



SNOMED CT vs. ICD 9/10

SNOMED Clinical Terms

- A controlled coded clinical terminology for use in Electronic Health Records
 - Developed in the USA and the UK as a merger of earlier versions of SNOMED with the NHS Clinical Terms (Read Codes)
 - College of American Pathologists in USA
 - National Health Service (NHS) in the UK
 - Design based on
 - Identified user requirements
 - Practical experience
 - Scientific principles established in peer reviewed publications
 - First released in 2002
- Acquired for the public good by IHTSDO in 2007
- In 2017 IHTSDO adopted the trading name
SNOMED International

SNOMED International

- **Is a not-for-profit company**
 - Owned by its Members
 - Governed by General Assembly of its Members
 - Funded by its members based on national wealth
- **Maintains and delivers SNOMED CT**
 - Licensed to registered Affiliates
 - SNOMED International does not charge for use in Member territories
 - Low-cost licenses for institutions in other territories
 - Free in lowest income countries
 - Fee waivers for approved research and 'Public Good' uses

SNOMED International Members (April 2019)

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 Austria	 Estonia	 Luxembourg	 Slovak Republic
 Australia	 Finland	 Malaysia	 Slovenia
 Belgium	 Hong Kong	 Malta	 Spain
 Brazil	 Iceland	 The Netherlands	 Sweden
 Brunei	 India	 New Zealand	 Switzerland
 Canada	 Ireland	 Norway	 United Kingdom
 Chile	 Israel	 Poland	 USA
 Cyprus	 Jordan	 Portugal	 Uruguay
 Czech Republic	 Kazakhstan	 Saudi Arabia	

Meaningful Use

- u CMS 'Meaningful Use' incentive program for EHR, Stage 2 Certification criteria:
 - l SNOMED CT to be used in
 - n Problems
 - n Procedures
 - n Smoking status
 - n Some laboratory tests results
 - n Family health history
 - n Cancer registry



ICD

INTERNATIONAL CODE OF DISEASE (ICD)

- Sviluppato e mantenuto dal WHO
- Nasce come classificazione delle cause di morte
- Attualmente è uno standard di classificazione dedicato all'epidemiologia e alla gestione sanitaria



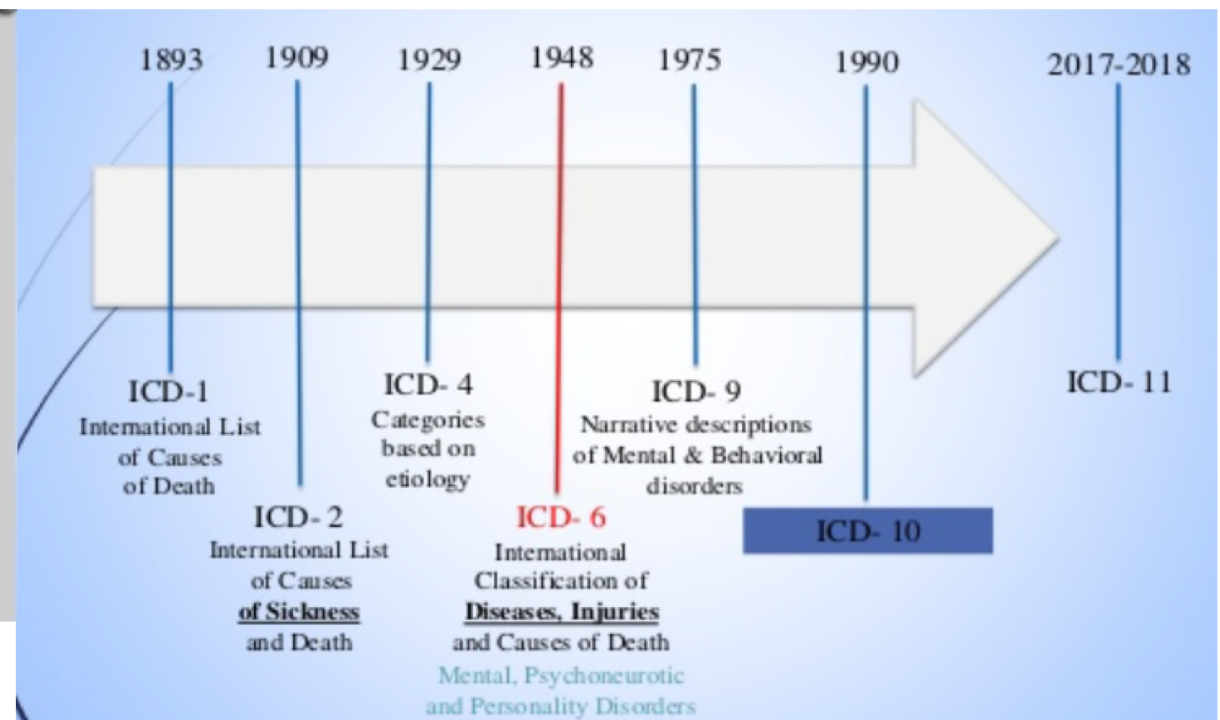
Evolution of ICD

First medical statistician of the General Register Office of England and Wales submitted his *Report in 1855 on nomenclature and statistical classification of diseases*, in which he included most of those fatal diseases that affect health.



William Farr
(1807-1883)

Prima "versione": 1850



SNOMED CT vs. ICD for the EHR

- u ICD-9-CM is accepted as an alternative for problem list in MU1, but not MU2, despite the ubiquity of ICD-9-CM codes in the EHR
- u Rationale: SNOMED CT (a clinical terminology) is inherently more suitable than ICD (a medical classification) for capturing clinical information
 - Content coverage
 - Clinical orientation
 - Flexible data entry and retrieval



ICD STRUCTURE

- Originally conceived by William Farr as a classification of death causes
- Lists only those causes that are statistically/epidemiologically relevant
- 5 groups
 - Epidemic diseases
 - Constitutional or general diseases
 - Local diseases arranged by site
 - Developmental diseases
 - Injuries.

