Four Options for Implementing SNOMED

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by Jack Bowie, ScD

HIM departments looking to employ SNOMED terminology have fourbasic application options. The final choice depends heavily on their ITdepartments.

SNOMED CT offers significant benefits in the structured codification of clinical activity, and it will be the foundation of many emerging applications in medical error reduction, clinical decision support, cost management, and outcomes analysis. HIM departments interested in employing the terminology need to know how it is available and what resources are required to employ it. This article explores the four basic options for integrating SNOMED into HIM operations.

SNOMED CT is a large, comprehensive, and fine-grained representation of clinical concepts. In contrast, taxonomies more familiar to HIM professionals, such as ICD-9-CM and CPT, are relatively smaller and focused on categorizing clinical situations or events. As a measure of its complexity, if a SNOMED CT reference manual similar to a CPT professional guide were produced, it would take up a shelf more than six feet long.

Obviously, browsing a printed document is not a viable method for working with SNOMED CT. Some type of electronic or computer-based application is required. HIM departments have four options when it comes to employing SNOMED CT data (and associated products and services):

- The National Library of Medicine (NLM)
- SNOMED International
- Terminology vendors
- HIM application vendors

The sections below explore the advantages and disadvantages of acquiring SNOMED CT from each source, paying particular attention to what SNOMED products and services are provided and what HIM resources are necessary to make use of these products.

The National Library of Medicine

The NLM is the world's largest medical library. Most healthcare professionals are familiar with the NLM through its popular PubMed and MedLine reference services.

Another major NLM program, however, is the Unified Medical Language System, or UMLS. The objective of the UMLS, according to the NLM, is "to facilitate the development of computer systems that behave as if they 'understand' the meaning of the language of biomedicine and health. To that end, NLM produces and distributes the UMLS Knowledge Sources (databases) and associated software tools (programs) for use by system developers in building or enhancing electronic information systems that create, process, retrieve, integrate, and/or aggregate biomedical and health data and information, as well as in informatics research."[1]

One of the major components of the UMLS is the Metathesaurus, a comprehensive database of biomedical and health-related concepts, their various names, and the relationships among them. The Metathesaurus is built from the collection and analysis of more than 100 different terminologies encompassing the leading vocabularies, classifications, code sets, and lists of terms used in healthcare. Researchers, informaticists, and system application developers use the Metathesaurus to assist in clinical data standardization, analysis, and retrieval.

In July 2003 the NLM (on behalf of the US Department of Health and Human Services) signed a five-year contract to license and supply SNOMED CT for use in healthcare information systems. Because of this agreement, any US organization can freely acquire and use SNOMED CT from the Metathesaurus.

The Metathesaurus is provided as a set of data files; the current size of these files is approximately 2.5 GB compressed, or 16 GB uncompressed. Also provided with the Metathesaurus is a UMLS application, MetamorphoSys, which can be used to extract individual terminology sources, such as SNOMED CT.

Although the NLM provides extensive documentation on the format and structure of the data files, these files must be loaded into a computer application to be effectively viewed and understood. The size and structure of the integrated Metathesaurus files (or even those of individual terminologies such as SNOMED CT) preclude their loading into familiar desktop applications such as Microsoft Excel.

Therefore, while the NLM is the "lowest cost" source for SNOMED CT, an HIM organization wishing to use the Metathesaurus would typically require expertise in and access to resources in database administration, systems integration, or application development to make UMLS terminologies available to coders. IT expertise, either from the HIM department or other IT organizations, must be available to take these files and integrate them into a database and user applications. If this expertise is available, however, the Metathesaurus provides access to all major terminologies (including SNOMED CT) as well as linkages between these terminologies (e.g., between SNOMED CT and ICD-9-CM).

SNOMED International

SNOMED International, a division of the College of American Pathologists (CAP), is the owner and developer of SNOMED CT. For more than 40 years, SNOMED International has led a multidisciplinary effort of clinical content experts, medical informaticists, representatives from clinical specialties and government agencies, physicians, and nurses in the development of a standardized terminology for medicine. As CAP states, SNOMED's goal is the development of a "seamless infrastructure of worldwide care while integrating an overwhelming amount of clinical data."[2]

Like NLM, SNOMED International offers data files and associated documentation—but only for the SNOMED CT terminology. (Links between SNOMED CT and ICD-9-CM are also provided.) The organization also offers tools and services to assist organizations with more rapid adoption of SNOMED CT. Software applications such as a stand-alone browser and subset editors are available for download, giving HIM users immediate access to the terminology. Also available are "developer toolkits" designed for application developers and programmers, which include supplementary data files and technical documentation to assist with integrating SNOMED CT into more advanced clinical applications. In addition, the organization offers on-site training programs.

Finally, SNOMED International has a variety of SNOMED CT educational materials, ranging from an introductory user guide to CD-ROM–based training courses that can assist nontechnical professionals in better understanding the capabilities, uses, design, and content of SNOMED CT.

