How SNOMED CT can help in the ICD-10-CM transition

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National Institutes of Health

SNOMED CT

- Systematized Nomenclature of Medicine - Clinical Terms
- The most comprehensive, multilingual clinical healthcare terminology in the world
- Created by the merging of SNOMED RT (Reference Terminology) with CTV3 (Clinical Terms version 3) in 2002

An international standard

- Owned by IHTSDO (International Health Terminology Standards Development Organisation)
- 18 member countries so far, including
  - US, UK, Canada, The Netherlands, Spain, Denmark, Australia, New Zealand
- SNOMED CT can be used by
  - Anyone with an Affiliate License (free for all member countries)
  - 40 low income countries (defined by the World Bank)
  - Qualifying research/humanitarian/charitable projects
Terminology for the EHR

• As a clinical terminology, SNOMED CT is inherently more suitable than other terminologies/classifications for clinical documentation in the EHR (electronic health record)
• This is not to say that ‘SNOMED CT is superior to ICD’, since they are designed for different purposes and each should each be used for the purpose for which it was designed

Content coverage

• SNOMED CT has better clinical coverage than ICD
• Number of codes:
  – SNOMED CT (Clinical finding): 100,000
  – ICD-9-CM: 14,000
  – ICD-10-CM: 68,000
• ICD’s focus is statistical – less common diseases get lumped together in “catch-all” categories e.g. J15.8 Pneumonia due to other specified bacteria, which could result in loss of information
• SNOMED CT is clinically-based – document whatever is needed for patient care

<table>
<thead>
<tr>
<th></th>
<th>ICD-9-CM</th>
<th>ICD-10-CM</th>
<th>SNOMED CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asperger’s disorder</td>
<td>299.8 Other specified pervasive developmental disorders</td>
<td>F84.5 Asperger’s disorder</td>
<td>23560001 Asperger’s disorder</td>
</tr>
<tr>
<td>Apert syndrome</td>
<td>755.55 Acrocephaloxyndactyly</td>
<td>Q77.0 Congenital malformation syndromes predominantly affecting facial appearance</td>
<td>20520000 Apert syndrome</td>
</tr>
<tr>
<td>Metabolic acidosis</td>
<td>276.2 Acidosis</td>
<td>E87.2 Acidosis</td>
<td>9845609 Metabolic acidosis</td>
</tr>
<tr>
<td>Respiratory acidosis</td>
<td>276.2 Acidosis</td>
<td>E87.2 Acidosis</td>
<td>12326000 Respiratory acidosis</td>
</tr>
<tr>
<td>Lactic acidosis</td>
<td>276.2 Acidosis</td>
<td>E87.2 Acidosis</td>
<td>9123001 Lactic acidosis</td>
</tr>
</tbody>
</table>
Clinical orientation

• Different users and usage
  – SNOMED CT - direct use by healthcare providers during the process of care
  – ICD – use by coding professionals after the episode of care

• It may be problematic for healthcare providers to use ICD directly
  – Some terms are not ‘clinical user-friendly’
  – Some contents have little clinical relevance
  – Presumed knowledge of coding rules and conventions

“Unfriendly” terms

• Apparently “awkward” names (embedded coding guidelines)
  – E878.2 Surgical operation with anastomosis, bypass, or graft, with natural or artificial tissues used as implant causing abnormal patient reaction, or later complication, without mention of misadventure at time of operation (ICD-9-CM)

• Clinically “irrelevant” details
  – V30.2xxD Person on outside of three-wheeled motor vehicle injured in collision with pedestrian or animal in nontraffic accident, subsequent encounter (ICD-10-CM)

ICD coding rules and conventions

• Patient admitted with gastrointestinal bleeding and found to be anemic. Which is the correct code?
  – 280 Iron deficiency anemia secondary to blood loss (chronic), OR
  – 285.1 Acute posthemorrhagic anemia

• There is no general code to cover both cases of acute and chronic blood loss

• In ICD convention, words in parenthesis e.g. (chronic) are known as “non-essential modifiers” – whether they are present or not doesn’t affect coding, so 280 is the correct code if the clinical course is not certain. But clinical users may not be aware of this convention.

