Consolidated Health Informatics

Standards Adoption Recommendation

Diagnosis and Problem List

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Summary

Domain: Diagnosis and Problem Lists

Standards Adoption Recommendation:
Systematized Nomenclature of Medicine Clinical Terms® (SNOMED CT®)

SCOPE
Diagnosis/Problem List is broadly defined as a series of brief statements that catalog a patient's medical, nursing, dental, social, preventative and psychiatric events and issues that are relevant to that patient's health care (e.g. signs, symptoms, and defined conditions).

RECOMMENDATION
SNOMED CT®.

OWNERSHIP
SNOMED CT® is a copyrighted work of the College of American Pathologists (CAP).

APPROVALS AND ACCREDITATIONS
The CAP is an ANSI Standards Development Organization. The SNOMED CT®. Healthcare Terminology Structure is ANSI approved.

ACQUISITION AND COST
The CAP and the National Library of Medicine (NLM) entered into an agreement to provide SNOMED CT® core content (English and Spanish language editions) via the UMLS® at no charge to those who execute a license agreement. This agreement is for healthcare applications and uses within the US and any application of use of SNOMED CT® by any US government facility or office, whether permanent or temporary, wherever located. This no-charge feature has been supported by HHS (NLM, NIH/OD, CDC, ASPE, AHRQ, CMS, FDA, HIS, SAMSHA, HRSA), DoD and VA.

Health care entities can also choose to purchase SNOMED CT® as a stand-alone terminology directly from SNOMED® International at (http://www.snomed.org)

REVISION HISTORY

DATE	VERSION	COMMENT
11/25/2003	Public Document	Final Recommendation
2/24/2006	1.1	AHRQ reference added

Part I – Team & Domain Scope Identification

Target Vocabulary Domain

Common name used to describe the clinical/medical domain or messaging standard requirement that has been examined.

Diagnosis and Problem List

Describe the specific purpose/primary use of this standard in the federal health care sector (100 words or less).

Diagnosis/Problem List is broadly defined as a series of brief statements that catalog a patient's medical, nursing, dental, social, preventative and psychiatric events and issues that are relevant to that patient's health care (e.g. signs, symptoms, and defined conditions).

Sub-domains *Identify/dissect the domain into sub-domains, if any. For each, indicate if standards recommendations are or are not included in the scope of this recommendation.*

Domain/Sub-domain	In-Scope (Y/N)
Clinical Diagnosis/Problems	Y
Subjective Symptoms/Observed Findings	Y
Nursing Diagnoses	N*
Modifiers and Descriptors	N
Synonyms	Y
Dental	N
Alternative Medicine	N

**To be addressed by nursing domain workgroup*

Note about Modifiers: Many modifiers or "attributes" of a diagnosis or problem often accompany the concept itself. These attributes are as a rule not well defined or standardized. Furthermore, the attributes represent the diagnosis at just one of many possible arbitrary slices in time (i.e., "final" is truly in the eyes of the beholder). The term "Modifiers and Descriptors" above refers to a grouping of these terms rather than attempting to list each specific one. The scope of this report does not cover any of these attributes.

There will be reasonable debate among informaticists about exactly how to define each, which are truly distinct attributes and which overlap, what is each one's proper domain values, whether it should be handled in a reference terminology as defined relationships or within the information model or a bit of both, etc.

Diagnosis Descriptors, Modifiers, Related Information

These may either be handled as a defined relationship to an attribute within the terminology or within the information model as a classic attribute, or a bit of both. For now, the workgroup considered these out of scope and is including here only to note they exist and to indicate they will have to be further developed within a terminology (e.g., SNOMED-CT®) or within the information model for an IT system.

	Axis and/or Modifier (change to Stan's recommended change?)
1.	Primary versus secondary
2.	Severity (e.g., mild, moderate, severe)
3.	Stage (e.g., cancer - similar to, but not exactly the same as severity)
4.	Chronicity (e.g., acute, subacute, chronic)
5.	Certainty (e.g., likely, possible or R/O, doubtful, confirmed)
6.	Status (e.g., active, in remission, improved, resolved)
7.	Active/Inactive (e.g., problem list placement)
8.	Preliminary versus final (Extremely ill-defined area. E.g., for inpatient encounters this may be defined as whether or not the primary physician certified a medical records generated discharge diagnosis, a pathologist has a different set of standards for defining preliminary versus final for a pathology readings, for dictations this may mean whether or not a diagnosis has been reviewed and certified by the originator, etc.)
9.	Is the diagnosis a purpose for this encounter, or a problem on this patient's problem list (most systems handle this within their model)
10.	Originator (if person, associated discipline, etc.)
11.	Date of onset
12.	Date of clinical recognition
13.	Date of entry
14.	Date of modification
15.	Underlying cause
16.	First visit versus re-visit
17.	Various specific possible relationships (e.g., related to Agent Orange, Ionizing Radiation, Persian Gulf Exposure, etc.)
18.	Provider narrative
19.	Relationship to various multiple hierarchies (usually handled within the RT)
20.	Comments
21.	Null condition (e.g., right upper quadrant pain not due to gall bladder disease, headache not due to subarachnoid bleed)

