

Coding and terminologies – terminology services

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What?

- Concept
 - Unit of meaning or knowledge
- Code
 - Converting information into a representation, also for communicating such information
- Term
 - Words and compound words that are used in specific contexts
- Attributes
 - a characteristic of an object

What?

- Concept: *Upper respiratory tract infection*
 - Unit of meaning or knowledge
- Code: *R74*
 - Converting information into a representation, also for communicating such information
- Term: *cold, pharyngitis, nasopharyngitis, rhinitis, coryza*
 - Words and compound words that are used in specific contexts
- Attributes: *acute, inflammation, nasal or pharyngeal mucosa, infection, virus, respiratory*
 - a characteristic of an object

Coding or terming?

- Free text
 - Ambiguity of meaning is an issue
- Nomenclature/Terminology
 - List of names and/or terms
 - System of principles, procedures and terms related to naming
- Classification – unique coding of concepts

Terminology or classification?

- Terminology gives promise of entering a preferred term, and the concept is captured without fuss
- Classifications seem technical, may be too big or too small (granularity), but have the major advantage of coding concepts exclusively
- Terminologies trade ambiguity for ease of use

Ambiguity of terms

- “Cold”
 - Upper respiratory tract infection
 - Influenza
 - Cold injury
 - Emotionally cold
 - Cold agglutinins

Ambiguity of terms

- “Cold”
 - Upper respiratory tract infection R74
 - Influenza R80
 - Cold injury A88
 - Emotionally cold P29
 - Cold agglutinins B82

Ambiguity of attributes

- Red
- Beautiful
- Expensive
- Desirable

Ambiguity of attributes

- Red
- Beautiful
- Expensive
- Desirable



Ambiguity of attributes

- Red
- Beautiful
- Expensive
- Desirable



Ambiguity of concepts

- “Metabolic syndrome”
- “Asthmatic bronchitis”
- Sadness, or clinical depression?
- Do we need unique concepts which are well defined, and which appropriately cover the domain?

SNOMED-CT

- Possible to code 'acute appendicitis' in many ways, *each correct but each with a different code* built up from child concepts in many different ways
- Each concept described by one or more terms
- No preferred or synonymous terms
- Concepts may overlap
- Further compounded with different languages, more complex or more ambiguous concepts, and when one chooses different level of specificity of the diagnostic label

ICPC

- Rubrics code mutually exclusive concepts
- Inclusion and exclusion criteria: definitions
- Covers the breadth of the domain
- “Granularity” appropriate for the domain
- Classification based on empirical data
- Non-ambiguity, non-vagueness (codes refer to one object in the domain)
- non-redundancy (only one correct way to code the concept)

Interoperability

- What?
- Why?
- How?

Interoperability

- The ability of diverse systems and organizations to work together (inter-operate)
- Why?
- How?

Semantic Interoperability

- Ability of any communicating entities (not only computers) to share unambiguous meaning
- Why?
- How?