Volumes of ICD-10

Volume 1: Tabular list

Volume 2: Instruction manual

Volume 3: Alphabetical Index



ICD ALPHABETICAL INDEX: CHAPTERS



UNIVERSITÀ
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XXI CHAPTERS

Chapter	Chapter Title	Codes
I	Infectious and parasitic diseases	A00-B99
II	Neoplasms	C00-D49
III	Diseases of the blood & blood-forming organs & disorders of the immune mechanism	D50-D59
IV	Endocrine, nutritional and metabolic diseases	E00-E99
V	Mental and behavioral disorders	F00-F99
VI	Diseases of the nervous system	G00-G99
VII	Diseases of the eye and adnexa	H00-H59
VIII	Diseases of the ear and mastoid process	H60-H99
IX	Diseases of the circulatory system	I00-I99
X	Diseases of the respiratory system	J00-J99
XI	Diseases of the digestive system	K00-K99
XII	Diseases of the skin and subcutaneous tissue	L00-L99

ICD ALPHABETICAL INDEX: CHAPTERS



Chapter	Chapter Title	Codes
XIII	Diseases of the musculoskeletal system & connective tissue	M00-M99
XIV	Diseases of the genitourinary system	N00-N99
XV	Pregnancy, childbirth and the puerperium	O00-O99
XVI	Certain conditions originating in the perinatal period	P00-P99
XVII	Congenital malformations, deformations, and chromosomal abnormalities	Q00-Q99
XVIII	Symptoms & abnormal clinical & lab findings, not elsewhere classified	R00-R99
XIX	Injury, poisoning and certain other consequences of external causes	S00-T99
XX	External causes of morbidity and mortality	V00-Y99
XXI	Factors influencing health status & contact with health services	Z00-Z99



ICD CODING RULES

- Basic coding guideline:

LETTER	NUMBER	NUMBER	.	NUMBER
A	0	0	.	0
...				
Z	9	9	.	9

Three-character category

Sub-category

- Three-character categories is mandatory level of coding for international reporting to the WHO mortality database and for general international comparisons.
- Some three-character categories have been left vacant for future expansion / Revision
 - Codes U00–U49 are to be used by WHO for the provisional assignment of new diseases of uncertain etiology.
 - Codes U50–U99 may be used in research, e.g. when testing an alternative sub-classification for a special project. Basic coding guidelines

SPECIAL CHARACTERS: DAGGER AND ASTERISKS



Amoebiasis (A060 to A069)		Intracranial & intraspinal abscess (G07*)
A06.0	Acute amoebic dysentery	Abscess of Brain
A06.1	Chronic intestinal dysentery	• Amoebic brain abscess (A06.6 †)
A06.2	Amoebic nondysenteric colitis	• Gonococcal abscess (A54.8 †)
A06.3	Amoeboma of intestine	• Tuberculous abscess (A17.8 †)
A06.4	Amoebic liver abscess	
A06.5 †	Amoebic lung abscess (J99.8*)	
A06.6 †	Amoebic brain abscess (G07*)	
A06.7	Cutaneous amoebiasis	
A06.8	Amoebic infection of other parts	
A06.9	Amoebiasis unspecified	

Asterisk (*) – Used for the secondary cause

Dagger (†) - Used for the root cause

INCLUSIONS AND EXCLUSIONS



► Tuberculosis (A15-A19)

► Incl.: Infections due to *Mycobacterium tuberculosis* and
Mycobacterium bovis

► Excl.: congenital tuberculosis ([P37.0](#))

human immunodeficiency [HIV] disease resulting in
tuberculosis ([B20.0](#))

pneumoconiosis associated with tuberculosis ([J65](#))

sequelae of tuberculosis ([B90.-](#))

silicotuberculosis ([J65](#))



PARKINSON'S DISEASE

ICD-10 Version:2016

Search [Advanced Search]

ICD-10

Versions - Languages

Info

▼ ICD-10 Version:2016

- ▶ I Certain infectious and parasitic diseases
- ▶ II Neoplasms
- ▶ III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
- ▶ IV Endocrine, nutritional and metabolic diseases
- ▶ V Mental and behavioural disorders
- ▼ VI Diseases of the nervous system
 - ▶ G00-G09 Inflammatory diseases of the central nervous system
 - ▶ G10-G14 Systemic atrophies primarily affecting the central nervous system
 - ▼ G20-G26 Extrapyrarnidal and movement disorders
 - G20 Parkinson disease
 - ▶ G21 Secondary parkinsonism
 - G22 Parkinsonism in diseases classified elsewhere
 - ▶ G23 Other degenerative diseases of basal ganglia
 - ▶ G24 Dystonia
 - ▶ G25 Other extrapyramidal and movement disorders
 - G26 Extrapyrarnidal and movement disorders in diseases classified elsewhere
 - ▶ G30-G32 Other degenerative diseases of the nervous system
 - ▶ G35-G37 Demyelinating diseases of the central nervous system
 - ▶ G40-G47 Episodic and paroxysmal disorders
 - ▶ G50-G59 Nerve, nerve root and plexus disorders
 - ▶ G60-G64 Polyneuropathies and other disorders of the peripheral nervous system
 - ▶ G70-G73 Diseases of myoneural junction and muscle
 - ▶ G80-G83 Cerebral palsy and other paralytic syndromes



Extrapyrarnidal and movement disorders (G20-G26)

G20 Parkinson disease

- Incl.:* Hemiparkinsonism
Paralysis agitans
Parkinsonism or Parkinson disease:
- NOS
 - idiopathic
 - primary

G21 Secondary parkinsonism

G21.0 Malignant neuroleptic syndrome

Use additional external cause code (Chapter XX), if desired, to identify drug.

G21.1 Other drug-induced secondary parkinsonism

Use additional external cause code (Chapter XX), if desired, to identify drug.

G21.2 Secondary parkinsonism due to other external agents

Use additional external cause code (Chapter XX), if desired, to identify external agent.

G21.3 Postencephalitic parkinsonism

G21.4 Vascular parkinsonism

G21.8 Other secondary parkinsonism

G21.9 Secondary parkinsonism, unspecified

G22* Parkinsonism in diseases classified elsewhere

- Incl.:* Syphilitic parkinsonism ([A52.1†](#))

