Unified Medical Language System® (UMLS®) – Basics

Medical Library Association
May 21, 2004
10: a.m. – 5 p.m.

Instructors: Carolyn B. Tilley
Jan Willis

National Library of Medicine, NIH
Department of Health & Human Services

United States National Library of National Institutes of Health

Welcome and Introductions

- Welcome and Introductions
  - Instructors
  - Class
- Schedule and Housekeeping
- Course Objectives

Instructors

- Carolyn B. Tilley
  - UMLS Advisor, Bibliographic Services Division (BSD), Library Operations (LO), National Library of Medicine
  - email: tilley@nlm.nih.gov
- Jan Willis
  - Senior Librarian, MEDLARS Management Section (MMS), Bibliographic Services Division (BSD), Library Operations (LO), National Library of Medicine
  - email: jwillis@nlm.nih.gov

Class Introductions

- Who you are
- Where you work
- What you do
- Your interest in the UMLS
- UMLS experience

Schedule

10:00- 10:15 Welcome and Introductions

10:15-10:45	Unified Medical Language System (UMLS) Overview
10:45-11:45	Controlled Vocabularies and the UMLS
11:45-12:00	UMLS Metathesaurus
12:00- 1:00	LUNCH
1:00- 2:00	UMLS Metathesaurus (continued)
2:00- 2:15	MetamorphoSys
2:15- 2:30	UMLS Semantic Network
2:30- 2:45	UMLS SPECIALIST Lexicon and Lexical Tools
2:45- 3:00	UMLS Knowledge Source Server (UMLSKS)
3:00- 3:30	BREAK
3:30- 3:45	UMLS Applications
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

Course Objectives

To provide students with an understanding of:

- The structure and components of the Unified Medical Language System (UMLS)
- UMLS Knowledge Source Server (UMLSKS) resources
- UMLS current uses and future potential
- Evaluation criteria for selecting controlled vocabularies
- The UMLS, HIPAA, and clinical vocabulary standards

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Overview of Section 2: The Unified Medical Language System (UMLS)

- Background and purpose
- UMLS = Unified Medical Language System
  -- consists of 3 Knowledge Sources
  1. ***Metathesaurus***
  2. ***Semantic Network***
  3. ***SPECIALIST Lexicon and lexical programs***
- Why librarians and information specialists should know about the UMLS

What is the UMLS?

Designed to help develop computer systems behave as if they "understand" the meaning of the language of biomedicine and health.

Unified Medical Language System (UMLS)

/ | \

1	2	3
Metathesaurus	Semantic Network	SPECIALIST Lexicon
different names for same meaning from vocabulary sources gathered by meaning	broad groupings and relationships	dictionary of biomedical terms and common words
machine-readable files	machine-readable files	machine-readable files

\ | /

Knowledge Sources (databases)

Genesis of the UMLS Project

The objective of this program. . .is to solve what is the most fundamental barrier to the application of computers in medicine; namely, the lack of a standard language in medicine. We will attempt to build that vocabulary, a language that will cross between the biomedical literature and the observations on the patient, as well as the educational applications in the school, a language which allows those areas to be interrelated.

--Donald A. B. Lindberg, M.D., March 19, 1985

Hearings before House Committee on Appropriations, 99th Cong., 1st Session, Part 4B (857), 1985.

Supporting the IAIMS

"A unified medical language system will also contribute greatly to the ultimate success of the Integrated Academic Information Management Systems (IAIMS). It is inevitable that the various IAIMS systems now under development will be hampered by the lack of such a language as they attempt to integrate and link existing information resources in the hospital, the classroom, the library, the administrative center, and in remote networks and databases…"

--Donald A. B. Lindberg, M.D., March 19, 1985

Hearings before House Committee on Appropriations, 99th Cong., 1st Session, Part 4B (896-7), 1985.

UMLS Background and Purpose

- 1986 UMLS began as NLM long-term research & development project
- 1990 first edition distributed; annual editions issued until quarterly distributions began in 2002
- UMLS purpose: To enable the building of computer systems that act as if they “understand” the language of biomedicine and health. To that end, NLM produces and distributes the UMLS Knowledge Sources (databases) and associated software tools (programs) for use by system developers in building or enhancing electronic information systems.

UMLS Background (cont.)

- UMLS correctly predicted information future. . .

  and the time is right to build on UMLS accomplishments and make more progress on informatics issues.

- UMLS Knowledge Sources are created for systems developers.

  Significant intellectual effort and computing resources are required.

- Informed librarians and informaticians can and should be full players on development teams that use UMLS resources.

In the Beginning…

In 1986, to address the complex problem of relating user queries to biomedical information sources, NLM assembled an internal research group (original team):

Donald A.B. Lindberg, MD
Betsy L. Humphreys, MLS, AHIP
Alexa T. McCray, Ph.D.
William T. Hole, MD
Lawrence Kingsland III, Ph.D.
Daniel Masys, MD
Richard P.C. Rogers, MD
Harold Schoolman, MD
Peri Schuyler, MLS

UMLS Research Groups and PIs*…

Institutions that have received one or more competitive contracts for general UMLS research and development (1986-1997) early in the history of the UMLS include:

Beth Israel Hospital, Charles Safran, MD
Brigham & Women's Hospital, Robert A. Greenes, MD, Ph.D.
Carnegie-Mellon University, David A. Evans, Ph.D.
Columbia University, James J. Cimino, MD
Indiana University, Clement J. McDonald, MD
Kaiser Permanente, Simon Cohn, MD, MPH
Lexical Technology, Inc., Mark S. Tuttle
Massachusetts General Hospital, G. Octo Barnett, MD

continued...

*PI = Principal Investigator

UMLS Research Groups and PIs* (cont.)

Mayo Foundation, Christopher G. Chute, MD, Ph.D.
Oregon Health Sciences University, William R. Hersh, MD
University of California, San Francisco, Marsden S. Blois, MD, Ph.D.
University of Pittsburgh, Randolph A. Miller, M.D., Gregory F. Cooper, MD, Ph.D., Henry J. Lowe, MD
University of Utah, Homer R. Warner, MD, Ph.D.
Yale School of Medicine, Perry L. Miller, MD, Ph.D.

- Literally dozens of individuals from these and other institutions have made substantial contributions to the UMLS project.
- Many vocabulary producers have made their terminologies available.
- NLM thanks them all for what has been and continues to be a gratifying and productive association.

*PI=Principal Investigator

Medical Librarians Have Received UMLS-related Funding …

• Harvard University	Elizabeth Wu, MLS
• Georgetown University Medical Center	Naomi Broering, MLS
• University of Washington	Sherrilynne Fuller, PhD and Debra Ketchell, MLS
• University of Maryland, Baltimore	Gary Freiburger, MLS
• Yale University	Nancy Roderer, MLS
• Columbia-Presbyterian Medical Center	Anthony R. Aguirre, MLS
• NNLM-Pacific NW, Univ. Washington	Denise P. Radow, MLS
• University of Pittsburgh	Catherine Arnott Smith, MLS
• Apelon, Inc	Stephanie Lipow, MLS
• MSD, Inc.	Laura Roth, MLS

. . . and others

UMLS Approach

To build Knowledge Sources that can be used to overcome:

- Disparities in **language of different users** and in **different information sources**

  e.g., TV, tv, television, telly, TV set

  atrial fibrillation, auricular fibrillation, af

- Disparities in granularity and perspective

- Problems in mapping and aggregating

UMLS Uses

Information retrieval

Thesaurus construction

Natural language processing

Automated indexing

Electronic patient records

A few definitions . . .

meta, from Webster's third definition: "more comprehensive, transcending"

thesaurus – a dictionary of synonyms in a particular field

concept – in Webster's something conceived in the mind, in the Metathesaurus the concept is the basic unit, each with its own distinct meaning; a concept includes various names that represent the same meaning; the concept is made up of information derived from the various source vocabularies.

A few definitions . . . (cont.)

semantic – meaning (semantics = study of meaning)

source vocabularies – the terminologies and thesauri, classifications, billing codes, full and partial; for some sources - sometimes only for relationships

lexicon – usually a collection of terms and definitions

ontology – organizing a certain subject or area, usually a hierarchical arrangement implied

UMLS Knowledge Sources

Metathesaurus

relationship tables consisting of concepts that include the various names representing the same meaning from many different source vocabularies including thesauri, coding systems, classifications, relationships, etc.

Semantic Network

135 Semantic Types and 54 semantic relationships

SPECIALIST Lexicon

and other lexical tools and records used in natural language processing

- Information Sources Map (1991) discontinued in 1998

UMLS Metathesaurus

- 2004AA 1,020,866 concepts and 2.8 million terms
- Contains information about biomedical concepts from many controlled vocabularies, classifications, and other sources
- Preserves original content and adds new information
- Organized by concept or meaning

UMLS Knowledge Source Server (UMLSKS)

National Library of Medicine

About the UMLSKS

- Log in
- Overview
- Frequently Asked Questions
- UMLS Metathesaurus®
- Semantic Network
- SPECIALIST Lexicon

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

UMLSKS Registered Users

Login ID:

Password:

Login

Forgotten your password?

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- **Existing users** may click on the Forgotten your password link (above) and enter the new license number. You may use your previous Login ID and Password. After a brief grace period, old license numbers will no longer work and all user accounts created ander those numbers will also not work.

- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new

New UMLSKS Users

The UMLSKS is restricted to registered users. If you are not a registered user and would like to use the resources of the UMLS, please read the UMLS license agreement, obtain a UMLS license number, and fill in the form below to request a UMLSKS user account.

Login ID:

Password:

Confirm Password:

First Name:

Last Name:

Request Account

Email:

UMLS License #:

UMLS Licensee First Name:

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2002AB 2003AA 2002AD 2003AC 2002 2002AC 2003AB 2001

Metathesaurus Semantic Network SPECIALIST Lexicon

Logout

About the UMLSKS

- Home
- Overview
- Frequently Asked Questions
- Edit Views/Profile

Downloads

- UMLS Knowledge Sources
- UMLSKS Developer's API

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

Resources

- NLP & Lexical Resources
- Semantic Network Resources
- Metathesaurus Resources

Metathesaurus | Semantic N/W | SPECIALIST Lexicon | Documentation | Resources

Quick Search

Select UMLS Release: 2003AC

Enter search value:

Metathesaurus Concept Search | Semantic Network Search | SPECIALIST Lexicon Search

Search Tips... | Search Tips... | Search Tips...

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!
- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

Advanced Searches

Metathesaurus Advanced Search

Facilitates advanced searching of the UMLS Metathesaurus, including restricting vocabularies, performing batch searches, performing XML queries, and using a command-line type interface.

Semantic Network Browser

Allows browsing of the hierarchies for the Semantic Network.

SPECIALIST Lexicon Advanced Search

Facilitates advanced

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home | Search | Advanced Search | Documentation | Resources | Views/Profiles | Logout

Metathesaurus Search

Select UMLS Release: 2003AC

Enter a term or a concept unique identifier (CUI):

Perform Concept Search

Basic searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is entered into the text entry box above.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is available during a concept search and includes synonyms, hierarchical context details, relations, and co-occurring concepts.

Users are responsible for compliance with UMLS copyright restrictions

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

Copyright Privacy Accessibility Freedom of Information Act

Site Last Updated: March 10, 2004 Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home | Search | Advanced Search | Documentation | Resources | Views/Profiles | Logout

Metathesaurus Search for: **Anthrax disease** in UMLS Release **2003AC**

Display | Display All

Concept
- [x] Definition
- [x] Synonyms
- [ ] Other Languages
- [ ] Suppressible Synonyms
- [ ] Sources

Context
- [ ] Ancestors
- [ ] Parents
- [ ] Siblings
- [ ] Children

Relations
- [ ] Narrower
- [ ] Broader
- [ ] Similar
- [ ] Other
- [ ] Related and possibly synonymous
- [ ] Source asserted synonymy
- [ ] Allowable Subheadings

Concept: Anthrax disease

CUI: C0003175

Semantic Type: Disease or Syndrome

Definition:

infectious bacterial zoonotic disease usually acquired by ingestion of Bacillus anthracis; marked by hemorrhage and serous effusions in the organs and cavities and symptoms of extreme prostration. (CRISP Thesaurus)

An acute infection caused by the spore-forming bacteria BACILLUS ANTHRACIS. It commonly affects hoofed animals such as sheep and goats. Infection in humans often involves the skin (cutaneous anthrax), the lungs (inhalation anthrax), or the gastrointestinal tract. Anthrax is not contagious and can be treated with antibiotics. (MeSH)

Synonyms:

Anthrax disease
[X]Anthrax, unspecified
Anthrax, unspecified
anthrax <1>
Bacillus anthraces infection
Charbon
Infection due to Bacillus anthracis

Semantic Network

- 135 Semantic Types provide a consistent categorization of all Metathesaurus concepts

For example:	Disease or Syndrome
	Body System
	Clinical Drug

- 54 semantic relationships provide the links between the Semantic Types

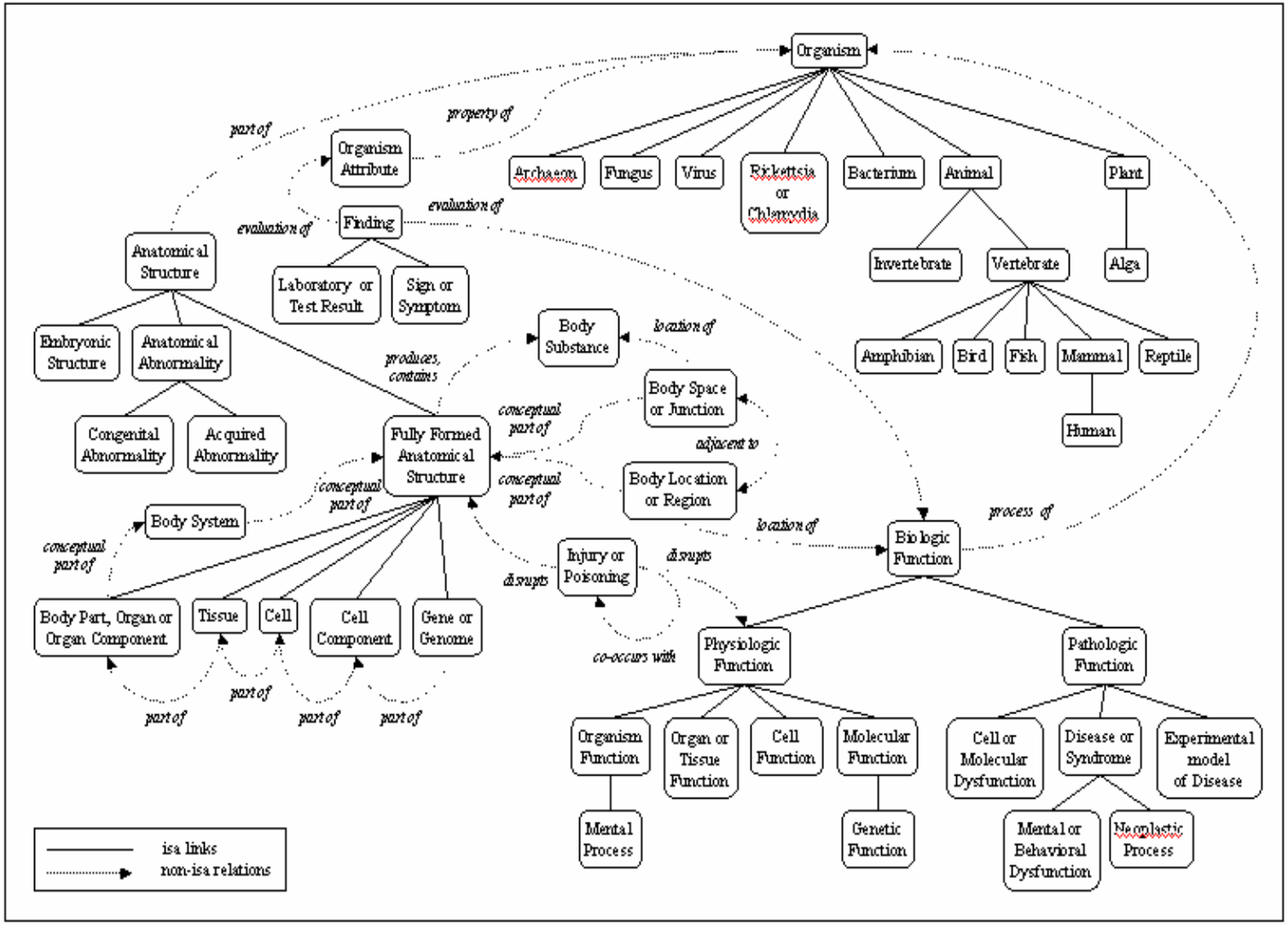
2004 Semantic Types

SEE HANDOUT

A. Entity
- 1. Physical Object
  - 1. Organism
    - 1. Plant
      - 1. Alga
    - 2. Fungus
    - 3. Virus
    - . . .

B. Event
- 1. Activity
  - 1. Behavior
    - 1. Social Behavior
    - 2. Individual Behavior
  - 2. Daily or Recreational Activity
  - 3. Occupational Activity
  - . . .

SEE HANDOUT


Organism
Organism Attribute
Finding
Anatomical Structure
Laboratory or Test Result
Sign or Symptom
Embryonic Structure
Anatomical Abnormality
Congenital Abnormality
Acquired Abnormality
Fully Formed Anatomical Structure
Body Substance
Body Space or Junction
Body Location or Region
Body System
Body Part, Organ or Organ Component
Tissue
Cell
Cell Component
Gene or Genome
Injury or Poisoning
Biologic Function
Physiologic Function
Pathologic Function
Organism Function
Organ or Tissue Function
Cell Function
Molecular Function
Mental Process
Genetic Function
Cell or Molecular Dysfunction
Disease or Syndrome
Experimental model of Disease
Mental or Behavioral Dysfunction
Neoplastic Process
Archaeon
Fungus
Virus
Rickettsia or Chlamydia
Bacterium
Animal
Plant
Invertebrate
Vertebrate
Alga
Amphibian
Bird
Fish
Mammal
Reptile
Human
part of
property of
evaluation of
evaluation of
produces, contains
location of
conceptual part of
adjacent to
conceptual part of
conceptual part of
conceptual part of
location of
process of
disrupts
disrupts
co-occurs with
part of
part of
part of
part of
isa links
non-isa relations

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

k here to view the Java SWING based version of the Semantic Network browser.

s is best viewed with Netscape 6.x and above or IE 5.x and above.

Semantic Network

mantic Types: Entity, Event

Semantic Relations: isa, associated_with

ase Enter a Semantic Type or Relation in the box below or select from the list below and click on the Find button:

Semantic Types:

Acquired Abnormality

Semantic Relations:

adjacent_to

Find

Show Relations Between Types

SPECIALIST Lexicon

- General English lexicon of biomedical terms and common words
- Provides the lexical information needed for the SPECIALIST Natural Language Processing System
- Lexical entry for each word or term records syntactic (the way words are put together in phrases and sentences), morphological (usually includes inflection, derivation, and compounding), and orthographic (spelling) information

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

ECIALIST Lexicon

The SPECIALIST Lexicon is an English language lexicon containing many biomedical terms. The lexicon entry for each word or term records syntactic, morphological, and orthographic information.

Lexical entries may be single or multi-word terms.

View Lexical Records for:

Users are responsible for compliance with UMLS copyright restrictions
Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

Specialist Lexical Record

```
{base=anesthetic
spelling_variant=anaesthetic
entry=E0330019
      cat=adj
      variants=inv
      position=attrib(3)
      position=pred
      stative
}
{base=anesthetic
spelling_variant=anaesthetic
entry=E0354094
      cat=noun
      variants=reg
      variants=uncount
}
```

View "anesthetic" in relational format.

Lexical Tools

Lexical software programs, indexes, and databases are included with the UMLS that may be useful to developers.

- lexical variant generation (lvg) programs
- 3 indexes (a simple word index of all words in Metathesaurus strings, a normalized word index, and a normalized string index)
- several lexical databases
  - derivational variants (e.g., aphasic/aphasia)
  - closely related terms (hepatocellular/liver cells)
  - spelling differences (e.g., color/colour)
  - combining forms (e.g., heart/cardi(o))

Terms and Conditions

- Free, but requires a License Agreement for use of the Metathesaurus
- In the License Agreement, 5 different levels of source restrictions exist; each source is assigned a restriction level (0,1,2,3,4). Many sources have 0 restriction level.
- Annual User Report with feedback to NLM is required
- License Agreement number needed to access KSS; users can have multiple accounts using this number along with first and last name of the person who signed the license
- License Agreement for Metathesaurus is available in documentation and on the Web: http://www.nlm.nih.gov/research/umls/license.html
- The Semantic Network, SPECIALIST Lexicon, and lexical tools are freely accessible on the Internet under "open" terms, which include appropriate acknowledgement for their use.
  http://semanticnetwork.nlm.nih.gov/TermsAndConditions/
  http://specialist.nlm.nih.gov/TermsAndConditions/

License restriction levels – 2004AA

Level 0 – 38.6% of concepts
Basic license requirements, e.g., copyright statement and credits to NLM and producers of the vocabularies you use, no restriction except as part of your application

Level 1 – 2.3% of concepts
Basic, plus you must negotiate with producer to translate into another language

Level 2 – 0.7% of the concepts
Basic, plus you must negotiate with producer for use in the creation of health data

Level 3 – 36.8% of the concepts
Basic, plus you must negotiate with the producer for any production use. Explicit prohibition against providing access via the Internet, even if it is research

Level 4 – 21.7
Basic, but restricted to use and distribution in the U.S.

There may or may not be license fees associated with uses not covered by the UMLS license.

Read the License, including the Appendix!

UMLS Distribution

- Annual updates since 1990
  -- quarterly updates began with Spring 2002

- Full UMLS available by downloading from the Knowledge Source Server, or through use of the Applications Program Interface (API). Users may also use a browser like Netscape Navigator or MS Internet Explorer and search via basic or advanced search modes. DVDs are also available .

- Knowledge Source Server (UMLSKS):
  http://umlsks.nlm.nih.gov

. . . and Why Do I Care?

UMLS products are potentially useful in local system development, e.g., to:

- identify appropriate terminologies) for local databases; create new vocabularies (DON'T – unless really necessary)
  - re-use Metathesaurus content and structure, link to UMLS unique id's
- interpret natural language or free text in information resources or user queries
- improve the thesaurus capabilities in commercial software products

. . . and Why Do I Care? (cont.)

- The UMLS Metathesaurus can help you become an institutional “expert” on health vocabularies and coding systems, e.g.,
    - The Metathesaurus contains coding systems and vocabularies designated as U.S. standards under the Administrative Simplification provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and as target U.S. government-side standards by the Consolidated Health Informatics e-Gov initiative.
    - emerging standards for clinical data and for electronic public health reporting, particularly mappings between various terminologies (e.g., SNOMED CT – ICD9)
- The UMLS has influenced informatics research and vocabulary and knowledge representation theory
- I’m just curious

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Controlled Vocabularies in the UMLS Metathesaurus

Over 100 controlled vocabularies and mappings

- **Determine scope of Metathesaurus**
- **Source meanings, hierarchies preserved**
- **Relationships, Semantic Types added**
- **Growing understanding of useful characteristics of controlled vocabularies**
    - **how to merge**
    - **how to maintain**

What is a Controlled Vocabulary?

- Authority lists
  - Proper Names
  - Organizations
  - Approved terms

- Structured Sets
  - Classification
  - Taxonomy
  - Thesaurus

What Controlled Vocabularies Do

- Group concepts by meaning
- Establish a preferred term for each meaning
- Help users name and locate units of meaning
- Note relationships between terms
- Arrange terms in hierarchy

Standard Relationships in Controlled Vocabularies

- Terms
  - PT: Preferred Terms
  - SY: Synonyms
  - RT: Related Terms
  - ET: Entry Terms (synonyms or near)

- Hierarchical
  - BT: Broader
  - NT: Narrower

Concept Information in the Metathesaurus

- Varies with the sources contributing to the concept
- May or may not include
  - Name, Preferred Name
  - Synonyms, Entry Terms, XR
  - Hierarchy
  - Definition
  - Code
  - Unique Identifier

Adding and Maintaining Vocabularies in the UMLS

- Administration
  - Licensing
  - Timing and scheduling
- Production
  - Inversion
  - Insertion
  - Editing
  - QA
  - Release
- Standards

Why so Many Controlled Vocabularies in the UMLS?

- Types of information
- Levels of specificity
- Unique/new applications
- Organizational and political boundaries
- Naiveté
- Translations

Categories of Controlled Vocabularies in the UMLS

1) Indexing or synthesizing knowledge-based information

2) Classifying (generalizing) clinical data for billing/statistical reporting

3) Representing clinically specific data

Three Main Categories of Controlled Vocabularies in the UMLS

1) Indexing or synthesizing knowledge-based information
   - Specific to
     - Diseases
     - Anatomy
     - Substance abuse and addiction
     - Research methodology

- Example – MeSH (Medical Subject Headings)

MeSH

- National Library of Medicine, 1960-
- Concepts (descriptors, subject headings)
  - Descriptors (22,568 in 2004)
    - Heart Diabetes Mellitus
  - Qualifiers (83)
    - surgery, history, statistics
  - Supplementary Concepts (137,000+)
    - basic red 46
- Contributed 528,639 strings to UMLS Metathesaurus version 2004AA

MeSH Descriptor Data

- Preferred Name
- Unique Identifier
- Hierarchical tree number
- Entry Terms, See Also
- Definitions, History and Scope Notes

MeSH Annotated Alphabetic

Diagnosis, Computer-Assisted

E1.158+

GEN; prefer specifics; restrict to MeSH definition; IM; DF: DIAG COMPUTER ASSISTED

91(69); was DIAGNOSIS, COMPUTER ASSISTED 1969-90 (Prov 1969-72)

X Computer-Assisted Diagnosis

http://www.nlm.nih.gov/mesh/MBrowser.html

NATIONAL LIBRARY OF MEDICINE | MEDICAL SUBJECT HEADINGS

MeSH Home | Contact NLM | Site Index | Search Our Web Site | NLM Home

Health Information | Library Services | Research Programs | New & Noteworthy | General Information

MeSH Browser:
The files are updated every week on Sunday.
Browse 2003 MeSH

Enter term or the beginning of any root fragments: or Navigate from tree top

Search for these record types:

- Main Headings
- Qualifiers
- Supplementary Concepts
- All of the Above
- **Search as MeSH Unique ID**
- **Search as text words in Annotation & Scope Note**

Search in these fields of chemicals:

- Heading Mapped To (HM) (Supplementary List)
- Indexing Information (II) (Supplementary List)
- Pharmacological Action (PA)
- CAS Registry/EC Number (RN)
- Related CAS Registry Number (RR)

Find Exact Term | Find Terms with ALL Fragments | Find Terms with ANY Fragment

About MeSH Browser | MeSH Home Page | Questions or Comments
NLM Classification, the scheme used to categorize and organize books, audiovisuals, and similar materials.

