UMLS METATHESAURUS
EDITING MANUAL

Part A. Introduction

I. UMLS = Unified Medical Language System
II. UMLS METATHESAURUS
III. THE CONCEPT
IV. SYNONOMY
V. THE SOURCES CONTAINED IN THE METATHESAURUS
VI. CONTEXTS
VII. RELATIONSHIPS IN THE METATHESAURUS
VIII. THE SEMANTIC NETWORK

Part B. Editing the Metathesaurus

IX. CONCEPT REPORTS
X. ADDITIONAL ATTRIBUTES
XI. CHEMICAL EDITING RULES
XII. INTRODUCTION TO MEOW
XIII. EDITING PRACTICE
XIV. MULTIPLE MEANINGS
XV. DEMOTIONS
XVI. EDITING FROM A WORKLIST
XVII. EDITING FROM THE INTERFACE
XVIII. REPORTING PROBLEMS

XIX. ADDITIONAL RESOURCES FOR EDITORS (INCLUDING SOURCE EDITING TIPS

XX. GLOSSARY
XXI. APPENDIX A – SEMANTIC TYPE EXAMPLES

I. UMLS = UNIFIED MEDICAL LANGUAGE SYSTEM

Purpose:

To assist in the advance of systems that aid health care professionals and researchers in retrieval and integration of biomedical information obtained from a number of knowledge sources, and to help users in linking dissimilar information systems. These sources of knowledge might include:

- Computer-based patient records
- Factual databanks
- Bibliographic databases
- Full-text sources
- Expert systems

Build knowledge sources that can be used by intelligent programs to overcome:

- Disparities in language used by different users and in different information sources.
- Disparities in granularity and perspective.
- Problems in mapping and aggregating data from different sources.

Time Line:

1986	UMLS Project commenced
1987	Metathesaurus proposed
1990	1st Edition of Metathesaurus released
1999, January	Tenth Edition released
2001, January	Twelfth Edition released
2004, January	SNOMED CT incorporated into the UMLS as well as switch to the Rich Release Format

Acquiring:

There is no monetary charge for the UMLS. They are made available to both U.S. and international users. Requestors must sign and submit a License Agreement for the use of UMLS products.

Applications:

The UMLS has been used in many application including:

- Patient data creation
- Natural language processing
- Information retrieval
- Thesaurus construction
- Concept/thesaurus/ontology structure and maintenance

- Natural language processing, automated indexing, information retrieval

Distribution:

The UMLS has produced annual updates since 1990. The complete UMLS is available on DVD or by http/ftp. The Knowledge Source Server (umlsks.nlm.nih.gov) provides the downloadable files and also offers an interface to the data.

Knowledge Sources:

The UMLS is composed of three Knowledge Sources that are used as intellectual middleware for system developers:

- Metathesaurus: concepts and terms combined from many different biomedical vocabularies and classifications.

- SPECIALIST Lexicon: programs that contain syntactic, morphological, and orthographic information for biomedical and common words in the English language. The Lexicon and associated programs are used to generate the indexes to the Metathesaurus and also have wide applicability in natural language processing applications in the biomedical domain.

- Semantic Network: sensible relationships among the semantic types or categories to which all the Metathesaurus concepts are assigned.

The majority of work done by contract editors involves the Metathesaurus.

Additional Resources to Obtain Information regarding UMLS:

UMLS info page from the National Library of Medicine
http://www.nlm.nih.gov/research/umls/

UMLS Project: Article by Stuart Nelson, Tammy Powell, and Betsy Humphreys (Please See Link)

UMLS Who's Who:

National Library of Medicine (NLM):

Dr. Donald Lindberg:	Director of NLM
Betsy Humphreys:	Associate Director for Library Operations
Dr. Stuart Nelson:	Head, Medical Subject Headings Section
Tammy Powell:	Technical Information Specialist; Project Officer: UMLS Editing
Dr. William Hole:	UMLS Metathesaurus Research
Dr. Alexa McCray:	Director, Lister Hill Center UMLS Semantic Network
Apelon:	Software and Database

Management Systems Designers, Inc. (MSD):
Metathesaurus Research support
UMLS Editing

II. UMLS METATHESAURUS

General Information:

The Metathesaurus contains information regarding biomedical concepts and terms from many controlled vocabularies and classifications used in patient records, administrative health data, bibliographic, and full text databases. The Metathesaurus maintains the names, meanings, hierarchical contexts, attributes, and inter-term relationships present in its source vocabularies. General defining principles of the UMLS Metathesaurus include:

- Concept Organization
- Common format for distribution of vocabularies
- Linking vocabularies
- Representing multiple hierarchies
- Regular updates (at least annual)
- Representation of the meaning in each source vocabulary
- Explicit tagging of each source vocabulary's information

Scope:

The range of the Metathesaurus is determined by the combined scope of the Metathesaurus source vocabularies. It is not a NLM maintained encyclopedia of biomedicine.

Organization:

- Organized by meaning or concept.
- Concepts are the core Metathesaurus units. Concepts contain all the names with the same meaning located in the component vocabularies.
- Alternate names, i.e. synonyms and lexical variants, are linked together in a concept.
- Relationships among different concepts are represented. These relationships are derived in two ways:
    - Source vocabularies
    - Created when editing the Metathesaurus

Production:

The Metathesaurus is produced by automated processing of machine-readable versions of the source vocabularies. To accomplish this, each source vocabulary must be put into a common representation. This process is called inversion. After the source is in this common data structure, lexical matching is performed, suggesting possible synonyms and concepts to which the added concept might be related. These suggestions are then reviewed and edited by human subject matter experts.

Content:

The 2004AA Metathesaurus contains:

- 3,800,000 Terms
- Over 1 million Concepts
- 100 different Source Vocabularies

Examples of Source Vocabularies include the following:

AOD#	Alcohol and Other Drug Thesaurus
ICD#	International Statistical Classification of Disease and Related Health
MDR#	Medical Dictionary for Regulatory Activities Terminology (MedDRA)
MSH#	Medical Subject Headings Bethesda, (MD) National Library of Medicine.
RXNORM#	RxNorm work done by the National Library of Medicine.
SNOMEDCT#	SNOMED Clinical Terms. College of American Pathologists.
UWDA#	Rosse, Cornelius. University of Washington Digital Anatomist.

The Symbol # in the above examples indicates a year or an edition.

Principle editing issue: source vs. truth:

- The Metathesaurus is not a NLM maintained encyclopedia of biomedicine.
- The Metathesaurus represents the meaning of the source vocabularies.
- The main editing principle is to respect the source.
- The Metathesaurus only takes a position about meanings when sources disagree about synonymy.

III. THE CONCEPT

- The Concept is the basic unit that makes up the Metathesaurus.
- Each Concept has 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.
- Identification tools for the Concepts contained in the Metathesaurus include the following:
    - Concept Unique Identifier (CUI)
      Each concept in the Metathesaurus has a unique concept identifier (CUI), which itself has no intrinsic meaning. This unique identifier is represented in the Metathesaurus by the letter C followed by 7 digits (i.e. C0010028). This identifier remains the same across versions of the Metathesaurus, irrespective of the term designated as the preferred name of the concept. This facilitates file maintenance and management, as well as tracking the meanings assigned to given term changes over time. It is "the name that never changes."
    - Concept ID
      This is an internal tracking number composed entirely of numbers of varying length. It is only present in the MID (the editing database) and is not released in the Release Files. All concepts in the MID have a Concept ID and they have no intrinsic value. This differs from CUIs in that not all concepts in the MID currently have CUIs.
- Concepts are created in a number of ways including:
    - During the process of a new source being inserted into the Metathesaurus.
    - During the process of editing, when terms (atoms) are split from one concept to form a new concept.
- While concepts are present in both the MID and the Release Files, there is a difference between the two. The editing environment is called the MID. It is where editors work and not all the information in the MID is released to the public at the end of the year. The Release Files are what go out to UMLS users and contain only information marked as releasable in the MID.

Concepts Contain the Following:

- Atoms (alternative names with the same meaning)
- Contexts
- Attributes
- Semantic Types
- Relationships

Alternative Names for the Same Meaning:

Names from different sources can appear different in appearance but have the same meaning.

Example: Red Apple; Apples, Red; red apples

These names have different appearances but all mean the same thing. The differences are simply lexical variations of a basic string. Lexical variation takes into account capitalization, inversion of words, plurality and punctuation. Lexical variant often end up in the same concept. There are some exceptions.

Anatomy of a Concept:

Atoms:

- "Terms" or "strings" forming a meaning from the source vocabularies are referred to as atoms in a concept.
    - Examples: Flintstones Complete with Calcium [SNMI98/PT/C-C1968]
      Dogs [MSH2001/MH/D012367]
      Acquired Immunodeficiency Syndrome [AOD99/DE/1560]

    - Lexical variants are names that are identical after a series of well-defined manipulations that can be done computationally, e.g. making all characters lower case, putting all words in a defined order, and changing all plural forms to a singular.

    - Terms are names with lexical variants or minor variations that all break down to the same lexical term. A term is the group of all strings that are lexical variants of each other.
        - Eye, Eyes, eye = 1 term

    - Strings are unique concept names that take into account variations in upper-lower case, plurality and punctuation.
        - Eye, Eyes, eye = 3 strings

- All the atoms within a concept should have the same meaning.
- Every atom has its own numerical atom_id (tracking number), and atom name.
- The Concept name is derived from one of the atoms in the concept.

Contexts and Attributes:

- Contexts come from the sources that provide them. There is no overall Metathesaurus context. For example, MeSH (Medical Subject Headings) is in a tree structure that is represented as context in the Metathesaurus.

- Attributes provide more information regarding the terms from a source.
    - Includes information like additional codes, mappings to other sources, and references.

Semantic Types:

- Semantic Types (STY's) come from the Semantic Network and categorize concepts.

- There are both chemical and non-chemical STYs.

Relationships:

- Relationships link concepts to each other

- Relationships are derived from sources themselves or are created by editors during editing.

Simplified Concept Example:

CN#484767 *Concept ID*
Chocolate *Concept Name*
C0008299 *CUI*
STY Food *Semantic Type*
Atoms:

Chocolate – MeSH2001
Chocolate – SNMI98
Chocolate – AOD99

Contexts

SNOMED INTERNATIONAL
Chemicals, Drugs and Biological Products
Food
Chocolate

Relationships

Chocolate Syrup is Narrower than Chocolate
Chocolate ingestion is Related to Chocolate

IV. SYNONYMY

As previously discussed, a concept links various names of the same meaning. Synonymous strings within a source and among sources should all appear in the same concept. Identifying all synonymous strings and making sure they appear in the same concept is one of the most important jobs of an editor.

Creation of Synonymy:

- Synonymy is first determined by the data given from a source
    - Strings that a source says is synonymous are algorithmically placed in the same concept.
- Algorithms and merge functions are then run to find synonymy among sources.
- Editors then review to make sure asserted synonymy is correct.
    - Generally, unless specifically told to do so, editors do not go searching for synonymy on their own.
    - If patterns of missed synonymy are seen, editors need to let the project manager know.

In determining synonymy editors should consider the following:

- First, follow the "Prime Directive" of respecting synonymy asserted by a source.
    - Example: Synonymy can be asserted between Preferred Terms and Entry Terms in a source
        - Example: MeSH asserts Vocal Cord Paralysis (Preferred Term) is synonymous with Vocal Cord Palsy (Entry Term)
- Lexical variation: strings that vary only in singular/plural form, direct/indirect form, punctuation, etc. are considered synonymous.
    - Examples:
        - Singular/plural: feet & foot; apple & apples
        - Direct/indirect: Neoplasms, Breast & Breast Neoplasms
        - Punctuation: Insulin – like receptor & insulin like receptor
- However, keep in mind, all lexical variants are not synonymous.
    - Examples:
        - Home Nursing and Nursing Homes
        - Mushroom Poison and Poison Mushrooms

- Synonymy between unlike strings.
    - Examples:
        - Kidney Failure and Renal Failure
        - PCR and Polymerase Chain Reaction
- In order to determine synonymy use clues from the source such as contexts, definitions and scope notes.
    - Example: MedDRA does not contain chemicals so no names from that source should be in a chemical concept.
    - Context gives clues to meaning:

- MSH2001/MH3/D003313
Medical Subject Headings
Technology, Food and Beverages (MeSH Category)
Food and Beverages
Food
Cereals
Barley
Buckwheat
<Corn>
Millet
Oats
Rice
Rye
Wheat

- The editors own biomedical knowledge can be used if synonymy is not asserted within a source or between sources.
    - Example: Olfactory nerve and Cranial nerve I are the same nerve with different names.
- Synonymous strings should always end up in the same concept.

Deciding whether two strings are synonyms can be a difficult task. There are no foolproof rules to apply. As an editor gains experience, they will learn more about the exceptions. Please see below for general directions in determining synonymy.

General Principles/Rules For Determining Synonymy:

- If two strings have different meanings within a single vocabulary source, they generally cannot be linked as synonyms in the Metathesaurus.
    - Respect the source unless there are disagreements with other sources.
- If a slight distinction in meaning between two strings is biomedically significant, the two strings should not be labeled as synonyms in the Metathesaurus, even if they are used synonymously in some environments.
- Making very fine and biomedically insignificant distinctions in meaning between strings in the Metathesaurus actually works against the goals of the UMLS.
- In general, concepts that name a group of items (e.g. Fruits) should be merged with concepts that also refer to the same group of items but also include specific examples (e.g. Fruits, including apples). Adding an example does not change the meaning of the concept.
- The letters NOS are an abbreviation for 'Not Otherwise Specified', meaning 'unspecified' or 'unqualified'. Concepts with Not Otherwise Specified, NOS, Unspecified, Site Not Specified, etc., are considered synonymous to the same term without the addition of NOS.
    - **For example**:
      Disease X , Disease X Site unspecified, Disease X unspecified, and Disease X NOS are viewed in the Metathesaurus as synonyms and should be merged together.

  An Editor will find that most "site unspecified" names come from vocabularies like the ICD which require coding "at the leaf", so they repeat the parent's meaning by adding "NOS" or "site unspecified".
    - **Example** of atoms from a concept that follows this rule is below:
      Benign Neoplasm
      Benign Neoplasm, NOS ('NOS' refers to 'not otherwise specified')
      Benign neoplasm of unspecified site (or Benign neoplasm, site unspecified)
      Benign neoplasm, unspecified.

- NEC (Not Elsewhere Classified): NEC terms from different sources do not mean the same thing. Do not merge NEC concepts from different sources even if they are identical strings.

    - **Example**: Heart Disease NEC from ICD2001 would not be merged with Heart Disease NEC from RCD99

- There are special rules re: Editing Carcinoma, Cancer and Malignant Neoplasms. The Metathesaurus has developed special rules on how to edit carcinoma, cancer, and malignant neoplasm terms.

    - Malignant Neoplasms are NOT equal to Carcinomas (the two should NEVER be merged)
    - Carcinomas are NRW than Malignant Neoplasms
    - Cancer may be = Carcinoma
    - Cancer may be = Malignant Neoplasms

- Chemical editing has its own set of special rules for synonymy. See the Chemical Editing section.

Synonymous Concepts that Did not Automatically Merge:

When editors find two concepts that have matching strings that were not automatically merged after an insertion, they should inform management (especially if an editor sees a pattern of non-merges occurring). There may be a valid explanation as to why the two were not merged, but this may also represent a software error that merits further evaluation.

Examples of Synonymy:

1. Gallbladder Diseases is synonymous with Disease of gallbladder and with Gall Bladder Diseases

2. Ensure Plus strawberry liquid Tetrapak is synonymous with Ensure Plus strawb Tetrapak

3. AFDC (Aid to Families with Dependent Children) is synonymous with Aid to Families with Dependent Children

4. Spine (Vertebral Column): Excision is synonymous with Vertebral Column: Excisions

5. Hallux is synonymous with Big Toe is synonymous with Great Toe

6. Pelvic Neoplasms is synonymous with Neoplasms of Pelvis and Pelvis Neoplasms

7. Sudafed 60mg tablet is synonymous with Sudafed, 60 mg oral tablet

8. Grape is synonymous with Grapes

9. Iodine preparation is synonymous with Iodine

10. Guppy is synonymous with Lebistes

Synonymy Exercise:

Instructions: Decide if the concepts are synonymous and should be merged.

1. a. Congenital absence of muscles [MDR70/PT/10010550]

MDR70/PT1/10010550
MedDRA
Congenital and familial/genetic disorders
Musculoskeletal, connective tissue and bone disorders congenital
Non site specific muscle disorders congenital
Accessory muscle
<Congenital muscle absence>
Duchenne muscular dystrophy
Dystrophia myotonica
Familial tremor
Muscular dystrophy NOS
Myotonia congenital

b. Absence of Muscle [RCD99/PT/PGyy4]

RCD99/PT1/PGyy4
Read thesaurus
Clinical findings
Disorders
Congenital disorder
Congenital abnormality of musculoskeletal system
Congenital malformation of muscles and tendons
Congenital absence of muscle and tendon
<Absence of Muscle>
Poland syndrome
Congenital absence of muscle or tendon NOS
Congenital absence of tendon
Other absent muscle

2. a. Potassium [MSH2001/MH/D011188]

MSH2001/MH1/D011188
Medical Subject Headings
Chemicals and Drugs (MeSH Category)
Inorganic Chemicals
Elements
Metals, Alkali
Cesium
Francium
Lithium
<Potassium>
Rubidium
Sodium

b. Potassium [MDR33/PT/10036439]

MDR31/PT1/10036439
MedDRA
Investigations
Water, electrolyte and mineral investigations
Mineral and electrolyte analyses
Carbon
Chromium
Potassium
Sodium
Zinc

3. a. Heart Aneurysm [MSH2001/MH/D006322]

MSH2001/MH1/D006322
Medical Subject Headings
Diseases (MeSH Category)
Cardiovascular Diseases
Heart Diseases
Arrhythmia +
Carcinoid Heart Disease
Cardiac Tamponade
Cardiomegaly +
Endocarditis +
<Heart Aneurysm>
Heart Arrest +
Heart Defects, Congenital +
Heart Failure, Congestive +
Heart Neoplasms
Heart Rupture +
Heart Valve Diseases +
Myocardial Diseases +
Myocardial Ischemia +

b. Aneurysm;cardiac [ICPC2P/PT/K99032]

ICPC2P/PT1/K99032
ICPC2-Plus
CIRCULATORY
CARDIOVASCULAR DISEASE OTHER
<Aneurysm;cardiac>

4. a. Ensure Chocolate [MMSL00/MS/U001404]
No context

b. Ensure Chocolate Liquid [RCD99/PT/x00UK]

RCD99/PT1/x00UK
Read thesaurus
Drug
Foods, vitamins, electrolytes and inorganic salts
Enteral+supplement feeds
Ensure
Ensure liquid
Ensure asparagus liquid
Ensure chicken liquid
<Ensure chocolate liquid>
Ensure chocolate liquid 250mL
Ensure chocolate liquid 946mL
Ensure coffee liquid
Ensure egg-nog liquid
Ensure mushroom liquid

Answers:

1. Yes

2. No

3. Yes

4. No – can't assume A means the liquid.

REVIEW

1. What is the "Name that Never Changes"?

2. What is the core record in the Metathesaurus?

3. What is considered the main principle of editing the Metathesaurus?

4. Name at least two sections of a Concept.

5. What is a source Inversion and what is a source Insertion (both processes used in constructing the Metathesaurus)?

6. Decide if the two strings below are synonymous or not

    6a. Tapeworm NOS
    Tapeworm infestation

    6b. AIDS
    Acquired Immunodeficiency Syndrome

    6c. Incision of Myocardium
    Myocardium: Incision

    6d. Advil
    Ibuprofen

    6e. Removal of foreign body from eye

Removal, foreign body, eye

6f. Procedure on foot
Procedure on foot, NOS

6g. Reason for visit, NOS
Reason for visit NEC

6h. Neoplasms of the Kidney
Renal Neoplasms

7. In the Metathesaurus, what do “sources” refer to?

8. Where do relationships come from?

Answers to Review:

1. CUI

2. The concept

3. Respect the Source unless there is a disagreement

4. Atoms, Context, Relationships, Attributes, Semantic Types

5. Inversion is when Apelon gets the data from a source and converts it to a common format for insertion into the Metathesaurus.

   Insertion is when Apelon puts the new data into the Metathesaurus and merges the data with the existing data.

6.
6a. No
6b. Yes
6c. Yes
6d. No (trade names are not merged with generic names)
6e. Yes
6f. Yes
6g. No
6h. Yes

7. The sources are the terminologies or vocabularies that we insert into the Metathesaurus.

8. Relationships come from the source itself or are created by the editors.

V. SOURCES CONTAINED IN THE METATHESAURUS

- A source vocabulary is any of the vocabularies, or lists of terms we receive for inclusion in the Metathesaurus.

- Source authors include government agencies as well as private companies.

- A source may be new or an update of a source previously included in the Metathesaurus.

- The purpose of the Metathesaurus is to take these different sources and link them together.

- The Metathesaurus source vocabularies include:

    - terminologies designed for use in patient-record systems
    - large disease and procedure classifications used for statistical reporting and billing
    - more narrowly focused vocabularies used to record data related to psychiatry, nursing, medical devices, adverse drug reactions, etc.
    - disease and finding terminologies from expert diagnostic systems
    - some thesauri used in information retrieval.
    - Examples include:

        - Thesauri: Medical Subject Headings (MeSH):

            The Medical Subject Headings is NLM's controlled vocabulary used for indexing articles, for cataloging books and other holdings, and for searching MeSH-indexed databases including MEDLINE. MeSH terminology provides a consistent way to retrieve information that may use different terminology for the same concepts.

            MeSH Information: (Please see Links)

            Medical Subject Headings

            MeSH2000 Descriptor Fields

            MeSH Browser

        - Classifications: International Classification of Diseases (ICD)

        - Drug Names: Multum

- NLM receives machine-readable data and evaluates it for inclusion.
- Once it is decided that a source will be added, Apelon does the source inversion and source insertion.
- NLM tries to keep sources current when updates are available.
- The best place to obtain information regarding sources is on "Meow":
    - **Source Information Link** (Please See Link)

Identification of Source Information:

- All data from a source is identified as having come from that source.
- Source abbreviations are used to identify the data.
    - For now, version or year information is included in the abbreviation.
        - Examples:
          CSP2001 – CRISP
          MSH2001 – MeSH
          UWDA155 – University of Washington Digital Anatomist
          MTH – Metathesaurus created
- Each atom, relationship, and attribute will have a source abbreviation.

