

Medizinische Terminologien, Ontologien, SNOMED CT

Tutorial auf der Jahrestagung der HL7- Benutzergruppe,
Göttingen, 30.10.2009



UNIVERSITÄTS
FREIBURG **KLINIKUM**

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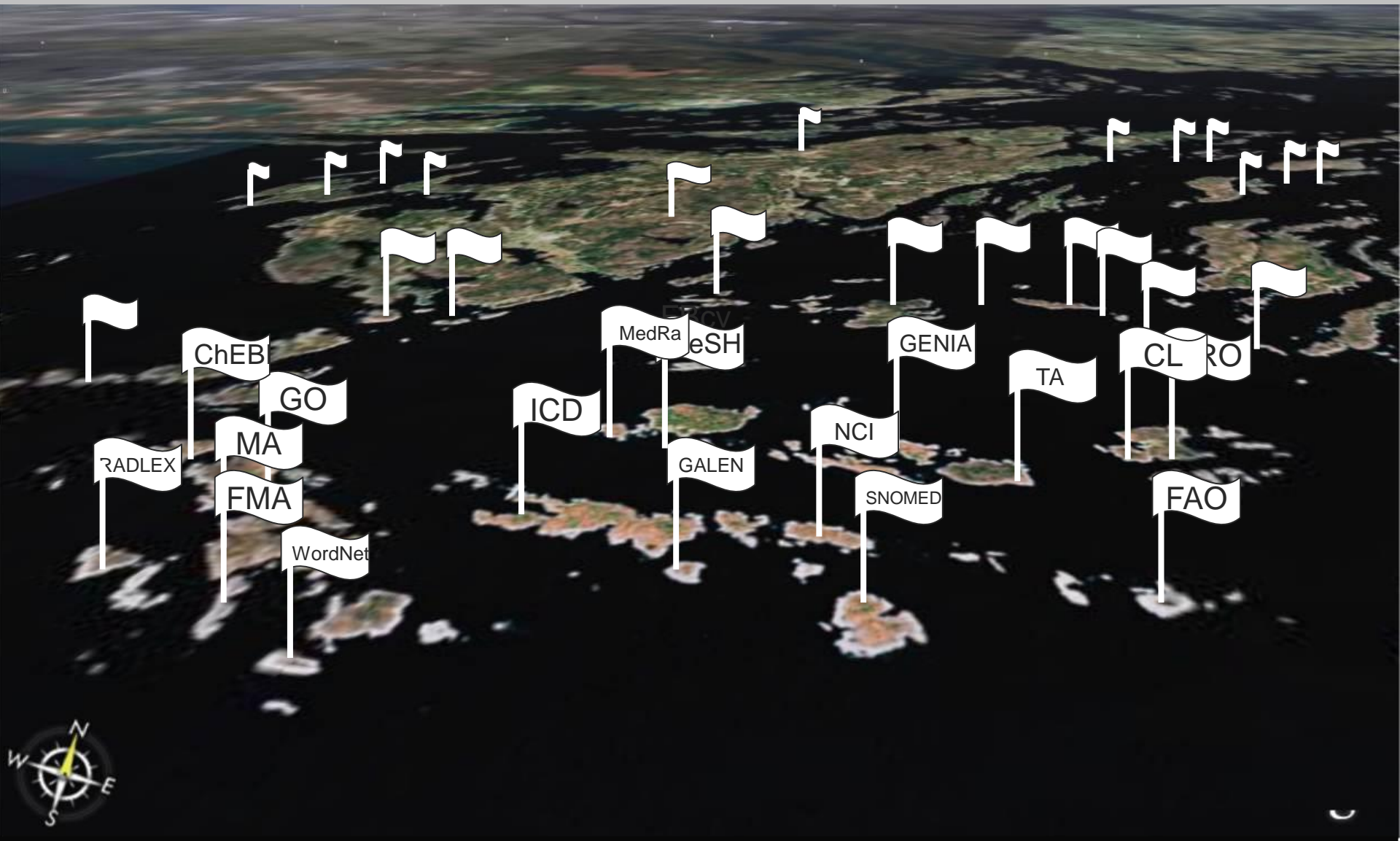
Aufbau des Tutorials

- **Überblick: medizinische Ordnungssysteme**
- Grundbegriffe medizinische Ordnungssysteme
- SNOMED CT
- Ontologien/Terminologien vs. Informationsmodelle
- IHTSDO
- SNOMED CT in Deutschland

Medizinische Ordnungssysteme

- Hierarchisch aufgebaute Systeme, welche Gegenstände (Objekte, Prozesse, Eigenschaften) der Medizindomäne oder der medizinischen Fachsprache kennzeichnen, beschreiben und mit eindeutigen Schlüsseln versehen

Biomedizinische Ordnungssysteme



An aerial photograph of a coastal city, likely Miami, Florida, showing a mix of urban development, green spaces, and a large body of water. A white callout box with wavy edges is overlaid on the image, containing the text 'MeSH' and 'Medical Subject Headings'.

MeSH

Medical Subject Headings

MeSH Tree Structures - 2006

[Return to Entry Page](#)

1. Anatomy [A]
2. Organisms [B]
 - o [Animals \[B01\]](#) +
 - o [Algae \[B02\]](#) +
 - o [Bacteria \[B03\]](#) +
 - o [Viruses \[B04\]](#) +
 - o [Fungi \[B05\]](#) +
 - o [Plants \[B06\]](#) +
 - o [Archaea \[B07\]](#) +
 - o [Mesomycetozoea \[B08\]](#) +
3. Diseases [C]
4. Chemicals and Drugs [D]
5. Analytical, Diagnostic and Therapeutic Techniques and Equipment [E]
6. Psychiatry and Psychology [F]
7. Biological Sciences [G]
8. Physical Sciences [H]
9. Anthropology, Education, Sociology and Social Phenomena [I]
10. Technology and Food and Beverages [J]
11. Humanities [K]
12. Information Science [L]
13. Persons [M]
14. Health Care [N]
15. Publication Characteristics [V]
16. Geographic Locations [Z]

[Return to Entry Page](#)

[Bacteria \[B03\]](#)

[Atypical Bacterial Forms \[B03.110\]](#) +

[Bacteria, Aerobic \[B03.120\]](#)

[Bacteria, Anaerobic \[B03.130\]](#)

[Bacteroidetes \[B03.140\]](#) +

[Biofilms \[B03.150\]](#)

[Blood-Borne Pathogens \[B03.165\]](#)

[Chlorobi \[B03.250\]](#) +

[Chloroflexi \[B03.275\]](#) +

[Cyanobacteria \[B03.280\]](#) +

[Endospore-Forming Bacteria \[B03.300\]](#) +

[Fusobacteria \[B03.370\]](#) +

[Gram-Negative Bacteria \[B03.440\]](#) +

▶ [Gram-Positive Bacteria \[B03.510\]](#)

[Actinobacteria \[B03.510.024\]](#) +

[Gram-Positive Cocci \[B03.510.400\]](#) +

[Gram-Positive Endospore-Forming Bacteria \[B03.510.415\]](#) +

[Gram-Positive Rods \[B03.510.460\]](#) +

[Proteobacteria \[B03.660\]](#) +

[Spirochaetales \[B03.851\]](#) +

[Spores \[B03.867\]](#) +

[Sulfur-Reducing Bacteria \[B03.900\]](#) +

[Return to Entry Page](#)

[Link to NLM Cataloging Classification](#)

[Bacteria \[B03\]](#)

[Gram-Positive Bacteria \[B03.510\]](#)

[Gram-Positive Cocci \[B03.510.400\]](#)

[Staphylococcaceae \[B03.510.400.790\]](#)

▶ [Staphylococcus \[B03.510.400.790.750\]](#)

[Staphylococcus aureus \[B03.510.400.790.750.100\]](#)

[Staphylococcus epidermidis \[B03.510.400.790.750.343\]](#)

[Staphylococcus haemolyticus \[B03.510.400.790.750.400\]](#)

[Staphylococcus hominis \[B03.510.400.790.750.425\]](#)

[Return to Entry Page](#)

[Link to NLM Cataloging Classification](#)

National Library of Medicine - Medical Subject Headings

2006 MeSH

MeSH Descriptor Data

[Return to Entry Page](#)

MeSH Heading	Staphylococcus aureus
Tree Number	B03.510.400.790.750.100
Annotation	infection = STAPHYLOCOCCAL INFECTIONS & do not bother to coord with S. aureus unless particularly discussed (index IM); DF: STAPH AUREUS
Scope Note	Potentially pathogenic bacteria found in nasal membranes, skin, hair follicles, and perineum of warm-blooded animals. They may cause a wide range of infections and intoxications.
Allowable Qualifiers	CH CL CY DE EN GD GE IM IP ME PH PY RE UL VI
Entry Version	STAPH AUREUS
Previous Indexing	Staphylococcus (1966-1974)
Online Note	use STAPHYLOCOCCUS AUREUS to search MICROCOCCUS PYOGENES 1975-91; use STAPHYLOCOCCUS 1966-74
History Note	76; was MICROCOCCUS PYOGENES see under STAPHYLOCOCCUS 1963-75; MICROCOCCUS PYOGENES was see STAPHYLOCOCCUS AUREUS 1976-91
Unique ID	D013211

MeSH Tree Structures

[Bacteria \[B03\]](#)

[Gram-Positive Bacteria \[B03.510\]](#)

[Gram-Positive Cocci \[B03.510.400\]](#)

[Staphylococcaceae \[B03.510.400.790\]](#)

[Staphylococcus \[B03.510.400.790.750\]](#)

▶ [Staphylococcus aureus \[B03.510.400.790.750.100\]](#)

[Staphylococcus epidermidis \[B03.510.400.790.750.343\]](#)

[Staphylococcus haemolyticus \[B03.510.400.790.750.400\]](#)

[Staphylococcus hominis \[B03.510.400.790.750.425\]](#)

[Return to Entry Page](#)

[Link to NLM Cataloging Classification](#)

Sinn und Zweck biomedizinischer Ordnungssysteme

- Verschlagwortung von Dokumenten

An aerial photograph of a coastal city, likely San Diego, showing a mix of urban development, green spaces, and a large body of water. A white, wavy-edged callout box is overlaid on the top left, containing the text 'GO Gene Ontology'.

GO
Gene Ontology

Search GO

 Exact Match Terms Gene Symbol/Name[Advanced Query](#)[Query By Sequence](#)

Gene Product Filters

Species

All ▲
A. thaliana ▲
B. anthracis str. Am ▼

Datasource ?

All ▲
CGD ▲
dictyBase ▼

Evidence Code ?

All Curator Approved ▲
IGI ▲
IEP ▼

Ontology Filter

All ▲
Biological Process ▲
Cellular Component ▲
Molecular Function ▲

[XML](#)[Flat File](#)[Permalink](#)

all : all (182213)

- [GO:0008150](#) : biological_process (129820)
- [GO:0005575](#) : cellular_component (117701)
- [GO:0003674](#) : molecular_function (123908)
- [obsolete_biological_process](#) : obsolete_biological_process (0)
- [obsolete_cellular_component](#) : obsolete_cellular_component (0)
- [obsolete_molecular_function](#) : obsolete_molecular_function (0)

Search GO

- Exact Match
 - Terms
 - Gene Symbol/Name
- Anfrage senden

Advanced Query
 Query By Sequence

Gene Product Filters

Species

All

A. thaliana

B. anthracis str. Am

Datasource ?

All

CGD

dictyBase

Evidence Code ?

All Curator Approved

IGI

IEP

Ontology Filter

All

Biological Process

Cellular Component

Molecular Function

Set Filters

XML

Flat File

Permalink

- all : all (182213)
- GO:0008150 : biological_process (129820)
 - GO:0000004 : biological process unknown (34192)
 - GO:0009987 : cellular process (80269)
 - GO:0007275 : development (13811)
 - GO:0040007 : growth (3307)
 - GO:0051704 : interaction between organisms (1454)
 - GO:0007582 : physiological process (82723)
 - GO:0043473 : pigmentation (98)
 - GO:0050789 : regulation of biological process (16097)
 - GO:0000003 : reproduction (4342)
 - GO:0050896 : response to stimulus (16018)
 - GO:0016032 : viral life cycle (308)
- GO:0005575 : cellular_component (117701)
 - GO:0005623 : cell (86914)
 - GO:0044464 : cell part (86873)
 - GO:0008372 : cellular component unknown (26407)
 - GO:0031975 : envelope (2624)
 - GO:0031012 : extracellular matrix (671)
 - GO:0044420 : extracellular matrix part (376)
 - GO:0005576 : extracellular region (6190)
 - GO:0044421 : extracellular region part (4719)
 - GO:0031974 : membrane-enclosed lumen (4138)
 - GO:0043226 : organelle (63366)
 - GO:0044422 : organelle part (14198)
 - GO:0043234 : protein complex (12525)
 - GO:0045202 : synapse (235)
 - GO:0044456 : synapse part (101)
 - GO:0019012 : virion (151)
 - GO:0044423 : virion part (121)
- GO:0003674 : molecular_function (123908)
 - GO:0016209 : antioxidant activity (504)
 - GO:0005488 : binding (35413)
 - GO:0003824 : catalytic activity (42468)
 - GO:0030188 : chaperone regulator activity (46)
 - GO:0042056 : chemoattractant activity (9)
 - GO:0045499 : chemorepellant activity (4)
 - GO:0031992 : energy transducer activity (0)
 - GO:0030234 : enzyme regulator activity (2307)
 - GO:0005554 : molecular function unknown (35361)
 - GO:0003774 : motor activity (556)
 - GO:0045735 : nutrient reservoir activity (49)
 - GO:0031386 : protein tag (18)
 - GO:0004871 : signal transducer activity (9415)
 - GO:0005198 : structural molecule activity (3727)
 - GO:0030528 : transcription regulator activity (8713)
 - GO:0045182 : translation regulator activity (770)
 - GO:0005215 : transporter activity (9520)

Sinn und Zweck biomedizinischer Ordnungssysteme

- Verschlagwortung von Dokumenten
- Semantische Annotation von Forschungsdaten

ICD

International Classification
of Diseases





Code-Suche:

Dreisteller-Eingabe:

ICD-10 Homepage

Internationale Statistische Klassifikation der Krankheiten und verwandter Gesundheitsprobleme

10. Revision

Version 2006

German Modification

Vierstellige Ausführliche Systematik

Kapitelübersicht

Kapitel	Gliederung	Titel
I	A00-B99	Bestimmte infektiöse und parasitäre Krankheiten
II	C00-D48	Neubildungen
III	D50-D90	Krankheiten des Blutes und der blutbildenden Organe sowie bestimmte Störungen mit Beteiligung des Immunsystems
IV	E00-E90	Endokrine, Ernährungs- und Stoffwechselkrankheiten
V	F00-F99	Psychische und Verhaltensstörungen
VI	G00-G99	Krankheiten des Nervensystems
VII	H00-H59	Krankheiten des Auges und der Augenanhangsgebilde
VIII	H60-H95	Krankheiten des Ohres und des Warzenfortsatzes
IX	I00-I99	Krankheiten des Kreislaufsystems
X	J00-J99	Krankheiten des Atmungssystems
XI	K00-K93	Krankheiten des Verdauungssystems
XII	L00-L99	Krankheiten der Haut und der Unterhaut
XIII	M00-M99	Krankheiten des Muskel-Skelett-Systems und des Bindegewebes
XIV	N00-N99	Krankheiten des Urogenitalsystems
XV	O00-O99	Schwangerschaft, Geburt und Wochenbett
XVI	P00-P96	Bestimmte Zustände, die ihren Ursprung in der Perinatalperiode haben
XVII	Q00-Q99	Angeborene Fehlbildungen, Deformitäten und Chromosomenanomalien
XVIII	R00-R99	Symptome und abnorme klinische und Laborbefunde, die anderenorts nicht klassifiziert sind
XIX	S00-T98	Verletzungen, Vergiftungen und bestimmte andere Folgen äußerer Ursachen
XX	Y01-Y98	Äußere Ursachen von Morbidität und Mortalität
XXI	Z00-Z99	Faktoren, die den Gesundheitszustand beeinflussen und zur Inanspruchnahme des Gesundheitswesens führen
XXII	U00-U99	Schlüsselnummern für besondere Zwecke

Kapitel I:

Bestimmte infektiöse und parasitäre Krankheiten

Code-Suche:

Dreisteller-Eingabe:

OK!

ICD-10 Homepage

Kapitel II:

Neubildungen (C00-D48)

[C00-C97](#) Bösartige Neubildungen

[C00-C75](#) Bösartige Neubildungen an genau bezeichneten Lokalisationen, als primär festgestellt oder vermutet, ausgenommen lymphatisches, blutbildendes und verwandtes Gewebe

[C00-C14](#) Lippe, Mundhöhle und Pharynx

[C15-C26](#) Verdauungsorgane

[C30-C39](#) Atmungsorgane und sonstige intrathorakale Organe

[C40-C41](#) Knochen und Gelenknorpel

[C43-C44](#) Haut

[C45-C49](#) Mesotheliales Gewebe und Weichteilgewebe

[C50](#) Brustdrüse [Mamma]

[C51-C58](#) Weibliche Genitalorgane

[C60-C63](#) Männliche Genitalorgane

[C64-C68](#) Harnorgane

[C69-C72](#) Auge, Gehirn und sonstige Teile des Zentralnervensystems

[C73-C75](#) Schilddrüse und sonstige endokrine Drüsen

[C76-C80](#) Bösartige Neubildungen ungenau bezeichneter, sekundärer und nicht näher bezeichneter Lokalisationen

[C81-C96](#) Bösartige Neubildungen des lymphatischen, blutbildenden und verwandten Gewebes, als primär festgestellt oder vermutet

[C97](#) Bösartige Neubildungen als Primärtumoren an mehreren Lokalisationen

[D00-D09](#) In-situ-Neubildungen

[D10-D36](#) Gutartige Neubildungen

[D37-D48](#) Neubildungen unsicheren oder unbekanntem Verhaltens [siehe Hinweis am Anfang der Krankheitsgruppe D37-D48]

Kapitel III:

Krankheiten des Blutes und der blutbildenden Organe sowie bestimmte Störungen mit Beteiligung des Immunsystems (D50-D90)

[D50-D53](#) Alimentäre Anämien

[D55-D59](#) Hämolytische Anämien

[D60-D64](#) Aplastische und sonstige Anämien

[D65-D69](#) Koagulopathien, Purpura und sonstige hämorrhagische Diathesen

[D70-D77](#) Sonstige Krankheiten des Blutes und der blutbildenden Organe

[D80-D90](#) Bestimmte Störungen mit Beteiligung des Immunsystems

Inkl.: Mittelohr
Exkl.: Mesotheliom ([C45.-](#))

C30.- Bösartige Neubildung der Nasenhöhle und des Mittelohres

C30.0 Nasenhöhle

Conchae nasales
Nasinnenraum
Nasenknorpel
Nasenseptum
Vestibulum nasi

Exkl.: Bulbus olfactorius ([C72.2](#))
Haut der Nase ([C43.3](#), [C44.3](#))
Hinterrand des Nasenseptums und der Choanen ([C11.3](#))
Nase o.n.A. ([C76.0](#))
Nasenbein ([C41.02](#))

C30.1 Mittelohr

Cellulae mastoideae
Innenohr
Tuba auditiva [Eustachio]

Exkl.: Gehörgang (äußerer) ([C43.2](#), [C44.2](#))
Haut des (äußeren) Ohres ([C43.2](#), [C44.2](#))
Knöcherner Gehörgang (Meatus) ([C41.01](#))
Ohrknorpel ([C49.0](#))

C31.- Bösartige Neubildung der Nasennebenhöhlen

C31.0 Sinus maxillaris [Kieferhöhle]

Antrum maxillare [Highmore-Höhle]

C31.1 Sinus ethmoidalis [Siebbeinzellen]

C31.2 Sinus frontalis [Stirnhöhle]

C31.3 Sinus sphenoidalis [Keilbeinhöhle]

C31.8 Nasennebenhöhlen, mehrere Teilbereiche überlappend

[Siehe Hinweis 5 am Anfang dieses Kapitels]

C31.9 Nasennebenhöhle, nicht näher bezeichnet

C32.- Bösartige Neubildung des Larynx

C32.0 Glottis

Lig. vocale [echtes Stimmband] o.n.A.
Ventriculus laryngis

C32.1 Supraglottis

Aryepiglottische Falte, laryngeale Seite
Epiglottis (suprahyoidaler Anteil) o.n.A.
Hintere (laryngeale) Fläche der Epiglottis

Übersicht

Kapitelvorspann

Kapitelgliederung

Vorige Gruppe

Nächste Gruppe

ICD-10 Homepage

Sinn und Zweck biomedizinischer Ordnungssysteme

- Verschlagwortung von Dokumenten
- Semantische Annotation von Forschungsdaten
- Klassifikation zur Leistungserfassung und Gesundheitsstatistik

Word NET

An aerial photograph of a coastal city, likely Miami, Florida, showing a mix of urban development, green spaces, and a large body of water. A white, wavy-edged callout box is overlaid on the image, containing the text 'Word NET' in a bold, black, sans-serif font.

WordNet Search - 2.1

[Return to WordNet Home](#)

[Glossary](#) - [Help](#)

SEARCH DISPLAY OPTIONS:

Enter a word to search for:

WARNING: The search exceeded the result limit, so the following list is valid but incomplete. Only the top levels of the list are displayed.

KEY: "S:" = Show Synset (semantic) relations, "W:" = Show Word (lexical) relations

Noun

- [S:](#) [\(n\)](#) **tongue**, [lingua](#), [glossa](#), [clapper](#) (a mobile mass of muscular tissue covered with mucous membrane and located in the oral cavity)
- [S:](#) [\(n\)](#) [natural language](#), **tongue** (a human written or spoken language used by a community; opposed to e.g. a computer language)
- [S:](#) [\(n\)](#) **tongue**, [knife](#) (any long thin projection that is transient) "*tongues of flame licked at the walls*"; "*rifles exploded quick knives of fire into the dark*"
- [S:](#) [\(n\)](#) **tongue** (a manner of speaking) "*he spoke with a thick tongue*"; "*she has a glib tongue*"
- [S:](#) [\(n\)](#) [spit](#), **tongue** (a narrow strip of land that juts out into the sea)
- [S:](#) [\(n\)](#) **tongue** (the tongue of certain animals used as meat)
- [S:](#) [\(n\)](#) **tongue** (the flap of material under the laces of a shoe or boot)
- [S:](#) [\(n\)](#) [clapper](#), **tongue** (metal striker that hangs inside a bell and makes a sound by hitting the side)

Verb

- [S:](#) [\(v\)](#) **tongue** (articulate by tonguing, as when playing wind instruments)
- [S:](#) [\(v\)](#) **tongue** (lick or explore with the tongue)

[Return to WordNet Home](#)

WordNet Search - 2.1

[Return to WordNet Home](#)

[Glossary](#) - [Help](#)

SEARCH DISPLAY OPTIONS: (Select option to change)

Enter a word to search for:

WARNING: The search exceeded the result limit, so the following list is valid but incomplete. Only the top levels of the list are displayed.