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Department of Health & Human Services
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Last updated: 25 September 2003

MeSH Tree Structures - 2004

Return to Entry Page

1. Anatomy [A]
2. Organisms [B]
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. Geographic Locations [Z]

Return to Entry Page

Diagnosis, Computer-Assisted - Microsoft Internet Explorer

File Edit View Favorites Tools Help

National Library of Medicine - Medical Subject Headings

2003 MeSH

MeSH Descriptor Data

Return to Entry Page

MeSH Heading	Diagnosis, Computer-Assisted
Tree Number	E01.158
Tree Number	L01.700.508.100.158
Annotation	GEN: prefer specifics; restrict to MeSH definition; IM; DF: DIAG COMPUTER ASSISTED
Scope Note	Application of computer programs designed to assist the physician in solving a diagnostic problem.
Entry Term	Computer-Assisted Diagnosis
Allowable Qualifiers	AE CL CT EC ES HI IS LJ MO MT NU PX SN ST TD UT VE
Entry Version	DIAG COMPUTER ASSISTED
Previous Indexing	Computers (1966-1968)
Online Note	use DIAGNOSIS, COMPUTER-ASSISTED to search DIAGNOSIS, COMPUTER ASSISTED 1969-90 (as Prov 1969-72)
History Note	91(69); was DIAGNOSIS, COMPUTER ASSISTED 1969-90 (Prov 1969-72)
Unique ID	D003936

MeSH Tree Structures

Diagnosis [E01]

- Diagnosis, Computer-Assisted [E01.158]
  - Image Interpretation, Computer-Assisted [E01.158.600] +
- Diagnosis, Differential [E01.171]

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home | Search | Advanced Search | Documentation | Resources | Views/Profiles | Logout

Metathesaurus Search for: **diagnosis, computer-assisted** in UMLS Release **2003AC**

Display | Display All

Concept
- [x] Definition
- [x] Synonyms
- [ ] Other Languages
- [x] Suppressible Synonyms
- [x] Sources

Context
- [ ] Ancestors
- [ ] Parents
- [ ] Siblings
- [ ] Children

Relations
- [ ] Narrower
- [ ] Broader
- [ ] Similar
- [ ] Other
- [ ] Related and possibly synonymous
- [ ] Source asserted synonymy
- [ ] Allowable Subheadings
- [ ] Associated Expressions

Co-occurring Concepts
- [ ] Co-occurring MeSH

Concept: Diagnosis, Computer-Assisted

CUI: C0011905

Semantic Type: Diagnostic Procedure

Definition:

computer hardware, database, software or program used by medical and health personnel to assist in patient diagnostic testing; for recommended schedules of therapy use COMPUTER ASSISTED PATIENT CARE. (CRISP Thesaurus)

Application of computer programs designed to assist the physician in solving a diagnostic problem. (MeSH)

Synonyms:

Diagnosis, Computer-Assisted
computer-aided diagnosis

Suppressible Synonyms:

Sources:

Alcohol and Other Drug Thesaurus
CRISP Thesaurus
MeSH
Psychological Index Terms

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **Diagnosis, Computer-Assisted** in UMLS Release **2003AC**

Display

Terms

- [x] Term Variants
- [ ] MeSH Entry Terms
- [ ] MeSH Attributes

Term Name: Diagnosis, Computer-Assisted
CUI: C0011905
Term UI: L0011905

Source: MeSH
TTY: MH
ID: D003936

Term Variants:

Variant: Computer Assisted Diagnosis
Tag: Other
Source: MeSH
TTY: PM
ID: D003936

Source: Psychological Index Terms
TTY: PT
ID: 10910

Variant: Computer-Assisted Diagnoses
Tag: Other
Source: MeSH
TTY: PM

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **computer-aided diagnosis** in UMLS Release **2003AC**

Display

Terms

- [x] Term Variants
- [ ] MeSH Entry Terms
- [ ] MeSH Attributes

Term Name: computer-aided diagnosis

CUI: C0011905

Term UI: L1193248

Source: Alcohol and Other Drug Thesaurus

TTY: DE

ID: 0000006858

Users are responsible for compliance with UMLS copyright restrictions

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

Copyright Privacy Accessibility Freedom of Information Act

Site Last Updated: March 10, 2004 Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

Changes to MeSH 2000 Data Structure

- More compatible with UMLS
- Descriptor = class of concepts
- Concept = class of synonymous terms
- Preferred concept name = MeSH Heading
- Facilitates maintenance
- Allows attributes at concept level

AIDS Dementia Complex.

Under the old term-based system, **AIDS Dementia Complex** had six print entry terms:

AIDS DEMENTIA COMPLEX
- HIV Dementia (equivalent)
- HIV-Associated Cognitive Motor Complex (equivalent)
- Dementia Complex, AIDS-Related (equivalent)
- HIV Encephalopathy (narrower)
- AIDS Encephalopathy (narrower)
- HIV-1-Associated Cognitive Motor Complex (related)

AIDS DEMENTIA COMPLEX [Descriptor Class]

Concept Class I - Preferred Concept

Terms:

AIDS Dementia Complex (Preferred Term)
HIV Dementia
HIV-Associated Cognitive Motor Complex
Dementia Complex, AIDS-Related

Concept Class II - Subordinate Concept (narrower)

Terms:

HIV Encephalopathy (Preferred Term)
AIDS Encephalopathy

Concept Class III - Subordinate Concept (related)

Terms:

HIV-1-Associated Cognitive Motor Complex (Preferred Term)

Three Main Categories of Controlled Vocabularies in the UMLS (cont.)

2) Classifying (generalizing) clinical data for billing/statistical reporting

- Diagnoses and procedures
- Diagnoses only
- Procedures only
- Nursing

Example – International Classification of Diseases (ICD)

International Classification of Diseases (ICD)

- First published 1893
- Used to report morbidity and mortality
- 9th revision (ICD-9) developed by the World Health Organization (WHO)
- 10th revision (ICD-10) already in use (not yet in the US)

International Classification of Diseases, 9th revision, Clinical Modifications (ICD-9-CM)

- US National Center for Health Statistics
  - Provide greater level of detail for US reporting
  - Designated as a HIPAA standard

- ICD-10-CM
  - under development
  - will likely become HIPAA standard

ICD-9-CM 2

- Volume 3 –Procedures
- In ICD-9 and ICD-9-CM

SAB |TTY|Code| STR
ICD9CM|HT|285|Other and unspecified anemias

- In ICD-9-CM
  - 'code at the leaf' i.e. only at the most detailed

SAB |TTY|Code| STR
ICD9CM|PT|285.0|Sideroblastic anemia
ICD9CM|PT|285.1|Acute posthemorrhagic anemia
ICD9CM|HT|285.2|Anemia in chronic illness
ICD9CM|PT|285.8|Other specified anemias
ICD9CM|PT|285.22|Anemia in neoplastic disease
ICD9CM|PT|285.21|Anemia in end-stage renal disease 285.29|Anemia of
ICD9CM|PT|other chronic illness 285.9|Anemia, unspecified|

ICD-9-CM Index to Diseases

Anthracosis (lung) (occupational) 500
lingua 529.3
Anthrax 022.9
with pneumonia 022.1
colitis 022.2
cutaneous 022.0
gastrointestinal 022.2
pulmonary 022.1
respiratory 022.1
septicemia 022.3
specified manifestation NEC 022.8
Anthropoid pelvis 755.69

022 ANTHRAX — An infectious disease caused by *Bacillus anthracis*, characterized by ulcerated papules, which form black eschars with following necrosis. It is transmitted to man by direct and indirect contact with infected animals and their commerical products.

022.0 CUTANEOUS ANTHRAX — A form marked by superficial black-crusted papules usually acquired through open wounds or abrasions.

Malignant pustule — A large, edematous, black-crusted papule.

022.1 PULMONARY ANTHRAX — A form marked by pulmonary involvement due to inhalation of dust or animal hair containing anthrax spores.

Respiratory anthrax — Synonym for Pulmonary Anthrax.

Wool-sorters' disease — A form affecting workers who handle and sort infected wools and fleeces.

022.2 GASTROINTESTINAL ANTHRAX — A severe form marked by gastrointestinal tract involvement.

022.3 ANTHRAX SEPTICEMIA — A severe form marked by bloodstream dissemination, often leading to sudden death.

022.8 OTHER SPECIFIED MANIFESTATIONS OF ANTHRAX

NOTE: Use this code when the diagnosis is specified as "anthrax," but is not listed above (022.0-022.3).

022.9 ANTHRAX, UNSPECIFIED

NOTE: Use this code when the diagnosis is identified as "anthrax," but is not specified as to type, or site.

ICD-10

The International Statistical Classification of Diseases and Related Health Problems, tenth revision

http://www.who.int/whosis/icd10/

- Description
- Electronic Version
- Purchase of ICD-10 (includes order form)
- Language versions available and in preparation
- Permission to translate
- Copyright information
- Implementation of ICD-10 by WHO Member States
- Corrigenda and updates to published volumes
- WHO Collaborating Centres for the Classification of Diseases
- Procedures for updating
- TENDON (Computer based training)
- Specialty-based adaptations
- International Classification of Functioning, Disability and Health
- Other classifications

ICD-10-CM draft

- **Anthrax** A22.9
- with pneumonia A22.1
- cerebral A22.8
- colitis A22.2
- cutaneous A22.0
- gastrointestinal A22.2
- inhalation A22.1
- intestinal A22.2
- meningitis A22.8
- pulmonary A22.1
- respiratory A22.1
- septicemia A22.7
- specified manifestation NEC A22.8

CDC
SAFER • HEALTHIER • PEOPLE™

nchs National Center for Health Statistics ...Monitoring the Nation's Health

Classifications of Diseases and Functioning & Disability

http://www.cdc.gov/nchs/icd9.htm

What's New

- Classification of Death and Injury Resulting from Terrorism
- WHO Family of International Classifications Meeting

There are two related classifications of diseases with similar titles, and a third classification on functioning and disability. The International Classification of Diseases (ICD) is the classification used to code and classify mortality data from death certificates. The International Classification of Diseases, Clinical Modification (ICD-9-CM) is used to code and classify morbidity data from the inpatient and outpatient records, physician offices, and most National Center for Health Statistics (NCHS) surveys. NCHS serves as the World Health Organization (WHO) Collaborating Center for the Family of International Classifications for North America and in this capacity is responsible for coordination of all official disease classification activities in the United States relating to the ICD and its use, interpretation, and periodic revision.

The Collaborating Center is also responsible in North America for the family of ICD classifications, which includes the *International Classification of Functioning & Disability and Health* (ICF).

Three Main Categories of Controlled Vocabularies in the UMLS (cont.)

3) Representing clinically specific data

- "Comprehensive" clinical vocabularies
- Observations and tests
- Procedures
- Diagnoses/Clinical problems/signs and symptoms
- Drugs
- Medical devices
- Nursing

- Example – SNOMED CT

SNOMED

Systemized Nomenclature of Medicine

- Developed in 1975 by the College of American Pathologists (CAP) to describe pathologic findings

- Evolved into a multiaxial, controlled terminology to index the entire medical record

SNOMED International

- Published 1998
- 164,000 strings in Metathesaurus
- SNMI98

SNOMED
INTERNATIONAL

Diseases / Diagnoses

A classification of diseases

The Diseases / Diagnoses module represents a classification of the recognized clinical conditions encountered in human and veterinary medicine. Named diseases, diagnoses, and syndromes are placed within a family of related conditions and assigned to one or multiple categories producing both a monohierarchical and polyhierarchical classification of medical disorders.

Chapter D0	Diagnoses related to the skin and subcutaneous tissues
Chapter D1	Diagnoses related to the musculoskeletal system and connective tissues
Chapter D2	Diagnoses related to the respiratory system
Chapter D3	Diagnoses related to the cardiovascular system
Chapter D4	Diagnoses related to congenital diseases
Chapter D5	Diagnoses related to the digestive system
Chapter D6	Diagnoses related to the metabolic and nutritional disorders
Chapter D7	Diagnoses related to the genitourinary systems
Chapter D8	Diagnoses related to pregnancy and the perinatal period
Chapter D9	Diagnoses related to mental disorders
Chapter DA	Diagnoses related to the nervous system and special senses
Chapter DB	Diagnoses related to the endocrine organs
Chapter DC	Diagnoses related to the hematopoietic and immune systems
Chapter DD	Diagnoses related to injuries and poisonings
Chapter DE	Diagnoses related to infectious and parasitic diseases
Chapter DF	Diagnoses related to general disorders, victim status, and death

E-110 Actinomycotic Infections — Continued

DE-11063V Bovine granulomatous mastitis
(T-04000) (L-22301)

DE-11064V Pulmonary nocardiosis
(T-28000) (L-22303)

DE-11066V Cutaneous nocardiosis
(T-01000) (L-22301)
Pyogranulomatous dermatitis
(T-01000) (L-22301)

DE-11070 Trichomycosis axillaris 039.0
(T-01400) (T-D8104) (L-14427)
Trichonocardiasis axillaris 039.0
(T-01400) (T-D8104) (L-14427)
Axillary trichomycosis due to Corynebacterium tenuis 039.0
(T-01400) (T-D8104) (L-14427)

DE-11080 Erythrasma 039.0
(T-01000) (M-43000) (L-14420)
Infection due to Corynebacterium minutissimum 039.0
(T-01000) (M-43000) (L-14420)

DE-11090 Botryomycosis 041.1
(T-01000) (M-44000) (L-24801)
Chronic granulomatous infection due mostly to Staphylococcus aureus 041.1
(T-01000) (M-44000) (L-24801)
Staphylococcal granuloma
(T-01000) (M-44000) (L-24801)

E-111 Angular Conjunctivitis

DE-11100 Angular conjunctivitis 372.0
(T-AA860) (L-21601)
Morax-Axenfeld conjunctivitis 372.0
(T-AA860) (L-21601)
Infection due to Moraxella lacunata 372.0
(T-AA860) (L-21601)
Infection due to Morax-Axenfeld bacillus 372.0
(T-AA860) (L-21601)

DE-11120V Bovine infectious keratoconjunctivitis
(T-AA860) (L-21602)
Bovine infectious ophthalmia
(T-AA860) (L-21602)

E-112 Anthrax

DE-11200 Anthrax, NOS 022.9
(L-12202)
Infection due to Bacillus anthracis 022.9
(L-12202)
Splenic fever
(T-12202)
Charbon
(L-12202)
Milzbrand
(L-12202)

DE-11201 Cutaneous anthrax 022.0
(T-01000) (L-12202)
Malignant pustule 022.0
(T-01000) (L-12202)

DE-11204 Pulmonary anthrax 022.1
(T-28000) (L-12202)
Woolsorters' disease 022.1
(T-28000) (L-12202)
Respiratory anthrax 022.1
(T-28000) (L-12202)

DE-11205 Pneumonia in anthrax 484.5
(T-28000) (M-40000)

DE-11206 Gastrointestinal anthrax 022.2
(T-50100) (L-12202)

DE-11207 Anthrax septicemia 022.3
(T-C2000) (L-12202)

DE-11208 Other specified anthrax manifestations 022.8
(T-.....) (L-12202)

E-113 Bacterial Food Poisoning

DE-11300 Bacterial food poisoning, NOS 005.9
(T-50100) (L-10000)
Food poisoning due to bacteria, NOS 005.8
(T-50100) (L-10000)

DE-11310 Botulism 005.1
(L-10038) (L-14118)
Food poisoning due to Clostridium botulinum toxin 005.1
(L-10038) (L-14118)
Lamziekte
(L-10038) (L-14121)
Lame sickness

SNOMED CT

- SNOMED Clinical Terms
- National license negotiated by NLM
- Jan. 2004 version included in the UMLS 2004AA release, May 2004

SNOMED® INTERNATIONAL

Home | About SNOMED | SNOMED CT | News / Events | Education | Products/Services | Clinical Activity | Related Sites | Member Services

News and Information

HHS Secretary announces access to SNOMED through National Library of Medicine

SNOMED Working Group Conference June 8, 2004 in London

SNOMED **Users Group - Register Now!** September 22-24, 2004

CAP and Cerner Corporation sign agreement for global distribution of SNOMED CT Core Content

CHI recommends SNOMED CT

SNOMED CT Encoded CAP Cancer Protocols available

NCVHS recommends adoption of SNOMED CT

CAP and NLM sign major agreement for SNOMED CT® in the US

WELCOME

Welcome to SNOMED® International, a division of the College of American Pathologists (CAP), where we focus on advancing excellence in patient care through the delivery of SNOMED® (the Systematized Nomenclature of Medicine) and terminology and implementation support products and services.

SNOMED Clinical Terms® (SNOMED CT®), is the universal health care terminology that makes health care knowledge usable and accessible wherever and whenever it is needed. This strong foundation is leading the health care industry in building a seamless infrastructure of worldwide care while integrating an overwhelming amount of clinical data.

Let SNOMED CT, backed by more than 40 years of pioneering research and development, help your organization transform its approach to creating, sharing, retrieving, and aggregating health care information.

Contact us | Link to CAP Web site

About the Site

http://www.snomed.org/snomedct/documents/Jan04_release_print.pdf

SNOMED CT in the UMLS

- Released with 2004AA UMLS
- Includes *active* core SNOMED CT content
  - the mapping from SNOMED CT to ICD-9-CM
  - over 300,000 SNOMED CT concepts
  - over 1,000,000 concept names

SNOMED CT in UMLS 2

- The principle of **source transparency** is always upheld in the Metathesaurus
  - Original SNOMED CT representation is always preserved and
  - Can be retrieved or reconstructed from the Metathesaurus

RxNorm Project

- **New UMLS source created by NLM**
- **2 Semantic Normal Forms (SNFs) created as UMLS concepts for every clinical drug**
  - **SNF Drug Component (SCDC)**
    - **clinical drugs (active ingredient + strength + dose form)**
  - **SNF Clinical Formulation (SCD)**
    - **dose forms as administered**

RxNorm

- RxNorm clinical drug name reflects
  - active ingredients
  - strengths
  - dose form
- RxNorm name should exist for every strength and dose of every combination of clinically significant ingredients available in the US
- Each element of an RxNorm clinical drug name is also a separate RxNorm term related by formal criteria to the clinical drug name

RxNorm

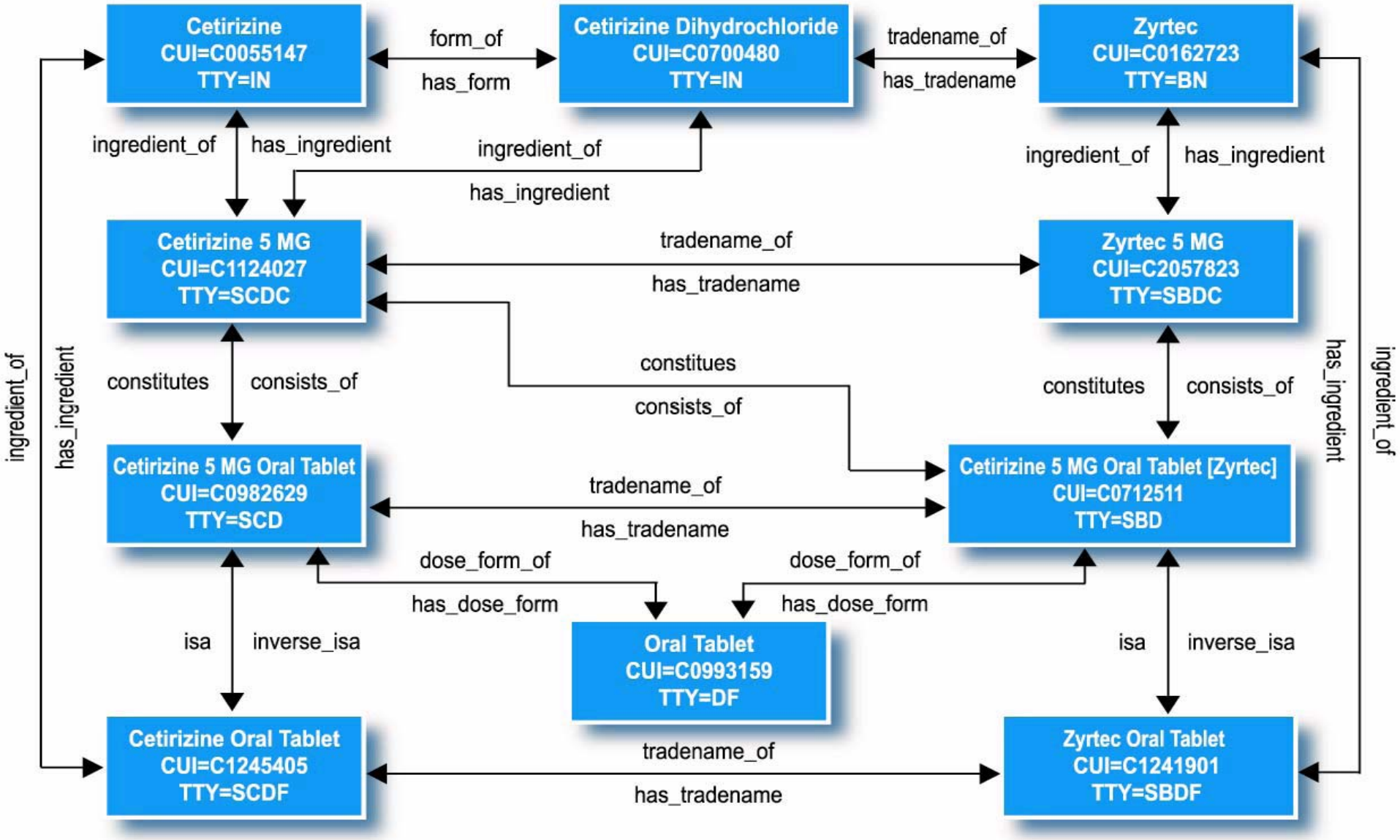
- **Normalized names include ingredients, strengths and dose forms**
  - ***Acetaminophen 500 MG Oral Tablet*** **generic drug**
  - ***Acetaminophen 500 MG Oral Tablet [Tylenol]*** **branded drug**

- **Generic and branded normalized forms are related to each other and to their components**
  - ***Acetaminophen 500 MG Oral Tablet*** **is related to**
  - ***Acetaminophen 500 MG Oral Tablet [Tylenol]***
    - **Both related to *Acetaminophen, Acetaminophen 500 MG,* and *Oral Tablet***
  - ***Acetaminophen 500 MG Oral Tablet***
  - ***Acetaminophen 500 MG Oral Tablet [Tylenol]***
    - **linked to different names used in other vocabularies**

RxNorm Relationships

- **constitutes / consists_of**
  - **between an SCD and an SCDC and between an SBD and an SBDC or SCDC**
- **contains / contained_in**
- **dose_form_of / has_dose_form**
  - **between an SCD or SBD and DF**
- **form_of / has_form**
  - **between two INs, which may designate different salts of the same active ingredient**
- **ingredient_of / has_ingredient**
  - **between an IN and an SCDC or SCDF and between a BN and an SBDC or SBDF**
- **isa / inverse_isa**
  - **between an SCD and an SCDF and between an SBD and an SBDF**
- **tradename_of / has_tradename**
  - **between a BN and an IN, between an SBDC and an SCDC, between an SBD and an SCD, or between an SBDF and an SCDF**

RxNorm Graph



RxNorm Filter in MetamorphoSys

- Extracts only concepts that participate in the RxNorm graph of connections:
  - RxNorm atoms, e.g., SCD
  - HL7 dose form atoms (TTY=DF), or
  - Semantic Type = Drug Delivery Device

- Default setting includes level 0 restricted sources and SNOMED CT

Why Not Combine Them Into One?

- One size does not fit all
- NLM supports coordination when possible
- Growing awareness of benefits of standardization where appropriate

The UMLS approach assumes continuing diversity in the formats and vocabularies of different information sources and in the language employed by different elements of the biomedical community. It is not an attempt to build a single standard biomedical vocabulary.

Humphreys, Betsy L. and Peri L. Schuyler, “The Unified Medical Language System,” in X, High- Performance Medical Libraries, p. 33.

Characteristics of a Good Controlled Vocabulary

- Cimino, James J. Desiderata for Controlled Medical Vocabularies in the Twenty-First Century

- **http://www.amia.org/cpri_hl7/cimino/sld001.htm**

Cimino's Desiderata #1

Content

- Terms are adequate to purpose in breadth and depth
- Formal methodology for adding new terms
- Structure must not limit size

Cimino's Desiderata #2

Concept Orientation

- Concept = basic unit of meaning
- One meaning per concept (non-vague)
- Only one meaning per concept (non-ambiguous)
- Only one concept per meaning (non-redundant)

Cimino’s Desiderata #3

Concept Permanence

- Old concepts (meanings) can’t be deleted
- Preferred names may evolve
- Strings and names may change or be deleted as long as meanings don’t change`

Cimino's Desiderata #4

Non-Semantic Concept Identifiers

- Concept identifiers should be meaningless integers
- Not the name (may change)
- Not the hierarchical code
  - concept may be reclassified
  - code may run out of space

NLM's Advice on Unique Numbering of Concepts in Vocabularies and Classification Systems

- Assign a single unique identifier to each discrete concept in your system.
- Never change the unique identifier for a concept.
- If a concept becomes outdated or no longer needed for any reason, flag it as obsolete but do not delete it or its unique identifier from the official version of the system.