Information Exchange Requirements (IERs) *Using the table at appendix A, list the IERs involved when using this vocabulary.*

Customer Health Care Information
Care Management Information
Customer Risk Factors

Case Management Information
Population Member Health Data
Customer Approved Care Plan

Team Members *Team members' names and agency names with phone numbers.*

Name	Agency/Department
Beth Acker (Co-lead)	**VA**
Karla Porter (Co-lead)	**VA**
Elizabeth Franchi	VA
Syed Tirmizi, MD	VA
Albert Toya	HHS/IHS
Stanley Griffith, MD	HHS/IHS
Donna Pickett	HHS/CDC/NCHS
Jorge Ferrer, MD	HHS/CMS
Cynthia Wark	HHS/CMS

Work Period *Dates work began/ended.*

Start	End
July 30, 2003	October 14, 2003

Part II – Standards Adoption Recommendation

Recommendation *Identify the solution recommended.*

The workgroup recommends the adoption of Systematized Nomenclature Medicine-Clinical Terms® (SNOMED CT®), a comprehensive health care reference terminology that includes concepts for diagnoses, findings and disorders.

The specific locations in the SNOMED CT® hierarchy that form the basis of our recommendation is:

The workgroup anticipates that the SNOMED CT® concept groupings "disorders" and "findings" will be the primary source for diagnoses and problem list entries, although it also anticipates that most, if not all of the other concept groupings (e.g., "body structure," "organism," "social context") will also be used instead or coordinated with the former to accurately express a diagnosis or problem list entry.

Diseases
Findings

Ownership Structure *Describe who "owns" the standard, how it is managed and controlled.*

Recently, the National Library of Medicine (NLM) enacted an agreement with the College of American Pathologists (CAP) for the distribution of SNOMED CT® that effectively makes it a perpetual Category 0 code set in the Unified Medical Language System® (UMLS®) for use in the United States. The CAP owns SNOMED CT® and maintains both the content and structure of the terminology. (See www.snomed.org for more information.)

UMLS is maintained by the NLM and is available at no charge to those who execute a license agreement. They have an extensive internal and contracted group that maintains content. (see www.nlm.nih.gov/research/umls/ for more information.)

Terminology found in both the UMLS® and SNOMED CT® extends beyond the domain of interventions and procedures. It is only the domain of interventions and procedures to which this recommendation applies. The specific axes are enumerated above.

Summary Basis for Recommendation *Summarize the team's basis for making the recommendation (300 words or less).*

The Workgroup compiled a list of six terminologies and code sets that included procedure code sets adopted under HIPAA. The team used, as a starting point, the criteria for PMRI put forth by the Subcommittee on Standards and Security of the NCVHS (concept orientation, concept permanence, non-ambiguity and explicit version

Ids). The CHI workgroup then collected information on additional items (Content coverage, scope, settings, ownership, cost/availability, usage, mappings, and other relevant considerations) to evaluate all candidate terminologies.

The main distinction between the analysis conducted by the CHI workgroup is that the NCVHS SSS used the criteria to identify terminologies that would be considered further for recommendation as a core PMRI terminology and CHI considered all criteria and information gathered for additional items to make recommendations. This resulted in identification of the "best" solution for the government.

The Diagnosis and Problem list code sets that were evaluated by NCVHS SSS did not meet all of the essential criteria for patient medical record terminologies, whereas SNOMED CT® and MEDCIN ®reference terminologies met all essential criteria. Content coverage in MEDCIN® and ICD-10-CM is limited to diagnoses used by physicians for the purpose of generating bills. SNOMED CT® has a more comprehensive content coverage including diagnoses and problems identified by nurses and allied health care providers, therapists, social workers, dieticians, etc. The MEDCIN® reference terminology is available for a small fee, whereas SNOMED CT® is now available to all US users without additional charge via the UMLS® resulting from the CAP/NLM contract. Therefore, the overall analysis of available alternatives resulted in SNOMED CT® being selected as the best choice for the Federal Government to represent a patient's diagnosis and problem lists. This will need to be used in conjunction with administrative code sets used for billing purposes under HIPAA and with interface terminologies (developed by a host of other parties such as vendors, government agencies, etc.)