KEY: "S:" = Show Synset (semantic) relations, "W:" = Show Word (lexical) relations

Noun

- [S: \(n\) tongue](#), [lingua](#), [glossa](#), [clapper](#) (a mobile mass of muscular tissue covered with mucous membrane and located in the oral cavity)
 - [part meronym](#)
 - [S: \(n\) tastebud](#), [taste bud](#), [gustatory organ](#) (an oval sensory end organ on the surface of the tongue)
 - [direct hypernym](#) / [inherited hypernym](#) / [sister term](#)
 - [S: \(n\) organ](#) (a fully differentiated structural and functional unit in an animal that is specialized for some particular function)
 - [S: \(n\) articulator](#) (a movable speech organ)
 - [part holonym](#)
 - [S: \(n\) mouth](#), [oral cavity](#), [oral fissure](#), [rima oris](#) (the opening through which food is taken in and vocalizations emerge) "*he stuffed his mouth with candy*"
 - [S: \(n\) throat](#), [pharynx](#) (the passage to the stomach and lungs; in the front part of the neck below the chin and above the collarbone)
 - [derivationally related form](#)
 -
 -
 - [W: \(adj\) lingual](#) [Related to: [lingua](#)] (pertaining to or resembling or lying near the tongue) "*lingual inflammation*"; "*the lingual surface of the teeth*"
 - [W: \(adj\) lingual](#) [Related to: [lingua](#)] (consisting of or related to language) "*linguistic behavior*"; "*a linguistic atlas*"; "*lingual diversity*"

[Return to WordNet Home](#)

Sinn und Zweck biomedizinischer Ordnungssysteme

- Verschlagwortung von Dokumenten
- Semantische Annotation von Forschungsdaten
- Klassifikation zur Leistungserfassung und Gesundheitsstatistik
- Bereitstellung von Bedeutungsrelationen für sprachverarbeitende Systeme

An aerial photograph of a coastal city, likely Miami, Florida, showing a mix of urban development, green spaces, and a large body of water. A white callout box with a wavy top and bottom edge is positioned in the upper left quadrant, containing the text 'SNOMED Clinical Terms'.

SNOMED Clinical Terms

ConceptId 54329005

acute myocardial infarction of anterior wall

Description Id 90302019

clinical finding

Search infarction

Words - any order

Refined search

- adrenal infarction
- thyroid infarction
- cerebral infarction
- cardiac infarction
- myocardial infarction
- impending infarction

Details of 'acute myocardial infarction of anterior wall'

Distributed Relationships

ConceptStatus Current

Descriptions

- acute myocardial infarction of anterior wall (disorder)
- acute myocardial infarction of anterior wall
- acute anterior myocardial infarction

Fully defined by...

- Is a
 - acute myocardial infarction
- Course
 - acute
- Group
 - Associated morphology
 - acute infarct
 - Finding site
 - structure of anterior myocardium

Qualifiers

- Onset
 - sudden onset
 - gradual onset
- Severity
 - severities
- Episodicity
 - Episodicities

Legacy codes

- SNOMED: D3-15110
- CTV3ID: Xa0YL

Hierarchy for 'myocardial infarction'

Subtype hierarchy

- injury of anatomical site
 - structural disorder of heart
 - myocardial necrosis
 - myocardial disease
 - myocardial infarction
 - acute myocardial infarction
 - acute anteroapical infarction
 - acute anteroapical myocardial infarction
 - acute anteroapical myocardial infarction
 - acute non-Q wave infarction - anteroapical
 - acute Q wave infarction - anteroapical
 - acute infarction of papillary muscle
 - acute myocardial infarction NOS
 - acute myocardial infarction of anterior wall
 - acute myocardial infarction of anterolateral wall
 - acute non-Q wave infarction - anterolateral
 - acute Q wave infarction - anterolateral
 - acute myocardial infarction of atrium
 - acute myocardial infarction of inferior wall
 - acute myocardial infarction of inferoposterior wall
 - acute non-Q wave infarction - inferior
 - acute Q wave infarction - inferior
 - acute myocardial infarction of inferolateral wall
 - acute non-Q wave infarction - inferolateral
 - acute Q wave infarction - inferolateral
 - acute myocardial infarction of lateral wall
 - acute myocardial infarction of apical-lateral wall
 - acute myocardial infarction of basal-lateral wall
 - acute myocardial infarction of high lateral wall
 - acute non-Q wave infarction - lateral
 - acute Q wave infarction - lateral
 - acute myocardial infarction of posterolateral wall
 - acute myocardial infarction of septum
 - acute myocardial infarction with rupture of ventricle
 - acute non-Q wave infarction
 - acute non-ST segment elevation myocardial infarction

An aerial photograph of a coastal city, likely San Diego, showing a mix of urban development, green spaces, and a large body of water. A white banner with a wavy top and bottom edge is superimposed over the upper portion of the image. The banner contains the text 'UMLS' in a bold, black, sans-serif font.

UMLS

Unified Medical Language System (UMLS)

- Metathesaurus aus zahlreichen (> 100) unterschiedlichen medizinischen Ordnungssysteme
- Gleichbedeutende Repräsentationseinheiten (Klassen, Konzepte, Terme) werden auf einen Schlüssel (CUI = concept unique identifier) gemappt
- CUI werden nach semantischen Typen klassifiziert

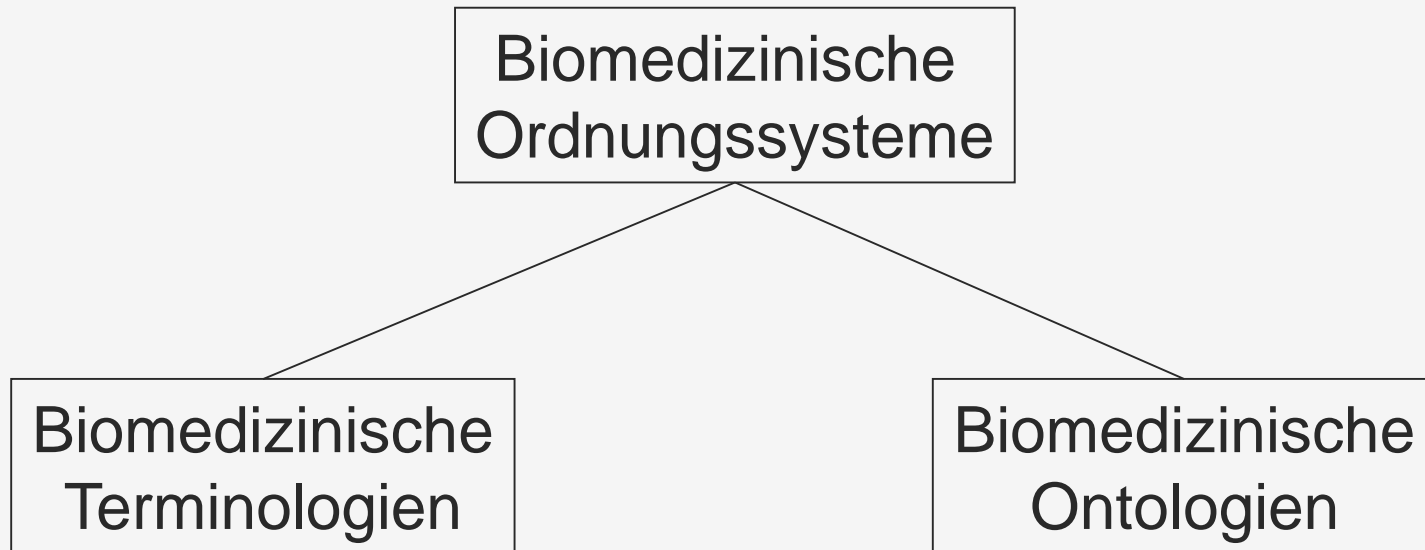
Sinn und Zweck biomedizinischer Ordnungssysteme

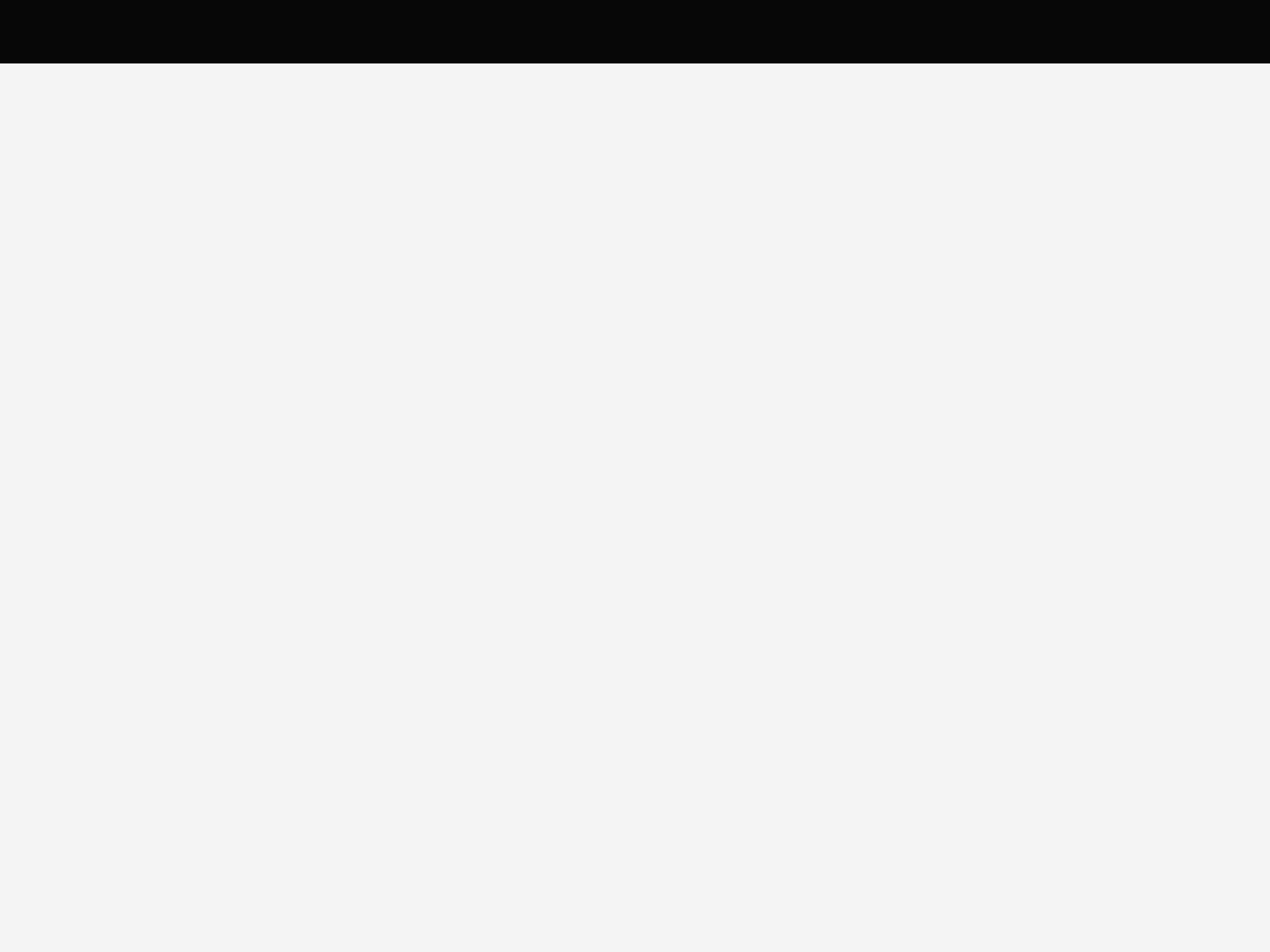
- Verschlagwortung von Dokumenten
- Semantische Annotation von Forschungsdaten
- Klassifikation zur Leistungserfassung und Gesundheitsstatistik
- Bereitstellung von Bedeutungsrelationen für sprachverarbeitende Systeme
- Kodierung klinischer Behandlungsdaten

Aufbau des Tutorials

- Überblick: medizinische Ordnungssysteme
- **Grundbegriffe medizinische Ordnungssysteme**
- SNOMED CT
- Ontologien/Terminologien vs. Informationsmodelle
- IHTSDO
- SNOMED CT in Deutschland

Grundbegriffe





Definitionen

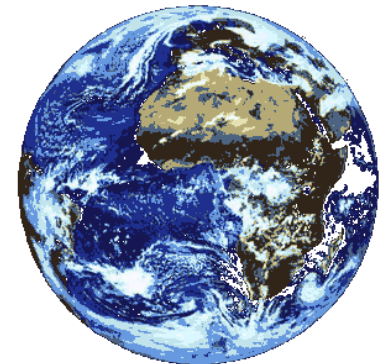


■ Terminologien

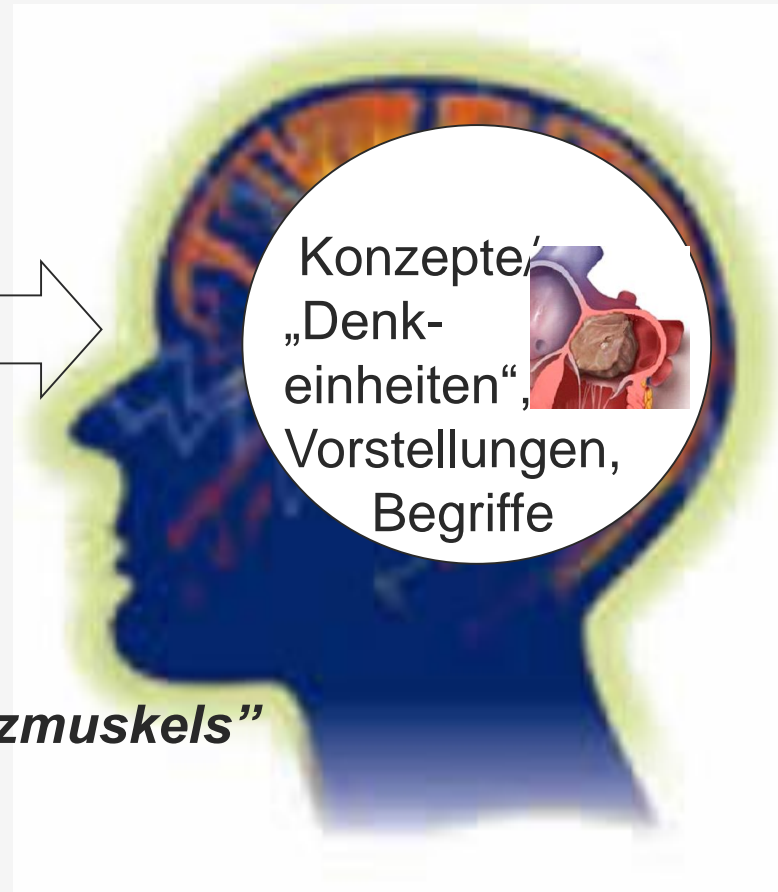
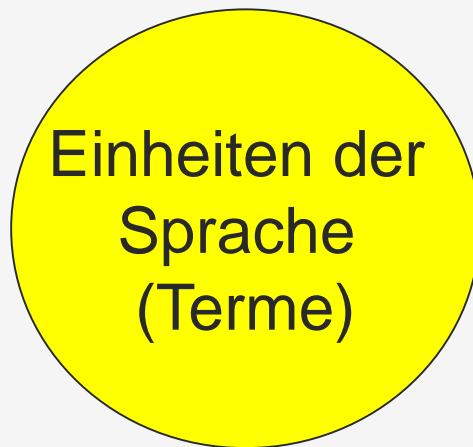
- Mengen von Termen, die das Konzeptsystem einer bestimmten Domäne repräsentieren [ISO 1087]

■ (Formale) Ontologie

- Ontologie = Lehre vom Sein
- Formale Ontologien sind Theorien, die versuchen, präzise mathematische Formulierungen der Eigenschaften und Relationen bestimmter Entitäten zu geben. [Quine 1948 – „On What There Is“]



Was sind Konzepte?




„benign neoplasm of heart“
„gutartige Neubildung des Herzmuskels“
“neoplasia cardíaca benigna”

Konzepte im UMLS Metathesaurus



Unified Medical
Language System



Konzepte/
„Denk-
einheiten“



Einheiten
der
Sprache
(Terme)

C0153957|ENG|P|L0180790|PF|S1084242|Y|A1141630|||MTH|PN|U001287|benign neoplasm of heart|0|N||
C0153957|ENG|P|L0180790|VC|S0245316|N|A0270815|||ICD9CM|PT|212.7|Benign neoplasm of heart|0|N||
C0153957|ENG|P|L0180790|VC|S0245316|N|A0270817|||RCD|SY|B727.|Benign neoplasm of heart|3|N||
C0153957|ENG|P|L0180790|VO|S1446737|Y|A1406658|||SNMI|PT|D3-F0100|Benign neoplasm of heart, NOS|3|N||
C0153957|ENG|S|L0524277|PF|S0599118|N|A0654589|||RCDAE|PT|B727.|Benign tumor of heart|3|N||
C0153957|ENG|S|L0524277|VO|S0599510|N|A0654975|||RCD|PT|B727.|Benign tumour of heart|3|N||
C0153957|ENG|S|L0018787|PF|S0047194|Y|A0066366|||ICD10|PS|D15.1|Heart|3|Y||
C0153957|ENG|S|L0018787|VO|S0900815|Y|A0957792|||MTH|MM|U003158|Heart <3>|0|Y||
C0153957|ENG|S|L1371329|PF|S1624801|N|A1583056|||10004245|MDR|LT|10004245|Benign cardiac neoplasm|3|N||
C0153957|GER|P|L1258174|PF|S1500120|Y|A1450314|||DMDICD10|PT|D15.1|Gutartige Neubildung: Herz|1|N||
C0153957|SPA|P|L2354284|PF|S2790139|N|A2809706|||MDRSPA|LT|10004245|Neoplasia cardiaca benigna|3|N||

Relationen im UMLS Metathesaurus

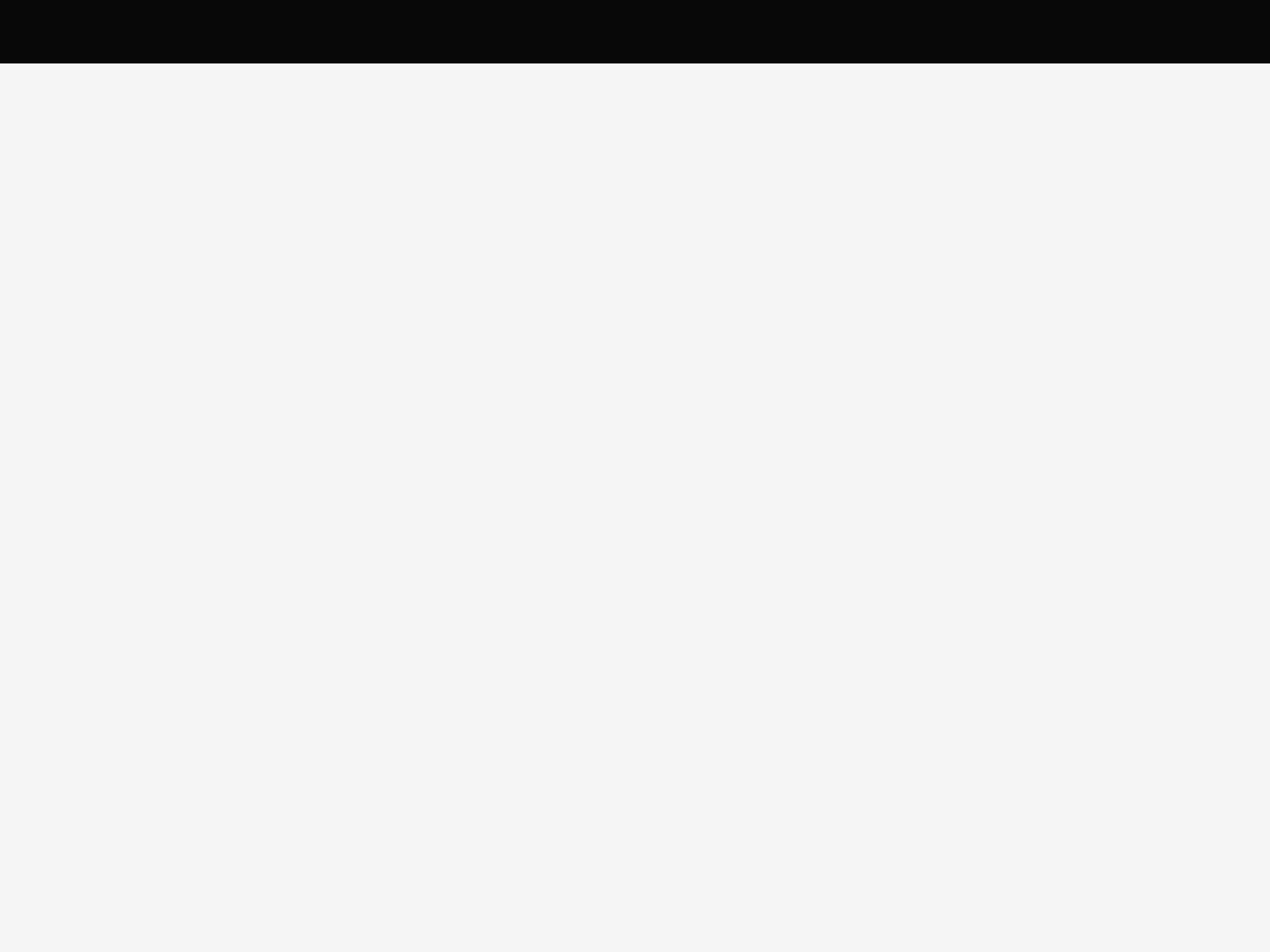


Konzepte/
„Denk-
einheiten“

Konzepte/
„Denk-
einheiten“

C0153957	A0066366	AUI	PAR	C0348423	A0876682	AUI		R06101405		ICD10	ICD10			N						
C0153957	A0066366	AUI	RQ	C0153957	A0270815	AUI		default_mapped_from	R03575929		NCISEER	NCISEER			N					
C0153957	A0066366	AUI	SY	C0153957	A0270815	AUI		uniquely_mapped_to	R03581228		NCISEER	NCISEER			N					
C0153957	A0270815	AUI	RQ	C0810249	A1739601	AUI		classifies	R00860638		CCS	CCS			N					
C0153957	A0270815	AUI	SIB	C0347243	A0654158	AUI			R06390094			ICD9CM	ICD9CM			N				
C0153957	A0270815	CODE	RN	C0685118	A3807697	SCUI		mapped_to	R15864842		SNOMEDCT	SNOMEDCT			Y		N			
C0153957	A1406658	AUI	RL	C0153957	A0270815	AUI		mapped_from	R04145423		SNMI	SNMI			N					
C0153957	A1406658	AUI	RO	C0018787	A0357988	AUI		location_of	R04309461		SNMI	SNMI			N					
C0153957	A2891769	SCUI	CHD	C0151241	A2890143	SCUI		isa	R19841220		47189027	SNOMEDCT	SNOMEDCT		0		Y		N	

**Semantische
Relationen**



Definitionen

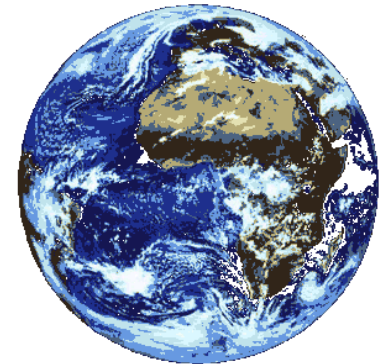


■ Terminologien

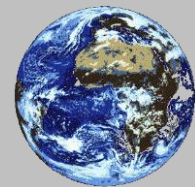
- Menge von Termen, die das Konzeptsystem einer bestimmten Domäne repräsentieren [ISO 1087]