Data Types from Sources:

- Most sources have some form of a Preferred Term: MeSH=MH (Main Heading), SNMI=PT (Preferred Term).
    - See Source Information pages for exact information on the data received from each source, including the Preferred Terms, etc.
- Many sources will also have some form of entry term or SY term that is connected to the Preferred Term in some way.
    - MeSH has Entry Terms (EN,EP), AOD has Non-Preferred Terms (NP), Read has Synonymous terms (SY)

- The relationship between Preferred Terms and Entry Terms can vary depending on the source.
    - Relationship can be synonymous, BT, NT or REL
    - Entry Terms can be equivalent to each other
    - Hopefully the source specified the relationship and that relationship is created when the source is inserted
    - If the relationship is not specified, it is up to the editors to decide
        - Unknown relationships are marked with special relationships like RT? and NSY
- Identification of which Entry Terms go with which Preferred Term can by done by source code when provided.

Example of Relationships between a Preferred Term and Entry Terms:

AIDS DEMENTIA COMPLEX (Preferred Term)
Entry Terms
HIV Dementia (equivalent)
Dementia Complex, AIDS-related (equivalent)
HIV Encephalopathy (narrower)
HIV-1 Associated Cognitive Motor Complex (related)

Term Types:

- The Term Type (TTY) represents the type of source data (i.e. Preferred Term, Entry Term).
    - The Source Information page lists what Term Types were created for each source
    - TTY is usually a two letter abbreviation
        - PT=Preferred Term, EN/EP/ET=Entry Term, DE=Descriptor, SY=Synonym, etc.
    - Combined with Source Abbreviation to make Termgroup
        - MSH2001 – MeSH Main Heading
        - AOD99/DE – AOD descriptor (their Preferred Term)

Extra Information on Metathesaurus Sources:

THE ALCOHOL AND OTHER DRUG (AOD) THESAURUS: A GUIDE TO CONCEPTS AND TERMINOLOGY IN SUBSTANCE ABUSE AND ADDICTION

http://etoh.niaaa.nih.gov/AODVol1/Aodthome.htm

AOD DE (descriptor) terms are AOD's equivalent to preferred terms in other sources. They are accompanied by hierarchies and in some case definitions.

AOD NP (Non-Preferred) terms may be synonymous with a DE or other NP term in AOD. They are similar to entry terms in other sources. For insertion purposes, many NPs were not merged with their corresponding DEs since synonymy could not be guaranteed. RT? relationships were created so that editors could review for synonymy.

AOD ET (Other Preferred) terms are considered to be neither a descriptor or a synonym to a descriptor. AOD's use of "OP" for "Other Preferred Term" is inconsistent with other sources (it is not the same thing as a READ OP term). AOD's use of OP appears to correspond to our use of ET (entry term) so they have been changed to ET terms to avoid confusion.

According to AOD, there are several phrases which AOD has created internal acronyms for (for example AODU, "other drugs and alcohol use"). When a term contains one of these acronyms, it has been assigned to the termgroup *S (short form of whatever termgroup they belong to) and an expanded form has been created under the termgroup *X (Expanded Term). A SFO/LFO relationships exists between the two forms.

Relationships marked as RT? may be synonymous, related, broader or narrower. In many cases, RT? is the relationships created between an NP and the DE it is associated with. Editors should carefully review RT? relationships between AOD terms while editing.

CCPSS CANONICAL CLINICAL PROBLEM STATEMENT SYSTEM

Termgroups:
Problems: PT
Term class: TC
Modifier: MP
synthesized "problems" for TCs: TX

CCPSS source level relationships were inserted as Reviewed RT? rels. DO NOT EDIT THESE RELATIONSHIPS. They will stay source level relationships and will be released as CCPSS source rels.

We are taking the CCPSS terms on face value. If CCPSS has the term Haiti, we are taking it to mean the country. If CCPSS has the term Kidney, we are taking that to mean the body part. So, merging between CCPSS and other sources can and will occur. There are some concepts in CCPSS that are not apparent as to meaning. For example:

ID
FM
Data

If an editor finds a CCPSS atom like this and cannot determine meaning, copy the concept into an e-mail message and send it to Tammy and Laura. Do not edit it. If it has already merged into a concept with other atoms and you are not sure of the meaning, send us e-mail with the concept (same as above).

We created a termgroup called TX. These terms were problems that we fully specified, like Liver became Liver Problem:

CN# 847675 Liver problem
CUI C0577060 Concept Status needs Review
STY Finding R
ATOMS
R [] Liver problem [RCD99/PT/Xa7UW]
R {Liver problem [RCD98/PT/Xa7UW]}
M N LIVER PROBLEM [CCPSS99/TX/U000046]
M N LIVER PROBLEM [CCPSS99/PT/0052733]
DMS N [] LIVER [CCPSS99/TC/U000046]
DM N LIVER [CCPSS99/PT/0050526]

The TCs and TXs should always remain together. They will have the same code. In the example above, the TC and TX both have the code of U000046.

If a concept has a CCPSS PT, this term should be taken on face value. Some PTs may be in the wrong concept. In the example above, there are two PTs. One is Liver Problem and should stay in the concept. The other is Liver and should be split out. The Liver PT term refers to the body part and should be merged with the concept that already exists in the Metathesaurus for Liver the body part. Note, the TC term of Liver does not get split out since it stays with its corresponding TX.

CPT PHYSICIANS' CURRENT PROCEDURAL TERMINOLOGY

http://www.ama-assn.org/ama/pub/category/3113.html

The Physicians' Current Procedural Terminology is a listing of descriptive terms and identifying codes for reporting medical services and procedures performed by physicians. It is published annually by the American Medical Association.

In the U.S. CPT-4 is required by HCFA and most other payers for physician billing (Form 1500), and is also required in addition to ICD-9 for some technical billing (UB-92)

CPT2004/AB- Short forms. these do not get released in MRCON. Tthey are included in the databased in case they are useful to editors (sometimes they can help disambiguate). They do not participate in matching. They are released as CPA in MRSAT.

CPT2004/MP - Modifiers
CPT2004/PT - Long forms
CPT2004/SY - Medium forms.
MTHCH04/HT - Metathesaurus CPT Hierarchical terms

There generally should never be a situation where more than one CPT OR HCPCS code should be in the same concept.

GENE ONTOLOGY™ CONSORTIUM

http://www.geneontology.org/

The goal of the Gene Ontology ™ (GO) Consortium is to produce a controlled vocabulary that can be applied to all organisms even as knowledge of gene and protein roles in cells is accumulating and changing. GO provides three structured networks of defined terms to describe gene product attributes. GO is one of the controlled vocabularies of the Open Biological Ontologies. The majority of GO concepts are related to Molecular Function, Cell Function, Cell Component. GO does not have any gene concepts in it.

ICD- INTERNATIONAL CLASSIFICATION OF DISEASES

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

When a concept in ICD has an "and" in the concept name, it generally means "or" for editing purposes. For example, ICD has the concept "Personal history of allergy to serum and vaccine. Read has the concept "Personal history of serum or vaccine allergy". After examination, it has been determined that these two mean the same thing and can be merged.

See also Read 1998 discussion of V terms below.

Most ICD terms refer to diseases and not organisms. The exception to this are the Index terms (IT). These terms can refer to organisms.

ICD 2 digit codes refer to procedures and 3 digit codes refer to diseases.

ICD V codes should get the STYs of Finding or Population Group. The V codes should never get any procedure STY.

Different V codes should not be merged into the same concept. Here is an example of two concept types that were merged together and should not have been.

Concept #1 is Contact with communicable diseases (V##). Concept #2 is Contact with unspecified communicable disease (V##.#). Even though these concepts appear to follow the X can be merged with X,NOS rule, these concepts should be kept separate. Concept #1 is plural and means class. Concept #2 is singular and means one disease (that is just not specified).

Editing Guidelines for ICD9 E codes

The ICD9 E codes all have source codes that begin with the letter E and are a special part of ICD9. According to the ICD documentation, E codes are:

"provided to permit the classification of environmental events, circumstances, and conditions as the cause of injury, poisoning, and other adverse effects. Where a code from this section is applicable, it is intended that it shall be used in addition to a code from one of the main chapters of ICD-9-CM, indicating the nature of the condition."

It has been decided by NLM, that E codes should be taken on face value. They can either be referring to the actual injury or to the cause of the injury. If it refers to the cause, the type should be assigned based on the cause and not the injury that may result.

When reviewing a concept, assign an STY based on the main noun:

Examples:

Accident by Methane - *Accident* is the main noun ; the STY is Phen. Or Process
Fire of Prairie - *Fire* is the main noun; the type is Phen or Process

CN# 476926 Fibrinolysis-affecting drugs causing adverse effects in therapeutic use
CUI C0261808 Concept Status needs Review
STY *Pharmacologic Substance*

ATOMS
R [] Fibrinolysis-affecting drugs causing adverse effects in therapeutic use [ICD2000/PT/E934.4]
R {Fibrinolysis-affecting drugs causing adverse effects in therapeutic use [ICD91/PT/E934.4]}

All drugs or chemicals causing adverse effects get Pharm. Substance. We will not be double typing these. Only Pharmacologic Substance will be assigned.

LOINC – LOGICAL OBSERVATION IDENTIFIER NAMES AND CODES

http://www.loinc.org/

LOINC concepts are either a composite of a single test, panel or individual portions of the record. They are usually lengthy strings of abbreviations and codes separated by combinations of colons and carets (^).

LOINC concepts can be translated via the following:

(Field 1) Component (analyte)
(Field 2) Property measured
(Field 4) Time Aspect
(Field 5) Type of Sample
(Field 6) Type of Scale
(Field 7) Method used to produce result or observation

1. Most of the long strings will be assigned STY ***Clinical Attribute.***

2. Concepts under the hierarchal term **Claims Attachment** are assigned STY ***Intellectual Product.***

   Example:
   CN# 10527352 Gastrointestinal attachment

   ATOMS
   N [] Gastrointestinal attachment [LNC210/HC/MTHU000012]
   NEVER [] {ATTACH.GI [LNC210/HS/MTHU000012]}

   CONTEXTS
   LNC210/HC1/MTHU000012
   LOINC Root
   Claims Attachment
   <Gastrointestinal attachment>
   GASTROENTEROLOGY ENDOSCOPY STUDIES:CMPLX:-:^PATIENT:SET

3. ***Qualitative Concept***

   - Rast Classes such as FOXTAIL MEADOW ANTIBODY.IMMUNOGLOBULIN E.RAST CLASS
   - Glycosaminoglycans/creatine

4. ***Laboratory or Test Result***

    - Chemicals with attached modifiers (other than FREE)
      Example:
      NEUTROPHIL CYTOPLASMIC ANTIBODY.ATYPICAL or
      ALKALINE PHOSPHATASE.TOTAL

5. ***Intellectual Product***

    - Anything written or created by medical staff like DIALYSIS RECORDS, DISCHARGE NOTES, patient records, etc. will be assigned the STY

6. ***Indicator, Reagent, or Diagnostic Aid, & Amino Acid, Peptide or Protein & Immunologic Factory***

    - Pharmacia Test Codes: Rf265 is a code that corresponds to the Caraway Antibody.IGE. The STY should be Similar concepts such as C70 appear in the same field in the definition. These are test codes that correspond to antibodies.

      Example:
      CN# 4137924 Rf265
      CUI Concept Status needs Review
      STY Immunologic Factor N
      DEF [Do not release]
      LNC203/RN|7178-7^CARAWAYAB.IGE@ACNC@PT@SER@Q
      N@@Carumcarvi;Rf265@ALLERGY

      ATOMS
      N [] Rf265 [LNC203/RN/NOCODE]

7. ***Clinical Attribute***

    - Ethambuton 2.5 UG/ML appears to be an SCDC; but, the STY should be . The PN would be Ethambutol 2.5 UG/ML Suspectibility.
    - Example:
      CN# 10505257 ORGANIC ACIDS PATTERN
      Concept Status needs Review
      STY Organic Chemical N
      ATOMS

      N [] ORGANIC ACIDS PATTERN [LNC210/CN/NOCODE]

MDRA : MEDICAL DICTIONARY FOR REGULATORY ACTIVITIES TERMINOLOGY

http://meddramsso.com/NewWeb2003/index.htm

MeddRA is an international medical terminology. It is applicable to all phases of drug development, including animal toxicology. It is also applicable to the health effects of devices (e.g. uteric rupture after iud insertion; infection because of failure to sterilize a catheter).

Lab Procedure: Names of Lab Procedures are located under the heading of Investigation. The test name will be followed by the results and should be assigned an STY *Laboratory or Test Result* or *Finding*.

The following termgroups exist in MedDRA:

System Organ Class	OS
High Level Group term	HG
High Level term	HT
Preferred term	PT
Lower Level term	LT
Non-current LLT	OL
Special Search Cat.	SC

Specific Editing Tips:
1. There are no chemical concepts in MedDRA; therefore, MedDRA atoms should never be in a chemical concept. The MedDRA string Calcium refers to a test for calcium or something similar. It can be merged with appropriate non-chemical concepts.

2. A general rule is that <*string*> *all forms* is equivalent to <*string*>.

3. Semantic Types - Default semantic types are assigned to the HT MedDRA termgroup in cases where MedDRA didn't merge with other sources. In some cases, default semantic types were also assigned further down the hierarchy. The HTs should be correct. However, there are cases where the inheritance may be incorrect and the STYs may need to be changed. In addition, the MedDRA LTs inherited STYs from the PTs and they also may be incorrect. If they are wrong, an editor can change the STY(s) to the appropriate one(s).

Please remember not to spend time changing closely related STYs, like changing between Sign or Symptom, Finding, or Disease.... If there are questions about this, please ask. If an editor finds a large section of a worklist that seems to need STY changes, please let NLM know before the changes are made in the editing interface.

When editing the MedDRA relationships from the PTs, editors may find LTs that are not EQV to the PTs but EQV to each other. These should be merged.

An example is (some of the report has been cut out):

.....

CN# 2145874 Blood follicle stimulating hormone increased
CUI Concept Status needs Review
STY Finding
ATOMS
N [] Blood follicle stimulating hormone increased [MDR99/PT/10005534]
N Blood follicle stimulating hormone increased[MDR99/LT/10005534]

CONTEXTS
MDR99/PT1/10005534
MedDRA
Investigations
Endocrine investigations including sex hormones
Pituitary hormone analyses anterior
Blood corticotrophin
Blood corticotrophin abnormal
Blood corticotrophin decreased
Blood corticotrophin increased
Blood corticotrophin normal
Blood follicle stimulating hormone
Blood follicle stimulating hormone abnormal
Blood follicle stimulating hormone decreased
Blood follicle stimulating hormone increased
Blood follicle stimulating hormone normal

NEEDS REVIEW RELATED CONCEPT(S)
[RT?] FSH increased [MDR99/LT||MDR99|MDR99] {2194655} C
[RT?] Follicle stimulating hormone increased [MDR99/LT||MDR99|MDR99] {14572} C

The two MDR99/LTs are synonymous and can be merged. They are not synonymous with the concept they are related to because the main concept specifies blood.

5. Concepts regarding pregnancy complications should be typed as Pathologic Function.

6. In MedDRA, diazepam means diazepam assay and valium means diazepam assay. We believe it is safe to assume they don't run a different test for the trade and the generic so these two need would be merged together. This concept receives the STY Laboratory Procedure.

7. In some cases, the OLs are obviously typos of a PT ot LT. These should be merged.

8. Laboratory Procedure: The lab procedure for the acid is probably equivalent to the test for the ester. For example, pyruvic acid assay is EQV to pyruvate assay. In MedDRA you would might see something like:
Pyruvate as an LT and Pyruvic Acid as an LT
These would be merged.

9. X increased is not equivalent to Blood X increased or Serum X increased or any other Substance X increased. X increased does not specify anything about where it was measured so it should be kept separate.

Examples:
Blood gastrin increased-MDR PT
Gastrin increased-MDR LT
Serum gastrin increased MDR LT

10. Laboratory or Test Results**:**

Low = Decreased e.g.. Proinsulin decrease = Proinsulin Low

High = Increased e.g. Proinsulin increased = Proinsulin High

X Deficiency ≠ X Decreased

X Raised does ≠ X Increased

11. **Findings** vs **Test or Lab Results**:
Lab Results have the following values: yes/no; positive/absent. Findings possess a greater level of interpretation: increased/decreased; abnormal/normal.

MeSH – MEDICAL SUBJECT HEADINGS

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

Don't merge MSH atoms with different MeSH UIs (D#, C#, Q#) together across the same MeSH year. This rule applies to all MeSH atoms and not just MHs.

Exceptions to this rule are:

MeSH GQ (geographic qualifier) terms may be merged with other atoms, including MeSH Main Headings
(e.g. Brazil [MSH99/MH/D001938] may be merged with Brazil [MSH99/GQ/Q000104], Brazil [CSP98/PT/1266-1044] and Brazil [RCD98/PT/Ua08y])

MeSH LQ terms (language qualifiers) may be merged with other MeSH terms and non-MeSH terms.

MeSH relationships (NRW, BRD, REL, and EQV) are to be respected by editors. This includes relationships between an entry term (EP, EN) and the Main Heading.

If an editor disagrees with the assigned relationship or STY, a message should be sent to meshsugg@nlm.nih.gov outlining the disagreement. Include all relevant identifying information (name of the MeSH Heading, Qualifier, or Chemical and the UI (D#, Q#, or C#) in the subject line).

Entry Terms - MeSH has two types of entry terms (EN, EP) that will have the same code as the corresponding main heading (MH). These entry terms can have different relationships. Some may be synonymous with the MH and should be merged. Entry terms can also be NRW and BRD than the main heading. In that case, they should not be merged with the MH. Entry terms can also be synonymous with each other and can be merged with each other (within the same code).

Permuted terms - Permuted terms are generated by the MeSH software and are permutations or lexical variants of the MH, or one of it's entry terms. Since permuted terms are derived from the MH or entry terms already in MeSH, they should never be in a concept without another MeSH atom that corresponds to the permuted term. PMs may be merged with other entry terms and MeSH main headings (within the same code).

HT is a MeSH hierarchical term. These atoms represent top levels of the MeSH hierarchy and are often alone in a concept.

Qualifiers - Qualifiers are sometimes referred to as subheadings; in MeSH, they are concepts that describe a particular aspect of a heading. For example, an article discussing

changes and progress in family planning would be indexed: Family Planning/trends. In this case, "Family Planning" is a MeSH MH and "trends" is a subheading.

XQ is the preferred term for qualifiers. TQ's are entry terms for the qualifier. Qualifiers do not merge with non MeSH qualifiers.

Hierarchical information, Scope Notes, Definitions - As with all sources, information such as the hierarchy and definitions ONLY appear in concepts with the preferred term from the source and not with any related or entry terms from the source. MeSH hierarchical information , Scope Notes, and Definitions are presented with the main heading. They never appear with the entry terms or permuted terms.

ICD9-ET (MTHICD9)

MTHICD9 contains ICD-ETs created by Apelon from the notes in ICD9 and reviewed by editors. The ETs have the same ICD9 code as corresponding PTs.

ICD-ETS are entry terms created to correspond with an ICD2000/PT. ETs can be synonymous to the PTs or have another rel (NT, BT, or REL). ETs are connected to PTs by code.

When codes and strings matched, ICD-ETs were merged with the PTs; else a rel was created.

CA (or Ca) can refer to either cancer or carcinoma. Atoms with the letters Ca should only be merged with cancer or carcinoma when there is adequate source information defining the intended meaning of Ca. Some Read thesaurus Optional Preferred (OP) terms have only the letters Ca and an associated body part (e.g. Ca Gallbladder) and do not specify the intended meaning of Ca. In this situation, pending clarification from Read, Ca should not be merged with either carcinoma or cancer. (Carcinoma is a subtype of cancer that arises from epithelial tissue and carcinoma is generally not viewed as a synonym for cancer. Cancer is synonymous with the terms malignant neoplasms and malignant tumors).

['bracket terms'] have the apparent meaning of the RCDSY terms (which strip the bracketed letters) - EXCEPT the [V] terms. [V] terms AND all ICD9 V codes AND all ICD10 codes under 'Factors influencing health status and contact with health services' MAY have DIFFERENT meanings from the apparent meaning and should be Multiple Meanings in those cases.

Example:

'V01.0 Cholera' means
 'V01 Contact with or exposure to communicable diseases'
 'V01.0 Cholera' or 'Contact with or exposure to cholera'

The RCDSYs must always travel with the [V] terms they are made from. They have to be edited with the knowledge that they well mean the something other than the apparent meaning of the string. In many cases, the 'stripped' RCDSY versions are involved in demotions. This is unfortunate but correct because each of these cases needs editing and the demotions will force that.

Definitions from Sources:

Read [V] terms; ICD-9 V codes;
ICD10 'Factors influencing health status and contact with health services'

[V] and all ICD V codes are 'Health Status and contact with health services factors' in Read; the ICD-9-CM manual says:

'This classification is provided to deal with occasions when circumstances other than a disease or injury classifiable to categories 001-999 (the main part of ICD) are recorded as "diagnoses or "problems."

and goes on to list cases where a person not currently sick needs:

a) prophylactic vaccination, to discuss a problem which is not a disease or injury, etc.;
b) when a person is receiving treatment (e.g. dialysis for renal disease, chemotherapy for malignancy, cast change
c) circumstance which which influences health status but is not a disease or injury.

*** Meaning of Read bracketed codes**

[V] - Health Status and contact with health services factors
[D] - Symptoms, signs and ill defined conditions
[M] - ICD neoplasms
[Q] - Qualifiers
[SO] - anatomy
[X] -Concepts relate to their meaning in ICD 10

Read98 uses the code PT to represent Preferred Term and SY to represent Synonymous terms. Read views the separate PT's as being truly distinct entities. Read also views the PT/SY relationships of the same code as being truly synonymous. In general, editors should not split Read SY's from their PT's unless there is a strong biomedical justification. Read also has OP's which represent optional or obsolete terms. These may be merged with PT's as discussed previously. Terms that are viewed as synonyms to OP's are assigned as IS (synonymous term to OP of the same code). Editors should use their own discretion when editing IS's in Read98, since the relationship between OP and IS terms may not be as consistently synonymous as the relationship between PT and SY terms.

SNOMED –SYSTEMATIZED NOMENCLATURE OF MEDICINE

http://www.snomed.org/

The term types for SNOMED CT are:

SNOMEDCT_2003_07_31/FN	Fully-specified name
SNOMEDCT_2003_07_31/IS	Obsolete synonym
SNOMEDCT_2003_07_31/OF	Obsolete fully-specified name
SNOMEDCT_2003_07_31/OP	Obsolete preferred term
SNOMEDCT_2003_07_31/PT	Preferred term
SNOMEDCT_2003_07_31/PTGB	Preferred term (Great Britain)
SNOMEDCT_2003_07_31/SB	Subset name
SNOMEDCT_2003_07_31/SY	Synonym
SNOMEDCT_2003_07_31/SYGB	Synonym (Great Britain)
SNOMEDCT_2003_07_31/XM	Crossmap set

The FN term type has the highest precedence. Many concepts will have additional terms in parenthesis; i.e., Gum Diseases (disorder) or Excision (Procedure). The PT is the preferred name and appears in the context.