Conditional Recommendation *If this is a conditional recommendation, describe conditions upon which the recommendation is predicated.*

No conditions apply to the above recommendation.

The workgroup anticipates that the SNOMED CT® concept groupings "disorders" and "findings" will be the primary source for diagnoses and problem list entries, although it also anticipates that most, if not all of the other concept groupings (e.g., "body structure," "organism," "social context") will also be used instead or coordinated with the former to accurately express a diagnosis or problem list entry.

The entirety of SNOMED CT® is not being recommended, only the content that contains diagnosis/problem list concepts as modeled/integrated from the source PMRI terminologies. The workgroup would like to see mapping of the diagnosis/problem list terminologies in the UMLS® to SNOMED CT® to be maintained, validated, and distributed through the UMLS®. The workgroup recognizes the importance of the collaboration of the source diagnosis/problem list terminology owners and SNOMED CT® for diagnosis/problem list with the appropriate inclusion and representation of diagnostic terms within SNOMED CT®.

For example: additional work with DSM-IV™ for Mental Health and MedDRA® for

adverse event reporting as annotated above.

Approvals & Accreditations

Indicate the status of various accreditations and approvals:

Approvals & Accreditations	Yes/Approved	Applied	Not Approved
Full SDO Ballot			
ANSI	Y		

Options Considered *Inventory solution options considered and summarize the basis for not recommending the alternative(s). SNOMED must be specifically discussed.*

SNOMED CT® – Recommended.
ICD-9-CM – The health care industry is planning to migrate to ICD-10-CM therefore the workgroup confined its review to ICD-10-CM
ICD-10-CM -- ICD-10-CM received a score of "0" in the PMRI Criteria of concept orientation and non-ambiguity. This was not an entirely unexpected outcome of the analysis since ICD-10 is designed primarily as a statistical classification rather than PMRI, or clinical terminology.
DSM-IV™ – Considered an important terminology that should be mapped to, but does not meet the essential technical criteria needed to represent the clinical domains required for a complete PMRI terminology standard.
MEDCIN® -- MEDCIN® provides a very valuable addition to our need for interface terminologies at the point of care. As an interface terminology (rather than an underlying core PMRI reference terminology) it does and should have special features for purposes that an underlying PMRI terminology may not. The scope of this recommendation is only for a reference terminology, therefore the interface (or application) part of MEDCIN® was not evaluated. We do concur with the NCVHS SSS recommendation that mappings between the underlying core PMRI terminologies and various interface terminologies for varying interface needs, such as MEDCIN®, be supported.
ICPC -- ICPC received a score of "0" for concept orientation and its score for concept permanence could not be ascertained.
MedDRA® – MedDRA® does not contain comprehensive coverage of diagnoses and problems to the extent of SNOMED CT®. Recommend additional work between MedDRA® and SNOMED CT® to address mapping needs for adverse event reporting.

Current Deployment

Summarize the degree of market penetration today; i.e., where is this solution installed

today?

The responses below apply to SNOMED CT®.

What number of or percentage of relevant vendors have adopted the standard?

The Workgroup had active discussion regarding the following table. We note that the table represents results regarding vendor intent. We could not find reliable information on the actual use of SNOMED CT® or earlier versions of SNOMED CT®. Hence, inferences regarding actual current use should not be made.

Enterprise-wide Computerized Patient Record Systems*:*

Vendor	**% Market**	**Use SNOMED**
Siemens	17	Yes
McKesson	16	Yes
Meditech	13	Yes
Cerner	10	Yes
IDX	6	Yes
Eclipsys	5	Yes
Epic	3	Yes
Per-Se	2	No
HC Mgmt	6	No
Achieve	4	No
Other	14	No

64% of the Computerized Patient Record Vendors are currently developing systems using SNOMED CT®

What number or percentage of healthcare institutions have adopted the standard?
Unknown. Number not available through CAP.

What number or percentage of federal agencies have adopted the standard?
See above.

Is the standard used in other countries?
SNOMED CT® as a whole is the national standard in the UK.

Are there other relevant indicators of market acceptance?
Market share information provided by CAP indicates that 79% of computerized patient record systems and 85% of laboratory systems vendors have made licensing commitment. Following are other relevant indicators of SNOMED's® market acceptance:

- Both HL7® and DICOM® have formally recognized SNOMED® as a standard code set within their messaging standard. SNOMED® is embedded in the DICOM® Structured Reporting Standard for Wave Forms.
- The American Veterinary Medical Association (AVMA) has adopted SNOMED CT® as the official terminology for veterinary practice in the US. It has been

used extensively by the veterinary community in a collaborative product to track health care data on a national basis.