G23 Other degenerative diseases of basal ganglia

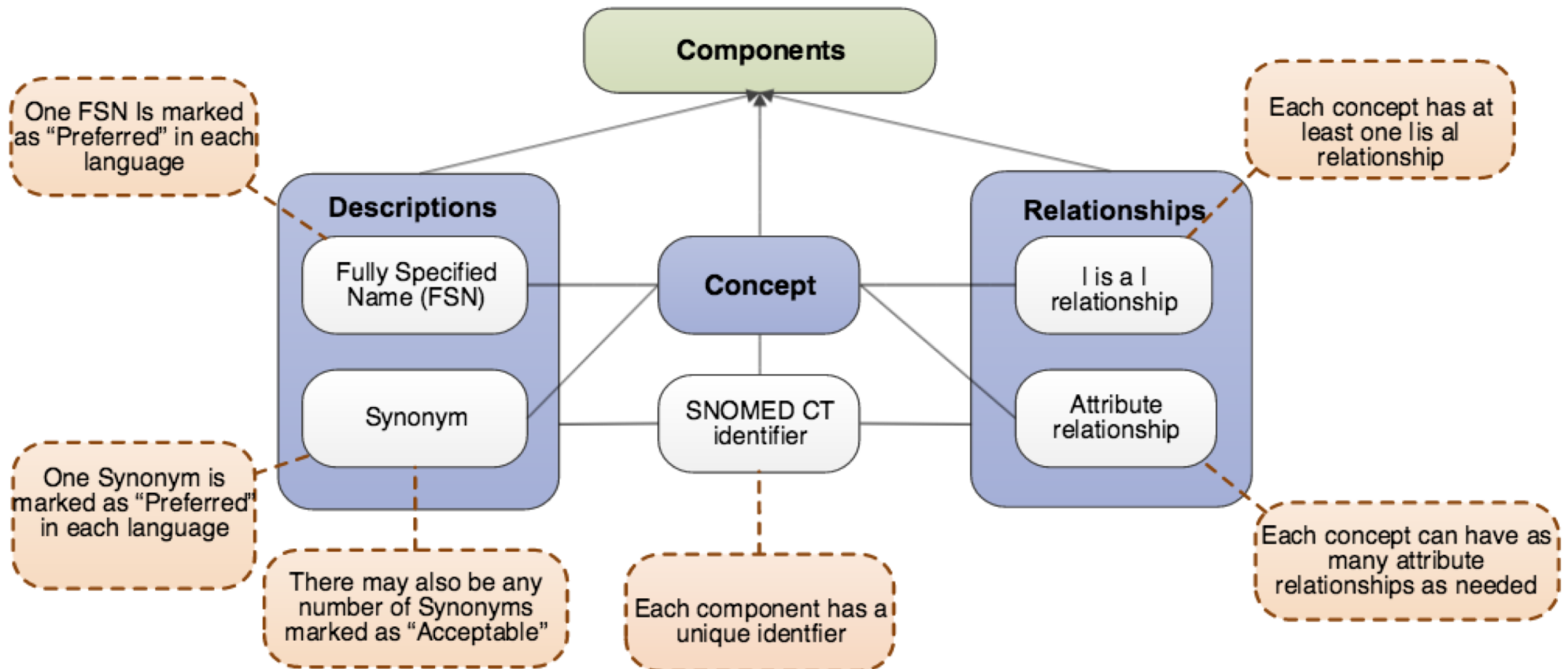
G23.0 Hallervorden-Spatz disease

Pigmentary pallidal degeneration

G23.1 Progressive supranuclear ophthalmoplegia [Steele-Richardson-Olszewski]

Progressive supranuclear palsy

SNOMED CT LOGICAL MODEL



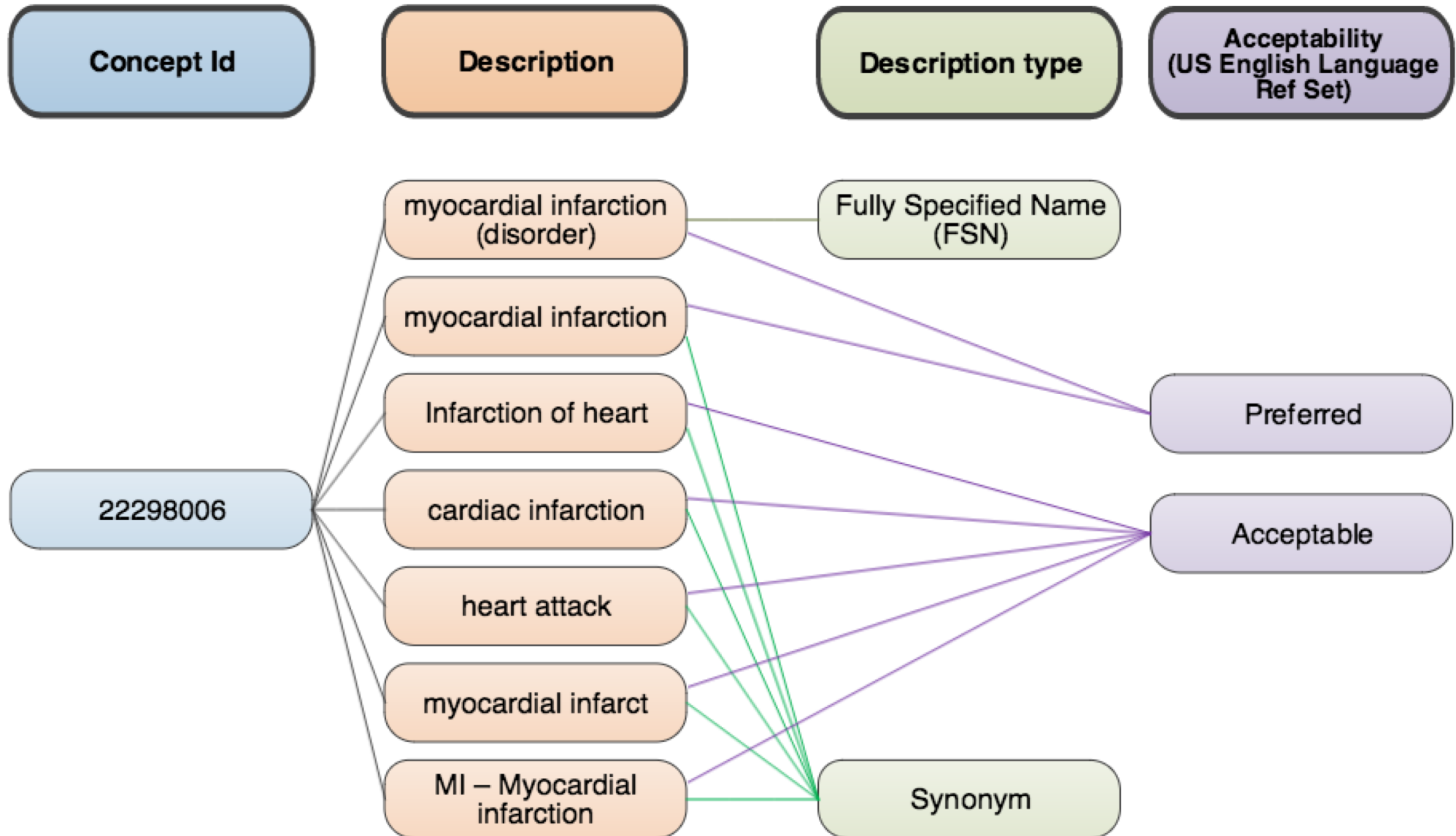
Concept = unique clinical meaning, which is referenced using a unique, numeric and machine-readable SNOMED CT identifier (pre-coordinated). The identifier provides an unambiguous unique reference to each concept and does not have any ascribed human interpretable meaning

Description = set of textual descriptions assigned to every concept. These provide the human readable form of a concept. Two types of description are used to represent every concept - Fully Specified Name (FSN) and Synonym.