With this array of offerings, SNOMED International gives HIM departments more assistance in the acquisition and integration of SNOMED CT than the NLM, at relatively moderate prices. For all but the simplest browser use, however, internal IT resources will still be needed to create applications that integrate SNOMED CT into the HIM coding process. This requirement will limit use of both these sources by all but the more technically sophisticated provider organizations.

Terminology Vendors

To meet the need for easier access to terminology data by both end users and application developers, a number of companies offer product lines focused exclusively on terminologies. These terminology vendors typically integrate the specific terminologies a prospective customer requires, such as SNOMED CT, ICD-9-CM, and CPT, into a usable whole. Their products may be easily loadable data sets, specialized components, or complete applications that enable users in a particular market area to view, organize (subset), extract, and compare terminologies of interest. Some products may even be able to share data with existing coding applications.

Frequently, these packages also provide mechanisms for the extension (also called localization) of standard terminologies. For example, an organization may have a local history of using the phrase "Black Creek disease" for amoebic dysentery. A terminology editing tool could be used to associate this phrase as a synonym with the SNOMED CT concept "amoebic dysentery (disorder)." Subsequent searches for encoding of "Black Creek disease" would return this SNOMED concept.

As well as providing terminology browsing, integration, and extension applications, these vendors typically offer one of a number of application programming interfaces (APIs) to facilitate the integration of their software and data into an organization's software applications. For departments or organizations with robust IT capabilities, these APIs make integration of SNOMED CT and other terminologies into applications much easier compared with the "data-only" products offered by the NLM and SNOMED International. Smaller organizations that do not have access to on-site programming expertise, on the other hand, will likely be limited to using SNOMED solely within the terminology vendor's applications.

One of the main benefits of using terminology vendors is that they insulate their customers from the problems of acquiring and updating terminologies as they change. Most terminologies are revised at least once a year; the UMLS Metathesaurus is updated quarterly and SNOMED CT semi-annually. This update and reintegration process can be a significant burden on small IT departments, a burden that vendor terminology offerings can reduce or eliminate.

The costs associated with using terminology vendor products will definitely be greater than the NLM or SNOMED International approaches. However, the terminology market is increasingly competitive, and the vendor approach may still be cost-effective depending on an organization's available IT expertise and project demands. The benefits to the organization are more functional terminology software products, more comprehensive terminology content, and more customized services (e.g., incorporation of a customer's local vocabularies and assistance with application development).

Other factors that should offset the cost to some extent are the release of new products targeted at the coding market or the fact that some vendors currently offer products based on new technologies, such as Web services. The latter products lower cost of ownership through subscription "pay-as-you-use" pricing and reduced installation requirements.

HIM Application Vendors

The simplest way for an HIM department to use SNOMED CT is to purchase a coding application that includes SNOMED capabilities. Unfortunately, few of the current coding application vendors have announced SNOMED CT additions. With the exception of clinical pathology, where SNOMED has been used extensively in the past, most HIM coding is performed for reimbursement, an area in which SNOMED has not, to date, played a significant role. Thus, few vendors have made the SNOMED terminology available in their applications.

This situation may be changing for two primary reasons. First, the endorsement of SNOMED CT by the US Department of Health and Human Services, the National Committee on Health and Vital Statistics, the Consolidated Health Initiative, and other federal agencies will raise its visibility and credibility as an option for coding and reporting.

Second, the increasing adoption of computerized systems within provider organizations, such as electronic health record products, will result in the capture of clinical (encounter and discharge) information in standard formats using terminologies such as SNOMED CT. As HIM departments are asked to review and encode these structured data reports, knowledge of and familiarity with SNOMED CT will be required. Although tables, or cross mappings, exist between SNOMED CT and reimbursement terminologies such as ICD-9-CM and CPT, these mappings at best help guide the coding process; HIM review is still required to verify and correct preliminary code assignment to ensure compliance with complex reimbursement rules and regulations.

Moving Forward

In short, as SNOMED-encoded information becomes more prevalent in hospitals and clinics, HIM departments should work with their coding application vendors to see that this important terminology is integrated within their products.

HIM departments must carefully evaluate the relative costs and benefits of moving to embrace SNOMED CT as another primary coding system. They should consider both short- and long-term needs for the SNOMED CT terminology and develop a plan to bring HIM staff to the required level of knowledge. Then, after evaluating available internal IT resources, the

considerations discussed in this article can be used as a guide to selecting the SNOMED source options that are most appropriate for each situation.

Notes

1. The National Library of Medicine. "About the UMLS Resources." Available online at www.nlm.nih.gov/research/umls/about_umls.html.
2. SNOMED International. "Welcome." Available online at www.snomed.org.

Resources

National Library of Medicine, Metathesaurus. Available on-line at www.nlm.nih.gov/research/umls.

SNOMED International. Available online at www.snomed.org.

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