- The American Nurses Association (ANA) has recognized SNOMED CT® as a terminology that supports nursing practice, specifically: nursing assessments, plans, interventions and outcomes.

WASPalm, the World Association of Societies of Pathology and Laboratory Medicine, representing 59 member societies throughout the world, has endorsed SNOMED® as the preferred reference language for laboratory clinicians.

Part III – Adoption & Deployment Information

Provide all information gathered in the course of making the recommendation that may assist with adoption of the standard in the federal health care sector. This information will support the work of an implementation team.

Existing Need & Use Environment

Measure the need for this standard and the extent of existing exchange among federal users. Provide information regarding federal departments and agencies use or non-use of this health information in paper or electronic form, summarize their primary reason for using the information, and indicate if they exchange the information internally or externally with other federal or non-federal entities.

Column A: Agency or Department Identity (name)
Column B: Use data in this domain today? (Y or N)
Column C: Is use of data a core mission requirement? (Y or N)
Column D: Exchange with others in federal sector now? (Y or N)
Column E: Currently exchange paper or electronic (P, E, B (both), N/Ap)
Column F: Name of paper/electronic vocabulary, if any (name)
Column G: Basis/purposes for data use (research, patient care, benefits)

Department/Agency	B	C	D	E	F	G
Department of Veterans Affairs	Y	Y	Y	B		Patient
Department of Defense	Y	Y	Y	B		Patient
HHS Office of the Secretary						
Administration for Children and Families (ACF)						
Administration on Aging (AOA)						
Agency for Healthcare Research and Quality (AHRQ)						
Agency for Toxic Substances and Disease Registry (ATSDR)						
Centers for Disease Control and Prevention (CDC)	Y	Y		B		Public Health
Centers for Medicare						

and Medicaid Services (CMS)						
Food and Drug Administration (FDA)						
Health Resources and Services Administration (HRSA)						
Indian Health Service (IHS)		Y	Y	Y	ICD-9	Patient care, reimbursement, public health care, outcome measurement, research, etc.
National Institutes of Health (NIH)	Y			P		Research
Substance Abuse and Mental Health Services Administration (SAMHSA)						
Social Security Administration						
Department of Agriculture						
State Department						
US Agency for International Development						
Justice Department						
Treasury Department						
Department of Education						
General Services Administration						
Environmental Protection Agency						
Department of Housing & Urban Development						
Department of Transportation						
Homeland Security						

Number of Terms

Quantify the number of vocabulary terms, range of terms or other order of magnitude.

There are approximately 344,549 concepts and 913,696 terms in the latest release of SNOMED CT®.

How often are terms updated?

Semiannually (January 31st and July 31st)

Range of Coverage

Within the recommended vocabulary, what portions of the standard are complete and can be implemented now? (300 words or less)

No terminology is complete, but SNOMED CT® is sufficiently complete in the areas of diagnoses and problem lists, especially in comparison to other available terminologies. As of the July 2003 release, the Disease hierarchy has 73,171 concepts and the Findings hierarchy has 40,106 concepts.

However, we still need to certify that an accurate mapping exists between SNOMED CT® and ICD-9/10-CM, validated by both maintaining organizations, before we should state that it can be implemented now.

Acquisition: *How are the data sets/codes acquired and use licensed?*

An agreement has been signed between the U.S. Government and the College of American Pathologists (CAP) to distribute SNOMED C®T in all future releases of the Unified Medical Language System® (UMLS®) Metathesaurus. UMLS® license terms allow use for all patient record uses and messaging. In the US, SNOMED CT® will be one of the Category 0 codesets. This permits free distribution and use in the US.

All U.S. users who obtain SNOMED CT® via the National Library of Medicine's UMLS® Metathesaurus® may use all SNOMED CT® content delivered under the contract in perpetuity. This includes use by U.S. commercial companies, in products sold to U.S. customers. (A separate license is needed to sell products including SNOMED CT® to non-U.S. users).

Cost

What is the direct cost to obtain permission to use the data sets/codes? (licensure, acquisition, other external data sets required, training and education, updates and maintenance, etc.)

There is no acquisition cost. The agreement between the CAP and National Library of Medicine permits all U.S. users who obtain SNOMED CT® via the UMLS® Metathesaurus® to use all SNOMED CT® content free of charge in perpetuity.