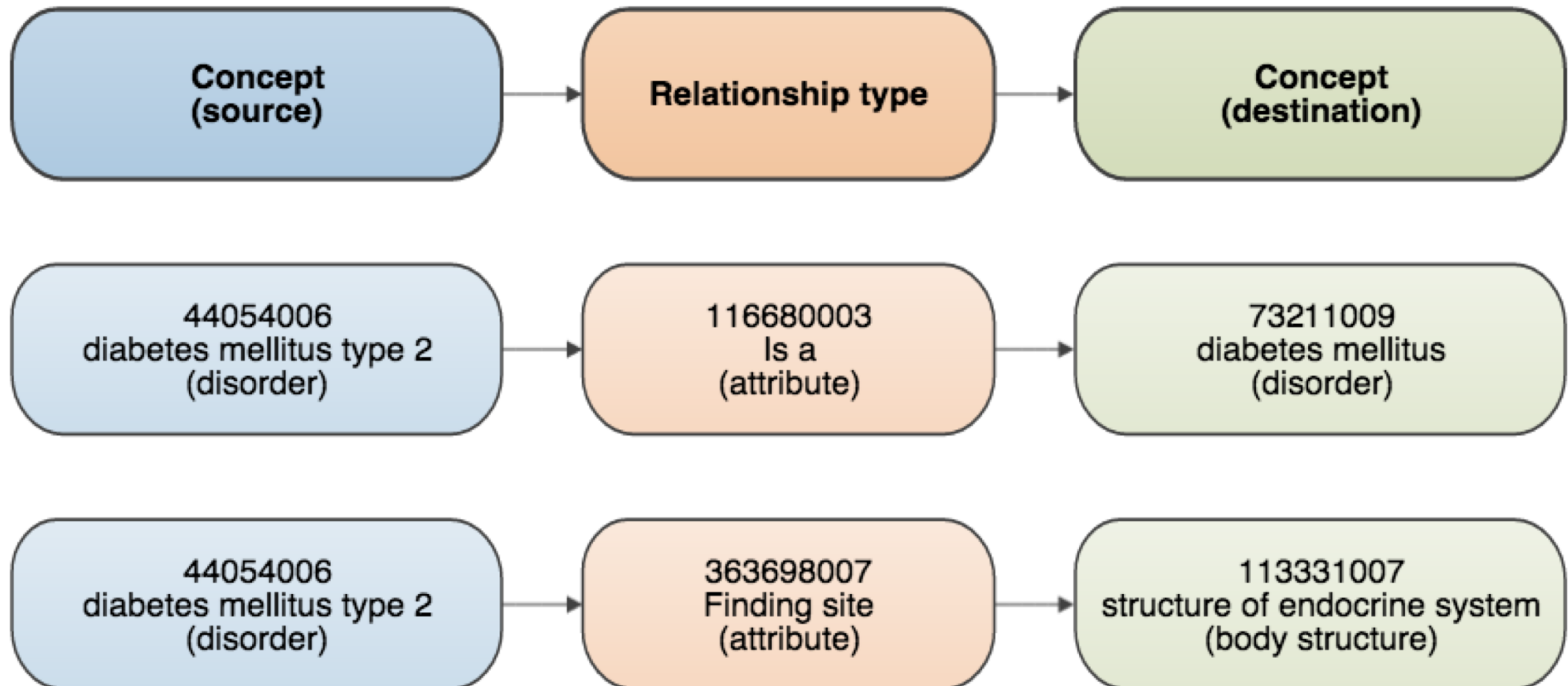
Relationship = association between two concepts. Relationships are used to logically define the meaning of a concept in a way that can be processed by a computer. A third concept, called a relationship type (or attribute), is used to represent the meaning of the association between the source and destination concepts.



EXAMPLE



EXAMPLE - RELATIONSHIPS



PARKINSON'S DISEASE



SNOMED CT Browser Release: International Edition 2019-07-31 Perspective: Full Feedback About 🇮🇹 SNOMED International

Taxonomy Search Favorites Refset

Search 🔍

Options

Search Mode: Partial matching search mode ▼

Status: Active concepts only ▼

Group by concept

Filter results by Language

english 245

Filter results by Semantic Tag

disorder 72

environment 1

occupation 1

assessment scale 1

procedure 1

finding 13

situation 2

Filter results by Module

SNOMED CT core module 245
(core metadata concept)

Type at least 3 characters ✔ Example: shou fra

Parkinson

245 matches found in 1.507 seconds.

● Parkinsonism	Parkinsonism (disorder)
■ FH: Parkinsonism	Family history: Parkinsonism (situation)
● Parkinson facies	Parkinson's facies (finding)
● Parkinsonian gait	Extrapyramidal gait (finding)
● Parkinson disease	Parkinson's disease (disorder)
● Parkinson's facies	Parkinson's facies (finding)
● Parkinsonian shift	Extrapyramidal gait (finding)
● Parkinsons disease	Parkinson's disease (disorder)
● Parkinson's disease	Parkinson's disease (disorder)
● Parkinsonian tremor	Parkinsonian tremor (finding)
■ Parkinsonian ataxia	Parkinsonian ataxia (finding)
● Parkinsonian facies	Parkinsonian facies (finding)
● Parkinson disease 9	Kufor Rakeb syndrome (disorder)
● Parkinsonian shuffle	Extrapyramidal gait (finding)
■ O/E - Parkinson gait	On examination - festination-Parkinson gait (finding)
● Primary Parkinsonism	Parkinson's disease (disorder)

Concept Details Expression Constraint Queries

Concept Details 🔍 ⚙️

Summary Details Diagram Expression Refsets Members References Stated Inferred

Parents

- ▶ ■ Disorder of basal ganglia (disorder)
- ▶ ■ Extraparimal disease (disorder)
- ▲ ● Parkinsonism (disorder)

● Parkinson's disease (disorder) ★ 📄

SCTID: 49049000

49049000 | Parkinson's disease (disorder) |

- en Idiopathic Parkinson's disease
- en Parkinson disease
- en Parkinsons disease
- en PD - Parkinson's disease
- en Parkinson's disease (disorder)
- en Idiopathic Parkinsonism
- en Primary Parkinsonism
- en Parkinson's disease
- en Shaking palsy
- en Paralysis agitans