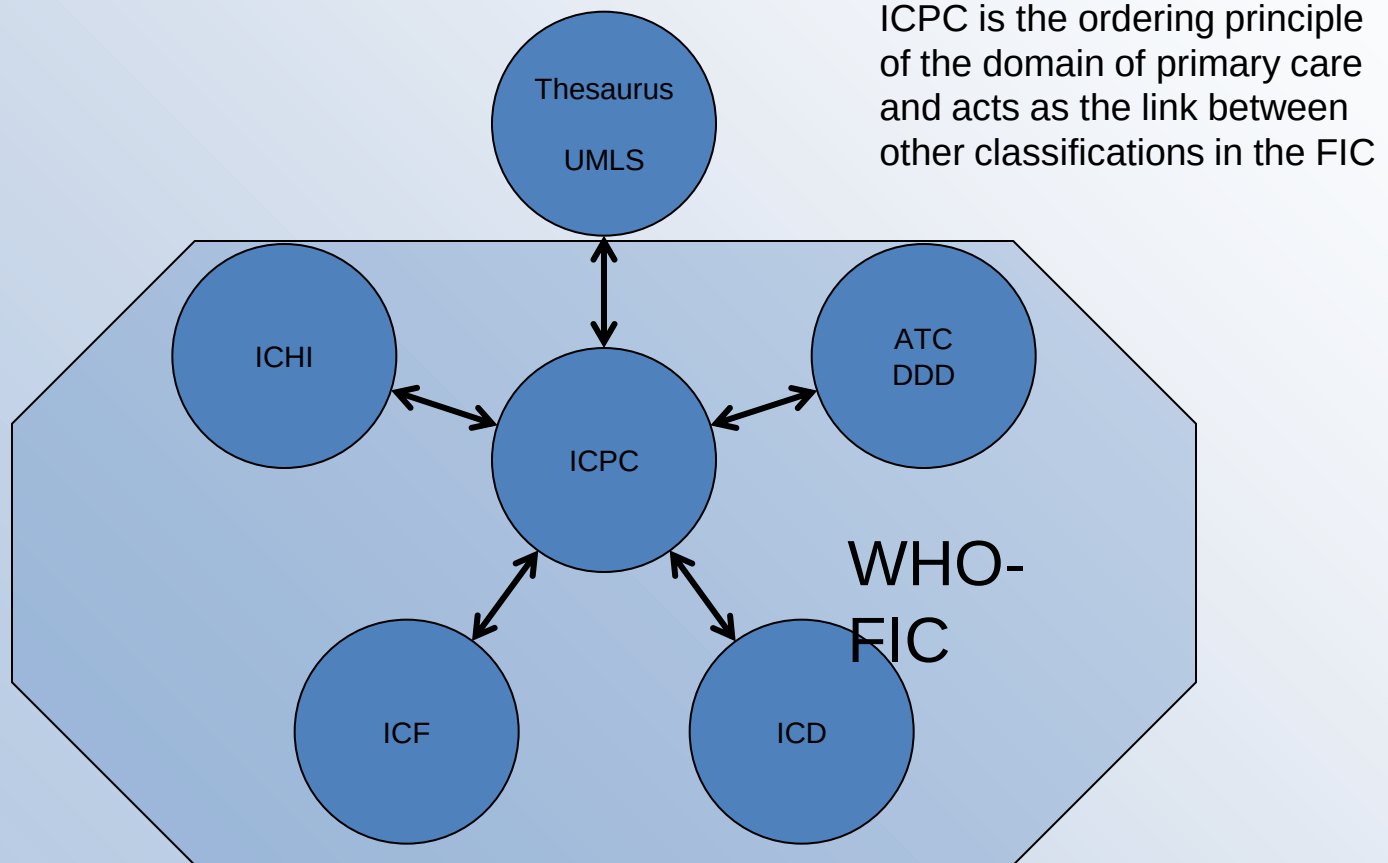
Semantic Interoperability

- Ability of any communicating entities (not only computers) to share unambiguous meaning
- If not, meaning is lost through communication
- How?

Semantic Interoperability

- Ability of any communicating entities (not only computers) to share unambiguous meaning
- If not, meaning is lost through communication
- Classifications offer unambiguous meaning

ICPC within WHO-FIC



Semantic interoperability in practice

A thesaurus for ICPC2 and ICD10

Because
ICPC does order the domain of
family medicine..

..but has insufficient granularity to
document all individual patients' diagnoses

.... thus a thesaurus would allow easy, semi-automatic double coding, using:

- ICPC-2 as an ordering principle based on the high prevalence of common diagnoses in family practice
- and ICD-10 as a nomenclature based on the wide range of known diagnoses



ICPC2-ICD10 THESAURUS

**A diagnostic Terminology for Semi-automatic Double Coding
in Electronic Patient Records**



Henk Becker, Sibö Oskam, Inge Okkes, Kees van Boven, Henk Lamberts
Academic Medical Center/University of Amsterdam
Department of Family Medicine

Amsterdam, 2005



Example:

In the Search text box, you type 'pneumonia',

Search text:

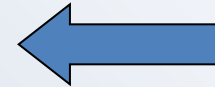
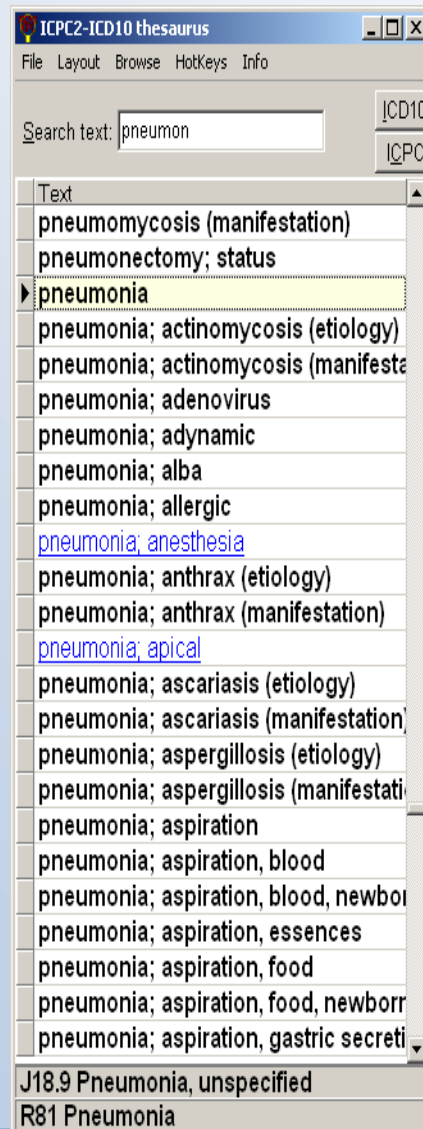
pneumonia