■ (Formale) Ontologie

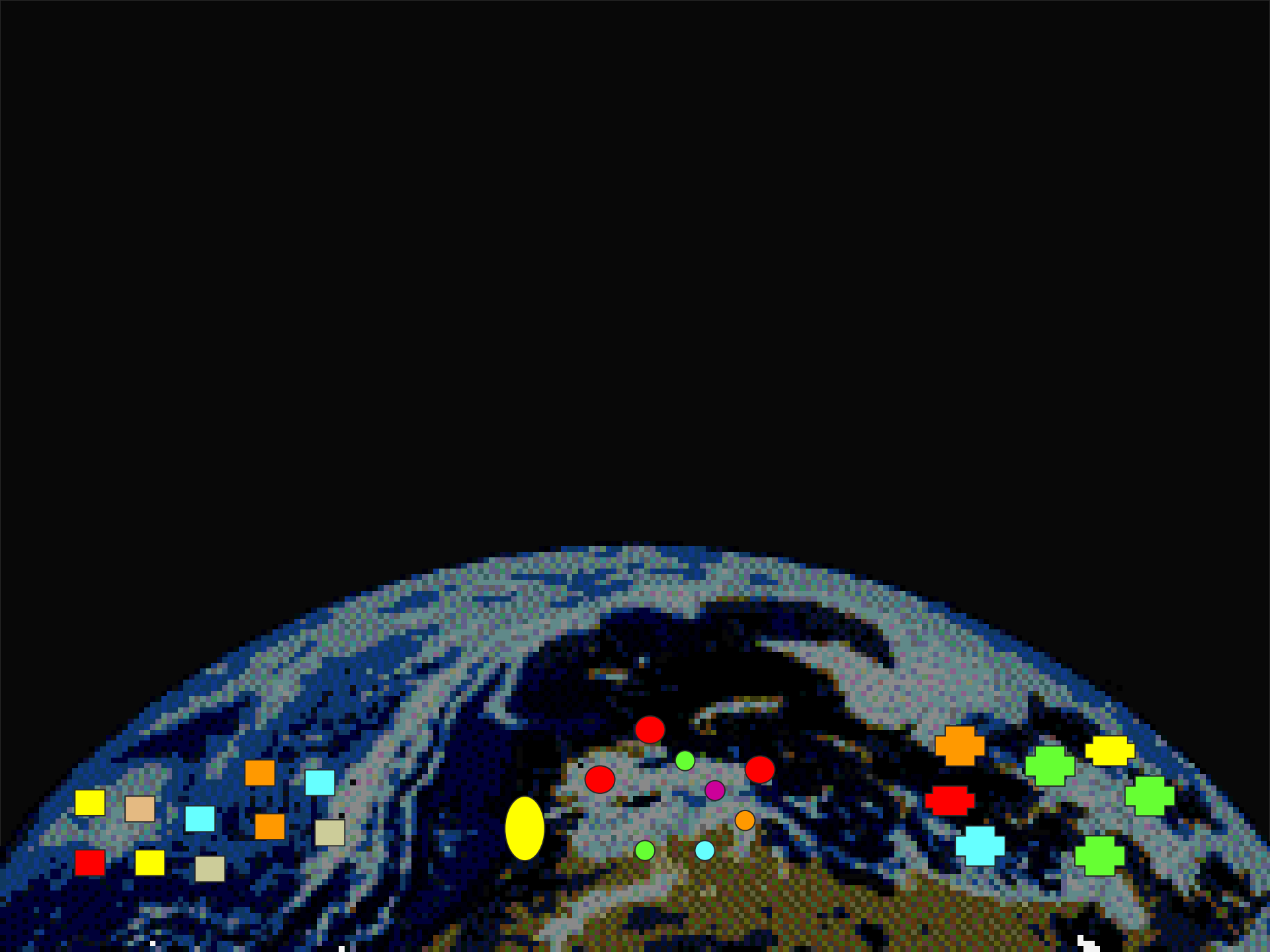
- Ontologie = Lehre vom Sein
- Formale Ontologien sind Theorien, die versuchen, präzise mathematische Formulierungen der Eigenschaften und Relationen bestimmter Entitäten zu geben. [Quine 1948 – „On What There Is“]



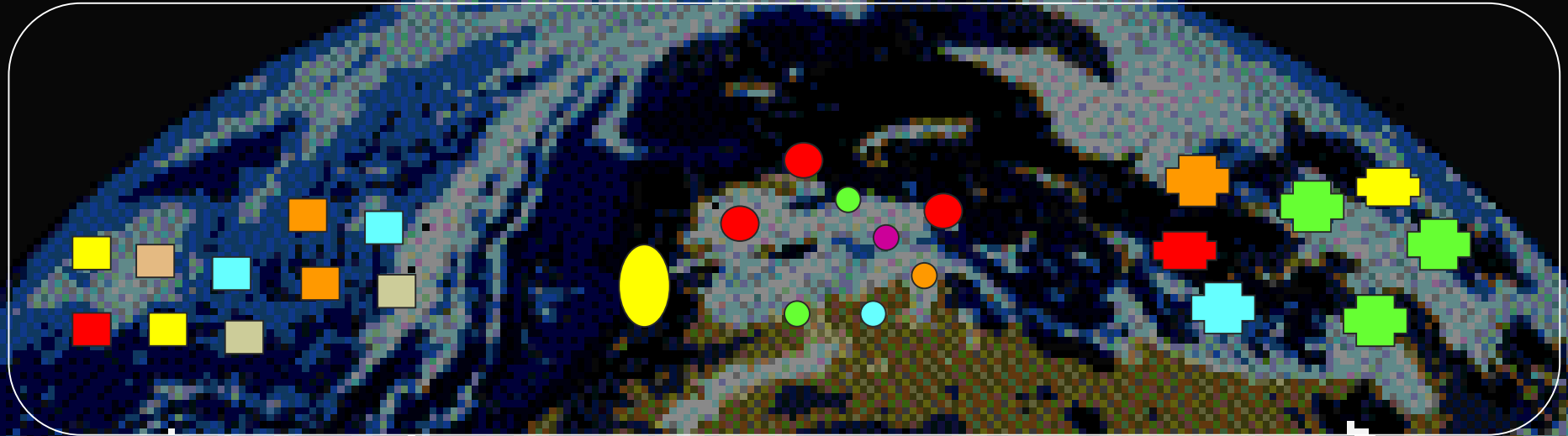
Grundprinzipien formaler Ontologien

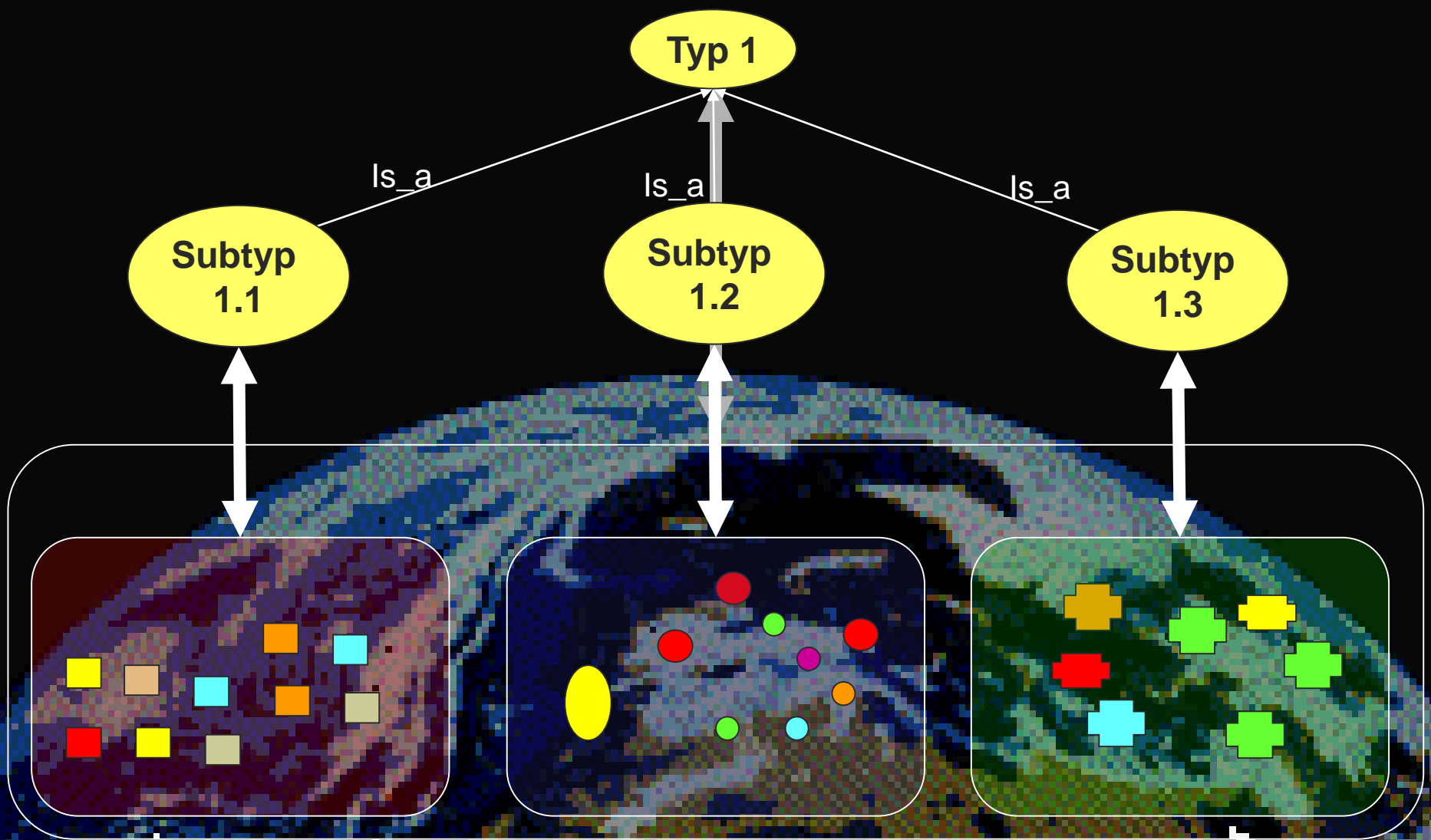


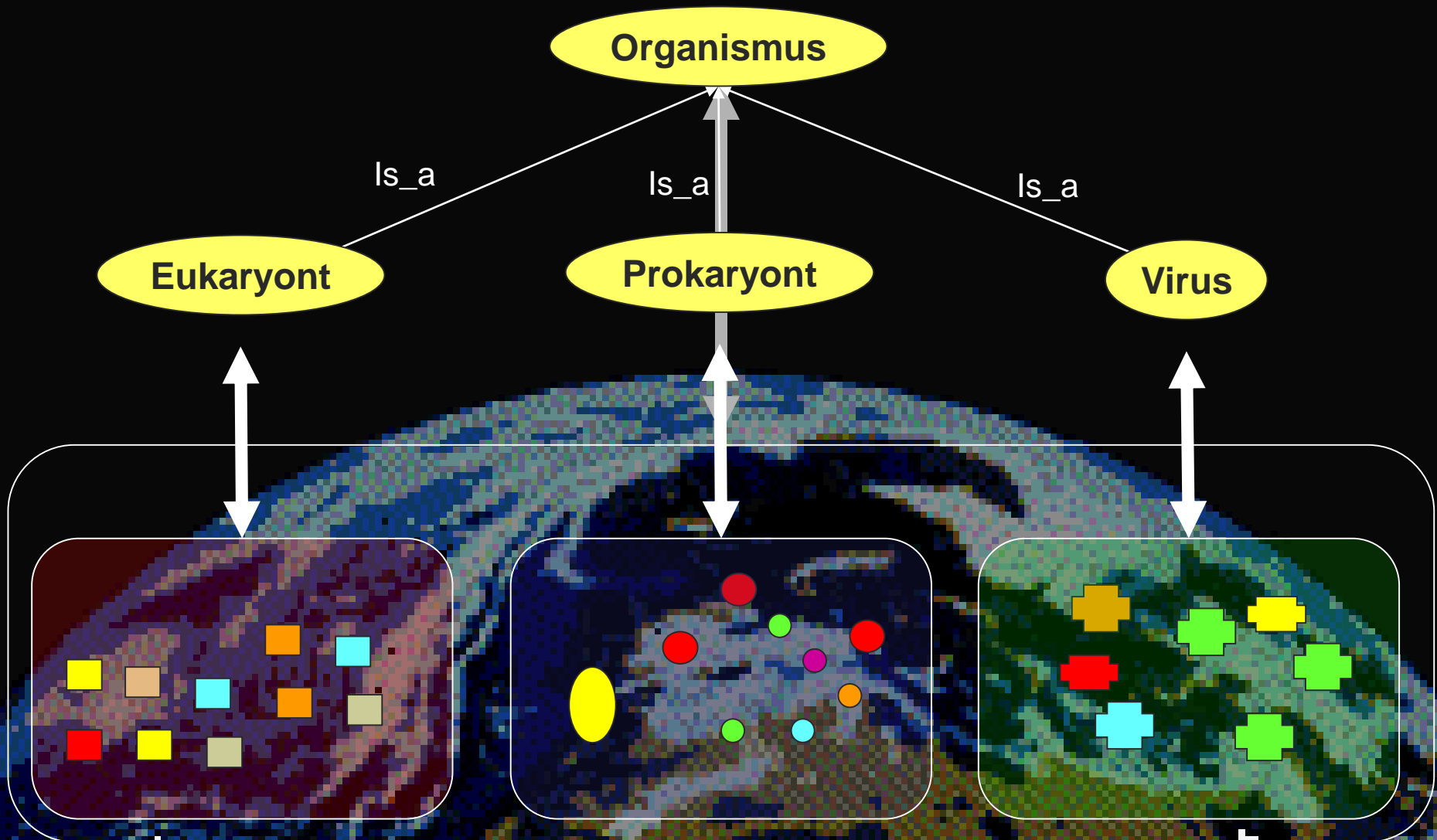
- Ontologien sind Hierarchien von **Typen**
- Typen (z.B. „*Hand*“, „*Hepatitis*“, „*Eisbär*“) stehen für Eigenschaften, nach denen Entitäten (Individuen) der Welt klassifiziert werden (z.B. „*meine rechte Hand*“, „*Hepatitis von Patient 12345*“, „*Knut*“)
- Relation „*instance of*“ verbindet ein Individuum mit zugehörige(n) Klassen / Typen
- Relation „*is a*“ verbindet Unter- mit Oberklassen
$$is-a(A, B) =_{def} \forall x: instance-of(x, A) \rightarrow instance-of(x, B)$$



Typ 1







Beschreibungssprachen für Ontologien

■ Natürliche Sprache

Jede Hepatitis ist eine Entzündung, die in einer Leber lokalisiert ist.
Jede Entzündung in einer Leber ist eine Hepatitis.

■ Prädikatenlogik

$\forall x$

$instanceOf(x, Hepatitis) \Leftrightarrow instanceOf(x, Inflammation) \wedge$

$\exists y: instanceOf(y, Liver) \wedge hasLocation(x,y)$

■ Beschreibungslogik

$Hepatitis \equiv Inflammation \wedge \exists hasLocation.Liver$

Formale Sprache: „Rechnen“

Formales Schließen mit Ontologien

- Abwägung: Performanz gegen Sprachumfang
- OWL-DL:
 - Standardisierte Sprachspezifikation (W3C)
 - Bewährte Editoren (Protégé)
 - angepasste Reasoner („Klassifikationsmaschinen“) – bei Verwendung des vollen Sprachumfangs nur bedingt skalierbar

```
<owl:Class rdf:about="#Deoxyribonucleotide">
  <owl:disjointWith rdf:resource="#Ribonucleotide"/>
  <rdfs:subClassOf>
    <owl:Class rdf:about="#Nucleotide"/>
  </rdfs:subClassOf>
  <owl:equivalentClass>
    <owl:Class>
      <owl:intersectionOf rdf:parseType="Collection">
        <owl:Restriction>
          <owl:allValuesFrom>
            <owl:Class>
              <owl:unionOf rdf:parseType="Collection">
                <owl:Class rdf:about="#Deoxyribose"/>
                <owl:Class rdf:about="#HeterocyclicBase"/>
                <owl:Class rdf:about="#Phosphate"/>
              </owl:unionOf>
            </owl:Class>
          </owl:allValuesFrom>
          <owl:onProperty>
            <owl:ObjectProperty rdf:about="#hasComponent"/>
          </owl:onProperty>
        </owl:Restriction>
        <owl:Restriction>
          <owl:someValuesFrom rdf:resource="#Deoxyribose"/>
          <owl:onProperty>
            <owl:ObjectProperty rdf:about="#hasComponent"/>
          </owl:onProperty>
        </owl:Restriction>
        <owl:Restriction>
          <owl:someValuesFrom>
            <owl:Class rdf:about="#HeterocyclicBase"/>
          </owl:someValuesFrom>
          <owl:onProperty>
            <owl:ObjectProperty rdf:about="#hasComponent"/>
          </owl:onProperty>
        </owl:Restriction>
      </owl:intersectionOf>
    </owl:Class>
  </owl:equivalentClass>
</owl:Class>
```



Metadata OWLClasses Properties Individuals Forms

SUBCLASS EXPLORER

For Project: biotop

Asserted Hierarchy

- owl:Thing
 - snapl:Role
 - snapl:GenericallyDependentContinuant
 - snapl:IndependentContinuant
 - ▶ ● ImmaterialIndependentContinuant
 - ▼ ● MaterialIndependentContinuant
 - ▶ ● SubatomicParticle
 - ▶ ● Atom
 - ▼ ● PolyatomicEntity
 - ▶ ● CompoundOfCollections
 - ▶ ● PolyMolecularCompound
 - ▶ ● CollectiveMaterialEntity
 - ▼ ● MolecularEntity
 - AminoAcidMonomer
 - ▶ ● Carbohydrate
 - ▶ ● Lipid
 - ▶ ● Peptide
 - ▼ ● Nucleotide
 - ▶ ● Ribonucleotide
 - ▶ ● Deoxyribonucleotide
 - WaterMolecule
 - ▶ ● BioMolecularSequence
 - ▶ ● HeterocyclicBase
 - ▶ ● Monomer
 - ▶ ● MolecularGroup
 - ▶ ● OligoOrPolymer
 - ▶ ● EntireMolecularEntity
 - ▶ ● NucleicAcid
 - ▶ ● Disaccharide

CLASS EDITOR

For Class: Deoxyribonucleotide (instance of owl:Class) Inferred View

Property	Value	Lang
rdfs:comment		
rdfs:label	deoxyribonucleotide	en

Annotations

Asserted Conditions

NECESSARY & SUFFICIENT

- hasComponent **only** (Deoxyribose or HeterocyclicBase or Phosphate)
- hasComponent **some** Deoxyribose
- hasComponent **some** HeterocyclicBase
- hasComponent **some** Phosphate

NECESSARY

- Nucleotide

INHERITED

- hasInherence **exactly** 1 PhysicalMass [from MaterialIndependentContinuant]
- hasInherence **exactly** 1 PhysicalVolume [from MaterialIndependentContinuant]
- rol:hasProperPart **some** Atom [from MolecularEntity]

Disjoints

- ▶ Ribonucleotide

nucleotide

Terminologien vs. Ontologien

Terminologien

- Beschreiben: Bedeutung von sprachlichen Einheiten
- "Konzepte": fassen bedeutungsgleiche Terme zusammen
- Relationen: informelle, elastische Assoziationen zwischen Konzepten
- Beschreibungsmuster:
Konzept₁ Rel Konzept₂

Formale Ontologien

- Beschreiben: sprach-unabhängige Realität
- "Typen": generische Eigenschaften von Entitäten der Welt
- Relationen: rigide, exakt definierte, quantifizierte Abhängigkeiten zwischen Instanzen
- Beschreibungsmuster:
für alle Instanzen von Typ₁ gilt... es gibt...

Beispiel Hepatitis - Leber

Terminologien

- Konzept *Hepatitis*:
{*Hepatitis (D)*, *Leberentzündung (D)*,
hepatitis (E), *hépatite (F)*}
- Konzept *Liver*:
{*Leber (D)*, *liver (E)*, *foie (F)*}
- Relationen:
 - *Hepatitis* – *hasLocation* – *Liver*
 - *Hepatitis* – *isA* - *Inflammation*

Formale Ontologien

- Typ: *Hepatitis*:
- Beschreibung:
- $\forall x: \text{instanceOf}(x, \text{Hepatitis}) \Rightarrow$
 $\text{instanceOf}(x, \text{Inflammation}) \wedge$
 $\exists y: \text{instanceOf}(y, \text{Liver}) \wedge$
 $\text{hasLocation}(x, y)$
- $\forall x: \text{instanceOf}(x, \text{Inflammation}) \wedge$
 $\exists y: \text{instanceOf}(y, \text{Liver}) \wedge$
 $\text{hasLocation}(x, y) \Rightarrow$
 $\text{instanceOf}(y, \text{Hepatitis})$

Beispiel Hand - Daumen

Terminologien

- Konzept *Hand*:
 $\{Hand (D), hand (E), main (F)\}$
- Konzept *Thumb*:
 $\{Daumen (D), thumb (E), pouce (F)\}$
- Relationen:
 - *Hand* – *hasPart* – *Thumb*
 - *Thumb* – *partOf* – *Hand*

Formale Ontologien

- Typ: *Thumb*:
- Beschreibung:
 - $\forall x: instanceOf(x, Thumb) \Rightarrow$
 $\exists y: instanceOf(y, Hand) \wedge$
 $partOf(x,y)$
 - $\forall x: instanceOf(x, Hand) \Rightarrow$
 $\exists y: instanceOf(y, Thumb) \wedge$
 $hasPart(x,y)$



Beispiel Aspirin - Kopfschmerz

Terminologien

- Konzept *Aspirin*:
{*Aspirin* (D,E), *Acetylsalicylsäure* (D),
ASS (D), *acetylsalicylic acid* (E), *Acide acétylsalicylique*(F)}
- Konzept *Headache*:
{*Kopfschmerz* (D), *headache* (E),
céphalée(F)}
- Relation:
 - *Aspirin* – *treats* – *Headache*

unscharf

Formale Ontologien

- Typ: *Aspirin*:
- Beschreibung:
- $\forall x: \text{instanceOf}(x, \text{Aspirin}) \Rightarrow$
 $\exists y: \text{instanceOf}(\text{DispositionOfTreatingHeadache})$
 $\wedge \text{inheres}(y,x)$
- $\forall x: \text{instanceOf}(\text{DispositionOfTreatingHeadache})$

...

kompliziert !

Was leisten formale Ontologien?

- Exakte, logikbasierte Beschreibungen von Typen, die durch konkrete Objekte der Welt instanziiert werden
- Repräsentation von stabilen, kontextunabhängigen Grundannahmen
- Verwendung von maschinellem Schließen, z.B. basierend auf Beschreibungslogiken (OWL-DL)

Was leisten formale Ontologien NICHT?

- Repräsentation kontextabhängigen Wissens
 - „Heuschnupfen ist die häufigste Allergie in D“
- Repräsentation probabilistischem Wissens
 - „5% der Hepatitiden verlaufen anikterisch“
 - Rauchen ist ein Risikofaktor für KHK
- Default / kanonisches Wissen
 - „Der Mensch hat 32 Zähne“
- Dispositionen:
 - „Gleevec® ist indiziert bei CML“
 - „Aspirin® greift die Magenschleimhaut an“

Ontologie \subset Wissensrepräsentation

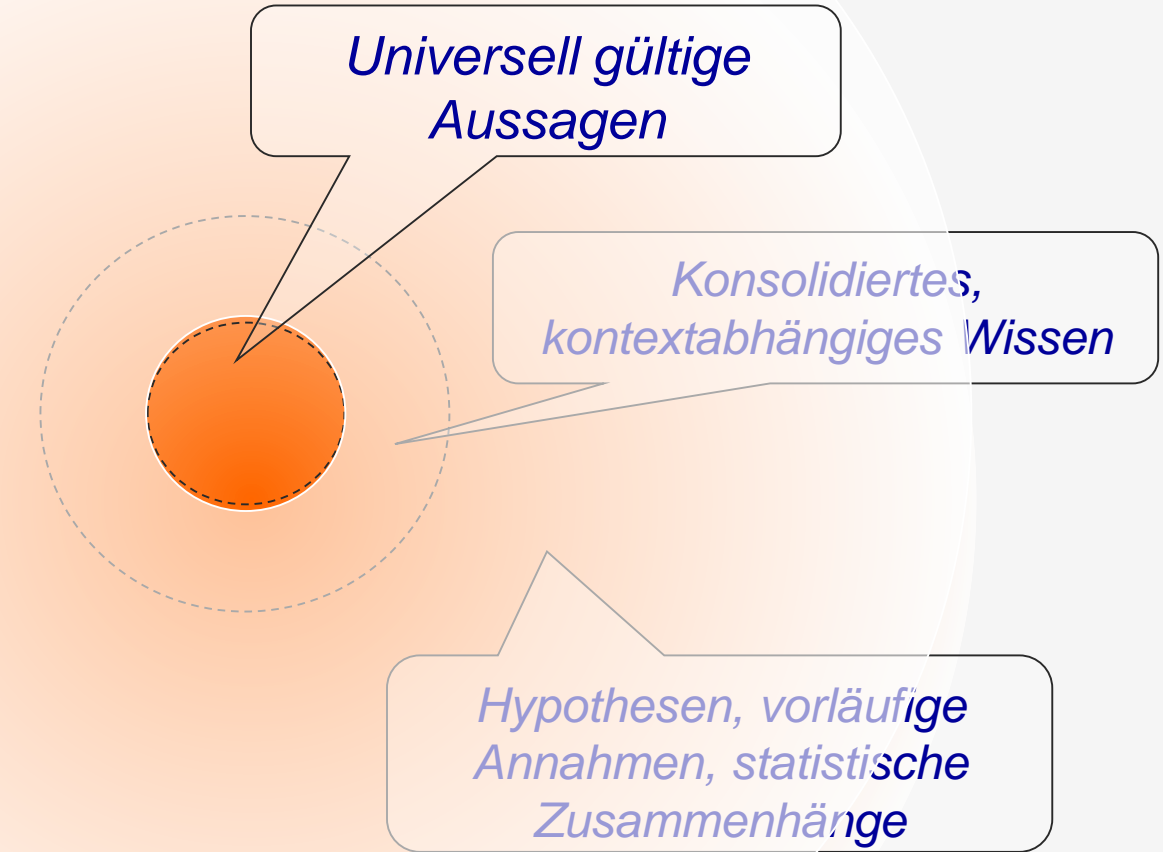
*Universell gültige
Aussagen*

*Konsolidiertes,
kontextabhängiges Wissen*

*Hypothesen, vorläufige
Annahmen, statistische
Zusammenhänge*

Domänenwissen

Ontologien !