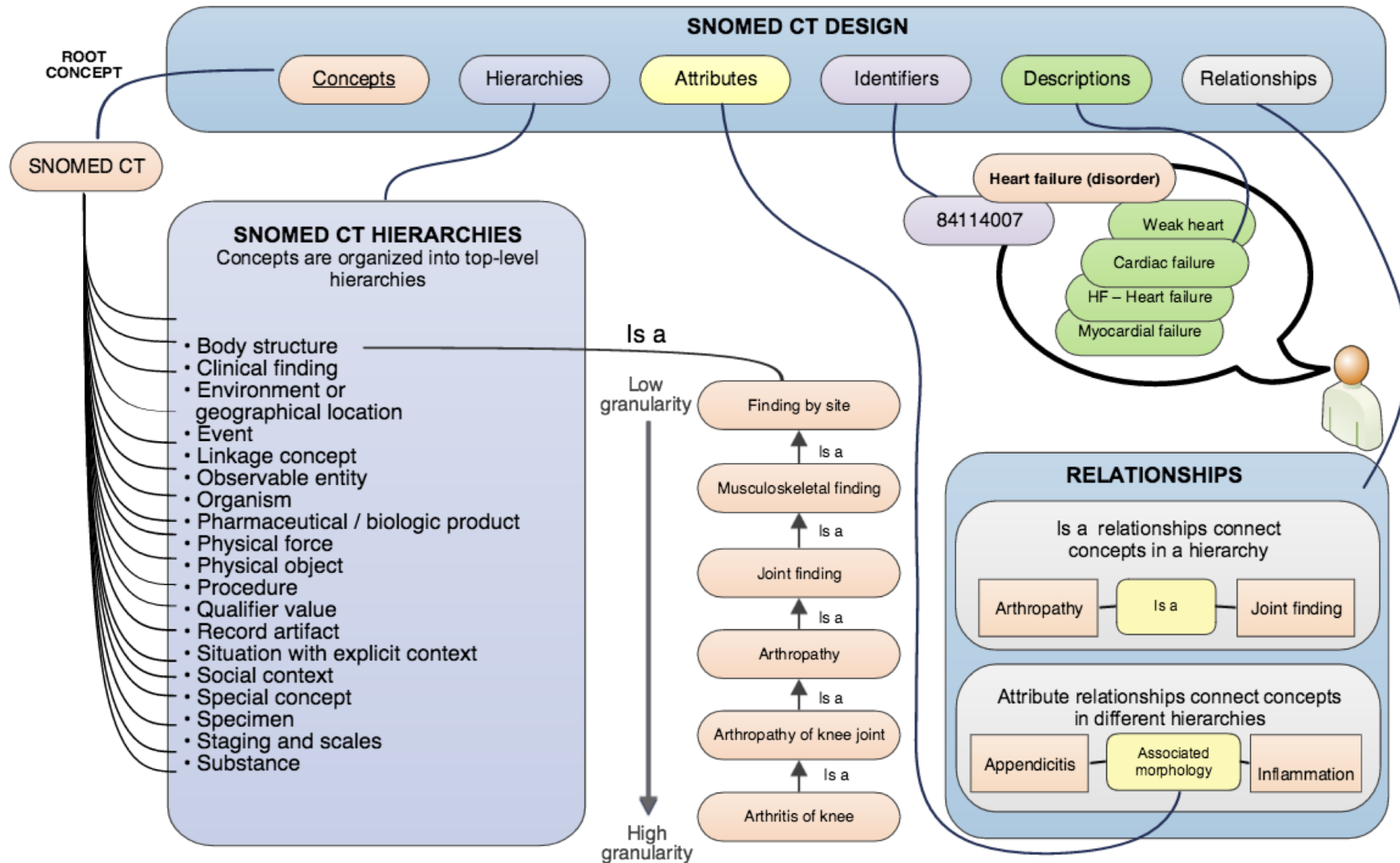
Finding site → Basal ganglion structure

Children (5)

- Autosomal dominant late onset Parkinson disease (disorder)
- Juvenile Parkinson's disease (disorder)
- Orthostatic hypotension co-occurrent and due to Parkinson's disease (disorder)
- Sporadic Parkinson disease (disorder)
- ▶ ● Young onset Parkinson disease (disorder)