We have no knowledge of the cost of implementing SNOMED CT® as a source terminology from UMLS® but it is our understanding that it can be extracted easily and then implemented as the current stand-alone version is. Successful implementation of the current version of SNOMED CT® requires knowledge of the file and data structure that can be obtained from extensive provided documentation or training courses, offered for a fee, on-site or at the CAP offices on a regular basis. Similarly, full use of the hierarchies and relationships in SNOMED CT® also require extensive training, education and in many cases extensive software changes. The United Kingdom has been working with CAP for 3+ years on implementation, Kaiser Permenate in US has for 5+ years, and various other prototype sites exist. To our knowledge, none have successfully used all features of SNOMED CT®. Hence, no estimates on cost in this area can be offered.

Systems Requirements

Is the standard associated with or limited to a specific hardware or software technology or other protocol?

SNOMED CT® is both vendor and platform neutral, and can thus be implemented into systems based on any technology.

Guidance: *What public domain and implementation and user guides, implementation tools or other assistance is available and are they approved by the SDO?*

An extensive set of education material is provided as well as training courses for SNOMED CT®. Training an educational material is more limited for UMLS®. Information and current draft documents can be found at www.snomed.org.

The Workgroup notes that the implementation of any coding system for any purpose within an institution is complex and actual guidance is outside the scope of this report and may be outside the scope of the terminology provider.

Is a conformance standard specified? Are conformance tools available?

No. Discussion is under way regarding conformance-testing tools for use in the UK and

subsequent use in the US, but they are at least one to two years away.

Maintenance: *How do you coordinate inclusion and maintenance with the standards developer/owners?*

The College of American Pathologists (CAP) is an ANSI standards development organization and is the sponsor of the Terminology Structure Standard. SNOMED® International is a division of the CAP and has an integral role in maintaining this standard and SNOMED CT®'s use of it. The College has been an active participant in standard development organizations. Following is a summary of this involvement:

- ANSI: approved as an ANSI accredited standards developer; the SNOMED CT® terminology structure is ANSI approved
- American Nurses Association: SNOMED CT® has been recognized as an ANA nomenclature;
- DICOM®: Secretariat of Working Group 8 (Structured Reporting) and participant in Working Group 13 (Visible Light Images);
- HL7®: SNOMED RT® is registered and SNOMED CT® registration is in progress;
- ISO: Participation in ISO Technical Advisory Group on Health Concept Representation;
- X12: Approved as a code source for ASC X12 version 4010 for the purpose of reporting more precise terms of medical results primarily for statistical purposes in the public health system;
- NCHS: SNOMED CT® monitors and integrates updates to ICD-9-CM as available;
- NCVHS: SNOMED CT® has consistently testified and responded to NCVHS requests in its evaluation of standards. In the February, 2003 NCVHS questionnaire, SNOMED CT® was identified as the most comprehensive nomenclature;
- NQF: SNOMED CT® has frequently been in attendance at NQF hearings and has testified whenever requested. At the request of the NQF, SNOMED CT® has also identified and incorporated "never events" into the SNOMED CT® structure;
- IOM: SNOMED CT® continues to testify and monitor deliberations regarding development of data standards applicable to the collection, coding and classification of patient safety information.
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What is the process for adding new capabilities or fixes?

The SNOMED CT® International Editorial Board (SIEB) recommends content direction, which is then sent to the SNOMED CT® International Authority for approval. Proposals come from requests from individual users, user groups, professional societies, internal editorial staff, and external consultants/advisors

The process includes:

- Collection of requests for changes and enhancements

- Prioritization of requests
- Implementation of changes
- Distribution to the relevant user base
- Quality assurance of the change.

Request for changes to SNOMED CT® come from many industry sources. To date, key contributors have been the result of close working partnerships with Kaiser Permanente, a large US healthcare organization, and the UK's National Health Service. SNOMED CT® International also partners with specialty medical groups including the American Dental Association, the American Academy of Ophthalmologists, DICOM®, and the American Veterinary Medical Association. SNOMED CT® has over 200 licensees that also provide detailed suggestions about new concepts and terms. An annual User's Group is a focal point for collecting input about the overall direction, although content submissions can be made at any time. SNOMED CT® also benefits from the detailed review of the terminology conducted during the translation to other languages. The scientific experts of the SNOMED CT® team, as part of its day-to-day work with SNOMED CT®, proactively scan new developments in healthcare and clinical treatments. In addition, SNOMED CT® sponsors a series of Convergent Terminology Groups (CTGs) to advise the Editorial Board. The CTGs recommend direction and priorities for a specialty area. Example CTGs include nursing, mapping, pathology, and imaging. SNOMED CT® has developed a web-based application for submitting change requests and recommending improvements to the vocabulary. This process will provide the end-user with better management of change requests and improved communication regarding its status. The status of requests can be viewed online 24x7 and email notifications are sent to the requestor at selected checkpoints as the request is processed. The process will acknowledge submissions within 1 working day, with most requests accepted or declined within a month. This application has been in pilot with several licensees since November 2002, and is being used actively within the SNOMED CT® team. All terminology suggestions are compiled and prioritized with input of the Editorial Board. If accepted, they are then scheduled to be addressed by the SNOMED CT® Clinical Editor team for a future release. Suggestions to other components of SNOMED CT®, such as documentation or file changes, are managed by other members of the SNOMED CT® team using a similar process. Major changes to content or technical structure are researched, documented and submitted to the SNOMED CT® International Editorial Board for formal consideration. Once scheduled, the change is made, reviewed, and incorporated into the next release. History files, subsets, cross-mappings, documentation, training, and release materials are all updated to reflect the change.