ICD10

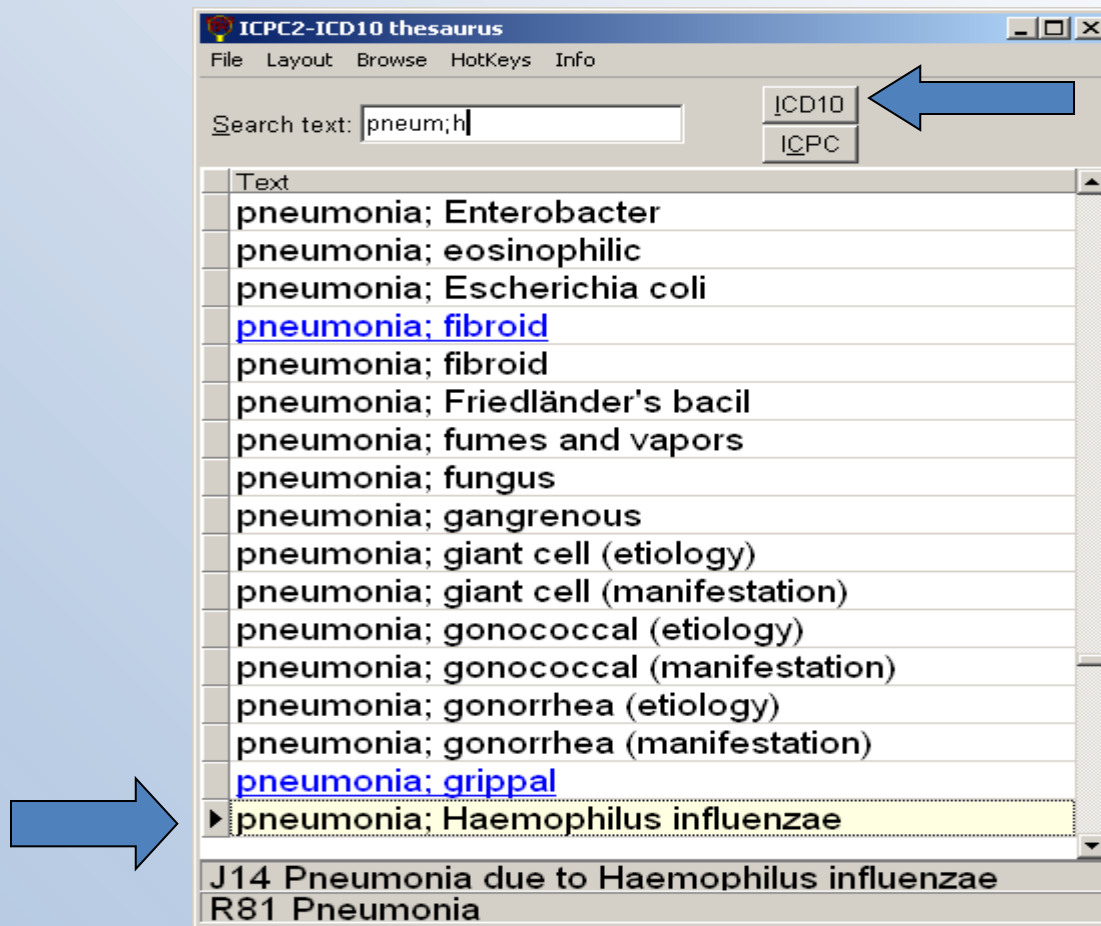
ICPC

Text
pneumohydrothorax
pneumohydrothorax
pneumomediastinum
pneumomediastinum; congenital or perinatal
pneumomycosis (etiology)
pneumomycosis (manifestation)
pneumonectomy; status
▶ pneumonia
pneumonia; actinomycosis (etiology)
pneumonia; actinomycosis (manifestation)
pneumonia; adenovirus
pneumonia; adynamic
pneumonia; alba
pneumonia; allergic
pneumonia; anesthesia
pneumonia; anthrax (etiology)