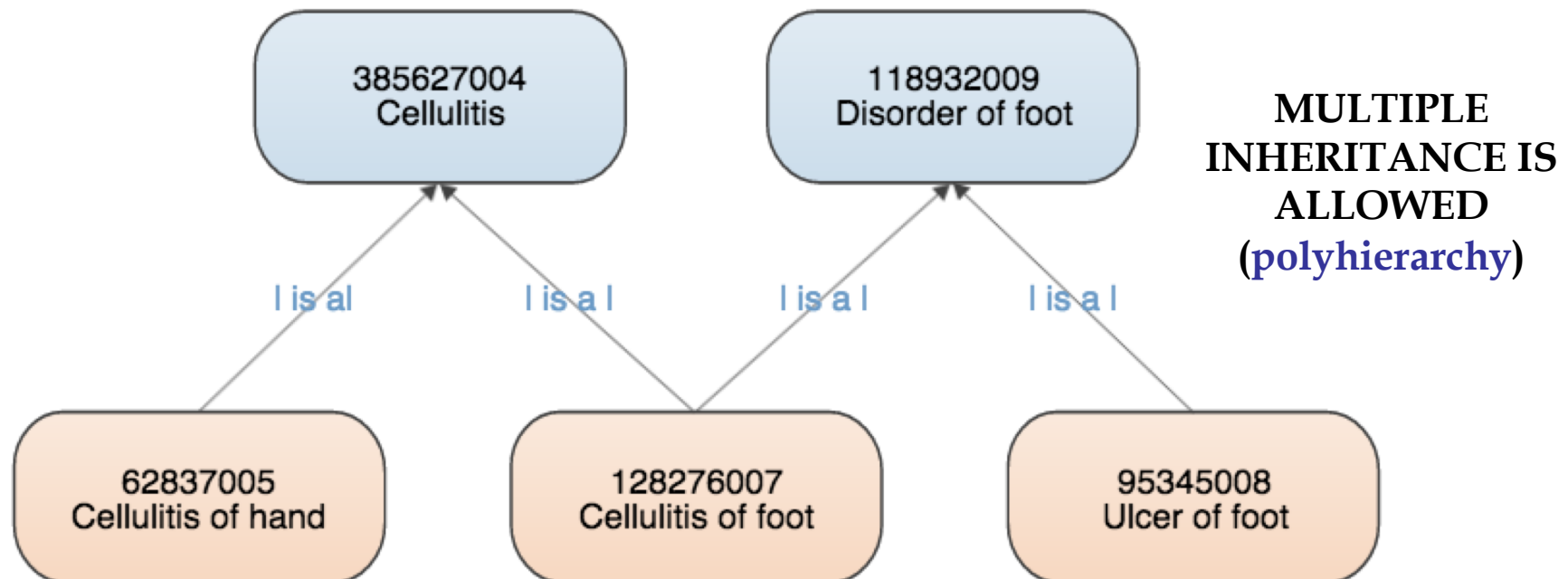
Screen

SNOMED CT LOGICAL DESIGN



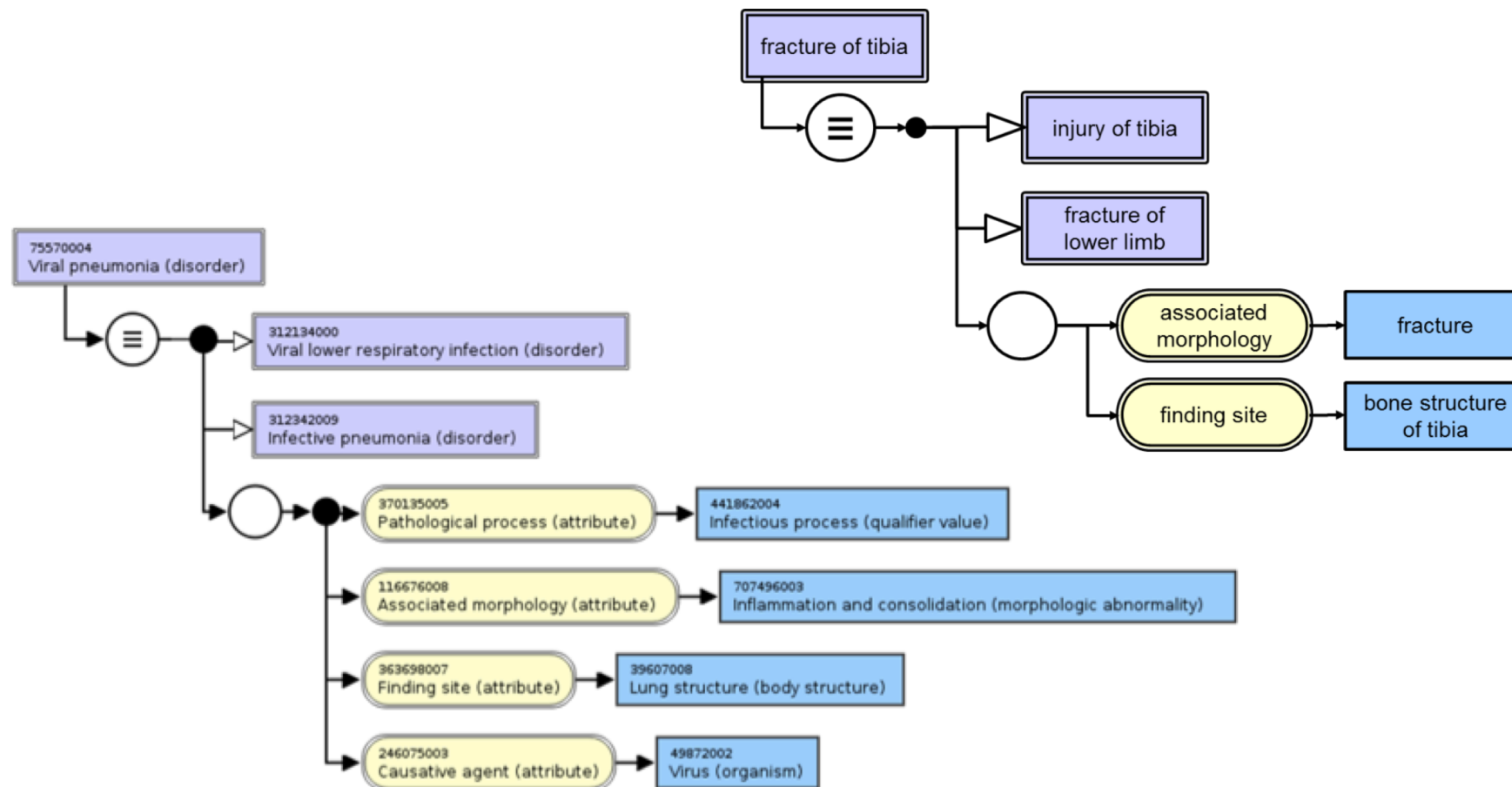
HIERARCHIES

- SNOMED CT concepts are organized in hierarchies.
- Within a hierarchy concepts range from the more general to the more detailed.
- Related concepts in the hierarchy are linked using the |is a| relationship.
- Examples of some of the hierarchies include:
 - | clinical finding |
 - | procedure |
 - | observable entity |
 - | body structure |
 - | organism |



PRE-COORDINATED EXPRESSIONS

- Precoordinated expressions represent the meaning of individual **concepts** which **are predefined in SNOMED CT**.
- Each concept also has a formal logic definition represented by a set of defining relationships to other concepts.





POST-COORDINATED EXPRESSIONS

- Expressions that contain **two or more concept identifiers**.
- Postcoordination **combines concepts** and allows more detail to be added to the meaning represented by a single concept.
- A postcoordinated expression is not just a list of concept identifiers, **it follows a set of rules** that mimic the way attributes and values are used to define SNOMED CT concepts.
- Postcoordinated expressions **may be created at run-time** by selection of individual facets of a concept.

Example: Postcoordinated representation of "Laparoscopic removal of device from abdomen"

SNOMED CT does not contain a concept that represents this clinical idea. However, it is possible to represent it using the following postcoordinated expression.

68526006|removal of device from abdomen:425391005|using access device= 6174004||laparoscope

CONCEPT

RELATIONSHIP

CONCEPT



PRE- vs POST-COORDINATION

Example: Precoordinated representation of "Laparoscopic emergency appendectomy"

SNOMED CT contains the concept `174041007|laparoscopic emergency appendectomy|`. The identifier of this concept (174041007) can be used (with or without the associated term) as a precoordinated expression to record an instance of this procedure.

