, which limits the usefulness of the HHS data to our public and private data customers and State partners, and vice versa. The need for shared health data standards encompasses the need for better agreement on common health data vocabularies, assurances of privacy, and other issues surrounding electronic transmission of information” (HHS Data Council 1997).

Moreover, an Institute of Medicine report titled “Key Capabilities of an Electronic Health Record System” states: “At the most basic level, data standards are about the standardization of data elements: (1) defining what to collect, (2) deciding how to represent what is collected (by designating data types or terminologies), and (3) determining how to encode the data for transmission” (IOM 2003).

This chapter provides a brief introduction to vocabularies, terminologies, and classifications and lays the foundation for the remaining chapters. Parts I, Terminologies and Classifications Commonly Used for Administrative and Statistical Reporting, and II, Other Vocabulary, Terminology, and Classification Systems, supply further detail on the various vocabularies, terminologies, and classifications either currently in use or having the potential for use in an EHR. This material combined with that found in Parts III, Data Standards for Healthcare, and IV, Application of Vocabularies, Terminologies, and Classification Systems, translates into a comprehensive textbook for HIM professionals. This chapter also establishes a framework for the entire textbook, whose purpose is to explain principles and applications associated with vocabulary, terminology, and classification systems for healthcare services.

Vocabulary, Terminology, and Classification Systems

Vocabulary, terminology, and classification systems are key to having the encoded data that users need to access, combine, manipulate, and share for various purposes.

Table 1.1 provides some reasons why vocabulary, terminology, and classification systems are needed in healthcare.

Definitions of Vocabulary, Terminology, and Classification Systems

Deciding on a definition for vocabulary, terminology, and classification is not as easy as it may sound. Although vocabulary and classification are relatively straightforward, terminology has various facets. The definitions for vocabulary and classification are:

- A vocabulary is a collection of words or phrases with their meanings.
- A classification is a system that is clinically descriptive and arranges or organizes like or related entities.

Bowman (2005) offers the following definitions for terminology:

- Terminology refers to a set of terms representing the system of concepts of a particular subject field (in healthcare, a set of terms that describes health concepts).
- Clinical terminology refers to a set of standardized terms and their synonyms that record patient findings, circumstances, events, and interventions with sufficient detail to support clinical care, decision support, outcomes research, and quality improvement; and can be efficiently mapped to broader classifications for administrative, regulatory, oversight, and fiscal requirements.

Table 1.1. Reasons for needing a vocabulary, terminology, or classification system

Function	Reason for Needing a Vocabulary, Terminology, or Classification System
1. Access to complete and accurate clinical data	<ul style="list-style-type: none"> • Facilitates electronic data collection at the point of care • Possesses the ability to capture the detail of diagnostic studies, history and physical examinations, visit notes, ancillary department information, nursing notes, vital signs, outcomes measures, and any other clinically relevant observations about the patient • Allows many different sites and different providers the ability to send and receive medical data in an understandable and usable manner, thereby speeding care delivery and reducing duplicate testing and duplicate prescribing
2. Practitioner alerts and reminders	<ul style="list-style-type: none"> • Improves the quality of healthcare through the effective utilization of information found in other information management systems • Allows the computer to manipulate standardized data and find information relevant to individual patients for the purpose of producing automatic reminders or alerts
3. Clinical decision support systems	<ul style="list-style-type: none"> • Permits retrieval of relevant data, information, and knowledge for the purpose of generating patient-specific assessments or recommendations designed to aid clinicians in making clinical decisions • Provides data to consumers regarding costs and outcomes of treatment options
4. Links to medical knowledge	<ul style="list-style-type: none"> • Provides an organized system of data collection and retrieval resulting in the linkage of published research with clinical care, thereby improving the quality of care through outcomes measurement
5. Research and epidemiological studies	<ul style="list-style-type: none"> • Allows the collection and reporting of basic health statistics • Ensures a high-quality database for accurate clinical and statistical data
6. Healthcare claims	<ul style="list-style-type: none"> • Provides data that are used in designing payment systems and determining the correct payment for healthcare services • Identifies fraudulent or abusive practices
7. Public health	<ul style="list-style-type: none"> • Provides data that are used in monitoring public health and risks
8. Management	<ul style="list-style-type: none"> • Makes available information that can be used to improve clinical, financial, and administrative performance