there are many types of pneumonia in ICD-10,

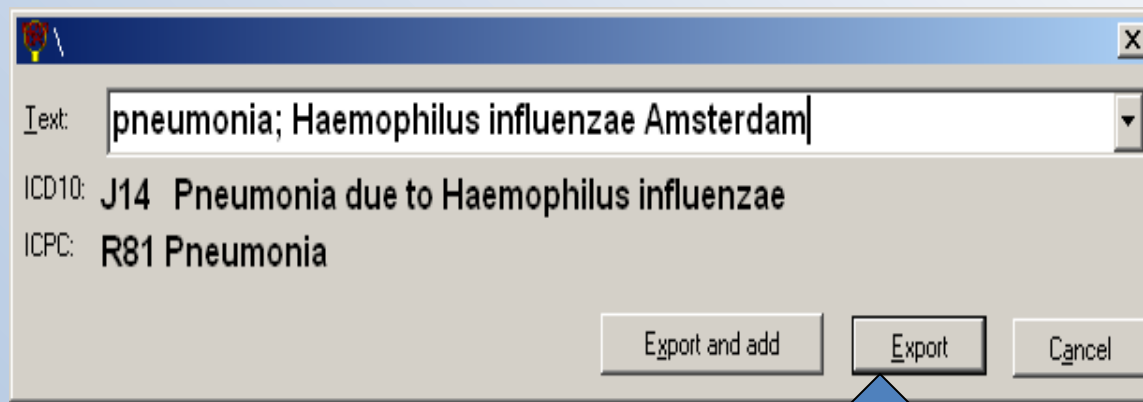


Say we want to select 'pneumonia; Haemophilus influenzae' (typing 'pneum;h' will do)..



..double click, and the export box shows.

Suppose you want to add a new type (e.g., 'Amsterdam'). You can add that term, and also you may add this new type to your Thesaurus.. just click 'Export and add'...



ICPC2-ICD10 thesaurus

File Language Layout Browse HotKeys Info

Search text: ICD10 ICPC

Text

- synovium; hypertrophy
- synovium; rupture
- synovium; syphilitic (etiology)
- synovium; syphilitic (manifestation)
- synovium; syphilitic, congenital (early) (etiology)
- synovium; syphilitic, congenital (early) (manifestation)
- syphilid
- syphilid; congenital
- syphilid; newborn
- syphilid; tubercular (etiology)
- syphilid; tubercular (manifestation)
- syphilid; tubercular, congenital
- ▶ syphilis
 - syphilis; , vitreous, hemorrhage (manifestation)
 - syphilis; abdomen
 - syphilis; adenopathy
 - syphilis; adrenal (etiology)
 - syphilis; adrenal (manifestation)
 - [syphilis; age under 2 years](#)
 - syphilis; age under 2 years
 - syphilis; age under 2 years, acquired
 - syphilis; alopecia (etiology)
 - syphilis; alopecia (manifestation)
 - syphilis; anemia (etiology)
 - syphilis; anemia (manifestation)

Select ICPC code:

Code	Label
▶ X70	Syphilis female
Y70	Syphilis male

☒ OK
 ☐ Cancel

Mapping to ICD9:

▶ 097.9 Syphilis nos

A53.9 Syphilis, unspecified
X70 Syphilis female

UMLS

Metathesaurus

Unified Medical Language System (UMLS) - Microsoft Internet Explorer

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Unified Medical Language System

UMLS Home

[Home](#) > [Biomedical Research & Informatics](#) > [UMLS](#)

7/26/05: **2005AB UMLS Release (corrected)** now available for [download](#) from the UMLSKS. [More information](#) Includes the **RRF Browser** (beta) for viewing your subsets. ••• New to the UMLS? [Register now](#).

▶ [About the UMLS Resources](#)
Metathesaurus; Semantic Network; SPECIALIST Lexicon and lexical programs; MetamorphoSys

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Metathesaurus license; Semantic Network; SPECIALIST Lexicon; DVD

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About NLM's Unified Medical Language System (UMLS) project develops and distributes multi-purpose, electronic "Knowledge Sources" and associated lexical programs for system developers. Researchers will find the UMLS products useful in investigating knowledge representation and retrieval questions.

Metathesaurus Source Vocabularies

- [SNOMED CT](#)
- [LOINC](#)
- [RxNorm](#)
- [MeSH](#)
- [List of Sources](#)
- [Source FAQs](#)

More Resources

- [Metathesaurus License](#)
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Internet

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CUI Search Tree Browser Word Search

Context Tree Tops

- + CPC2E
- + International Statistical Classification of Diseases and F
- + MeSH
- + SNOMED CT Concept
- + The International Classification of Diseases: 9th revision

Raw View Report View

Concept: International Classification of Primary Care 2nd Edition, Electronic, 2E
CUI: C1331395

Semantic Type: Intellectual Product

Atoms (4):
 International Classification of Primary Care 2nd Edition, Electronic, 2E
 [A4376358/SRC/RPT/V-ICPC2EENG]
 ICPC2E [A4376014/SRC/RHT/V-ICPC2EENG]
 ICPC2E [A4376015/SRC/SSN/V-ICPC2EENG]
 ICPC2EENG [A4376318/SRC/RAB/V-ICPC2EENG]

