Mapping between ICD (9-CM and 10-CM) and SNOMED CT

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National Library of Medicine

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Current NLM Roles

- Distributor of HIPAA classifications & code sets AND terminologies required for EHR certification within UMLS

- Designated HHS coordinating body for clinical terminologies (including developing relevant mappings)

- Terminologies:
  - **LOINC**: a major funder
  - **RxNorm**: developer
  - **SNOMED CT**: payer of US IHTSDO membership that enables US use
Focus on Mappings Between SNOMED CT and ICD

- SNOMED CT to ICD-9-CM
- SNOMED CT to ICD-10 (international version)
- SNOMED CT to ICD-10-CM
- ICD-9-CM to SNOMED CT
Problem list – Map Issue #1

• **Target:** SNOMED CT
• **Issue:** Transition from use of ICD-9-CM for problems
  – Available from IHTSDO:
    • Conceptual mapping **from** SNOMED CT **to** ICD-9-CM
      – Minimal maintenance – planned to phase out by 2013
  – Available from NLM:
    • Synonymous mappings in UMLS Metathesaurus
    • **April 2012:** Trial map for evaluation
      – **from** heavily used ICD-9-CM **to** SNOMED CT
      – Trial version based on CMS data (codes used in the Medicare Program)
        » ~40% will NOT be 1-to-1 mappings
Problem list – Map Issue #2

• **Target:** SNOMED CT

• **Issue:** Use of SNOMED CT to generate encounter diagnoses (in ICD-10-CM or ICD-9-CM) for billing/statistics
  - Available from IHTSDO:
    • Conceptual mapping from SNOMED CT to ICD-9-CM
      - Minimal maintenance – planned to phase out by 2013
  - Available from NLM:
    • Synonymous mappings in UMLS Metathesaurus
    • Old (2008) rule-based map from SNOMED CT subset to ICD-9-CM
      - Working with ONC and NCHS to determine priority for updating if necessary

• **NEW:** FROM SCT subset to ICD-10-CM, with demonstration tool
  - February 29, 2012: From 7,277 SNOMED CT concepts
  - June 2012: Complete initial map. From ~15,000 SNOMED CT concepts
    » Leverages procedures, data & tools from the IHTSDO and UK NHS Terminology Centre and data from Kaiser Permanente’s CMT donations
SNOMED CT to ICD-10-CM Map

Download the Map

<table>
<thead>
<tr>
<th>SNOMED CT to ICD-10-CM Map Version</th>
<th>Derived from SNOMED CT version</th>
<th>Derived from ICD-10-CM version</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNOMEDCT_ICD10CM_map_201202</td>
<td>July 2011 International Release</td>
<td>2011</td>
<td>Release Notes (PDF)</td>
</tr>
</tbody>
</table>

Supporting Materials

- **I-MAGIC Demo Page** - to see the Map in action. The I-MAGIC (Interactive Map-Assisted Generation of ICD Codes) Algorithm utilizes the SNOMED CT to ICD-10-CM Map in a real-time, interactive manner to generate ICD-10-CM codes. This demo simulates a problem list interface in which the user enters problems with SNOMED CT terms, which are then used to derive ICD-10-CM codes using the Map.
- **Technical Documentation (PDF)** for the SNOMED CT to ICD-10-CM Map and accompanying exemplar file (Excel).
- **Frequently Asked Questions**
- **Mapping from SNOMED CT to ICD-10 and ICD-10-CM** presented by Dr. Kin Wah Fung at HIMSS (Healthcare Information and Management Systems Society) 2012 Conference

Introduction

SNOMED CT (Systematized Nomenclature of Medicine-Clinical Terms) is considered to be the most comprehensive, multilingual clinical healthcare terminology in the world. It is designed for use in clinical documentation in the Electronic Health Record (EHR). The purpose of the SNOMED CT to ICD-10-CM map (herein referred to as “the Map”) is to support semi-automated generation of ICD-10-CM codes from clinical data encoded in SNOMED CT for reimbursement and statistical purposes.

Use cases supported

The Map can be used in the following scenarios:

- **Real-time use by the healthcare provider** - In this scenario, the Map is embedded in the problem list application of the EHR used by the physician or other healthcare provider. At the end of a clinic encounter, the clinician updates the problem list, which is encoded in SNOMED CT. The Map-enabled problem list application outputs a list of ICD-10-CM codes based on algorithmic evaluation of map rules, which makes use of patient context (e.g., age, gender) and comorbidities (other problems on the problem list) to identify the most appropriate candidate ICD-10-CM codes, in accordance with ICD-10-CM coding guidelines and conventions. If necessary, the clinician is prompted for additional information to decide between alternative codes, or to refine the output codes. The clinician confirms the suggested ICD-10-CM codes. (See the I-MAGIC algorithm and demo page)

- **Retrospective coding by coding professionals** - In this scenario, the Map is used within an application to suggest candidate ICD-10-CM codes to coding professionals based on a stored SNOMED CT encoded problem list. The degree of automation can vary. Textual advice can be displayed in cases where automated rule processing is not available.
Intended uses of the map