Cimino's Desiderata #5

Polyhierarchy

- Useful for "tree walking" (locating and grouping concepts)
- Single vs. vs polyhierarchy
- Ex: hepatorenal syndrome
  - Liver disease
  - Renal disease

Cimino's Desiderata #6

Formal Definitions

- Structured and controlled definitions
- Expressed as relationships to other concepts in the vocabulary
  - Hierarchical links
- Can be machine manipulated

Cimino's Desiderata #7

Reject NEC

- NEC = Not elsewhere classified
- Catchall concept lacks formal definition
- Vocabulary changes induce semantic drift
- NEC vs. NOC (not otherwise specified)

Cimino's Desiderata #8 and #9

Multiple Granularities, Multiple Consistent Views

- Expand or collapse hierarchies, classes or concepts as needed
- Computerized systems facilitate display of multiple views or hierarchies
- Allow for shareable, multipurpose vocabularies

Cimino's Desiderata #10

Representing Context

- Grammar to show usage
- Context-specific information
- Needed to support
  - natural language processing
  - automated decision support
  - indexing
  - clinical research

Cimino's Desiderata #11

Graceful Evolution

- As knowledge grows, content and structure evolve
  - New terms added
  - Existing terms refined
    - Precoordination
    - Disambiguation
    - Discovered redundancy
- Document changes

Evaluating a Controlled Vocabulary

- Why was it developed? What are its intended uses?
- What does it cover?
- What is its structure? **How is it maintained**?
- How **is it used**?

NLM Evaluation Criteria for Adding New Vocabularies to the UMLS

1. Who does the vocabulary serve?

2. Is the vocabulary authoritative?

3. Is the thesaurus available in a well-structured, computable electronic form?

4. Have copyright ownership and license restriction levels been considered?

NLM Evaluation Criteria (cont.)

5. What thesaurus characteristics and principles are used?

6. How fully descriptive are the terms when seen alone, rather than in the associated context?

7. Will there be many cases where the 'face' meaning of your terms are different from the meaning of the same term in other areas of biomedicine?

8. Who would be available to assist in editing and review?

UMLS Metathesaurus

- Concepts, terms, and attributes from many controlled vocabularies
- Scope determined by combined scope of source vocabularies
- New inter-source relationships, definitional information, use information

Mappings

- Link concepts between two or more specific vocabularies

- May be
  - Established by a source vocabulary
    - SNOMED-ICD-03; LOINC®; ICD-10 (UK Edition); NIC; NOC; NANDA; PNDS
  - Created by NLM for Metathesaurus`

Schedule

10:00 – 10:15	Welcome and Introductions
10:15 – 10:45	Unified Medical Language System (UMLS) Overview
10:45 – 11:45	Controlled Vocabularies and the UMLS
11:45 – 12:00	UMLS Metathesaurus
12:00 – 1:00	Lunch
1:00 – 2:00	UMLS Metathesaurus (continued)
2:00 – 2:15	MetamorphoSys
2:15 – 2:30	UMLS Semantic Network
2:30 – 2:45	UMLS SPECIALIST Lexicon and Lexical Tools
2:45 – 3:00	UMLS Knowledge Source Server (UMLSKS)
3:00 – 3:30	Break
3:30- 3:45	UMLS Applications
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

UMLS Metathesaurus

1. Vocabularies
2. Organization, Concepts, Relationships, Data
3. Making the Metathesaurus
4. Customizing the Metathesaurus including use of MetamorphoSys – making your own local, customized copy of the Metathesaurus

UMLS Metathesaurus

- Built on merging different vocabularies
- Over 100 source vocabularies
- Preserves original content and adds new information
- Organized by concept or meaning

UMLS Source Vocabularies – Types of Metathesaurus Sources

Widely varying purposes, structures, properties, but all are in essence “sets of valid values” --

-Thesauri, e.g., MeSH
- Statistical Classifications, e.g., ICD-9, ICD-10, ICPC
- Billing Codes, e.g., CPT, CPT Spanish version, HCPCS
- Clinical Coding Systems, e.g., SNOMED, Read
- Nursing Vocabularies, e.g., NIC, NOC, OMAHA
- Alternative/Complementary Medicine: ALTLINK
- Drug Sources: Multum, Micromedex, VANDF
- Drug Regulatory, e.g., MedDRA
- Lists of controlled terms, e.g., COSTAR, HL7 values

All HIPAA code sets included, except NDC

Metathesaurus Source Vocabularies

APPENDIX TO THE UMLS LICENSE, SEE HANDOUT

AIR93 AI/RHEUM. Bethesda, (MD): National Library of Medicine, Lister Hill Center, 1993.
Contact: May Cheh, Lister Hill Center, NLM; e-mail: cheh@nlm.nih.gov
---
ALT2000 Alternative Billing Concepts (AltLink). Las Cruces (NM): Alternative Link LLC, 2000.
CATEGORY 3 RESTRICTIONS APPLY

Contact: Alternative Link LLC; 1065 Main Street, Bldg C; Las Cruces, NM 88005; phone:
505-527-0636; http://www.alternativelink.com; e-mail: mail@alternativelink.com
. . .

Source Vocabularies by Purpose

SEE HANDOUT

Classifying (generalizing) clinical data for billing/statistical reporting
(# denotes a National Standard designated by HIPAA regulation)

- Diagnoses and procedures
  - International Classification of Diseases -ICD2002#
- Diagnoses only
  - Diagnostic and Statistical Manual of Mental Disorders-DSM4
  - International Statistical Classification of Diseases and Related Health Problems - ICD10

etc . . .

Organization by Concept

Atoms (AUIs)	Strings (SUIs) synonyms/names	Terms (LUIs) lexical variation	Concept (CUIs) the meaning
A0027665	**S0016668**	**L0004238**	**C0004238**
Atrial Fibrillation (from MSH)	Atrial Fibrillation (preferred)	Atrial Fibrillation (preferred)	Atrial Fibrillation (preferred)
		Atrial Fibrillations	Atrial Fibrillations
A0027668	**S0016669**		Auricular Fibrillation
Atrial Fibrillations (from MSH)	Atrial Fibrillations		Auricular Fibrillations
A0027930	**S0016899**	**L0004327**	
Auricular Fibrillation (from PSY)	Auricular Fibrillation (preferred)	(synonym) Auricular Fibrillation	
		Auricular Fibrillations	
A0027932	**S001690**		
Auricular Fibrillations (from MSH)	Auricular Fibrillations (plural variant)		

UMLS Knowledge Source Server (UMLSKS)

National Library of Medicine

About the UMLSKS

- Log in
- Overview
- Frequently Asked Questions
- UMLS Metathesaurus®
- Semantic Network
- SPECIALIST Lexicon

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

UMLSKS Registered Users

Login ID:

Password:

Login

Forgotten your password?

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- **Existing users** may click on the Forgotten your password link (above) and enter the new license number. You may use your previous Login ID and Password. After a brief grace period, old license numbers will no longer work and all user accounts created ander those numbers will also not work.

- UMLSKS Version 4.1 released on

New UMLSKS Users

The UMLSKS is restricted to registered users. If you are not a registered user and would like to use the resources of the UMLS, please read the UMLS license agreement, obtain a UMLS license number, and fill in the form below to request a UMLSKS user account.

Login ID:

Password:

Confirm Password:

First Name:

Last Name:

Request Account

Email:

UMLS License #:

UMLS Licensee First Name:

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2002AB 2003AA 2002AD 2003AC 2002 2002AC 2003AB 2001

Metathesaurus Semantic Network SPECIALIST Lexicon

Logout

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- Edit Views/Profile

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- UMLS Documentation Set

Resources

- NLP & Lexical Resources
- Semantic Network Resources
- Metathesaurus Resources

Metathesaurus | Semantic N/W | SPECIALIST Lexicon | Documentation | Resources

Quick Search

Select UMLS Release: 2003AC

Enter search value:

Metathesaurus Concept Search | Semantic Network Search | SPECIALIST Lexicon Search

Search Tips... | Search Tips... | Search Tips...

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!
- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

Advanced Searches

Metathesaurus Advanced Search

Facilitates advanced searching of the UMLS Metathesaurus, including restricting vocabularies, performing batch searches, performing XML queries, and using a command-line type interface.

Semantic Network Browser

Allows browsing of the hierarchies for the Semantic Network.

SPECIALIST Lexicon Advanced Search

Facilitates advanced

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus | Semantic Network | SPECIALIST Lexicon

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Metathesaurus Search

Select UMLS Release: 2003AC

Enter a term or a concept unique identifier (CUI): atrial fibrillation

Perform Concept Search

Basic searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is entered into the text entry box above.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is available during a concept search and includes synonyms, hierarchical context details, relations, and co-occurring concepts.

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U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

Copyright Privacy Accessibility Freedom of Information Act

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **atrial fibrillation** in UMLS Release **2003AC**

Display | Display All

Concept
- [x] Definition
- [x] Synonyms
- [ ] Other Languages
- [ ] Suppressible Synonyms
- [ ] Sources

Context
- [ ] Ancestors
- [ ] Parents
- [ ] Siblings
- [ ] Children

Relations
- [ ] Narrower
- [ ] Broader
- [ ] Similar
- [ ] Other
- [ ] Related and possibly synonymous
- [ ] Source asserted synonymy
- [ ] Allowable Subheadings
- [ ] Associated Expressions

Co-occurring Concepts
- [ ] Co-occurring MeSH

Concept: Atrial Fibrillation

CUI: C0004238

Semantic Type: Finding
Pathologic Function

Definition:
Disorder of cardiac rhythm characterized by rapid, irregular atrial impulses and ineffective atrial contractions. (MeSH)

Synonyms:
Atrial Fibrillation
AF
AF - Atrial fibrillation
AFib
a fib
Auricular Fibrillation

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **Atrial Fibrillation** in UMLS Release **2003AC**

Display

Terms

- [x] Term Variants
- [ ] MeSH Entry Terms
- [ ] MeSH Attributes

Term Name: Atrial Fibrillation
CUI: C0004238
Term UI: L0004238

Source: MeSH
TTY: MH
ID: D001281

Source: Metathesaurus Names
TTY: PT
ID: 561

Source: Psychological Index Terms
TTY: ET
ID: 04333

Term Variants:

Variant: ATRIAL FIBRILLATION
Tag: Case
Source: Clinical Problem Statements

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Metathesaurus Search for: **atrial fibrillation** in UMLS Release **2003AC**

Display | Display All

Concept
- ☐ Definition
- ☐ Synonyms
- ☐ Other Languages
- ☐ Suppressible Synonyms
- ☑ Sources

Context
- ☐ Ancestors
- ☐ Parents
- ☐ Siblings
- ☐ Children

Relations
- ☐ Narrower
- ☐ Broader
- ☐ Similar
- ☐ Other
- ☐ Related and possibly synonymous
- ☐ Source asserted synonymy
- ☐ Allowable Subheadings
- ☐ Associated Expressions

Co-occurring Concepts
- ☐ Co-occurring MeSH
- ☐ Co-occurring MeSH By

Concept: Atrial Fibrillation

CUI: C0004238

Semantic Type: Finding
Pathologic Function

Sources:

Alcohol and Other Drug Thesaurus
Beth Israel Problem List
Clinical Problem Statements
Clinical Classifications Categories
COSTAR 1989-1995
CRISP Thesaurus
COSTART
DXplain
ICD-9-CM
ICPC2P 1998 Plus Austral Mod
Library of Congress Subject Headings
MedDRA
MeSH
Metathesaurus Names
Psychological Index Terms
Read Codes
SNOMED 1982
SNOMED Intl 1998

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Metathesaurus Search for: **atrial fibrillation** in UMLS Release **2003AC**

Display | Display All

Concept
- ☑ Definition
- ☑ Synonyms
- ☑ Other Languages
- ☑ Suppressible Synonyms
- ☑ Sources

Context
- ☑ Ancestors
- ☑ Parents
- ☑ Siblings
- ☑ Children

Relations
- ☑ Narrower
- ☑ Broader
- ☑ Similar
- ☑ Other
- ☑ Related and possibly synonymous
- ☑ Source asserted synonymy
- ☑ Allowable Subheadings
- ☑ Associated Expressions

Co-occurring Concepts
- ☐ Co-occurring MeSH

Concept: Atrial Fibrillation

CUI: C0004238

Semantic Type: Finding
Pathologic Function

Definition:
Disorder of cardiac rhythm characterized by rapid, irregular atrial impulses and ineffective atrial contractions. (MeSH)

Synonyms:
Atrial Fibrillation
AF
AF - Atrial fibrillation
AFib
a fib
Auricular Fibrillation

Other languages:
Dutch
Atriumfibrillatie
Boezemfibrillatie
Fibrillatie, atrium-
Fibrillatie, boezem-

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UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **corn** in UMLS Release **2003AC**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

Zea mays
Corn of toe
Maize

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Multiple Meanings

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Metathesaurus Search for: **cold** in UMLS Release **2003AC**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

- cold temperature
- Common Cold
- Cold Therapy
- Chronic Obstructive Airway Disease
- Cold Sensation
- Cold brand of chlorpheniramine-phenylpropanolamine

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Multiple Meanings - Cold

Concepts (CUIs)	Terms (LUIs)	Strings(SUIs)	Atoms (AUIs)
C0009264	**L0215040**	**S0288775**	**A0318651**
cold temperature	cold temperature	cold temperature	cold temperature
			(from CSP)
	L0009264	**S0007170**	**A0016032**
	Cold<1>	Cold<1>	Cold <1>
	Cold		(from MTH)
		S0026353	**A0040712**
		Cold	Cold
			(from MSH)
C0009443	**L0009443**	**S0026747**	**A0041261**
Common Cold	Common Cold	Common Cold	Common Cold
			(from MSH)

Relationships

Relationships in the Metathesaurus come from the sources themselves or are created by the Metathesaurus editors to link concepts that would not otherwise be connected.

RELATIONSHIP	DEFINITION
Broader (RB)	Has a meaning which includes that of the concept.
Narrower (RN)	Has a meaning which is included in that of the concept.
Other related (RO)	Has a relationship other than synonymous, narrower, or broader
Like (RL)	The two concepts are similar or "alike". In the previous editions of the Metathesaurus, most relationships with this attribute linked MeSH supplementary concepts which are largely chemicals. Many of the concepts linked by this relationship were synonymous and were combined into a single concept identifier. Source-specific mappings from one vocabulary to another also have this relationship, along with the label for the relationship attribute of "mapped_to.".
RQ	related and possibly synonymous
SY	source asserted synonymy
Parent (PAR)	Is a parent in a hierarchy of a Metathesaurus source vocabulary
Child (CHD)	Is a child in a hierarchy of a Metathesaurus source vocabulary
Sibling (SIB)	Shares a parent in a hierarchy in a Metathesaurus source vocabulary.
AQ	Is an allowed qualifier for a concept in a Metathesaurus source vocabulary.
QB	Can be qualified by a concept in a Metathesaurus source vocabulary.

“Fruit” Hierarchies

REPRESENTATIVE HIERARCHICAL CONTEXTS FOR THE CONCEPT “FRUIT” ALCOHOL AND OTHER DRUG THESAURUS

technology, safety and accidents

- technology, manufacturing, and agriculture
- food product
- beverage +
- chocolate
- dairy product +
- fish, shellfish, other seafood
- food product ingredient
- fruits
- grain, cereal +
- junk food
- meat, poultry, eggs +
- nut, seed
- pastry, sweets
- vegetables
- vitamin supplement

“Fruit” Hierarchies

CRISP THESAURUS
food science/technology
- food
  - animal food
  - baby food
  - beverage +
  - dairy product +
  - fruit
    - tomato
  - grain +
  - meat
  - poultry product +
  - seafood
  - vegetable +

“Fruit” Hierarchies

MESH
Organisms (MeSH Category)
Plants
Plant Components
Fruit
Nuts
Plant Epidermis
Plant Roots +
Plant Shoots +
Pollen
Seeds

“Fruit” Hierarchies

MESH
Technology, Food and Beverages (MeSH Category)
Food and Beverages
Bread
Candy +
Cereals +
Condiments +
Crops, Agricultural +
Dairy Products +
Dietary Fats +
Dietary Fiber
Dietary Supplements
Eggs +
Flour
Food Additives +
Foods, Specialized +
Fruit
Citrus
Coconut
Honey
Meat +
Micronutrients
Molasses
Nuts +
Vegetables

Concept name bolded for readability.
Contexts drawn from the 2002 UMLS Metathesaurus.
+ Indicates has children not shown.

Establishing the “name” for a concept: precedence

- Precedence is determined from a computer algorithm that determines the preferred name for a concept
- Preferred name can change often so CUI is used to represent the “meaning” of the concept
- MTH/PN has highest precedence with MeSH being the highest precedence vocabulary source
- Users can change this with tools like MetamorphoSys provided with the UMLS

Order of Precedence Among Concept Names

The Metathesaurus PN names always receive the highest ranking within a concept. After that, the ranking of Metathesaurus MM immediately precedes the highest ranking Source/Type of Name of the ambiguous string that caused it to be created.
Also, please note that users are encouraged to change precedence to suit their own preferences. The Metathesaurus file MRRANK.RRF (MRRANK in ORF) contains this information which can be used to change precedence to suit the user's needs.

Source	Term Type
MTH	PN
MSH	MH
MSH	TQ
MSH	EP
MSH	EN
MSH	XQ
MSH	NM
RXNORM	SCD
...	
NCBI Taxonomy	SCN
VANDF	CD
...	

Concepts

- Concepts – basic unit of the Metathesaurus
- Each concept is a separate meaning.
- CUI – Concept Unique Identifier
  - represents the meaning throughout history; called the “name that never changes”
- Concepts contain atoms, strings, contexts, attributes, semantic types, and relationships

Data File Examples

Data is divided into 20-some different “MR” files;
M=Metathesaurus, R=Relational, and the
.RRF extension = Rich Release Format

The CUI is the link between the data in the different MR files

Five important Metathesaurus files are:

MRCONSO.RRF – Concepts, concept names, and their sources
MRSTY.RRF – Semantic Types
MRREL.RRF – Relationships
MRSAT.RRF – Attributes
MRCXT.RRF - Contexts

Concept Name Indexes

To assist system developers building applications retrieving strings with concept names including specific words or groups of words, 3 indexes to the concept names are provided.

Example concept name: Lung Diseases, Obstructive; Lung Diseases, Obstructive; Obstructive Lung Disease, Obstructive Lung Diseases

Word Index disease, diseases, lung, obstructive

Normalized Word Index (English) disease, lung, obstructive
(normalization – break into words, lowercase, un-inflect, stop words stripped, base forms only so no plurals)

Normalized String Index (English) disease lung obstructive
(break into words, lowercase, un-inflect, sort words in alphabetic order, stop words stripped, base forms only so no plurals)

Concepts & Sources (MRCONSO.RRF)

CUI|LAT|TS|LUI|STT|SUI|ISRPREF|AUI|SAUI|SCUI|SDUI|SAB|
TTY|CODE|STR|SRL|SUPPRESS|CVF|

C0000052|ENG|S|L0006129|PF|S2069199|Y|A19545338|||MSH|
PM|D015061|Branching Enzyme, 1,4-alpha-Glucan|0|N||

Concepts & Sources (MRCONSO.RRF)

CUI – Concept Unique Identifier
LAT – Language of Term
TS – Term Status
LUI – Lexical Unique Identifier
STT – String Type
SUI – String Unique Identifier
ISPREF – Indicates whether AUI is preferred
AUI – Atom Unique Identifier
SAUI – Source asserted atom identifier
SCUI – Source asserted concept identifier
SDUI – Source asserted descriptor identifier
SAB – Source abbreviation
TTY – Term type in source
CODE – Unique 8identifier or code for string in source
STR – String
SRL – Source Restriction Level
SUPPRESS – Suppressible flag
CVF – Content view flag

Semantic Types (MRSTY.RRF)

Semantic Types come from the Semantic Network and are used to categorize the concepts

Every concept must have at least one

CUI|TUI|STN|STY|ATUI|CVF|
C0000097|T109|A1.4.1.2.1|OrganicChemical|AT17685735||

CUI – Concept unique identifier
TUI – Type (semantic) unique identifier
STN – Semantic Type tree number
STY – Semantic Type
ATUI – Attribute unique identifier
CVF – Content view flag

Relationships (MRREL)

Relationships link concepts. They can come from the sources themselves or editors
There are 11 types of relationships:

Broader RB – has a broader relationship
Narrower RN – has a narrower relationship
Related, Other RO – has relationship other than synonymous, narrower, or broader
Related, Like RL – the relationship is similar or “alike” (like)
RQ – related and possibly synonymous
SY – source asserted synonymy
Parent PAR – has parent relationship in a Metathesaurus source vocabulary
Child CHD – has sibling relationship in a Metathesaurus source vocabulary
Sibling SIB – has sibling relationship in a Metathesaurus source vocabulary
AQ – is an Allowed Qualifier for the first concept in a Metathesaurus source vocabulary
QB – can be Qualified By a concept in a Metathesaurus source vocabulary

Relationship Attributes (RELA)

These come from the Semantic Network

They help to further define a relationship between Semantic Types

Examples include:

mapped_to, clinically_associated_with, classified_as, is_a, part_of, result_of

Relationships (MRREL.RRF)

CUI|AUI1|STYPE1|REL|CUI2|AUI2|STYPE2|RELA|RUI|SRUI|SAB|SL|RG|DIR|SUPRES|CVF|

C0000005|A0016459|RB|C0036775|A0115649||R01982973||MSH|MSH|||N||

Relationships (MRREL.RRF)

CUI – Concept unique identifier for first concept
AUI1 – Unique identifier for first atom
STYPE1 – Source asserted type for first identifier
REL – Relationship of second concept to the first
CUI2 – Concept unique identifier for second concept
RELA – Relationship attribute (not required)
RUI – Unique identifier for relationship
SRUI – Source attributed relationship identifier
SAB – Source (vocabulary) abbreviation
SL – Source (vocabulary) of the relationship label
RG – Relationship group
DIR – Source asserted directionality flag
SUPPRESS – Suppressible flag
CVF – Content view flag

Attributes (MRSAT)

Generic source attributes that do not fit into other categories

A list of all attributes are in the UMLS documentation in Section B.1.2

CUI|LUI|SUI|AUI|CODE|ATUI|SATUI|ATN|
SAB|ATV|SUPRESS|CVF|

C0000005|L0000005|S0007492|A0016459|
D012711|AT15278131||DID|MSH|
D012711|N||

Attributes (MRSAT.RRF)

CUI – Concept unique identifier
LUI – Lexical unique identifier
SUI – String unique identifier
UI – Source asserted or Metathesaurus unique identifier
STYPE – Source asserted type for the identifier
CODE – Unique identifier or code for string in source
ATUI – Unique identifier for attribute
SATUI – Source asserted attribute identifier
ATN – Attribute name
SAB – Source vocabulary abbreviation for source of attribute
ATV – Attribute value
SUPPRESS – Suppressible flag
CVF – Content view flag

Contexts (MRCXT.RRF)

- Hierarchies or classifications from vocabulary sources
- Represented as relationships in MRCXT.RRF
- Editors use the context provided by the source vocabularies to help determine meaning
- Relationships include:
  - Parent (PAR), Child (CHD), Sibling (SIB),
  - And Ancestors (ANC) and CCP for concept

Contexts (MRCXT.RRF)

CUI|SUI|AUI|SAB|CODE|CXN|CXL|RNK|CXS|CUI2|AUI2|HCD|RELA|XC|CVF|

C000052|S0575717|A0630731|SNMI|F-687A0|1|ANC|4|ENZYMES|C0014442|A0691788|||||

Contexts (MRCXT.RRF)

CUI – Concept unique identifier
SUI – String unique identifier for string in context
AUI – Atom unique identifier
SAB – Source (vocabulary) abbreviation
CODE – Unique identifier or code for string in source
CXN – ConteXt number
CXL – Context member label, e.g., PAR, CHD, ANC
RANK – For ANCs (ancestors), the rank of the ancestors
CXS – Context member string
CUI2 – Concept unique identifier of context member
AUI2 – Unique identifier for second atom
HCD – Hierarchical number or code of context member
RELA – Relationship attribute
XC – Plus sign indicates if the concept has children
CVF – Content view flag

Making the Metathesaurus

- NLM acquires rights to incorporate a vocabulary
- Rights include permission to represent the vocabulary in the particular form and to distribute to UMLS licensees
- Restriction level established
- Apelon, Inc. -formerly Lexical Technology, Inc.
  - provides backend support for Metathesaurus database, produces UMLS product, created editing system (MEME-4) used, performs source insertions and programming

Making the Metathesaurus (cont.)

- Machine-readable vocabulary converted in a “normal” or canonical form (meta.src).
- This “inversion” process requires consideration of how the source is representing its meanings and attempts to make all of this explicit.
- Terms from different sources lexically similar to each other or which appear to be semantically identical to Metathesaurus concepts are brought together (merged) as proposed synonyms.
- Results reviewed by editors; additional relationships and semantic types added if necessary.

Metathesaurus Resources for Further Information

UMLS documentation
http://www.nlm.nih.gov/research/umls/UMLSDOC.HTML
Printed copy sent to licensees

Public Web site “UMLSINFO” open to everyone (no license)
http://umlinfo.nlm.nih.gov

UMLS Knowledge Source Server
http://umlsks.nlm.nih.gov

UMLS-users Listserv – see instructions in documentation

e-mail: custserve@nlm.nih.gov

Schedule

10:00 – 10:15	Welcome and Introductions
10:15 – 10:45	Unified Medical Language System (UMLS) Overview
10:45 – 11:45	Controlled Vocabularies and the UMLS
12:00 – 1:00	LUNCH
1:00 – 2:00	UMLS Metathesaurus (continued)
2:00 – 2:15	**MetamorphoSys**
2:15 – 2:30	UMLS Semantic Network
2:30 – 2:45	UMLS SPECIALIST Lexicon and Lexical Tools
2:45 – 3:00	UMLS Knowledge Source Server (UMLSKS)
3:15- 3:30	BREAK
3:30- 3:45	UMLS Applications
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

MetamorphoSys

What is it?