In the concept reports, you will see legacy codes from SNMI98 and RCD. These legacy codes were used to guide merge activity. Legacy codes should have the same meaning as the referring concept. IF there are several concepts merged together, you may need to check the Clue Browser to figure out what is going on. We report concepts with different meanings and the same codes to SNOMED.

Rules for merging duplicate strings based on categories: These were the rules Apelon used when inserting SNOMED. In some cases, you may decide that the merges are incorrect and need to be split. In almost all cases you want to keep everything with the same code together from SNOMED CT. If you decide you need to split, send Tammy and Laura an email first.

"Do Not Merge" means do not merge 2 Snomed PTs (and the SYs and fully specified terms associated with them) into the same concept during the insertion. It does not mean, do not merge into existing concepts w/in the mid.

Combinations:

1. Body structure/Body structure
do not merge, do not create a demotion

“Entire” concepts- the PT contains the word "Entire" i.e. Entire Liver, only merge if the PT contains an exact or norm match to something already in the mid. The original “Entire” concept should have atoms with matching codes. These are not to be split even though the string name is lacking the word “Entire”. They are related to the same concept without the “Entire”. Do not use the SYs for merging. If a multi-meaning occurs, a PN matching the PT should be created.

The concept with the word "structure" can merge into existing concepts base on on PT, SY, or legacy code. If a PN doesn't already exist, we think the PN should be the same as the SY. Liver Structure would merge correctly into the Metathesaurus concept for Liver. This concept already has a PN.

2. Product/Substance
Merge - We are not respecting Snomeds view that these are different concepts.

3. Disorder/Disorder
Merging should only be done by PTs & Legacy Codes, not SYs.

4. Disease/Morphologic Abnormality
Merge

5. Substance/Substance
Do not merge-demote

6. Organism/Organism
Do not merge-Demote

7. Procedure/Procedure
Merge

8. Product/Product
Merge

9. Disorder/Finding
Merge

10. Finding/Procedure
Do not merge-demote

11. Finding/Finding
Merge only based on PTs & Legacy Codes. Not on SYs.

12. Qualifier Value/Qualifier Value
Merge with appropriate match

13. Finding/Observable Entity

Do not merge-demote

14. Morphologic Abnormality/Morphologic Abnormality
Merge only based on PTs & Legacy Codes. Not on SYs.

15 Organism/Substance
Do not Merge-demote

16. Finding/Morphologic Abnormality
Merge

17. Procedure/Qualifier Value
Merge

18. Observable Entity/Observable Entiy
Merge only based on PTs & Legacy Codes. Not on SYs.

19. Finding/Qualifier Value
Merge

The rest of the duplicate pairs should just demote and we will edit them.

Leftover from RCD but still in SNOMED:

[V] terms AND all ICD9 V codes AND all ICD10 codes under 'Factors influencing health status and contact with health services' MAY have DIFFERENT meanings from the apparent meaning and should be Multiple Meanings in those cases.

Lab Procedure vs Laboratory or Test Result

SNOMED and RCD often group together RCD Test Results with SNOMED Lab Procedures. This is obvious when the location of the RCD concept is under the heading of Finding or Investigation. These are to be split into the appropriate concept.

VI. CONTEXTS

- A context is an arrangement of atoms from a source that helps users understand the atom and its relationship to others atom in the source.

- Contexts are taken from source data when provided.

- There is no overall Metathesaurus context.

- For most sources only the main headings or the preferred terms are linked to a concept.
    - Therefore, there are concepts with no context information

- Contexts assist editors in determining the meaning of the atoms present in a concept.
    - Some atoms are not fully specified so contexts are needed to determine meaning

        Example: ICD
                 Benign Neoplasms
                 Prostate
- Some sources have multiple contexts for one atom. For example: MeSH.

Context versus Hierarchy:

- A hierarchy is a context that starts with a broad term and then narrows down to more specific terms.

    - Many, BUT NOT ALL, hierarchies contain an is_a relationship between parent and child terms.
        - Examples: Dog is_a Mammal, Apple is_a Fruit

- Not all contexts are hierarchies in the Metathesaurus.
    - From previous ICD example, Prostate is not a Benign Neoplasm

- However, at times these terms are used interchangeably.

Contexts have this general structure:

Name of the source/term group/source code
    Name of Source
        Hierarchy
            <Atom Name>

SNMI98/PT/C-F2220
    SNOMED International
        INFANT DIETS AND FORMULAS
            Infant Formula, NOS

More Information on Contexts in the Metathesaurus:

Depending on the design and information available for each source, different types of contexts are provided for the Metathesaurus.

Full Contexts:

Full Contexts are made for sources that have rich hierarchies. Some sources with hierarchical contexts includes Medical Subject Headings (MeSH), Universal Medical Device Nomenclature (UMD), Read (RCD), and CRISP (CSP). But, as with some sources like MeSH and PDQ, some parts of the context may not be as full as others. MeSH Supplementary Concepts do not have any context. In PDQ, some strings have no context and no relationships.

Example:

MSH2000/MH1/D012541 (Source/Termgroup/Source code)
MeSH
Diseases (MeSH Category)
Bacterial Infections and Mycoses
Bacterial Infections
Gram-Positive Bacterial Infections
Streptococcal Infections
Ecthyma
Endocarditis, Subacute Bacterial
Erysipelas
Fasciitis, Necrotizing
Impetigo
Pneumococcal Infections +
Rheumatic Fever +
<Scarlet Fever>

CSP98/PT1/0990-2166
CRISP Thesaurus
food science /technology
food
poultry product
<egg food product>
egg yolk

Title Contexts:

Title Contexts are built for sources that do not have true hierarchies, but supply "section titles." These titles are used as Parents for the terms under them.

Example:

CPT2000/PT1/90717
Current Procedural Terminology
Medicine Guidelines
Vaccines, Toxoid Products
<Yellow fever vaccine, live, for subcutaneous use>

WHO97/PT1/1766
WHO Adverse Reaction Terminology
FOETAL DISORDERS
ABORTION
ABORTION MISSED
ADRENOGENITAL SYNDROME CONGENITAL
ALKAPTONURIA
ANENCEPHALY
ANGIOFIBROMA
ANOPHTHALMIA
ANUS IMPERFORATE
AORTIC COARCTATION
<AORTIC STENOSIS>
ARTERY MALFORMATION
ATRIAL SEPTAL DEFECT
BILIARY ATRESIA
BLINDNESS CONGENITAL
BRAIN DAMAGE CONGENITAL

Some sources also place terms in multiple contexts. These include Medical Subject Headings (MeSH), CRISP (CSP), Physician's Data Query (PDQ) and University of Washington Digital Anatomist (UWDA).

Example:

UWDA99/PT1/12154
University of Washington Digital Anatomist
Anatomical entity
Physical anatomical entity
Anatomical structure
Organ part

Organ component
Macroscopic organ component
Macroscopic organ component of heart
Chorda tendinea +
Component of cardiac valve +
Component of conducting system of heart +
Component of fibrous skeleton of heart +
Conducting system of heart
Conducting system of left atrium
Conducting system of left ventricle
Conducting system of right atrium
Conducting system of right ventricle
Endocardium
Endocardium of atrium +
Endocardium of auricle +
Endocardium of ventricle +
Epicardial fat +
Epicardium
Epicardium of atrium +
Epicardium of auricle +
Epicardium of ventricle +
Musculus pectinatus +
Myocardium
Myocardium of atrium +
Myocardium of auricle +
Myocardium of ventricle +
<Papillary muscle>
Papillary muscle of ventricle +
Trabecula carnea +

UWDA99/PT2/12154
University of Washington Digital Anatomist
Heart
Wall of heart
Atrioventricular septum
Cardiac septum +
Endocardium
Epicardium +
Interatrial septum +
Interventricular septum +
Musculus pectinatus
Myocardium +
<Papillary muscle>
Surface of heart +
Wall of left atrium +
Wall of left ventricle +

Wall of right atrium +
Wall of right ventricle +

UWDA99/PT3/12154
University of Washington Digital Anatomist
Mediastinum
Heart
Wall of heart
Atrioventricular septum
Cardiac septum +
Endocardium
Epicardium +
Interatrial septum +
Interventricular septum +
Musculus pectinatus
Myocardium +
<Papillary muscle>
Surface of heart +
Wall of left atrium +
Wall of left ventricle +
Wall of right atrium +
Wall of right ventricle +

As mentioned, the contexts can be used by editors to determine the meaning of atoms that are not fully-specified. Some examples that illustrate this point:

ICD10/PS1/D30.0
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)
Neoplasms
Benign neoplasms
<Kidney>

ICD10/PS1/Y40.4
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)
External causes of morbidity and mortality
Complications of medical and surgical care
Drugs, medicaments and biological substances causing adverse effects in therapeutic use
<Tetracyclines>

RCD99/PT1/XaA1W
Read thesaurus
Unit

Unit of pressure
  Non-SI unit of pressure
   <atmosphere>
    bar - pressure
    cm H2O
    kg/sq. m

Exercise: Contexts in the Metathesaurus:

Instructions: Match the atoms to the contexts.

ATOMS:

Acquired Immunodeficiency Syndrome [MSH2001/MH/D000163]

acquired immunodeficiency syndrome [AOD99/DE/0000004854]

Acquired Immune-Deficiency Syndrome [ICPC2P/PX/B90001]

Acquired immune deficiency syndrome [RCD99/PT/XE0RX]

Acquired immunodeficiency syndrome, NOS [SNMI98/SY/DE-36310]

#1
ICPC2P/PX1/B90001
ICPC2-Plus
BLOOD/BLOOD FORMING ORGANS/IMMUNE MECHANISM
HIV-INFECTION/AIDS
<Acquired Immune-Deficiency Syndrome>

#2
AOD99/DE1/0000004854
Alcohol and Other Drug Thesaurus
health and disease
disorder by cause
communicable disease
viral disease
retroviral disease
HIV infection
<acquired immunodeficiency syndrome>

#3
MSH2001/MH1/D000163
Medical Subject Headings
Diseases (MeSH Category)
Virus Diseases
Slow Virus Diseases
<Acquired Immunodeficiency Syndrome>
AIDS-Related Complex
Aleutian Mink Disease

Equine Infectious Anemia
Feline Acquired Immunodeficiency Syndrome
Leukoencephalopathy, Progressive Multifocal
Pneumonia, Progressive Interstitial, of Sheep
Simian Acquired Immunodeficiency Syndrome
Subacute Sclerosing Panencephalitis
Visna

#4
MSH2001/MH2/D000163
Medical Subject Headings
Diseases (MeSH Category)
Virus Diseases
Sexually Transmitted Diseases
Sexually Transmitted Diseases, Viral
HIV Infections
<Acquired Immunodeficiency Syndrome>
AIDS Arteritis, Central Nervous System
AIDS Dementia Complex
AIDS-Associated Nephropathy

#5
AIDS-Related Complex RCD99/PT1
Read thesaurus
Clinical findings
Disorders
Infective disorder
Viral disease
Human immunodeficiency virus infection
Acquired human immunodeficiency virus infection syndrome NOS
<Acquired immune deficiency syndrome>
Acquired immune deficiency syndrome dementia complex
Acquired immune deficiency syndrome-related complex
Acquired immune deficiency syndrome-related nephropathy
Acute human immunodeficiency virus seroconversion illness
Asymptomatic human immunodeficiency virus infection
HIV disease resulting in Burkitt's lymphoma
HIV disease resulting in candidiasis
HIV disease resulting in cytomegaloviral disease
HIV disease resulting in Kaposi's sarcoma
HIV disease resulting in lymphoid interstitial pneumonitis
HIV disease resulting in multiple infections
HIV disease resulting in multiple malignant neoplasms
HIV disease resulting in mycobacterial infection

HIV disease resulting in other types of non-Hodgkin's lymphoma
HIV disease resulting in Pneumocystis carinii pneumonia
HIV-associated retinitis
HIV-related sclerosing cholangitis
Human immunodef virus resulting in other disease
Human immunodeficiency viral myelitis
Human immunodeficiency virus enteropathy
Human immunodeficiency virus infection constitutional disease
Human immunodeficiency virus infection wasting syndrome
Human immunodeficiency virus infection with persistent generalised lymphadenopathy
Human immunodeficiency virus infection with secondary clinical infectious disease
Human immunodeficiency virus myelitis
Human immunodeficiency virus myopathy
Human immunodeficiency virus neuropathy
Human immunodeficiency virus with neurological disease
Human immunodeficiency virus with other clinical findings
Human immunodeficiency virus with secondary cancers
Human immunodeficiency virus-associated periodontitis
Human immunodefiency virus encephalitis
Human immunodefiency virus leucoencephalopathy
Neuropathy due to human immunodeficiency virus
[X]Human immunodeficiency virus disease
HIV Enteropathy
HIV Seropositivity

#6
CSP2000/PT1/1560-6271
CRISP Thesaurus
disease/disorder
immunopathology
immunodeficiency
acquired immunodeficiency
<AIDS>
AIDS related neoplasm/cancer +
pediatric AIDS
hairy cell leukemia
human T cell leukemia
hypogammaglobulinemia
murine AIDS

2.
Instructions: In this context, what is the atom and what is its meaning?

CST95/HT1/UG/MG/PROS
COSTART: coding symbols for thesaurus of adverse reaction terms
Urogenital System
Male Genital Disorders
epididymis +
male breast +
Male Genital Disorders, General and NEC +
penis +
<prostate>
PROSTATE NEOPLASIA
PROSTATIC CARCINOMA
PROSTATIC DISORDER
PROSTATIC SPECIFIC ANTIGEN DECREASE
PROSTATIC SPECIFIC ANTIGEN INCREASE
scrotum +
seminal vesicles +
testis (excluding endocrine function) +

3.
Instructions: In this context, what is the atom and what is its meaning?

CPT2001/PT1/82175
Physicians' Current Procedural Terminology
Pathology and Laboratory Tests
Chemistry Pathology and Laboratory Tests
<Arsenic>

4.
Instructions: In this context, what is the atom and what is the meaning?

ICD10/PS1/Y53.4
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)
External causes of morbidity and mortality
Complications of medical and surgical care
Drugs, medicaments and biological substances causing adverse effects in therapeutic use
Agents primarily affecting the gastrointestinal system
<Other laxatives>

Answers: Contexts in the Metathesaurus*:*

#1
Acquired Immunodeficiency Syndrome [MSH2001/MH/D000163] --- #3 & #4
acquired immunodeficiency syndrome [AOD99/DE/0000004854] -- #2
Acquired Immune-Deficiency Syndrome [ICPC2P/PX/B90001] -- #1
Acquired immune deficiency syndrome [RCD99/PT/XE0RX] -- #5

#2
CST95/HT1/UG/MG/PROS
COSTART: coding symbols for thesaurus of adverse reaction terms
Urogenital System
Male Genital Disorders
epididymis +
male breast +
Male Genital Disorders, General and NEC +
penis +
<prostate> = Atom Meaning: Disorders of the prostate
PROSTATE NEOPLASIA
PROSTATIC CARCINOMA
PROSTATIC DISORDER
PROSTATIC SPECIFIC ANTIGEN DECREASE
PROSTATIC SPECIFIC ANTIGEN INCREASE
scrotum +
seminal vesicles +
testis (excluding endocrine function) +

#3
CPT2001/PT1/82175
Physicians' Current Procedural Terminology
Pathology and Laboratory Tests
Chemistry Pathology and Laboratory Tests
<Arsenic> = Atom Meaning: Measurement of Arsenic

#4
ICD10/PS1/Y53.4
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)
External causes of morbidity and mortality
Complications of medical and surgical care
Drugs, medicaments and biological substances causing adverse effects in therapeutic use
Agents primarily affecting the gastrointestinal system
<Other laxatives> = Atom Meaning: Other laxatives causing adverse effects in therapeutic use

REVIEW – w/out notes or handouts

CN#12937853
Cotton Candy
CUI 0001739
Def: A pink sweet sticky substance eaten mostly by small children.

Atoms:
Cotton Candy [MSH01/MH/D073923]
Cotton Candy [SNMI98/PT/L-3729382]
Cotton Candy [CSP00/ET/39273-38334]
Cotton Candy, NOS [SNMI98/PT/L-3729381]
Candy, Cotton [MSH01/EP/D07923]
Cotton Candies [AOD99/NP/00000003723]
Coten Candy [LNC10I/LN/NOCODE]

Context
MSH2001/MH1/D073923
Medical Subject Headings
Technology, Food and Beverages (MeSH Category)
Food and Beverages
Food
Bread
Candy
Chewing Gum
Cotton Candy
Cereals +
Condiments +
SNMI98/PT/L-3729382
Hazardous or Poisonous Substances
Found In Elvis's Body When He Died
Drugs Found +
Food Found
<Cotton Candy>
Cotton Candy, NOS
Peanut Butter Sandwiches +
SNMI98/PT/L-3729381
Hazardous or Poisonous Substances
Found In Elvis's Body When He Died
Drugs Found +
Food Found
Cotton Candy
<Cotton Candy, NOS>
Peanut Butter Sandwiches +

Relationships

Candy is Broader than Cotton Candy
Sugar is Broader than Cotton Candy
Provide ice chips, wet washcloth, or hard candy is not related to Candy

1. How many concepts are listed above?

2. How many atoms are there?

3. How many strings are there and what are they?

4. How many sources are there?

5. How many termtypes are there?

6. List the termtypes from MeSH.

7. How many different codes are there?

8. What is the code from CRISP?

9. How many terms are there & what are they?

10. Is this concept an example of respecting the source?

VII. RELATIONSHIPS IN THE METATHESAURUS

The purpose of Relationships in the Metathesaurus is to link concepts to each other. By linking concepts to each other, sources become linked to each other.

- Example: The concept of Fortified Wine has an atom from AOD and a relationship to Wine, which contains a MeSH atom. So there is now a link between AOD and MeSH.

Methods in Creating Relationships:

- Relationships can be provided by the source vocabularies.
    - Entry Terms to Preferred Terms
    - Other terms from sources have relationships between them which creates relationships between the concepts the terms are in
    - Links to other sources are sometimes provided (ex. mapping between ICD9 diseases and CPT procedures)
- The editors can create relationships.
    - Relationships are created during normal editing, especially when concepts are split apart
    - Special projects exist to create certain types of relationships for certain reasons

Types of Relationships:

The most basic relationship is synonymy. There also exists Broader & Narrower (BRD & NRW), Related (REL) and Not Related (XR).

Broader And Narrower Relationships:

- Aside from determination of synonymy, the next most important determination is whether there is a Broader or Narrower relationship between two concepts.
- One is the inverse of the other. So, if Mammals is Broader than Dogs – Dogs is automatically Narrower than Mammals.

- Editors need only to specify the relationship in one direction. Because the Metathesaurus is a relational database, if an editor makes "Flower" narrower to "Plant," then the database will make "Plant" broader than "Flower."

    - IS IT BROADER? Does it have a meaning that includes that of the concept?
      Examples: Mammals **is Broader than** Dogs.
      Dessert **is Broader than** Ice cream.

    - IS IT NARROWER? Does it have a meaning that is included in that of the concept?

      Examples:
      Chow Chow **is narrower than** Dog.
      Lemon meringue pie **is narrower than** Pie.

Are They Related?

- If not Broader/Narrower/Synonymous, consider whether two concepts have a useful relationship. At first, new editors will review only existing relationships. As an editor learns more they will become knowledgeable about what NLM considers a useful relationship.

  Examples:

    - France is related to French.
    - Anti HIV agent is related to AIDS.
    - Tooth brushing is related to Oral Hygiene.
    - PCP is related to PCP abuse.
    - Refrigeration is related to Freezing.
    - Snake venom is related to Snakes.
    - Smoking is related to Tobacco.

Are They Not Related (XR)?

- The Not Related relationship is used primarily to prevent editors from having to repeatedly review concepts that have similar strings but do not mean the same thing. The presence of a XR relationship indicates that two concepts should not be merged.
    - Examples: Camping **is not related to** Camp Protocol
      Indiana **is not related to** Indian race

- Not Related is also used when atoms are split out of a concept into a new concept and there is no relationship between the two concepts.

- A XR relationship should never be created just to indicate that two concepts have no relationship

- XR relationships are not released in the Release Files.

- Editors cannot delete relationships, so if an ugly relationship exists, a XR relationship can be assigned and then it will not be released to the UMLS users.

Level of Relationship:

In addition to establishing relationships between two concepts, NLM maintains information on where that relationship was derived. This information is known as the level of the relationship.

- There are three Levels of Relationships:

    - Concept (C)
    - Source (S)
    - Processed (P)

- Concept Level

    - Always created by an editor
    - Exception: Debris from MEME-I (old system/early days)
    - Only one concept level relationship is allowed between any two concepts
    - Editors should change the relationship if they feel the concept level relationship is incorrect
    - Concept to concept linked
    - Cannot be deleted by editors

- Source Level

    - Relationships that have been assigned by a source
    - An editor should be able to tell which source asserted the relationship by source of relationship information
    - These will be released even if there is a concept level relationship that conflicts with it
    - There can be multiple source level relationships between two concepts
    - Atomic relationship: Atom to atom linked
    - Cannot be deleted by editors

- Processed Level

    - Relationships created by Apelon during a source insertion

- They will never be released
- When overridden, they become concept level
- Atomic relationship

Relationship Status Categories:

- Reviewed – R
- Needs Review – N
- Unapproved – U
- Demoted Match – D
- LIK
- RT?
- NSY

  - Reviewed

    - Should have already been reviewed by another editor or were brought in from another source
    - Do not spend to much time looking at these unless specific instructions are given to do so
    - If there is something that is ugly or a problem – fix it
    - If there are lots of things that appear to be problems, ask first before spending too much time on these.

  - Needs Review: Must be reviewed by an editor.

  - Demoted Match

    - Until editors receive demotions training, notify NLM if one of these appears on a work list

  - LIK (LIKE)

    - Always appears in the unreviewed/unapproved field of a concept

  - RT?

    - Usually an indication of some type of relationship from a source
    - Entry vocabulary that has some relationship to the preferred term
    - Relationship may be BRD, NRW, SYN or REL
    - These only need to be edited if they appear as needs review or NLM specifically asks for them to be edited
    - NLM does not always edit these due to time constraints

- NSY
    - Concept level clones of RT? Relationships
    - Produced from entry vocabulary that has some relationship to the preferred term
    - If these are status N and there is time, an editor needs to decide if synonymous or assign some type of rel
    - If there is not a lot of time to edit these rels, editors just look to see if the two concepts are synonymous and merges

More Hints on Editing Relationships:

- Editors usually only edit existing relationships and do not create new ones.
- Try to respect source relationships.
- Don't assume to know the meaning of a related term based on the concept name shown on the report. The concept reports of the related concepts need to be looked at also when deciding on relationships.
- Don't spend a lot of time trying to decide between assigning BRD/NRW vs. Related.