- Embedded in the EHR for real-time, interactive ICD codes generation (I-MAGIC=Interactive Map-Assisted Generation of ICD Codes)

- To assist coding professionals by suggesting ICD codes based on SNOMED CT-encoded problem list entries
Two mapping projects

- **SNOMED CT to ICD-10** (international version)
  - Joint effort between IHTSDO and WHO
  - International participation (including USA, UK, Canada, Sweden, Australia, and New Zealand)
  - Funded by IHTSDO with a lot of volunteer contribution

- **SNOMED CT to ICD-10-CM**
  - Led by NLM with direct involvement from National Center for Health Statistics (NCHS)
  - Methodology and tools – based on ICD-10 Map project

- Collaboration between the 2 projects – people, methodology, tooling, mapping data

- Stronger collaboration expected in future through IHTSDO mapping service under development
Priorities for phase 1 work

• ICD-10 map
  – NLM’s CORE Problem List Subset
  – SNOMED CT concepts that correspond to top ranking ICD-10 codes in 5 countries

• ICD-10-CM map
  – NLM’s CORE Problem List Subset
  – Donated content from Kaiser Permanente’s Convergent Medical Terminology (CMT)
    • top 2,500, sub-specialty subsets (cardiology, neurology, mental health, musculo-skeletal)
SNOMED CT concepts that are in scope for mapping

• Any concept in the following three SNOMED CT hierarchies
  – Clinical finding
  – Event
  – Situation with explicit context
• Total about 110,000 concepts in scope
Work progress

• SNOMED CT to ICD-10 map
  – Preview publication of maps for 5,000 concepts in September 2011
  – Final publication of phase 1 maps (about 20,000 concepts) planned for April 2012

• SNOMED CT to ICD-10-CM map
  – Planned release dates
    • February 2012 – preview release (7,277 concepts)
    • June 2012 – full phase 1 maps (15,000 concepts)
The I-MAGIC (Interactive Map-Assisted Generation of ICD Codes) Algorithm utilizes the SNOMED CT to ICD-10-CM Map in a real-time, interactive manner to generate ICD-10-CM codes. This demo simulates a problem list interface in which the user enters problems with SNOMED CT terms, which are then used to derive ICD-10-CM codes using the Map.

<table>
<thead>
<tr>
<th>Name: My Patient</th>
<th>Gender:</th>
<th>Date of Birth:</th>
</tr>
</thead>
</table>

**Problem List (SNOMED-CT terms)**

What's wrong with the patient? Please add problem(s) here. (Hint: type 'dizzy')

<table>
<thead>
<tr>
<th>Action</th>
<th>SNOMED-CT Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add</td>
<td>Problem:</td>
</tr>
</tbody>
</table>

(Only SNOMED CT terms included in the published SNOMED CT to ICD-10-CM Map are shown.)

[Update List] [Get ICD Codes] [Add Complex Examples]
Interactive Map-Assisted Generation of ICD Codes (I-MAGIC) Algorithm

1. Add context information from EHR (e.g., gender, age)
2. Obtain additional user input
3. Display candidate ICD-10-CM code(s)
4. Get user input to refine ICD-10-CM Code

A. Is there a default ICD10CM code in Map?
   - Yes: Display candidate ICD-10-CM code(s)
   - No: Add context information from EHR (e.g., gender, age)

B. Sufficient information to generate ICD10CM code?
   - Yes: Obtain additional user input
   - No: Add context information from EHR (e.g., gender, age)

C. Optional refinements?
   - Yes: Get user input to refine ICD-10-CM Code
   - No: Pick from list of candidate ICD10CM code(s)
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Name: Male adult 1  Gender: Male  Date of Birth: 1965-12-01

Problem List (SNOMED-CT terms)

What's wrong with the patient? Please add or remove problem(s) here.

<table>
<thead>
<tr>
<th>Action</th>
<th>SNOMED-CT Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Remove</td>
<td>Apnea</td>
</tr>
<tr>
<td>□ Remove</td>
<td>Hypercholesterolemia</td>
</tr>
<tr>
<td>□ Remove</td>
<td>Histoplasmosis with meningitis</td>
</tr>
<tr>
<td>□ Remove</td>
<td>Herniated urinary bladder</td>
</tr>
<tr>
<td>□ Remove</td>
<td>Diabetes mellitus type 2</td>
</tr>
<tr>
<td>□ Remove</td>
<td>Hypertensive heart failure</td>
</tr>
</tbody>
</table>

Add
Problem: 

(Only SNOMED CT terms included in the published SNOMED CT to ICD-10-CM Map are shown.)