• SNOMED CT: 413532003 Anemia due to blood loss
Flexible data entry and retrieval

- ICD dictates level of granularity of coding
  - NOS (Not otherwise specified) codes - cases with insufficient information for more specific codes
  - NEC (Not elsewhere classified) codes - cases with more specific information but not covered by existing codes
- SNOMED CT allows coding at any level of granularity as appropriate for the clinical situation - no need for NOS, NEC codes
- Flexible data retrieval
  - SNOMED CT has multiple hierarchy (single hierarchy for ICD)
  - SNOMED CT concepts are defined logically by their attributes (only textual rules and definitions in ICD)

Clinical guideline for hypertension

- ICD-9-CM
  - If one uses only codes in the range HYPERTENSIVE DISEASE (401-405), will be missing
    - 410.9 Myocardial infarction with hypertension
    - 642 Hypertension complicating pregnancy, childbirth, and the puerperium
- SNOMED CT
  - All descendants of 38341003 Hypertensive disorder

Data retrieval using attributes

- Find all diseases caused by occlusion of artery affecting any artery except mesenteric or renal arteries
  - SNOMED CT
    - Find all descendants of 2929001 Occlusion of artery
      - Exclude those with “Finding site” = “Structure of mesenteric artery” or “Structure of renal artery”
  - ICD-9-CM
    - 440 Atherosclerosis and descendants (except 440.1 Of renal artery)
    - 433 Occlusion and stenosis of prevertebral arteries and descendants
    - 437.0 Cerebral atherosclerosis
    - 414.0 Coronary arteriosclerosis
    - 416.0 Idiopathic pulmonary arteriosclerosis
    - 443.9 Peripheral vascular disease, unspecified...
      - List needs to be reviewed with each update
Extensibility

- No single terminology will be complete for every use case - there is always a need for extension
- ICD – no available method for extension provided by the classification
- SNOMED CT – well-defined rules to extend coverage by combining existing concepts (post-coordination) e.g.
  - “Left kidney stone” can be represented by adding the laterality attribute 7771000 Left to 95570007 Kidney stone
- Advantages:
  - Can compute equivalence of new concepts to existing concepts
  - The new concept will be recognized as a sub-class of existing concepts

Meaningful Use Criteria for EHR

- Stage 1 Meaningful Use – problem list data should be encoded in either SNOMED CT or ICD-9-CM
- NPRM (Notice of Proposed Rule Making) for Stage 2 Meaningful Use – SNOMED CT proposed as the preferred problem list terminology

Direct generation of ICD-10-CM codes from clinical data

- Clinical data coded in SNOMED CT can be used to generate ICD-10-CM codes (“code once, use multiple times”)
- Implementation of SNOMED CT in the EHR will not only improve the quality of data, but can also help the transition to ICD-10-CM
SNOMED CT to ICD-10-CM Map

- NLM project with participation from National Center for Health Statistics (NCHS)
- Re-use of methodology, tools and data from the IHTSDO/WHO project to map SNOMED CT to ICD-10
- Rule-based map because
  - One SNOMED CT concept may need more than one ICD-10-CM codes to fully represent its meaning e.g. etiology and manifestation, injury codes
  - One SNOMED CT concept may have multiple alternative ICD-10-CM target codes
- Dual independent mapping – as built-in quality assurance

Scope of the map

- Only mapping those SNOMED CT concepts suitable for the problem list: clinical findings, events and situation
- Commonly occurring concepts are mapped first
  - CORE Problem List Subset
  - Donated content from Kaiser Permanente’s Convergent Medical Terminology (CMT)
- Preview publication released in February - covers 7,000 concepts
- Final release in June – about 15,000 concepts

Intended uses of the map

- Embedded in the EHR to find ICD-10-CM codes in real-time – the I-MAGIC (Interactive Map-Assisted Generation of ICD Codes) use case
- To assist coding professionals by suggesting ICD codes based on SNOMED CT-encoded problems
I-MAGIC demo tool


**Link to I-MAGIC demo tool**

**U.S. National Library of Medicine**

**Information from EHR**

**Problem list entry interface**
Laterality refinement choices

ICD coding notes

ICD-10-CM code for adult
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<td>Failure to gain weight</td>
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<tr>
<td>Q81.9</td>
<td>Other specified disorders of bladder</td>
</tr>
<tr>
<td>J42.0</td>
<td>Herniated umbilical cord</td>
</tr>
</tbody>
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**ICD-10-CM code for child:**

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**ICD-10-CM code for newborn:**

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**ICD-10-CM code for male:**

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ICD-10-CM code for female

Trimester specification

Fetus specification

Different ICD-10-CM codes if these more specific conditions apply
No valid default ICD-10-CM code

Mandatory refinement choices

NLM SNOMED CT resources

- Subsets
- Mappings
  - ICD-9-CM Map to SNOMED CT map (under development)

Questions?

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