Standardized Terminologies Used in the Learning Health System

Judith J. Warren, PhD, RN, BC, FAAN, FACMI
Christine A. Hartley Centennial Professor
University of Kansas School of Nursing

(With Permission from Dr. Warren) /Updates on HIPAA in 2014
Standards Specified by Legislation

• HIPAA 1996
  – Code sets: ICD-9 and moving to ICD-10 in 2014, CPT, RxNorm, SNOMED CT, LOINC
  – Transactions: HL7, X12
• MMA 2003
  – Confirmed HIPAA code sets
  – Transactions: HL7, X12, NCPDP
• HITECH of ARRA 2009
  – Confirmed HIPAA code sets, exploring ICF and other niche code sets (such as race, gender, etc.)
  – Confirmed transaction standards
• ACA 2011
  – Confirmed HIPAA code sets / Under the ACA, provisions to HIPAA further increase use of electronic data interchange and include additional requirements
  – Confirmed transaction standards
  – Added Operating Rules for transactions
A Learning System for the U.S.
Interface and Reference Terminologies

• Interface terminology supplies the terms used by clinicians as they talk about clinical concepts or the set of terms displayed in an electronic health record for the clinicians to use

• Theses terms need to be link/mapped to a standard reference terminology to achieve the benefits of using standardized terminologies for interoperability

• Examples of interface terminology: NANDA, local expressions and preferences

• Examples of reference terminologies: ICD-9-CM, LOINC, SNOMED CT
ICD-9-CM and ICD-10-CM

WHO Collaborating Center for the Classification of Diseases for North America

- Established in 1974 at the National Center for Health Statistics (NCHS)
- WHO is a specialized agency of the United Nations
- Its responsibilities include the International Classification of Diseases
- This is performed in conjunction with collaborating centers, established primarily on the basis of language, in North America (NCHS), England, Australia, Paris, Nordic countries, Moscow, Beijing, Caracas, Sao Paulo and Kuwait. Other countries, such as Japan, have recognized ICD offices
ICD-9-CM and ICD-10-CM/ICD-10-PCS

- ICD-9-CM is a medical disease classification used in the US as a billing classification
  - [http://www.cdc.gov/nchs/icd/icd9cm.htm](http://www.cdc.gov/nchs/icd/icd9cm.htm)
- In 2014 all healthcare services that receive Medicare and Medicaid reimbursement will be required to submit ICD-10-CM OR 1CD-10-PCS codes
  - [http://www.cdc.gov/nchs/icd/icd10cm.htm](http://www.cdc.gov/nchs/icd/icd10cm.htm)

• Developed by the American Medical Association

• Adopted by CMS and most insurance companies as reimbursement codes
RxNorm

• Developed by the National Library of Medicine to be a standard for representing drug information in EHRs
  • Provides normalized names for clinical drugs and links its names to many of the drug vocabularies commonly used in pharmacy management and drug interaction software, including those of First Databank, Micromedex, MediSpan, Gold Standard, and Multum.
  • Mediates messages between systems not using the same software and vocabulary.
  • Includes the National Drug File - Reference Terminology (NDF-RT) from the Veterans Health Administration.
    • Used to code clinical drug properties, including mechanism of action, physiologic effect, and therapeutic category.

Systematic Nomenclature of Medicine—Clinical Terms (SNOMED CT)

- Developed and released by the International Health Terminology Standards Development Organization
  - [http://www.ihtsdo.org/snomed-ct](http://www.ihtsdo.org/snomed-ct)
- Patient-centric, Interprofessional clinically focused terminology
- Developed to be used in EHRs for data entry and retrieval
- Optimized for clinical decision support and data analysis
- USA has a free use license managed by the National Library of Medicine
The Axes of SNOMED CT—Provides the Syntax for the Concepts

<table>
<thead>
<tr>
<th>Clinical Finding</th>
<th>Physical object (Suture needle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Finding (Swelling of arm)</td>
<td>Physical force (Friction)</td>
</tr>
<tr>
<td>• Disease (Pneumonia)</td>
<td>Events (Disease outbreak)</td>
</tr>
<tr>
<td>Procedure/intervention (Biopsy of lung)</td>
<td>Environments/geographical locations (Intensive care unit)</td>
</tr>
<tr>
<td>Observable entity (Tumor stage)</td>
<td>Social context (Organ donor)</td>
</tr>
<tr>
<td>Body structure (Structure of thyroid)</td>
<td>Situation with explicit context (family history of heart disease)</td>
</tr>
<tr>
<td>Organism (DNA virus)</td>
<td>Staging and scales (Braden Scale)</td>
</tr>
<tr>
<td>Substance (Gastric acid)</td>
<td>Attribute (Controlled temperature)</td>
</tr>
<tr>
<td>Pharmaceutical/biologic product (aspirin)</td>
<td>Qualifier value (Bilateral)</td>
</tr>
<tr>
<td>Specimen (Urine specimen)</td>
<td>Linkage concept (has reason)</td>
</tr>
</tbody>
</table>
SNOMED CT Browser and Subsets