What is the average time between versions?

The average time between versions of SNOMED CT® is 6 months, January and July for English editions; April and October for Spanish editions. New editions have been released less frequently. For example, SNOMED CT® has published five editions over the last 40 years. The first edition, SNOMED® for Pathology (known as SNOP®) was

developed in 1965. SNOMED® II was released in 1979, followed by SNOMED® International in 1997. SNOMED Reference Terminology® (SNOMED RT®), which revolutionized the structure of SNOMED CT®, was released in July 2000, followed by SNOMED Clinical Terms® (SNOMED CT®) in January, 2002, essentially doubling the content. There are no plans for an edition to replace SNOMED CT®. Predating the launch of SNOMED RT®, SNOMED® has issued updates (version releases) on a twice annual basis. This practice is expected to continue.

What methods or tools are used to expedite the standards development cycle?

SNOMED CT® infrastructure comprises a unified set of tools, structures and processes used to create, maintain and build upon the SNOMED CT® Core. The infrastructure includes a range of third party proprietary tools as well as CAP developed tools including the following:

SNOMED CT® Terminology Platform Tools

- Terminology Development (editor and classifier, QA tools, subset editor, release process tools, QA scripts);
- Mapping tools (mapping master);
- Content tools (editor style guides, authors web site);
- Translation tools (translation master, validator web site, memory tools);
- Documentation tool;
- Back-up/recovery.

License Deployment Tools

- License terminology tools (browser, request submission toolkits).

As an ANSI approved developer of standards, SNOMED CT® has a formalized set of procedures for the development and coordination of standards, and specifically SNOMED CT®. An integral part of this standard is the function of the SNOMED CT® International Editorial Board, which holds regularly scheduled meetings, and is consulted by email and phone conference as needed. As previously discussed, the Editorial Board consists of experts from a number of medical disciplines, thus enhancing the breadth and scope of the content. Working groups are formed as required and then dissolved when their mission is accomplished. As an example, a "context of care" working group has worked for the past several months to create an approach and guidelines for how terminology can be used in the context of a healthcare record. In addition to exposing these ideas for dialog in the informatics research community through such forums as AMIA (American Medical Informatics Association), SNOMED CT® holds memberships in standards groups such as HL7® and ISO to ensure alignment with evolving standards. To ensure that the standards can be used in a practical way, the SNOMED CT® team uses the broad experience of SNOMED CT® licensees, the SNOMED CT® Industry Advisory Group, SNOMED CTGs, and the SNOMED CT® International Editorial Board to shorten the cycle from idea to standard discussion, and most importantly, to standard adoption. Other processes that are used to expedite the development of the terminology include the

use of alpha and beta tests, validation studies, consultative reviews and focus groups. The ANSI guideline document also outlines both quality assurance and continual quality indicator processes.

How are local extensions, beyond the scope of the standard, supported if at all?

Local extensions are supported within the SNOMED CT® structure. They provide extensibility of SNOMED CT® for specialized organizational terminology. Extensions may be developed by CAP or by one of its licensees who have applied to CAP for a designated name space in accordance with the SNOMED CT® extension policy. Local concepts can be kept in separate extension files using the SNOMED CT® standard structure with locally assigned identifiers. The identifiers are kept distinct from SNOMED CT® and from other local extensions utilizing a "namespace" that is assigned by SNOMED CT® International. Currently, the US Drug extension and the UK Drug extension are maintained by the College of American Pathologists and the National Health Service respectively. When content overlaps the scope of SNOMED CT®, it is submitted to the SNOMED CT® International team for consideration for the core content, so that other SNOMED CT® licensees can also take advantage of this work. Similarly, this structure can also help organizations transfer responsibility for terminology not only to SNOMED CT® International but also to another organization as appropriate.