Domänenwissen

Ontologien: Kontroversen (I)

- Realismusdebatte: Was soll repräsentiert werden...
 - Die Gegenstände (Objekte, Prozesse) der Welt, wie sie sind – unabhängig vom Beobachter (abgeschwächt: konsensuelle Eigenschaften)
 - Die Konzepte (mentale Konstrukte), mit denen der Mensch die Gegenstände vergegenwärtigt

Ontologien: Kontroversen (II)

- Bottom up vs. Top Down
 - Bottom up (Semantic Web - Ansatz): viele kleine Modelle ohne Anspruch auf Gesamtkonsistenz, semantische Mediation. Eine große konsistente Modellierung der Welt unmöglich
 - Top Down (Standardisierungs – Ansatz): Innerhalb einer Domäne muss eine Übereinkunft über die genaue Bedeutung von Termen und Klassen gefunden werden, da sonst keine verlässliche Interoperabilität möglich

Vorteil von formalen Beschreibungen

- Unterschiedliche Beschreibungen desselben Sachverhalts können durch Reasoner auf eine kanonische Beschreibung abgebildet werden








$$\begin{aligned} \forall x: \text{instanceOf}(x, \text{ChronicAppendicitis}) &\Leftrightarrow \\ &\text{instanceOf}(x, \text{Inflammation}) \wedge \\ &\exists y: \text{instanceOf}(y, \text{AppendixStructure}) \wedge \\ &\quad \text{hasLocation}(x, y) \wedge \\ &\exists z: \text{instanceOf}(z, \text{AcuteCourse}) \wedge \\ &\quad \text{hasCourse}(x, z) \end{aligned}$$

Vorteil von formalen Beschreibungen

- Unterschiedliche Beschreibungen desselben Sachverhalts können durch Reasoner auf eine kanonische Beschreibung abgebildet werden
- Bedeutung der (definierten) Klassen ist durch logische Sprache eindeutig erkennbar

snob - SNOMED Browser _ □ ×

File Options Help

 Home
  Centre
  Back
  Forward
  Spawn
  Subsets
  Send Bug

Appendicitis Rubric ID: 123558018 Status: Current Language:

CLINICAL FINDING

- Appendicitis**
 - Acute appendicitis
 - Amoebic appendicitis
 - Appendicitis NOS
 - Appendicitis, unqualified
 - Atypical appendicitis
 - Catarrhal appendicitis
 - Chronic appendicitis
 - Complicated appendicitis
 - Focal appendicitis
 - Other appendicitis
 - Other appendicitis NOS
 - Pelvic appendicitis
 - Recurrent appendicitis

74400008 Appendicitis

Synonym(s)
Appendicitis, NOS

Fully Specified Name(s)
Appendicitis (disorder)

Definition
Group #1
this concept [Associated morphology](#)
Inflammation
this concept [Finding site](#) Appendix
structure

Qualifiers

Special disorder atoms

Status:
 Original SNOMED code:
 Read code (Ctv3Id):

Vorteil von formalen Beschreibungen

- Unterschiedliche Beschreibungen desselben Sachverhalts können durch Reasoner auf eine kanonische Beschreibung abgebildet werden
- Bedeutung der (definierten) Klassen ist durch logische Sprache eindeutig erkennbar

...aber...

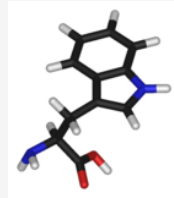
Risiko formalen Beschreibungen

- Immenser Pflegeaufwand (Gesamtsystem muss immer konsistent gehalten werden)
- Vollständige Klassifikation überfordert gegenwärtige Reasoner bzw. erzwingt schmerzhaft Abstriche in der Mächtigkeit der Beschreibungssprache: Beispiel: SNOMED unterstützt keine Negation, daher z.B. ICD – „Sonstige“ nicht adäquat abbildbar
- Gefahr inadäquater Schlüsse

Inadäquate Schlüsse : Beispiel

- „Semantic Web“ Standards
(OWL-DL)
- Standardrelationen aus
Open Biomedical Ontology (OBO)
- Klassifikation der Ontologie mittels DL-Reasoner
(Pellet)

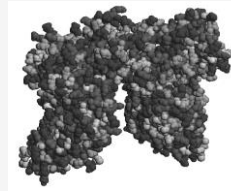
Beispieldomäne



AminoAcid

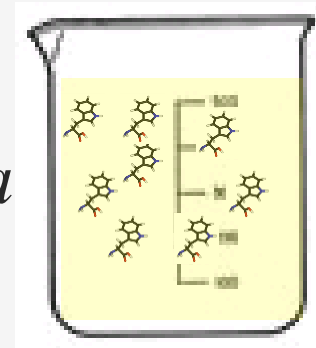
Disorder

Protein



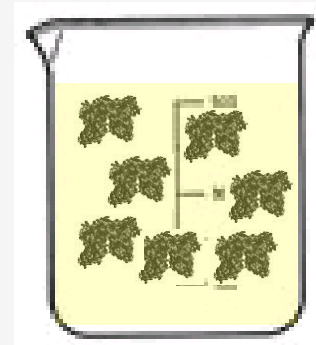
Organism

Aminoaciduria



PortionOfUrine

Proteinuria



Standardrelationen (OBO Relation Ontology)

- *hasPart / partOf*

Teil-Ganzes-Relation im weitesten Sinne
zwischen physikalischen Objekten

- *hasLocation / locationOf*

Lokalisation von Prozessen, Vorgängen

- transitiv, reflexiv, antisymmetrisch

- Subsumption \sqsubseteq
- Äquivalenz \equiv
- Existenz \exists
- Konjunktion \sqcap
- Transitiv Relationen

Axiome

Protein $\sqsubseteq \exists \text{ hasPart.AminoAcid}$

Aminoaciduria $\equiv \text{Disorder} \sqcap$

$\exists \text{ hasLocation.}(Body \sqcap$

$\exists \text{ hasPart.}(PortionOfUrine \sqcap$

$\exists \text{ hasPart.AminoAcid}))$

Proteinuria $\equiv \text{Disorder} \sqcap$

$\exists \text{ hasLocation.}(Body$

$\exists \text{ hasPart.}(PortionOfUrine \sqcap$

$\exists \text{ hasPart.Protein}))$

Inferenz

falsch



Proteinuria \sqsubseteq *Aminoaciduria*

(denn Proteine haben Aminosäuren als Teile und *partOf* ist transitiv)

- Reicht das Sprachinventar nicht aus?
- Ist die Transitivitätsannahme von *hasPart* falsch?

Formal Korrekt
Ontologisch schludrig

AminoAcid: verborgene Ambiguität:

- *AminoAcidSingleMolecule*
- *AminoAcidResidue*
- *AminoAcidSingleMoleculeCollection*
 - *AminoAcidSingleMoleculeCollectionLowConc*
 - *AminoAcidSingleMoleculeCollectionHighConc*

Axiome, korrigiert

Aminoaciduria \equiv *Disorder* \sqcap

\exists *hasLocation*.(*Body* \sqcap

\exists *hasPart*.(*PortionOfUrine* \sqcap

\exists *hasPart*.*AminoAcidSingleMoleculeCollectionHighConc*))

Proteinuria \equiv *Disorder* \sqcap

\exists *hasLocation*.(*Body* \sqcap

\exists *hasPart*.(*PortionOfUrine* \sqcap

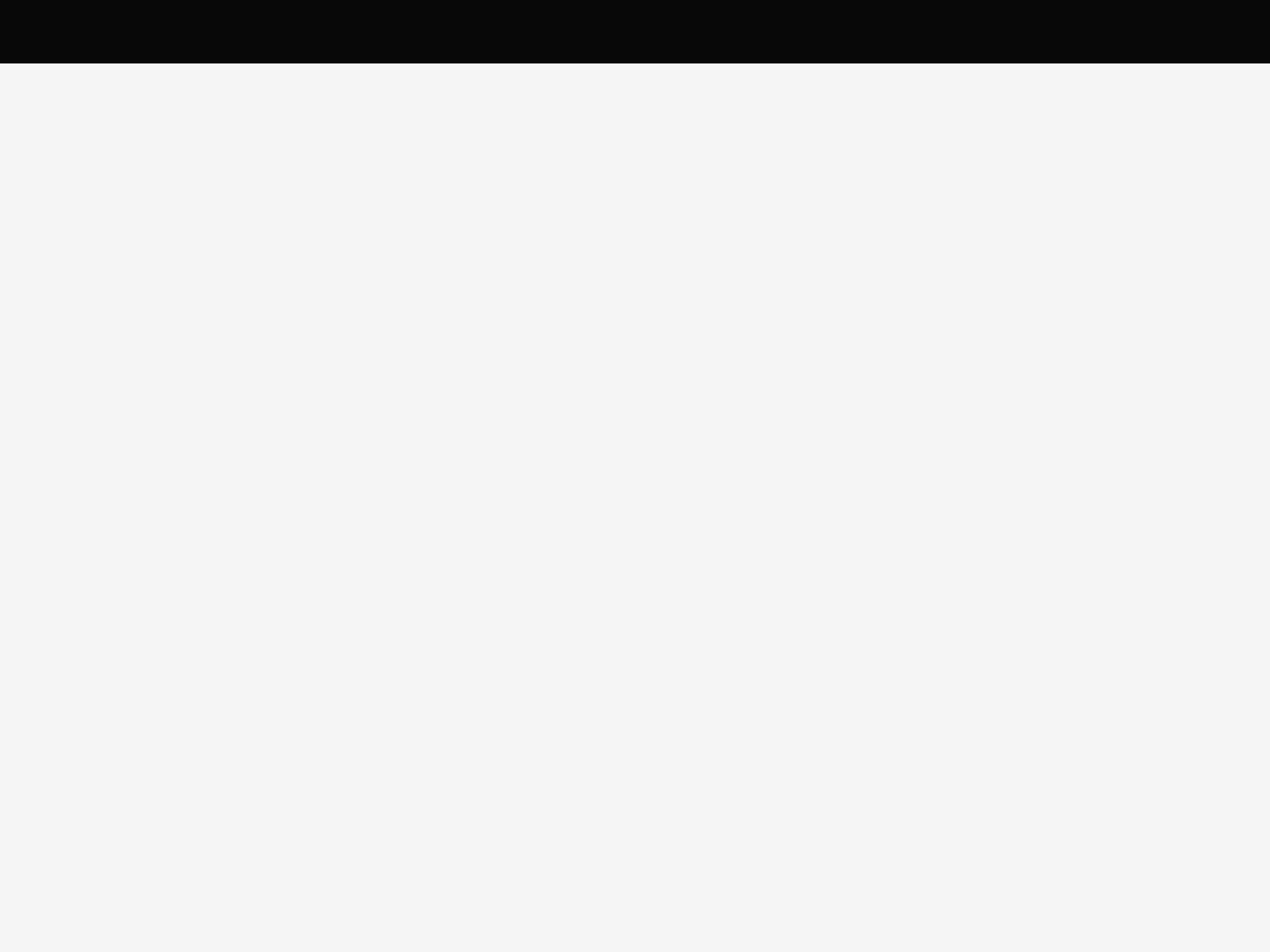
\exists *hasPart*.*ProteinMoleculeCollectionHighConc*))

Seltsame Schlussfolgerungen in biomedizinischen Ordnungssystemen

- Gene Ontology: *Menopause part_of Death*
- GALEN: *Vomitus contains carrot*
- SNOMED CT:
Amputation of toe is_a amputation of foot
- SNOMED CT:
Proximal hemiphalangectomy of toe is_a Amputation of toe.
- SNOMED CT:
Absence of liver or gallbladder NOS is_a Congenital absence of liver and gallbladder

Aufbau des Tutorials

- Überblick: medizinische Ordnungssysteme
- Grundbegriffe medizinische Ordnungssysteme
- **SNOMED CT**
- Ontologien/Terminologien vs. Informationsmodelle
- IHTSDO
- SNOMED CT in Deutschland



SNOMED RT – CT: Anspruch

"...a set of concepts and relationships that provides a common reference point for comparison and aggregation of data about the entire health care process"

Spackman KA, Campbell K, Cote RA. SNOMED RT: A reference terminology for health care. Proc. AMIA Smp. 1997

SNOMED CT (Clinical Terms)

- 300 000 Konzepte
- 770 000 Englische Terme
- Übersetzungen nach Spanisch, Französisch, Dänisch, Schwedisch
- Deutsche Übersetzung inkomplett, nicht validiert
- 900 000 Definitionsausdrücke
- 19 Top-level Kategorien
- 49 Relationstypen

SNOMED CT

■ *Standardized Nomenclature of Medicine – Clinical Terms:*

- Terminologiesystem für die Kodierung von Inhalten in der elektronischen Patientenakte
- Konzipiert als weltweiter terminologischer Standard mit dem Schwerpunkt klinische Dokumentation

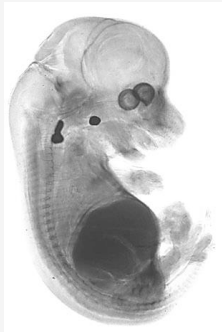
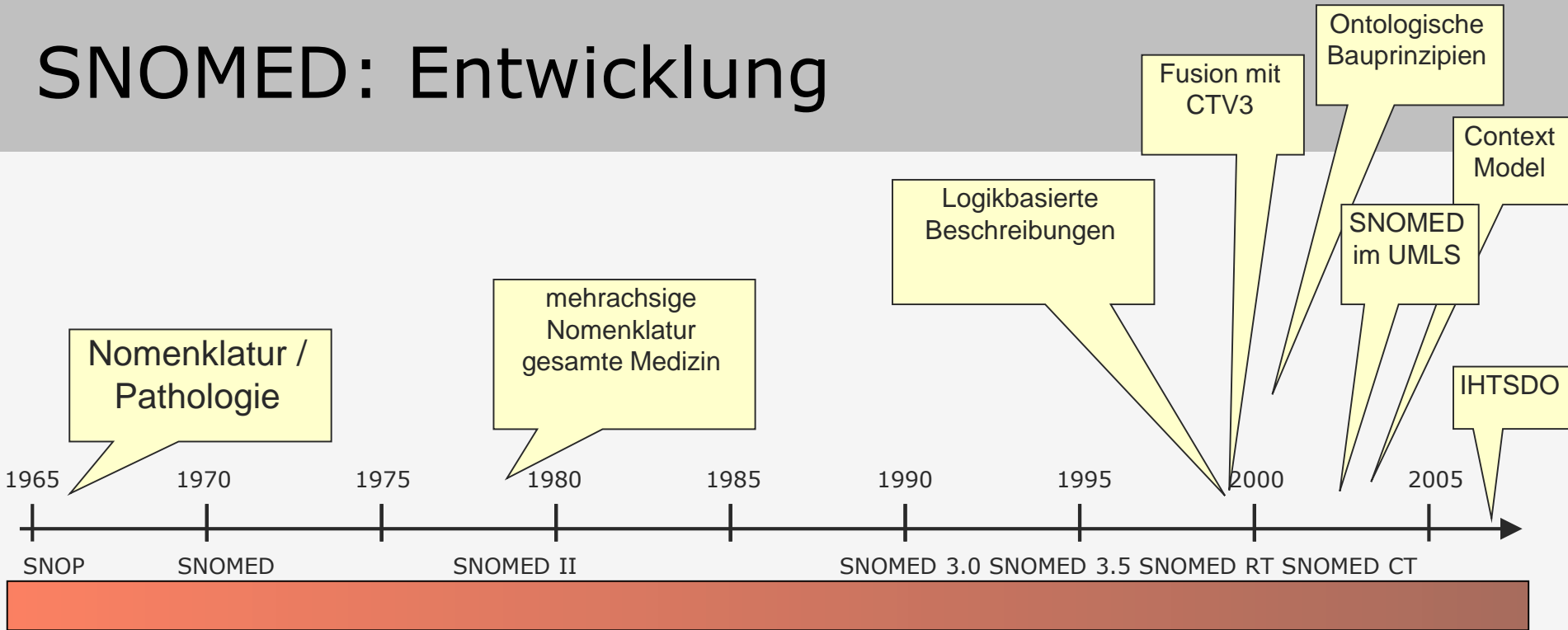
Verbreitet von der 2007 gegründeten IHTSDO (*International Health Terminology Standards Development Organisation*):

Mitgliedsstaaten: US, UK, AU, NZ, CA, DK, SE, NL, LV,

Neu: ES, SG,

bisher nicht: Deutschland

SNOMED: Entwicklung



SNOMED: Werkzeuge und Quellen

- Browser
 - CliniClue (www.cliniclue.com)
 - SNOB (snob.eggbird.eu/)
 - Online: (snomed.vetmed.vt.edu/sct/menu.cfm)
- Quellen
 - Clue-Dateien (proprietär)
 - Textfiles (über UMLS)
- experimentelle Nutzung ohne kommerziellen Hintergrund in D möglich

sct_relationships_20090731.txt

RELATIONSHIPID	CONCEPTID	RELATIONSHIPTYPE	CONCEPTID2	CHARACTERISTICCTYPE	REFINABILITY	RELATIONSHIPGROUP
8086027	103628006	116680003	84499006	0	0	0
8087020	103628006	116680003	34248003	0	0	0
7777029	171395005	116680003	171390000	0	0	0
3874027	159598005	116680003	265979006	0	0	0
4785027	160905000	116680003	266959008	0	0	0
4844026	160987006	116680003	266975006	0	0	0
4845025	102523004	116680003	105726004	0	0	0
12876021	178732003	116680003	173788005	0	0	0
12817021	178618008	116680003	239542002	0	0	0
14569023	181380003	116680003	313560002	0	0	0
14568026	181380003	116680003	81040000	0	0	0
14364025	181248002	116680003	21306003	0	0	0
13759024	180634001	116680003	180632002	0	0	0
3181599026	180097006	116680003	239606002	0	0	0
3171800021	180097006	116680003	119657005	0	0	0
2683723022	180097006	116680003	119647009	0	0	0
3181600028	180098001	116680003	239606002	0	0	0
13553023	180098001	116680003	625000	0	0	0
2683725026	180098001	116680003	119647009	0	0	0
1651441025	180117008	116680003	188383006	0	0	0
13571027	180117008	116680003	239624000	0	0	0
3560921024	104517005	116680003	413993002	0	0	0
1650992022	177118006	116680003	79876008	0	0	0
3181015028	175458000	116680003	276978009	0	0	0
10590020	175458000	116680003	301081007	0	0	0
1910412026	103408004	116680003	385353004	0	0	0
6843024	103353001	116680003	260546003	0	0	0
6844029	103353001	116680003	106233006	0	0	0
3221429029	103354007	116680003	103379005	0	0	0
6845028	103354007	116680003	106233006	0	0	0

sct_concepts_20090731.txt

CONCEPTID	CONCEPTST FULLYSPECIFIEDNAMICTV3ID	SNOMEDID	ISPRIMITIVE
103408004	0 Human immunodeficiency virus	G-E613	1
103353001	0 Transgastric (qualifier value) X8111	G-A1B2	1
103354007	0 Transmural (qualifier value) XU0tX	G-A1B3	1
169269008	0 Blood/plasma viscosity 5884.	P3-70775	1
103521009	0 Influenzavirus A Phillipine XU0va	L-32816	1
169435005	0 Ultrasound therapy - anechoic 5B72.	P5-B0093	1
169436006	0 Ultrasound therapy - skeletal 5B73.	P5-B0094	1
103401005	0 Saturated (qualifier value) XU0uB	G-D642	1
171007003	0 Counseling for bereavement 6751.	P2-11911	1
103542006	0 Ookinete form of protozoan XU0vx	L-50062	1
171016004	2 Investigation result count 6773.	P2-118C4	1
103543001	0 Merozoite form of protozoan X80tf	L-50063	1
160632008	0 Enjoys moderate exercise 1384.	F-0A8FD	1
162340000	0 Hearing difficulty (finding) 1C12.	F-F5031	1
160646008	0 Frequency-Intensity-Time 1381.	F-0A90C	1
10245000	0 Structure of abductor digitorum XU0h9	T-14910	1
102453009	0 Peritonsillar cellulitis (disorder) X00ms	DC-71602	0
102473004	0 Shortened therapeutic regimen XU0hU	F-00557	1
160519009	0 Indian origin (finding) 1347.	F-024BD	1
160520003	0 Middle Eastern origin (finding) 1348.	F-024BE	1
102475006	0 Patient reaction finding (XU0hW)	F-00560	1
160538000	0 Religious affiliation (observation) 135..	F-024E8	1
160633003	0 Enjoys heavy exercise (finding) 1385.	F-0A8FE	1
160634009	0 Competitive athlete (finding) 1386.	F-0A8FF	1
102444002	0 Exposure to toxic dust (event) XU0h5	A-A3280	1
102445001	0 Exposure to toxic dust, chronic XU0h6	A-A3281	1

sct_descriptions_20090731.txt

DESCRIPTIONID	DESCRIPTIONSTATUS	CONCEPTID	TERM	INITIALCAPITALSTATUS	DESCRIPTIONTYPE
541062010	0	160179009	Foreman - rail transport (occupati	0	3
540501016	0	159684005	Head barman (occupation)	0	3
540502011	8	159685006	Supervisor - catering (occupation)	0	3
495182013	0	4870002	Structure of dorsal tegmental nuc	0	1
9118018	0	4873000	Localized vascularization of corne	0	1
1490491010	0	4873000	Localized corneal vascularization	0	2
2532573019	0	47337003	Capsular fibrosis	0	1
78919019	1	47337003	After-cataract	0	2
78920013	1	47337003	After-cataract, NOS	0	2
78922017	0	47338008	Removal of coronary artery obstru	0	1
80122013	1	48079002	Mood alteration, NOS	0	2
80120017	0	48079002	Disturbance in mood	0	1
516148014	0	137763006	Entire nasal spine of frontal bone	0	3
517831013	0	139279001	Entire lateral part of occipital bone	0	3
539721011	0	158996009	State enrolled nurse (occupation)	1	3
539449015	0	158754002	Managing director (occupation)	0	3
539733018	0	159006006	Dental nurse (occupation)	0	3
539737017	0	159010009	Hospital pharmacist (occupation)	0	3
539558013	0	158851003	Buyer - advertising space (occupa	0	3
539559017	0	158852005	Print buyer - advertising (occupati	0	3
539714011	0	158989007	Occupational health nursing office	0	3
539715012	0	158990003	Nursing officer (occupation)	0	3
539726018	0	159000000	Health visitor (occupation)	1	3
539727010	0	159001001	Clinic nurse (occupation)	0	3
539697012	0	158974003	Clinical medical officer (occupatio	0	3
539698019	0	158975002	Medical practitioner - teaching (oc	0	3

SNOMED CT als Terminologie

Parent(s):
(Select a parent to make it the "Current Concept".)