Why use it?

How to use it.

What is MetamorphoSys?

- A tool distributed with the UMLS for use with the Knowledge Sources.
- Multi-platform Java software
- Creates a local, customized version of the Metathesaurus for the user
- The installation and customization wizard for the 2004AA release
    - Installer and for sub-setting
    - Ability to output in original MR files format

Why Customize? 3 Basic Reasons

- Because nobody needs or wants all of it

  extraneous vs. pernicious concepts, strings, relationships

- Because you don’t have the licenses required for operational use of all source vocabularies

- Because the default “preferred name” is not best for your applications

Possibly Extraneous, e.g.,

- Terms in languages other than English
- Redundant minor variations
- Procedure codes, when your application is focused on problems

Possibly Pernicious, e.g.,

- Terms that lack face validity
- Abbreviations and short forms
- Other less than beautiful “suppressible” terms
- Relationships that reflect an alien or unhelpful “world view”

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

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Metathesaurus Search for: **prostate** in UMLS Release **2003AC**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

- Prostate
- Prostatic Diseases
- Benign neoplasm of prostate
- Carcinoma in situ of prostate
- Neoplasm of uncertain or unknown behavior of prostate

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National Institutes of Health (NIH)
Department of Health & Human Services

Copyright Privacy Accessibility Freedom of Information Act

Site Last Updated: March 10, 2004 Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home | Search | Advanced Search | Documentation | Resources | Views/Profiles | Logout

Metathesaurus Search for: **er** in UMLS Release **2003AC**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

- Endoplasmic Reticulum
- Estrogen Receptors
- Estrogen receptor positive
- estrogen receptor negative

Users are responsible for compliance with UMLS copyright restrictions

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LUTROPIN^1.5 HOURS POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^1.5 HOURS POST DOSE GONADOTROPIN RELEASING HORMONE:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^105M POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^15 MINUTES POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^1 HOUR POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^1 HOUR POST DOSE GONADOTROPIN RELEASING HORMONE:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^2 HOURS POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^2 HOURS POST DOSE GONADOTROPIN RELEASING HORMONE:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^30 MINUTES POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^30 MINUTES POST DOSE GONADOTROPIN RELEASING HORMONE:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^45M POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^75M POST 100 G LUTROPIN INTRAVENOUS:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]
LUTROPIN^BASELINE:MASS CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE (LOINC) [Relation: measures]

Omaha System

DOMAIN III. PHYSIOLOGICAL [P3]
- Digestion-hydration [P330]
  - Impairment [Q05]
    - anemia [P30S06]

Physician Data Query

cancer
- cancer-related problem/condition
  - bone marrow suppression
    - anemia

Psychological Index Terms

Disorders (PsycINFO Cluster Term)
- Physical & Psychosomatic Disorders (PsycINFO Subcluster Term)
  - Anemia

Psychological Index Terms

Disorders
- Physical Disorders
  - Blood and Lymphatic Disorders
    - Anemia

Read Codes

Clinical findings [XaBVJ]
- Disorders [X0003]
  - Disorders of blood, lymphatics and immune system [X20Bj]
    - Red blood cell disorder [X20Bk]
      - Anaemia [XM05A]

Read Codes

Clinical findings [XaBVJ]
- Disorders [X0003]
  - Disorders of blood, lymphatics and immune system [X20Bj]
    - Red blood cell disorder [X20Bk]
      - Anaemia [XM05A]
        - Other and unspecified anaemia [D21..]
          - Anaemia unspecified [XE140]

Why use MetamorphoSys?

- To exclude vocabularies as required by the UMLS License Agreement

  Default action is to select only those vocabularies that have additional restrictions (level 0)

- To remove terminology that may not fit a particular view or application

  For example, one may want to remove LOINC terms for a natural language processing application

- To alter the default “preferred name” precedence and control suppressibility of source term types

Why use MetamorphoSys (cont.)

- To remove certain strings or relationships

  For example, you might decide that the relationships from the CCPSS source are not needed in your application due to the nature of the relationships and the number that exist

License Restriction Levels – 2004AA

Level 0 – 38.6% of concepts
Basic license requirements, e.g., copyright statement and credits to NLM and producers of the vocabularies you use, no restriction except as part of your application

Level 1 – 2.3% of concepts
Basic, plus you must negotiate with producer to translate into another language

Level 2 – 0.7% of the concepts
Basic, plus you must negotiate with producer for use in the creation of health data

Level 3 – 36.8% of the concepts
Basic, plus you must negotiate with the producer for any production use. Explicit prohibition against providing access via the Internet, even if it is research

Level 4 – 21.7%
Basic, but restricted to use and distribution in the U.S.

There may or may not be license fees associated with uses not covered by the UMLS license.

Read the License, including the Appendix!

Customization is Critical

But it requires a clear understanding of:

- Characteristics of relevant UMLS source vocabularies
  You can explore these via the KSS
- Your functional requirements
- Your license arrangements … and technical expertise
  - Therefore, it is usually a team sport!

Machine Requirements

A reasonable fast CPU – 1 GHz or higher

1 GB RAM recommended, preferably more

6x (or better) DVD drive

At least 20 GB free disc space

Can run on Sun Solaris, Windows XP, ME, and 2000, and Mac OS 10.2. Currently working on Linux version.

Graphical User Interface

Simple to use

allows users to make changes and save the changes for later use without having to edit a config file

Screens and tabs will lead you through the process of installing all the UMLS Knowledge Sources and customizing the Metathesaurus.

Welcome screen: Install UMLS or Customize my subset

Select default subset:

Level 0 – contains terminologies for which no separate, additional licenses are necessary

Level 0 + SNOMED CT – contains all level 0 (no additional licenses) and SNOMED CT

Note: Non-U.S. users need separate license for SNOMED CT

RxNorm subset – contains RxNorm concepts in level 0 sources

Everything in this subset is present in the other two subsets.

Graphical User Interface Components

Five basic Option tabs

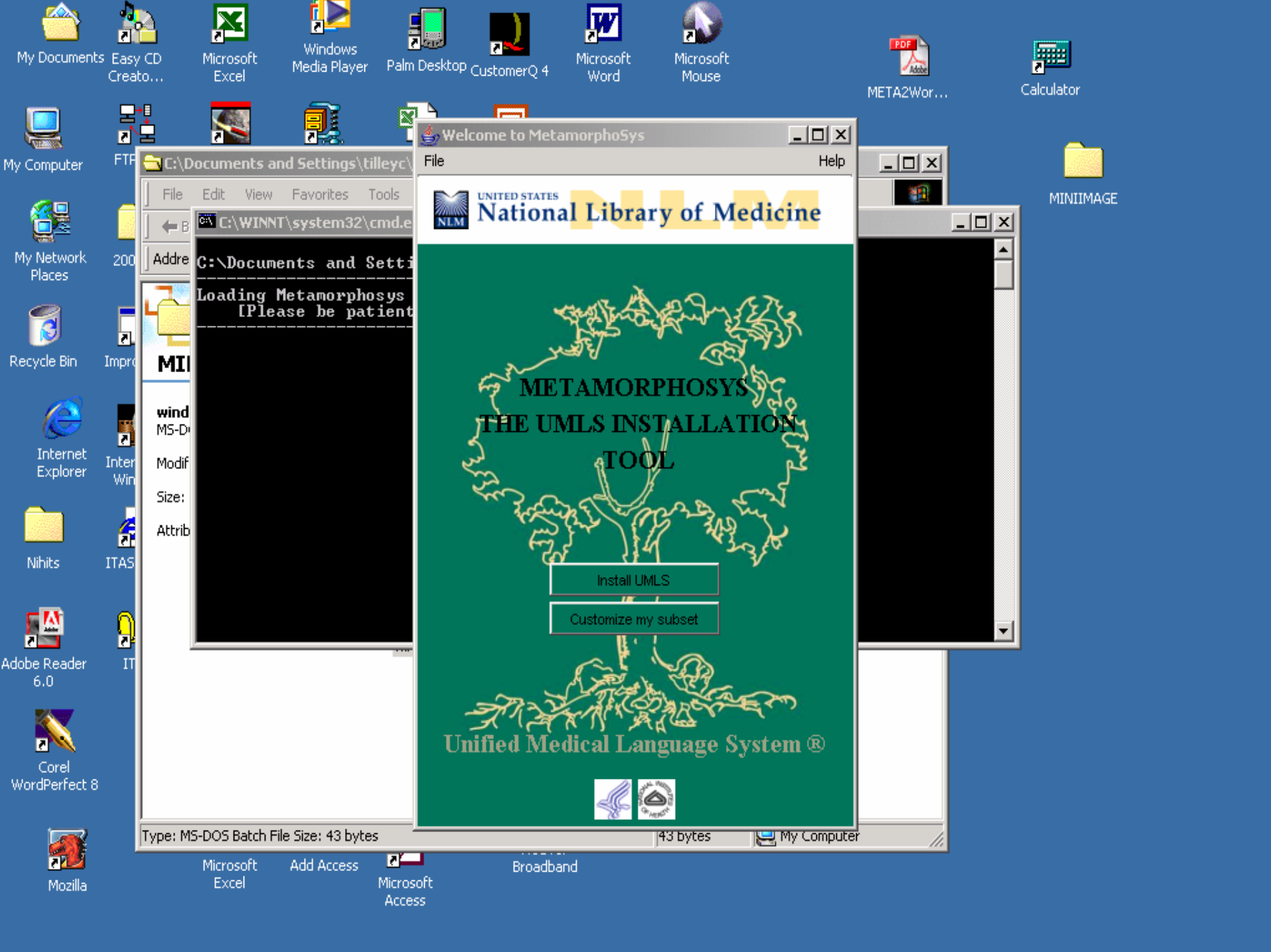
- Input Options
- Output Options
- Source List
- Precedence
- Suppressibility

How MetamorphoSys Works

What it does: removes all information from MR* files that is supplied by the excluded vocabularies

- includes atoms, strings, relationships, attributes, mappings, etc.
- can make additional changes like adding source term suppressibility and altering precedence

What are the results: a full local Metathesaurus, including all the MR* files, containing information that matches what the user requested


Welcome to MetamorphoSys
File
Help
UNITED STATES
National Library of Medicine
NLM
METAMORPHOSYS
THE UMLS INSTALLATION
TOOL
Install UMLS
Customize my subset
Unified Medical Language System ®
C:\Documents and Settings\tilleyc\
File Edit View Favorites Tools
C:\WINNT\system32\cmd.e
C:\Documents and Setti
Loading Metamorphosys
[Please be patient
Type: MS-DOS Batch File Size: 43 bytes
43 bytes
My Computer
My Documents
Easy CD Creato...
Microsoft Excel
Windows Media Player
Palm Desktop
CustomerQ 4
Microsoft Word
Microsoft Mouse
META2Wor...
Calculator
My Computer
My Network Places
Recycle Bin
Internet Explorer
Nihits
Adobe Reader 6.0
Corel WordPerfect 8
Mozilla
MINIIMAGE
Microsoft Excel
Add Access
Microsoft Access
Broadband

Install UMLS screen

Help

INSTALL UMLS

Source C:\Documents and Settings\tilleyc\Desktop\MINIIMAGE Browse..

(this directory contains UMLS files)

Destination Browse..

(this is where top-level directory 2004AA will be created)

Install UMLS Knowledge Sources:

- [x] Metathesaurus
- [x] Semantic Network
- [x] Specialist Lexicon & Tools

Advanced Options..

OK Cancel

MetamorphoSys Progress..

Install UMLS

The following operations will be performed:

- [x] Installing Specialist Lexicon & Tools
- [x] Installing Semantic Network
- [x] Configure Metathesaurus Subset
- [ ] Installing Metathesaurus
  - [ ] Initializing CUI List
  - [ ] Subsetting Content
  - [ ] Subsetting Indexes
  - [ ] Final Processes
- [ ] Done

Cancel

License Agreement Notice

Notice:

The Metathesaurus contains source vocabularies produced by many different copyright holders. The majority of the content of the Metathesaurus is available for use under the basic (and quite open) terms described in the Metathesaurus license http://www.nlm.nih.gov/research/umls/license.html

However, some vocabulary producers place ADDITIONAL RESTRICTIONS ON THE USE OF THEIR CONTENT AS DISTRIBUTED WITHIN THE METATHESAURUS.

The various levels of additional restrictions are described in Section 12 of the license. The level that applies to individual vocabularies is recorded in the Appendix to the license. If a UMLS user already has a separate license for use of one of the source vocabularies, the user's existing license also applies to that source as distributed within the Metathesaurus. In some cases, UMLS users may have to request permission or negotiate a separate license with a vocabulary producer in order to use that vocabulary in a production system. There may be a charge associated with these separate permissions or license agreements.

Accept | Do Not Accept

Size:

Attrib

Type: MS-DOS Batch File Size: 4

Palm Desktop | CustomerQ 4 | Microsoft Word | Microsoft Mouse | Calculator | Nihits | ITAS | Adobe Reader 6.0 | Corel WordPerfect 8 | Mozilla | Access

MetamorphoSys Progress..

Install UMLS

The following operations will be performed:

- [x] Installing Specialist Lexicon & Tools
- [x] Installing Semantic Network
- [x] Configure Metathesaurus Subset
- [ ] Installing Metathesaurus
  - [ ] Initializing CUI List
  - [ ] Subsetting Content
  - [ ] Subsetting Indexes
  - [ ] Final Processes
- [ ] Done

Cancel

Welcome to MetamorphoSys

File Help

Select Default Subset

Help

Select Default Subset

Select one of the default Metathesaurus subsets below. The default subset, Level 0, includes only those sources for which no additional license agreements are necessary. Note: You may later use the Source List tab to customize your subset, to include or exclude specific vocabularies.

Name	Description
Level 0	Exclude all non-level 0 sources
Level 0 + SNOMEDCT	Exclude all non-level 0 sources except SNOMEDCT
RxNorm Subset	Include all RxNorm concepts, exclude all non-level 0 sources except SNOMEDCT

Done Cancel

Unified Medical Language System ®

Type: MS-DOS Batch File Size: 43 bytes

43 bytes

My Computer

Input Options Tab

File Edit Options Reset Done Help

Input Options | Output Options | Source List | Precedence | Suppressibility

Customize the input of UMLS data. See Help for more information.

When you have made your selections on this tab, you may proceed to the other Options tabs in any order. If you are finished customizing your subset, select Done on the menu bar and Begin Subset

Input Format Options

Select Input Format

NLM Data File Format | Browse..

NLM Data File Format

Source Folder - Location of Metathesaurus Files

C:\Documents and Settings\tilleyc\Desktop\MINIMAGE | Browse..

Output Options Tab

File Edit Options Reset Done Help

Input Options | Output Options | Source List | Precedence | Suppressibility

Select data output options for your local application. See Help for more information.

When you have made your selections on this tab, you may proceed to the other Options tabs in any order. If you are finished customizing your subset, select Done on the menu bar and Begin Subset

Output Format Options

Select Output Format

Rich Release Format [Browse..]

Rich Release Format

Subset Folder - Location of Subset Files

C:\Documents and Settings\tilleyc\Desktop\2004AA\META [Browse..]

Write Database Load Scripts

☐ Write Oracle load script.

☐ Write Mysql load script.

Source Abbreviation Format

☐ Output versioned source abbreviations rather than versionless source abbreviations.

Maximum Field Length

☐ Truncate long fields to 4000 characters.

Eliminate Extended Unicode Characters

☑ Remove records containing extended UTF-8 characters.

Source List Tab

File Edit Options Reset Done Help

Input Options | Output Options | Source List | Precedence | Suppressibility

Include or exclude source vocabularies for your Metathesaurus subset. See Help for more information.

Hold down the <Ctrl> key to select multiple rows.

To reset to the default Source List, click on Reset on the menu bar, and select Reset Source List.

Sources to Exclude

Full Source Name	Source Abbreviation	Source Family	Language	Level
AI/RHEUM, 1993	AIR93	AIR	ENG	0
Alternative Billing Concepts	ALT2003	ALT	ENG	3
Alcohol and Other Drug Thesaurus, 2000	AOD2000	AOD	ENG	0
Beth Israel Vocabulary, 1.0	BI98	BI	ENG	2
Canonical Clinical Problem Statement System, 1999	CCPSS99	CCPSS	ENG	3
Clinical Classifications Software, 2003	CCS2003	CCS	ENG	0
Current Dental Terminology (CDT), 4	CDT4	CDT	ENG	3
COSTAR, 1989-1995	COSTAR_89-95	COSTAR	ENG	0
Medical Entities Dictionary, 2003	CPM2003	CPM	ENG	2
Physicians' Current Procedural Terminology, Spanish Translation, 2001	CPT01SP	CPT	SPA	3
Physicians' Current Procedural Terminology, 2004	CPT2004	CPT	ENG	3
CRISP Thesaurus, 2003	CSP2003	CSP	ENG	0
COSTART, 1995	CST95	CST	ENG	0
Diseases Database, 2000	DDB00	DDB	ENG	3
German translation of ICD10, 1995	DMDICD10_1995	ICD10	GER	1
German translation of UMDNS, 1996	DMDUMD_1996	UMD	GER	1
DSM-III-R, 1987	DSM3R_1987	DSM3R	ENG	3
DSM-IV, 1994	DSM4_1994	DSM4	ENG	3
DXplain, 1994	DXP94	DXP	ENG	0
Gene Ontology, 2002_12_16	GO2002_12_16	GO	ENG	0
HCPCS Version of Current Dental Terminology (CDT), 4	HCDT4	CDT	ENG	3
HCFA Common Procedure Coding System, 2004	HCPCS04	HCPCS	ENG	0
HCPCS Version of Current Procedural Terminology (CPT), 2004	HCPT04	HCPCS	ENG	3
Health Devices Alerts, 1999	HDA99	HDA		0
Home Health Care Classification, 2003	HHC2003	HHC	ENG	1
Health Level Seven Vocabulary, 1998-2002	HL7_1998-2002	HL7	ENG	0
ICPC2E-ICD10 relationships from Dr. Henk Lamberts, 1998	HLREL_1998	HLREL		3
Health Product Comparison System, 1999	HPC99	HPC		0
ICD10, American English Equivalents, 1998	ICD10AE_1998	ICD10	ENG	3

Precedence Tab

File Edit Options Reset Done Help

Input Options | Output Options | Source List | Precedence | Suppressibility

Change the ranking of sources and their associated term types to create concept names that are more useful in your local application. Concept names are determined by the term with highest ranking source/term type.

To move rows, either cut and paste rows, or drag and drop.

When you have made your selections on this tab, you may proceed to the other Options tabs in any order. If you are finished customizing your subset, select Done on the menu bar and Begin

Precedence

Full Source Name	Source Abbreviation	Term Type
UMLS Metathesaurus	MTH	PN
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	MH
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	TQ
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	EP
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	EN
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	XQ
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	NM
RXNORM Project, META2004AA	RXNORM_04AA	SCD
RXNORM Project, META2004AA	RXNORM_04AA	SBD
RXNORM Project, META2004AA	RXNORM_04AA	SY
RXNORM Project, META2004AA	RXNORM_04AA	OCD
RXNORM Project, META2004AA	RXNORM_04AA	OBD
RXNORM Project, META2004AA	RXNORM_04AA	SCDF
RXNORM Project, META2004AA	RXNORM_04AA	SBDF
RXNORM Project, META2004AA	RXNORM_04AA	SCDC
NCBI Taxonomy, 2003	NCBI2003	SCN
Veterans Health Administration National Drug File, 03	VANDF03	CD
Veterans Health Administration National Drug File, 03	VANDF03	HT
Veterans Health Administration National Drug File, 03	VANDF03	IN
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	N1
Medical Subject Headings, MSH2004_2003_12_12	MSH2004_2003_12_12	CE
RXNORM Project, META2004AA	RXNORM_04AA	BN
RXNORM Project, META2004AA	RXNORM_04AA	IN
University of Washington Digital Anatomist, 1.7.3	UWDA173	PT
University of Washington Digital Anatomist, 1.7.3	UWDA173	SY
Metathesaurus FDA National Drug Code Directory, 2003_01	MTHFDA_2003_01	CD
Standard Product Nomenclature, 2003	SPN2003	PT
COSTART, 1995	CST95	PT
AI/RHEUM, 1993	AIR93	HT

Running MetamorphoSys

Once configuration is defined, a simple file selection starts the sub-setting

-- under the Done Menu – Begin subset

Before sub-setting begins, user is asked if they want the current config file (with all changes) to be saved

-- allows users to save changes for future runs of MetamorphoSys

Log File

MetamorphoSys Subset Log

```
MetamorphoSys Version:................UMLS MetamorphoSys, version 5.0
Metathesaurus Source paths:...........C:\Documents and Settings\tilleyc\Desktop\MINIIMAGE
Subsetted Metathesaurus folder:.......C:\Documents and Settings\tilleyc\Desktop\2004AA\MET
Start at:............................Tue May 18 13:54:03 EDT 2004
Initialize CUI List completed:........Tue May 18 13:54:06 EDT 2004
Subset Metathesaurus completed:.......Tue May 18 13:54:13 EDT 2004
Subset Index Files completed:.........Tue May 18 13:54:15 EDT 2004
Subset Release Metadata completed:....Tue May 18 13:54:19 EDT 2004
Finished at:.........................Tue May 18 13:54:20 EDT 2004
Concepts in source:...................50
Concepts in subset:...................49
Time elapsed:........................00:00:16


Details about MetamorphoSys Input Handler
-----------------------------
MetamorphoSys Input: Rich Release Format

Details about MetamorphoSys Output Handler
------------------------------
```

OK

Schedule

10:00- 10:15	Welcome and Introductions
10:15-10:45	Unified Medical Language System (UMLS) Overview
10:45-11:45	Controlled Vocabularies and the UMLS
11:45-12:00	UMLS Metathesaurus
12:00- 1:00	LUNCH
1:00- 2:00	UMLS Metathesaurus (continued)
2:00- 2:15	MetamorphoSys
➢ **2:15- 2:30**	**UMLS Semantic Network**
2:30- 2:45	UMLS SPECIALIST Lexicon and Lexical Tools
2:45- 3:00	UMLS Knowledge Source Server (UMLSKS)
3:00- 3:30	BREAK
3:30- 3:45	UMLS Applications
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

Semantic Network

- 135 Semantic Types
  - Broad subject categories
- 54 Semantic Relationships
  - Links between categories
- Together
  - Form the structure of the semantic network
  - Broadly categorize the biomedical domain

135 Semantic Types

- Broad subject categories
- Represent the biomedical domain
- Arrangement
  - 2 main categories
    - Entity
    - Event
  - Hierarchy

Assigning Semantic Types

- Each concept in the Metathesaurus is assigned at least one Semantic Type
- Semantic Type is assigned at the most specific level

54 Semantic Relationships

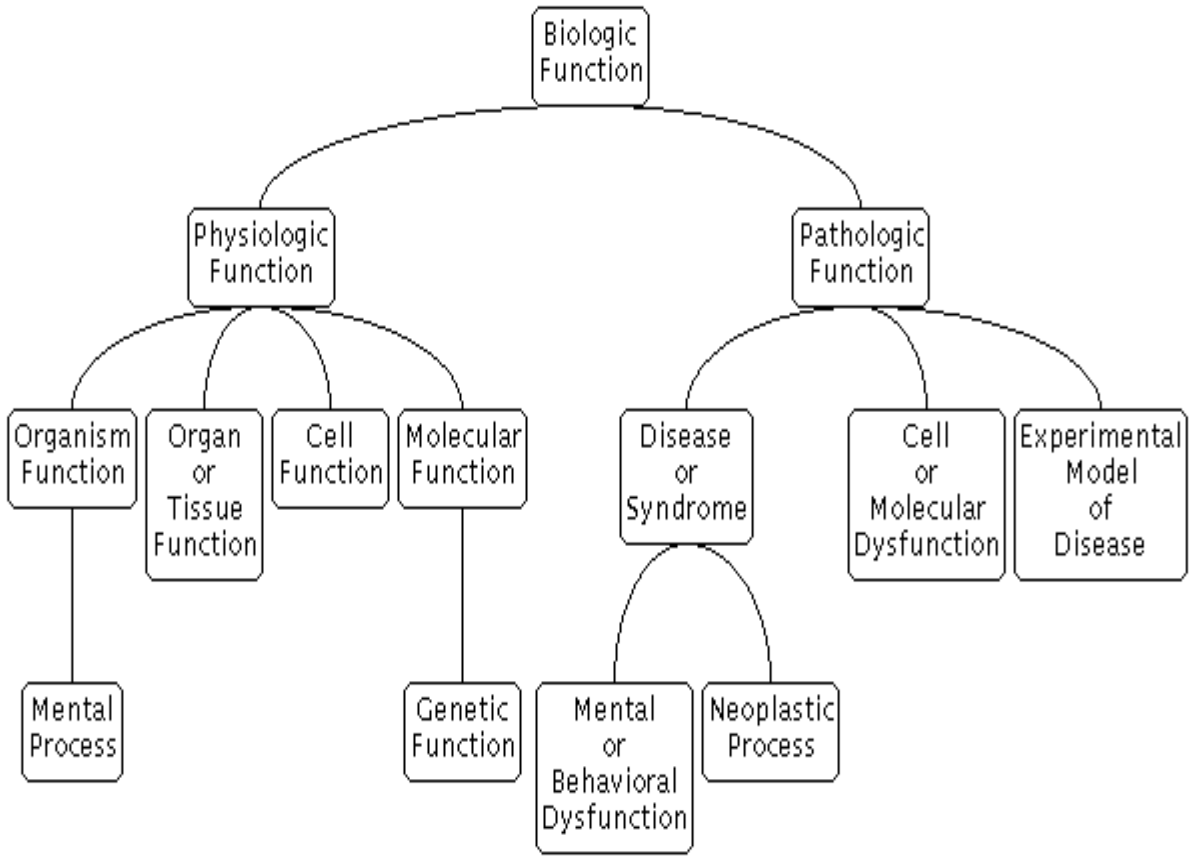
- Represent useful relationships that hold between Semantic Types
- Divided into 2 main categories
  - “isa”
  - “associated with”