Customization: *Describe known implementations that have been achieved without user customization, if any.*

A large number of SNOMED CT® end-users use SNOMED CT® in an as-delivered format as incorporated into software solutions. Perhaps the greatest number of these exists within the anatomic/clinical pathology environment, where numerous end-users have deployed SNOMED CT® as a standard component of their LIS. Many of the software suppliers are also in various stages of implementing SNOMED CT® into other systems, such as EMR and Order Entry. Kaiser Permanente has also made extensive use of SNOMED CT® throughout its health care system. As SNOMED CT® has been in the market for little over a year, many organizations have not yet completed their implementation process.

If user customization is needed or desirable, how is this achieved? (e.g, optional fields, interface engines, etc.)

Localization can be achieved throughout to development SNOMED CT® compliant subsets, mapping and extensions to content. The SNOMED CT® structure supports this process by offering tools such as the subset editor, mapping master, and editor style guidelines. Additionally, the CAP supports consultative services that can assist customization efforts on an individual client basis.

Mapping Requirements

Describe the extent to which user agencies will likely need to perform mapping from internal codes to this standard.

Several terminologies identified, but not selected, were identified as "should be mapped to" SNOMED CT®. These included Medcin and DSM-IV. Consideration must also be given for administrative, financial and HIPAA requirements.

Identify the tools available to user agencies to automate or otherwise simplify mapping from existing codes to this standard.

Under the guidance of the Mapping Convergent Terminology Group, predefined mappings have been developed between SNOMED CT® and existing code sets. This can simplify the mapping process for organizations using the SNOMED CT® standard. These pre-defined mappings include ICD-9-CM, and ICD-10. LOINC® codes have been integrated into SNOMED CT® as well. Documentation about the mapping structure and heuristics used to develop these mappings is available. Internal tools assist the mappers and the validators of those pre-defined maps. Among the tools that are available to those interested in mapping are:

- The SNOMED CT® Registry of Subsets, Extensions and Mappings, which identifies who is or has developed a SNOMED CT® compliant work;
- The SNOMED CT® Mapping Kit, in development, which summarizes the key structure and content decision rules to consider when mapping;
- Consultative services available for custom mapping projects.

Identify the extent of off-the-shelf conformity with other standards and requirements.

Compatibility

Identify the extent of off-the-shelf conformity with other standards and requirements:

Conformity with other Standards	Yes (100%)	No (0%)	Yes with exception
NEDSS requirements	**Y**		
HIPAA standards			
HL7 2.x	**Y**		

Implementation Timeframe

Estimate the number of months required to deploy this standard; identify unique considerations that will impact deployment schedules.

Estimating this would require far more extensive research, analysis, resources, and time than available within this CHI cycle. Suffice it to say that deploying SNOMED CT® even within new IT systems will likely require years, not months, and that transitioning existing systems to this new standard and mapping legacy data (as would likely be required to transition existing systems) would take even longer.

If some data sets/code sets are under development, what are the projected dates of completion/deployment?

Gaps

Identify the gaps in data, vocabulary or interoperability.

Obstacles

What obstacles, if any, have slowed penetration of this standard? (technical, financial, and/or cultural)

Many software suppliers and health care providers have delayed adoption and deployment of SNOMED CT® pending positive conclusion of the relationship or of the NCVHS recommendations regarding clinical terminology. Experience has also shown that while organizations recognize the value of terminologies and the effort in developing and maintaining them, many also believe that funding should be at a national level. Also, the lifecycles of terminologies are very long. For example, many laboratory information systems in the U.S. still auto encode using SNOMED CT® II (circa 1979). Health care organizations need to be confident over long-term development, control, and costs of the terminology prior to making the commitment to their use. In some organizations, the scope and pace of implementation is determined by factors such as health priorities, the lifecycles of information systems, and their associated funding streams, legislation, accreditation, billing requirements as well as the level of market acceptance. As the hurdles to implementing electronic records are addressed, SNOMED CT® provides the framework for interoperability, at a local, regional, national, or global level. To manage the scale of the commitment and its associated risks, organizations need to be able to evaluate, experiment, make adaptations, and share the results with others. For many, industry is the distribution and implementation channel for SNOMED CT®. Software suppliers also need to assess the cost of system redesign with the benefits in their market sector. Past experience has revealed a number of associated risks that must be managed for suppliers to engage in the necessary systems development, including:

- Perceived high whole systems costs to migrate a health care enterprise to a new software platform;
- Uncertain realizable benefits from full use of the clinical richness of the terminology and the robustness of its infrastructure;

- Long time-scales (12-24 months to market);
- Diverse, potentially conflicting stakeholder requirements including the preservation of legacy information;
- Dependencies on other "user" initiatives, local priorities and information systems life cycles;

Reluctance to commit to terminology produced by a terminology developer that is not committed to long-term maintenance using commercial grace processes.