[Entire limb \(body structure\)](#)

[Upper limb structure \(body structure\)](#)

z.Zt.
311 000
Konzepte

Current Concept:
[Entire upper limb \(body structure\)](#)

Child(ren):

(N=2) (Select a child to make it the "Current Concept".)

[Entire left upper extremity \(body structure\)](#)

[Entire right upper extremity \(body structure\)](#)

Zuordnung von medizinischen Fachtermini (einschließlich Synonymen und Übersetzungen) zu sprachunabhängigen Konzepten

Current Concept:

Fully Specified Name: Entire upper limb (body structure)

ConceptId: 182245002

Defining Relationships:

Is a Entire limb (body structure)

Is a Upper limb structure (body structure)

This concept is primitive.

z.Zt.
732 000
engl. Terme

Qualifiers:

View Qualifying Characteristics and Facts

Descriptions (Synonyms):

Preferred: Entire upper limb

Synonym: Upper limb

Synonym: UL - Upper limb

Synonym: Arm region

Synonym: Arm

Fully Specified Name: Entire upper limb (body structure)

SNOMED CT als formales System

SNOMED CT als formales System

Parent(s):

(Select a parent to make it the "Current Concept".)

[Disorder of appendix \(disorder\)](#)

[Inflammation of large intestine \(disorder\)](#)

Current Concept:
[Appendicitis \(disorder\)](#)

Child(ren):

(N=14) (Select a child to make it the "Current Concept".)

There are 5 Retired Children. [Show Retired Children](#)

[Acute appendicitis \(disorder\)](#)

[Amebic appendicitis \(disorder\)](#)

[Appendicitis of a pelvic appendix \(disorder\)](#)

[Atypical appendicitis \(disorder\)](#)

[Catarrhal appendicitis \(disorder\)](#)

[Chronic appendicitis \(disorder\)](#)

[Complicated appendicitis \(disorder\)](#)

[Focal appendicitis \(disorder\)](#)

Hierarchien:
Strikte
Spezialisierung
(is-a)

Current Concept:

Fully Specified Name: [Appendicitis \(disorder\)](#)

ConceptId: 74400008

Refining Relationships:

Is a [Disorder of appendix \(disorder\)](#)

Is a [Inflammation of large intestine \(disorder\)](#)

Group 1

Associated morphology (attribute) [Inflammation \(morphologic abnormality\)](#)

Finding site (attribute) [Appendix structure \(body structure\)](#)

This concept is fully defined.

Qualifiers:

[View Qualifying Characteristics and Facts](#)

Descriptions (Synonyms):

Preferred: [Appendicitis](#)

Fully Specified Name: [Appendicitis \(disorder\)](#)

Synonym: [Appendicitis, NOS](#)

SNOMED CT als formales System

Parent(s):

(Select a parent to make it the "Current Concept".)

[Disorder of appendix \(disorder\)](#)

[Inflammation of large intestine \(disorder\)](#)

Current Concept:
[Appendicitis \(disorder\)](#)

Child(ren):

(N=14) (Select a child to make it the "Current Concept".)

There are 5 Retired Children. [Show Retired Children](#)

[Acute appendicitis \(disorder\)](#)

[Amebic appendicitis \(disorder\)](#)

[Appendicitis of a pelvic appendix \(disorder\)](#)

[Atypical appendicitis \(disorder\)](#)

Current Concept:

Fully Specified Name: Appendicitis (disorder)

ConceptId: 74400008

Defining Relationships:

Is a Disorder of appendix (disorder)

Is a Inflammation of large intestine (disorder)

Group 1

Associated morphology (attribute) [Inflammation \(morphologic abnormality\)](#)

Finding site (attribute) [Appendix structure \(body structure\)](#)

This concept is fully defined.

Qualifiers:

[View Qualifying Ch...](#)

Descriptions (4)

Preferred:

Fully Specified Name:

Synonym:

Relationen (Attribute):

z.B.

Associated morphology

Finding site

(50 Relationstypen)

Restriktionen: auf einfacher
Beschreibungslogik beruhend:

$C1 - Rel - C2$ zu interpretieren als:

$\forall x: instanceOf(x, C1) \Rightarrow$

$\exists y: instanceOf(C2) \wedge Rel(x,y)$

SNOMED CT als formales System

Current Concept:
Fully Specified Name: Entire upper limb (body structure)
ConceptId: 182245002

Defining Relationships:
Is a Entire limb (body structure)
Is a Upper limb structure (body structure)
This concept is primitive.

Current Concept:
Fully Specified Name: Appendicitis (disorder)
ConceptId: 74400008

Defining Relationships:
Is a Disorder of appendix (disorder)
Is a Inflammation of large intestine (disorder)
Group 1
Associated morphology (attribute) [Inflammation \(morphologic abnormality\)](#)
Finding site (attribute) [Appendix structure \(body structure\)](#)
This concept is fully defined.

Qualifiers:
View Qualifying Characteristics and Facts

Descriptions (Synonyms):
Preferred: Appendicitis

definierte vs. primitive
Konzepte

Defizit von nicht-formalen Ansätzen (frühere SNOMED-Versionen)

D5-46210 [Acute appendicitis, NOS](#)

D5-46100 [Appendicitis, NOS](#)

G-A231 [Acute](#)

M-41000 [Acute inflammation, NOS](#)

G-C006 [In](#)

T-59200 [Appendix, NOS](#)

G-A231 [Acute](#)

M-40000 [Inflammation](#)

G-C006 [In](#)

T-59200 [Appendix, NOS](#)

- Unterschiedliche Beschreibungen desselben Sachverhalts sind nicht aufeinander abbildbar
- Aneinanderreihung von Konzepten und Relationen nicht eindeutig interpretierbar

SNOMED CT : taxonomische Hierarchien

Current Concept:

SNOMED CT Concept (SNOMED RT+CTV3)

Child(ren):

(N=19) (Select a child to make it the "Current Concept"

[Body structure \(body structure\)](#)

[Clinical finding \(finding\)](#)

[Environment or geographical location \(envirc](#)

[Event \(event\)](#)

[Linkage concept \(linkage concept\)](#)

[Observable entity \(observable entity\)](#)

[Organism \(organism\)](#)

[Pharmaceutical / biologic product \(product\)](#)

[Physical force \(physical force\)](#)

[Physical object \(physical object\)](#)

[Procedure \(procedure\)](#)

[Qualifier value \(qualifier value\)](#)

[Record artifact \(record artifact\)](#)

[Situation with explicit context \(situation\)](#)

[Social context \(social concept\)](#)

[Special concept \(special concept\)](#)

[Specimen \(specimen\)](#)

[Staging and scales \(staging scale\)](#)

[Substance \(substance\)](#)

Current Concept:

Clinical finding (finding)

Child(ren):

(N=20) (Select a child to make it the "Current Concep

There are 2 Retired Children. [Show Retired Children](#)

[Administrative statuses \(finding\)](#)

[Adverse incident outcome categories \(findi](#)

[Clinical history and observation findings \(fir](#)

[Clinical stage finding \(finding\)](#)

[Deformity \(finding\)](#)

[Disease \(disorder\)](#)

[Drug action \(finding\)](#)

[Edema \(finding\)](#)

[Effect of exposure to physical force \(findin](#)

[Enzyme activity finding \(finding\)](#)

[Finding by method \(finding\)](#)

[Finding by site \(finding\)](#)

[Finding of grade \(finding\)](#)

[Finding related to physiologic substance \(f](#)

[Finding reported by subject or history prov](#)

[General clinical state finding \(finding\)](#)

[Neurological finding \(finding\)](#)

[Prognosis/outlook finding \(finding\)](#)

[Sequelae of external causes and disorders](#)

[Wound finding \(finding\)](#)

Current Concept:

Disease (disorder)

Child(ren):

(N=71) (Select a child to make it the "Current Cor

There are 2 Retired Children. [Show Retired Child](#)

[Acute disease \(disorder\)](#)

[AIDS-associated disorder \(disorder\)](#)

[Angioedema and/or urticaria \(disorder\)](#)

[Biphasic disease \(disorder\)](#)

[Chronic disease \(disorder\)](#)

[Communication disorder \(disorder\)](#)

[Complication \(disorder\)](#)

[Complication of procedure \(disorder\)](#)

[Congenital disease \(disorder\)](#)

[Degenerative disorder \(disorder\)](#)

[Developmental disorder \(disorder\)](#)

[Disease due to Arthropod \(disorder\)](#)

[Disease of presumed infectious origin \(c](#)

[Disorder associated with menstruation A](#)

[Disorder by body site \(disorder\)](#)

[Disorder characterized by edema \(disord](#)

[Disorder characterized by pain \(disorder](#)

[Disorder due to exposure to ionizing rad](#)

[Disorder of cellular component of blood](#)

[Disorder of fetus or newborn \(disorder\)](#)

SNOMED CT : taxonomische Hierarchien

Parent(s):

(Select a parent to make it the "Current Concept".)

[Acute inflammatory disease \(disorder\)](#)

[Appendicitis \(disorder\)](#)

Current Concept:

[Acute appendicitis \(disorder\)](#)

Child(ren):

(N=10) (Select a child to make it the "Current Concept".)

There are 1 Retired Children. [Show Retired Children](#)

[Acute appendicitis with appendix abscess \(disorder\)](#)

[Acute appendicitis with peritoneal abscess \(disorder\)](#)

[Acute appendicitis with peritonitis \(disorder\)](#)

[Acute appendicitis without peritonitis \(disorder\)](#)

[Acute focal appendicitis \(disorder\)](#)

[Acute fulminating appendicitis \(disorder\)](#)

[Acute gangrenous appendicitis \(disorder\)](#)

[Acute obstructive appendicitis \(disorder\)](#)

[Acute perforated appendicitis \(disorder\)](#)

[Acute suppurative appendicitis \(disorder\)](#)

Current Concept:

Fully Specified Name: Acute appendicitis (disorder)

ConceptId: 85189001

Defining Relationships:

Is a Acute inflammatory disease (disorder)

Is a Appendicitis (disorder)

Group 1

Associated morphology (attribute) [Acute inflammation \(morphologic abnormality\)](#)

Finding site (attribute) [Appendix structure \(body structure\)](#)

This concept is fully defined.

Qualifiers:

[View Qualifying Characteristics and Facts](#)

Descriptions (Synonyms):

Fully Specified Name: Acute appendicitis (disorder)

Preferred: Acute appendicitis

Synonym: Acute appendicitis, NOS

Related Concepts:

- [All "Is a" antecedents](#) -

- [All descendants and related subtypes](#) -

Präkoordination - Postkoordination

- Präkoordination: komplexe Ausdrücke sind vorformuliert:
[Acid chemical burn of cornea and conjunctival sac](#)
 - Vorteil: schnelle Kodierung komplexer, aber häufiger Sachverhalte
 - Nachteil: kombinatorische Explosion der Terminologie
- Postkoordination: komplexe Ausdrücke werden aus atomaren Konzepten, **Relationen** und logischen **Konstruktoren** aufgebaut:
[Burn](#) **AND** *has-location* **SOME** ((*has-part* **SOME** [Cornea](#)) **AND** (*has-part* **SOME** [Conjunctival sac](#))) **AND** *causal-agent* **SOME** [Acid](#)
 - Nachteil: aufwändige Kodierung
 - Vorteil: Terminologie bleibt pflegbar und übersichtlich
- Formaler Fundierung erlaubt das Berechnen der Äquivalenz zwischen Prä- und Postkoordinationen

Problematik der Postkoordination

- Komplizierte Syntax und Kombinationsregeln:
erfordert intensive Schulung
- Anwendungssysteme müssen teils sehr lange
Ausdrücke beherrschen
- Unterscheidung zwischen logischer Konjunktion
(ein kombiniertes Konzept) und
Nebeneinanderstellung von Konzepten (Addition)

SNOMED CT: Derzeitige Schwächen

Uneinheitlicher Top-Level

Current Concept:
SNOMED GT Concept (SNOMED RT+CTV3)

- Body structure (10)
 - Acquired body structure
 - Anatomical organizational pattern (...)
- Clinical finding (22)
 - Administrative statuses
 - Adverse incident outcome categories (...)
- Environment or geographical location
 - Environment
 - Geogr. and/or political region of the world
- Event (19)
 - Abuse
 - Accidental event
 - Bioterrorism related event (...)
- Linkage concept
 - Attribute
 - Link assertion
- Observable entity
 - Age AND/OR growth period
 - Body product observable (...)
- Clin. history / examination observable (21)
 - Device observable
 - Drug therapy observable
 - Feature of Entity (...)
- Organism (11)
 - Animal
 - Chromista

- Pharmaceutical / biologic product (58)
 - Alcohol products
 - Alopecia preparation
 - Alternative medicines (...)
- Physical force (21)
 - Altitude
 - Electricity (...)
- Physical object (8)
 - Device
 - Domestic, office and garden artefact
 - Fastening (...)
- Procedure (23)
 - Administrative procedure
 - Community health procedure (...)
- Qualifier value (52)
 - Action
 - Additional dosage instructions (...)
- Record artifact
 - Record organizer
 - Record type

- Social context (10)
 - Community
 - Family
 - Group (...)
- Special concept
 - Namespace concept
 - Navigational concept
 - Non-current concept
- Specimen (45)
 - Biopsy sample
 - Body substance sample
 - Cardiovascular sample (...)
- Staging and scales (6)
 - Assessment scales
 - Endometriosis classification of American Fertility Society (...)
- Substance (11)
 - Allergen class
 - Biological substance
 - Body substance (...)

The Celestial Emporium of Benevolent Knowledge

Jorge Luis Borges

"On those remote pages
it is written that animals
are divided into:

- a. those that belong to the Emperor
- b. embalmed ones
- c. those that are trained
- d. suckling pigs
- e. mermaids
- f. fabulous ones
- g. stray dogs
- h. those that are included in this classification
- i. those that tremble as if they were mad
- j. innumerable ones
- k. those drawn with a very fine camel's hair brush
- l. others
- m. those that have just broken a flower vase
- n. those that resemble flies from a distance"

Exzessive Präkoordination

deep full thickness burn of the cheek without loss of body part
deep full thickness burn of the cheek, with loss of body part
deep third degree burn of forehead AND/OR cheek with loss of body part
deep full thickness burn of the lip(s), with loss of body part
deep full thickness burn of the lip(s) without loss of body part
deep full thickness burn of the cheek without loss of body part
deep full thickness burn of the cheek, with loss of body part
deep third degree burn of forehead AND/OR cheek with loss of body part
deep full thickness burn of the forehead without loss of body part
deep third degree burn of forehead AND/OR cheek with loss of body part
deep third degree burn of face, head AND/OR neck with loss of body part
deep third degree burn of face AND/OR head with loss of body part
deep third degree burn of face, head AND/OR neck with loss of body part
deep full thickness burn of the eye, with loss of body part
deep full thickness burn of the cheek, with loss of body part
deep third degree burn of forehead AND/OR cheek with loss of body part
deep full thickness burn of the chin without loss of body part
deep full thickness burn of the lip(s) without loss of body part
deep full thickness burn of the forehead without loss of body part
deep third degree burn of forehead AND/OR cheek with loss of body part

Über 350 Konzepte für
Brandverletzungen
im Bereich des Kopfes

Hypertrophierte Hierarchien

Root Concept: **Acute appendicitis (disorder)**

The following 36 "Is a" antecedents are present in the SNOMED hierarchy:

[Disorder of appendix \(disorder\)](#)

[Disorder of digestive system \(disorder\)](#)

[Disease \(disorder\)](#)

[Appendicitis \(disorder\)](#)

[Disorder of digestive organ \(disorder\)](#)

[Disorder of lower gastrointestinal tract \(disorder\)](#)

[Disorder of digestive tract \(disorder\)](#)

[Disorder of intestine \(disorder\)](#)

[Finding by site \(finding\)](#)

[Finding of large intestine \(finding\)](#)

[Disorder of abdomen \(disorder\)](#)

[Disorder of gastrointestinal tract \(disorder\)](#)

[General finding of abdomen \(finding\)](#)

[Disorder of large intestine \(disorder\)](#)

[Disorder by body site \(disorder\)](#)

[Disorder of trunk \(disorder\)](#)

[Inflammatory disorder \(disorder\)](#)

[Acute inflammatory disease \(disorder\)](#)

[Inflammatory disorder of digestive tract \(disorder\)](#)

[SNOMED CT Concept \(SNOMED RT+CTV3\)](#)

[Abdominal organ finding \(finding\)](#)

[Bowel finding \(finding\)](#)

[Finding of appendix \(finding\)](#)

[Finding of body region \(finding\)](#)

[Inflammation of large intestine \(disorder\)](#)

[Finding of trunk structure \(finding\)](#)

[Disorder of body system \(disorder\)](#)

[Inflammation of specific body organs \(disorder\)](#)

[Inflammation of specific body structures or tissue \(disorder\)](#)

[Inflammation of specific body systems \(disorder\)](#)

[Inflammatory disorder of digestive system \(disorder\)](#)

[Digestive system finding \(finding\)](#)

[Gastrointestinal tract finding \(finding\)](#)

[Disorder of body cavity \(disorder\)](#)

[Clinical finding \(finding\)](#)

[Viscus structure finding \(finding\)](#)

„Epistemic intrusion“ – Aussagen statt Konzepte

metastasis to peritoneum of unknown primary tumor

Suspected autism

Suspicion of gastritis

Other circus performer

No antenatal care: not known pregnant

No drug side effect reported

Take at regular intervals. Complete the prescribed course unless otherwise directed

Pregnant ? – planned

T1a (IA): Invasive carcinoma of uterine cervix diagnosed by microscopy only

Diabetes mellitus excluded

Surgical pathology consultation and report on referred slides prepared elsewhere

Previous known suicide attempt

Medication not administered

Helicobacter blood test negative

Poor condition at birth without known asphyxia

Natural death with probable cause suspected

Dendritic cell sarcoma, not otherwise specified

Unlikely diagnosis

Operating room unavailable

Fehlende Beschreibungen

[Admission to intensive care:](#)

kein Link zu: [Intensive Care](#)

[Severe Asthma](#) :

kein Link zu: [Severe](#)

[Chronic hemorrhage](#) :

kein Link zu: [Chronic](#)

[Hemorrhage](#) :

kein Link zu: [Blood](#)

[Epithelium](#) :

kein Link zu: [Epithelial Cell](#)

[Diabetic foot at risk](#) :

kein Link zu: [Diabetes, Foot](#)

[Operating room unavailable](#) :

kein Link zu: [Operating Room](#)

[Failed heroin detoxification](#) :

kein Link zu: [Heroin](#)

[Alopecia preparation](#) :

kein Link zu: [Alopecia](#)

Concept Status: **Current**

- **Descriptions**
 - F admission to intensive care unit (procedure)
 - P admission to intensive care unit
 - S admit to ITU
 - S admit to intensive care unit
 - S ICU - Admission to intensive care unit
- **Definition: Primitive**
 - is a
 - D admission to department
- **Qualifiers**
 - priority
 - P priorities
- **Codes**
 - Original SnomedId : P0-00279
 - Read Code (Ctv3Id) : XaAN6



Concept Id 109442002

Congenital missing tooth

Description Id 174009017

clinical finding

Words - any order

Find missing

- S missing rib
- S missing leg
- S missing toe
- S tooth missing
- S missing hand
- S missing foot
- S teeth missing
- S missing sternum
- S finger missing
- P missing tooth count

Hierarchy Subtype hierarchy

- C 422977003 congenital anomaly of tooth
- C 66793004 congenital absence of alimentary tract
- C 91922000 congenital absence of jaw
- C 91946007 congenital absence of mouth
- 109442002 congenital absence of one tooth

congenital absence of one tooth - Definition
 Concept Status: **Current**

Descriptions

- F congenital absence of one tooth (disorder)
- P congenital absence of one tooth
- S congenital hypodontia, single tooth
- S congenital missing tooth

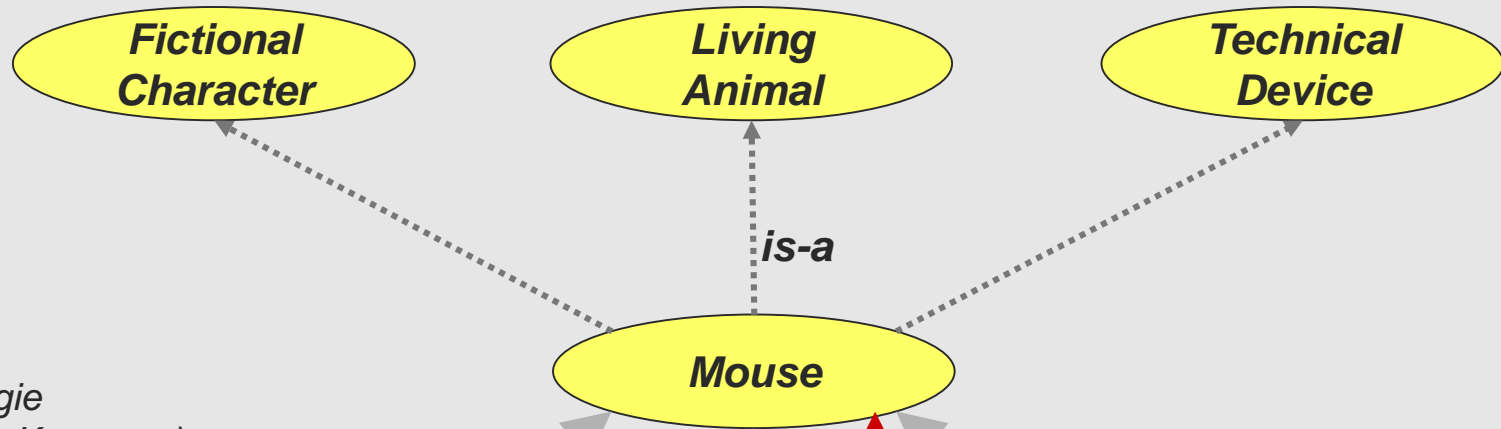
Definition: Primitive

- is a
 - D congenital anomaly of tooth
 - D congenital absence of alimentary tract
 - D congenital absence of jaw
 - D congenital absence of mouth
- occurrence
 - D congenital
- Group
 - associated morphology
 - D congenital absence
 - finding site
 - D tooth structure
- Qualifiers
 - severity
 - severities
 - clinical course
 - courses
- Codes
 - Original SnomedId : D4-51015
 - Read Code (Ctv3Id) : XU2Mr

Unklares „Ontological Commitment“

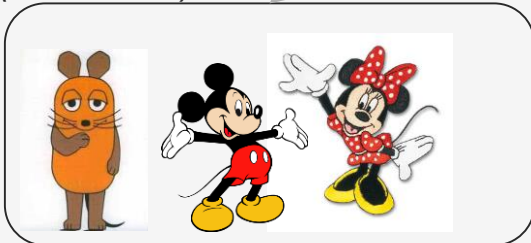
- Beschreibungslogik: Konzepte sind einstellige Prädikate über eine Domäne
- Was sind Instanzen von SNOMED CT – Konzepten?
 - Konzepte: [Linkage concept](#)
 - Individuelle materielle Entitäten / Prozesse: [Gallbladder](#), [Cholecystitis](#)
 - Individuelle Aussagen / Dokumentationsobjekte, : [Diabetes mellitus excluded](#), [Take at regular intervals](#), [Biopsy planned](#)
 - keine: [Indian Subcontinent](#), [Milligram](#)

Konzepte, Klassen, Instanzen



Ontologie
(Typen, Konzepte)

Domäne
(Individuen)