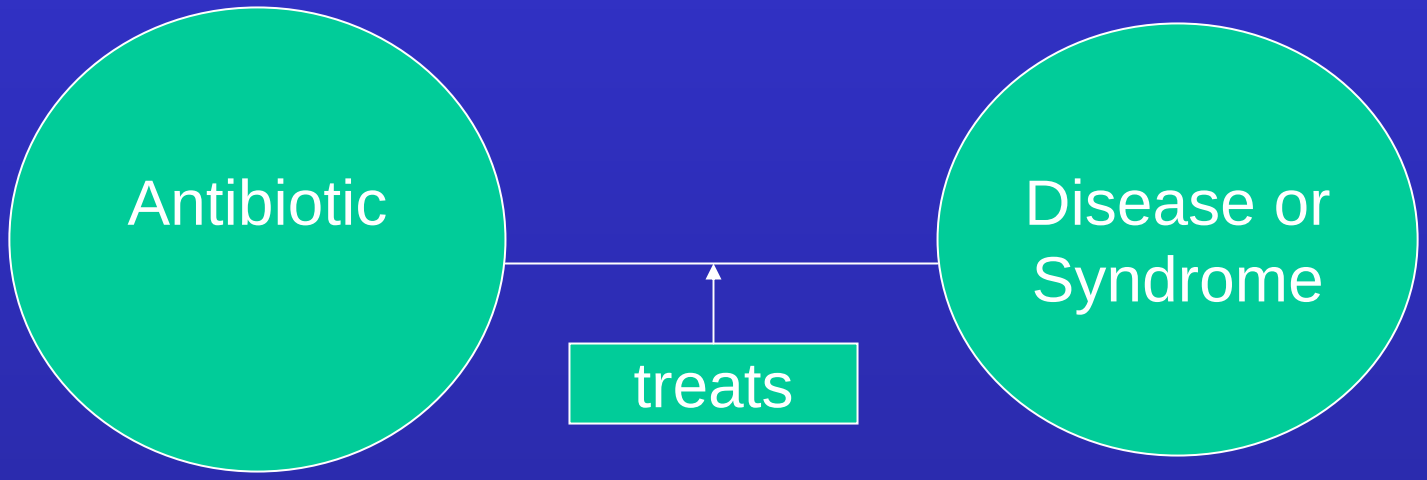
ISA = IS A

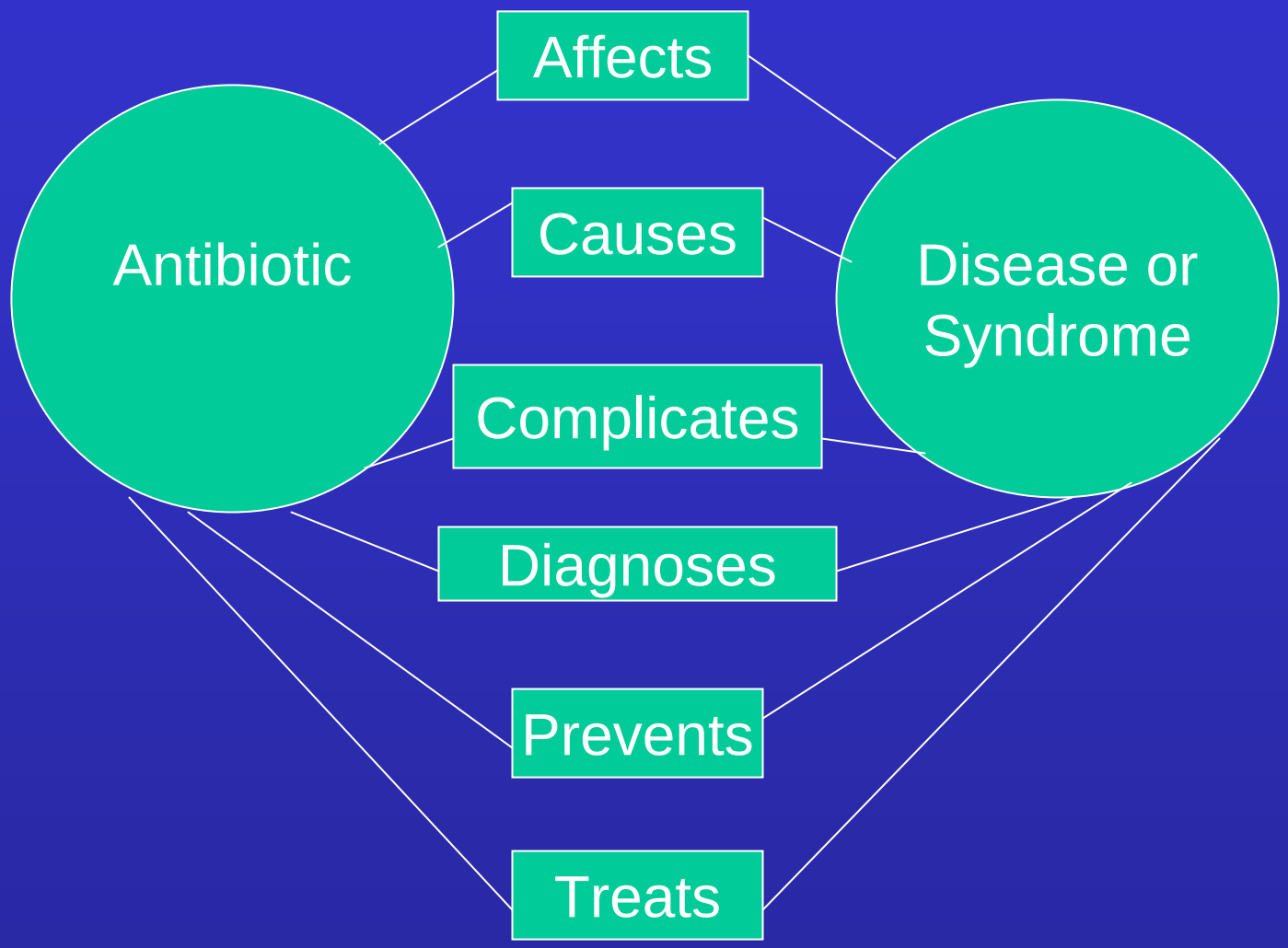
- Primary link of Semantic Network
- Establishes the hierarchy of Semantic Types within the Semantic Network

A Portion of the UMLS Semantic Network

"Biologic Function" Hierarchy




Antibiotic
treats
Disease or Syndrome


Antibiotic
Affects
Causes
Complicates
Diagnoses
Prevents
Treats
Disease or Syndrome

UMLS Knowledge Source Server (UMLSKS)

National Library of Medicine

About the UMLSKS

- Log in
- Overview
- Frequently Asked Questions
- UMLS Metathesaurus®
- Semantic Network
- SPECIALIST Lexicon

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

UMLSKS Registered Users

Login ID:

Password:

Login

Forgotten your password?

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- **Existing users** may click on the Forgotten your password link (above) and enter the new license number. You may use your previous Login ID and Password. After a brief grace period, old license numbers will no longer work and all user accounts created ander those numbers will also not work.

- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

- UMLSKS Version 4.2 is planned for late May. 4.2 will provide searching of UMLS release 2004AA, a new look

New UMLSKS Users

The UMLSKS is restricted to registered users. If you are not a registered user and would like to use the resources of the UMLS, please read the UMLS license agreement, obtain a UMLS license number, and fill in the form below to request a UMLSKS user account.

Login ID:

Password:

Confirm Password:

First Name:

Last Name:

Request Account

Email:

UMLS License #:

UMLS Licensee First Name:

UMLS Licensee Last Name:

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2002AB 2003AA 2002AD 2003AC 2002 2002AC 2003AB 2001

Metathesaurus Semantic Network SPECIALIST Lexicon

Logout

About the UMLSKS

- Home
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- Edit Views/Profile

Downloads

- UMLS Knowledge Sources
- UMLSKS Developer's API

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

Resources

- NLP & Lexical Resources
- Semantic Network Resources
- Metathesaurus Resources

Quick Search

Select UMLS Release: 2003AC

Enter search value:

Metathesaurus Concept Search | Semantic Network Search | SPECIALIST Lexicon Search

Search Tips... | Search Tips... | Search Tips...

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

- UMLSKS Version 4.2 release is planned for late May. 4.2 will provide searching of UMLS release 2004AA, a new look and feel throughout the site, and augmented documentation.

Advanced Searches

Metathesaurus Advanced Search

Facilitates advanced searching of the UMLS Metathesaurus, including restricting vocabularies, performing batch searches, performing XML queries, and using a command-line type interface.

Semantic Network Browser

Allows browsing of the hierarchies for the Semantic Network.

SPECIALIST Lexicon Advanced Search

Facilitates advanced searching of the UMLS SPECIALIST Lexicon, including a command-line type interface.

http://umlsks1.nlm.nih.gov/kss/servlet/Turbine/template/semanticNW,SNScreen.vm;jsessionid=op9r6 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites History

Address http://umlsks1.nlm.nih.gov/kss/servlet/Turbine/template/semanticNW%2CSNScreen.vm;jsessionid=op9r6m41r1

Links (DHHS-NIH-NLM) UMLS Metathesaurus News Entrez-PubMed Google KSS Serial Viewer International Council of Nurses [ICNP®]

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Click here to view the Java SWING based version of the Semantic Network browser.

This is best viewed with Netscape 6.x and above or IE 5.x and above.

Semantic Network

Semantic Types: Entity, Event

Semantic Relations: isa, associated_with

Please Enter a Semantic Type or Relation in the box below or select from the list below and click on the Find button:

Semantic Types:

Age Group

Semantic Relations:

adjacent_to

Find

Show Relations Between Types

Internet

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSemNetServletSearch/template/semanticNW - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites History

Semantic Network

Semantic Types: Entity, Event

Semantic Relations: isa, associated_with

Please Enter a Semantic Type or Relation in the box below or select from the list below and click on the Find button:

Semantic Types:

Acquired Abnormality

Semantic Relations:

tributary_of

Find

- associated_with
  - physically_related_to
    - part_of
    - contains
    - consists_of
    - connected_to
    - interconnects
    - branch_of
    - ***tributary_of***
    - ingredient_of
  - temporally_related_to
  - functionally_related_to
  - conceptually_related_to
  - spatially_related_to

☐ Semantic Types ☐ Raw Records

Semantic Relation: tributary_of
TUI: T199
Definition: Merges with. For example, the confluence of veins.
Inverse: has_tributary
Abbrevation: TB

Show Relations Between Types

U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894

Done Internet

The UMLS Semantic Network: "fully formed anatomical structure"

```
Semantic Types
   |
Entity
    |
  Physical Object
      |
    Anatomical Structure
        |
      Fully Formed Anatomical Structure - Anatomical Abnormality - Embryonic Structure
          |
        Body Part, Organ, or Organ Component
        Cell
        Cell Component
        Tissue
        Gene or Genome
```

Definition:

An anatomical structure in a fully formed organism; in mammals, for example, a structure in the body after the birth of the organism.

See a list of Metathesaurus concepts with Semantic type: "Fully Formed Anatomical Structure".

Relations and Related Types for "Fully Formed Anatomical Structure".

View records for Fully Formed Anatomical Structure in relational format

---

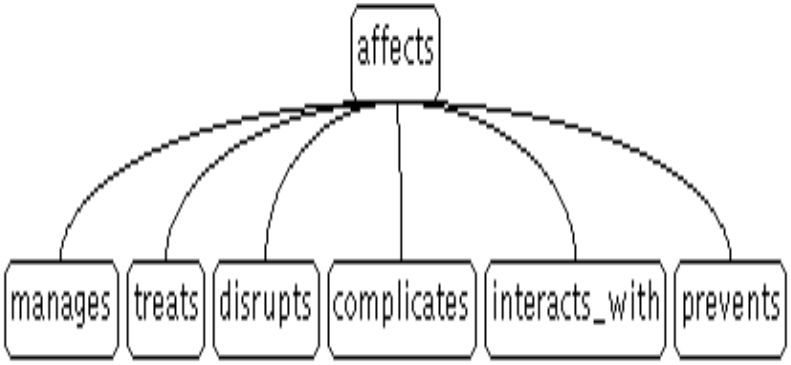
Associated_with

5 major categories of non-hierarchical relations:

- physically related to
- spatially related to
- temporally related to
- functionally related to
- conceptually related to

A Portion of the UMLS Semantic Network

"affects" Hierarchy



The UMLS Semantic Network

The UMLS Semantic Network is one of three UMLS Knowledge Sources developed as part of the Unified Medical Language System project. The network provides a consistent categorization of all concepts represented in the UMLS Metathesaurus.

The UMLS Semantic Network is available in unit record and relational format and is distributed subject to these terms and conditions.

- Download the UMLS Semantic Network files

The UMLS semantic network reduces the complexity of the Metathesaurus by grouping concepts according to the semantic types that have been assigned to them. For certain purposes, however, an even smaller and coarser-grained set of semantic type groupings may be desirable. The UMLS semantic groups have been established for this purpose.

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- UMLS Semantic Network Fact Sheet
- UMLS Semantic Network Documentation

McCray AT. An upper level ontology for the biomedical domain. Comp Funct Genom 2003; 4:80-4.

Updated: May 19, 2004

Lister Hill National Center for Biomedical Communications
National Library of Medicine
National Institutes of Health
Department of Health & Human Services
Copyright - Privacy - Accessibility

Semantic Network homepage: http://semanticnetwork.nlm.nih.gov/

The UMLS Semantic Network Files

The UMLS Semantic Network files are distributed subject to these terms and conditions.

Download the current Semantic Network files:

- The SRFIL file (File Description)
- The SRFLD file (Field Description)
- The SRDEF file (Basic information about the Semantic Types and Relations)
- The SRSTR file (Structure of the Network)
- The SRSTRE1 file (Fully inherited set of Relations (UIs))
- The SRSTRE2 file (Fully inherited set of Relations (Names))

- The SU file (Unit Record)

Updated: May 4, 2004

Semantic Types (MRSTY)

- Every concept must have at least one
- Example:
  - **C0221233|T184|Sign or Symptom|**
- CUI|TUI|STY
  - CUI – Concept Unique Identifier
  - TUI - Semantic Type Unique Identifier
  - STY – Semantic Type

Semantic Type Record Data

- Each Semantic Type record contains:
  - Unique identifier
  - Tree number indicating its position in an `isa' hierarchy
  - Definition
  - Example
  - Its immediate parent and children

Sample Semantic Type Unit Record

- UI: T100
- STY: Age Group
- STN: A2.9.4
- DEF: An individual or individuals classified according to their age.
- EX: Adult; Infant, Premature; Adolescents; Aged, 80 and over
- HL: {isa} Group

Semantic Relation Record Data

- Each Semantic Network record contains
  - Unique identifier
  - Semantic Relation name
  - Abbreviation
  - Definition
  - Example
  - Inverse

Sample Semantic Relation Unit Record

- UI: T173
- RL: adjacent_to
- ABR: AD
- RIN: adjacent_to
- RTN: R2.2
- DEF: Close to, near or abutting another physical unit with no other structure of the same kind intervening. This includes adjoins, abuts, is contiguous to, is juxtaposed, and is close to.
- HL: {isa} spatially_related_to

Semantic Relation Record ASCII Example

RL|T156|indicates|R3.7|Gives evidence for the presence at some time of an entity or process.||||IN|indicated_by|

Basic information about the Semantic Types and Relations: SRDEF

```
RL|T156|indicates|R3.7|Gives evidence for the presence at some time of an entity or process.
```

Structure of the Network: SRSTR

```
Immunologic Factor|indicates|Bacterium|D|
Immunologic Factor|indicates|Pathologic Function|D|
Immunologic Factor|indicates|Rickettsia or Chlamydia|D|
Immunologic Factor|indicates|Virus|D|
Laboratory or Test Result|indicates|Anatomical Abnormality|D|
Laboratory or Test Result|indicates|Biologic Function|D|
Laboratory or Test Result|indicates|Injury or Poisoning|D|
indicates|isa|functionally_related_to|D|
```

Relational Records for "indicates"

Fully inherited set of Relations (Names): SRSTRE2

```
Immunologic Factor|indicates|Bacterium|
Immunologic Factor|indicates|Cell or Molecular Dysfunction|
Immunologic Factor|indicates|Disease or Syndrome|
Immunologic Factor|indicates|Experimental Model of Disease|
Immunologic Factor|indicates|Mental or Behavioral Dysfunction|
Immunologic Factor|indicates|Neoplastic Process|
Immunologic Factor|indicates|Pathologic Function|
Immunologic Factor|indicates|Rickettsia or Chlamydia|
Immunologic Factor|indicates|Virus|
Laboratory or Test Result|indicates|Acquired Abnormality|
Laboratory or Test Result|indicates|Anatomical Abnormality|
Laboratory or Test Result|indicates|Biologic Function|
Laboratory or Test Result|indicates|Cell Function|
Laboratory or Test Result|indicates|Cell or Molecular Dysfunction|
Laboratory or Test Result|indicates|Congenital Abnormality|
Laboratory or Test Result|indicates|Disease or Syndrome|
Laboratory or Test Result|indicates|Experimental Model of Disease|
Laboratory or Test Result|indicates|Genetic Function|
Laboratory or Test Result|indicates|Injury or Poisoning|
Laboratory or Test Result|indicates|Mental Process|
Laboratory or Test Result|indicates|Mental or Behavioral Dysfunction|
Laboratory or Test Result|indicates|Molecular Function|
Laboratory or Test Result|indicates|Neoplastic Process|
Laboratory or Test Result|indicates|Organ or Tissue Function|
Laboratory or Test Result|indicates|Organism Function|
Laboratory or Test Result|indicates|Pathologic Function|
Laboratory or Test Result|indicates|Physiologic Function|
```

UMLS Semantic Groups

- 15 Semantic Groups
  - Smaller set of categories (135 : 15)
  - Broader, coarser groupings
  - Partition 99.5% of UMLS Metathesaurus concepts
- Used for:
  - Word sense disambiguation
  - Profiling, analyzing vocabularies
  - Display in Semantic Navigator

Semantic Groups

- Activities and Behavior
- Anatomy
- Chemicals & Drugs
- Concepts & Ideas
- Devices
- Disorders
- Genes & Molecular Sequences
- Geographic Areas
- Living Beings
- Objects
- Occupations
- Organizations
- Phenomena
- Physiology
- Procedures

Semantic Groups

- ACTI|Activities & Behaviors|T053|Behavior
- ANAT|Anatomy|T024|Tissue
- CHEM|Chemicals & Drugs|T195|Antibiotic
- CONC|Concepts & Ideas|T170|Intellectual Product
- DEVI|Devices|T074|Medical Device
- DISO|Disorders|T047|Disease or Syndrome

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB 2003AC

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Documentation Resources Views/Profiles Logout

UMLS® Semantic Navigator

English term (or CUI):

Type of hierarchical rel.: All Parent/Child only Broader/Narrower only

Transitive reduction: yes no

UMLS data: UMLS_2003

Display Clear

Some material in the UMLS Metathesaurus is from copyrighted sources of the respective copyright claimants. Users of the UMLS Metathesaurus are solely responsible for compliance with any copyright restrictions and are referred to the copyright notices appearing in the original sources, all of which are hereby incorporated by reference.

Comments? Feedback? Questions?

Contact: Olivier Bodenreider

Users are responsible for compliance with UMLS copyright restrictions

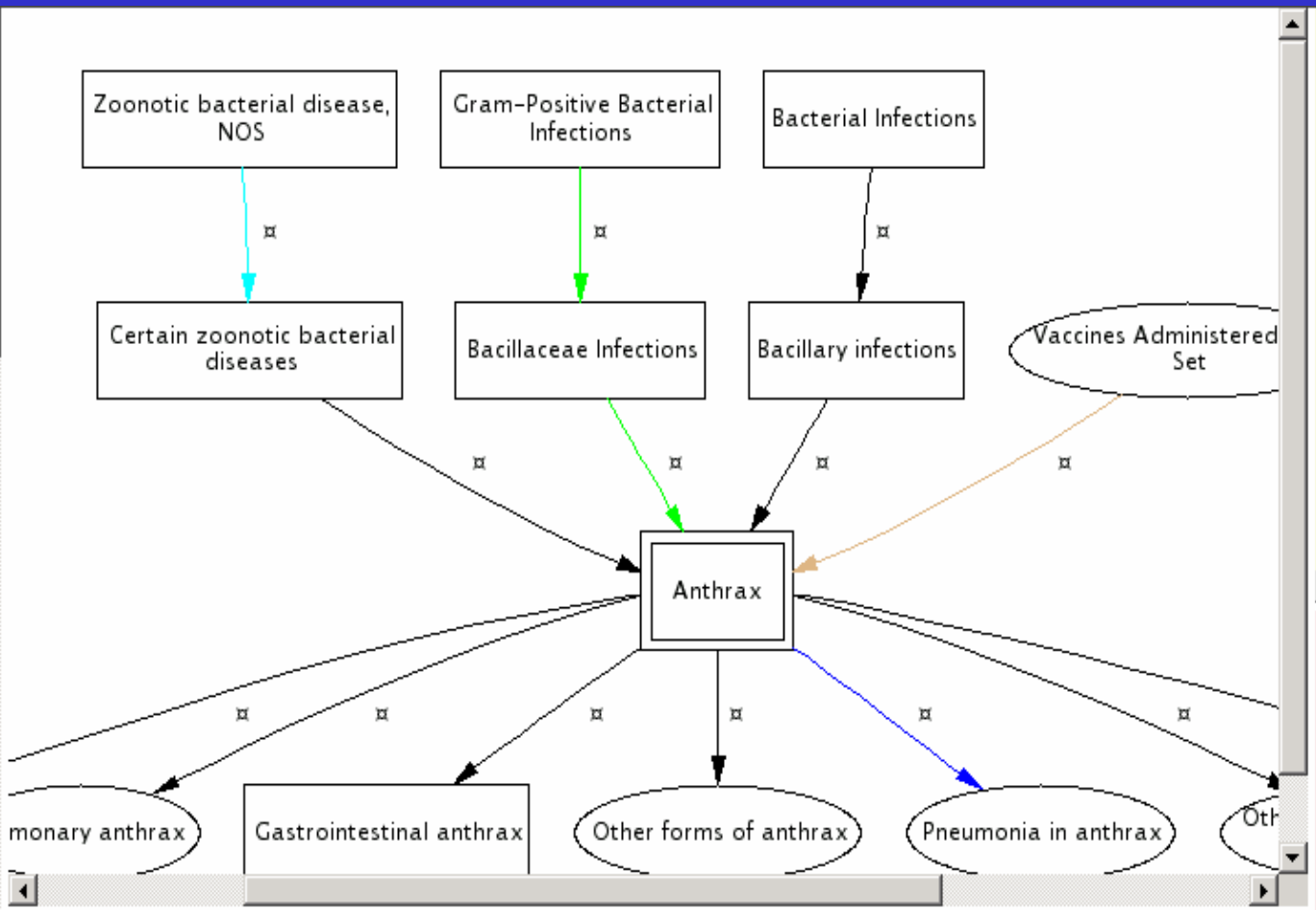
Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

Semantic Navigator

Siblings

Chemicals & Drugs

- Botulinum Antitoxin ¤
- CNVIG ¤
- DT (pediatric) ¤
- DTP-Hib ¤
- DTaP ¤
- DTaP-Hib ¤
- Diphtheria Antitoxin ¤
- Heb B - adolescent/high risk infant ¤
- Hep A - adult ¤
- Hep A -pediatric ¤
- Hep B - adolescent or pediatric ¤
- Hep B - adult ¤
- Hep B - dialysis ¤
- Hep b - other or unspecified ¤
- Hib - PRP-D ¤
- Hib - unspecified ¤
- Hib-HbOC ¤
- Hib-Hep B ¤
- Hib-PRP-OMP ¤
- Hib-PRP-T ¤
- Infectious pustular



Start again | Apply new parameters

Restrict to vocabulary: Show all

Highlight vocabulary: Nothing

UMLS data: UMLS 2003

Similar Concepts

(none)

Allegedly

Closest MeSH Terms

Main Headings

Other Related Concepts

Activities & Behaviors

- bioterrorism/chemical warfare ¤

Chemicals & Drugs

- BACILLUS ANTHRACIS ANTIBODY ¤

Concepts

Activities & Behaviors

- Biological Warfare [46] ¤
- Bioterrorism [167] ¤
- Disaster Planning [14] ¤
- Information Services [3] ¤
- Physician's Role [3] ¤
- Postal Service [18] ¤

Semantic Network

- 135 Semantic Types
- Broad categories (nodes)
- 54 Semantic Relationships
  - Links between categories

- Together
  - Form the structure of the semantic network
  - Broadly categorize the biomedical domain

Schedule

10:00-10:15	Welcome and Introductions
10:15-10:45	Unified Medical Language System (UMLS) Overview
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11:45-12:00	UMLS Metathesaurus
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2:00- 2:15	MetamorphoSys
2:15- 2:30	UMLS Semantic Network
➢ **2:30- 2:45**	**UMLS SPECIALIST Lexicon and Lexical Tools**
2:45- 3:00	UMLS Knowledge Source Server (UMLSKS)
3:00- 3:30	BREAK
3:30- 3:45	UMLS Applications
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

SPECIALIST Lexicon and Lexical Tools

- Syntactic lexicon of biomedical and general English words
- Lexical tools (programs) to process words, terms and strings and generate indexes
- Developed to support natural language processing applications at NLM