Appendix A

Information Exchange Requirements (IERs)

Information Exchange Requirement	Description of IER
Beneficiary Financial / Demographic Data	Beneficiary financial and demographic data used to support enrollment and eligibility into a Health Insurance Program.
Beneficiary Inquiry Information	Information relating to the inquiries made by beneficiaries as they relate to their interaction with the health organization.
Beneficiary Tracking Information	Information relating to the physical movement or potential movement of patients, beneficiaries, or active duty personnel due to changes in level of care or deployment, etc.
Body of Health Services Knowledge	Federal, state, professional association, or local policies and guidance regarding health services or any other health care information accessible to health care providers through research, journals, medical texts, on-line health care data bases, consultations, and provider expertise. This may include: (1) utilization management standards that monitor health care services and resources used in the delivery of health care to a customer; (2) case management guidelines; (3) clinical protocols based on forensic requirements; (4) clinical pathway guidelines; (5) uniform patient placement criteria, which are used to determine the level of risk for a customer and the level of mental disorders (6) standards set by health care oversight bodies such as the Joint Commission for Accreditation of Health Care Organizations (JCAHO) and Health Plan Employer Data and Information Set (HEDIS); (7) credentialing criteria; (8) privacy act standards; (9) Freedom of Information Act guidelines; and (10) the estimated time needed to perform health care procedures and services.
Care Management Information	Specific clinical information used to record and identify the stratification of Beneficiaries as they are assigned to varying levels of care.
Case Management Information	Specific clinical information used to record and manage the occurrences of high-risk level assignments of patients in the health delivery organization..
Clinical Guidelines	Treatment, screening, and clinical management guidelines used by clinicians in the decision-making processes for providing care and treatment of the beneficiary/patient.

Cost Accounting Information	All clinical and financial data collected for use in the calculation and assignment of costs in the health organization .
Customer Approved Care Plan	The plan of care (or set of intervention options) mutually selected by the provider and the customer (or responsible person).
Customer Demographic Data	Facts about the beneficiary population such as address, phone number, occupation, sex, age, race, mother's maiden name and SSN, father's name, and unit to which Service members are assigned
Customer Health Care Information	All information about customer health data, customer care information, and customer demographic data, and customer insurance information. Selected information is provided to both external and internal customers contingent upon confidentiality restrictions. Information provided includes immunization certifications and reports, birth information, and customer medical and dental readiness status
Customer Risk Factors	Factors in the environment or chemical, psychological, physiological, or genetic elements thought to predispose an individual to the development of a disease or injury. Includes occupational and lifestyle risk factors and risk of acquiring a disease due to travel to certain regions.
Encounter (Administrative) Data	Administrative and Financial data that is collected on patients as they move through the healthcare continuum. This information is largely used for administrative and financial activities such as reporting and billing.
Improvement Strategy	Approach for advancing or changing for the better the business rules or business functions of the health organization. Includes strategies for improving health organization employee performance (including training requirements), utilization management, workplace safety, and customer satisfaction.
Labor Productivity Information	Financial and clinical (acuity, etc.) data used to calculate and measure labor productivity of the workforce supporting the health organization.
health organization Direction	Goals, objectives, strategies, policies, plans, programs, and projects that control and direct health organization business function, including (1) direction derived from DoD policy and guidance and laws and regulations; and (2) health promotion programs.
Patient Satisfaction Information	Survey data gathered from beneficiaries that receive services from providers that the health organization wishes to use to measure satisfaction.

Patient Schedule	Scheduled procedure type, location, and date of service information related to scheduled interactions with the patient.
Population Member Health Data	Facts about the current and historical health conditions of the members of an organization. (Individuals' health data are grouped by the employing organization, with the expectation that the organization's operations pose similar health risks to all the organization's members.)
Population Risk Reduction Plan	Sets of actions proposed to an organization commander for his/her selection to reduce the effect of health risks on the organization's mission effectiveness and member health status. The proposed actions include: (1) resources required to carry out the actions, (2) expected mission impact, and (3) member's health status with and without the actions.
Provider Demographics	Specific demographic information relating to both internal and external providers associated with the health organization including location, credentialing, services, ratings, etc.
Provider Metrics	Key indicators that are used to measure performance of providers (internal and external) associated with the health organization.
Referral Information	Specific clinical and financial information necessary to refer beneficiaries to the appropriate services and level of care.
Resource Availability	The accessibility of all people, equipment, supplies, facilities, and automated systems needed to execute business activities.
Tailored Education Information	Approved TRICARE program education information / materials customized for distribution to existing beneficiaries to provide information on their selected health plan. Can also include risk factors, diseases, individual health care instructions, and driving instructions.