

How ICD10, SNOMED-CT and GO Can Benefit from the FMA

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FMA

- One of best made ontologies
- Has single inheritance
 - Liver is-a lobular organ
 - Lobular organ is-a parenchymatous organ
 - Parenchymatous organ is-a solid organ
 - Solid organ is-a organ
 - Organ is-a anatomical structure
- Parthood relations
 - Superficial fascia of mouth part-of mouth
 - mouth part-of alimentary system

FMA

- Good thing about it
 - many
- Not so good thing about it
 - Right upper first primary molar tooth is-a upper first primary molar tooth is-a upper primary molar tooth is-a primary molar tooth is-a molar tooth
 - Structure and Function

FMA

- Attributes: boundary, 3-D, mass
- Considers different aspects of classification
- Provides different levels of granularity, though does not make it explicit
 - Body part, Body part subdivision
 - Organ system, Organ system subdivision
 - Organ, Organ part
 - Tissue, Tissue subdivision
 - Cell, Cell part

FMA

- Adjacency, Containment, Connectivity (Continuity, Attachment), Boundary
- Subdivisions, Zones, Parts, Zones, Walls, Cavities

ICD10

- A classification of diseases
- Provides an anatomical vocabulary
- Problems with the use of is-a
 - Viral enteritis NOS is-a Viral intestinal infection unspecified
 - Tuberculosis of larynx is-a Tuberculosis of larynx, trachea and bronchus

ICD10

- Method of classification
 - Infectious diseases
 - Intestinal infectious diseases
 - Tuberculosis
 - Certain zoonotic bacterial diseases
 - Infections with predominantly sexual mode of transmission
 - Other spirochetal diseases
 - Rickettsiosis
 - Viral infection of the central nervous system
 - Viral hepatitis

ICD10

- Typhoid fever is-a intestinal infectious disease
 - Typhoid fever, unspecified
 - Typhoid meningitis
 - Typhoid endocarditis
 - Typhoid pneumonia
 - Typhoid arthritis
 - Typhoid osteomyelitis
- Primary site of carcinoma and secondary sites?
- Spread : Occurrent?

SNOMED-CT

- Usage: Hospitals, Medical Associations, Clinical bioinformatics
- Problems with is-a relations
 - Dupuytren’s disease of palm, nodules with no contracture is-a contracture of palmar fascia
 - wedge fracture of vertebra is-a collapse of lumbar vertebra
 - structure of labial vein is-a vulval vein; structure of labial vein is-a structure of vein of head
 - amputation of leg means RT: “amputation of lower leg”; and in CT: “amputation of any part of the lower limb, including complete amputation”

SNOMED-CT

- open fracture of head of femur is-a fracture of femur
- open fracture head, femur is-a fracture of neck of femur
- structure of tibial nerve is-a thigh part
- structure of tibial nerve is-a lower leg structure

SNOMED-CT

- Diseases treated in ways similar and dissimilar from ICD10
 - Colon Carcinoma (location, pathology)
 - AIDS (cause, effect, system dependence)
- Multiple inheritance vs. Single Inheritance
- What about Java?
- Necessary traits for a single inheritance proposer
 - To be a strong personality
 - To be ready to sacrifice

SNOMED-CT

- Traits for partitions proposer
 - To agree that the practice existed (maybe not the theory)
 - To agree that it was being done in IT by other means
- Traits for multiple inheritance proposer
 - To be lenient

GO

Locus_id	GO_id	GO_term	Term_type
1356	GO:0006811	ion transport	biological_process
1356	GO:0006825	copper ion transport	biological_process
1356	GO:0006878	copper ion homeostasis	biological_process
1356	GO:0006879	iron ion homeostasis	biological_process
1356	GO:0005507	copper ion binding	molecular_function
1356	GO:0016491	oxidoreductase activity	molecular_function
1356	GO:0004322	ferroxidase activity	molecular_function
1356	GO:0005375	copper ion transporter activity	molecular_function
1356	GO:0005615	extracellular space	cellular_component

GO for humans

- nucleus part-of cell
- Nucleated cell and non-nucleated cell
- Cytoplasms of nucleated and non-nucleated cells
- Properties related to nucleated cells
- Nucleated precursors of non-nucleated cells
- nucleus part-of (cells in nucleated stage)

GO for humans

- pronucleus is-a nucleus
- germ cell nucleus is-a nucleus
- apical part of cell part-of intracellular
- apical part of (cell which have apices)
- apex part-of apical cells
- apex part-of (cells in apical cellular stage)
- flagellum, cilium, thylakoid

GO for humans

- non-nucleated lens fiber, nucleated secondary lens fiber, non-nucleated colligocyte, non-nucleated solocyte
- cell body part of cell
- midbody part of cell
- inclusion body part of cell

Where are we with usage?

- I am not talking about NLP
- We are making and using dictionaries
- We are moving towards the use of hierarchy
- We do not use relations except subsumption
- We do not use inferences based on ontologies
- We do not want to go beyond certifications
- This is where we do not want to be for too long
- Moving targets like FMA will keep moving and will be accepted