The procedure 'laparoscopic emergency appendectomy' has at least three distinct facets: 'removal of appendix', 'using a laparoscope' as 'emergency procedure'. The SNOMED CT concept `174041007|laparoscopic emergency appendectomy|` precoordinates these facets as its definition includes the following defining relationships:

- `116680003|is a| = 80146002|appendectomy|`
- `260870009|priority|=25876001|emergency|`
- `425391005|using access device| = 86174004|laparoscope|`

Example: Postcoordinated representation of "Laparoscopic emergency appendectomy"

Although SNOMED CT contains the concept `|laparoscopic emergency appendectomy|`, it is also possible to represent this clinical phrase using the following postcoordinated expression.

- `80146002|appendectomy|:260870009|priority|=25876001|emergency|, 425391005|using access device|=86174004|laparoscope|`

This postcoordinated expression has exactly the same meaning as the precoordinated expression

- `174041007|laparoscopic emergency appendectomy|`

The fact that the two expressions have the same meaning can be computed because

- `174041007|laparoscopic emergency appendectomy|` is a fully-defined subtype descendant of `80146002|appendectomy|` ; and
- the only differences between the defining attributes of these concepts are the addition of
 - `260870009|priority|=25876001|emergency|`
 - `425391005|using access device| = 86174004|laparoscope|`

Content coverage

- u SNOMED CT has much better clinical coverage than ICD
- u Number of codes:
 - SNOMED CT (Clinical finding): 100,000
 - ICD-9-CM: 14,000
 - ICD-10-CM: 68,000
- u 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
- u SNOMED CT is clinically-based – document whatever is important for patient care



	SNOMED CT	ICD-9-CM	ICD-10-CM
Congenital skin anomalies	205573006 Focal dermal hypoplasia 79468000 Familial benign pemphigus 5132005 Keratosis pilaris ... (total 21 codes)	757.39 Other specified congenital anomalies of skin	Q82.8 Other specified congenital malformations of skin
Acidosis	59455009 Metabolic acidosis 12326000 Respiratory acidosis 91273001 Lactic acidosis ... (total 60 codes)	276.2 Acidosis	E87.2 Acidosis
Brachial plexus disorders	72893007 Brachial neuritis 278065000 Pancoast's syndrome 78141002 Erb-Duchenne paralysis ... (total 33 codes)	353.0 Brachial plexus lesions	G54.0 Brachial plexus disorders



SNOMED CT is extensible

- u Coverage of SNOMED CT is not limited to existing codes
- u ICD
 - no reproducible method for adding codes
 - Local extension codes are not shareable
- u SNOMED CT – well-defined rules to extend coverage by modifying or refining existing concepts (post-coordination) e.g.
 - New concept “Left kidney stone” can be created by adding the laterality attribute “*Left*” to “*Kidney stone*”
- u Advantages:
 - Can compute equivalence of new concepts to existing concepts
 - The new concept (left kidney stone) will be recognized as a sub-type of existing concepts (kidney stone)



Clinical orientation

- u SNOMED CT terms are words that clinicians use in clinical discourse, but some ICD names are not
 - l SNOMED CT: *281430007 Failure of tendon graft*
 - l ICD-9-CM: *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*
- u Excessive detail in some areas (e.g. external causes of injury)
 - l ICD-10-CM
 - n *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)*
 - l More bizarre examples: burning water-skis, turtle bite
 - l public health perspective vs. patient perspective



Data entry

- u In ICD, 2 kinds of special codes are needed because it is a statistical classification
 - NOS (Not otherwise specified) or Unspecified codes - cases with some missing information and cannot be classified to more specific codes e.g. *Viral pneumonia, unspecified*
 - NEC (Not elsewhere classified) codes - cases with more specific information not covered by available codes e.g. Pneumonia caused by Human metapneumovirus is codes as *Viral pneumonia, NEC*
- u NOS and NEC codes can be confusing for clinical users
- u SNOMED CT
 - no need for NOS or NEC codes
 - Can use codes at any level of specificity as warranted by the clinical situation



Semantic drift of NEC terms

ICD-9-CM in 2003

480 Viral pneumonia

480.0 Pneumonia due to adenovirus

480.1 Pneumonia due to respiratory syncytial virus

480.2 Pneumonia due to parainfluenza virus

480.8 Pneumonia due to other virus not elsewhere classified

480.9 Viral pneumonia, unspecified

ICD-9-CM in 2004

480 Viral pneumonia

480.0 Pneumonia due to adenovirus

480.1 Pneumonia due to respiratory syncytial virus

480.2 Pneumonia due to parainfluenza virus

480.3 Pneumonia due to SARS-associated coronavirus

480.8 Pneumonia due to other virus not elsewhere classified

480.9 Viral pneumonia, unspecified



Semantic drift of NEC terms

ICD-9-CM in 2003

480 Viral pneumonia

480.0 Pneumonia due to adenovirus

480.1 Pneumonia due to respiratory syncytial virus

480.2 Pneumonia due to parainfluenza virus

480.8 Pneumonia due to other virus not elsewhere classified

480.9 Viral pneumonia, unspecified

ICD-9-CM in 2010

480 Viral pneumonia

480.0 Pneumonia due to adenovirus

480.1 Pneumonia due to respiratory syncytial virus

480.2 Pneumonia due to parainfluenza virus

480.3 Pneumonia due to SARS-associated coronavirus

480.8 Pneumonia due to other virus not elsewhere classified

480.9 Viral pneumonia, unspecified



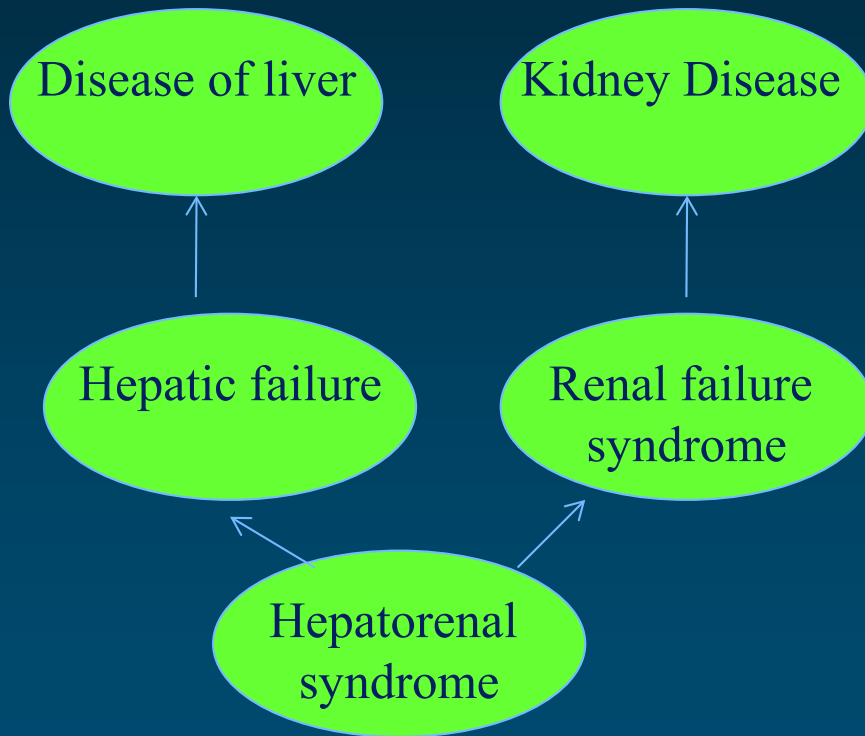
Data retrieval

- u Data retrieval is easier in SNOMED CT
 - Poly-hierarchy
 - Logical definition