Contexts (1):
 ICPC2EENG/RHT/V-ICPC2EENG 1
 <ICPC2E>

Relationships (4):
 [CHD] Symptoms and Complaints Component [ICPC2EENG/CO||ICPC2EENG] [C0497525](#)
 [CHD] Diseases Component [ICPC2EENG/CO||ICPC2EENG] [C1331399](#)
 [RN] International Classification of Primary Care 2nd Edition, Electronic, 2E,
 200203 [SRC/VPT|version_of|SRC] [C1331396](#)
 [RO] International Classification of Primary Care 2nd Edition, Electronic, 2E, Dutch
 Translation [SRC/DOT#translation_of|SRC|C1266737]

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CUI Search Tree Browser Word Search

Context Tree Tops

- ICPC2E
 - Diseases Component
 - Abdominal hernia other
 - Abnormal cervix smear
 - Abnormal result investigation nos
 - Abnormal urine test nos
 - Abortion induced
 - Abortion spontaneous
 - Acne**
 - Acoustic trauma
 - Acquired deformity of limb
 - Acquired deformity of spine
 - Acute bronchitis/bronchiolitis
 - Acute internal damage knee
 - Acute myocardial infarction
 - Acute otitis media/myringitis
 - Adverse effect medical agent
 - Adverse effect physical factor
 - Affective psychosis
 - Allergic rhinitis
 - Allergic reaction nos

Raw View Report View

Concept: [X]Acne, unspecified
CUI: C0702166

Semantic Type: Disease or Syndrome

Atoms (14):

- [X]Acne, unspecified [A3223623/SNOMEDCT/PT/201408008]
- Acne [A2878063/SNOMEDCT/PT/11381005]
 - Acne [A4375449/ICPC2EENG/PT/S96]
 - Acne [A4375448/ICPC2EENG/AB/S96]
 - Acne [A0019095/ICD10/HT/L70]
- Acne, NOS [A2952587/SNOMEDCT/SY/11381005]
- acne [A4386539/ICPC2ICD10ENG/PT/MTHU002966]
- Acne NOS [A1576036/MTHICD9/ET/706.1]
- [X]Acne, unspecified (disorder) [A3793678/SNOMEDCT/FN/201408008]
- Acne (disorder) [A3439373/SNOMEDCT/FN/11381005]
- Acne, unspecified [A0857558/ICD10/PT/L70.9]
- Acne [A5065334/ICPC2EDUT/PT/S96]
 - Acne [A6763751/ICD10DUT/HT/L70]
- Acne, niet gespecificeerd [A5147121/ICD10DUT/PT/L70.9]

Relationships Within Concept (10):

- Acne [CHD/ICD10] Acne, unspecified
- Acne [CHD/SNOMEDCT] [X]Acne, unspecified

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CUI Search Tree Browser Word Search

Context Tree Tops

- ICPC2E
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 - Abdominal hernia other
 - Abnormal cervix smear
 - Abnormal result investigation nos
 - Abnormal urine test nos
 - Abortion induced
 - Abortion spontaneous
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 - Acute internal damage knee
 - Acute myocardial infarction
 - Acute otitis media/myringitis
 - Adverse effect medical agent
 - Adverse effect physical factor
 - Affective psychosis
 - Allergic rhinitis
 - Allergic reaction nos

Raw View Report View

Relationships (56):

- [CHD] Acne vulgaris [ICD10/PT||ICD10] [C0001144](#)
- [CHD] Other acne [ICD10/PT||ICD10] [C0029485](#)
- [CHD] Acne varioliformis [ICD10/PT||ICD10] [C0152249](#)
- [CHD] Infantile acne [ICD10/PT||ICD10] [C0263437](#)
- [CHD] Acne conglobata [ICD10/PT||ICD10] [C0263442](#)
- [CHD] Acne excoriee des jeunes filles [ICD10/PT||ICD10] [C0343078](#)
- [CHD] Acne tropica [ICD10/PT||ICD10] [C0494863](#)
- [PAR] Disorders of skin appendages [ICD10/HT||ICD10] [C0037272](#)
- [RQ] Other acne [ICD9CM/PT|mapped_to|HLREL] [C0029485](#)
- [CHD] Acne vulgaris [SNOMEDCT/PT|isa|SNOMEDCT] [C0001144](#)
- [CHD] Acne keloid [SNOMEDCT/PT|isa|SNOMEDCT] [C0001145](#)
- [CHD] Other acne [SNOMEDCT/PT|isa|SNOMEDCT] [C0029485](#)
- [CHD] Acne varioliformis [SNOMEDCT/PT|isa|SNOMEDCT] [C0152249](#)
- [CHD] Neonatal acne [SNOMEDCT/PT|isa|SNOMEDCT] [C0263437](#)
- [CHD] Adult premenstrual acne [SNOMEDCT/PT|isa|SNOMEDCT] [C0263438](#)
- [CHD] Acne atrophica [SNOMEDCT/PT|isa|SNOMEDCT] [C0263439](#)
- [CHD] Tropical acne [SNOMEDCT/PT|isa|SNOMEDCT] [C0263440](#)
- [CHD] Acne indurata [SNOMEDCT/PT|isa|SNOMEDCT] [C0263444](#)
- [CHD] Acne of external chemical origin [SNOMEDCT/PT|isa|SNOMEDCT] [C0263451](#)
- [CHD] Acne venenata [SNOMEDCT/PT|isa|SNOMEDCT] [C0263456](#)
- [CHD] Acne estivalis [SNOMEDCT/PT|isa|SNOMEDCT] [C0263459](#)
- [CHD] Acne mechanica [SNOMEDCT/PT|isa|SNOMEDCT] [C0263460](#)
- [CHD] Canine acne [SNOMEDCT/PT|isa|SNOMEDCT] [C0263461](#)