Two other related terms, *ontology* and *reference terminology*, are also important to understand in context of clinical terminologies for the EHR. An ontology is a common vocabulary organized by meaning that allows for an understanding of the structure of descriptive information, which helps to facilitate interoperability. A reference terminology is a set of concepts and relationships that provides a common consultation point for comparison and aggregation of data about the entire healthcare process, recorded by multiple individuals, systems, or institutions. A

reference terminology is a form of ontology. ICD-9-CM is not an ontology because it does not include clear definitions of terms, nor does it define relationships between terms. So, while it might be considered to have a defined vocabulary, ICD-9-CM does not include definitions for shared meaning. In contrast, SNOMED CT is considered an ontology because it includes both a defined vocabulary and defined relationships.

Even though there are slight differences in the definitions of terminology and vocabulary, the terms are frequently used interchangeably.

Differences among Vocabulary, Terminology, and Classification Systems

Considering the definitions, a vocabulary or a terminology provides a way to input clinical data into a record. That is, it is intended to cover a particular subject (clinical practice) and include the smallest details. The purpose of a classification is to group or categorize the details. A classification is designed to provide output and not to be used as an input device.

Table 1.2 shows some differences among vocabularies, terminologies, and classification systems based on the chosen goal and targeted user.

Data Sets and Data Interchange Standards for Healthcare

In addition to understanding the principles of nomenclature, terminology, and classification systems, HIM professionals must be educated in data set and data interchange standards. A portion of the professional definition of HIM is the statement that HIM professionals manage healthcare data and information resources (AHIMA 2001). To succeed in meeting this requirement, expertise in various types of data, data sets, and standards used in the exchange of data is needed. And although some data standards, such as the Uniform Hospital Discharge Data Set (UHDDS), have been in existence since the late 1960s, others have been created expressly for use in an electronic world, such as the Digital Imaging and Communications in Medicine (DICOM) standard.

Having standard vocabularies, terminologies, and classifications available means that the numerous bits of data contained in the health record can be coded and shared internally and externally. But as HIM professionals know, not everyone needs exactly the same set of data. Data set standards exist for a variety of purposes. For example, the

UHDDS is considered a core data set for hospital reporting. Vocabularies, terminologies, and classifications form the basis of all coded data sets and provide the data structure required for a fully functional EHR.

Data set standards, along with those required for the electronic exchange of data, also are evolving as the transition from paper-based records to an EHR occurs. Although HIM professionals may have heard of the acronyms *PCDS*, *HL7*, *DICOM*, or *NCPCDP*, a broader understanding of these and other data sets and data interchange standards is necessary to understand how interoperability will happen.

Use of Vocabulary, Terminology, and Classification Systems in an EHR

According to the e-HIM Task Force report titled “A Vision of the e-HIM® Future,” the future state of health information is electronic, patient centered, comprehensive, longitudinal, accessible, and credible (AHIMA 2003).

In addition, IOM’s 2003 report states that an EHR system includes the following:

- Longitudinal collection of electronic health information for and about persons, where health information is defined as information pertaining to the health of an individual or healthcare provided to an individual
- Immediate electronic access to person- and population-level information by authorized, and only authorized, users
- Provision of knowledge and decision support that enhance the quality, safety, and efficiency of patient care
- Support of efficient processes for healthcare delivery (critical building blocks of an EHR system are the EHRs maintained by providers and individuals)

Table 1.2. Differences among vocabulary, terminology, and classification systems based on the chosen goal and targeted users