Instance_of



SNOMED CT Beispiele

1. *Tonsillectomy planned* \equiv

$\exists rg. (\exists associatedProcedure.Tonsillectomy \sqcap$

$\exists procedureContext.Planned \sqcap$

$\exists subjectRelationshipContext.SubjectOfRecord \sqcap$

$\exists temporalContext.CurrentOrSpecifiedTime)$

SNOMED CT Examples

1. *Tonsillectomy planned* \equiv

$\exists rg. (\exists associatedProcedure.Tonsillectomy \sqcap$

$\exists procedureContext.Planned \sqcap$

$\exists subjectRelationshipContext.SubjectOfRecord \sqcap$

$\exists temporalContext.CurrentOrSpecifiedTime)$

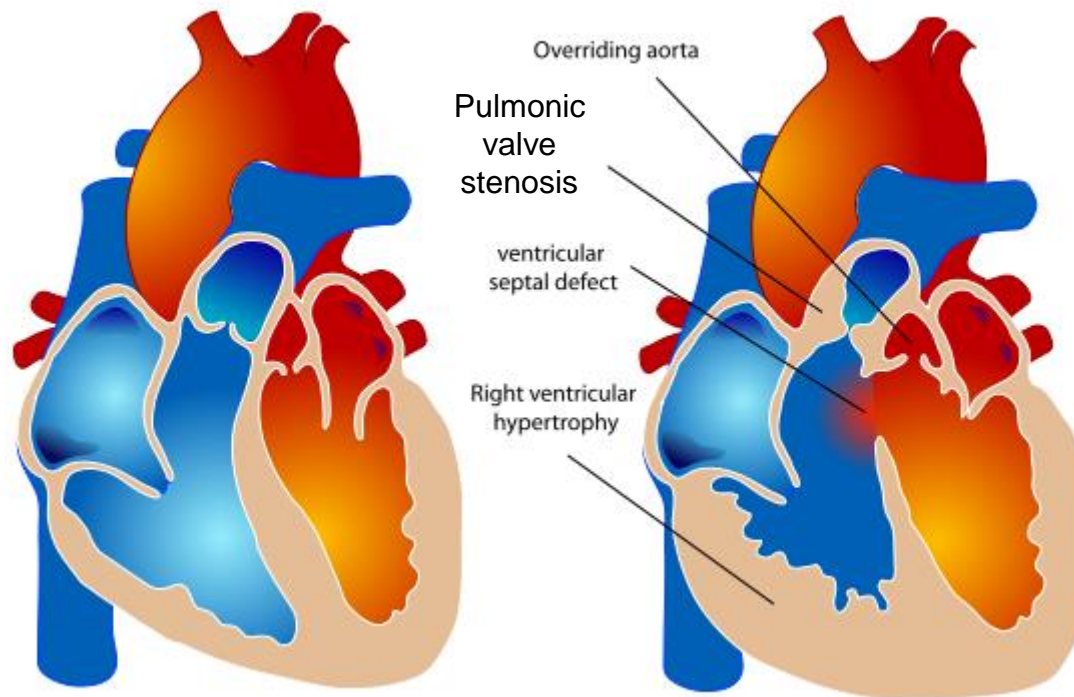
SNOMED CT Examples

1. *Tonsillectomy planned* \equiv

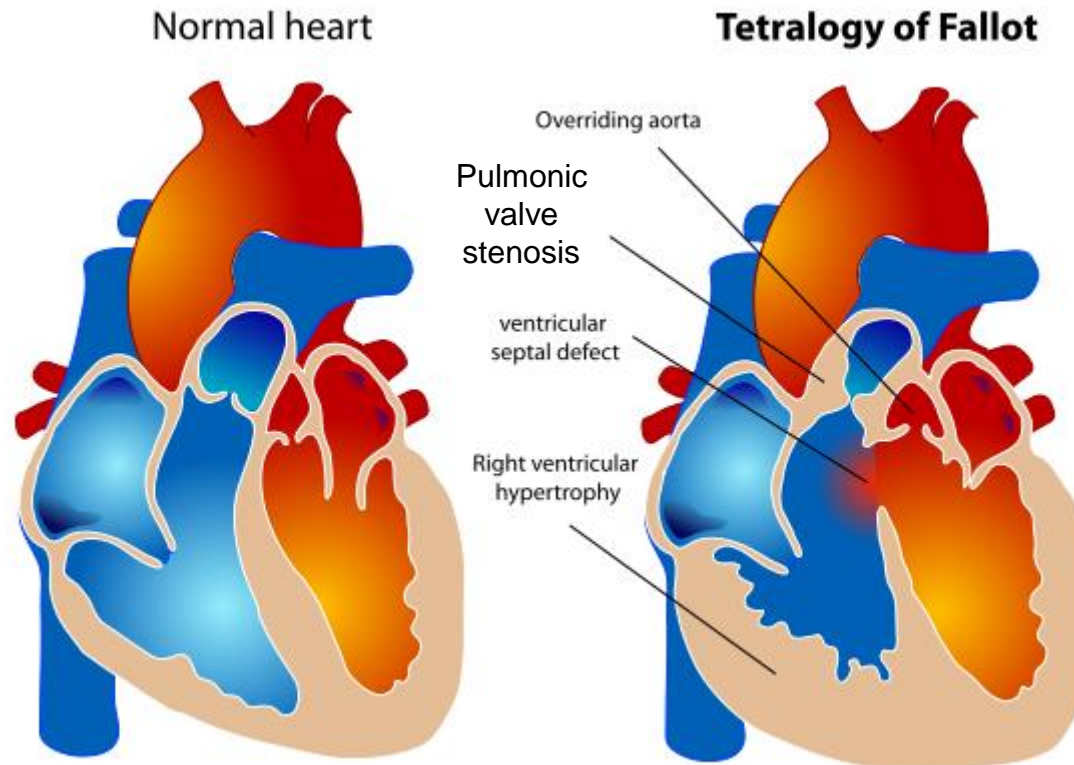
$\exists rg. (\exists associatedProcedure.Tonsillectomy \sqcap$
 $\exists procedureContext.Planned \sqcap$
 $\exists subjectRelationshipContext.SubjectOfRecord \sqcap$
 $\exists temporalContext.CurrentOrSpecifiedTime)$

2. *Denied tonsillectomy* \equiv

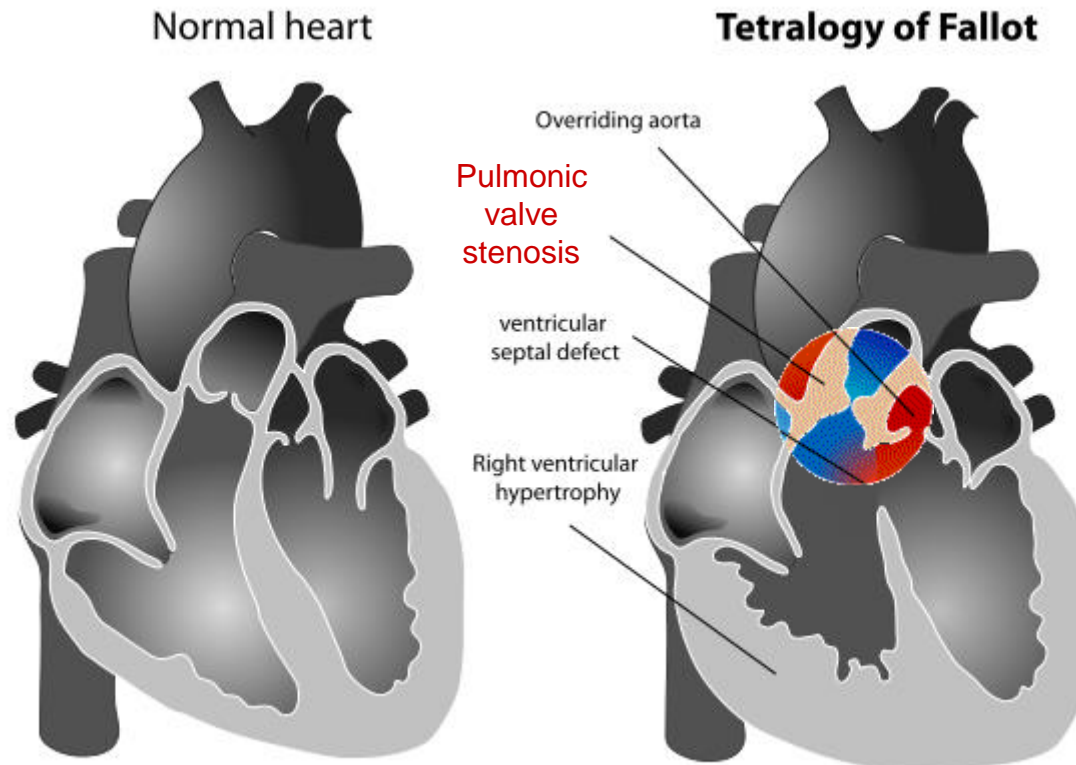
$Tonsillectomy \sqcap \exists Priority.Denied$



Fallot'sche Tetralogie



Fallot'sche Tetralogie



SNOMED CT Beispiele

1. *Tonsillectomy planned* ≡

*∃ rg.(∃ associatedProcedure.Tonsillectomy ⊎
∃ procedureContext.Planned ⊎
∃ subjectRelationshipContext. SubjectOfRecord ⊎
∃ temporalContext.CurrentOrSpecifiedTime)*

2. *Denied tonsillectomy* ≡

Tonsillectomy ⊎ ∃ Priority.Denied

3. *Tetralogy of Fallot* ≡

*PulmonicValveStenosis ⊎ VentricularSeptalDefect ⊎
OverridingAorta ⊎ RightVentricular hypertrophy*

SNOMED CT Examples

1. Tonsillectomy planned \equiv

\exists arg. (\exists associatedProcedure. Tonsillectomy \sqcap
 \exists procedureContext. Planned \sqcap
 \exists subjectRelationshipContext. SubjectOfRecord \sqcap
 \exists temporalContext. CurrentOrSpeci

jede Instanz von
"Tonsillectomy
planned" impliziert eine
Tonsillektomie"

2. Denied tonsillectomy \equiv

Tonsillectomy \sqcap \exists Priority. Denied

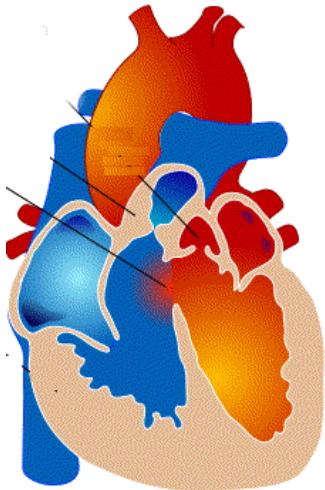
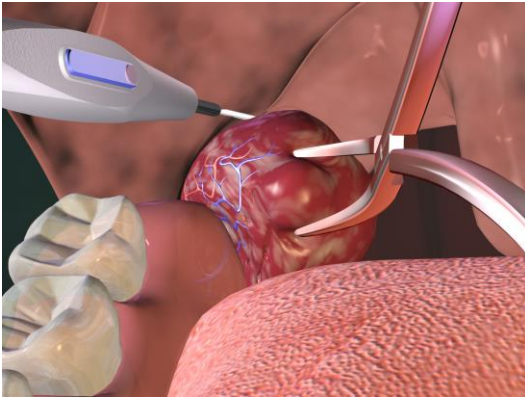
jede Instanz von
"denied tonsillectomy"
ist eine Tonsillektomie

3. Tetralogy of Fallot \equiv

PulmonicValveStenosis \sqcap VentricularSeptalDefect \sqcap
 OverridingAorta \sqcap RightVentricular hypertrophy

jeder Fallot is auch
eine Pulmonal-
venenstenose

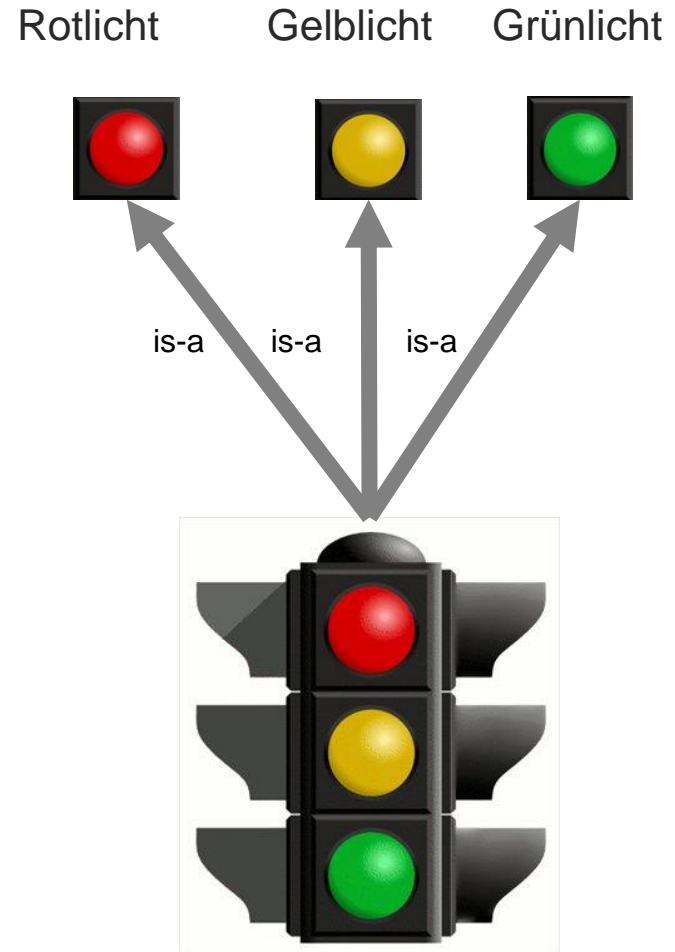
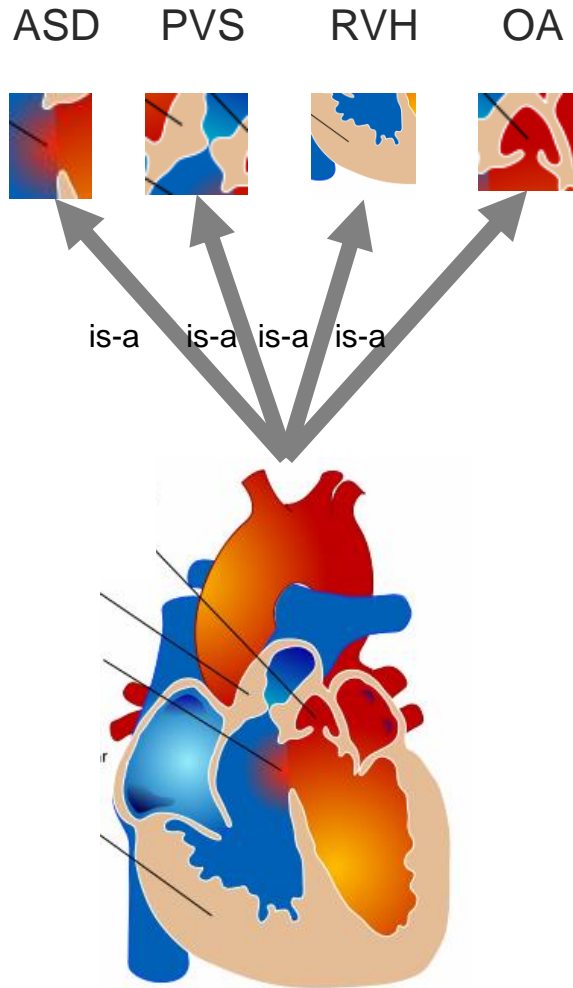
Probleme



- Die Negation eines Prozesses ist eine Spezialisierung dieses Prozesses
- Ein Plan ist so definiert, dass seine Realisierung impliziert ist
- Ein Teil von X ist gleichzeitig sein Elternkonzept

Teile von Elternkonzepten ?

Beispiel: Harold Solbrig



Relevanz

- Alle drei Beispiele sind typische Muster in SNOMED CT
 - bei 50,000 Prozedurkonzepten können “denied” - Subkonzepte erzeugt werden
 - Hunderte von Konzepten haben Eigenschaften wie “planned”, “suspected” or “known absent” in ihrer Definition
 - 77,000 “procedure” or “finding” - Konzepte haben Komponenten als Elternkonzepte
- Hypothese: Unterschiedliche und konkurrierende ontologische Vereinbarungen, stark beeinflusst durch den Anwendungskontext.

Alternative Interpretationen ?

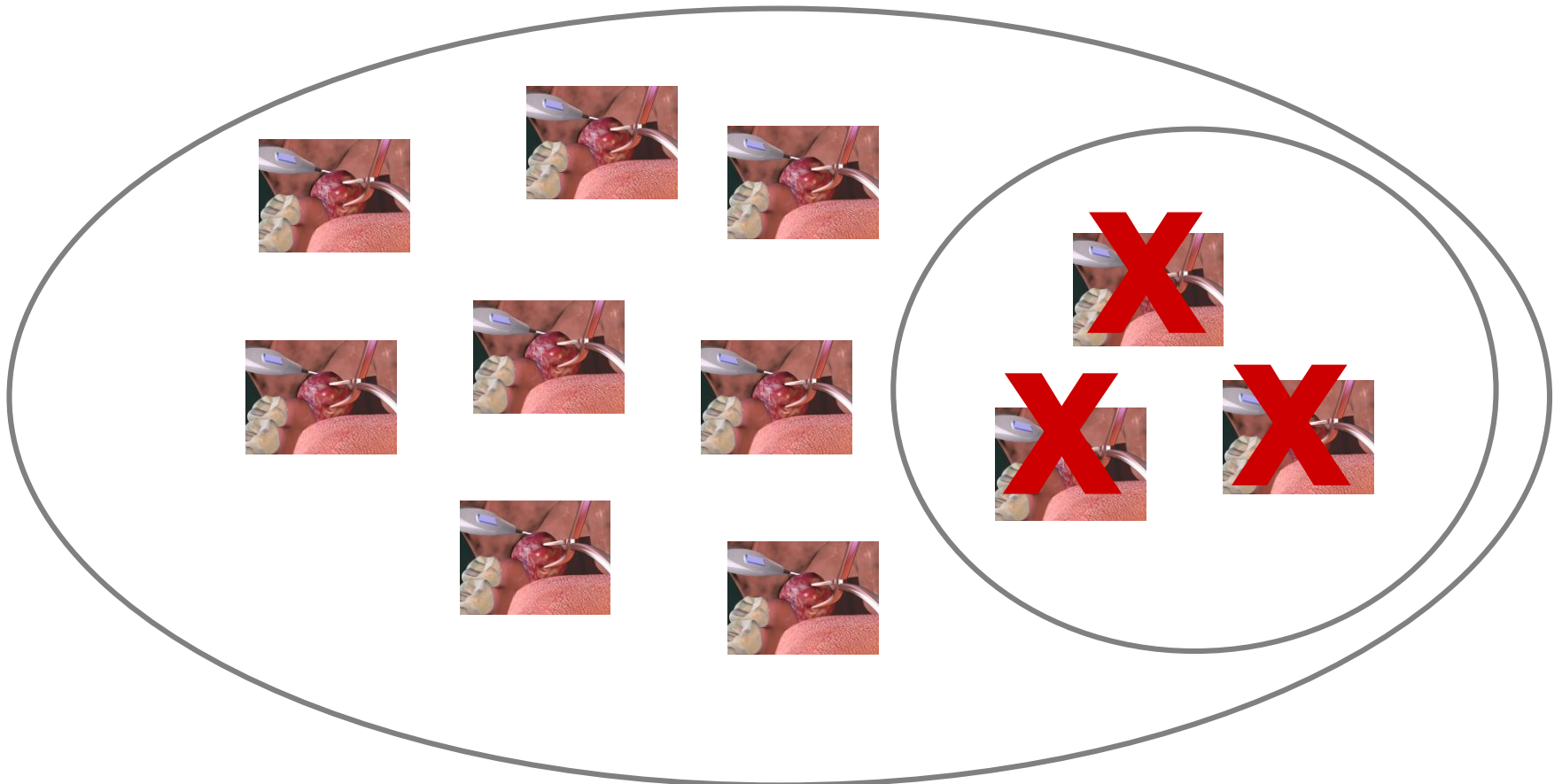
Alternative Interpretation (I)

SNOMED CT – Konzepte werden instanziiert durch EPA - Einträge

- Für jeden Patienten, der für eine OP vorgesehen ist, wird ein Informationsobjekt generiert
- Die Klasse dieser Informationsobjekte enthält Kindklassen von Informationsobjekte mit Werten wie "planned", "executed", "denied" etc.
- Ausdrücke wie \exists *associatedProcedure.Tonsillectomy* repräsentieren Pläne (" \exists " allerdings in jedem Fall falsch)
- \exists *Priority.Denied* spezialisiert die Klasse von Informationsobjekten aber nicht die Klassen der Tonsillektomien

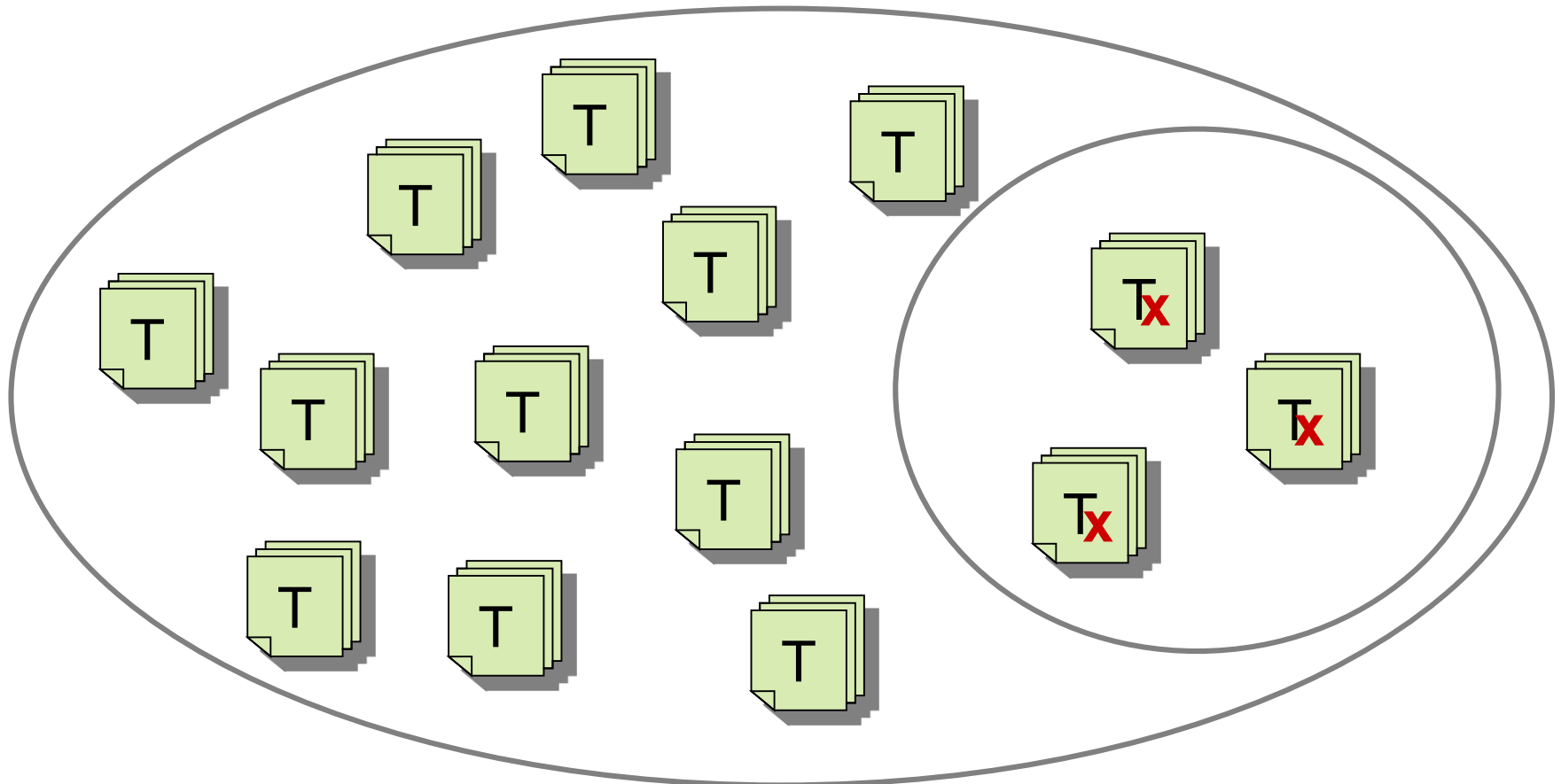
Alternative Interpretation (I)