Rich Release Format Browser 2005AA C0263442

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CUI Search Tree Browser Word Search

Context Tree Tops

- ICPC2E
 - Diseases Component
 - Abdominal hernia other
 - Abnormal cervix smear
 - Abnormal result investigation nos
 - Abnormal urine test nos
 - Abortion induced
 - Abortion spontaneous
 - Acne**
 - Acoustic trauma
 - Acquired deformity of limb
 - Acquired deformity of spine
 - Acute bronchitis/bronchiolitis
 - Acute internal damage knee
 - Acute myocardial infarction
 - Acute otitis media/myringitis
 - Adverse effect medical agent
 - Adverse effect physical factor
 - Affective psychosis
 - Allergic rhinitis
 - Allergy/allergic reaction nos

Raw View Report View

Concept: Acne conglobata
CUI: C0263442

Semantic Type: Disease or Syndrome

Atoms (9):

- Acne conglobata [A2952564/SNOMEDCT/PT/42228007]
- Acne conglobata [A0531985/ICD10/PT/L70.1]
- acne; conglobata [A4433206/ICPC2ICD10ENG/PT/MTHU002971]
- conglobata; acne [A4399652/ICPC2ICD10ENG/PT/MTHU018764]
- Acne, conglobata [A0532025/MTHICD9/ET/706.1]
- Acne conglobata (disorder) [A3439446/SNOMEDCT/FN/42228007]
- Acne conglobata [A5147117/ICD10DUT/PT/L70.1]
- conglobata; acne [A5085641/ICPC2ICD10DUT/PT/MTHU018764]
- acne; conglobata [A5071105/ICPC2ICD10DUT/PT/MTHU002971]

Relationships Within Concept (4):

- Acne conglobata [RN/ICPC2ICD10ENG] conglobata; acne
- Acne conglobata [RN/ICPC2ICD10ENG] acne; conglobata

Contexts (14):

ICD10/PT/L70.1 1
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision

EU TRANSFoRm WT7.2

- A working terminology service is made available as a **software-based milestone**
 - A simple **web-based interface of the TRANSFoRm Integrated VS**, allowing terminology searches through the Unified Medical Language System (UMLS) to a subset of hosted vocabularies, relevant to Primary Care Research and Clinical Practice.
 - A publically* available **web service**
 - **Integration** of TRANSFoRm VS to users, such as electronic Primary Care Research Network workbench