Poly- vs. Strict hierarchy

SNOMED CT (poly-hierarchy)



ICD-9-CM (strict hierarchy to avoid double-counting)

DISEASES OF THE DIGESTIVE SYSTEM (520-579)

572 Liver abscess and sequelae of chronic liver disease

572.4 Hepatorenal syndrome



Easier to find codes in polyhierarchy

- u Task: identify all patients suffering from hypertension
- u ICD-9-CM
 - One may be tempted to restrict to *HYPERTENSIVE DISEASE (401-405)*
 - But will be missing
 - n *410.9 Myocardial infarction with hypertension*
 - n *642 Hypertension complicating pregnancy, childbirth, and the puerperium*
- u SNOMED CT
 - Simple query to get all descendants of *38341003 Hypertensive disorder*



Code retrieval using attributes

- u Research interest: diseases caused by arterial occlusion but not those affecting intestinal or renal arteries
- u SNOMED CT
 - Get all descendants of *2929001 Occlusion of artery (183 concepts)*
 - Exclude those with 'Finding site' = 'Structure of mesenteric artery' and descendants; or 'Structure of renal artery' and descendants (11 concepts)
- u ICD-9-CM
 - *440 Atherosclerosis and descendants (except 440.1 Of renal artery)*
 - *437.0 Cerebral atherosclerosis*
 - *414.0 Coronary atherosclerosis*
 - *362.3 Retinal vascular occlusion descendants*
 - *747.22 Atresia and stenosis of aorta*
 - ...
- u When source terminologies are updated
 - SNOMED CT – re-run query
 - ICD-9-CM – manually review all codes



Inter-terminology mapping

- u The CORE concepts are among the priority list of concepts for mapping in two mapping projects
 - SNOMED CT to ICD-10 map – collaborative project between IHTSDO and WHO
 - SNOMED CT to ICD-10-CM map – NLM project to support the transition to ICD-10-CM in the US in 2014
- u MedlinePlus Connect – NLM service to connect patient portals and EHRs to patient education information
 - Accepts CORE concepts as input, which are mapped in the backend to terms used to index MedlinePlus pages

NLM tool for conversion:

<https://imagic.nlm.nih.gov/imagic/code/map>



Terminology research

u Comparison of SNOMED CT to ICD

- Nadkarni PM et al. Migrating existing clinical content from ICD-9 to SNOMED. *J Am Med Inform Assoc* 2010;17:602-7.
- Steindel SJ. A comparison between a SNOMED CT problem list and the ICD-10-CM/PCS HIPAA code sets. *Perspect Health Inf Manag* 2012;9:1b.
- Hogan WR et al. Measuring the Information Gain of Diagnosis vs. Diagnosis Category Coding. *AMIA Annu Symp Proc* 2010;2010:306-10.

u Ontology modularization, translation and graphical representation

- Lopez-Garcia P et al. Usability-driven pruning of large ontologies: the case of SNOMED CT. *J Am Med Inform Assoc* 2012;19:e102-9.
- Abdoune H et al. Assisting the translation of the CORE subset of SNOMED CT into French. *Stud Health Technol Inform* 2011;169:819-23.
- Lamy JB et al. A Semi-automatic Semantic Method for Mapping SNOMED CT Concepts to VCM Icons. *Stud Health Technol Inform* 2013;192:42-6.



CONCLUSIONS: ICD



- Essential to the big picture view of healthcare
 - Group ideas for aggregation and analysis
 - Add statistical value to data
- Limited value in an individual patient record
 - Represent one dimension of meaning
 - For example 'viral pneumonia' (J12 or J12.9)
 - Classified as a 'respiratory disease'
 - But not classified as a 'viral disease'
 - No links to body sites, causes, etc.
 - For example, 'viral pneumonia' (J12 or J12.9)
 - Not linked to site 'lung'
 - Not linked to causative agent 'virus'



CONCLUSIONS: SNOMED CT

- **SNOMED CT**
 - Rich semantic structure adds meaning to the EHR
 - Adequate detail for clinical recording
 - Broad scope of coverage
- **SNOMED CT maps to Classifications**
 - Existing maps to ICD-9-CM and ICD-10
 - Enhanced rule-based mapping to ICD-10
 - Maps to ICD-10 are used by NLM for mapping to ICD-10-CM
- **SNOMED International and WHO**
 - Cooperate on approaches to shared challenges
 - As a common terminology SNOMED CT eases transition to future versions of classifications

NLM SNOMED CT resources

- u NLM Tools for EHR Certification and Meaningful Use
http://www.nlm.nih.gov/healthit/meaningful_use.html
- u CORE Problem List Subset
http://www.nlm.nih.gov/research/umls/Snomed/core_subset.html
- u Convergent Medical Terminology Subsets
<http://www.nlm.nih.gov/research/umls/Snomed/cmt.html>
- u SNOMED CT to ICD-10-CM Map
http://www.nlm.nih.gov/research/umls/mapping_projects/snomedct_to_icd10cm.html
- u ICD-9-CM Diagnostic Codes to SNOMED CT Map
http://www.nlm.nih.gov/research/umls/mapping_projects/icd9cm_to_snomedct.html
- u ICD-9-CM Procedure Codes to SNOMED CT Map
http://www.nlm.nih.gov/research/umls/mapping_projects/icd9cmv3_to_snomedct.html
- u US Edition of SNOMED CT
http://www.nlm.nih.gov/research/umls/Snomed/us_edition.html
- u US SNOMED CT Content Request System
<https://uscrc.nlm.nih.gov/>
- u UMLS-enhanced SNOMED CT browser
<https://uts.nlm.nih.gov/snomedctBrowser.html>
- u NLM Value Set Authority Center (VSAC)
<https://vsac.nlm.nih.gov/>