Extension von "Tonsillektomy" enthält die Extension von
"Denied Tonsillektomy": **FALSCH**



Alternative Interpretation (I)

Extension von "Record of Tonsillectomy" schließt die Extension von "Record of Denied Tonsillectomy" ein: **WAHR**



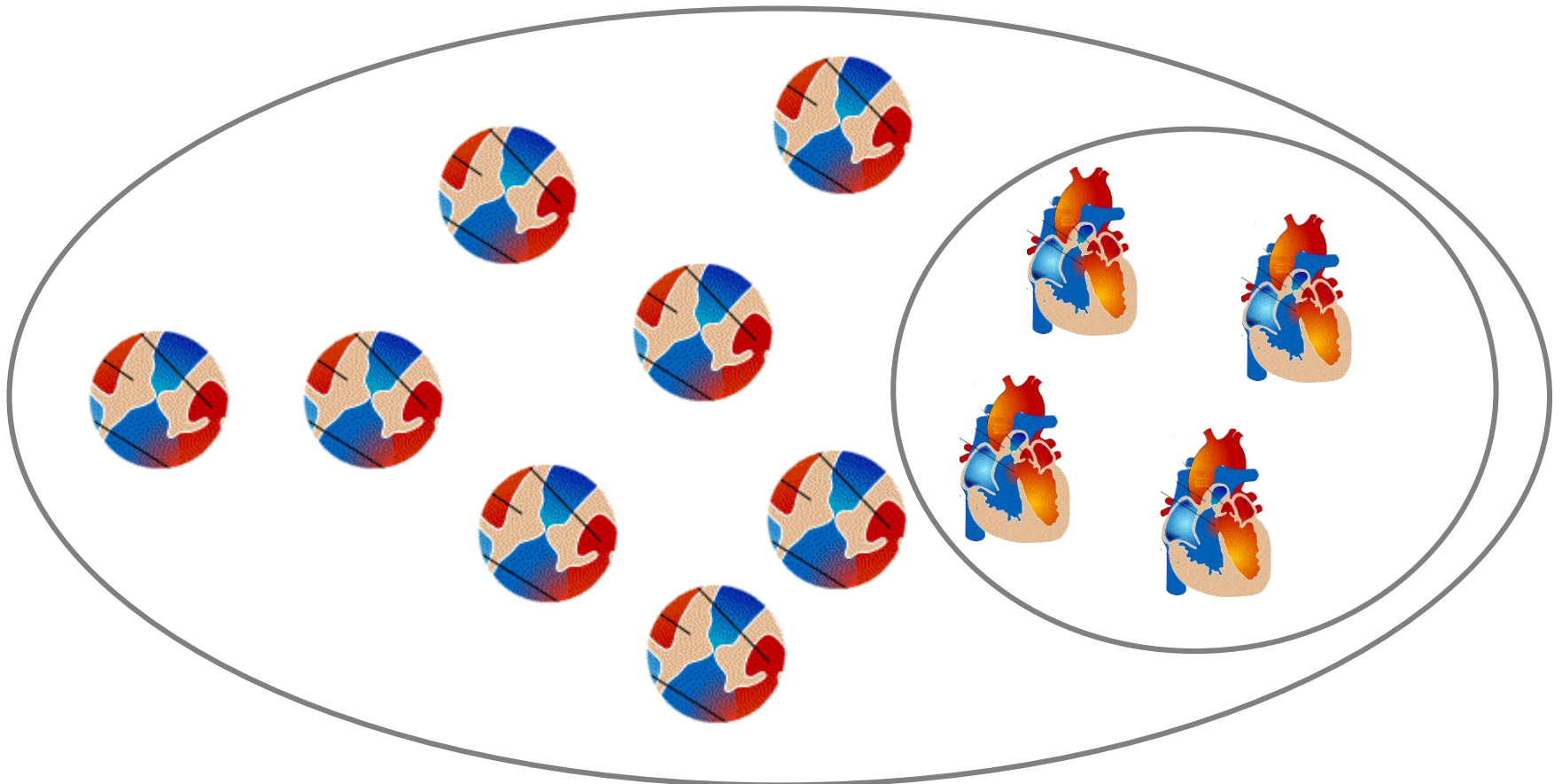
Alternative Interpretation (II)

SNOMED CT concepts are instantiated by patients or clinical situations.

- *Pulmonic Valve Stenosis* stands for “Patient with a pulmonic valve stenosis”
- *Tetralogy of Fallot* stands for “Fallot Patient”
- All Fallot patients are also patients with pulmonic valve stenosis because every instance of Tetralogy of Fallot has one instance of pulmonic valve stenosis as part
- Consequence:
 - Finding and procedure concepts extend to classes of patients but not to classes of findings or procedures

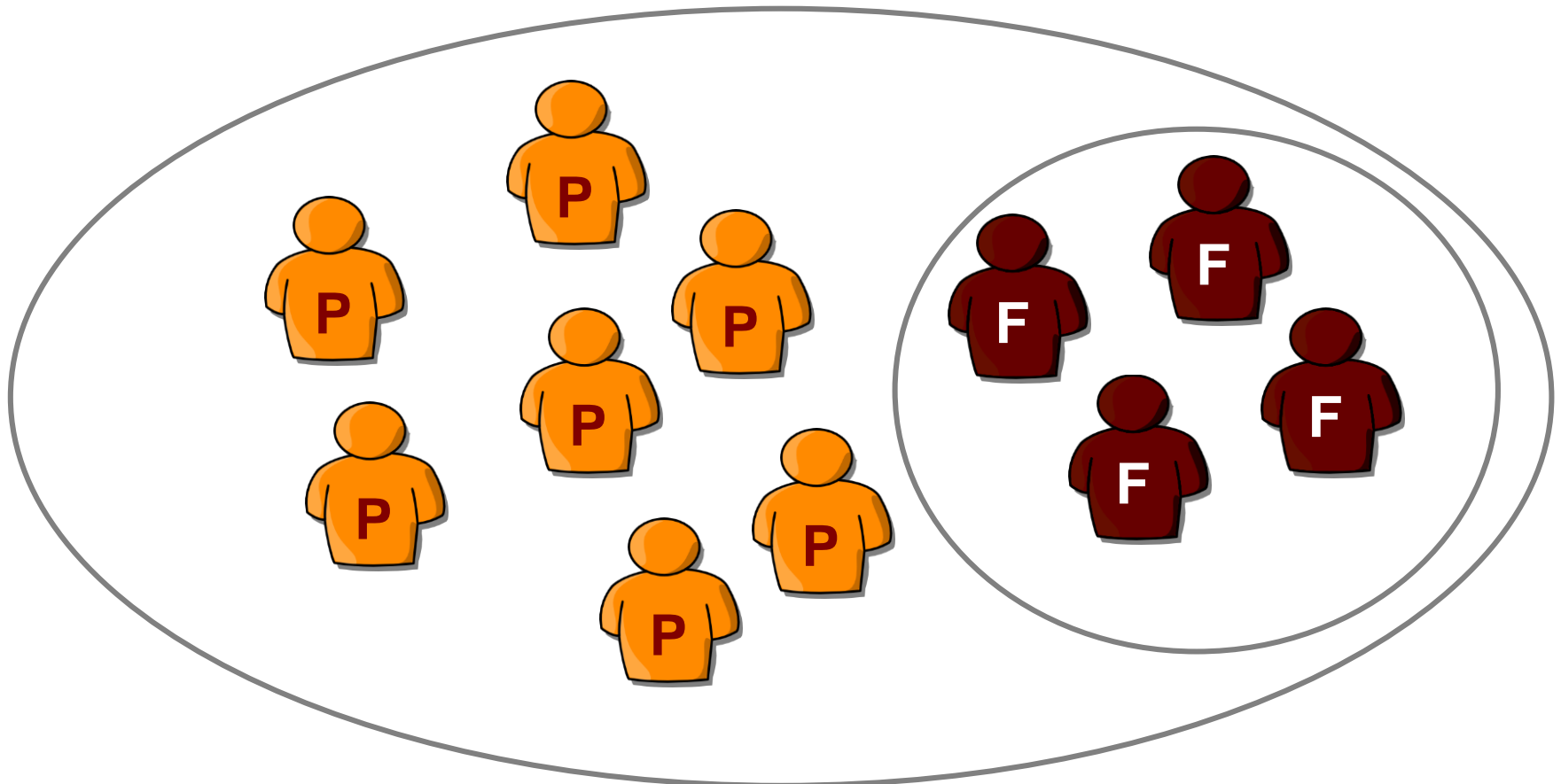
Alternative Interpretation (II)

Extension von "Pulmonic Valve Stenosis" schließt die Extension von "Tetralogy of Fallot" ein: **FALSE**



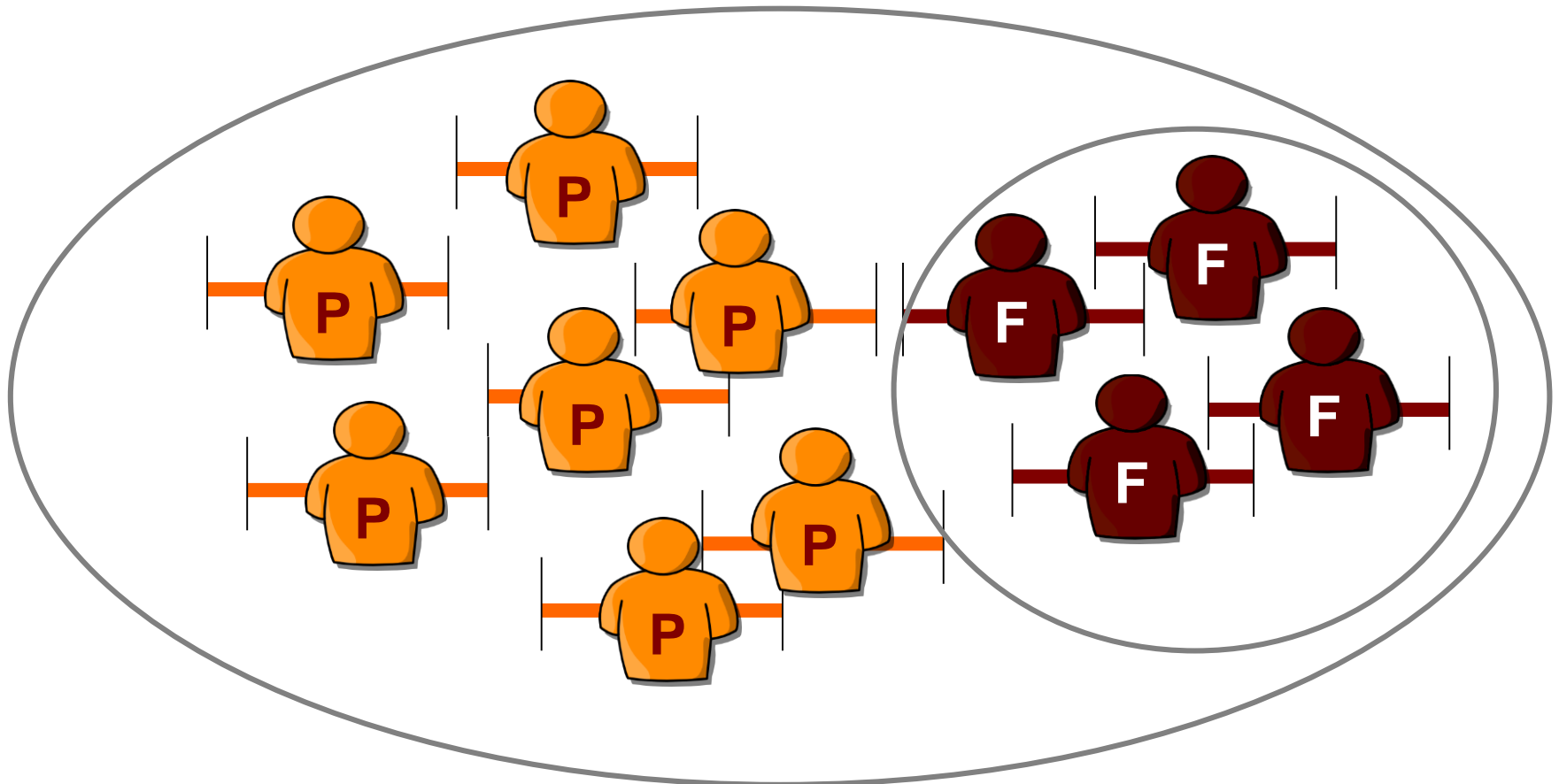
Alternative Interpretation (II)

Extension von "**Patient with** Pulmonic Valve Stenosis" schließt die Extension von "**Patient with** Tetralogy of Fallot" ein: **TRUE**



Alternative Interpretation (II)

Extension von "**Situation with Pulmonic Valve Stenosis**" schließt die Extension von "**Situation with Tetralogy of Fallot**" ein: **TRUE**



Bedeutung des „ontological Commitment“

- Es ist oft unklar, was SNOMED CT Konzepte repräsentieren
- Die Interpretation davon, was mit SNOMED CT – Konzepten genau gemeint ist, bleibt dem Nutzer überlassen.
- Mögliche Interpretationen leiten sich oft implizit von zu Grunde liegenden klinischen Schlussmustern ab.
- SNOMED CT vermischt Charakteristika von Ontologien mit denen von Informationsmodellen.
- SNOMED CT lässt sich erst dann sinnvoll als eine Ontologie nutzen, wenn Konsens über sein “ontological commitment” besteht

Inhaltlich falsche Beschreibungen

Biopsy Planned:

impliziert Existenz von: Biopsy

Drug_Abuse_Prevention :

impliziert Existenz von : Drug Abuse

Suspected Gallstones:

impliziert Existenz von : Gallstones

Absence of Arm:

impliziert Existenz von : Upper Limb Structure

Amputation of toe:

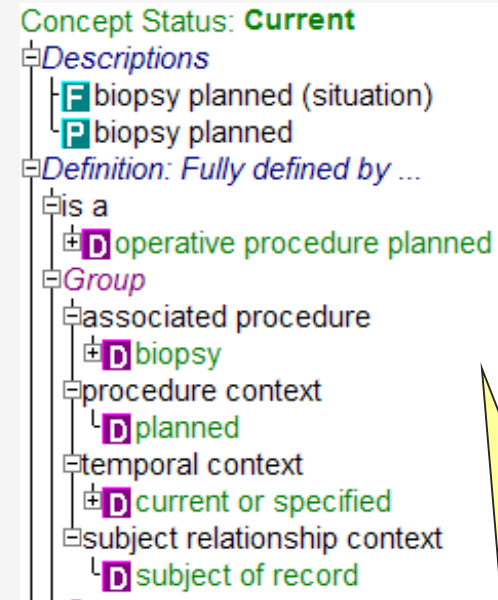
: wird klassifiziert als: Amputation of foot

Absence of liver or gallbladder NOS :

wird klassifiziert als: Congenital absence of liver and gallbladder

Proximal hemiphalangectomy of toe :

wird klassifiziert als: Amputation of toe.



C1 – Rel – C2 zu
interpretieren als:
 $\forall x: \text{instanceOf}(x, C1) \Rightarrow$
 $\exists y: \text{instanceOf}(C2)$
 $\wedge \text{Rel}(x,y)$

Ursache vieler Defizite

- SOLL: Beschränkung auf kontrolliertes Vokabular (Terminologie) und / oder Hierarchie und Beschreibung von Typen (Ontologie)
- IST: Inkonsequente und formal fragwürdige Repräsentation aller Arten dokumentarischer Aussagen, wie sie typisch sind für Informationsmodelle und statistische Klassifikationen
- Grundirrtümer: Medizinische Dokumentation als Instantiierung von Terminologie / Ontologie-Konzepten, Vermischung Ontologie / Informationsmodell

Hierarchy

SNOMED CT Top Level Navigation Hierarachy (v1)

Default to

138875005	SNOMED CT Concept
243796009	situation with explicit context
276445008	A/N risk factors
405647008	critical incident factors
405648003	critical incident properties
398819009	diabetic foot at risk
33993005	disease type AND/OR category not applicable
66678007	disease type AND/OR category not assigned
271336007	examination / signs
57177007	family history of
413350009	finding with explicit context
4908009	history of
309575005	laboratory finding absent
405280005	operating room unavailable
416534008	outbreak

Aufbau des Tutorials

- Überblick: medizinische Ordnungssysteme
- Grundbegriffe medizinische Ordnungssysteme
- SNOMED CT
- **Ontologien/Terminologien vs. Informationsmodelle**
- IHTSDO
- SNOMED CT in Deutschland

From metaphysics...

Ontology

- theory of reality



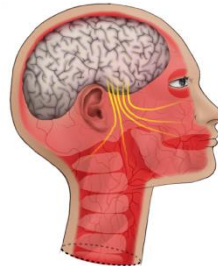
Semantics

- theory of meaning of (human language) designations

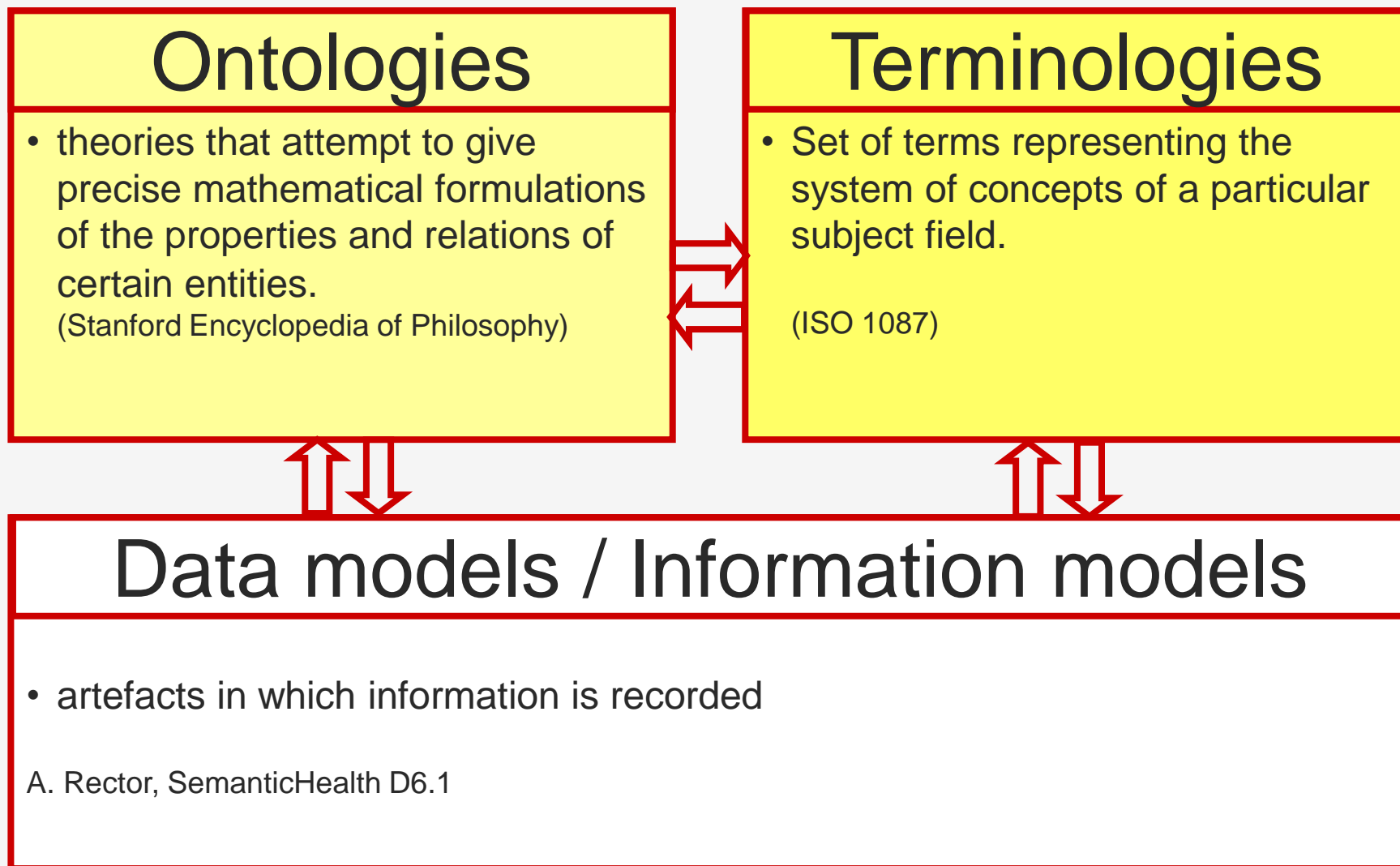


Epistemology

- theory of knowledge



...to an ideal world of representation artifacts



Examples

Ontologies

Formal descriptions

- MRSA *subtype-of* SA
- SA *subtype-of* Staphylococcus
- SA *implies* bearer-of some MR quality

Textual descriptions

- “MRSA is defined as SA for which methicillin has no toxic effect”

Terminologies

- Concept 1 – Synonyms:
 - SA
 - Staphylococcus aureus
 - Staph. aur.
- Concept 2 – Synonyms:
 - MRSA
 - Methicillin-resistant SA
 - Methicillin-resistant Staphylococcus Aureus

Data models / Information models

Methicillin resistance

- Clinically confirmed
- Confirmed by antibiogram
- Suspected
- None
- Unknown

but in the real, chaotic world...