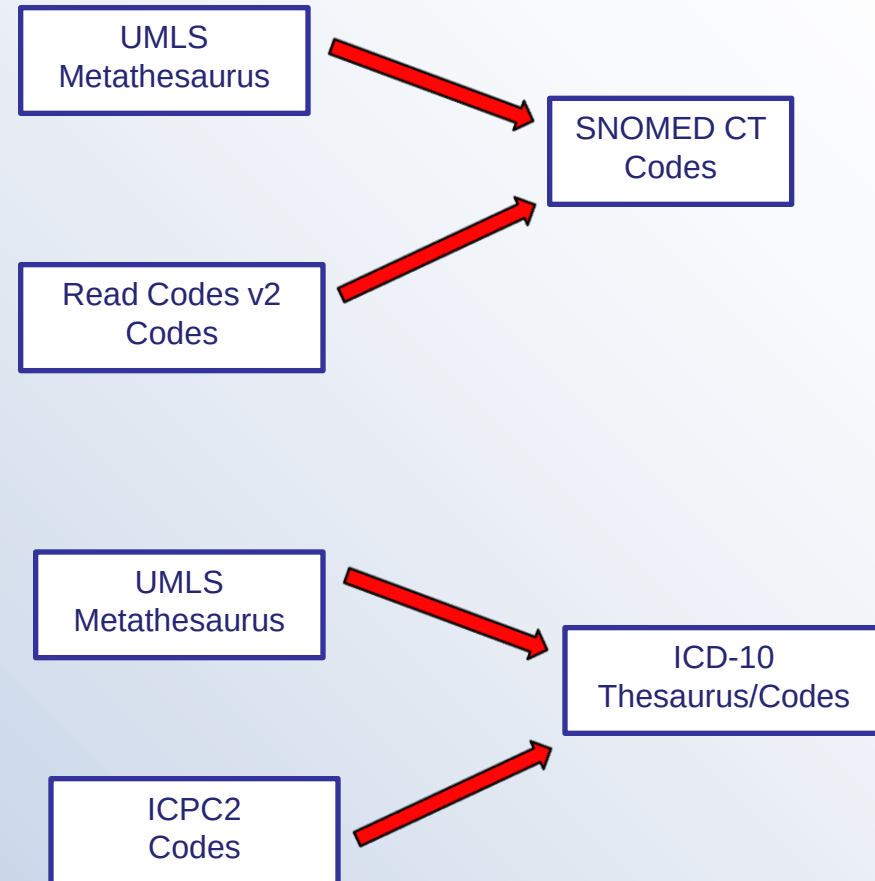
Hosted Vocabularies

- **UMLS Metathesaurus**
- National Cancer Institute Thesaurus
- ICD-9-Clinical Modification
- ICD-10
- ICPC-2
- ICPC-2-ICD-10 Thesaurus
- Read Codes version 2

Various Languages (e.g. English, Basque, Danish, Dutch, Finnish, French, German, Hebrew, Hungarian, Italian, Norwegian, Portuguese, Spanish, Swedish)

RCD v2/ICPC2

- Read Codes (RCDv2) and International Classification of Primary Care (ICPC2) corpus of terms and their associated mappings
 - created to cater for the initial need of the existence of specific **primary care** oriented terminologies.
- The UK NHS Connecting for Health Terminology Centre - mappings from Read Codes version 2 to SNOMED CT.
- The Read Codes v2 database in Transform VS is set up based on this mapping so that Read Codes 2 concepts can be linked to a UMLS search. Similar approach for ICPC2.
- ICPC2-ICD10 Thesaurus and mappings - Transition Project @ University of Amsterdam
- WP7 (MIPC) is updating the ICPC-ICD 10 mapping and Thesaurus
 - to eventually incorporate the new Thesaurus into UMLS (09/2011).