- CliniClue is a free browser that allows you to view SNOMED CT
  - [http://www.cliniclue.com/software](http://www.cliniclue.com/software)
  - There are several hundred thousand concepts in SNOMED CT so a browser is necessary

- Problem list subsets for Meaningful Use
CliniClue Browser for SNOMED CT
Nursing Problem List Subset of SNOMED CT

Nursing Problem List Subset File | Derived from SNOMED CT version | Derived from UMLS Metathesaurus version
--- | --- | ---
NursingProblemListSubset_20110408.zip | July 2010 International Release | 2010AB

Introduction

The SNOMED CT® encoded Nursing Problem List Subset, intended for use in patients’ problem lists, is an output of the Unified Medical Language System® (UMLS®) Metathesaurus® that is based on nursing diagnosis concepts found within the Metathesaurus.

Purpose and use of subset

The main purpose of the Nursing Problem List Subset of SNOMED CT is to facilitate the use of SNOMED CT as the primary coding terminology for nursing problems used in care planning, problem lists or other summary level clinical documentation.

The use of a common list of SNOMED CT concepts will maximize data interoperability among institutions. Local problem list vocabularies often need to expand to satisfy specific user needs. Institutions that are using their own nursing problem list vocabularies are encouraged to map them to SNOMED CT with a focus on these nursing diagnosis concepts to facilitate data interoperability. The UMLS Terminology Services (UTS) includes a SNOMED CT browser that may be used for this purpose. The SNOMED CT Browser is available through the SNOMED CT menu of the UTS.

Choice of SNOMED CT concepts

To find the most appropriate SNOMED CT concepts for each problem list term, the following guidelines are used:

- Only current SNOMED CT concepts are included (concept status = 0)
- Concepts belonging to the Non-Human Subset are excluded
- Most concepts are chosen from the SNOMED CT clinical finding hierarchy.

Additional resources from the UMLS

For each SNOMED CT concept in the subset, the corresponding UMLS CUI (concept unique identifier) is listed. By using these identifiers, users can access resources available in the UMLS e.g., additional synonyms (beyond those present in SNOMED CT itself), text definitions for many terms, corresponding codes in other terminologies, etc.

File description

The SNOMED CT Nursing Problem List Subset data file has the following fields:

- SNOMED_CONCEPT_ID - conceptID of the SNOMED CT concept
- SNOMEDCT_FNM - SNOMED CT fully-specified name
- UMLS_CUI - the corresponding UMLS concept identifier - if concept is not yet in the UMLS this will be listed as NA (not available)
- UMLS_SEMANTIC_TYPE - the corresponding UMLS semantic type provides consistent categorization of UMLS concepts at a general level
- SNOMEDCT_STATUS - concept status of the SNOMED CT concept

The file identifies what we hope is a useful Nursing Problem List Subset of SNOMED CT, but does not include all the information likely to be required to make effective use of SNOMED CT in an application, such as synonyms that may include more clinician-friendly terms than the SNOMED CT fully-specified name. The identifiers in the file can be used to extract more complete information for these concepts from either the UMLS release files or the SNOMED CT native format files.
IHTSDO Nursing Special Interest Group

• A community of practice for the nursing profession, supporting worldwide nursing participation in the development, validation, uptake, implementation, and correct use of SNOMED CT and related products.

• Participation is welcome from anyone interested in ensuring that SNOMED CT supports nursing requirements for electronic documentation and communication of patient care in any setting.

• Join the SIG: http://www.ihtsdo.org/about-ihtsdo/governance-and-advisory/working-groups/special-interest-groups

• Meets in person once a year at the annual meeting

• Meets monthly by webinar
  • Information for attendance is posted at their web site above
Logical Observation Identifiers Names and Codes (LOINC®)

- Developed by the Regenstrief Institute and supported by the National Library of Medicine
- Provides a standard set of universal names and codes for identifying individual laboratory and clinical results.
  - Used in clinical observations and scales, e.g., Morse Falls Risk, Clinical Care Classification goals
- Nursing Consultant: Susan Matney, PhDc, RN, FAAN
  - Chairs the Nursing SIG
- [http://www.loinc.org](http://www.loinc.org)
Search functionality online; but also publishes a free browser—RELMA, http://www.ihtsdo.org/about-ihtsdo/governance-and-advisory/working-groups/special-interest-groups
National Committee on Vital and Health Statistics (NCVHS)

- Serves as the statutory public advisory body to the Secretary of Health and Human Services in the area of health information
- Provides advice and assistance to the Department
- Serves as a forum for interaction with interested private sector groups on a variety of key health data issues
- Accelerates the evolution of public and private health information systems
  - Uniform shared data standards
  - Protecting privacy, confidentiality, and security
- Advises on implementation HIPAA, MMA, ACA
Methods of Operation