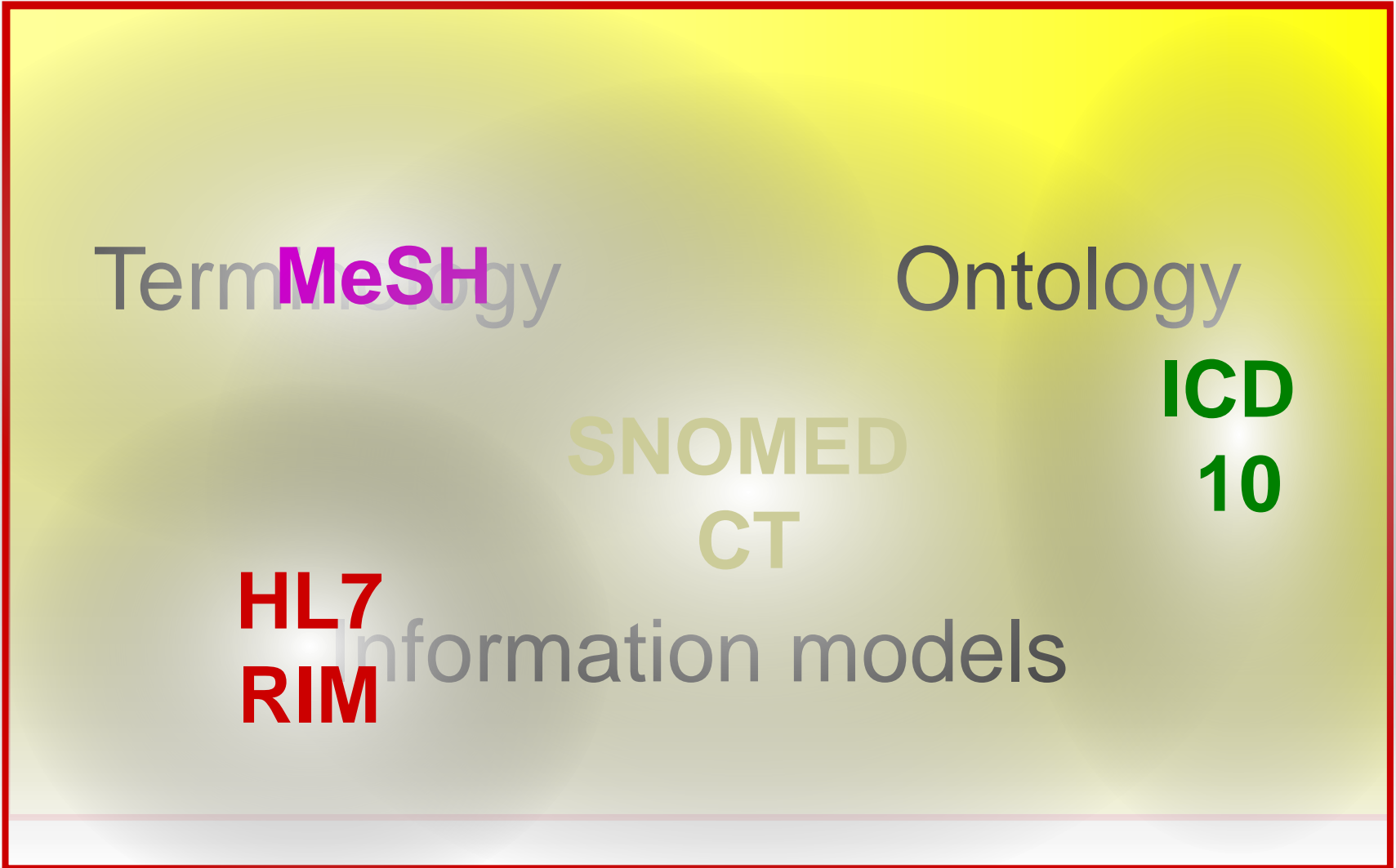
we have to deal with “living” representational artifacts far from being ideal

Terminology

Ontology

Information models

that combine terminology, ontology and information model elements



Problem: Semantic Overlap

Terminologies
Ontologies stray
the terrain of
information
models

- **Historically: solution developers tended to work with a single representation standard**
- **Multiple approaches to encode the same information**
- **Risk of arbitrary design decisions when used together**
- **Lack of clarity with regard to satisfying unmet representational need**

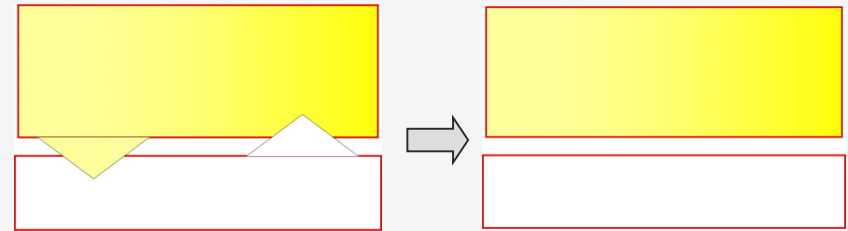
Information
models
stray the
terrain of
Terminologies /
Ontologies

Examples of “epistemic intrusion”

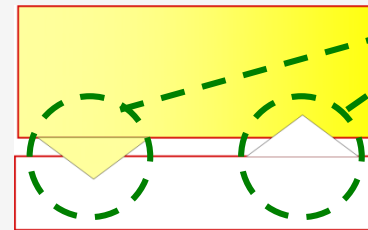
- SNOMED CT: “Suspected autism”
- SNOMED CT: “Biopsy planned”
- SNOMED CT: “Take at regular intervals”
- ICD 10: “Tuberculosis of lung, confirmed histologically”
- ICD-O: “Basal cell tumor, uncertain whether benign or”
malignant
- ICD-9-CM: “Replacement of unspecified heart valve”
- NCI Thesaurus: “Unknown If Ever Smoked”
- NCI Thesaurus: “Absent Adverse Event”

Solutions

- Establish a clear boundary between information models and ontologies: desirable but unfeasible for legacy systems



- Develop rules for managing ambiguities
- **HL7** TermInfo



```

* In an associated information model or template that permits or requires the use of
  SNOMED CT to represent the status of an Act class object
- The Attribute attribute SHALL permit the use of the Concept Class (CC) data
  type
  * This is required, all instances of the associated information model using
    qualified values shall use appropriate
- The Attribute attribute MAY be constrained to a data type that prohibits qualified values, only
  if there is a reason (e.g., requirement for representation, forwarding) that might
  require the use of post-coordinated expressions
- This is required to allow inclusion of post-coordinated expressions whose data
  type is not a CC
- The Observation attribute MAY be constrained to a data type that prohibits
  qualified values, only if there is a reason to be no requirement for representation of meaning
  that might require the use of post-coordinated expressions



* In an Act class instance where the Act code attribute is a SNOMED CT expression
- The expression SHALL be asserted to have a [SNOMED] observable entity (i.e.,
  [SNOMED] procedure with explicit content) (e.g., [SNOMED] event)
  * It is [SNOMED] (e.g., "event") and is included here as illustrative
  * It is not constrained to a procedure (i.e., it might be a procedure
    representing a procedure) However, this is an exception on the SNOMED CT Concept
    Model, since it is not a relationship between "[SNOMED] event"
    concept and concept instance as generally specified

* In an Observation class instance where the Observation code attribute is a SNOMED CT expression
- The Observation attribute SHALL be asserted to have a [SNOMED] observable entity
  (e.g., [SNOMED] procedure with explicit content) (e.g., [SNOMED] event)
  * It is [SNOMED] (e.g., "event") and is included here as illustrative
  * It is not constrained to a procedure (i.e., it might be a procedure
    representing a procedure) However, this is an exception on the SNOMED CT Concept
    Model, since it is not a relationship between "[SNOMED] event"
    concept and concept instance as generally specified

* In an Observation class instance where the Observation code attribute is a SNOMED CT expression
  representing a [SNOMED] clinical finding (e.g., [SNOMED] finding with explicit
  content) (e.g., [SNOMED] clinical finding) (e.g., [SNOMED] finding with explicit
  content) as specified in the SNOMED CT Concept Model, since it
  permits the use of post-coordinated expressions (e.g., [SNOMED] event)
  * It is not constrained to a procedure (i.e., it might be a procedure
    representing a procedure) However, this is an exception on the SNOMED CT Concept
    Model, since it is not a relationship between "[SNOMED] event"
    concept and concept instance as generally specified

```


Two Health Information Standards

	HL7 Version 3	SNOMED CT
Characterization	Messaging Standard for healthcare workflows	Terminology Standard for healthcare
	Information model	Ontology-inspired Terminology
	Model of use	Model of meaning
Represents	Informational artifacts	Clinical reality: patients, diseases, procedures, drugs
	States of knowledge	Meaning of terms
Methodological foundation	UML	Description logics
SDO	 HL7, Inc Ann Arbor, Michigan, USA	 IHTSDO International Healthcare Terminology Standards Development Organisation Copenhagen, Denmark
Participation	HL7 local organizations in over 30 countries	Member states: Australia, Canada, Cyprus, Denmark, Lithuania, New Zealand, Singapore, Spain, Sweden, The Netherlands, United Kingdom, United States

TermInfo Draft Standard for Trial Use (DSTU): History

- 2004 onwards, Growing interest in use of **SNOMED Clinical Terms (SNOMED CT)** in the **HL7** community
- HL7 Vocabulary Technical Committee (supported by SNOMED International and NASA) launched the 'TermInfo Project' with the following missions:
 - General: investigate interfacing between **HL7** information models and terminologies or code systems.
 - Specific: A guide on use of **SNOMED CT** within the **HL7 V3**
- Outcome September 2007:
 - Guide to Use of **SNOMED CT** in **HL7 Version 3** accepted as a Draft Standard for Trial Use (DSTU)
- <http://www.hl7.org/v3ballot/html/welcome/environment/index.htm>

Using SNOMED CT in HL7 v3 DSTU

Using SNOMED CT

May 2008
v3

HL7 Version 3 Standard

- Introduction
- Foundation
 - Reference Information Model
 - Data Types: Abstract
 - Data Types: Abstract R2
 - Core Principles and Properties
 - Constraints Project
 - GELLO: Common Expression
 - Refinement, Constraint and
 - Security (RBAC)
 - Templates Project
 - Using SNOMED CT
 - Vocabulary
- Specification Infrastructure
 - References
 - Revision changes
 - SNOMED CT Open Issues
 - Detailed aspects of issues
 - Glossary
- Vocabulary
- Specification Infrastructure
- Implementation Technology
- Services

Legend

- Informative
- Reference
- Normative
- DSTU
- Draft
- Document Group

1.3 Scope

The primary scope of this implementation guide is to provide guidance for the use of SNOMED CT in the HL7 V3 Clinical Statement pattern. The intent is to guide implementers in the construction of instances based on models derived from that pattern. These include models covering the representation of clinical information from the perspective of various HL7 domains including Structured Documents (CDA release 2), Patient Care, Orders and Observations and models using the Clinical Statement CMET².

Word Count

Statistics:

Pages	65
Words	36,699
Characters (no spaces)	206,370
Characters (with spaces)	244,090
Paragraphs	2,031
Lines	4,860

Include footnotes and endnotes

Show Toolbar Cancel

Structure of SNOMED CT in HL7 v3 DSTU

1. Introduction and Scope

⇒ 2. **Guidance on Overlaps between RIM and SNOMED CT Semantics**

3. Common Patterns

4. Normal Forms

5. SNOMED CT vocabulary domain constraints

6. Glossary

Appendix A General Options for Dealing with Potential Overlaps

Appendix B References

Appendix C Revision changes

Appendix D SNOMED CT Open Issues

Appendix E Detailed aspects of issues with a vocabulary specification formalism

Section 2:

Guidance on overlaps between RIM and SNOMED CT Semantics

- Detailed walk-through of RIM attributes vs. SNOMED CT properties:
 - Act.classCode
 - Act.code and Observation.value
 - Act.moodCode
 - Act.statusCode
 - Procedure.targetSiteCode and Observation.targetSiteCode
 - Procedure.approachSiteCode and SubstanceAdministration.approachSiteCode
 - Procedure.methodCode and Observation.methodCode
 - Act.priorityCode
 - Act.negationInd
 - Act.uncertaintyCode
 - Representation of Units
 - Dates and Times



HL7 moodCode ↔ SNOMED CT
finding and procedure context

HL7 methodCode ↔ SNOMED CT
finding and procedure methods

And so on...

RIM 2.19
March 21, 2008

Each subsection in HL7 v3 DSTU Section 2: divided into:

1. Potential overlap
2. Rules and guidance
3. Rationale

Two examples

Example 1: *Procedure.targetSiteCode* and *Observation.targetSiteCode*

- Potential Overlap:
 - Complete overlap
 - *HL-7 targetSiteCodes* are defined as “the anatomical site or system that is the focus of the procedure / observation.”
 - SNOMED CT finding and procedure concepts have a defining attribute that specifies the site: e.g. *Appendicitis – Finding Site – Appendix structure*
- Rules and Guidance
 - omit *targetSiteCode* attribute from:
 - any *Act* class clone in which *SNOMED CT* is the only permitted code system for the *Act.code* attribute.
 - any *Observation* class clone in which *SNOMED CT* is the only permitted code system for the *Observation.value* attribute...'
- Rationale
 - Argues case for *SNOMED CT* attribute preference
 - Precision of available attributes; relationship grouping
 - The site of an action or event is clearly of ontological nature

Example 2: *Act.MoodCode*

- Potential overlap
 - The values in *ActMood* vocabulary partially overlap with SNOMED CT representations of *Finding context* and *Procedure context*
 - *Finding context* relevant to instances of HL7 *Observation* classes expressed in "event", "goal", "expectation" and "risk" moods.
 - *Procedure context* relevant to (i) instances of various HL7 *Act* classes including *Procedure*, *SubstanceAdministration* and *Supply*, (ii) instances of the HL7 *Observation* class except in "intent" moods (including "request" and other subtype of "intent").
- Rules and guidance
 - The *moodCode* SHALL be present in all *Act* class instances
 - Rules for valid *moodCode* / SNOMED CT associations:
 - ‘...IF *moodCode* <>INT (or subtype), THEN *code* attribute of *Observation* class MAY be populated by the following SNOMED CT expression patterns...’
 - Defaults described by default correspondence tables
 - Allowable patterns described by constraint tables
 - ‘If both are present then they must be kept in step

Example 2: *Act.MoodCode*

- Mood Code = SNOMED CT context default and constraint tables

moodCode	Mood Name	SNOMED CT Finding context
EVN	Event	[410515003 known present]
GOL	Goal	[410518001 goal]
RSK	Risk	[410519009 at risk]
EXPEC	Expectation	[410517006 expectation]

Finding
default

Finding
constraints

moodCode	Mood name	SNOMED CT Finding context
EVN	Event	[(<<36692007 known) OR (<<261665006 unknown)]
GOL	Goal	[<<410518001 goal]
RSK	Risk	[<<410519009 at risk]
EXPEC	Expectation	[<<410517006 expectation]

Next Steps - DSTU

- Encourage use and testing
 - Marketing effort
- Encourage and support submission and timely resolution of issues encountered in use
 - **HL7 DSTU** issue reporting mechanism (pending re-publication)
 - <http://www.hl7.org/dstucomments/index.cfm>
 - **HL7** Project Homebase mechanism
 - <http://hl7projects.hl7.nscce.edu/>
- Encourage list membership and submission of issues
 - http://www.hl7.org/special/committees/list_sub.cfm?list=hl7TermInfo
 - Conference call debate and resolution
 - Establish close ties with e.g. **IHTSDO** expertise for timely resolution/interim suggestions
 - Advancement through **IHTSDO** standards approval processes



Health Level Seven, Inc.
For Immediate Release



**International Health Terminology
Standards Development Organisation**

HL7 and IHTSDO Sign Agreement

Up front coordination will bring significant improvements in interoperability and patient safety

Chicago, IL., U.S. and Copenhagen, Denmark – April 5, 2009 – Health Level Seven® Inc. (HL7®), the leading authority for global healthcare IT standards, and the International Health Terminology Standards Development Organisation (IHTSDO®), the leading provider of standardized clinical terminology, today announced a collaboration agreement that will foster interoperability and lead to improvements in patient safety by eliminating gaps and overlaps between the HL7 and IHTSDO standards.

Aufbau des Tutorials

- Überblick: medizinische Ordnungssysteme
- Grundbegriffe medizinische Ordnungssysteme
- SNOMED CT
- Ontologien/Terminologien vs. Informationsmodelle
- **IHTSDO**
- SNOMED CT in Deutschland

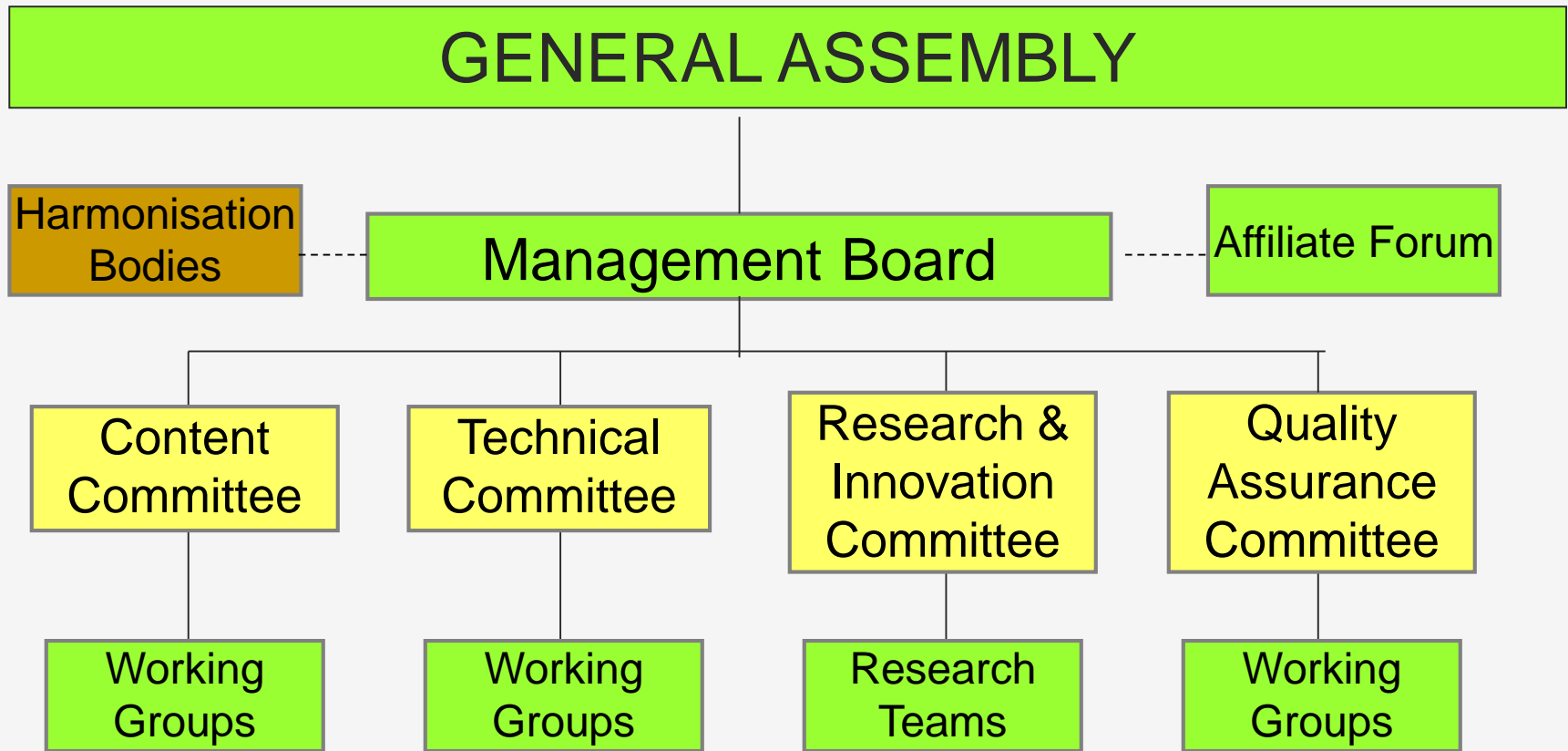
IHTSDO: International Health Terminology Standard Development Organization

- Internationale Non-profit-Organisation nach dänischem Recht, Sitz Kopenhagen
- Gegründet 2006
- Mitglieder: Australien, Kanada, Dänemark, Litauen, Niederlande, Neuseeland, Schweden, Singapur, Spanien, Vereinigtes Königreich, Vereinigte Staaten
- Corporate Affiliates
- Hält die Rechte an SNOMED CT seit 2007
- CEO: Jennifer Zelmer (Kanada)
- Chief Terminology Officer: Kent Spackman (USA)
- <http://www.ihtsdo.org>

Aufgaben der IHTSDO

- Hält Rechte and SNOMED CT:
bisher einziger Standard
- Terminologiepflege (derzeit Unterauftrag an CAP
(College of American Pathologists))
- Harmonisierung von Terminologien
- Mapping von Terminologien

SNOMED SDO Struktur



Standing Committees

CONTENT	QUALITY
Terminologie Editors etc: Change request process, Mapping, Refsets and subsets, Content documentation, Content quality processes and conformance criteria	Advise on quality framework, Agree quality processes, conformance criteria, asses adherence [audit]; quality improvement processes, Quality documentation
RESEARCH & INNOVATION	TECHNICAL
Will necessary change over time; looks at 3-5 year horizon; links to forefront activity	Technical Infrastructure, SNOMED CT Tools, Concept model, Release Schema, Transformation Rules, Description logic, Technical documentation

Struktur der IHTSDO: PG's und SIG's

- Anesthesia
- Concept Model
- Education
- Mapping
- Nursing
- Primary Care
- Pathology and Laboratory Medicine
- Pharmacy
- Translation
- Collaborative working
- Education
- Machine and Human Readable Concept Model
- Mapping SNOMED to ICD-10
- Mapping standard processes
- Pharmacy content and model
- Pharmacy naming and editorial rules
- Request submission
- Substance hierarchy redesign
- Translation standard processes

IHTSDO: Organisation

- Konferenzen: halbjährlich
 - nächste Konferenz in Kopenhagen, 4/2010
- Komiteesitzungen: monatlich Telecon, halbjährlich Meetings
- Arbeitsgruppensitzungen halbjährlich
- SNOMED Collaborative WorkSpace: Diskussionslisten

Aufbau des Tutorials

- Überblick: medizinische Ordnungssysteme
- Grundbegriffe medizinische Ordnungssysteme
- SNOMED CT
- Ontologien/Terminologien vs. Informationsmodelle
- IHTSDO
- **SNOMED CT in Deutschland**

SNOMED CT – in Deutschland

- Bereits jetzt für wissenschaftliche Zwecke uneingeschränkt nutzbar.
- Ein Vorbehalt gegenüber Beitritt zur IHTSDO: kostspielige Übersetzung der Terminologie
- Status der deutschen Übersetzung
 - Unvollständig
 - Nicht validiert
 - Nicht von der IHTSDO freigegeben
 - Rechtlich unklar

SNOMED CT – multilinguale Aspekte

- SNOMED CT ist auch sinnvoll ohne Übersetzung nutzbar
- Für fokussierte Anwendungen wären nur überschaubare Bereiche zu übersetzen
- Für bestimmte Benutzergruppen sind auch englische Terme zu verwenden
- Direkte SNOMED – Kodierung durch Ärzte auch bei idealer Übersetzung ein eher unrealistisches und wohl nicht wünschenswertes Szenario

Pro: Aufschiebung der SNOMED CT Übersetzung

- Strukturelle Probleme in SNOMED:
 - Wenig freitextliche Definitionen
 - Bedeutung vieler SNOMED CT Konzepte oft nur (teilweise) aus dem Kontext ableitbar, daher unscharf
 - Diskussion über die Notwendigkeit von freitextlichen Diskussionen innerhalb IHTSDO nicht abgeschlossen
 - Umstrukturierungsprozess
- Erfahrung laufender Übersetzungsprojekte (Dänisch, Schwedisch) nicht abgeschlossen.

Pro: Beitritt zur IHTSDO

- Mitgestaltung eines in der Zukunft bedeutsamen Standards
- Stärkung der Position nicht-anglophoner Staaten
- Stärkung der Position der EU bzgl. Standardisierung im Gesundheitswesen
- Sammeln von Erfahrungen in Deutschland
- Allmähliches Wachsen einer deutschen Übersetzung relevanter SNOMED CT – Konzepte („SNOMED – WIKI“)

Fazit

Fazit

- SNOMED CT: muss trotz teils eklatanter Schwächen ernst genommen werden
- SNOMED CT wird auf breiter Front verbessert
- SNOMED CT scheint sich als weltweiter Standard durchzusetzen
 - Im besten Fall: Herausforderungen der formal-ontologischen Fundierung wird gemeistert
 - Im schlechtesten Fall: SNOMED CT reduziert sich auf ein unübersichtliches Sammelsurium an semantischen IDs unterschiedlichster Komplexität und Granularität
- Deutschland sollte der IHTSDO beitreten
- Übersetzung von SNOMED CT ins Deutsche davon unabhängig

Publikationshinweise

- Alan Rector (2007): Barriers, approaches and research priorities for integrating biomedical ontologies.
http://www.semantichealth.org/DELIVERABLES/SemanticHEALTH_D6_1.pdf
- Stefan Schulz, Boontawee Suntisrivaraporn, Franz Baader (2007). SNOMED CT's problem list: ontologists' and logicians' therapy suggestions. *Stud Health Technol Inform.* 2007;129(Pt 1):802-6.
- Ingenerf J (2007). *Die Referenzterminologie SNOMED CT - von theoretischen Betrachtungen bis zur praktischen Implementierung.* Neu Isenburg: MMI-Verlag (ISBN 978-3-87360-010-2).
- Schwerpunktheft "Medizinische Klassifikationen" im Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz, Ausgaben 49 und 50.
- Ingenerf J (2007). Terminologien oder Klassifikationen - Was bringt die Zukunft? *Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz* 50 (8): 1070-1083.
- Positionspapier zur „Systematized Nomenclature of Medicine -Clinical Terms“ (SNOMED CT) in Deutschland.
<http://www.gmds.de/pdf/publikationen/stellungnahmen/Positionspapier.pdf>

Arbeitsgruppen

- GMDS-Arbeitsgruppe Standardisierte Terminologien in der Medizin (STM)

<http://www.imi.uni-luebeck.de/gmds-ag-stm/index.html>

- AMIA-Arbeitsgruppe: Formal (Bio)Medical Knowledge Representation

<http://www.kr-med.org>

- IHTSDO: Zahlreiche Arbeitsgruppen

<http://www.ihtsdo.org>

Folien zum Herunterladen

- purl.org/steschu
- Klicken auf "aktuelle Downloads"
- Klicken auf "publications"