Hints for Source Level Relationships:

Sources that are merged into the UMLS Metathesaurus usually contain their own representations of relationships and hierarchies of terms within their own source vocabularies. It is important to maintain the integrity of these relationships as established by the contributing sources, and they are rarely if ever changed by Metathesaurus editors. Relationships assigned by the source are attributed to them at publication, as indicated by the letter "S" (source) at the end of the entry, as opposed to "C" or concept level relationships, which are created or approved in the Metathesaurus editing process.

Hints for Concept Level Relationships:

Concept level relationships are created by the Metathesaurus in order to link the vocabularies of the various sources, and to provide useful connections between related concepts in these vocabularies. Metathesaurus editors create concept level relationships, and the Metathesaurus is responsible for their accuracy. A primary duty of the editor is to establish synonymy between equivalent terms in the vocabularies, and to merge these entries as appropriate. It is also useful at times to relate these concepts from various sources within a logical framework, as being broader to, narrower than, or otherwise related to other concepts in the database.

Hints for Broader/Narrower Relationships:

It is essential, when trying to establish whether and how a concept is related to another, to consciously formulate in precisely what way the two concepts are related. The designation of a relationship as being broader/narrower should be restricted to those concepts in which the broader term can clearly be seen to subsume or include the narrower term. Physically or conceptually it "is a," or is "part of," the broader term. For instance, "cardiac surgery" would be narrower to "surgery," but only related to the discipline of "cardiology." If in doubt as to whether two concepts have

a true broader/narrower relationship, it is better to define the relationship as (other) "related."

Hints for Other Related Relationships:

In deciding whether two concepts should be linked as related in the Metathesaurus, decide whether the "needs review" concept in some way clarifies or defines the primary concept, or has some other clear relationship as discussed above. For example, "Human circadian rhythm" would be linked as narrower to "circadian rhythm," but could also be linked as other related to "sleep" because circadian rhythm affects sleep. This would therefore be a legitimate "related" linkage in the database. Specific drugs, as another example, are linked as related in the Metathesaurus to laboratory procedures that measure the serum levels of those drugs. When looking at relationships, consider the usefulness of the link for users of the resource. Does the other concept provide additional information, such as linkages to other useful concepts? Will the relationship endure? For example, diseases and their specific drug treatments are not related in the database, because this is a relationship that may change as therapies advance.

Hints for Creating "Orphan" Relationships:

Although not a routine editing task, at times editors will be asked to create a relationship for "orphans", that is, concepts without links to any other concept in the database. For this task, fairly narrow criteria are used. Concepts should be linked to their nearest direct parent when possible, that is, the closest "broader" term that would be inclusive of the entry term, for example, "Traumatic rupture of bronchus" would be linked to "Rupture of bronchus," as opposed to the more distantly related "Traumatic rupture," "Trauma" or "Bronchus." Again, the broader term should subsume or in some way be definitional of the narrower "orphan" concept. However, directly hierarchical or "closely broader" concepts are not always to be found in the Metathesaurus, in which case judgment must be made as to what concept or concepts would most usefully relate the "orphan" to its relatives.

The most obvious link at first glance to a "broader" concept in the Metathesaurus may not be the best choice for several reasons. "Ovarian cancer," for example, could link to "cancer," but such a general link is less useful than a narrower link to "gynecological malignancies." It can be helpful to visualize the concept as existing within a conceptual framework or hierarchy, even if none is provided by the source. Is there a "regional" concept that would effectively encompass the orphan concept, for example, "pulmonary function disorder" as broader to "lung disease" rather than simply "disease." Here one notes also different terms with a synonymous meaning, as in "cancer" and "malignant neoplasm." Try to think of such synonyms or closely related terms when searching for related concepts. Avoid if possible creating relationships to broad root terms such as "disease" or "syndrome" which are poorly definitional, and which are too broad to provide other useful links related to the orphan concept.

In choosing appropriate relationships for an orphan entry with no close semantic parent, look next to useful “other related” relationships. The relationship should conform to the criteria for relatedness as detailed in the Relationship Attributes list. These are organized conceptually into tree form for convenient reference in the “UMLS Semantic Network” available online. Generally only one, but up to a maximum of three new relationships should be created.

Strategies for searching for and choosing related concepts should take into account practical as well as conceptual search strategies. For example, think of any possible alternative spellings (“labor” versus “labour,” or “heme” versus “haem”), which may have been used. Often there are British and American variants of a term. Omitted or added spaces or hyphens may limit captured entries in a search, so try various alternatives for terms such as “transfatty” (trans-fatty) acids. Some entry terms that find their way into source vocabularies are simply incorrect in spelling. They should be linked with or merged to other, correct entries.

Finally, when creating relationships it is important to give precedence to forming links with concepts that include major sources, particularly MeSH concepts, or those which contain useful definitions. Look to see if the linked entry contains other related concepts useful to the searcher. Consider as well whether the linked concept would be a logical place to “look” for the orphan entry.

Hints on the Use of "Not Related" or "XR":

The primary use of the relationship "XR" is to clearly indicate that two concepts with similar or identical atoms or strings in fact have a distinct meaning, i.e., "cold" the temperature should be linked as "XR" or not related to "cold" the disease. Acronyms with multiple meanings should also have "XR" relationships in the Metathesaurus, i.e., "P.E." for "pulmonary embolism" should be linked as "XR" to a concept containing "P.E." for "physical education." In general, "XR" is used only to clarify that similar-looking concepts are in fact not related, or to indicate that an already-created "relationship” is in fact not related to the current concept.

Exercise on Relationships in the Metathesaurus:

Instructions: Please assign a relationship to the concepts below.

1. Postoperative wound break down _____ Post-operative wound break down
2. Obstetrical air embolism, unspecified as to episode of care _____ Embolism, Air
3. Procedural site reaction _____ Catheter site related reaction
4. Arterial catheter insertion _____ Needles
5. T3 uptake measurement _____ Triiodothyronine
6. Secondary diagnosis _____ Selenium
7. Folate decreased _____ Blood Folate decreased
8. X-ray of thigh, knee & lower leg normal _____ X-ray of thigh, knee & lower leg
9. X-ray of fingers abnormal _____ X-ray NOS upper limb abnormal
10. Biopsy of bone excluding marrow _____ Biopsy of bone
11. ECG abnormal specific _____ Electrocardiogram abnormal specific
12. PR shortened _____ Shortened P-R interval
13. Pressure central venous increased _____ CVP increase
14. Stammering and Stuttering _____ Stuttering
15. Snow _____ Skier

Answers: Exercise on Relationships in the Metathesaurus:

1. Postoperative wound break down **is Synonymous with** Post-operative wound break down
2. Obstetrical air embolism, unspecified as to episode of care **is Narrower than** Embolism, Air
3. Procedural site reaction **is Broader than** Catheter site related reaction
4. Arterial catheter insertion **is Not Related to** Needles
5. T3 Uptake measurement **is Related** Triiodothyronine
6. Secondary diagnosis **is Not Related to** Selenium
7. Folate decreased **is Broader than** Blood Folate decreased
8. X-ray of thigh, knee & lower leg normal **is Related** X-ray of thigh, knee & lower leg
9. X-ray of fingers abnormal **is Narrower** X-ray NOS upper limb abnormal
10. Biopsy of bone excluding marrow **is Narrower than** Biopsy of bone
11. ECG abnormal specific **is Synonymous** Electrocardiogram abnormal specific
12. PR shortened **is Synonymous** Shortened P-R interval
13. Pressure central venous increased **is Synonymous** CVP increase
14. Stammering and stuttering **is Related** Stuttering
15. Snow **is not related to** Skier

Relationship Attributes (relA)

What is a relA?:

- Part of the Semantic Network
- A set of potentially useful non-hierarchical relations between Semantic Types
- Helps to further define relationships
- Are frequently added as part of the source insertion process
- See on concept reports
- Grouped into five major categories, which are themselves relations: "physically related to", "spatially related to", "temporally related to", functionally related to", and "conceptually related to."

Context Relationship:

- CHD – is a child of the concept
- PAR – is a parent of the concept
- SIB – is a sibling to the concept
- Repeats information seen in the context portion of the report

Relationships On A Concept Report:

- Appear towards the end of the concept report
- Order on report
    - Only see section if a relationship exists
    - Needs Review appears first
    - Reviewed Related
    - Suggested
    - Unreviewed

- If there are no rels from the above categories, context rels will appear.

- If there are multiple source relationships between 2 concepts, only the winner determined by precedence is shown.

- If there is a source and concept relationship between two concepts, only the winner will be seen (concept rels will win).

- There are ways to change what is displayed (usually only needed for special projects).

- For more information on changing relationship displays, see:
  New Relationships display

Example of a Concept Report with Relationships:

As of 27-nov-2000 14:37:46, this entry had no problems/issues.
.....
CN# 495797 Ensure mushroom liquid
CUI C0546890 Concept Status is Reviewed
STY Food R
ATOMS
R [] Ensure mushroom liquid [RCD99/PT/x00UP]

CONTEXTS
RCD99/PT1/x00UP
Read thesaurus
Drug
Foods, vitamins, electrolytes and inorganic salts
Enteral+supplement feeds
Ensure
Ensure liquid
Ensure asparagus liquid
Ensure chicken liquid
Ensure chocolate liquid
Ensure coffee liquid
Ensure egg-nog liquid
<Ensure mushroom liquid>
Ensure sav mushroom liquid 250mL
Ensure nut liquid
Ensure vanilla liquid

REVIEWED RELATED CONCEPT(S)
[BRD] Ensure [MSH2001/NM||E-TPW|MSH99] {1316305} C
[NRW] Ensure nut liquid 946mL [RCD99/OP||E-TPW|E-TPW] {197797} C
[REL] Ensure chocolate liquid [RCD99/PT||E-LAD|E-LAD] {594877} C
[REL] Ensure coffee liquid 946mL [RCD99/OP||E-TPW|E-TPW] {499816} C
[REL] Ensure chocolate liquid 250mL [RCD99/OP||E-TPW|E-LAD] {499774} C
[REL] Ensure egg-nog liquid [RCD99/PT||E-TPW|E-TPW] {495801} C
[REL] Ensure nut liquid [RCD99/PT||E-TPW|E-TPW] {495800} C
[REL] Ensure coffee liquid [RCD99/PT||E-TPW|E-TPW] {495799} C
[REL] Ensure chicken liquid [RCD99/PT||E-TPW|E-TPW] {495798} C
[REL] Ensure vanilla liquid [RCD99/PT||E-TPW|E-LAD] {205023} C

[REL][1.] Ensure asparagus liquid[2.] [RCD99/PT[3.] | [4.] | E-TPW[5.]| E-TPW[6.]] {495796[7.]} C[8.]

1. The relationship between the concept in the relationship portion of the report and the concept being looked at. For BRD/NRW relationships, read from right to left. In the example above, a NRW rel would be Ensure asparagus liquid is narrower than Ensure Mushroom Liquid.

2. This is the preferred name of the concept.

3. This is the preferred term group of the concept.

4. The relationship attribute between the two concepts. The example above does not contain one, but instead contains a null value.

5. The source of the relationship. Usually either a source (i.e. RCD99, an editor as shown above or something that was done during an insertion, L-BAC).

6. The authority of the relationship.

7. The Concept ID.

8. The level of the relationship (i.e. S, C).

Bequeathal Rels:

CUIs are the unique concept identifier. The identifier remains the same across versions of the Metathesaurus irrespective of the term designated as the preferred name of the concept. This facilitates file maintenance and management. In the Metathesaurus distribution formats, all data elements are linked to the concept(s) to which they belong.

If a CUI no longer exists in the Metathesaurus, it means that the meaning is no longer in the Metathesaurus. In same cases an editor will find that the meaning still exists in the Metathesaurus. If in fact it doesn't exist, we want to find the concept(s) that has the closest meaning to the CUI that was deleted.

Apelon has created a query to identify which CUIs are going to die. These are cases where all atoms w/in a concept will be deleted when the next release is made. In these cases, an edited must either decide that this concept is really synonymous w/ an existing concept or create a bequeathal rel to the closest concept or concepts. An editor will only assign bequeathal Rels if it has been specifically assigned as a task on a given worklist.

Instead of assigning the regular relationships: BRD, NRW, REL, use the bequeathal forms of these in the interface. BBT, BNT, BRT.

How to choose the best CUI to bequeath a deleted CUI to:

Is there a living concept in the Metathesaurus that has the same meaning? We found many cases where a source killed something because it contained a typo.

For example:

LOINC had GLASCOW COMA SCORE.EYE OPENING
It died but they created GLASGOW COMA SCORE.EYE OPENING

In other cases we found missed synonymy because one concept contains a parenthetical such as "central nervous system (CNS)".

2. If there is no synonymous concept, try to map to the same source first, preferring the parent.

For example: C0498076
ONLAY-COMPOSITE/RESIN-PER TOOTH (IN ADDITION TO INLAY-LABORATORY PROCESSED)

is BNT

C0498076 Inlay/Onlay Restorations

Both of these concepts were from HCPCs. C0498076 is a Hierarchical term from

the section that C0498076 came from.

3. Choose something broader rather than close in meaning when possible.

4. If the meaning appears to be mapped to any single reasonable CUI then do not map to multiple CUIs.

Or if the meaning cannot be mapped to any reasonable CUI than map to multiple CUIs.

5. Choose simple (& general) as opposed to complex pre-coordinated expression or multiple CUIs.

Examples:

C0499279 INTERMITTENT URINARY CATHETER, DISPOSABLE; STRAIGHT TIP
is BNT
C0497833. INTERMITTENT URINARY CATHETER; STRAIGHT TIP, EACH

LOWER GI TRACE - C0489859
is BRT
C0489144 STOOLS:APPEARANCE:POINT IN TIME:LOWER GI TRACE:QUALITATIVE

C0369194 ESTRIOLS.TOTAL
Is a Synonym
C0014927 Estriol
Note: This was from LOINC which had it related to:
C0364383 ESTRIOL.TOTAL:MASS CONCENTRATION:POINT IN TIME:AMNIOTIC FLUID:QUANTITATIVE
whose concept name has been changed to:
ESTRIOL:MASS CONCENTRATION:POINT IN TIME:AMNIOTIC FLUID:QUANTITATIVE

C0500278 IMMUNOASSAY, INFECTIOUS AGENT ANTIGEN, QUALITATIVE OR SEMIQUANTITATIVE
is BBT than two CUIs
C0373856 IMMUNOASSAY FOR INFECTIOUS AGENT ANTIGEN, QUALITATIVE
OR
SEMIQUANTITATIVE; MULTIPLE STEP METHOD
and

C0520389 IMMUNOASSAY FOR INFECTIOUS AGENT ANTIGEN, QUALITATIVE OR SEMIQUANTITATIVE; SINGLE STEP METHOD (EG, REAGENT STRIP)

Final notes:

In some cases an editor may feel that they cannot create a relationship. If an editor feels that they can find any concept that could even be generally related to the deleted concept in a reasonable amount of time, notify NLM. There also may be cases where the concept is not a useful biomedical meaning and is not mappable to any current UMLS concept (e.g.,   in PDQ). There should be very few of these.

VIII. THE SEMANTIC NETWORK

General Information:

In general, semantic networks attempt to impart common sense knowledge to computers, allowing them to "reason" and draw conclusions about entities by virtue of the categories to which they have been assigned.

The semantic links of a network provide the structure and represent important relations within the domain.

UMLS Semantic Network:

The UMLS Semantic Network is tied closely to the content of the Metathesaurus. The Semantic Types in the UMLS Semantic Network provide a categorization of all concepts represented in the UMLS Metathesaurus. There are currently 134 Semantic types in the UMLS. These are broad categories that are intended to indicate the general area of meaning of a Metathesaurus concept. There are 54 semantic relationships among the Semantic Types.

Structure:

- Semantic Types are the nodes in the network.
- Relationships between them are the links. The primary link is the "is a" link.

Content:

The Semantic Network can be visualized as a diagram where the types make up nodes within a network. The top of the network has two nodes, "Entity" and "Event." The remaining types each appear only in one location within the Network. The major groupings of the Semantic types include:

A. Entity

1. Physical Object
2. Anatomical Structure
3. Manufactured Object
4. Substance

B. Conceptual Entity

1 Idea of Concept
2. Finding

3. Organism Attribute
4. Intellectual Product
5. Language
6. Occupation or Discipline
7. Organization
8. Group Attribute
9. Group

C. Event

1. Activity
2. Phenomenon or Process
3. Injury or Poisoning

Semantic Types:

Semantic Types (abbreviated STY) are derived from the Semantic Network and their function is to categorize concepts.

- The STY is the Basic Category or Categories to which a Concept is assigned. For example:
    - Acquired Immunodeficiency Syndrome **is a** "Disease or Syndrome"
    - Compact bone of phalanx of the left middle finger **is a** "Body Part, Organ, or Organ Component"
    - Carcinoma in Situ **is a** "Neoplastic Process"

- Each concept in the Metathesaurus is assigned at least one STY. A concept can not be released if it does not have at least one STY.

- The purpose of the Semantic types is to link between the Metathesaurus and the UMLS Semantic Network. Application programs may be able to use the Semantic Type information to determine the general topics of interest in a particular user query.

- In order to understand the purpose of an STY, editors need to read the usage notes and definitions that each STY is given. Do not rely on the STY name alone to determine its meaning and usage.

STY Hierarchy & STY Definitions and Usage Notes (Please see Link)
UMLS Semantic Type Definitions

General Rules On Typing Semantic Types:

- Assigning a concept to a particular Semantic Type only if the concept has an "is_a" relationship to that type. For Example:
    - Agaricales is_a "Fungus"
    - Mushroom Poisoning is_a "Injury or Poisoning." Mushroom Poisoning is NOT a "Food."
    - Mushroom Poison is_a "Hazardous or Poisonous Substance." Mushroom Poison is NOT an "Injury or Poisoning."

- It is important to read the definition and usage notes for each Semantic Type. It is not possible to rely solely on the name of the Semantic Type, since there are often shades of meaning involved. The definition makes clear the intended meaning in the UMLS context.

- Assign STYs according to the primary meaning to the concept.

- Do not assign both parent and child Semantic Types from the hierarchy.
- If all children apply, then assign the parent.
- If only some children apply, then assign the more specific type as appropriate.
- All concepts MUST have at least one Semantic Type.
- Respect the meaning of the concept in the source, not the categorization by that source.
- Please use Semantic Types themselves and not the "T" numbers when paper editing.

Additional Information on Semantic Typing:

- General hint: Semantic typing is not always black and white.
  - Don't change existing types if they seem reasonable
  - Don't spend too much time trying to decide between STYs if they both seem reasonable
  - Ask if there are questions or something is not clear when assigning STYs
- NLM only sends back concepts for STY reassignment when the STYs are clearly wrong. For example, Mammal being assigned to Gophers (computer network).
- NLM runs queries to check for STY patterns that may be problematic. After the initial training period, NLM does not look at the STYs for every single concept.
- Some gray or problem areas include:
  - Disease or Syndrome vs. Finding vs. Pathologic Function
  - Congenital Abnormalities – must be structural, does not include genetic abnormalities
  - Abnormalities vs. Disease or Syndrome – assigned both if the condition has to be treated
    - Six fingers on the right hand is an abnormality but it does not need to be treated. Therefore, it is not a Disease.
  - Tissue vs. Body Part, Organ or Organ Component
  - Groups vs. Professions (nurses vs. nursing)
  - Finding vs. Laboratory Results
  - Classification
  - Organism Attribute - Something that is going to be measured and applies to the organism as a whole or one of it's major parts. Things like height/ body weight/body temperature.

- Clinical Attribute - If it is something to be measured and it doesn't apply to the entire organism then it is a clinical attribute. Like ACCOMODATION WIDTH MEASURED.
- Finding - If something is measured and a determination is made then it is a Finding. For example: Ineffective airway clearance
- If the concept includes a Finding as a result of a disease, then it should be typed as disease. For example: Ineffective airyway clearance due to chronic obstructive pulmonary disease

See Appendix A for more Semantic Type examples…..

Semantic Type Exercise:

Instructions: Please assign a Semantic type to the concepts listed below.

1. Skeletal bone
2. Organisms
3. Diseases
4. Chemical Compounds
5. Analytical, Diagnostic and Therapeutic Techniques and Equipment
6. Psychiatry
7. Physiologic Processes
8. Half-Life
9. Democracy
10. Coconut
11. Nobel Prize
12. Information Centers
13. Medically Uninsured
14. Patient Care Management
15. Geographic Locations

Answers to Semantic Type:

1. <T023> Body Part, Organ, or Organ Component
2. <001> Organism
3. <T047> Disease or Syndrome
4. <T103> Chemical
5. <T185> Classification
6. <T091> Biomedical Occupation or Discipline
7. <T039> Physiologic Function
8. <T079> Temporal Concept
9. <T078> Idea or Concept
10. <T168> & <T002> Food & Plant
11. <T073> Manufactured Object
12. <T073> & <T092> Manufactured Object & Organization
13. <T098> Population Group
14. <T058> Healthcare Activity
15. <T083> Geographic Area

IX. CONCEPT REPORTS

Editors use concept reports to edit. The reports are either printed out for editing on paper or can be viewed online from the editing interface or Meow. Concept reports display all the relevant information in a concept that an editor needs.

Basic Sections of a Concept Report:

1. As of 27-nov-2000 14:37:46, this entry had no problems/issues.
.....
2. CN# 1073130 Snow
3. CUI C0037386 4. Concept Status is Reviewed
5. STY Natural Phenomenon or Process R
STY Substance R
6. SCT {noun/noun phrase}
7. DEF [Do not release]
- DOR27/DT|a freezing or frozen mixture consisting of discrete particles or crystals. Dorland's Illustrated Medical Dictionary 27th edition; entry for snow.

ATOMS
8. R [] Snow [MSH2001/MH/D012914]
R Snow [RCD99/PT/XC0Bm]
R Snow [LCH90/PT/U004353]
R {Snow [MSH2000/MH/D012914]}
R Snows [MSH2001/PM/D012914]
R {Snows [MSH2000/PM/D012914]}
R snow [AOD99/ET/0000013358]
R {snow [DOR27/DT/U018441]}
NEVER {snow [AOD95/ET/0000011475]}

LEXICAL RELATIONSHIPS
{ Snow [SFO] / [LFO] Snows {MSH2001} }

CONCEPT NOTE(S)
- MSHSugg add STY natural phenomenon with Substance

9. CONTEXTS
AOD95/ET1/0000011475
Alcohol and Other Drug Thesaurus
history, geography, and the environment
geography
physical geography
climate and weather
weather
type of precipitation
hail
rain

sleet
<snow>
AOD99/ET1/0000013358
Alcohol and Other Drug Thesaurus
history, geography, and the environment
geography
physical geography
climate and weather
weather
type of precipitation
hail
rain
sleet
<snow>
MSH2000/MH1/D012914
MeSH
Biological Sciences (MeSH Category)
Environment and Public Health
Environment
Meteorological Factors
Atmosphere
Weather
Humidity
Lightning
Rain +
<Snow>
Sunlight +
Temperature +
Wind
MSH2001/MH1/D012914
Medical Subject Headings
Biological Sciences (MeSH Category)
Environment and Public Health
Environment
Meteorological Factors
Atmosphere
Weather
Humidity
Lightning
Rain +
<Snow>
Sunlight +
Temperature +
Wind
RCD99/PT1/XC0Bm
Read thesaurus

Additional values
Substances, materials and objects
Substances
Substance categorised structurally
Natural form of water
Fresh water
Ice
Sea water
<Snow>

10. REVIEWED RELATED CONCEPT(S)
[REL] sleet [AOD99/ET||E-TMC|E-TMC] {1417198} C
[REL] hail [AOD99/ET||E-TMC|E-TMC] {1417197} C
[REL] Skier [RCD99/PT||E-GLH|E-KLL] {156465} C

11. There are 26 context relationships not shown here.

There are also 1 hidden regular relationships not shown here.