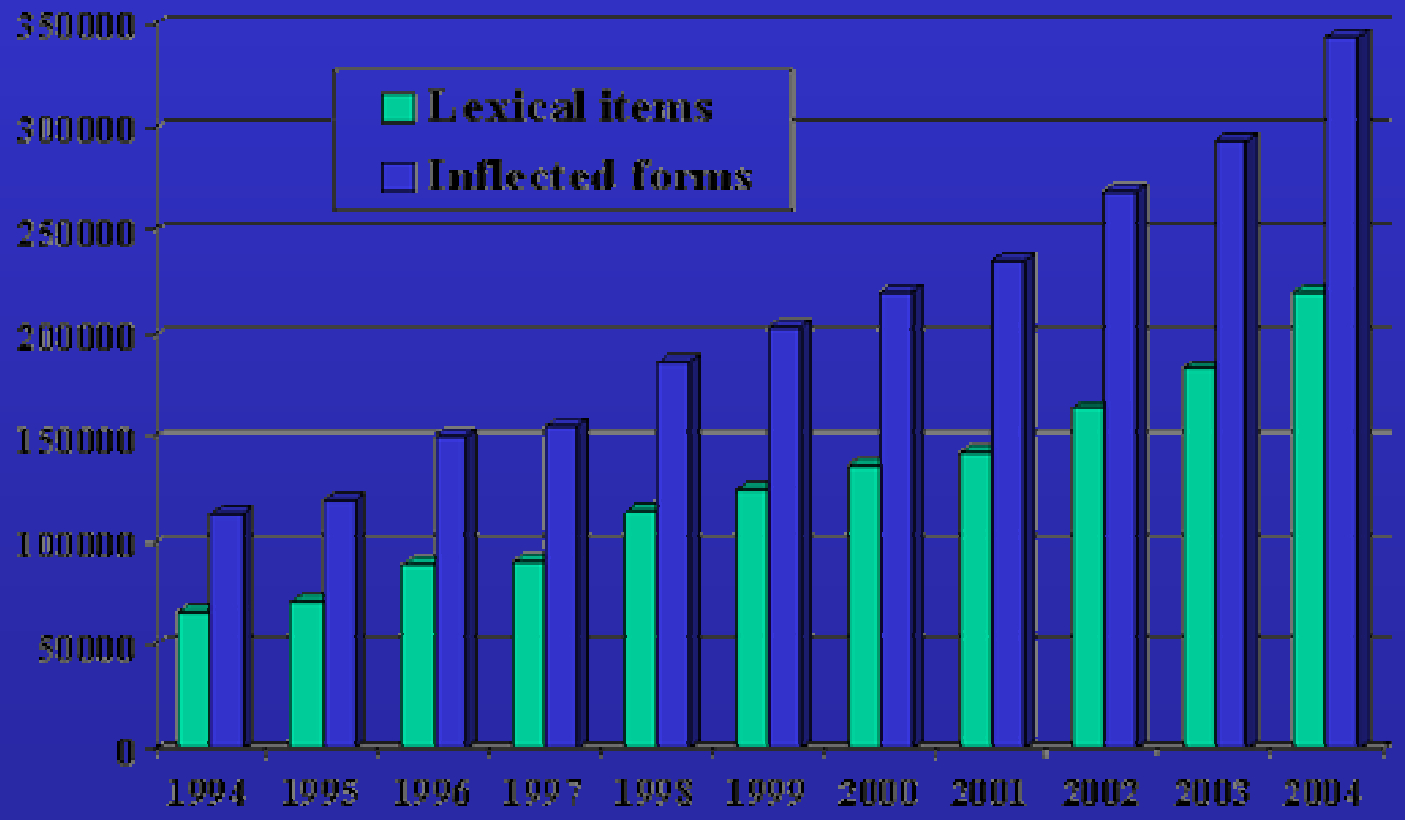
SPECIALIST

- Experimental natural language processing (NLP) system
- Developed for the biomedical domain
- Based on major components of natural language: **lexicon, morphology, syntax, and semantics.**
- Relies on linguistic and domain information in the UMLS knowledge sources

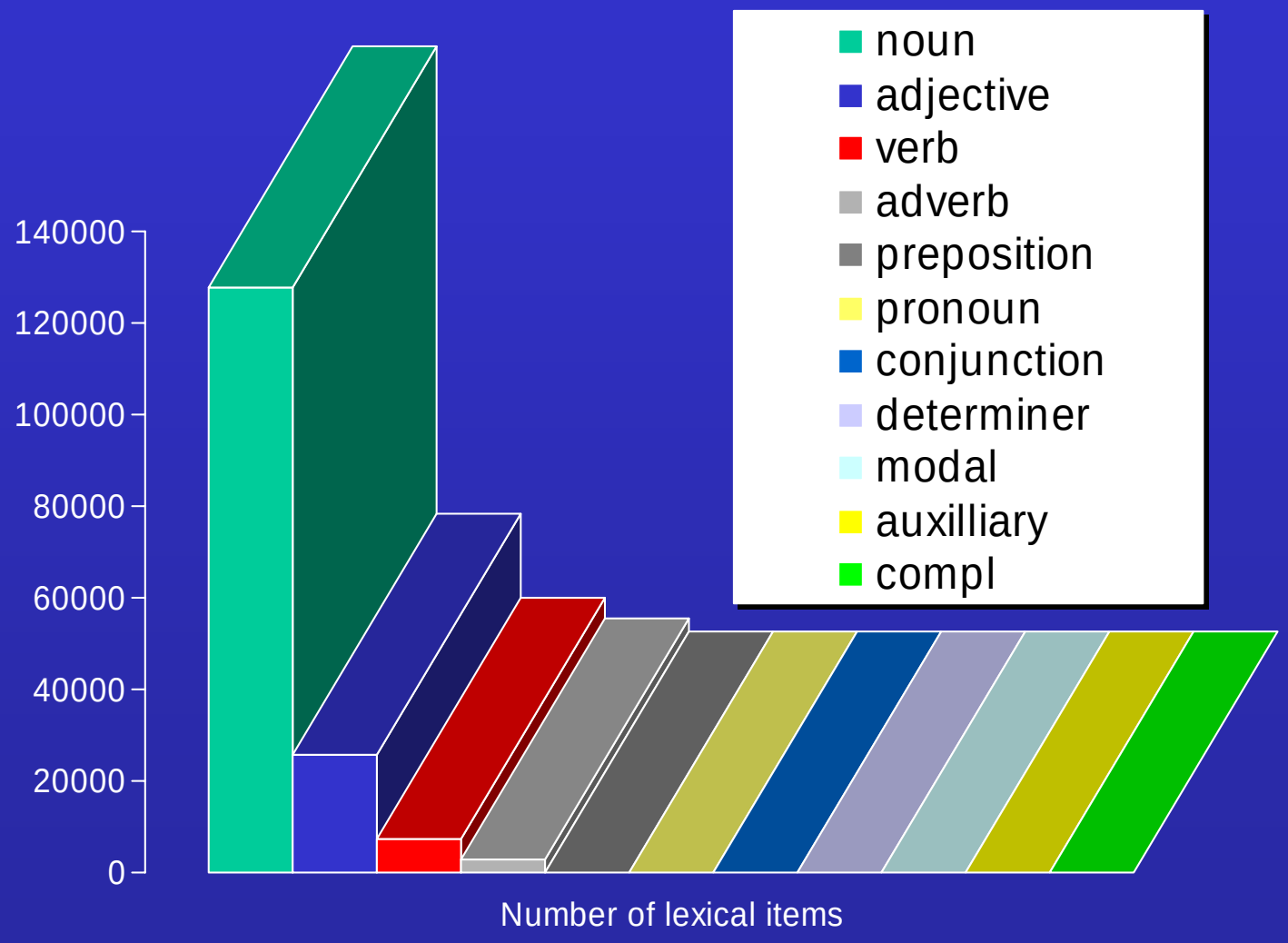
SPECIALIST Lexicon

- English words
  - 20,000 (initial) test set from MEDLINE abstracts
  - 10,000 American Heritage Dictionary frequency list
  - 2,000 Longman's Dictionary of Contemporary English
  - verbs and adjectives identified by heuristics
- Biomedical terms in the Metathesaurus

Lexicon Growth



SPECIALIST Lexicon



⇩

Lexical Entries

- Base Form
- Syntax
  - Noun, verb, adjective complementation
- Morphology
  - Inflection, Derivation
- Orthography
  - Spelling variants

SPECIALIST Lexicon Unit Records

{**base=**Kaposi's sarcoma
spelling_variant=Kaposi sarcoma
entry=E0003576
cat=noun
variants=uncount
variants=reg
variants=glreg}

{**base**=aspirate
entry=E0010803
cat=verb
variants=reg
tran=np
nominalization=aspiration|noun|E0010804}

Noun Variants

{base=Kaposi's sarcoma
spelling_variant=Kaposi sarcoma
entry=E0003576
cat=noun
variants=uncount
variants=reg
variants=glreg}

- Kaposi’s sarcoma
- Kaposi’s sarcomas
- Kaposi’s sarcomata
- Kaposi sarcoma
- Kaposi sarcomas
- Kaposi sarcomata

Orthography

- spelling variations
  - Down’s Syndrome
  - Down’s syndrome
  - Down syndrome
- British-American spellings
  - centre – center
  - foetus – fetus
  - ise -ize

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/lexicon,KSS_lexicon.vm;jsessionid=0mro9 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

SPECIALIST Lexicon

The SPECIALIST Lexicon is an English language lexicon containing many biomedical terms. The lexicon entry for each word or term records syntactic, morphological, and orthographic information.

Lexical entries may be single or multi-word terms.

View Lexical Records for:

U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

Users are responsible for compliance with UMLS copyright restrictions
Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoLexPerl/template/lexicon,LexScreen.vm;j - Microsoft Internet Explorer

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UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Documentation Resources Views/Profiles Logout

Specialist Lexical Record

```
{base=anthrax
entry=E0009383
      cat=noun
      variants=glreg
      variants=uncount
}
```

lexical record in unit record format

View "anthrax" in relational format.

click here to display lexical record in relational format

Users are responsible for compliance with UMLS copyright restrictions
Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

UMLS Knowledge Source Server (UMLSKS)

Relational Records for "anthrax"

LRWD

```
anthraces|E0009383|
anthrax|E0009383|
```

LRAGR

```
E0009383|anthraces|noun|count(thr_plur)|anthrax|anthrax|
E0009383|anthrax|noun|count(thr_sing)|anthrax|anthrax|
E0009383|anthrax|noun|uncount(thr_sing)|anthrax|anthrax|
```

LRTYP

```
E0009383|anthrax|noun|glreg|
E0009383|anthrax|noun|uncount|
```

View the unit record for "anthrax"

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Specialist Lexical Record

```
{base=patient
entry=E0045986
      cat=adj
      variants=inv;periph
      position=attrib(1)
      position=pred
      nominalization=patience|noun|E0045985
}
{base=patient
entry=E0045987
      cat=noun
      variants=reg
}
```

View "patient" in relational format.

Users are responsible for compliance with UMLS copyright restrictions
Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

Relational Records for "patient"

LRMOD

```
E0045986|patient|adj|attrib(1),pred||
```

LRWD

```
patient|E0045986|
patient|E0045987|
patients|E0045987|
```

LRAGR

```
E0045986|patient|adj|positive;periph|patient|patient|
E0045987|patient|noun|count(thr_sing)|patient|patient|
E0045987|patients|noun|count(thr_plur)|patient|patient|
```

LRNOM

```
E0045985|patience|noun|E0045986|patient|adj|
```

LRTYP

```
E0045986|patient|adj|inv;periph|
E0045987|patient|noun|reg|
```

Lexical Tools - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites History

Address http://umlslex.nlm.nih.gov/lvg/2003/index.html

Lexical Tools *Java, 2003*

Home | Release | Documentation | Web Tools | FAQs | Contact Us | About

- **Lexical Tools** *Java* **, 2003 Release:**

08/20/02

Download the 2003 version of Lexical Tools. This release includes:

- bugs fix and features enhancement in Java Api classes
- executable programs of Norm, LuiNorm, Lvg, WordInd, and Lgt (Lexical tool with Graphics Users Interfaces)
- latest support documentation
- improved performance

Download Lexical Tools, 2003 Release!

National Library of Medicine
8600 Rockville Pike, Bethesda, MD 20894, E-Mail: umlslex@nlm.nih.gov,
National Institutes of Health, *Copyright and Privacy Policy*

Lexical Variant Generator Package

- 3 primary programs
  - Normalizer (norm)
  - Word index generator (wordInd)
  - Lexical variant generator (LVG)
- Set of ancillary programs for normalization
- Java

Normalization (norm)

- Abstracts away
  - Case
  - Punctuation
  - word order
  - possessive forms
  - inflectional variation
- Generates strings in Metathesaurus normalized string index (MRXNS)

Normalization

- Hodgkin Disease
- HODGKINS DISEASE
- Hodgkin's Disease
- Disease, Hodgkin's
- HODGKIN'S DISEASE
- Hodgkin's disease
- Hodgkins Disease
- Hodgkin's disease NOS
- Hodgkin's disease, NOS
- Disease, Hodgkins
- Diseases, Hodgkins
- Hodgkins Diseases
- Hodgkins disease
- hodgkin's disease
- Disease;Hodgkins
- Disease, Hodgkin

- Disease hodgkin

Word Index Generator (wordInd)

- Breaks up strings into list of lowercased words
  - Removes spaces and punctuation
- Example: Heart Disease, Acute
  - Heart
  - Disease
  - Acute
- Produces Metathesaurus word indexes (MRXW)

Lexical Variant Generation (LVG)

- Generates lexical variants
- Flow commands can be combined by users to abstract away:
  - Inflections and conjugations
  - Word order in multi-word terms
  - Alphabetic case variants
- Norm is a predefined set of LVG commands

Ancillary Data Bases

- Synonymy (sm.db)
  - fununcular|adj|boil|noun
  - genicular|adj|knee|noun
  - lazar|adj|leprosy|noun
- Neoclassical compounds (nc.db)
  - abdomin(o)|abdomen|root
  - ab|away from|prefix
  - acanth(o)|prickle|root
  - ad|towards|prefix
  - sis|condition|terminal
  - stomy|surgical opening|terminal

⇩

Greco-latin Regular Nouns

singular ends with:	plural ends with:	Examples
–us	–i	focus/foci
–ma	–mata	trauma/traumata
–a	–ae	larva/larvae
–um	–a	ilium/ilia
–on	–a	taxon/taxa
–sis	–ses	analysis/analyses
–is	–ides	cystis/cystides
–men	–mina	foramen/foramina
–ex	–ices	index/indices
–x	–ces	matrix/matrices

String Properties

- Not all Metathesaurus terms suitable for NLP applications
- 65 string properties (number of words, presence of non-alphaumeric characters) identified and tested as predictors
- file = MRNLP

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Updated: May 19, 2

Semantic Network Homepage

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2:15- 2:30	UMLS Semantic Network
2:30- 2:45	UMLS SPECIALIST Lexicon and Lexical Tools

- **2:45- 3:00 UMLS Knowledge Source Server (UMLSKS)**

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3:30- 3:45	UMLS Applications
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4:15- 4:30	What's New with the UMLS
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UMLS Knowledge Source Server (UMLSKS)

- Web based interface to UMLS
- Access from UMLS home page at http://www.nlm.nih.gov/research/umls/
- Access to UMLS data
  - Download subsets
  - Embed access to server in local applications
  - Immediate access to new versions, documentation

Unified Medical Language System

HHS Secretary Thompson **announces** availability of **2004AA Metathesaurus** including **SNOMED CT** ••• 2004AA UMLS files now available to **download** from the UMLSKS ••• **Register Now** for a new UMLS license. Existing and new UMLS users must execute this new license agreement to obtain future editions of the Metathesaurus including SNOMED CT.

About the UMLS Resources

Metathesaurus; Semantic Network; SPECIALIST Lexicon and lexical programs; MetamorphoSys

Accessing UMLS Knowledge Sources

Metathesaurus license; Semantic Network; SPECIALIST Lexicon; DVD

Knowledge Source Server

Download files; searching; additional tools and resources

Documentation

Help

Training; contact us; FAQs; listserv

Metathesaurus Source Vocabularies

- SNOMED CT
- LOINC
- RxNorm
- MeSH
- List of Sources
- Source FAQs

More Resources

- Metathesaurus License
- Tools
- Learning Resources

- Archives

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.

Last updated: 06 May 2004
First published: 01 January 1999
Permanence level: Permanence Not Guaranteed

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U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health, Health & Human Services

Unified Medical Language System

Accessing UMLS® Knowledge Sources

The UMLS Knowledge Sources are available free of charge to U.S. and international users. Access to the UMLS Metathesaurus requires a license agreement.

Metathesaurus

To access or download UMLS Metathesaurus data, go to the Web site below and electronically sign a copy of the license agreement. We will send you an e-mail verification to which you must respond within 72 hours to complete the license process. You will then be sent a license number and instructions for accessing or downloading the Metathesaurus.

- License Agreement for Use of the UMLS Metathesaurus - indicates additional restrictions and licensing, if any, that apply for use of vocabularies obtained through the Metathesaurus.

Semantic Network, SPECIALIST Lexicon, and Lexical Programs

The Semantic Network, SPECIALIST lexicon, and lexical tools are available under "open" terms, which include appropriate acknowledgement for their use.

- Semantic Network (terms and conditions of use)
- SPECIALIST Lexicon and Lexical Programs (terms and conditions of use)

UMLS Knowledge Source Server (UMLSKS)

The UMLSKS is a set of web based interactive tools and a programmer interface to the UMLS Knowledge Sources and related lexical tools. In addition to searching, the UMLSKS is the source for downloading UMLS Knowledge Sources and programs.

- UMLS Knowledge Source Server

DVD

The Metathesaurus, the Semantic Network, and the SPECIALIST Lexicon are available in UTF-8 format on DVD-ROM by request.

- Request DVD - include your new license number in the message
- Using the DVD

UMLS Knowledge Source Server (UMLSKS)

National Library of Medicine

About the UMLSKS

- Log in
- Overview
- Frequently Asked Questions
- UMLS Metathesaurus®
- Semantic Network
- SPECIALIST Lexicon

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

UMLSKS Registered Users

Login ID:

Password:

Login

Forgotten your password?

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- **Existing users** may click on the Forgotten your password link (above) and enter the new license number. You may use your previous Login ID and Password. After a brief grace period, old license numbers will no longer work and all user accounts created ander those numbers will also not work.

- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

- UMLSKS Version 4.2 is planned for late May. 4.2 will provide searching of UMLS release 2004AA, a new look

New UMLSKS Users

The UMLSKS is restricted to registered users. If you are not a registered user and would like to use the resources of the UMLS, please read the UMLS license agreement, obtain a UMLS license number, and fill in the form below to request a UMLSKS user account.

Login ID:

Password:

Confirm Password:

First Name:

Last Name:

Request Account

Email:

UMLS License #:

UMLS Licensee First Name:

UMLS Licensee Last Name:

UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.1 UMLS Releases: 2002AB 2003AA 2002AD 2003AC 2002 2002AC 2003AB 2001

Metathesaurus Semantic Network SPECIALIST Lexicon

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About the UMLSKS

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- Overview
- Frequently Asked Questions
- Edit Views/Profile

Downloads

- UMLS Knowledge Sources
- UMLSKS Developer's API

Documentation

- User's Guide
- Developer's API
- UMLS Documentation Set

Resources

- NLP & Lexical Resources
- Semantic Network Resources
- Metathesaurus Resources

Quick Search

Select UMLS Release: 2003AC

Enter search value:

Metathesaurus Concept Search | Semantic Network Search | SPECIALIST Lexicon Search

Search Tips... | Search Tips... | Search Tips...

What's New

- 2004AA Metathesaurus - including SNOMED CT® - now available to download for those that have signed the new license agreement!

- UMLSKS Version 4.1 released on 04/21/04. Look here for a list of new features and bug fixes.

- UMLSKS Version 4.2 release is planned for late May. 4.2 will provide searching of UMLS release 2004AA, a new look and feel throughout the site, and augmented documentation.

Advanced Searches

Metathesaurus Advanced Search

Facilitates advanced searching of the UMLS Metathesaurus, including restricting vocabularies, performing batch searches, performing XML queries, and using a command-line type interface.

Semantic Network Browser

Allows browsing of the hierarchies for the Semantic Network.

SPECIALIST Lexicon Advanced Search

Facilitates advanced searching of the UMLS SPECIALIST Lexicon, including a command-line type interface.

Unified Medical Language System

Documentation

Current UMLS Release - 2004AA: HTML, 639KB PDF

Current release documentation for the Unified Medical Language System.

- Introduction and Overview
- Metathesaurus
- Semantic Network
- SPECIALIST Lexicon and Lexical Tools
- UMLSKS
- MetamorphoSys
- UMLS DVD

UMLS Knowlege Source Server (UMLSKS) Documentation

Latest set of release documentation for the UMLSKS.

- UMLSKS User's Guide
- Developer's Guide
- Release Notes

Fact Sheets

High-level overviews of the functionality of elements of the UMLS.

- Unified Medical Language System Fact Sheet
- UMLS Metathesaurus

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/meta,Search.vm;jsessionid=0mro9sppy1 - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus Search

Select UMLS Release: 2003AB

Enter a term or a concept unique identifier (CUI):

Perform Concept Search

Basic search screen

Basic searching allows users to search for a concept that contains either a user entered t entifier (CUI). The term name/CUI (e.g. C0001175) is e into the text entry box above.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is av during a concept search and includes synonyms, hierarchical context details, relations, and co-occurring concepts.

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National Institutes of Health (NIH)
Department of Health & Human Services

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Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/meta,KSS_advanced_search.vm;jsessionid= - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus Advanced Search Options:

1 Perform Focused Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier
The advanced searching option allows user to restrict the results to a set of source vocabularies and may specify the method of ma
the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered st
the UMLS contents.

2 Perform Command-Line Query

rther tailoring of a data query wherein the user can request all available data or a subset with a sin
s of Version 2.0, the command-line query will remain available, but will be unsupported as new fe
nto the UMLSKS.

5 Advanced Search Options

3 Perform Command-Line Query using File of Query Terms

ry terms allows a user to upload a file of query terms. The UMLSKS subsequently issues the user-
command for each of the terms (one per line) found in the batch file. **NOTE: As of Version 2.0, the**
t available, but will be unsupported as new features and functions are incorporated into the UMLS

4 Perform XML Query

The XML query facility allows users to specify a query using the eXtensible Markup Language (XML) dialect created for the UML
User's of this searching feature must be familiar with the internal database structures and how table data are related to each other.

5 Request ASCII Relational Records

The data tables used to populate the backend Oracle database can be returned to the user that match a user's input term or concept
unique identifier.

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus Focused Search:

1) Select UMLS Release: 2003AB (1)

2) Enter a term or a concept unique identifier (CUI): (2)

(3) ◉ Exclude suppressible synonyms ○ Include suppressible synonyms

3) Restrict source vocabulary to:

(4) ◉ All Source Vocabularies ○ Restrict to selected sources:

AI/RHEUM
Alcohol and Other Drug Thesaurus
Alternative Billing Concepts
Beth Israel Problem List
COSTAR 1989-1995
COSTART
CPT

4) String Matching Criteria: Normalized string index (5)

☐ Check if you want results ordered by Semantic Groups (6)

(7) Perform Concept Search | Perform Term Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is entered into the text entry box above and the appropriate radio button is selected. The restricted searching option allows the user to restrict the results to a set of source vocabularies. The user may specify the method of matching the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered string to the UMLS contents.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is available for

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/meta,KSS_restricted_search.vm;jsessioni - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

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Metathesaurus Focused Search:

1) Select UMLS Release: 2003AB

2) Enter a term or a concept unique identifier (CUI):

Exclude suppressible synonyms Include suppressible synonyms

3) Restrict source vocabulary to:

All Source Vocabularies Restrict to selected sources:

ICD-10
ICD-10 Am Engl
ICD-10 Austral Mod
ICD-10 Austral Mod Am Engl
ICD-10 German
ICD-9-CM
ICPC 1993

Limit retrieval to concepts in any of the International Classification of Disease sources

4) String Matching Criteria Normalized string index

Check if you want results ordered by Semantic Groups

Perform Concept Search Perform Term Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is en into the text entry box above and the appropriate radio button is selected. The restricted searching option allows the user to restrict the results to a set of source vocabularies. The may specify the method of matching the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered string to the contents.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is availat

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

Display Display All

Concept
- [x] Definition
- [x] Synonyms
- [ ] Other Languages
- [ ] Suppressible Synonyms
- [x] Sources

Context
- [ ] Ancestors
- [ ] Parents
- [ ] Siblings
- [ ] Children

Relations
- [ ] Narrower
- [ ] Broader
- [ ] Similar
- [ ] Other
- [ ] Related and possibly synonymous
- [ ] Source asserted synonymy
- [ ] Allowable Subheadings
- [ ] Associated Expressions

Co-occurring Concepts
- [ ] Co-occurring MeSH
- [ ] Co-occurring MeSH By Semantic Group

Concept: Anthrax

CUI: C0003175

Semantic Type: Disease or Syndrome

Definition: None found.