	Chosen Goal	Users
Vocabulary or terminology	To facilitate electronic data collection at the point of care	<ul style="list-style-type: none"> • Healthcare providers • Consumers
Vocabulary or terminology	To capture the detail of diagnostic studies, history and physical examinations, visit notes, ancillary department information, nursing notes, vital signs, outcomes measures, and any other clinically relevant observations about the patient	<ul style="list-style-type: none"> • Healthcare providers
Vocabulary or terminology	To allow many different sites and different providers the ability to send and receive medical data in an understandable and usable manner, thereby speeding care delivery and reducing duplicate testing and duplicate prescribing	<ul style="list-style-type: none"> • Healthcare providers • IS personnel
Vocabulary or terminology	To improve the quality of healthcare through the effective utilization of information found in other information management systems	<ul style="list-style-type: none"> • Healthcare providers • IS personnel
Vocabulary or terminology	To allow the computer to manipulate standardized data and find information relevant to individual patients for the purpose of producing automatic reminders or alerts	<ul style="list-style-type: none"> • IS personnel • Healthcare providers
Vocabulary or terminology	To permit the retrieval of relevant data, information, and knowledge for the purpose of generating patient-specific assessments or recommendations designed to aid clinicians in making clinical decisions	<ul style="list-style-type: none"> • IS personnel • Healthcare providers
Vocabulary or terminology	To provide an organized system of data collection and retrieval resulting in the linkage of published research with clinical care, thereby improving the quality of care through outcomes measurement	<ul style="list-style-type: none"> • Data analysts • Quality management personnel • Utilization management personnel
Classification	To provide data to consumers on costs and outcomes of treatment options	<ul style="list-style-type: none"> • Consumers
Classification	To allow collection and reporting of basic health statistics	<ul style="list-style-type: none"> • Researchers • Epidemiologists
Classification	To ensure a high-quality database for accurate clinical and statistical data	<ul style="list-style-type: none"> • Data analysts
Classification	To provide data that are used in designing payment systems and determining the correct payment for healthcare services	<ul style="list-style-type: none"> • Accounting personnel • Billing personnel • Payers
Classification	To identify fraudulent or abusive practices	<ul style="list-style-type: none"> • Compliance personnel • Auditors
Classification	To provide data that are used in monitoring public health and risks	<ul style="list-style-type: none"> • Public health
Classification	To make available information that can be used to improve clinical, financial, and administrative performance	<ul style="list-style-type: none"> • Management

With this as the future of HIM, it is important to understand how vocabulary, terminology, and classification systems integrate into this electronic environment.

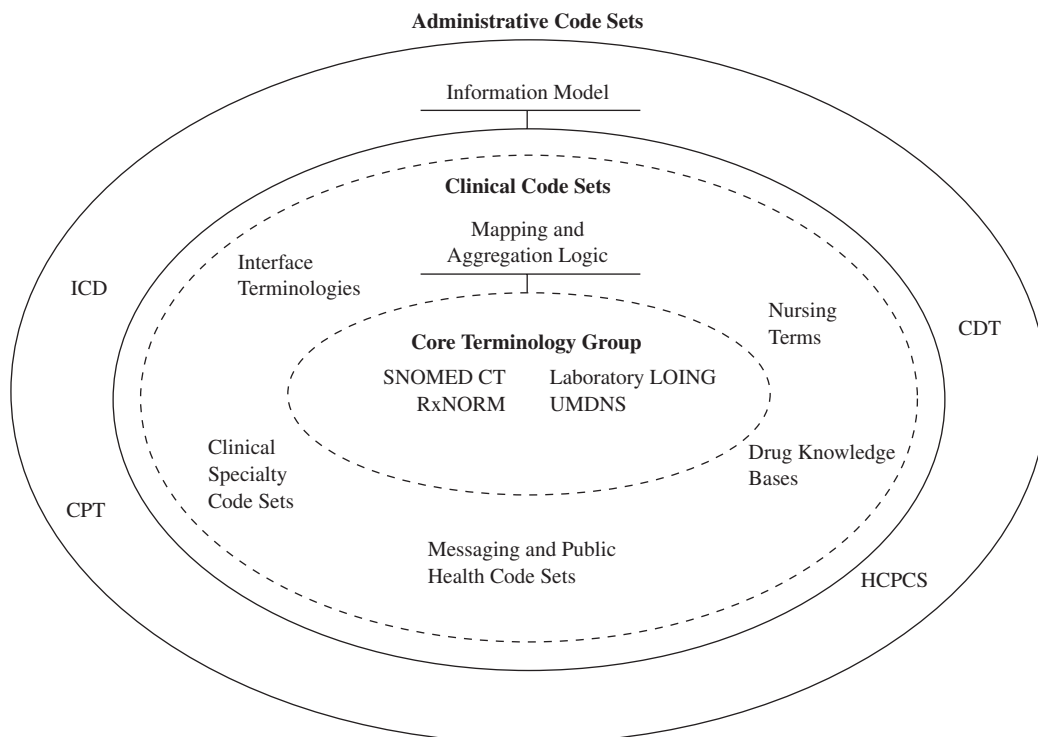
According to Amatayakul, “On a practical level for providers seeking to implement an EHR system, a controlled vocabulary would support a data structure that promotes standardization of terms. The vocabulary aids data capture, enhances database management, and helps build a data warehouse for use in executive and clinical decision support. The vocabulary also supports contributions to standard data sets, required either by law or for voluntary participation in research studies, registries, the development of clinical practice guidelines, and many other uses” (2004, 157). (In Amatayakul’s book, the terms *vocabulary* and *ter-*