Concept was released in Meta2000 as Approved.
12. Last MEME action: MOLECULAR_DELETE, performed by MSH2001 on 25-oct-2000 21:04:23

Explanation of the Basic Sections of a Concept Report:

1. The last time status information was computed for this concept through a process called matrix initialization.

2. The Concept ID (CN#) is a numeric unique identifier used to identify the concept internally in the MEME system. This is followed by the concept name.

3. The CUI is an 8-character unique identifier that starts with a leading C that identifies the concept.

4. The status of the entire concept at the time the concept report was created. Status is one of:

R: Reviewed
N: Needs Review
U: Unreviewed (usually MeSH supplementary concepts)
E: Embryonic concept (still being constructed)

5. This section list the semantic types currently assigned to the concept. A reviewed concept must have at least one semantic type.

The status of the semantic type attribute is shown at the end of each line. Status is one of:

R: Reviewed
N: Needs Review
U: Unreviewed (usually MeSH supplementary concepts)

6. This section lists the syntactic category of the strings in the concept. This attribute correctly belongs in the UMLS Specialist Lexicon and is maintained there.

7. This section lists definitions for the concept from all the sources that make this information available.

The definition is marked "Release" or "Do not release" depending on whether the definition can be released to UMLS licensees, or is only made available for editing purposes.

8. The ATOMS section lists the strings from the different sources that together comprise the meaning of the concept. A leading "D" indicates that this atom participated in a demotion. A leading "M" means that this atom has been merged into this concept. A leading "S" means that the atom is suppressible. This is followed by the status of the atom itself (R: Reviewed, N: Needs Review, U: Unreviewed, E: Embryo). If there is a NEVER instead of one of the statuses listed above, that means that atom is never

released. It at some point will be removed from the database. This usually is seen with older versions of sources, bad PNs, or other bad atoms.

The status may be followed optionally by []. The brackets indicate where a lexical tag would appear if one was present. Since lexical tags are assigned to one lexical string, the brackets also divide the lexical variants and indent all variant strings under the preferred lexical string.

The structure of the atoms is as follows:

Sandwich – dietary [RCD99/PT/UblqO]

The atom name, then in brackets, the source, the term type and the code assigned by the source for the atom (separated by /). In the example above,

Sandwich – dietary = Atom name
RCD99 = Source
PT = Term type
UblqO = Source code

9. The Contexts section shows the context from different sources for the atoms present in the concept. The current atom is surrounded by angled brackets <> in the context. Only parent-child relations are shown. A trailing + indicates non-leaf terms that subsume other terms.

At the top of each hierarchy is information on which source the context came from (Example: AOD95/DE1/00000004283). The first field denotes the source abbreviation. The second field is the term group and the third field is the source code of the atom in the concept.

The Contexts are listed alphabetically by source. Not all concepts will have context present.

10. Reviewed Relationships are ones that have been approved by editors. A Reviewed Relationship has the following structure:

[NRW] HIV Wasting Syndrome [MSH2001/MH|mapped_to|E-KLL|E-KLL] {1112510} C

In [], the type of relationship. Then, the preferred name of the concept the relationship is linked to. In [], the first field is the preferred termgroup of the related concept, the second field contains the relationship attribute, the third field is lists the source of the relationship and the fourth field lists the authority of the relationship. The concept_id of the related concept is in {}. This is followed by the level of the relationship (ex. C or S). If a little "n" appears after the relationship level, this means the relationship will not be released. It can be turned back to releasable in the future. If a NEVER appears, the relationship will never be released.

[11.] After displayed relationships, there may be a line or two:

There are 26 context relationships not shown here.
There are also 1 hidden regular relationships not shown here.

These messages indicate if there are more relationships present in the concept that are not displayed in the concept report. These relationships can be context relationships (they come from the source hierarchies) or source level relationships that are not normally shown since editors are not responsible for editing these. The report option in Meow and the editing interface can be changed to show these relationships if an editor needs more information for editing.

[12.] This line indicates the last action done on the concept and by whom and on what date. In the example above, a delete was done by L-DRH on Jan. 25th. If the concept had been approved, the initials of the person who approved it and the date it was approved would be listed.

If the concept has not been touched during the current editing cycle, this message will appear:

Concept was released in Meta2001 as Approved.

Note: Editor's initials are seen only by NLM and are not released to the public.

Additional parts of Concept Reports:

There are some other sections of a concept report that may not appear in all reports but provide important information.

CN# 863871 Seen by marriage guidance counselor
CUI C0583519 Concept Status is Reviewed
STY Finding R
ATOMS
R [] Seen by marriage guidance counselor [RCDAE/PT/XaAS3]
S R [] Seen by marriage guidance cllr [RCD99/AB/XaAS3]
R [] Seen by marriage guidance counsellor [RCD99/PT/XaAS3]

[1.] LEXICAL RELATIONSHIPS
{ Seen by marriage guidance cllr [SFO] / [LFO] Seen by marriage guidance counsellor {RCD99} }
{ Seen by marriage guidance counselor [SFO] / [LFO] Seen by marriage guidance counsellor {MTH} }

[2.] ATOM NOTE(S)
[Seen by marriage guidance cllr] This is a note for a specific atom in the concept.

[3.] CONCEPT NOTE(S)
This concepts refers to a finding. (LAD 9/28/99).

CONTEXTS
RCD99/PT1/XaAS3
Read thesaurus
Administration
Administrative statuses
Patient encounter status
Seen by person
Seen by professional
Seen by health professional
Seen by counsellor
Seen by bereavement counsellor
Seen by genetic counsellor
<Seen by marriage guidance counsellor>
Seen by mental health counsellor

[4.] Versions: common (4.00), common2meme (9.00), molecular_actions (11.0), Reports (7.00), CONCEPTpp.pl (6.0).
This report ran against database: oa_mid2002.

reports.pl version used: Release 3: version 3.0, 04/27/2000 (BAC).
ORWeL.pl version used: Release 3: version 3.0, 4/27/2000 (BAC).

1. Lexical relationships consist of short form (SFO) and long form (LFO) atoms. Lexical relationships are usually created between abbreviations and the string the abbreviation represents.

The structure of a Lexical Relationship is:
{atom [SFO] / atom [LFO] {authority} }

2. If an atom note is present in the concept, it appears under the Atoms and Lexical Relationships in the concept report. The atom note will have the atom that it is attached to in [] and then the atom note. These are not released to the public. Internal use only.

3. If a concept note is present in the concept, it appears under the Atoms and Lexical Relationships in the concept report. The concept note will just display what the editor entered into the editing interface. These are not released to the public. Internal use only.

4. This section lists important information relating to the version of the software components used to produce the report as well as statistical data relating to who last approved the concept and when.

Additional Information on Concept Reports:

- What determines the concept name?
    - Precedence that is determined algorithmically
    - Editors cannot set concept name
    - The concept name can change anytime editing is done
    - Source and termgroup with highest precedence is MTH/PN followed by MeSH termgroups
    - See " Precedence for MEME-III" link off Meow for current precedence
- Why are some atoms and relationships surrounded by brackets {}?
    - Some data is present in the concept reports that will not be released when the Metathesaurus is produced for the public. These include data like old versions of sources and relationships that are not to be released (like XR rels). These data items are surrounded in {} to distinguish from the items that will be released.

      [BRD] {Administrators [MSH2001/EP|inverse_isa|NLM01|E-DAB] {271338} S} n

      R [] Professional Personnel [PSY2001/PT/40765]
      R {Professional Personnel [PSY97/PT/40765]}

      [BRD] {receptor [PDQ2001/PT|inverse_isa|NLM01|E-TPW] {983611} S} NEVER

Example of precedence:

As of 16-dec-2000 0:37:29, this entry had the following problems/issues:
- Concept contains one or more tbr=Y atoms with termgroup MTH/MM or MTH/PN and
- there are no other releasable atoms.

.....
CN# 1029208 Football game
CUI C0016517 Concept Status is Reviewed
STY Daily or Recreational Activity R
SCT {noun/noun phrase}
DEF [Release]
- MSH2000/MH|A competitive team sport played on a rectangular field. This is the American or Canadian version of the game and also includes the form known as

rugby. It does not include non-North American football (= SOCCER).

ATOMS

R [] Football game [MTH/PN/U003086] **Atom with highest precedence
R [] Football <1> [MTH/MM/U000151]
R Football [MSH2000/MH/D005538]
R Football [PSY94/PT/20090]
R Football [LCH90/PT/U001853]
R Footballs [MTH/PT/U000419]
R Footballs <2> [MTH/MM/U000451]
R football [AOD95/DE/0000011463]

CONTEXTS

AOD95/DE1/0000011463
Alcohol and Other Drug Thesaurus
sports
individual and team sports
team sports
baseball
basketball
<football>
ice hockey
rugby
soccer
MSH2000/MH1/D005538
MeSH
Anthropology, Education, Sociology and Social Phenomena (MeSH Category)
Human Activities
Leisure Activities
Recreation
Sports
Baseball
Basketball
Bicycling
Boxing
<Football>
Golf
Gymnastics
Hockey
Martial Arts
Mountaineering
Racquet Sports +
Running +

Example (no context):

As of 17-jul-2001 20:08:29, this entry had no problems/issues.

.....
CN# 1710671 Gaviscon Extra Strength
CUI C0720584 Concept Status is Reviewed
STY Clinical Drug R
ATOMS
R [TRD] Gaviscon Extra Strength [MMSL00/BN/11102]

REVIEWED RELATED CONCEPT(S)
[BRD] Gaviscon [RCD99/PT|isa|E-CCR|L-BAC] {296164} C
[NRW] Gaviscon Extra Strength, 160 mg-105 mg oral tablet, chewable [MMSL00/BD|isa|MMSL99|S-CCR] {1703676} C

There are also 1 hidden regular relationships not shown here.
Concept was released in Meta2001 as Approved.

Example (Only Context rels, no other rels present):

As of 17-jul-2001 20:08:29, this entry had no problems/issues.
.....
CN# 2008951 Observation of digit of hand
CUI C0730480 Concept Status is Reviewed
STY Finding R
ATOMS
R [] Observation of digit of hand [RCD99/PT/XaEEB]

CONTEXTS
RCD99/PT1/XaEEB
Read thesaurus
Clinical findings
History and observations
Clinical history and observations
Musculoskeletal observation
Observation of regional structure
Observation of upper limb
Observation of hand region
Absence of hand
Form of hand
General observation of the hand
Hand present
Hands normal
Named signs of hand
Observation of bone in hand
<Observation of digit of hand>
Form of finger or thumb

Observation of finger
Observation of musculoskeletal structure of digit of hand
Observation of thumb
Observation of function of hand
Observation of measures of hand
Observation of movement of hand
Observation of proportion of hand
Size of hand
Swelling of hand

CONTEXT RELATIONSHIP(S)
[PAR] Observation of hand region [RCD99/PT||RCD99|RCD99] {845444} S
[CHD] Form of finger or thumb [RCD99/PT||RCD99|RCD99] {158376} S
[CHD] Observation of musculoskeletal structure of digit of hand [RCD99/PT||RCD99|RCD99] {845481} S
[CHD] Observation of finger [RCD99/PT||RCD99|RCD99] {2008952} S
[CHD] Observation of thumb [RCD99/PT||RCD99|RCD99] {2008953} S

There are 13 additional SIB context relationships not shown here.

Concept was released in Meta2001 as Approved

Example (Merge present):

CN# 1094410 Librarians
CUI C0079695 Concept Status is Needs Review
STY Professional or Occupational Group N
SCT {noun/noun phrase}
DEF [Release]
- MSH2001/MH|Specialists in the management of a library or the services rendered by a library, bringing professional skills to administration, organization of material and personnel, interpretation of bibliothecal rules, the development and maintenance of the library's collection, and the provision of information services.

ATOMS
R [] Librarians [MSH2001/MH/D016245]
M R Librarians [PSY2001/PT/28314]
R {Librarians [PSY97/PT/28314]}
R Librarian [SNMI98/PT/J-19120]
R Librarian [MSH2001/PM/D016245]
R Librarian [RCD99/PT/02G1.]
R Librarian [SNM2/PT/J-19120]

LEXICAL RELATIONSHIPS
{ Librarian [SFO] / [LFO] Librarians {MSH2001} }

CONTEXTS
MSH2001/MH1/D016245
Medical Subject Headings
Persons (MeSH Category)
Persons
Occupational Groups
Administrative Personnel +
Clergy
Faculty +
Foreign Professional Personnel +
Health Personnel +
<Librarians>
Military Personnel
Missions and Missionaries
Police
Research Personnel
PSY2001/PT1/28314
PsycINFO Thesaurus
Education (PsycINFO Cluster Term)
Educational Personnel & Administration (PsycINFO Subcluster Term)
<Librarians>
PSY2001/PT2/28314
PsycINFO Thesaurus
Occupational & Employment (PsycINFO Cluster Term)
Occupational Groups (PsycINFO Subcluster Term)
<Librarians>
PSY2001/PT3/28314
PsycINFO Thesaurus
Personnel
Professional Personnel
Information Specialists
<Librarians>
PSY97/PT1/28314
PsycINFO Thesaurus
Personnel
Professional Personnel
Information Specialists
<Librarians>
RCD99/PT1/02G1.
Read thesaurus
Occupations
Management support professions
Librarian/information officer
Archivist
Information officer

<Librarian>
Librarian/info.officer NOS
Trainee librarian
SNM2/PT1/J-19120
SNOMED-2
Occupation Axis
Professional, Technical and Related Workers
Professional, Technical and Related Workers NEC
Librarians, Archivists and Curators
<Librarian>
SNMI98/PT1/J-19120
SNOMED International
OCCUPATIONS
PROFESSIONAL, TECHNICAL AND RELATED WORKERS
PROFESSIONAL, TECHNICAL AND RELATED WORKERS NEC
LIBRARIANS, ARCHIVISTS AND CURATORS
<Librarian>

REVIEWED RELATED CONCEPT(S)
[BRD] Information Specialists [MSH2001/EN||PSY94|L-BAC] {277235} C
[REL] Library Science [MSH2001/MH||MSH2001EC|MSH2001] {1043915} S
[REL] Professional Personnel [PSY2001/PT||PSY2001|PSY2001] {3013726} S
[RT?] {Medical Record Administrators [MSH2001/MH||NLM01|NLM01] {1046957}
S} n
[RT?] {Trainee librarian [RCD99/PT||NLM01|NLM01] {632514} S} n

There are 20 context relationships not shown here.

XI. CHEMICAL EDITING RULES

Semantic Types
Chemical editing involves a set of chemical STYs (listed on the next page)

- Most should have structural and functional STY. However, concepts that represent activity (i.e., Molecular Function and Genetic Function) should have only one.
- Try not to use Chem viewed functionally and Chem viewed structurally.
- Food and Plant are NOT typed together. Also, a substance that is exists as a food, a plant, and/or a pharmacologic substance must have separate concepts for each.
- Clinical drug is used for chemicals used as drugs AND contain info about its dose or form. Clinical Drug concepts are never double typed.\
- Sometimes two functional STYs are assigned; for instance, vaccines receive Pharmacologic Substance and Immunologic Factor.

Chemicals/Ingredients

- Salts (i.e., hydrochlorides) and isomers are NRW than unspecified parent
- Trade names and lab numbers are NRW than generic name (and get lexical tags)
- Trade names and lab numbers for the same generic are REL to each other
- Common names and systemic names are SYN
- Unspecified sugars are SYN to D-isomer
- Unspecified proteins are SYN to L-isomer
- NDDF, MMSL, MMX, VANDF, FDA contain info relating only to chemicals
- Chemical names followed by 'preparation,' 'product,' or 'substance' or [additional information in brackets] are all SYN to the chemical itself.
- Preparations of bacteria and fungi should be included in the organism concept, and should not be typed as Pharmacologic Substance.

Proteins

- Follow same guidelines as MeSH. Organism-specific proteins are named by using this format: [GENE SYMBOL] protein, [Organism]

- NCI proteins are usually human and should be merged with the matching SCR, if one exists. Check Attributes for additional information about NCI proteins.

- GO (Gene Ontology) enzymes refer to the action of the enzyme

Usually in concept by themselves (do not merge w/ MeSH)
Contain "activity" or after protein/enzyme name

Clinical Drugs

- MeSH SCRs should not be clinical drugs (if so, change them)

- Strings from NLM02 with the following term types should always be typed as Clinical Drug: SCD, SBD, SCDC, SCDF, and SBDF.

  The Clinical Drug STY is assigned to chemical concept that contain the name of the chemical in addition to its strength and/or form as given to/taken by a patient.

"**Chemical" STYs**

Substance
- Chemical
  - Chemical Viewed Functionally
    - Pharmacologic Substance
      - Antibiotic
    - Biomedical or Dental Material
    - Biologically Active Substance
      - Neuroreactive Substance or Biogenic Amine
      - Hormone
      - Enzyme
      - Vitamin
      - Immunologic Factor
      - Receptor
    - Indicator, Reagent, or Diagnostic Aid
    - Hazardous or Poisonous Substance
  - Chemical Viewed Structurally
    - Organic Chemical
      - Nucleic Acid, Nucleoside, or Nucleotide
      - Organophosphorus Compound
      - Amino Acid, Peptide, or Protein
      - Carbohydrate
      - Lipid
        - Steroid
        - Eicosanoid
    - Inorganic Chemical
    - Element, Ion, or Isotope
  - Body Substance
  - Food

Single-typed STYs

Manufactured Object
- Medical Device
  - Drug Delivery Device
- Research Device
- Clinical Drug

- Food
- Plant

Molecular Function
- Genetic Function

X. ADDITIONAL ATTRIBUTES

Lexical Relationships:

Lexical relationships consist of short form (SFO) and long form (LFO) atoms. Lexical relationships are usually created between abbreviations and the strings the abbreviations represent.

The structure of a Lexical Relationship is:
{string [SFO] / string [LFO] {authority} }

Lexical Rels are used to indicate SFO (shortened form of) to LFO (Long Form Of) relationships when both forms occur in the same concept. For example:

DNA is a SFO of Deoxyribonucleic Acid.

SFO/LFO relationships should only be displayed from the Classes frame and not in the relationship frame of MEME-III. If two atoms that have an SFO/LFO relationship to one another are split out together or moved to the same concept, this attribute should be carried along. If on the other hand only one atom is split out or moved, or the two atoms do not stay together, the relationship should be destroyed by the database.

Lab & Trade:

These are two Lexical Tags that are mainly seen with chemicals. They are used to designate Lab # and Trade Name.

For Example: Lab # - RU486

Trade Name – Valium

Chemical editors are asked to assign these when appropriate. Non-chemical editors usually do not worry about Lexical Tags. The only items besides chemicals where they are added are Medical Devices. Only add Lexical Tags to Medical Devices when NLM assigns that as a task.

Definitions/SOS/Scope Notes:

These are provided by the sources and usually serve to define what a term from a source means. Some are released and some are not but are kept on concept reports to help editors edit. Dorland definitions are an example of definition that are not released. These fields are not edited even if there are mistakes. Editors also do not change whether a definition or Scope Note or SOS are released or not. These fields exist to provide additional information and are released for users but not edited by the UMLS staff.

XI. Introduction to Meow

- Meow, is the acronym for Metathesaurus Editors Online World. Meow supplies the UMLS team with a central location for exchange of information including editing procedures, schedules, and editing tools.

- Meow can be accessed by the IP address or username/password. The URL: http://meow.nlm.hih.gov.

Anatomy of the Contents of Meow:

Daily Information:

- **What's New:**
    - Illustrates which pages on Meow have been updated recently.
    - Editors should look at this page every day.

- **Schedule:**
    - Vacation schedule; Meeting schedule; Editors training schedule.

- **List of e-mail addresses:**
    - Includes individuals and e-mail groups.

- **Concept Reports:**
    - Contains various interfaces which can be used to query the MID for concept reports using a flexible string matching algorithm or by typing in the concept identifier directly.

- **Tools:**
    - A tool, which is used frequently by Editors, is the WMS: Worklist Management System. The WMS is a system for managing the editing workload for the UMLS Metathesaurus. NLM manages the work list creation, workload assignment and batch approval while editors themselves manage other aspects of the work lists they have been assigned. See the end of this section for more information.

- **Database Information:**
    - Current database and version information. It is important for editors to ensure they are using the correct database and interface versions.

- **Editing Information**

    - Includes links to Current Semantic Type information, the Editing Manual, Source Information, Precedence, and Instructions on how to report problems to NLM.

- **Release Documentation and Meeting Information:**

    - Online version of the documentation (Green Book) that UMLS users receive and notes from UMLS meetings.

- **Miscellaneous:**

    - UmlsInfo (Please see below)
    - UMLS Links – lists URLs for websites for the sources contained in the UMLS as well as links that may provide information that is helpful with editing

- **UmlsInfo:**

    - UMLS Information (Please See Link)
    - This is a public site for anyone interested in the UMLS.

Concept Reports on Meow:

- Concept reports can be viewed from Meow

    - On the left side of main Meow page, go to Concept Reports
        - Editing DB is the current editing environment or MID
        - Browse DB is a copy of the MID that is not edited but kept as a backup or for editors to look at when the MID is down
        - Frozen DB is a copy of the database as it looked at the beginning of the year. It shows the state of the database released to users before the new year's editing begins.

- Choose database to search.