Synonyms:
Anthrax
Anthrax, unspecified
Anthrax, unspecified
Anthrax, unspecified

Sources:
ICD-10
ICD-10 Austral Mod
ICD-9-CM

Retrieval is restricted to sources specified

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoNextSearch/template/meta,ResultScreen.v - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

Display Display All

Concept
- [ ] Definition
- [x] Synonyms
- [ ] Other Languages
- [ ] Suppressible Synonyms
- [x] Sources

Context
- [ ] Ancestors
- [ ] Parents
- [ ] Siblings
- [ ] Children

Relations
- [ ] Narrower
- [ ] Broader
- [ ] Similar
- [ ] Other
- [ ] Related and possibly synonymous
- [ ] Source asserted synonymy
- [ ] Allowable Subheadings
- [ ] Associated Expressions

Co-occurring Concepts
- [ ] Co-occurring MeSH
- [ ] Co-occurring MeSH By Semantic Group
- [ ] Co-occurring AI/RHEUM

Concept: Anthrax

CUI: C0003175

Semantic Type: Disease or Syndrome

Synonyms:

Anthrax
[X]Anthrax, unspecified
Anthrax, unspecified
Bacillus anthraces infection
Charbon
Infection due to Bacillus anthracis
Milzbrand
Splenic fever

Sources:

COSTAR 1989-1995
CRISP Thesaurus
DXplain
Health Level Seven Vocabulary System
ICD-10
ICD-10 Austral Mod
ICD-9-CM
ICPC2P 1998 Plus Austral Mod
Library of Congress Subject Headings
MedDRA
MeSH

More synonyms

when sources are unrestricted
(all sources searched)

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/meta,KSS_restricted_search.vm;jsessioni - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus Focused Search:

1) Select UMLS Release: 2003AB

2) Enter a term or a concept unique identifier (CUI):

Exclude suppressible synonyms Include suppressible synonyms

3) Restrict source vocabulary to:

All Source Vocabularies Restrict to selected sources:

AI/RHEUM
Alcohol and Other Drug Thesaurus
Alternative Billing Concepts
Beth Israel Problem List
COSTAR 1989-1995
COSTART
CPT

4) String Matching Criteria Normalized string index

Check if you want results ordered by Semantic Groups

Perform Concept Search Perform Term Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is en into the text entry box above and the appropriate radio button is selected. The restricted searching option allows the user to restrict the results to a set of source vocabularies. The may specify the method of matching the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered string to the contents.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is availat

String Matching Criteria

- Normalized string
- Normalized word
- Approximate word
- Word
- Left truncation
- Right truncation
- Exact match

Approximate Matching

- Retrieves rank-ordered list of up to 20 matching or closely related concepts
- Useful when the input term is not found
- Uses lexically based approximate matching routines
  - not strictly string or word-based search
  - take into account synonymy and other lexically-based techniques to retrieve the "best" matches

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSearch/template/meta,ResultScreen.vm;js - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

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Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

Approximate Matching

Anthrax
Anthrax septicemia
Gastrointestinal anthrax
Anthrax exposure
Pneumonia in anthrax
Anthrax, intestinal
Cutaneous anthrax
anthrax toxin
Anthrax Vaccines
Anthrax vaccination
Bacillus anthracis
Pulmonary anthrax
Terrorism involving anthrax
Anthrax spore vaccine
edema factor, bacterial
PA antigen, Bacillus anthracis
Anthracinum, nosode of anthrax
Anthrax vaccine allergy

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSearch/template/meta,ResultScreen.vm;js - Microsoft Internet Explorer

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

Word index

ANTHRAX
Anthrax
Anthrax NOS
Anthrax, NOS
Anthrax, unspecified
Bacillus anthraces infection
CHARBON
Charbon
E-112 ANTHRAX
FEVER, SPLENIC
Infection due to Bacillus anthracis
MILZBRAND
Milzbrand
SPLENIC FEVER
Splenic fever
[X]Anthrax, unspecified
anthrax
Anthrax, cutaneous

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSearch/template/meta,ResultScreen.vm;js - Microsoft Internet Explorer

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

Right truncation

ANTHRAX
Anthrax
Anthrax NOS
Anthrax, NOS
Anthrax, unspecified
anthrax
Anthrax, cutaneous
anthrax skin
Anthrax, intestinal
Anthrax bacillus
anthrax bacterium
anthrax toxin
anthrax toxin I
anthrax toxin II
anthrax toxin III
anthrax toxin receptor
anthrax toxin receptors
anthrax toxin EF

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSearch/template/meta,ResultScreen.vm;js - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

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Metathesaurus Search for: **heart** in UMLS Release **2003AB**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

Heart
Malignant neoplasm of heart
benign neoplasm of heart
HEART PROBLEM

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National Institutes of Health (NIH)
Department of Health & Human Services

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UMLS Knowledge Source Server (UMLSKS)

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Metathesaurus Search for: **heart** in UMLS Release **2003AB**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

Semantic Group: Anatomy

- Heart (C0018787) - [Body Part, Organ, or Organ Component]

Semantic Group: Disorders

- benign neoplasm of heart (C0153957) - [Neoplastic Process]
- HEART PROBLEM (C0795691) - [Disease or Syndrome]
- Malignant neoplasm of heart (C0153500) - [Neoplastic Process]

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National Institutes of Health (NIH)
Department of Health & Human Services

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

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Metathesaurus Focused Search:

1) Select UMLS Release: 2003AB

2) Enter a term or a concept unique identifier (CUI): cold

Exclude suppressible synonyms Include suppressible synonyms

3) Restrict source vocabulary to:

All Source Vocabularies Restrict to selected sources:

AI/RHEUM
Alcohol and Other Drug Thesaurus
Alternative Billing Concepts
Beth Israel Problem List
COSTAR 1989-1995
COSTART
CPT

4) String Matching Criteria Exact match

Check if you want results ordered by Semantic Groups

Perform Concept Search Perform Term Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is en into the text entry box above and the appropriate radio button is selected. The restricted searching option allows the user to restrict the results to a set of source vocabularies. The may specify the method of matching the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered string to the contents.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is availat

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UMLS Knowledge Source Server (UMLSKS)

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Metathesaurus | Semantic Network | SPECIALIST Lexicon

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Metathesaurus Search for: **cold** in UMLS Release **2003AB**

This term has multiple concepts associated with it in the Metathesaurus.
Select the concept from the list to obtain more details about the selected concept.

Semantic Group: **Chemicals & Drugs**

- Cold brand of chlorpheniramine-phenylpropanolamine (C0719425) - [Organic Chemical] [Pharmacologic Substance]

Semantic Group: **Concepts & Ideas**

- Cold Sensation (C0234192) - [Qualitative Concept] [Sign or Symptom]

Semantic Group: **Disorders**

- Chronic Obstructive Airway Disease (C0024117) - [Disease or Syndrome]
- Cold Sensation (C0234192) - [Qualitative Concept] [Sign or Symptom]
- Common Cold (C0009443) - [Disease or Syndrome]

Semantic Group: **Phenomena**

- cold temperature (C0009264) - [Natural Phenomenon or Process]

Semantic Group: **Procedures**

- Cold Therapy (C0010412) - [Therapeutic or Preventive Procedure]

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National Institutes of Health (NIH)
Department of Health & Human Services

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UMLS Knowledge Source Server (UMLSKS)

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Metathesaurus | Semantic Network | SPECIALIST Lexicon

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Metathesaurus Focused Search:

1) Select UMLS Release: 2003AB

2) Enter a term or a concept unique identifier (CUI):

3) Restrict source vocabulary to:

- (•) Exclude suppressible synonyms
- ( ) Include suppressible synonyms

- (•) All Source Vocabularies
- ( ) Restrict to selected sources:

AI/RHEUM
Alcohol and Other Drug Thesaurus
Alternative Billing Concepts
Beth Israel Problem List
COSTAR 1989-1995
COSTART
CPT

4) String Matching Criteria: Normalized string index

[ ] Check if you want results ordered by Semantic Groups

Perform Concept Search | Perform Term Search

Focused searching allows users to search for a concept that contains either a user entered term name or a concept unique identifier (CUI). The term name/CUI (e.g. C0001175) is en
into the text entry box above and the appropriate radio button is selected. The restricted searching option allows the user to restrict the results to a set of source vocabularies. The
may specify the method of matching the entered term name. When searching for a term name, the user may also specify the criteria to be used in matching the entered string to the
contents.

Pressing the *Perform Concept Search* button will update the display to show concepts found with the entered term name or with the requested CUI. Concept information is availat

Internet

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoNextSearch/template/meta,Term.vm/cui/C0 - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

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Metathesaurus Search for: **Anthrax** in UMLS Release **2003AB**

Display

Terms

- [x] Term Variants
- [ ] MeSH Entry Terms
- [ ] MeSH Attributes

Term Name: Anthrax
CUI: C0003175
Term UI: L0003175

Source: COSTAR 1989-1995
TTY: PT
ID: NOCODE

Source: Health Level Seven Vocabulary System
TTY: PT
ID: 0292.24

Source: ICD-10 Austral Mod
TTY: HT
ID: A22

Source: ICD-10
TTY: HT
ID: A22

Source: ICD-9-CM
TTY: HT
ID: 022

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/meta,KSS_rawrecord_search.vm;jsessionid - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Metathesaurus UMLS ASCII Relational Records Request:

Select UMLS Release: 2003AB

1) Enter a term or concept unique identifier (CUI): anthrax

2) Select the UMLS table whose raw records are to be returned. mrcon

Perform Concept Search

Specify:

UMLS release

Term or Concept UI

UMLS Table (file)

Raw record return allows users to search for a concept using either a user entered concept unique identifier (CUI) or a term name which is entered into the text entry box below of the UMLS tables listed in the drop down menu may be selected for return.

Pressing the *Perform Concept Search* button will update the display to show the raw records from the selected table based on the concept information found.

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UMLS Knowledge Source Server (UMLSKS)

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Metathesaurus Semantic Network SPECIALIST Lexicon

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

```
CUI|LAT|TS|LUI|STT|SUI|STR|LRL|
C0003175|ENG|P|L0003175|PF|S0014378|Anthrax|0|
C0003175|ENG|P|L0003175|VC|S0353005|ANTHRAX|0|
C0003175|ENG|P|L0003175|VC|S1942221|anthrax|0|
C0003175|ENG|P|L0003175|VO|S0470490|Anthrax, NOS|3|
C0003175|ENG|P|L0003175|VO|S0590882|Anthrax NOS|3|
C0003175|ENG|S|L0290889|PF|S0475880|Charbon|3|
C0003175|ENG|S|L0290889|VC|S0360717|CHARBON|0|
C0003175|ENG|S|L0301515|PF|S0511718|Splenic fever|3|
C0003175|ENG|S|L0301515|VC|S0402506|SPLENIC FEVER|0|
C0003175|ENG|S|L0301515|VCW|S0371590|FEVER, SPLENIC|0|
C0003175|ENG|S|L0312198|PF|S0497331|Milzbrand|3|
C0003175|ENG|S|L0312198|VC|S0385944|MILZBRAND|0|
C0003175|ENG|S|L0371877|PF|S0491926|Infection due to Bacillus anthracis|3|
C0003175|ENG|S|L0505866|PF|S0590888|Anthrax, unspecified|0|
C0003175|ENG|S|L0505867|PF|S0760412|[X]Anthrax, unspecified|3|
C0003175|ENG|S|L1369696|PF|S1622321|Bacillus anthraces infection|3|
C0003175|ENG|s|L1200415|PF|S1439199|E-112 ANTHRAX|3|
```

CUI = Concept Identifier
LAT = Language of Term
TS = Term Status
LUI = Term UI
STT = String Type
SUI = String UI
STR = String
LRL = Source restriction level

U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

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Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSearch/template/meta,Raw.vm;jsessionid= - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

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Metathesaurus Search for: **anthrax** in UMLS Release **2003AB**

```
CUI|SUI|SAB|SCD|CXN|CXL|RNK|CXS|CUI2|HCD|REL|XC|
C0003175|S0014378|ICD10|A22|1|ANC|1|International Statistical Classification of Diseases and Related Health Problem
C0003175|S0014378|ICD10|A22|1|ANC|2|Certain infectious and parasitic diseases|C0694449|A00-B99.9|||
C0003175|S0014378|ICD10|A22|1|ANC|3|Certain zoonotic bacterial diseases|C0348110|A20-A28.9|||
C0003175|S0014378|ICD10|A22|1|CCP||Anthrax|C0003175|A22||+|
C0003175|S0014378|ICD10|A22|1|CHD||Anthrax septicaemia|C0152946|A22.7|||
C0003175|S0014378|ICD10|A22|1|CHD||Anthrax, unspecified|C0003175|A22.9|||
C0003175|S0014378|ICD10|A22|1|CHD||Cutaneous anthrax|C0003177|A22.0|||
C0003175|S0014378|ICD10|A22|1|CHD||Gastrointestinal anthrax|C0152945|A22.2|||
C0003175|S0014378|ICD10|A22|1|CHD||Other forms of anthrax|C0348113|A22.8|||
C0003175|S0014378|ICD10|A22|1|CHD||Pulmonary anthrax|C0339947|A22.1|||
C0003175|S0014378|ICD10AM|A22|1|ANC|1|ICD10-AM|C1140246||||
C0003175|S0014378|ICD10AM|A22|1|ANC|2|Certain infectious and parasitic diseases|C0694449|A00-B99.9|||
C0003175|S0014378|ICD10AM|A22|1|ANC|3|Certain zoonotic bacterial diseases|C0348110|A2
C0003175|S0014378|ICD10AM|A22|1|CCP||Anthrax|C0003175|A22||+|
C0003175|S0014378|ICD10AM|A22|1|CHD||Anthrax septicaemia|C0152946|A22.7|||
C0003175|S0014378|ICD10AM|A22|1|CHD||Anthrax, unspecified|C0003175|A22.9|||
C0003175|S0014378|ICD10AM|A22|1|CHD||Cutaneous anthrax|C0003177|A22.0|||
C0003175|S0014378|ICD10AM|A22|1|CHD||Gastrointestinal anthrax|C0152945|A22.2|||
C0003175|S0014378|ICD10AM|A22|1|CHD||Other forms of anthrax|C0348113|A22.8|||
C0003175|S0014378|ICD10AM|A22|1|CHD||Pulmonary anthrax|C0339947|A22.1|||
C0003175|S0014378|ICD10AM|A22|1|SIB||Brucellosis|C0006309|A23||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Erysipeloid|C0014734|A26||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Glanders and melioidosis|C0494041|A24||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Leptospirosis|C0023364|A27||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Other zoonotic bacterial diseases, not elsewhere classified|C0494044|A28||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Plague|C0032064|A20||+|
C0003175|S0014378|ICD10AM|A22|1|SIB||Rat-bite fevers|C0034686|A25||+|
```

MRCXT = Concept contexts file

Row = occurrence of a concept in any UMLS source hierarchy

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/semanticNW,KSS_semanticNW.vm;jsessionid - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

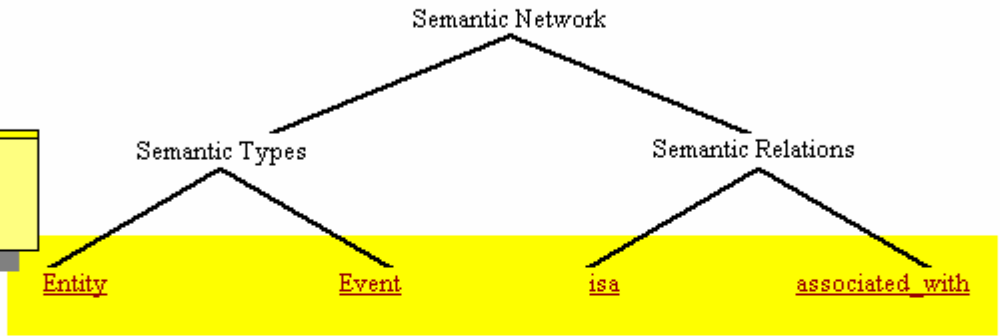
Home Search Advanced Search Documentation Resources Views/Profiles Logout

Semantic Network

The Semantic Network is a knowledge source developed as part of the UMLS. The Semantic Network, through its semantic types, provides a categorization of all conc in the UMLS Metathesau between the semantic typ structure for the Network and represent important relationships in the biomedical domain. All information about specific concepts is found in the Metathesaurus; the Network provides information about the basic semantic types that are assigned to these concepts, and it defines the relationships th between the semantic typ

Display

Search



Enter a Semantic Type or Semantic Relation:

Submit

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/semanticNW,SNScreen.vm;jsessionid=nr40u - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus | Semantic Network | SPECIALIST Lexicon

Home Search Advanced Search Documentation Resources Views/Profiles Logout

Click here to view the Java SWING based version of the Semantic Network browser.

This is best viewed with Netscape 6.x and above or IE 5.x and above.

Semantic Network

Semantic Types: Entity, Event **Semantic Relations:** isa, associated_with

Please Enter a Semantic Type or Relation in the box below or select from the list below and click on the Find button:

Semantic Types:

Acquired Abnormality

Semantic Relations:

adjacent_to

Find

Enter search term

Select from pulldown menu

Select from pulldown menu

Show Relations Between Types

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Comments/Suggestions? Email umlsks@nlm.nih.gov with your input

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSemNetServletSearch/template/semanticNW - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

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Click here to view the Java SWING based version of the Semantic Network browser.

This is best viewed with Netscape 6.x and above or IE 5.x and above.

Semantic Network

Semantic Types: Entity, Event

Semantic Relations: isa, associated_with

Please Enter a Semantic Type or Relation in the box below or select from the list below and click on the Find button:

Semantic Types:

Acquired Abnormality

Semantic Relations:

adjacent_to

Find

Click to display all concepts assigned selected Semantic Type, OR Semantic Relations associated with selected Semantic Type OR raw Semantic Type records

Entity
- Physical Object
  - Organism
    - Plant
      - Alga
    - Fungus
    - Virus
    - Rickettsia or Chlamydia
    - Bacterium
    - Animal
      - Invertebrate
      - Vertebrate
        - Amphibian

Scroll down to see entered search term in Semantic Type hierarchy

Meta Concepts Relations Raw Records

Semantic Type: Acquired Abnormality

TUI: T020

Definition: An abnormal structure, or one abnormal in size or location, found in or der previously normal structure. Acquired abno distinguished from diseases even though the pathological functioning (e.g., "hernias incar

Semantic Type Unit Record

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoSemValidCheck/template/semanticNW,relsB - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

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Select an element from each list below and click the *Submit Query* button.

Type1:	Relation(s):	Type 2:
Acquired Abnormality	adjacent_to	Acquired Abnormality
Activity	affects	Activity
Age Group	analyzes	Age Group
Alga	assesses_effect_of	Alga
Amino Acid Sequence	associated_with	Amino Acid Sequence

Submit Query Reset

Type1: Acquired Abnormality
Rel: associated_with
Type2:

Acquired Abnormality associated_with Clinical Attribute
Acquired Abnormality associated_with Daily or Recreational Activity
Acquired Abnormality associated_with Diagnostic Procedure
Acquired Abnormality associated_with Educational Activity
Acquired Abnormality associated_with Finding
Acquired Abnormality associated_with Geographic Area
Acquired Abnormality associated_with Governmental or Regulatory Activity
Acquired Abnormality associated_with Health Care Activity
Acquired Abnormality associated_with Individual Behavior
Acquired Abnormality associated_with Laboratory Procedure
Acquired Abnormality associated_with Laboratory or Test Result
Acquired Abnormality associated_with Molecular Biology Research Technique

http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/template/lexicon,KSS_lexicon.vm;jsessionid=0mro9 - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

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SPECIALIST Lexicon

The SPECIALIST Lexicon is an English language lexicon containing many biomedical terms. The lexicon entry for each word or term records syntactic, morphological, and orthographic information.

Lexical entries may be single or multi-word terms.

View Lexical Records for:

U.S. National Library of Medicine (NLM), 8600 Rockville Pike, Bethesda, MD 20894
National Institutes of Health (NIH)
Department of Health & Human Services

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http://umlsks5.nlm.nih.gov/kss/servlet/Turbine/action/DoLexPerl/template/lexicon,LexScreen.vm;j - Microsoft Internet Explorer

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UMLS Knowledge Source Server (UMLSKS)

UMLSKS Version 4.0 UMLS Releases: 2000 2001 2002 2002AB 2002AC 2002AD 2003AA 2003AB

Metathesaurus Semantic Network SPECIALIST Lexicon

Documentation Resources Views/Profiles Logout

Specialist Lexical Record

```
{base=anthrax
entry=E0009383
      cat=noun
      variants=glreg
      variants=uncount
}
```

lexical record in unit record format

View "anthrax" in relational format.

click here to display lexical record in relational format

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Comments/Suggestions? Email umlsks@nlm.nih.gov with your input.

UMLS Knowledge Source Server (UMLSKS)

Relational Records for "anthrax"

LRWD

```
anthraces|E0009383|
anthrax|E0009383|
```

LRAGR

```
E0009383|anthraces|noun|count(thr_plur)|anthrax|anthrax|
E0009383|anthrax|noun|count(thr_sing)|anthrax|anthrax|
E0009383|anthrax|noun|uncount(thr_sing)|anthrax|anthrax|
```

LRTYP

```
E0009383|anthrax|noun|glreg|
E0009383|anthrax|noun|uncount|
```

View the unit record for "anthrax"

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UMLS Knowledge Source Server (UMLSKS)

National Library of Medicine

About the UMLSKS

- Log in
- Overview
- Frequently Asked Questions
- UMLS Metathesaurus®
- Semantic Network
- SPECIALIST Lexicon

Documentation

- User's Guide
  1. Introduction
  2. Installing the UMLSKS
  3. Using the Web Interface
  4. Using the Command-line Interface
  5. Building UMLSKS Software Applications
  6. Using the XML Query Facility
  7. Using the UMLSKS Socket Server
- Developer's API
- UMLS Documentation Set

User's Guide

About This Guide

This guide describes the installation, usage, and programmatic interface for the UMLS Knowledge Source Server (UMLSKS) Version 3

Audience

The audience for this guide is the following set of people:

- UMLSKS System Administrators who will be installing the UMLSKS,
- Users of the UMLSKS web and command-line interfaces, and
- Developers of UMLSKS applications using the UMLSKS API.

Release Notes

The UMLSKS API Version 3.0 permits access to Metathesaurus data contained within the UMLS. Future versions of the API will allow the Semantic Network and Lexicon functions.

Version 3.0 of the UMLSKS provides a Java interface to the UMLSKS, as well as a TCP socket-based implementation of the UMLSKS f Java developers. A detailed list of features, bug fixes, and known problems can be found here.

How to Use This Guide

This manual contains the following chapters:

- Chapter 1 - Introduction describes the basic features and architecture of the UMLSKS.
- Chapter 2 - Installing the UMLSKS provides administrators instructions on installing and tailoring a UMLSKS installation.
- Chapter 3 - Using the Web Interface provides users with detailed instructions on interfacing with the UMLSKS using a standar browser (Netscape, Internet Explorer, etc.).
- Chapter 4 - Using the Command-line Interface provides users with detailed instructions on interfacing with the UMLSKS using browser and a set of text commands.
- Chapter 5 - Building UMLSKS Software Applications describes the functions available to developers wanting to interface to th UMLSKS through another Java program.

How This API Document Is Organized

This API (Application Programming Interface) document has pages corresponding to the items in the navigation bar, described as follows.

Overview

The Overview page is the front page of this API document and provides a list of all packages with a summary for each. This page can also contain an overall description of the set of packages.

Package

Each package has a page that contains a list of its classes and interfaces, with a summary for each. This page can contain four categories:

- Interfaces (italic)
- Classes
- Exceptions
- Errors

Class/Interface

Each class, interface, nested class and nested interface has its own separate page. Each of these pages has three sections consisting of a class/interface description, summary tables, and detailed member descriptions:

- Class inheritance diagram
- Direct Subclasses
- All Known Subinterfaces

UMLS Distribution

- Annual updates since 1990
  -- quarterly updates began with Spring 2002
- Available for download from the Knowledge Source Server or through use of the Applications Program Interface (API).
- Available on DVD by request
- Knowledge Source Server (UMLSKS):
  http://umlsks.nlm.nih.gov

Getting Started

- Explore UMLS homepage
- Submit license agreement
- Access UMLS knowledge sources via the NLM website (UMLSKS)

MLA '04
Seize the Power

UMLS
Unified
Medical
Language
System

Schedule

10:00 – 10:15	Welcome and Introductions
10:15 – 10:45	Unified Medical Language System (UMLS) Overview
10:45 – 11:45	Controlled Vocabularies and the UMLS
11:45 - 12:00	UMLS Metathesaurus
12:00- 1:00	LUNCH
1:00- 1:30	UMLS Metathesaurus (continued)
2:00 – 2:15	MetamorphoSys
2:15 – 2:30	UMLS Semantic Network
2:30 – 2:45	UMLS SPECIALIST Lexicon
2:45 – 3:00	UMLS Knowledge Source Server (UMLSKS)
3:15- 3:30	BREAK
3:30- 3:45	**UMLS Applications**
3:45- 4:15	Standards, HIPAA, and the Future
4:15- 4:30	What's New with the UMLS
4:30- 5:00	Questions, Evaluation, Certificates

UMLS Applications - Microsoft Internet Explorer

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Address http://www.nlm.nih.gov/research/umls/umlsapps.html Go

United States
National Library of Medicine
National Institutes of Health

Search NLM Web Site Go

NLM Home | Contact NLM | Site Map | FAQs

Unified Medical Language System

UMLS Home

Home > Biomedical Research & Informatics > UMLS

UMLS® Applications

NLM® Applications

- PubMed® offers free access to MEDLINE® (with links to participating on-line journals), and other related databases.
- The NLM Gateway allows users to search in multiple retrieval systems at the U.S. National Library of Medicine (NLM). The current Gateway searches MEDLINE and OLDMEDINE (pre-1966) using PubMed, LOCATORplus, AIDS Meetings, HSRProj, and MEDLINEplus®.
- Medical terms can be difficult to remember, and often there are many names for a single concept (e.g., cancer of the colon, colonic neoplasm, colon cancer, etc.). Thus, ClinicalTrials.gov uses the UMLS to automatically add words related to those that searchers enter.
- NLM's Indexing Initiative uses the UMLS as a major component in investigating automated indexing methods.

Other Applications

Many other institutions and individuals are applying the UMLS Knowledge Sources and lexical programs. Here are a few examples.

- National Guidelines Clearinghouse, an AHRQ initiative, is a public resource for evidence-based clinical practice guidelines.
- National Quality Measures Clearinghouse, sponsored by AHRQ, is a public repository for evidence-based quality measures and measure sets.
- NCI's Thesaurus and Enterprise Vocabulary Services includes reference terminology and related vocabulary resources to help researchers, clinicians, and administrators identify types of cancer, treatments, and other cancer related topics.