minology are used as synonyms to mean a body of terms and their definitions.)

The practicality of usage of vocabularies, terminologies, and classifications within EHRs is tied to the applications that employ these systems. Thus, more than one vocabulary, terminology, and classification system is necessary to meet the needs of the applications that contain them. For example, multiple systems have been recommended as U.S. government-wide standards by the Consolidated Health Informatics eGov initiative and/or as core terminology standards by the National Committee on Vital and Health Statistics (NCVHS).

Following were the general criteria used by NCVHS to make its recommendations for the patient medical record information terminology standards:

Figure 1.1. Relationships of various vocabulary, terminology, and classification systems



- The extent to which the standard enables interoperability between information systems
- The ability of the standard to facilitate the comparability of data
- The aspects of the standard that support data quality, accountability, and integrity
- The degree of market acceptance of the standard

During a NCVHS Subcommittee on Standards and Security meeting in August 2002, Dr. James R. Campbell presented a trilevel model showing the relationships of various vocabulary, terminology, and classification systems. He defined the layers as follows:

1. Core convergent reference terminology will deliver accurate patient records, improvement of clinical outcomes and decision support.
2. Modeled departmental, professional, and legacy terminology will provide for clinical system integration and departmental function.
3. Mapped administrative and financial classifications and codes will offer administrative and governmental reporting.

Figure 1.1 from the IOM report, *Patient Safety: Achieving a New Standard for Care*, is a modification of what Dr. Campbell presented at the NCVHS meeting.

With so many systems available, and some of them being quite large, a centralized location is needed in order to maintain consistent use. One such centralized database of vocabulary, terminology, and classification systems is the Unified Medical Language System (UMLS), a project of the National Library of Medicine. The UMLS's Metathesaurus includes more than a hundred vocabularies, terminologies, and classifications, some in multiple languages. Many of the terminology and classification systems mentioned in this book are included in the UMLS.

Summary

With the coding of healthcare encounters one of the core functions of health information management, vocabulary, terminology, and classification systems have been integral to our work for a very long time. However, familiarity with what works in a paper-based environment, though necessary, is not adequate in an electronic one. Having better ways and means to understand, organize, and analyze health data will increase as the automation of health information continues. Many vocabulary, terminology, and classification systems will be necessary to meet the needs of the various electronic health record (EHR) applications.

In addition, to arrive at meaningful data comparisons, standard data representation of clinical and administrative information is necessary. Uniform data sets and standards for the electronic exchange of health record information results in the ability to send and receive medical and administrative data in an understandable and usable manner.

Data sets are required for data capture, to enhance database management, and to help build a data warehouse for use in executive and clinical decision support. Moreover, to access, combine, manipulate, and share data for various purposes, data interchange standards are necessary. The encoded data for codified data sets needed for a number of uses and by a number of users requires more than one system. Therefore HIM professionals need to understand the differences among a vocabulary, terminology, and classification, the need for each, and how they can work together in an EHR.

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