- Three ways to search

    Search by Identifier
    Normalized String Search
    Approximate Word Search

Search by Identifier:

- Used to search when editor knows specific concept
- Can search by CUI, Concept_id, atom_id, or source code
- Identifiers and codes have to be entered exactly or concept will not be found

- Normalized String Search:

  - Used to find concepts that contain atoms with the exact string entered
  - Words are normed so that plurals are found
    - Ex. AIDS and its normalized form of AID
  - Only concepts with every word in the string will be retrieved, not the same as a Boolean operator search

- Approximate Word Search:

  - Used to search for words
  - Will normalize words to find plural versions
  - Can be limited to search for words in atoms from specific sources
  - Not an exact search
  - Can specify search retrieval limit (maximum is 100 records so all possible concepts may not be retrieved)

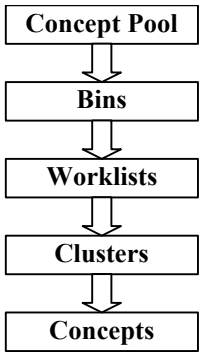
Advance Section – EMS and WMS:

Editing Management System (EMS) and Worklist Management System (WMS):

The Editing Management System (EMS) is designed to allow NLM to create work for editors in ordered, manageable units called *worklists*. It provides information in order to monitor the workload and the editing resources and to allocate these resources efficiently so that all necessary editing and evaluation is completed before a release.

The EMS also allows continuous evaluation in the database as well as identification of problem areas that can be targeted to improve the overall quality of the Metathesaurus as editing resources allow.

The following figure illustrates the hierarchy of work units in the EMS:



The concepts in the database are segregated into bins using broad queries, for example: *all concepts with a MeSH atom needing review*. Worklists are then made from each bin by selecting ordered sequences of concepts. The ordering of bins and worklists must be optimized for editing; good ordering presents related concepts in a meaningful order that improves quality and performance, while poor ordering is destructive to both. The concepts in a worklist are sometimes clustered. Clusters show a related problem that requires that they be edited together. For example, if the worklist involved reviewing relationships, a cluster would contain the pair of concepts linked by the relationship.

Bins:

"Bins" are large, named collections of concepts from which worklists can be made. The EMS uses a configuration file to specify how a bin's contents are to be generated and how they are to be ordered when a worklist is made. Since our editor pool is divided into those with chemical and clinical expertise, the configuration file also carries information on whether the worklists made from a bin are to contain only chemical clusters or not. The determination of whether a concept is a chemical or not is made by looking at its assigned (or default) semantic types.

The contents of the bins are refreshed frequently so that the current counts for the total, chemical, and non-chemical work remaining in each bin may be tracked. The EMS also reports counts for the number of clusters that cannot currently go out on a worklist (clusters contain embryos, concepts already out on a worklist, etc). Numbers such as these are very useful for accurate workload prediction and planning.

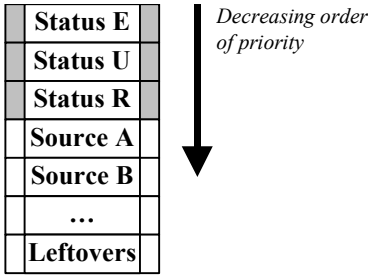
There are three types of bins in the EMS: mutually exclusive (ME), quality assurance (QA), and ad-hoc (AH). These are described below.

Mutually Exclusive (ME) Bins:

The ME bin mechanism is effectively a way to isolate concepts which need review, to implement optimum ordering for editors, and to avoid duplicate editing. Each concept is assigned to one (and only one) bin. The process begins by excluding the non-edited concepts: those in development ("embryos"), those not re-edited ("unreviewed") and those already reviewed.

Shown in Figure 1 is a hypothetical partitioning. There are three non-editable ME bins (shown with shaded borders): status **E**, status **U** and status **R**.

Figure 1: ME Bins



The editable bins, which contain concepts with **N** status, start with Source A, Source B, etc. The last bin is a catchall "leftovers" bin for the remaining concepts. As is evident from the figure, concepts with atoms from both Source A and B will end up in the bin for Source A, which has higher precedence. Once concepts are in the right ME bin, worklists can be made from any editable bin, regardless of the bin ranking. Editing then proceeds until there are no concepts left in any editable ME bin. This is currently a necessary condition for making a release.

Evaluation: Quality Assurance (QA) and Ad-Hoc (AH) Bins:

There are two other types of bins that the EMS creates and tracks. These bins are orthogonal in scope to the ME bins in the sense that concepts that are in these bins may not necessarily have status **N**, but may need editing for reasons other than unreviewed content.

QA bins are generated from specific evaluation queries that enforce rigid semantic constraints on the data. Some sample queries are ones which implement the following restrictions: 1) all concepts without any releasable semantic types, 2) abbreviations and acronyms must not be separated (i.e., in different concepts) from the expanded forms, 3) all concepts must have at least one releasable relationship to another concept. Such "orphaned" concepts violate the intent of the Metathesaurus. As with ME bins, worklists can be made from Q/A bins and tracked.

The third category of bins is the result of ad-hoc queries and is called AH bins. These queries are the result of work that strives to improve the quality of the Metathesaurus. The queries identify concepts that satisfy some general problem criteria. For example, we have queries that look for missed synonymy using lexical matching and other techniques. Overly aggressive queries may result in far more work for editors than can be handled, but conversely, knowing there will be editorial review allows for some interesting experimentation.

AH bins result in worklists just like the other bins but are generally only worked on after the ME and QA bin work is completed.

One distinguishing feature of AH bins is the notion of history. If a concept cluster has been reviewed for a specific problem, it should not have to be looked at again for the same problem. If an editor has said, for example, that *INTRAVASCULAR TUBE* and *Tubes, Intravenous* are not synonymous (a case where the generating algorithm might have been overly ambitious), these concepts should never need to be re-reviewed in a missed synonymy context unless the component atoms move to other concepts. AH bins that inherit the same historical thread are assigned the same canonical name. When worklists are made from AH bins, a history filter eliminates clusters of concept ID's that have been previously examined for that problem (the canonical bin name is the proxy for this).

Worklists:

Worklist are the made from their parent bins by ordering the concepts in the bin and selecting a reasonable number of clusters off the top of the ordered list. Worklists are then assigned to an editing group and to specific editors.

The EMS ensures that a concept is only on a single worklist at a time to prevent multiple editors making simultaneous and potentially contradictory changes. The Worklist Management System (WMS), a subsystem of the EMS, allows NLM to monitor the status of worklists and editor and editor group assignments.

After a worklist is created, it is assigned to an editor by NLM and the group, editor initials and time are recorded in the WMS. After editing the worklist, the editor records its completion in the WMS and may return the paper report to NLM. NLM reviews the worklist for quality assurance and problem cases are returned for re-editing.

With the information recorded in the WMS, NLM is able to keep track of worklists and produce summary reports by worklist. Some example queries in the WMS are: a) Show worklists currently being edited, b) Show worklists returned to NLM and awaiting Q/A, c) Show all worklists fully edited (i.e., assigned and stamped) between any two dates by editor and/or group, etc.

Exercise: Using Meow:

Instructions: Using Netscape, go to this URL: Http//meow.nlm.nih.gov and please answer the questions below.

1. Where would an editor go on Meow to see information on the available Semantic Types? Go there and write down two semantic types that you find. Then, using the same page, find an example of a concept that can be typed using each semantic type.

2. Where can an editor find e-mail addresses for people involved in the project? Go there and write down Bill Hole's e-mail address, and the name of one e-mail group listed.

3. What does WMS stand for? Go to this page. Click on Query WMS. Then, using the search interface, find out how many worklists are currently assigned to the editor group of "MSH."

4. Write down what the current database is as well as the current editing interface.

5. What is an MTHICD9/ET?

5a. What does "Tapeworm NOS" mean in MTHICD9?

5b. What are some other terms from ICD that have the same code as Tapeworm NOS?

6. Put the following sources/termgroups list the order by precedence and give their rank:

MTH/PN
RCD99/PT
MMX00/CD
MSH2001/HT
RCDSY/OP
MSH2001/NM
SNMI98/HT

7. How many e-mail messages were there about RedHat that got copied to nlmreg?

8. How many new pages were added to Meow on July 27th and what are they?

9. In the concept for Facial Nerve Diseases, how many different languages are there and what are they?

10. How many new sources were added to the 12th edition of the Metathesaurus? List two of them.

11. I want to find out if there are any concepts for flea collar in the Metathesaurus. How would I do that? List 5 concepts close in meaning (including Flea collar if available), include both concept name and concept number.

XII. EDITING PRACTICE:

1.

As of 18-aug-2000 04:04:29, this entry had no problems/issues.

.....

CN# 3010406 College Major
CUI Concept Status needs Review
STY Occupation or Discipline N
ATOMS
N [] College Major [PSY97/ET/10310]

NEEDS REVIEW RELATED CONCEPT(S)
[NSY] Academic Specialization [MTH/SY||PSY97|PSY97] {30152} C

There are also 1 hidden regular relationships not shown here.

Concept was NOT released in Meta00.
Last MEME action: MOLECULAR_INSERT, performed by PSY97 on 17-aug-2000 19:17:04

Versions: common (3.00), common2meme (5.00), molecular_actions (5.00), Reports (5.00), CONCEPTpp.pl (2.0).
This report ran against database: oa_mid2001.
reports.pl version used: Release 3: version 3.0, 04/27/2000 (BAC).

2.

CN# 3009424 Adult Day Care
CUI Concept Status needs Review
DEF [Release]
- PSY97/PT|In home- or center-based care of physically or mentally disabled ad ults
during daytime hours, providing personal, social, and homemaker services.
ATOMS
N [] Adult Day Care [PSY97/PT/01125]

CONTEXTS
PSY97/PT1/01125
PsycINFO Thesaurus
<Adult Day Care>

REVIEWED RELATED CONCEPT(S)
[REL] Long-Term Care [MSH2000/MH||PSY97|PSY97] {979511} S
[REL] home visiting program [AOD99/DE||PSY97|PSY97] {1416179} S
[REL] Home care of patient [MTH/PN||PSY97|PSY97] {105798} S

[REL] Elder Care [PSY97/PT||PSY97|PSY97] {3015885} S
[REL] Day care center (for any age) [MTH/PN||PSY97|PSY97] {106445} S

3.

.....
CN# 2209513 Fourth lumbar vertebra
CUI C0223537 Concept Status
STY Body Part, Organ, or Organ Component R
STY Disease or Syndrome R
ATOMS
Fourth lumbar vertebra [MTH/PN/NOCODE]
Fourth lumbar vertebra [SNMI98/PT/T-11940]
Fourth lumbar vertebra [SNM2/PT/T-10780]
Fourth lumbar vertebra [UWDA142/PT/13075]
L4 [CCPSS99/PT/1006205]
L4 vertebra [RCD99/PT/7N93R]
L4 vertebra [UWDA142/SY/13075]
L4 VERTEBRA [CCPSS99/PT/1002798]

CONTEXTS
RCD99/PT1/7N93R
Read thesaurus
Anatomical concepts
Human body structure
Body system structure
Musculoskeletal structure
Bone structure
Regional bone structure
Bone structure of trunk
Bone structure of spine
Vertebra
Lumbar vertebra
L1 vertebra
L2 vertebra
L3 vertebra
<L4 vertebra>
L5 vertebra
L6 vertebra

REVIEWED RELATED CONCEPT(S)
[BRD] Lumbar Vertebrae [MSH2001/MH|isa|UWDA97|E-ALF] {1044887} C
[RT?] Compression of fractured vertebra
[MDR33/LT|co-occurs_with|CCPSS99|CCPSS99] {2161172} S

[RT?] Fifth lumbar vertebra [MTH/PN|co-occurs_with|CCPSS99|CCPSS99] {2209515} S
[RT?] LUMBAR SPINE DISC HERNIATION [CCPSS99/PT|co-occurs_with|CCPSS99|CCPSS99]
{2210106} S
[RT?] Spine Problem [MTH/PN|inverse_isa|CCPSS99|CCPSS99] {14312} S
[LIK] Malignant neoplasm of vertebral column
[MTH/PN|mapped_from|SNMI98ICD|E-ALF] {820980} S

There are 13 context relationships not shown here.

There are also 2 hidden regular relationships not shown here.

Concept was released in Meta2001 as Approved.
Last MEME action: MOLECULAR_DELETE, performed by L-DRH on 25-jan-2001 19:19:33

4.

CN# 1425233 grade 11
CUI C0683863   Concept Status needs Review
STY Intellectual Product   R
ATOMS
          R [] grade 11 [AOD99/DE/0000012770]
       NEVER   {grade 11 [AOD95/DE/0000010926]}
          R [] high school junior [AOD99/NP/0000026424]
       NEVER   {high school junior [AOD95/NP/0000022595]}
 M   N   Junior High Schools [PSY97/PT/27240]

CONTEXTS
  AOD95/DE1/0000010926
  Alcohol and Other Drug Thesaurus
    communication, information, and education
      education and training
        educational level
          secondary education level
            high school level
              grade 10
             <grade 11>
              grade 12
              grade 9
  AOD99/DE1/0000012770
  Alcohol and Other Drug Thesaurus
    communication, information, and education
      education and training

educational level
elementary and secondary education level
secondary education level
high school level
grade 10
<grade 11>
grade 12
grade 9
PSY97/PT1/27240
PsycINFO Thesaurus
Schools
<Junior High Schools>

REVIEWED RELATED CONCEPT(S)
[BRD] high school level [AOD99/DE||AOD95|S-WOU] {1425230} C
[BRD] Schools [MSH2000/MH||PSY97|PSY97] {1071325} S
[REL] secondary education level [AOD99/DE||PSY97|PSY97] {1425227} S

There are 9 context relationships not shown here.

There are also 6 hidden regular relationships not shown here.

Concept was released in Meta2000 as Approved.

5.

CN# 3014327 Self Help Techniques
CUI Concept Status needs Review
DEF [Release]
- PSY97/PT|Techniques, materials, or processes designed to assist individuals in solving their own problems. Consider also SUPPORT GROUPS.
ATOMS
N [] Self Help Techniques [PSY97/PT/46275]

CONTEXTS
PSY97/PT1/46275
PsycINFO Thesaurus
<Self Help Techniques>
Self Management +

REVIEWED RELATED CONCEPT(S)
[NRW] Self-Management [MSH2000/EN||PSY97|PSY97] {281752} S
[REL] twelve step program [AOD99/DE||PSY97|PSY97] {1414239} S
[REL] Therapeutic procedure [MTH/PN||PSY97|PSY97] {491856} S
[REL] Self-Help Groups [MSH2000/MH||PSY97|PSY97] {1414231} S

[REL] Social support [MTH/PN||PSY97|PSY97] {1073347} S
[REL] Self-referral [RCD99/PT||PSY97|PSY97] {30097} S
[REL] Self-monitoring [RCD99/PT||PSY97|PSY97] {875228} S
[REL] self-actualization [AOD99/DE||PSY97|PSY97] {29748} S
[REL] Psychotherapeutic Techniques [PSY97/PT||PSY97|PSY97] {3013871} S
[REL] group counseling [AOD99/DE||PSY97|PSY97] {29837} S
[REL] Services, Community [MSH2000/EN||PSY97|PSY97] {282010} S
[REL] Behavior Therapy [MSH2000/MH||PSY97|PSY97] {1004550} S

There are 2 context relationships not shown here.

There are also 12 hidden regular relationships not shown here.

Concept was NOT released in Meta00.

6.

CN# 3011720 Harassment (Sexual)
CUI Concept Status needs Review
ATOMS
N [] Harassment (Sexual) [PSY97/ET/22283]

NEEDS REVIEW RELATED CONCEPT(S)
[NSY] Sexual Harassment [MSH2000/MH||PSY97|PSY97] {1101677} C

There are also 1 hidden regular relationships not shown here.

Concept was NOT released in Meta00.
Last MEME action: MOLECULAR_INSERT, performed by ENG-PSY97 on 14-aug-2000

7.

CN# 279701 Right to Treatment
CUI C0035618 Concept Status needs Review
STY Idea or Concept R
SCT {noun/noun phrase}
ATOMS
R [] Right to Treatment [MSH2000/EP/D010344]
M N Right to Treatment [PSY97/PT/44615]
R Right to Treatments [MSH2000/PM/D010344]
R Treatment, Right to [MSH2000/PM/D010344]
R Treatments, Right to [MSH2000/PM/D010344]

CONTEXTS

PSY97/PT1/44615
PsycINFO Thesaurus
Social Issues
Human Rights
Civil Rights
Client Rights
<Right to Treatment>

REVIEWED RELATED CONCEPT(S)
[REL] Patient advocacy [MTH/PN||MSH2000|MSH2000] {1057710} S
[BRD] Client Rights [PSY97/PT||PSY97|PSY97] {3010326} S
[REL] Self-referral [RCD99/PT||PSY97|PSY97] {30097} S
[REL] mandatory treatment [AOD99/DE||PSY97|PSY97] {1424347} S
[REL] Deinstitutionalization [MSH2000/MH||PSY97|PSY97] {1017376} S
[REL] Psychiatric Commitment [MTH/SY||PSY97|PSY97] {29809} S
[REL] Advocacy [MTH/PN||PSY97|PSY97] {13670} S

There are 1 context relationships not shown here.

There are also 9 hidden regular relationships not shown here.

Concept was released in Meta2000 as Approved.
Last MEME action: MOLECULAR_CHANGE_STATUS, performed by MATRIXINIT on 15-aug-200
0 22:37:32

8.

CN# 29383 Species Differences
CUI C0178849 Concept Status needs Review
STY Biologic Function R
DEF [Release]
- PSY97/PT|Anatomical, physiological, and/or behavioral variations between members of different species. May be used for comparisons between human and animal populations. Consider COMPARATIVE PSYCHOLOGY to access references from 67-81.
Compare ANIMAL STRAIN DIFFERENCES.
ATOMS
M N [] Species Differences [PSY97/PT/49035]
R species difference [CSP2000/PT/0418-5451]
R {species difference [CSP98/PT/0418-5451]}

CONTEXTS
CSP2000/PT1/0418-5451
CRISP Thesaurus

biology
systematic biology
evolution +
genetic strain
microorganism classification +
<species difference>
CSP98/PT1/0418-5451
CRISP Thesaurus
biology
systematic biology
evolution +
genetic strain
microorganism classification +
<species difference>
PSY97/PT1/49035
PsycINFO Thesaurus
<Species Differences>

REVIEWED RELATED CONCEPT(S)
[BRD] systematic biology [CSP2000/PT||CSP98|E-MQS] {984523} C
[REL] Science of genetics [MTH/PN||PSY94|L-BAC] {1417486} C
[REL] Animals [MTH/PN||E-RAZ|E-KLL] {1000610} C
[REL] Interspecies Interaction [PSY97/PT||PSY97|PSY97] {3012172} S

There are 9 context relationships not shown here.

There are also 7 hidden regular relationships not shown here.

Concept was released in Meta2000 as Approved.

9.

CN# 1113954 Instruction [Publication Type]
CUI C0302828 Concept Status needs Review
STY Intellectual Product R
DEF [Do not release]
- AOD95/DE|Process by which knowledge, attitudes, or skills are deliberately conveyed. Includes the total instructional process, from planning and implementation through evaluation and feedback.

DEF [Release]
- MSH2000/MH|Nonfiction films and video designed to teach, instruct, or train. (Moving Image Materials: Genre Terms, 1988)

SOS [Do not release]
- AOD95/DE|Process by which knowledge, attitudes, or skills are deliberately conveyed. Includes the total instructional process, from planning and

implementation through evaluation and feedback.
SOS [Release]
- AOD99/DE|Process by which knowledge, attitudes, or skills are deliberately conveyed. Includes the total instructional process, from planning and implementation through evaluation and feedback.
ATOMS
R [] Instruction [Publication Type] [MSH2000/MH/D019514]
R [] Instruction [MSH2000/EN/D019514]
M N Instruction [PSY97/ET/25710]
R instruction [AOD99/DE/0000012666]
NEVER {instruction [AOD95/DE/0000010838]}
R [] Instruction (PT) [MSH2000/EN/D019514]

CONTEXTS
AOD95/DE1/0000010838
Alcohol and Other Drug Thesaurus
communication, information, and education
education and training
curriculum and instruction
curriculum +
<instruction>
class instruction
class technique
homework
independent study
individualized instruction +
language of instruction +
student counseling and guidance
AOD99/DE1/0000012666
Alcohol and Other Drug Thesaurus
communication, information, and education
education and training
curriculum and instruction
curriculum +
<instruction>
class instruction
class technique
homework
independent study
individualized instruction +
language of instruction +
student counseling and guidance

REVIEWED RELATED CONCEPT(S)
[BRD] curriculum and instruction [AOD99/DE||AOD95|S-WOU] {1416520} C
[NRW] Homework [RCD99/PT||AOD95|S-WOU] {877543} C

[NRW] language of instruction [AOD99/DE||AOD95|S-WOU] {1416530} C
[NRW] individualized instruction [AOD99/DE||AOD95|S-WOU] {29961} C
[NRW] independent study [AOD99/DE||AOD95|S-WOU] {1416526} C
[NRW] class technique [AOD99/DE||AOD95|S-LAD] {1416525} C
[NRW] class instruction [AOD99/DE||AOD95|S-WOU] {1416524} C
[NRW] social learning [AOD99/DE||AOD95|S-LAD] {1410826} C
[NRW] observational learning [AOD99/DE||AOD95|S-WOU] {1410825} C
[REL] learning/teaching methods [AOD99/NP||S-WOU|S-LAD] {1425181} C
[REL] learning strategies [AOD99/NP||S-LFS|S-WOU] {30160} C
[REL] teaching strategies [AOD99/NP||E-LFS|S-WOU] {1425182} C
[REL] Learning [MSH2000/MH||AOD95|E-LAD] {1043056} C
[REL] Educational process of instructing [MTH/PN||E-TMC|S-WOU] {1077420} C
[NOT] Psychological adjustment [MTH/PN||E-LAD|E-LAD] {997008} C

There are 18 context relationships not shown here.

There are also 29 hidden regular relationships not shown here.

IMN for catalogers only

RO O|TGC
RO M|MSR
RO A|SJN

Concept was released in Meta2000 as Approved.
Last MEME action: MOLECULAR_CHANGE_STATUS, performed by MATRIXINIT on 15-aug-200
0 22:37:32

10.
Which of the following STYs might you assign to the atom below?

Touchdown [MSH2001/CE/C404484]

a) Dailey or Recreational Activity
b) Idea or Concept
c) Quantitative Concept
d) Organic Chemical
e) Human-caused Phenomenon or Process

ANSWERS TO EDITING PRACTICE:

1. In this concept an editor needs to review the "Needs Review Related Concepts," and change NSY to [REL].

2. This concept is missing a Semantic Type. Add STY: Self Help or Relief Organization.

3. This concept has an erroneous Semantic Type. Delete wrong STY: Disease or Syndrome. Also, the CCPSS/PT atom needs to be split out. CCPSS (Canonical Clinical Problem Statement System) which is a list of problems modifiers and term categories.

4. In this concept Junior High Schools [PSY97/PT/27240], newly merged atom needs to be split out and assigned double Semantic Types: Manufactured Object and Organization.

5. This concept is missing a Semantic Type: Add STY: Intellectual Product.

6. This concept is missing a Semantic Type. Merge with previously existing concept: Sexual Harassment that has a double STY: Mental or Behavioral Dysfunction and Social Behavior.

7. There are no edits to be made on this concept.

8. There are no edits to be made on this concept.

9. There are no edits to be made on this concept.

10. Assign STY: Organic Chemical.

XIII. MULTIPLE MEANINGS:

What is a Multi-Meaning?

- A multi-meaning occurs when two concepts contain an identical string
    - Examples: Gopher (mammal or networks), Corn (vegetable or foot), Kidney (organ, problem, neoplasms), Football (game or object)
- Since the Metathesaurus is arranged by meaning, there are many cases in which identical strings do not always represent identical meaning.

Important Points about Multi-Meanings:

- Whenever there are two concepts with an identical string, editors must create a relationship between the two (BRD, NRW, REL, XR)
    - We ask editors to do this throughout the year as a special project
- <1>s and <2>s
    - These are added during production to indicate a multi-meaning exists
    - All concepts from the previous year that contain a Multi-Meaning string contain the string with a <> and number appended to the end
    - Examples: Kidney <1>, Corn <2>
    - These atoms are labeled "MTH/MM"
    - There is no limit to the number of MMs that can exist for a string
- Multi-Meaning Termgroups
    - These atoms have the termgroup of MTH/MM with MM being the term type for multiple meaning
    - In an editing year, new strings involved in multi-meanings will get a temporary termgroup of MTH/TM
        - If the multi-meaning is removed during the year by merging the concepts involved together, the MTH/TM atoms are removed
        - If the multi-meaning persists, the TMs are converted to MMs during production and released
- PNs
    - Throughout the year, concepts identified as having a multi-meaning are given an unambiguous atom called a MTH/PN
    - These are usually created by NLM staff
        - Editors can be asked to suggest PN names
    - PN = Preferred name and should clearly represent the meaning

- Examples: Kidney, Kidney Problem, Benign Neoplasm of Kidney

- Relationships between Multi-Meanings

  - Any concepts with identical strings need to be linked with a relationship, many times as XR
  - This is done to prevent the automated system from trying to merge the concepts together based on their identical strings
    - The presence of a relationship show that these concepts have been reviewed and do not need to be merged
  - Editors create these relationships throughout the year as part of a special editing project called NeedsRel

- Precedence

  - If an PN exists for a concept, that would always be the concept name
  - If a MTH/MM exists and it has no PN it will appear as the concept name in the mid only (editing interface/Meow)
    - This is changed in the Release Files
    - Useful in the MID so that MMs are very obvious due to the name being a MM
  - Please see link for Precedence of Termgroups on Meow to see which sources have precedence for concept naming

- Rules for Creating PNs
  - Naming of Multi-Meanings (Please see Link)

Examples of Multiple Meanings:

1.

CN# 275840 Manufactured football
CUI C0016518 Concept Status is Reviewed
STY Manufactured Object R
SCT {noun/noun phrase}
DEF [Release]
- MTH/DT|The oblong ball used in the sport of football.
ATOMS
R [] Manufactured football [MTH/PN/U003085]
R [] Footballs <1> [MTH/MM/U000450]
R Football [SNMI98/PT/A-75150]
R Football [SNM2/PT/E-9182]
R Footballs [MSH2001/EN/D005538]
R Footballs [LCH90/PT/U001854]
R Football <2> [MTH/MM/U000152]
R Football <2> [MTH/DT/U000074]

CONTEXTS
SNM2/PT1/E-9182
SNOMED-2
Etiology Axis
Physical Agents
Recreation Equipment
<Football>
SNMI98/PT1/A-75150
SNOMED International
PHYSICAL AGENTS, FORCES, AND ACTIVITIES
PHYSICAL ACTIVITIES AND RECREATIONAL EQUIPMENT
RECREATIONAL EQUIPMENT
<Football>

REVIEWED RELATED CONCEPT(S)
[REL] Football game [MTH/PN||E-JJT|S-AMS] {1029208} C

2.

CN# 1029208 Football game
CUI C0016517 Concept Status is Reviewed
STY Daily or Recreational Activity R
SCT {noun/noun phrase}
DEF [Release]
- MSH2001/MH|A competitive team sport played on a rectangular field. This is the

American or Canadian version of the game and also includes the form known as rugby. It does not include non-North American football (= SOCCER).

ATOMS

R [] Football game [MTH/PN/U003086]
R [] Football <1> [MTH/MM/U000151]
R Football [MSH2001/MH/D005538]
R Football [PSY97/PT/20090]
R Football [LCH90/PT/U001853]
R Footballs [MTH/PT/U000419]
R Footballs <2> [MTH/MM/U000451]
R football [AOD99/DE/0000013346]

CONTEXTS

AOD99/DE1/0000013346
Alcohol and Other Drug Thesaurus
sports
individual and team sports
team sports
baseball
basketball
<football>
ice hockey
rugby
soccer

MSH2001/MH1/D005538
Medical Subject Headings
Anthropology, Education, Sociology and Social Phenomena (MeSH Category)
Human Activities
Leisure Activities
Recreation
Sports
Baseball
Basketball
Bicycling
Boxing
<Football>
Golf
Gymnastics
Hockey
Martial Arts
Mountaineering
Racquet Sports +
Running +
Skating
Skiing
Soccer

Swimming +
Track and Field
Walking
Weight Lifting
Wrestling
PSY97/PT1/20090
PsycINFO Thesaurus
Recreation
<Football>
PSY97/PT2/20090
PsycINFO Thesaurus
Sports
<Football>

REVIEWED RELATED CONCEPT(S)
[BRD] ground sports [AOD99/DE||E-LFS|E-LFS] {1601380} C
[BRD] team sports [AOD99/DE||AOD95|S-WOU] {1417007} C
[BRD] Sports [MSH2001/MH||PSY94|L-BAC] {1074598} C
[BRD] Recreation [MSH2001/MH||PSY94|L-BAC] {1067959} C
[NRW] Super Bowl [AOD99/DE||AOD95|S-LFS] {1417033} C
[REL] Manufactured football [MTH/PN||E-JJT|S-AMS] {275840} C
[REL] Rugby [MSH2001/EP||MSH2001|MSH2001] {275841} S

3.

CN# 431216 Gophers
CUI C0524713 Concept Status is Reviewed
STY Mammal R
ATOMS
R [] Gophers [MTH/PN/NOCODE]
R Gophers [MSH2001/EP/D012377]
R Gopher [MSH2001/PM/D012377]
R Gopher <1> [MTH/MM/U006067]

LEXICAL RELATIONSHIPS
{ Gopher [SFO] / [LFO] Gophers {MSH2001} }

REVIEWED RELATED CONCEPT(S)
[NOT] {Gopher (computer network) [MTH/PN||E-ADP|E-LAD] {989309} C}
[NOT] {Gopherus, NOS [SNMI98/PT||E-ndw|E-LAD] {78705} C}
[BRD] Rodent [MTH/PN||MSH2001|MSH2001] {1070393} S

4.

CN# 989309 Gopher (computer network)
CUI C0598713 Concept Status is Reviewed

STY Intellectual Product R
STY Manufactured Object R
ATOMS
R [] Gopher (computer network) [MTH/PN/NOCODE]
R Gopher (computer network) [CSP2000/ET/4006-0052]
R [] gopher <2> [MTH/MM/U006068]
R gopher [AOD99/ET/0000012540]

CONTEXTS
AOD99/ET1/0000012540
Alcohol and Other Drug Thesaurus
communication, information, and education
concepts in information
information transfer
electronic information transfer
network communication format
computer conference
electronic mail
<gopher>
listserv
news group

REVIEWED RELATED CONCEPT(S)
[REL] Internet [MSH2001/MH|mapped_from|E-GLH|E-LAD] {1118377} C
[NOT] {network communication format [AOD99/DE||E-LAD|E-LAD] {1416413} C}
[NOT] {Rodent [MTH/PN||E-WOU|E-LAD] {1070393} C}
[NOT] {Gophers [MTH/PN||E-ADP|E-LAD] {431216} C}
[NOT] {Gopherus, NOS [SNMI98/PT||E-ADP|E-LAD] {78705} C} |

5.

CN# 2656445 WHITE BRYONY <2>
CUI C0772323 Concept Status needs Review
STY Organic Chemical R
STY Pharmacologic Substance R
ATOMS
S R [] WHITE BRYONY <2> [MTH/TM/U001494]
D N WHITE BRYONY [NDDF01/IN/007358]
M N [] BRYONIA ALBA [MMX01/IN/U000284]
R {BRYONIA ALBA [NDDF00/IN/007358]}

REVIEWED RELATED CONCEPT(S)
[BRD] Bryonia, NOS [SNMI98/PT||E-CCR|E-CCR] {459770} C
[NRW] BRYONIA ALBA 12X Sublingual tablet [MMX01/CD|has_ingredient|MMX01|MMX01] {4034652} S
[NRW] BRYONIA ALBA 30X Sublingual tablet [MMX01/CD|has_ingredient|MMX01|MMX01] {4034651} S
[NRW] BRYONIA ALBA 6X Sublingual tablet [MMX01/CD|has_ingredient|MMX01|MMX01] {4034650} S

XIV. DEMOTIONS

A demotion is the name NLM gives a particular situation that can occur during the insertion of a source. During the insertion, there are at least two conflicting issues that the programs must deal with. One of these is that something is telling the programs to merge two concepts together. It might be identical strings, same codes, or something else. The second is that something is telling the computer that there is a reason why these two concepts can't be merged together.

Since there is conflicting information, the merge does not happen. Instead a demoted relationship is created. This provides editors a way to look at two or more concepts and make a decision about whether a merge should occur.

Reasons to Merge Concepts:

- Identical exact strings
- Identical normalized strings
- Same code across different years
- Relationships from source asserting synonymy between two strings

Reasons to Prevent Concepts from Merging:

- An existing relationship between two concepts
- Different MeSH D#s in the two concepts
- Other rules such as don't merge anything from this source with a chemical

How to edit demoted concepts:

- Make sure all concepts involved in the demoted match are available to look at. If an editor can't see all of the concepts involved, he/she is just guessing at meaning. Since the editing interface only allows one concept to be viewed at a time, it is best to edit these on paper.

- Are there two (or more) distinct meanings? Look at semantic types, sources, contexts, etc. to determine what the sources involve mean.

- Do all of the atoms appear in the correct concept? If it looks like more than one meaning is in a concept, the answer is no.

- Do the STYs appear correct?

- If the concepts mean the same thing, a merge is done. Remember, just because the computer didn't merge something doesn't mean that it can't be merged. Sometimes a source will change codes and preserve a meaning. Frequently NLM takes a conservative approach during source insertions and will end up with lots

of things that will be need to be merged to prevent a few mishaps that are hard to find if they had been automatically merged together.

- Move any atoms to the correct location as needed.

- Look at the remaining concepts and make sure all atoms end up where they should be.

- Check the STYs on the remaining concepts and make sure they appear correct.

- Review the relationships. A concept level relationship needs to exist between the two concepts. Note if there is a demoted fact between two concepts (P level, Status D) and NO concept level rel, the concepts cannot be approved. An error message will appear.

- If any changes are made, the concepts need to be manually approved or they will appear on another worklist. If they are both OK AND there is an existing Concept (or Source) Level relationship between the involved concepts, an editor does not need to manually approve.

- Make sure the concepts have been carefully reviewed and approved, when needed, before moving on to the next pair.

- Deciphering the "D" next to the atoms section.

    - Back in the dark ages of editing, Apelon would put "D" or "d" next to some of the atoms involved. There were also dMs. This has changed some since we got Meme-III and it can get confusing to try to edit based on the "D" alone. In addition, there are no longer dM or d, only D or DM. If there is a DM that indicates a newly merged atom in the concept. An editor can't assume that is the only newly merged atom so other status N atoms need to be looked for. If there is a "D" next to a string that means the demotion was caused by something in the string class. NLM strongly recommends not worrying about what actually caused the demotion until a lot of editing experience has been accumulated. The only time that information is really useful is if there is concern with whether an insertion was done correctly ot.

Example 1: School Nurses and Nursing Schools
xxxxx (1 of 2) xxxxx
CN# 464806 School nurse
CUI C0302833 Concept Status needs Review
STY Professional or Occupational Group R
ATOMS
D R [] School nurse [RCD99/PT/03FN.]
R [] SN - School nurse [RCD99/SY/03FN.]

CONTEXTS
RCD99/PT1/03FN.
Read thesaurus
Occupations
Education/welfare/health professions
Healthcare professional
Health visitors, nurses and midwives
Nursing occupations
Nurse
Accident and emergency nurse
Agency nurse
Behavioural therapist nurse
Care of the elderly nurse
Clinic nurse
Clinical nurse specialist
Community nurse
Contact tracing nurse
Continence nurse
Dental nurse
District nurse
General nurse
Intensive therapy nurse
Learning disabilities nurse
Liaison nurse
Mental health nurse
Nurse - teaching
Nurse practitioner
Nurse psychotherapist
Nursery nurse
Occupational health nurse
Outreach nurse
Pediatric nurse
Practice nurse
Private nurse
Public health nurse
Recovery nurse
Research nurse
<School nurse>
Theatre nurse

DEMOTED RELATED CONCEPT(S)
M[REL] {Schools, Nursing [MSH2000/MH||PSY97|ENG-PSY97] {1071352} P}
R [NOT] Schools, Nursing [MSH2000/MH||E-AGS|S-AMS] {107135}

xxxxx (2 of 2) xxxxxx
CN# 1071352 Schools, Nursing
  CUI C0036380   Concept Status is Reviewed
  STY Health Care Related Organization   R
  STY Manufactured Object   R
  SCT {noun/noun phrase}
  DEF [Release]
   - MSH2001/MH|Educational institutions for individuals specializing in the field of nursing.
  ATOMS
          R [] Schools, Nursing [MSH2001/MH/D012579]
          R   Nursing School [MSH2001/PM/D012579]
          R   Nursing Schools [MSH2001/EP/D012579]
          R   School, Nursing [MSH2001/PM/D012579]
          R   Nursing schools [LCH90/PT/U003302]
          R   nursing school [AOD99/DE/0000012615]
          R [] Nurse Training Schools [MSH2001/EP/D012579]
          R   Nurse Training School [MSH2001/PM/D012579]
          R   School, Nurse Training [MSH2001/PM/D012579]
          R   Schools, Nurse Training [MSH2001/EN/D012579]
          R   Training School, Nurse [MSH2001/PM/D012579]
          R   Training Schools, Nurse [MSH2001/PM/D012579]

  LEXICAL RELATIONSHIPS
   { Training Schools, Nurse [SFO] / [LFO] Schools, Nurse Training {MSH2001} }
   { Nursing School [SFO] / [LFO] Nursing Schools {MSH2001} }
   { School, Nursing [SFO] / [LFO] Nursing Schools {MSH2001} }
   { Training School, Nurse [SFO] / [LFO] Schools, Nurse Training {MSH2001} }
   { School, Nurse Training [SFO] / [LFO] Schools, Nurse Training {MSH2001} }
   { Nurse Training School [SFO] / [LFO] Schools, Nurse Training {MSH2001} }

  CONTEXTS
    AOD99/DE1/0000012615
    Alcohol and Other Drug Thesaurus
     communication, information, and education
       education and training
         educational system, educational institution
           educational institution
             higher education institution
               professional school
                 medical school
                <nursing school>
                 school of social work
    MSH2001/MH1/D012579
    Medical Subject Headings
      Anthropology, Education, Sociology and Social Phenomena (MeSH Category)

Education
Schools
Schools, Health Occupations
Area Health Education Centers
Schools, Dental
Schools, Medical
<Schools, Nursing>
Schools, Pharmacy
Schools, Public Health
Schools, Veterinary

REVIEWED RELATED CONCEPT(S)
[BRD] professional school [AOD99/DE||AOD95|E-KLL] {1416468} C
[REL] School nurse [RCD99/PT||E-MOG|E-MOG] {464806} C
[REL] Nursing occupations NOS [RCD99/OP||E-KLL|E-KLL] {995461} C
[REL] Discipline of Nursing [MTH/PN||E-KLL|E-LFS] {1417573} C
[REL] Nurses [MTH/PN||E-KLL|E-KLL] {995460} C
[REL] Personnel, Educational [MSH2001/EN||E-KLL|E-KLL] {282555} C
[REL] Registered nurse [MTH/PN||E-KLL|E-KLL] {1601182} C
[NOT] {Radon [MTH/PN||E-KLL|E-KLL] {994366} C}
[NOT] {School Nursing [MSH2001/MH||E-AGS|S-AMS] {1071318} C}

Do I have all the concepts I need to look at?

No, this is a 3-way demotion so I would need to get the other concept. (For this example I will just look at the first two concepts involved in the demotion)

Do I have more than 1 distinct meaning?

Yes, I have the group and the place.

Do all atoms appear to be in the correct concept?

No. PSY appears to mean the group so that would need to be moved.

Are the STYs correct?

Yes

Once the PSY atom was merged to the correct place, I would review these again. Since there are already concept level relationships between these concepts I would not have to create them, but I would have to manually approve the concepts since a change was made.

XV. EDITING FROM A WORKLIST

Below are examples to be used when editing a printed worklist. Please try to be as neat as possible. If there is not enough room to write on the printout, securely attach a sticky note to the printout and write the concept number on it. Or you may write on back if that is clearly indicated.

If you have specific questions/comments about comments on your worklist, please make sure they are clearly flagged. In addition, please make sure you write out what you want us to look at or what your question is. It is usually difficult for us to figure out what you want if you merely flag a concept.

1. Semantic Type Changes

Adding an STY: Write +STY (The STY should be either abbreviated or written out). Do NOT use the T#s.

As of 17-jul-2001 20:08:29, this entry had no problems/issues.
.....
CN# 187388
Cheesecake
CUI C0452234
Concept Status is Reviewed
STY **+STY FOOD**
ATOMS
R [] Cheesecake [RCD99/PT/Ub00D]

CONTEXTS
RCD99/PT1/Ub00D
Read thesaurus Additional values
Substances, materials and objects Substances Substance categorised functionally
Dietary substance
Foods and drinks
Foods
Starchy food
Cake
Battenburg cake
<Cheesecake>
Welsh cheesecake

Replacing a STY –
Write the STY to be added; Cross-out with a single line the STY to be removed
.....
CN# 841906

Motorcycle accident
CUI C0574035
Concept Status is Reviewed
STY ~~Manufactured Object~~ R **+STY Inj/Pois**

ATOMS
R [] Motorcycle accident [RCD99/OP/Xa6ZX]
R MOTORCYCLE ACCIDENT [CCPSS99/PT/1005275]

To indicate you want an STY removed just cross a single line through the one to be removed.

.....
CN# 1079340
Tobacco
CUI C0040329
Concept Status is Reviewed
STY ~~Organic Chemical~~ R
STY ~~Pharmacologic Substance~~ R
STY Plant R

1. Adding/Changing Lexical Information

If there are no lexical tags, write the 3 letter abbreviation (lab/trd) next to the atom where needed. If the existing tag is incorrect, cross it out with a single line and write the correct abbreviation next to the concept. If the tag is incorrect and one is not needed, just cross through it. Note, you only have to add one lexical tag per concept. Lexical tags should not be added for each atom, string, or term that contains the trade name or lab number.

R [ ] Epipen 300micrograms/0.3mL preloaded injection pen [RCD99/PT/bp1A.] **TRD**

2. Changing Relationships

Cross out any incorrect relationships and write the correct 2-3 letter abbreviation next to it.

NEEDS REVIEWED RELATED CONCEPT(S)
XR ~~**[BRD]**~~ sleet [AOD99/ET||E-TMC|E-TMC] {1417198} C
BRD ~~**[NSY]**~~ hail [AOD99/ET||E-TMC|E-TMC] {1417197} C
REL ~~**[NRW]**~~ Skier [RCD99/PT||E-GLH|E-KLL] {156465} C

3. Splitting

To split out atoms – Write: split as (whatever the relationship should be) to the right of the atoms. Put brackets around the terms that should be included in the split. Write the correct STY next to the atoms you are going to split if you are not going to copy. Also write if you are planning on copying the rels & STYs or not.

(Integrity information is stale and has been omitted.)
.....
CN# 1679243 DIAZEPAM 10MG ORAL TABLET
CUI C0355027   Concept Status needs Review
CUI C0688559
STY Clinical Drug   R
ATOMS
N [] DIAZEPAM 10MG ORAL TABLET [NDDF01/CD/003766]
N {DIAZEPAM 10MG ORAL TABLET [NDDF00/CD/003766]}
N [] DIAZEPAM 10 MG Oral (systemic) tablet [MMX01/CD/101135]
N {DIAZEPAM 10 MG Oral (systemic) tablet [MMX00/CD/101135]}
N ~~[TRD]~~ diazepam 10 mg oral tablet [MMSL01/CD/2617]
N {diazepam 10 mg oral tablet [MMSL00/CD/2617]}
N Diazepam, 10 mg oral tablet [MMSL01/BD/2617]
N {Diazepam, 10 mg oral tablet [MMSL00/BD/2617]}
N [] Diazepam 10mg tablet [RCD99/PT/d215.]
N [] Diazepam Tab 10 MG [MDDB99/CD/02975]
R [TRD] Valium 10mg tablet [RCD99/PT/d21t.] ---------- **- SPLIT as NRW**
R [TRD] Valium, 10 mg oral tablet [MMSL01/BD/2617] | **No Copy Rels**
R {Valium, 10 mg oral tablet [MMSL00/BD/2617]} | **STY = Clinical Drug**

CONTEXTS
RCD99/PT1/d215.
Read thesaurus
Drug
Drug groups primarily affecting the central nervous system
Sedative/neuroleptic
Sedative
Benzodiazepine sedative
Diazepam product
Oral diazepam
<Diazepam 10mg tablet>
Alupram 10mg tablet
Atensine 10mg tablet
Rimapam 10mg tablet
Tensium 10mg tablet
Valium 10mg tablet
RCD99/PT1/d21t.
Read thesaurus
Drug
Drug groups primarily affecting the central nervous system
Sedative/neuroleptic
Sedative
Benzodiazepine sedative
Diazepam product
Oral diazepam
Diazepam 10mg tablet
Alupram 10mg tablet
Atensine 10mg tablet
Rimapam 10mg tablet
Tensium 10mg tablet
<Valium 10mg tablet>

NEEDS REVIEW RELATED CONCEPT(S)

[BRD] Diazepam [MTH/PN|ingredient_of|E-TPW|E-TPW] {1683060} C
[NRW] Tensium 10mg tablet [RCD99/PT||MTH|E-TPW] {1679242} C
[NRW] Rimapam 10mg tablet [RCD99/PT||MTH|E-TPW] {1679241} C
[NRW] Atensine 10mg tablet [RCD99/PT||MTH|E-TPW] {1679240} C
[NRW] Alupram 10mg tablet [RCD99/PT||MTH|E-TPW] {1679239} C

REVIEWED RELATED CONCEPT(S)
[BRD] Valium [MSH2001/EN|inverse_isa|MMSL99|MISSEDSY] {1681742} C

There are 45 context relationships not shown here.
There are also 21 hidden regular relationships not shown here.