Return to UMLS Home

Done | Internet

UMLS–MeSH Mapping File

- Every Metathesaurus synonym to MeSH term
- Edited to exclude “bad” maps and restricted vocabulary (using MetamorphoSys)
- File format is synonym|MeSH preferred name

Mapping Problems

- Multiple meanings
  - COLD - Chronic Obstructive Lung Disease
  - Cold - cold environment
  - Cold - common cold
  - ER – Endoplasmic Reticulum
  - ER – Emergency Room
- Additional mappings needed
  - Cancers - neoplasms

Skip navigation

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Drug Information

About your prescription and over-the-counter medicines

Medical Encyclopedia

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Dictionary

Spellings and definitions of medical words

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Health News from the past 30 days

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Find doctors, dentists and hospitals

Other Resources

Local libraries, health organizations, international sites and more

Current Health News

- Change in Kidney Donor Criteria Helps with Shortage
- Test Predicts Heart Damage from Chemotherapy
- Diabetes May Raise Risk of Alzheimer's Disease
- More news

Featured Site

May is National High Blood Pressure Education Month. Learn more from the National Heart, Lung, and Blood Institute.

In the Spotlight

Take precautions against skin cancer. Learn more:

- Go to Sun Exposure
- Go to Skin Cancer
- Interactive Tutorial on Skin Cancer

Interactive Tutorials

Over 165 slideshows with sound and pictures

ClinicalTrials.gov

Studies for new drugs and treatments

NIHSeniorHealth

Health information for older adults

- What's new on MedlinePlus?

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Single Citation Matcher
Batch Citation Matcher
Clinical Queries
LinkOut
Cubby

Related Resources
Order Documents
NLM Gateway
TOXNET
Consumer Health
Clinical Alerts
ClinicalTrials.gov
PubMed Central

Query Translation:

```
("myocardial infarction"[MeSH Terms] OR heart
attack[Text Word])
```

Search URL

Result:

93213

Translations:

heart attack[All Fields]	("myocardial infarction"[MeSH Terms] OR heart attack[Text Word])

Database:

PubMed

User query:

heart attack

Gateway

your entrance to the knowledge resources of the National Library of Medicine

pizza

Search | Clear Search

Find Terms | Limits | Results | History | Locker | Preferences

New Search

Overview

What's New

Help

F A Q

Other NLM Resources

Ordering Info.

Clinical Alerts

ClinicalTrials.gov

Details of Search

Journal Citations

PubMed	
Translated Search	**Items**
(pizza [All Fields])	354
OLDMEDLINE	
Translated Search	**Items**
(("pizza" <IN> KEYWORD_LIST OR "pizza" <IN> PERSONAL_NAME_AS_SUBJECT OR "pizza" <IN> TITLE))	0

http://gateway.nlm.nih.gov

Concepts Related to

pizza

We were unable to find a direct match for your concept. You may search for another concept or select one from the list below.

pizza

Find Terms

- Glutafin gluten free/wheat free pizza base
- Ultra gluten free pizza base
- Schar GF pizza base
- Gluten-free pizza base
- Schar GF pizza base 250g
- Ultra PKU pizza base
- Savory dishes
- Gluten-free other foods
- Other phenylketonuria food

ClinicalTrials.gov

A service of the National Institutes of Health
Developed by the National Library of Medicine

Linking patients to medical research

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Search Clinical Trials

Enter words or phrases, separated by commas:

Search Tips

Search by Specific Information

Focused Search - search by disease, location, treatment, sponsor...

Browse

Browse by Condition - studies listed by disease or condition
Browse by Sponsor - studies listed by funding organization

http://clinicaltrials.gov/

Resource Information

Understanding Clinical Trials - information explaining and describing clinical trials
MEDLINE*plus* - authoritative consumer health information
NIH Health Information - research supported by the National Institutes of Health
healthfinder® - consumer health and human services information

ClinicalTrials.gov - Does a person need to know scientific terminology to search the database?

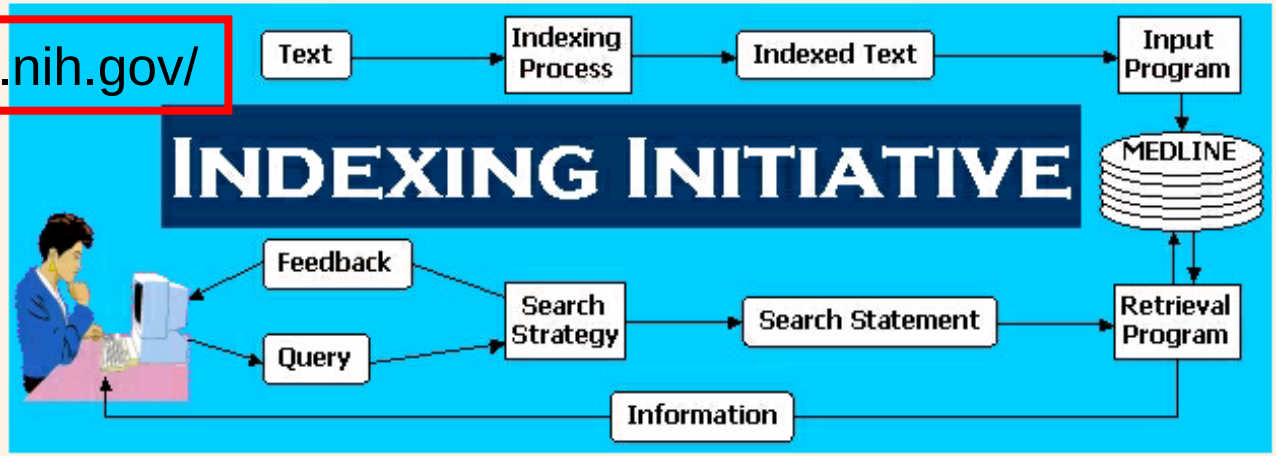
Question: Does a person need to know scientific terminology to search the database?

Answer:

- No. The National Library of Medicine (NLM) has developed methods to assist users in searching the database. Each search will give the results for the disease or condition entered, as well as results from related terminology.

- There is also an automatic spell check that may help users who are unsure of the spelling of a medical term.

http://ii.nlm.nih.gov/



DEMO

Indexing Demo (1/27/99)

Background Info

Project Information

Team Members

Focus Areas

Medical Text Indexer (MTI)

Semi-Automatic Indexing

Automatic Indexing Experiments

MARS & MTI Test Bed Results

Word Sense Disambiguation (WSD)

Objective:

The objective of NLM's Indexing Initiative (II) is to investigate methods whereby automated indexing methods partially or completely substitute for current indexing practices. The project will be considered a success if methods can be designed and implemented that result in retrieval performance that is equal to or better than the retrieval performance of systems based principally on humanly assigned index terms.

Background:

For more than 150 years, the National Library of Medicine has provided access to biomedical journal literature through the analytical efforts of human indexers. Since 1966, access has been provided in the form of electronically searchable document surrogates consisting of bibliographic citations, descriptors assigned by indexers from the MeSH controlled vocabulary and, since 1974, author abstracts of many, but not all, items. The objective of the Indexing Initiative project work is to investigate methods whereby automated indexing methods partially or completely substitute for current indexing practices. The project will be considered a success if methods can be designed and implemented that result in retrieval performance that is equal to or better than retrieval of citations based on humanly assigned index terms.

A project of this scope necessarily involves the efforts of many people. Project team members are from several NLM divisions, including the LHNCBC, LO, and NCBI.

The project will assume the availability of free text in the form of titles and abstracts but will also consider the increasing availability of the full text of journal articles in electronic form. The project will investigate concept-based indexing methods that go well beyond automatic word-based indexing (such as the inverted word index already part of MEDLINE). As insights are gained throughout the project, current operational processes or systems may be iteratively modified and improved in keeping with those insights.

The following papers and poster presentation provide a good overiew of the Indexing Initiative:

The NLM Indexing Initiative, AMIA 2001 (139kb)

Published Literature

- NLM bibliography 1986-1996 (various media)
  http://www.nlm.nih.gov/pubs/cbm/umlscbm.html
- NLM bibliography 1997 – present
  Use search feature from UMLS Web page
  (conducts a PubMed search)
  http://www.nlm.nih.gov/research/umls/learning_resources.html
- Reflects wide range of research and some commercial applications

Research Applications

- Annual reports
- Listserver messages
- Literature
  - Significant part of medical informatics research
  - NLM major funding source for medical informatics research

UMLS APPLICATIONS: FROM THE LISTSERV

… we (group of 4 students) had developed a powerful search engine which searches for pathology images on the web. The search engine would not have been very accurate and efficient without the use of UMLS. Essentially, what we did was get the synonyms of any word typed by the user using the UMLS and search on all the synonyms.

All the Synonyms in UMLS have the same CUI number...what we did was using a program extracted the CUI and the synonyms from the original UMLS file and stored it in MySQL database and used the database for searching. This made the searches very fast. As we had used Java, JSP and My SQL which are free, we incurred no cost for the project.

I would be happy to provide further details if interested...

Commercial Products

- Distributed Terminology System (Apelon)
  - Enhances UMLS Metathesaurus with additional content
  - Delivers content in relational databases http://www.apelon.com/products/products.htm

Apelon Browser

DTS Browser - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Apelon DTS Browser Tree Advanced Collapse Detail Search Results Help About Logout Quick Search SARS

Apelon DTS Tree View

Select a namespace:

CPT
[Current Procedural Terminology]

HL7
[Health Level Seven Vocabulary]

ICD-9-CM
[International Classification of Diseases: 9th revision, Clinical Modification]

LOINC
[Logical Observations Identifiers, Names, and Codes]

MeSH
[Medical Subject Headings]

RXNORM
[NLM Drug Names - Normalized Forms]

SNOMED CT
[Systematized Nomenclature of Medicine - Clinical Terms]

UMLS Metathesaurus
[NLM Concept-based Unified Thesaurus - All Terms in NHII-Approved Terminologies]

VANDF-RT
[VA National Drug File - Reference Terms]

Cancel

Severe acute respiratory syndrome (disorder)

Code: D2-00121 Id: 398447004 Namespace: SNOMED CT

Preferred Term

Severe acute respiratory syndrome

Synonyms

SARS

Properties

UMLS CUI	C1175175
UMLS Definition	[MSH] A viral disorder characterized by high FEVER, dry COUGH, shortness of breath (DYSPNEA) or breathing difficulties, and atypical PNEUMONIA. A virus in the genus CORONAVIRUS is the suspected agent.
UMLS Semantic Type	Disease or Syndrome
Code in Source	398447004
NHS Clinical Terms Version 3	XaIzV
SNOMED Legacy-style Code	D2-00121
SNOMED_ICD9_MAP	786.09

Superconcepts

Coronavirus infection (disorder)

Viral respiratory infection (disorder)

Roles

National Guideline Clearinghouse
www.guideline.gov

AHRQ

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20 Results | Search
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Resources

- Annotated Bibliographies
- Bioterrorism
- Discussion List
- EPC Reports
- FAQ
- Glossary
- Guideline Archive
- Guideline Index
- Guideline Resources
- New Features
- NLM Links
- Patient Resources
- PDA/Palm
- SARS
- Search Form
- Web Developer Tools

Browse

- Disease / Condition
- Treatment / Intervention
- Organization

Compare

- View My Collection
- Guideline Syntheses

Welcome!

You are connected to the National Guideline Clearinghouse™ (NGC™), a public resource for evidence-based clinical practice guidelines. NGC is an initiative of the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services. NGC was originally created by AHRQ in partnership with the American Medical Association and the American Association of Health Plans (now America's Health Insurance Plans [AHIP]). Click on About NGC to learn more about us.

Start your search by typing keywords into the search box on this page, or use the NGC Browse or Detailed Search features.

NGC News

New/updated CCHMC, ICSI, and SAGES guidelines. Go to "What's New This Week".

The National Institute for Clinical Excellence (NICE) has recently submitted guidelines on topics such as COPD, multiple sclerosis, pressure ulcer prevention, and infection control. Look for these in NGC in the future.

New PDF view! All NGC summaries are now available in Portable Document Format (PDF). For more information please see the PDF Download page.

Look for practical, ready-to-use tools for measuring and improving the quality of Americans' health care in the Agency for Healthcare Research and Quality's (AHRQ's) QualityTools Web site.

Look for Quality Measures in AHRQ's National Quality Measures Clearinghouse (NQMC).

Subscribe to the NGC Weekly E-mail Update Service.

Schedule

8:30- 8:45 Welcome and Introductions
8:45- 9:15 UMLS Overview
9:15-10:15 Controlled Vocabularies and the UMLS
10:15-10:30 BREAK
10:30-11:00 Controlled Vocabularies (continued)
11:00-12:00 UMLS Metathesaurus; Exercises
12:00- 1:00 LUNCH
1:00- 1:30 Metathesaurus: Customizing with MetamorphoSys; Exercises
1:30- 2:00 UMLS Semantic Network
2:00- 2:30 UMLS SPECIALIST Lexicon and Lexical Tools
2:30- 3:15 UMLS Knowledge Source Server (UMLSKS); Exercises
3:15- 3:30 BREAK
3:30- 3:45 UMLS Applications

3:45- 4:15 Standards, HIPAA, and the Future

4:15- 4:30 What's New with the UMLS
4:30- 5:00 Questions, Evaluation, Certificates

Why Standardized Health Data Are Desirable

- More efficient to process
- Unambiguous to different health care professionals, institutions, patients
- Able to trigger automated reminders/alerts
- Easier to link to knowledge-based information
- Comparable and therefore useful in quality assessment and research

Barriers to Standardized Health Data (especially clinical data)

- Lack of interest among system buyers
- Competing candidates and no “perfect” candidate, especially in vocabulary area
- Presumed increased costs of data creation
- No hard data on value of vocabulary standardization, e.g., for which data elements is there a real payoff?

Types of Health Data

- Clinical data
  - e.g., lab test results, problems, diagnoses, history and physical
- Administrative health data
  - e.g., health insurance claims, billing, ordering
- Public health data
  - e.g., disease surveillance, immunization rates, environmental monitoring, health services research

Categories of Standards

- Transactions – sets of data elements transmitted for a particular purpose
  - e.g., lab test order, health insurance claim, interlibrary loan request
- Valid values – range of permitted values for a particular data element
  - e.g., ICD code for discharge diagnosis, provider ID, MeSH descriptor for article indexed in MEDLINE
- Descriptions of entities – the complete set of data elements that describes something of interest
  - e.g., catalog record for a book, patient record?
- Information models – formal description of the various entities important in an information system and the possible relationships among them

Health Insurance Portability and Accountability Act of 1996: Title II, Subtitle F: Administrative Simplification

- Establish Uniform National Standards for Electronic Health Transactions
- Propose Privacy Legislation to Congress
- Advise Congress on Any Necessary Federal Action to Promote Complete Electronic Medical Records

HIPAA: Administrative Simplification

- Focused on transactions and valid values for administrative health data, but has impact on clinical and public health data
- Stems from previous health care reform debate and even earlier emphasis on cutting administrative overhead

Purpose of Administrative Simplification

- Improve the efficiency and effectiveness of the health care system, by standardizing the electronic transmission of certain administrative and financial transactions

- Protect the security and privacy of health information

Overview of Provisions

- Secretary of HHS must adopt standards for electronic health care transactions, code sets, unique health identifiers, security, and privacy
- All health plans, clearinghouses, and those providers who choose to conduct these transactions electronically are **required** to implement these standards
- Supersedes most contrary provisions of state laws
- Expands the scope and membership of the National Committee on Vital and Health Statistics
- Prescribes civil and criminal penalties for failure to use standards and for wrongful disclosure of confidential information

Translates to Various Rules and Regulations

- Transactions and Code Sets
- Privacy
- Security
- Claims Attachments
- Electronic Signature
- Transaction for First Report of Injury
- Unique Identifiers:
  - Employers
  - Health Care Provider
  - Health Plan
  - Individuals

What Health Care Transactions Use the Standards?

- Health care claims or equivalent encounter information
- Health care payment and remittance advice
- Coordination of benefits
- Health care claim status
- Enrollment and dis-enrollment in a health plan
- Eligibility for a health plan
- Health plan premium payments
- Referral certification and authorization
- First report of injury
- Health claims attachments
- Other transactions that the Secretary may prescribe by regulation

Standards for Transactions

- ANSI ASC X12N standards, Version 4010

  Covers everything except retail pharmacy transactions.

- NCPDP

  For retail pharmacy transactions.

Standards for Medical Data Code Sets

- ICD-9-CM, Volumes 1 and 2 for:
  - Diseases
  - Injuries
  - Impairments
  - Other health problems and their manifestations
  - Causes of injury, disease, impairment, or other health problems.
- ICD-9-CM, Volume 3 for:
  - Prevention
  - Diagnosis
  - Treatment
  - Management
- National Drug Codes for retail pharmacists:
  - Drugs
  - Biologics
- ADA's Codes on Dental Procedures and Nomenclature:
  - dental services
- HCPCS and CPT-4 for:
  - Physician services
  - Physical and occupational therapy services
  - Radiologic procedures
  - Clinical laboratory tests
  - Other medical diagnostic procedures
  - Hearing and vision services
  - Transportation services including ambulance
- HCPCS for:
  - Medical supplies
  - Orthotic and prosthetic devices
  - Durable medical equipment

How Were Standards Chosen?

- HHS identified guiding principles
  - Published in regulation
- Inventory of standards developed by ANSI Health Informatics Standards Board
- Teams evaluated available standards against guiding principles
- Advice sought from:
  - National Committee on Vital and Health Statistics (NCVHS)
  - Designated Standard Maintenance Organizations (DSMO)
  - Public meetings

Modifications and Revisions

- Regulations written for a point in time, everyone expects they will change
- Legislation incorporates provisions for change
- One modification and one revision have been finalized for transaction and code set standard
- Modification to Privacy regulation also finalized

Possible HIPAA Code Set Changes Currently Under Discussion

- Replacement of ICD-9-CM vol. 1 and 2 with ICD-10-CM
- Replacement of ICD-9-CM vol. 3 with ICD-10-PCS
- Adoption of a single procedural classification code (ICD-10-PCS or CPT or ?)

VHS Home Page - Microsoft Internet Explorer

Edit View Favorites Tools He » Links » Address http://www.ncvhs.hhs.gov/ Go

The National Committee on Vital and Health Statistics

The Public Advisory Body to the Secretary of Health and Human Services

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NCVHS Website Search Page

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Introduction

NCVHS Charter
Updated 1/31/02

The NCVHS serves as the statutory [42 U.S.C. 242k(k)] public advisory body to the Secretary of Health and Human Services in the area of health data and statistics. In that capacity, the Committee provides advice and assistance to the Department and serves as a forum for interaction with interested private sector groups on a variety of key health data issues.

The Committee is composed of 18 individuals from the private sector who have distinguished themselves in the fields of health statistics, electronic interchange of health care information, privacy and security of electronic information, population-based public health, purchasing or

Public Meetings ...

All meetings of the NCVHS are open to the public. The complete calendar of meetings links to agendas where they are available. Each agenda, in turn, will be linked to the transcripts or minutes of the meeting when they have been completed, and any testimony, statements, or related submissions made available electronically.

tp://www.dhhs.gov/ Internet

Moving to ***Clinical*** Vocabulary Standards

- Bulk of vocabulary “creation” is done
- Need a workable strategy for:
  - choosing the base set of vocabularies
  - supporting maintenance of that set
  - promoting use - BEFORE mandating use
  - building a feed-back loop between users and vocabulary producers

Guidance for Choosing Standards

- NCVHS, IOM, etc. independently set forth similar guidance on choosing vocabularies for clinical standards. They called for:
  - "HIPAA-like" process for *choosing* U.S. clinical standards (messages, vocabulary, etc.)
  - Federal guidance, not regulation
  - Federal agencies as early adopters
  - Federal support of clinical vocabularies

Choices to Date

- CDC set forth standards for reporting public health data in the National Electronic Disease Surveillance System (NEDSS) in February, 2002. [http://www.cdc.gov/cic/functions-specs/]

- NCVHS issued first PMRI recommendations for clinical transaction standards in February, 2002. [http://ncvhs.hhs.gov/reptrecs.htm]; second set of recommendations made November 2003 for core clinical data: SNOMED, Lab Loinc, and Rederal drug information sources (including RxNorm).

- Cross agency eGov project on Consolidated Health Informatics (CHI) was convened in 2002. [http://www.whitehouse.gov/omb/egov/gtob/health_informatics.htm]

- FDA has made several international agreements to use and support MedDRA and the Global Medical Device Nomenclature (GMDN) [http://www.fda.gov/]

Supporting Maintenance

- 1999 – began Federal contract support for LOINC
- 2003– License for US-wide arrangement for SNOMED CT (in 2004Aa UMLS release)
- 2001 – began NLM/DVA/FDA development of RxNorm

Consolidated Health Informatics

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Government to Business

G2B Portfolio > Consolidated Health Informatics

Consolidated Health Informatics

Program Managers :	Karen Trudel, Program Manager CAPT Cynthia Wark, Deputy Program Manager
Description :	Adopts a portfolio of existing health information interoperability standards (health vocabulary and messaging) enabling all agencies in the federal health enterprise to "speak the same language" based on common enterprise-wide business and information technology architectures.
Progress to Date :	• Government-wide health IT governance council established • Portfolio of 24 target domains for data and messaging standards identified • Four messaging and one health vocabulary standard adopted government-wide; recommendations under review for remaining 19 clinical domains • Partnered with 23 federal agencies/departments who use health data for agreements to build adopted standards into their health IT architecture • Regular meetings with industry to prevent major incompatibilities in partnership with the National Committee on Vital and Health Statistics
Next Steps :	• Review recommendations and adopt standards • Assess government-wide investments in standards' licenses and support • Define change management role for the initiative • Provide requirements for government-wide usage for health IT architecture standards

Consolidated Health Informatics

- Adopting health information interoperability standards (health vocabulary and messaging) to enable Federal health enterprise agencies to “speak the same language”
- March 21, 2003 standards (HL7, NDCCP, IEEE1073, DICOM, LOINC)
- May 6, 2004 electronic exchange standards announced

HL7 for demographic information

SNOMED CT for laboratory result contents, non-lab interventions and procedures, anatomy, diagnosis and problems, and nursing

LOINC for lab test orders

HIPAA transactions and code sets for billing or administrative functions

Federal terminologies related to medications (FDA, NLM’s RxNorm, Veteran Affairs NDF-RT)

Human Gene Nomenclature (HUGN) for genes

EPA’s Substance Registry System for non-medicinal chemicals

Supporting Maintenance

- 1999 – began Federal contract support for LOINC
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- 2001 – began NLM/DVA/FDA development of RxNorm

Promoting Use

- LOINC has been adopted by VA
- Coming “soon”:
  - Ripple effect from National Electronic Disease Surveillance System (NEDSS) requirements
  - NCVHS, CHI, NHII, and others collaborating on selection of clinical vocabularies. Additional independent recommendations expected from all groups.
- SNOMED CT in 2004AA UMLS release

The UMLS Metathesaurus, HIPAA, and Other Standards

- Uniform distribution mechanism for standard code sets and patient record vocabularies
- Vehicle for building and maintaining maps between standard codes and patient record vocabularies
- One mechanism for distributing information about which vocabularies are valid for segments of the industry

Resources for HIPAA Information:

- HHS Administrative Simplification Site:
  http://aspe.hhs.gov/admnsimp/

- Centers for Medicare and Medicaid Services (formerly HCFA), HIPAA Sites:
  http://www.cms.gov/hipaa/ and
  http://www.hcfa.gov/hipaa/hipaahm.htm

- HHS, Office of Civil Rights, Privacy Site:
  http://www.hhs.gov/ocr/hipaa/

- National Committee on Vital and Health Statistics Main Site:
  http://www.ncvhs.hhs.gov

More Resources

- HHS News Releases

http://www.os/dhhs.gov/news/press/2004pres/20040506.html
http://www.hhs.gov/news/press/2004pres/20040427a.html

- e-Gov Government to Business – Consolidated Health Informatics

http://www.whitehouse.gov/omb/egov/gtob/health_informatics.htm

- National Health Information Infrastructure

http://aspe.hhs.gov/sp/nhii/

- Markle Foundation – Connecting for Health

http:www.connectingforhealth.org/

- Three Imperatives for Digital Health Records (The Wall Street Journal Online – Best Practices by Laura Landro, 2/23/04)

http://webreprints.djreprints.com/934930492249.html

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4:30- 5:00	**Questions, Evaluation**

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What's New for 2004?

SNOMED CT released first quarter (2004AA)

New Rich Release Format with additional files

New MetamorphoSys

DVD distribution for those who request

Documentation re-written

Semantic Network and SPECIALIST Lexicon & lexical tools – open source resources

SNOMED Clinical Terms© to be added to UMLS Metathesaurus

- July 1, 2003 Secretary Tommy G. Thompson, Secretary DHHS announcement
- SNOMED CT© formed from SNOMED RT and UK's Clinical Terms Version 3 (Read Codes)
- 344,000 concepts – comprehensive clinical terminology
- Free to U.S. users
- Secretary Thompson announced availability in 2004AA release on May 6, 2004

Rich Release Format (RRF) Atomic Format now in UMLS Metathesaurus

White paper available at:
http://www.nlm.nih.gov/research/umls/white_paper.html

Rich Release Format (RRF) - 2004AA release

Original Release Format (ORF) available as an output from MetamorphoSys

UMLS documentation describes

Rich Release Format (Continued)

- Additional fields for many files
- MRCON, MRSO, MRATX will be deprecated
- SNOMED CT© in the release
- Changes detailed at: http://umlsinfo.nlm.nih.gov/Objects/
- Makes it easier to customize the Metathesaurus for particular applications AND to maintain source terminologies in the Metathesaurus

- This course is:

  "UMLS Basics"

- Instructors:

  Carolyn Tilley and Jan Willis

- Please complete the course evaluation forms (front and back if possible)

- You will be given a course completion certificate

We enjoyed being with you today!