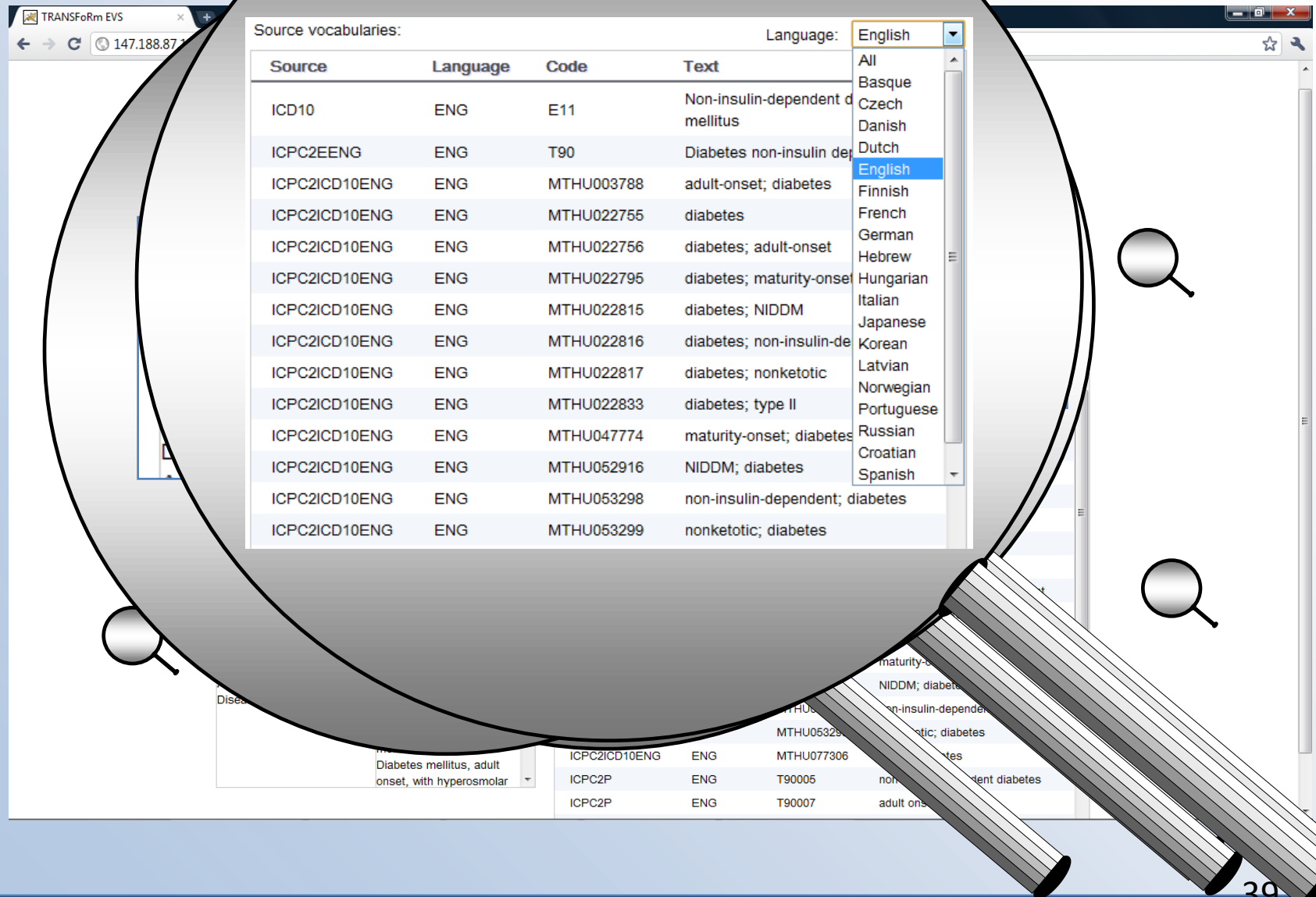
Web Service: Example of partial output for the search of the abbreviated clinical term “GORD”

```
Console X
<terminated> VocabularyServiceClient [Java Application] C:\zhaolz\Java\jdk1.6.0_23\bin\javaw.exe (31 Mar 2011 15:54:06)

Concept:      Gastroesophageal reflux disease
UMLS CUI:     C0017168
Semantic type: Disease or Syndrome
Source concepts:
    K21          ICD10          ENG      Gastro-oesophageal reflux disease
    530.81       ICD9CM         ENG      Esophageal reflux
    MTHU030535   ICPC2ICD10ENG  ENG      gastroesophageal; reflux
    MTHU063996   ICPC2ICD10ENG  ENG      reflux; gastroesophageal
    D84004       ICPC2P          ENG      oesophageal reflux
    X3003        RCDv3           ENG      Gastro-oesophageal reflux disease
    J1011        RCDv2           ENG      Acid reflux
    J10y4        RCDv2           ENG      Gastro-oesophageal reflux
    102620007    SNOMEDCT        ENG      Gastroesophageal reflux
    155673008    SNOMEDCT        ENG      Esophageal reflux
    196600005    SNOMEDCT        ENG      Acid reflux
    196624002    SNOMEDCT        ENG      Esophageal reflux
    235595009    SNOMEDCT        ENG      Gastro-esophageal reflux
    266498005    SNOMEDCT        ENG      Esophageal reflux
    54856001     SNOMEDCT        ENG      Gastresophageal reflux disease
    K21          DMDICD10        GER      Gastrooesophageale Refluxkrankheit
    K21          ICD10DUT        DUT      Aandoeningen door gastro-oesofagale reflux
    MTHU030535   ICPC2ICD10DUT   DUT      gastro-oesofagaal; reflux
    MTHU063996   ICPC2ICD10DUT   DUT      reflux; gastro-oesofagaal
    102620007    SCTSPA         SPA      reflujo gastroesofagico (hallazgo)
    196600005    SCTSPA         SPA      Acid reflux
    196624002    SCTSPA         SPA      Oesophageal reflux
    235595009    SCTSPA         SPA      reflujo acido
    54856001     SCTSPA         SPA      enfermedad por reflujo gastroesofagico

Concept:      Phylum Nematomorpha
UMLS CUI:     C0027584
Semantic type: Eukaryote
Source concepts:
    106683009    SNOMEDCT        ENG      Phylum Nematomorpha
    112448006    SNOMEDCT        ENG      Hairworms
    54282001     SNOMEDCT        ENG      Nematomorpha
    106683009    SCTSPA         SPA      tipo Nematomorpha
    112448006    SCTSPA         SPA      nematomorfos
    54282001     SCTSPA         SPA      Nematomorpha
```

A screenshot of a user interface



MIPC in TRANSFoRm WP7

- Updating ICPC-2 (with Wonca Classification Committee)
- Updating ICPC-2 map to ICD-10 (with Wonca Classification Committee and University of Nijmegen)
- Updating ICPC-2/ICD-10 Thesaurus (with Transition Project group)
- Thesaurus terms and ICPC-ICD mapping into UMLS

Thank you