Update List  Get ICD Codes

Add Complex Examples: 

Kin Wah Fung  Contact Us
Lister Hill National Center for Biomedical Communications, U.S. National Library of Medicine
National Institutes of Health, Department of Health & Human Services.
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Name: Male adult 1  Gender: Male  Date of Birth: 1965-12-01

### Mapping Problems to ICD-10-CM

<table>
<thead>
<tr>
<th>SNOMED-CT Code</th>
<th>ICD-10-CM Code</th>
<th>ICD-10-CM Name</th>
<th>Optional refinement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apnea (1023001)</td>
<td>R06.81</td>
<td>Apnea, not elsewhere classified</td>
<td></td>
</tr>
<tr>
<td>Hypercholesterolemia (13644009)</td>
<td>E78.0</td>
<td>Pure hypercholesterolemia</td>
<td></td>
</tr>
<tr>
<td>Histoplasmosis with meningitis (187057005)</td>
<td>B39.9</td>
<td>Histoplasmosis, unspecified</td>
<td>Refine problem</td>
</tr>
<tr>
<td>Hemiated urinary bladder (410070006)</td>
<td>N32.89</td>
<td>Other specified disorders of bladder</td>
<td>ICD notes</td>
</tr>
<tr>
<td>Diabetes mellitus type 2 (44054006)</td>
<td>E11.9</td>
<td>Type 2 diabetes mellitus without complications</td>
<td>ICD notes</td>
</tr>
<tr>
<td>Hypertensive heart failure (46113002)</td>
<td>I11.0</td>
<td>Hypertensive heart disease with heart failure</td>
<td>ICD notes</td>
</tr>
<tr>
<td></td>
<td>I150.9</td>
<td>Heart failure, unspecified</td>
<td>ICD notes</td>
</tr>
</tbody>
</table>

[Submit Refinement] [Back to Problem List]

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Lister Hill National Center for Biomedical Communications, U.S. National Library of Medicine
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<tr>
<td>1023001</td>
<td>R06.81</td>
<td>Apnea, not elsewhere classified</td>
<td></td>
</tr>
<tr>
<td>136110000</td>
<td>E79.0</td>
<td>Pure hypercholesterolemia</td>
<td></td>
</tr>
</tbody>
</table>

**Histoplasmosis with meningitis (187057005)**

**Problem refinement**

Would one of the following specific diagnoses apply?

- Histoplasma duboisi with meningitis
- Histoplasma capsulatum with meningitis
- The above choices are not applicable

Replace the original problem with the more specific diagnosis.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>ICD notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B39.9</td>
<td>Histoplasmosis, unspecified</td>
<td></td>
</tr>
<tr>
<td>G02</td>
<td>Meningitis in other infectious and parasitic diseases classified elsewhere</td>
<td></td>
</tr>
<tr>
<td>N32.89</td>
<td>Other specified disorders of bladder</td>
<td></td>
</tr>
<tr>
<td>410070006</td>
<td>Herniated urinary bladder (other specified disorders of bladder)</td>
<td></td>
</tr>
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<td>44054006</td>
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<td></td>
</tr>
<tr>
<td>E11.9</td>
<td>Type 2 diabetes mellitus without complications</td>
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<tr>
<td>46113002</td>
<td>Hypertensive heart failure</td>
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<td>E11.9</td>
<td>Type 2 diabetes mellitus without complications</td>
<td></td>
</tr>
<tr>
<td>Hypertensive heart failure</td>
<td>I11.0</td>
<td>Hypertensive heart disease with heart failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I50.9</td>
<td>Heart failure, unspecified</td>
<td></td>
</tr>
</tbody>
</table>

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[ICD notes]
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<tbody>
<tr>
<td>1023001</td>
<td>R06.81</td>
<td>Apnea, not elsewhere classified</td>
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<tr>
<td>13642009</td>
<td>E78.0</td>
<td>Pure hypercholesterolemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>187057005</td>
<td>B39.9</td>
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</tr>
<tr>
<td></td>
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</tr>
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<td>410070006</td>
<td>N32.89</td>
<td>Other specified disorders of bladder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44054006</td>
<td>E11.9</td>
<td>Type 2 diabetes mellitus without complications</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ICD notes for "Type 2 diabetes mellitus"**

Use additional code to identify any insulin use (Z79.4)

| 46113002       | I11.0          | Hypertensive heart disease with heart failure       |                     | ICD notes |
|               | I50.9          | Heart failure, unspecified                          |                     | ICD notes |
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**Mapping Problems to ICD-10-CM**

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<th>ICD-10-CM Name</th>
<th>Optional refinement</th>
</tr>
</thead>
<tbody>
<tr>
<td>189336000</td>
<td>D05.90</td>
<td>Unspecified type of carcinoma in situ of unspecified breast</td>
<td>Laterality</td>
</tr>
<tr>
<td>307726001</td>
<td>C56.9</td>
<td>Malignant neoplasm of unspecified ovary</td>
<td>Laterality</td>
</tr>
<tr>
<td></td>
<td>D63.0</td>
<td>Anemia in neoplastic disease</td>
<td></td>
</tr>
<tr>
<td>310495003</td>
<td>F32.0</td>
<td>Major depressive disorder, single episode, mild</td>
<td></td>
</tr>
<tr>
<td>364400009</td>
<td>R62.7</td>
<td>Adult failure to thrive</td>
<td></td>
</tr>
<tr>
<td>410070006</td>
<td>N81.10</td>
<td>Cystocele, unspecified</td>
<td></td>
</tr>
</tbody>
</table>
Questions

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NLM Website:
http://www.nlm.nih.gov/

NLM Customer Service: