Update on ICD-11 and SNOMED CT harmonisation
The use of classification for clinical data capture

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Access CT—EU-US Workshop, Amsterdam
3 May 2016
Outline

- The semantic roots of ICD11
- Connections with SNOMED
- Status of Common Ontology efforts
- Future opportunities
Traditional Hierarchical System
ICD-10 and family
The ICD11 Foundation Component
a Semantic Network

ICD Concept Title
Unique Identifier (URI)
Fully Specified Name
Preferred Name
Synonyms
Classification
Properties
Parents
Type
Use and
Linearization(s)
Textual Definition(s)
Terms
Base Index Terms
Inclusion Terms
Exclusions

Body System/Structure
Manifestation
Causal
Etiology
Genomics
Agents
Temporal Severity
Functioning Properties
Specific Condition
Gender
Life Cycle
Treatment
Diagnostic Criteria
Algorithmic Serialization of the Foundation Component into a *Linearization* Mutually Exclusive And Exhaustive
Linearizations for multiple use-cases
Morbidity, Mortality, Quality, …
ICD 11 Linearization(s)
and the Foundation Component

Foundation Component

- Semantic Network
  - Allows multiple parenting
- Ontological Scaffolding
  - SNOMED Common Ontology
- Has “Content Model”
  - Definitions, Preferred Terms
  - Etiology, Anatomy, Severity
- Meaningless Identifiers (uri)
- Potentially huge
- Rapid updates possible

Linearization(s)

- Mutually Exclusive
  - Always single parent
- Exhaustive
  - Residual Categories
- Derive From Foundation L.
  - Inherit content model
- Stable versions intended
- Examples
  - Morbidity
  - Mortality (mapping, tabular)
  - Primary Care
JLMMS: The Joint Linearization for Morbidity and Mortality Statistics

• Petitioned by Morbidity and Mortality TAGs
• Will be the face of ICD11 for statistical commuty.
• Basic framework shares “codes”
• Quasi-autonomous specification-JLMMS task force
  • Mono-hierarchy (single parent specification)
  • The “shoreline” (boundary of pre-coordination)
• Subtle distinctions for morbidity and mortality
  • Post-coordination permitted for morbidity
  • Some rubrics designated for Mb or Mt only
Linearizations for Discovery and Quality
ICD-11 Beyond JLMMS

Some example linearizations possible:

• Quality Improvement
• Clinical Decision Support
• Community public health
• Clinical Practice Management
• Sub-specialty detail
• Precision Medicine discovery and implementation

All linked together via ICD11 Foundation
Relationship with IHTSDO
SNOMED content

• IHT (SNOMED) will require high-level nodes that aggregate more granular data
  • Use-cases include mutually exclusive, exhaustive,…
  • Sounds a lot like ICD

• ICD-11 will require lower level terminology for value sets which populate content model
  • Detailed terminological underpinning
  • Sounds a lot like SNOMED

• Memorandum of Agreement – July 2010!
  • WHO right to use for authoring and interpretation
Potential Future States (2007)

ICD-11

Ghost SNOMED

SNOMED

Ghost ICD
Common Ontology

• Joint effort between WHO and IHTSDO
• A subset of SNOMED CT
• Provides semantic anchoring of ICD11 Foundation Component
  • Semantic backbone
• All ICD11 Foundation Component elements will be defined by “query expressions” against the Common Ontology
ICD 11 Architecture

Foundation Layer
Contingent knowledge: signs, symptoms, causes, …, linkage entities

Common Ontology
a subset of SNOMED CT classes and axioms

Linearizations
Mortality  Morbidity  Primary Care  ...

SNOMED CT
Common Ontology (definitions)
ICD 11 Linkage Queries

Links between Foundation Component and Linearizations

Morbidity Linearization

Residual Categories

NEC NOS

Morbidity Linearization

Morbidity

“Hypertension excluding Pregnancy”

SELECT ?CN WHERE
(?CN SubclassOf Hypertension)
MINUS
(?CN SubclassOf Disorders of Pregnancy)

Common Ontology

a subset of SNOMED CT

All linearization entities are represented as queries against Common Ontology.
Status of Work
Semantic Alignment of Lexical Maps: Not Order Preserving

ICD-11  SNOMED CT

Disease of circulatory system

Hypertensive disease

Secondary hypertension

Pheochromocytoma

Secondary hypertension w/endocrine disorder

Disease/Disorder

Hypertensive disorder

Systemic arterial

Neoplastic disease

Pheochromocytoma

Rodrigues et al. Medinfo 2015
Semantic Alignment of Lexical Maps: Order Preserving

Disease of circulatory system

Hypertensive disease

Secondary hypertension

Secondary hypertension w/endocrine disorder

(2ndry HTN w/)
Pheochromocytoma

2ndry HTN d/t Pheochromocytoma

2ndry Hypertension w/Endocrine disorders

Hypertensive disorder

Systemic arterial

Secondary hypertension

Secondary hypertension w/endocrine disorder

Pheochromocytoma

Neoplastic disease

ICD-11 JLMMS

Disease/Disorder

SNOMED CT

Rodrigues et al. Medinfo 2015
Personal Understanding of Work Status

• Pilot work done on one chapter—cardiovascular
• Initial players in process highly enthusiastic
• New management at SNOMED
  • Board-level concern about intellectual property
• Personalities at WHO
  • ICT Coordinator assumed new role in “Big Data”
• Presently work is in Hiatus
• WHO ADG and Director re-opening discussions with IHTSDO
Present WHO Priorities

• JLMSS is priority #1
• All-hands-on-deck for Tokyo Oct 2016 unveiling
• No resources or considerations deflected
• Effective delivery date ICD11—late 2017
• Ratification by World Health Assembly-2018
Strategic Priorities Going Forward
Referencing SNOMED
In Order of WHO Enthusiasm

- Semantic scaffolding of Foundation Component
  - The Common Ontology (mid-2017 earliest)
- Complete population of ICD11 Information Model
  - Crowd-source with review
  - Distributed authoring
- Clinical Criteria (phenotyping algorithms)
  - Technology tier appropriate
  - Multiple scenario template
  - *Sine qua non* for automated EHR ICD coding