Meetings are open to public and broadcast on the Internet
  • www.ncvhs.hhs.gov
  • Hears testimony on selected topics
    • Testimony is invited
    • Open microphone time at every hearing
  • Sends letters of recommendation concerning health information technology to the Secretary of the Department of Health and Human Services
Office of the National Coordinator for Health Information Technology (ONC)

- NCVHS recommended to HHS that this office be established
- ONC is the major influencer in achieving the vision of the EHR and the Nationwide Health Information Network (NwHIN).
- Established by President Bush to support the adoption of healthcare IT in this country.
- Supported by President Obama and given a larger budget in HITECH
- [http://healthit.hhs.gov](http://healthit.hhs.gov)
HIT Policy Committee: Advisory to ONC

• The HIT Policy Committee will make recommendations to the NationalCoordinator for Health Information Technology on
  • a policy framework for the development and adoption of a nationwide interoperable health information infrastructure
  • including standards for the secure and private exchange of patient medical information
  • ARRA 2009 requires recommendations on standards, implementation specifications, and certifications criteria in eight specific areas.
  • [http://www.healthit.gov/policy-researchers-implementers/health-it-policy-committee](http://www.healthit.gov/policy-researchers-implementers/health-it-policy-committee)
HIT Standards Committee: Advisory to ONC

• Charged with making recommendations to the ONC on
  • Standards
  • Implementation specifications, and
  • Certification criteria for the electronic exchange and use of health information.

• Focus on the policies developed by the Health IT Policy Committee’s eight areas.

• While developing, harmonizing, or recognizing standards and implementation specifications, the Health IT Standards Committee will also provide for the testing of the same by the National Institute for Standards and Technology (NIST).

• [http://www.healthit.gov/policy-researchers-implementers/health-it-standards-committee](http://www.healthit.gov/policy-researchers-implementers/health-it-standards-committee)
Ways to Participate

• Dial into the meetings
  • If there is an open microphone time, testify
  • If feedback is requested, respond!!!!!!
• Send in testimony you feel is pertinent and relevant
• Attend meetings in person, if possible, or by Internet
• Seek nomination to HIT Policy, HIT Standards, or their work groups
• Support the Alliance for Nursing Informatics
  • All nursing informatics organizations belong and they have a process for rapid turn-around of testimony and comments
• http://www.allianceni.org
Unified Medical Language System (UMLS)

• Rosetta Stone was critical to the translation between and among ancient languages
• UMLS functions in this capacity
  • Developed by the National Library of Medicine
• Has a metathesaurus that provides a crosswalk between concepts in different terminologies

Rosetta Stone
Unified Medical Language System (UMLS)

Developed by the National Library of Medicine
- [http://www.nlm.gov/research/umls](http://www.nlm.gov/research/umls)

A compilation of a number of classifications and code sets

Has a metathesaurus that provides a crosswalk between concepts in different systems

Provides support for Medline literature searches

Is NOT a clinical coded language
Accurate Terminology Mapping

- Health Information Technology and Health Data Standards at NLM
- Go to the web sites of the terminologies to learn more
- Validate the terminology mapping
To realize the value of standardized terminologies you need:

- Transaction and Message standards
- HL7, X12, NCPDP
- Terminology engine also known as a terminology server
Common Terminology Engine

• Allows for the definition of terms and relationships, which can then be used for the definition of clinical protocols, clinical applications, quality reporting and research

• Allows for transformation and abstraction of data

• Contains all the clinical concepts needed for healthcare delivery, measurement, and research
Architecture Framework for Clinical Information Systems

- Performance Reporting
- Administrative Systems
- Analytical Data Repository
- Clinical Systems
- Clinical Data Repository
- Workflow Engine
- Clinical Decision Support (Evidence Based Guidelines)
- Rules Engine
- Terminology Infrastructure (Data and Information)
- Terminology Engine
A Last Thought: Terminology is a Technology

For technology to work in health care so that it assists us in delivering quality care, the following technologies must exist:

- Hardware
- Software
- Messages
- Terminology that represents knowledge!
1. How does federal legislation impact standardized health care terminologies?

2. Describe the role of LOINC and SNOMED in coding data for health IT.

3. How can you influence or participate in the activities of standard development and federal regulation?

4. Give a brief description of each of the mandated code sets for HIPAA, MMA, HITECH and ACA. Why were they chosen?

5. Why is the UMLS important?

6. Describe a terminology engine and how terminologies are processed for the clinician to use.

7. Why is terminology a technology?
Teaching Methods and Strategies

- Lecture
  - Describe the process used to implement national terminology requirements: HIPAA, meaningful use, NCVHS, and ONC.

- Discussion Board
  - Use the questions from the previous slide.

- Journal
  - Have student keep a journal of where standardized terminologies are used when they are in clinical rotations.
  - Write reflections on their response to using and seeing used the various terminologies they learn about in class.

- Activity
  - Have students download the browsers and explore the terminologies; could be linked to a quality exercise by looking at the terminology needed for quality metrics.
  - Develop a slide presentation on one of the mandated terminologies.
Questions?