Concept was released in Meta2001 as Approved.
Last MEME action: MOLECULAR_MERGE, performed by E-TPW on 02-aug-2001 07:23:57

Versions: common (4.00), common2meme (9.00), molecular_actions (11.0), Reports (7.00), CONCEPTpp.pl (6.0).
This report ran against database: oc_testsrc.

If you are planning on merging the split out atoms w/ a new concept (or moving them) also write the concept number (NOT CUI) of the other concept and the concept name.

4. To merge the entire concept with another one.
If it is on the same page or directly above or below, you should draw a line pointing to the concept you want to merge it to and write, merge, merge with above, or merge with below as appropriate.

If you want to merge one of the related concepts into the existing concept, cross out the 3 letter relationship abbreviation and write “merge” then draw an arrow.

.....
CN# 2868038 emergency room reports
CUI C0814902   Concept Status needs Review
STY Intellectual Product   R
ATOMS
        R [] emergency room reports [AOD99/DE/0000013999]

LEXICAL RELATIONSHIPS
 { ER reports [SFO] / [LFO] emergency room reports {AOD99} }

CONTEXTS
  AOD99/DE1/0000013999
  Alcohol and Other Drug Thesaurus
    research method and research organization
      research and evaluation method
        data collection
          data collection from documents
            specific data source
              <emergency room reports>
               hospital discharge data

NEEDS REVIEW RELATED CONCEPT(S)
↑ MERGE with above concept

~~[NRW]~~ ER reports [AOD99/NP||E-TPW|E-TPW] {4097513} C

Other important points:

If no changes are required to a concept, the editor should place a check mark (√) next to the concept.

Once the editor inputs the designated changes for a given concept, put an enclose **e** next to the concept. Do not put this "e" unless the changes have actually been made in the interface. This is suppose to help editors remember if they have entered changes into the system or just on paper.

When a worklist is completed, return the work list with the attached completed work list cover sheet to NLM. The worklist cover sheet should have the worklist name, editors' initials, time it took to edit the worklist, return date and any notes or questions the editor has.

Worklist Cover Sheet

Worklist Name: _____

Editor: _____

Total Time: _____

Assign Date: _____

Return to NLM Date: _____

Comments for NLM:

XVI. EDITING FROM THE INTERFACE (JEKYLL)

The editing interface is called Jekyll using the fourth version of the Metathesaurus Enhancement and Maintenance Environment.

- Changes made in the editing interface are done in real time. So, if an editor makes a change, the data immediately reflects this new information.

- There are many screens in the interface that can be opened at once. Different data in a concept is stored on different screens. It is very important that editors always know what concept they are working one. Therefore, on each screen, the concept name and concept_id appears in a yellow box.

- Data that is in a Needs Review status always appear in Red as a clue to the editors that this information needs to be looked at.

- Any change an editor makes in the editing interface automatically changes the concept to a Needs Review status and the editor needs to manually approve the concept.

XVII. REPORTING PROBLEMS TO NLM

One important point about all problem reports, please let more than one person know if there is a problem. Don't just send e-mail or call one person in case that person is not in the office. The best communication method is e-mail. Please only use the phone for contract or personal issues or if it is a real emergency. If it is an emergency, keep calling people until you talk to a real person and do not leave a message. All this is just to ensure that problems get fixed if someone is out of the office.

1. Metathesaurus Editing Problem Reports

If you think something is damaging the data, or something is wrong with a specific concept: DO NOT EDIT IT. It is a lot easier for all of us to diagnose problems if we can see what you saw when you decided there was a problem and allows us to track the problem. If the concept is edited or data changed, we may not be able to discover what the original problem was.

- The first thing an editor should always determine is whether the problem is an editing site issue or if it is an NLM issue. Problem reports are only sent to NLM when the problem is an NLM issue. A bad connection at an editing site does not need to have a problem report sent to NLM but should be dealt with by the editing site computer support staff. Each editing site should have a checklist of what to do when there is a problem for their computer support to follow before anything is sent to NLM.

- If there are any questions about which version of the interface is the most current and correct, please check in Meow.
    - The main screen that first appears when opening the editing interface contains the interface version information. At the top, the database to be edited is listed - for example, oa_editing. Since there are multiple databases at NLM, including the actual editing database, a test database and a production database, it is important that the correct database for editing is being used.

      The next piece of information shown is the editing interface image date. Again, an editor needs to make sure that the most current image is being used. An editor can use Meow to check to make sure that the information that appears on their interface is correct. The home page for Meow (http://meow.nlm.nih.gov) contains this information near the top under the Database Information section.

    - If you do not have the correct version, send an e-mail to Tammy and Laura clearly stating that you have an old version of the editing interface. Please give us the version information you are seeing.

- Database problems can come in different forms. They may be data problems, software problems, version issues, or database issues. All of these types of problems need to be reported and corrected. Below are guidelines for all editors to follow in reporting problems.

    - When an editor sends a message concerning problems with editing, please include the following information:
        - **the exact error message received**
        - **where in the interface the problem occurred**
        - **concept_id(s) and concept names being worked on**
        - **interface version**
        - **editing actions performed at the time of the problem**
        - **complete worklist name if applicable**

- **Very Important:** If an editor thinks the database is doing something to corrupt the data, **editing should immediately be stopped**. A call should be placed to Tammy and/or Laura and a message should be sent to Tammy, Laura, and nlmreg. Laura can be reached at 301-435-3176, and Tammy can be reached in the MeSH section at 301-496-1496 and at home (on Fridays) at 301-362-0407. Please make sure you get an acknowledgment from someone that the message has been received. Also, the other editors should be told to **stop editing** until further instructions are given by NLM. Examples include:

    - Try to link two concepts as REL and the interface makes them XR.
    - Try to add an STY and the interface deletes all the STYs on a concept even though you did not use Replace All.
    - Try to move an atom from one concept to the next and it merges the two concepts together.
    - Relationships are created but when the concept report is viewed, the relationships do not appear.
- If an editor is completely unable to perform some editing functions, this is also important and this information should be e-mailed to us. However, as long as the data is not being corrupted, editing can continue. While these problems will require editors to go back and re-edit concepts once the system is fixed, they do not prevent all editing. Examples include:
    - Unable to change the concept status to Approved/Reviewed.
    - Unable to add atom notes.

- **Your editing site may have already implemented a problem reporting procedure that incorporates these guidelines. Please follow any site procedures for reporting problems to NLM.**

2. MeSH 2000 Problem Reports

- If there is a problem with the MeSH2000 interface, please send a problem report to Doug Johnston in the MeSH section (douglas_johnston@nlm.nih.gov). Do not address these problems to the UMLS staff. Please include as much information in the e-mail message as possible to help Doug diagnose the problem.

3. Other problem reports (like Meow, can't find worklist, etc.)

- **Meow**
  - If there is a problem with a tool on Meow, please report it to Tammy and Laura. Please send e-mail to both - do not leave a voice mail message. Possible problems include can't connect to Meow, concept reports do not work, WMS or EMS is not responding, etc. When reporting the problem, give a detailed explanation of what is wrong and what has been checked so far to try to solve the problem. Don't just send a message saying that Meow does not work.
  - One hint: If you think that Meow is pointing to the wrong database, refresh the webpage before reporting the problem. Sometimes a simple refresh will fix any problems that may be occurring due to cached web pages.

- **Can't find a worklist**
  - If you have been told that a worklist has been sent to your machine and you can not find it, send a message to both Tammy and Laura. Do not leave a voice mail message. List which worklist(s) can not be found and where you looked for it.

- **Commands for refreshing or printing worklists**
  - If you are having problems refreshing or printing worklists, send a message to Laura and Tammy. Copy and paste the command you entered and what error message you are getting.

- Please let us know if there are **any** questions. When in doubt, please contact Tammy and Laura.

QUIZ: Reporting Problems to NLM:

1. What is the most important principle in reporting problems to NLM?

2. What is the most important principle if you think something is damaging the data, or something is wrong with the specific concept?

3. What information should an editor include when sending a problem report message to NLM?

4. What should an editor do if there is a bad connection at the editing site?

Answers: Quiz on Reporting Problems to NLM:

1. One important point about all problem reports is to let more than one person know if there is a problem. Don't just send e-mail or call one person in case that person is not in the office. The best communication method is e-mail. Please only use the phone for contract or personal issues or if it is a real emergency. If it is an emergency, keep calling people until you talk to a real person and do not leave a message. All this is just to ensure that problems get fixed if someone is out of the office.

2. If you think something is damaging the data, or something is wrong with a specific concept: **DO NOT EDIT IT**. It is a lot easier for all of us to diagnose problems if we can see what you saw when you decided there was a problem and allows us to track the problem. If the concept is edited or data changed, we may not be able to discover what the original problem was.

3. When an editor sends a message concerning problems with editing, please include the following information:

- the exact error message received
- where in the interface the problem occurred
- concept_id(s) and concept names being worked on
- interface version
- editing actions performed at the time of the problem
- complete worklist name if applicable

4. The first thing an editor should always determine is whether the problem is an editing site issue or if it is an NLM issue. Problem reports are only sent to NLM when the problem is a NLM issue. A bad connection at an editing site does not need to have a problem report sent to NLM but should be dealt with by the editing site computer support staff. Each editing site should have a checklist of what to do when there is a problem for their computer support to follow before anything is sent to NLM.

XVIII. ADDITIONAL RESOURCES FOR EDITORS

Medical Subject Headings

PubMed

Internet Grateful Med

UMLSInfo

Specific Source pages

- **AOD editing tips**
- **CCPSS editing tips**
- **Drug Sources and Plants**
- **HL7 editing tips**
- **ICD editing tips**
- **LOINC editing tips**
- **MedDRA editing tips**
- **MTHICD9 editing tips**
- **MeSH (Medical Subject Headings)**
- **NCBI editing tips**
- **Read Editing Tips**
- **VANDF editing tips**

XIX. GLOSSARY

AH bin - Ad-hoc bin created by the EMS. These bins are not based on integrity checks, and are not created for the purpose of editing new/updated source content. Rather, they are things like the needsrel bin (which produces clusters of concepts which have ambiguous LUIs) which are generally useful but ad hoc in nature.

Ambiguous LUI - If the same LUI appears in multiple concepts it is considered an ambiguous LUI. Every case of an ambiguous string is implicitly a case of an ambiguous lui. If a LUI is split across multiple concepts, it implies that there is some lexical similarity between the two classes, which means that the concepts are likely related in some way. The NLM has an editing bin the goal of which is to have editors assign relationships between any two concepts that have an ambiguous LUI. The following example (taken from Meta2001AA) shows a case of an ambiguous LUI without an ambiguous string.

C0010504|ENG|P|L0000003|PF|S0029254|Cyanidanol-3|0|
C0917995|ENG|P|L0000003|PF|S0007489|(+)-Cyanidanol-3|0|

A review of the relationships shows that the second one is marked as narrower than the first.

Ambiguous string [aka. multiple meaning, separated string] - If the same string appears in multiple concepts, it is considered an ambiguous string. This example (taken from Meta2001AA) shows the same string in three different concepts:

C0010823|ENG|S|L0010825|VO|S0000811|Cytomegalovirus|3|
C0010825|ENG|P|L0010825|PF|S0000811|Cytomegalovirus|0|
C0677047|ENG|S|L0010825|VO|S0000811|Cytomegalovirus|3|

The test for ambiguous strings looks for case insensitive string matches across concepts. There are a number of important integrity constraints that apply to cases of ambiguous strings, in particular:

- Every concept containing an ambiguous string should get a disambiguating MTH/PN atom.
- For each ambiguous string case, every concept participating in that case must have a relationship to every other concept also participating.
- MTH/PN atoms may not be ambiguous. A MTH/PN atom in one concept containing an ambiguous string may have a string matching the ambiguous string, but no other concept in the MID may have a string matching that MTH/PN. A concept may not have more than one MTH/PN atom.

Approved concept [aka reviewed concept] **-** A concept that has been looked at by an editor and determined to be correct. The concept becomes "approved" either by an explicit editor approval action or by an automated process that approves content that editors have OK'd on paper.

"As of …problems/issues" – These are "canned messages" alerting editors to potential problems the engine detects in the concept record. Do Not assume these are the only problems.

Atom - The smallest unit of meaning in a concept. Atoms are the noun phrases that make up the synonyms of a concept. Atoms are also known as terms and sometimes as classes. In the MID, atoms exist in the classes, foreign_classes, atoms, and string_ui tables. In the Metathesaurus, they exist in the MRCON, MRSO, and MRX (index files).

Atomic action - A logged action that changes data in a single row of a core table. Implemented by the MEME_APROCS package, these actions are logged in the atomic_actions table. In addition to atomic actions that change core table fields, there is an atomic action to undo any other atomic action and an atomic action to redo any undone atomic action.

Bequeathal relationship - A special type of relationship used to map a CUI that will be deleted to a CUI that will not be deleted. Three special relationship names were created for this purpose: bequeathed broader (BBT), bequeathed narrower (BNT), and bequeathed related (BRT). Level 5 editors in the editor interface can add these relationships so long as the concept being bequeathed contains a single CUI value. In the MID, bequeathal relationships are stored in the relationships table. In the Metathesaurus, bequeathal relationships can be found in MRCUI.

Bin - A set of clustered concepts created by a particular predicate or set of predicates. Bins are used as the basis for most worklists and checklists by the EMS and WMS.

Checklist - A table containing a list of (potentially clustered) concepts generated by the WMS. Checklists are like worklists but are not tracked as rigorously. They exist to facilitate ease of editing for things like QA bins and ad-hoc editing sets.

Concept - The fundamental unit of the Metathesaurus. A concept represents a single "meaning" and contains the various ways of expressing that meaning in the form of atoms. All of the atoms within a concept are synonyms. Each concept is assigned at least one semantic type, and possibly other attributes. Every concept is assigned a CUI which (ideally) uniquely identifies a single "meaning" and is stable over time.

Concept Name – A string chosen to represent the concept as a whole. The name is selected form the atoms belonging to the concept by the computer. The decision is based on a simple priority list (the term whose source/term type is highest on the list wins.)

CN# - (Concept Number) – An identifying numerical key for the concept.

Concept report - A standard format for viewing the content in a concept.

Context - Often atoms are given a context by the source providers that create them. A context can be thought of as a hierarchy expressed as a path from that particular atom the root of its tree. A context has a "self", an ancestor chain (leading to the root), child atoms, and sibling atoms. In the MID, contexts are represented as parent and sibling relationships in the context_relationships table. In the Metathesaurus, contexts are represented in the MRCXT file, and as parent, child, and sibling relationships in the MRREL file.

Context relationship - A parent, child, or sibling relationship between two atoms. A parent means that one atom is higher in the context tree than the other atom. A sibling means that two atoms have the same parents and paths to the root. A child relationship is the inverse of a parent relationship; the other atom would be higher in the context tree than the one atom. In the MID, they are represented in the context_relationships table. In the Metathesaurus, context relationships appear as PAR, CHD, and SIB rows in MRREL.

Co-occurrence - A case where atoms of two different concepts appear in the same journal article, abstract, or other publication. It is a co-occurrence because two different concepts are occurring together in some third party source. Typically we track the source of the co-occurrence, an id representing the citations, frequency of co-occurrence and type of co-occurrence.

CUI - the concept unique identifier for a Metathesaurus concept to which strings with the same meaning are linked. One of the principles of the Metathesaurus is that meanings should be preserved over time regardless of what atoms are used to express those meanings. The CUI is an identifier that uniquely represents a meaning and (ideally) over time the meaning of a CUI does not change. As sources are updated and as editors merge and split concepts, meanings are altered and sometimes disappear. A tracking scheme now exists (involving what are called bequeathal relationships) to map meanings that go away (deleted CUIs) to living CUIs. CUIs are algorithmically assigned on a daily basis by the MEME_OPERATIONS.assign_cuis procedure which uses relative rankings and previous cui assignments of atoms to determine which concept wins a CUI in a split and which CUI wins a concept in a merge.

Demotion - A type of relationship typically resulting from a failed attempt to merge two concepts. Demotions are a flag for editors meaning that these two concepts are potentially synonymous but were not merged for integrity reasons. Demotions are created during source insertions when performing automated merge sets. A complex set of merge inhibitors is used to prevent merges from occurring under certain conditions (such as two concepts containing MSH main headings). If an automated merge set is running and one of its merges fails due to these integrity constraints, a relationship is created between the two concepts that were to be merged; this is a demotion. Infrequently, demotions are created without attempting to merge, especially in cases where we know that all of the attempted merges would fail.

Editing interface - An application that allows editors to view and edit the content in the MID. The molecular actions implementation exists in the back end of the interface and is the code that actually enacts the editor actions.

Embryo - A concept with a status of E. These are concepts that are currently undergoing changes due to the source insertion process. To avoid contaminating the process, editors are not allowed to edit concepts in an embryo state. Once source insertion is complete, embryo concepts are converted into approved or unapproved concepts.

EMS - The Editing Management System is a web application designed by the NLM to manage the editing of concepts. It enables the partitioning of the database into mutually exclusive sets that are then broken down into worklists. The EMS is available at http://meow.nlm.nih.gov/cgi-oracle-meowusers/ems.pl.

Hypernym - A "near synonym" of an atom that has a broader meaning.

Hyponym – A "near synonym" of an atom that has a narrower meaning.

Integrity constraint [aka integrity check] - The MEME integrity system is built on a series of integrity constraints that are designed to look at concepts and determine if certain conditions exist, or to examine certain pairs of concepts and determine if certain conditions exist. Integrity constraints are used to prevent merges by the merge engine, they are used by the matrix initializer to unapprove concepts that violate particularly severe conditions, and they are used by the EMS to generate checklists for editor review.

Inversion - The complex process by which files sent from source providers are converted to our common format.

Lexical Variants - A string that is lexically similar to another string. Common lexical variants are plural vs. singular, capitalization differences, and word order differences. For example:

Abbreviated injury scale
and
Abbreviated Injury Scales

are pluralization and case variants of one another. Here we have a word order variant,

Abbreviated Injury Scale
and
Injury Scale, Abbreviated

Lexical variants of this nature are determined by passing various flows to the NLM's lvg program.

LUI - A lexical class unique identifier. Any two strings (in English) that have the same normalized string after having been run through the NLM's luiNorm program will have the same LUI.

Lvg - A suite of lexical normalization tools part of which is the specialist lexicon a general English language lexicon that includes many biomedical terms.

ME bin [aka mutually exclusive bin] - Mutually exclusive bin created by the EMS when the MID is repartitioned. There are six permanent mutually exclusive bins (demotions, embryos, norelease, noreview, reviewed, leftovers) and other ones are added, generally to create bins containing concepts from a new or update source.

MEME - Metathesaurus Enhancement and Maintenance Environment. MEME is a suite of tools written in a combination of Oracle PL//SQL, CA-OpenROAD, and Java that comprises the editing environment for the UMLS Metathesaurus. Its tools include (but are not limited to) a back end implementation of the molecular actions, an editing interface, source insertion tools, and code for generating concept reports.

MetamorphoSys- A java client tool used for subsetting the Metathesaurus. Users of the Metathesaurus may not have licenses for all available sources and so may be forced to exclude them from their distribution. Alternatively, users may want to exclude sources for other reasons, or they may want to change the ranking of the various sources, or to alter the default settings for what source, term type combinations are suppressible. MetamorphoSys takes a Metathesaurus distribution and allows users to make these kinds of selections and then it produces a subset with the user-defined rankings and suppressibility choices.

MID - Metathesaurus Information Database. This is the editing database that contains all of the data that will ultimately be released.

Molecular action - A logged action corresponding to a "high level" editor action that affects a whole concept and not just a single core table row. Molecular actions employ one or more atomic actions to enact a higher-level change, like delete a concept or merge concept a into concept b. These actions are logged in the molecular_actions table and like atomic actions can be undone and redone.

MR* Files - UMLS Metathesaurus Release files. These contain the data files for the UMLS release and consist of MRCON, MRREL, MRCXT, MRCOC, MRATX, MRSAT, MRDEF, MRSTY, MRLO, MRSO, MRRANK, MRXW.* (*=language abbreviation).

Norm - A program that is part of the lvg distribution that generates one or more normalized strings given an input string. The program is implemented as an lvg call with a specific pattern of parameters.

Partitioning - A process performed by the EMS that divides all of the concepts in the MID into mutually exclusive sets. There exists a list of predicates which are run in order,

each of which siphons off concepts into a bin which are not allowed to exist in the later sets. The result of partitioning is the ME bins. Each time a new or update source is inserted, predicates for extracting concepts belonging to that source are added and the MID is repartitioned.

Precedence - selection of the default preferred name for any Metathesaurus concept is based on an order of precedence of Metathesaurus source vocabularies and their term types, e.g., preferred term, synonym. The MRRANK table computes precedence at production time with each source/termgroup combination having a place in the order.

Preferred Name - one string from each term is designated as the default preferred form of the term in the Metathesaurus. Then, based on Precedence, the preferred form of the term with highest precedence is made the preferred name of the concept.

Production - The complex process for creating a release.

QA bin - Quality assurance bin created by the EMS. These bins correspond to various integrity checks implemented as MEME_INTEGRITY_PROC procedures.

Relationship attribute - A further specification of a more generic kind of relationship. For example, a narrower relationship can be further specified as isa or has ingredient. Generally, relationship attribute values can be found in the Semantic Network.

Release - An instance of the Metathesaurus. Releases are assigned version numbers like this 2001AA, or like this 2001AA_01. The first form indicates an unsubsetted release, and AA indicates the first version of the year 2001. 2001AB would indicate the second year. 2001AA_01 indicates a subset of the first version of the 2001 release.

Restriction level - Every source has a restriction level between 0 and 3. The level indicates the type of license agreement that a user must have to use that source. 0 is the least restrictive (meaning the source is free or in the public domain) and 3 is the most restrictive (meaning that you have to pay a license fee to the source provider). Typically, users remove source they do not have licenses for by using MetamorphoSys.

Safe replacement - When a source is updated, there are atoms from the new source that are new versions of atoms from the old source. These atoms are safe replacements. In practice, we calculate safe replacements by generating safe replacement facts (through matching), and then we store the safe replacement facts in a table called mom_safe_replacement. It is possible that the matching criteria turns up multiple replacements in the new source for an old source atom, so we rank the safe replacement facts so that other applications can find the "best one". Safe replacement atoms inherit last_release_cui and last_release_rank values from the atoms they replace.

Semantic Type - one of the categories in the UMLS Semantic Network, e.g., Disease or Syndrome, Pharmacologic Substance. Each Metathesaurus concept is assigned at least one Semantic Type.

Source family - In some cases, different sources belong to the same family of sources. What this means is that one source should not exist without the other one, so when a user is subsetting the Metathesaurus using MetamorphoSys, a decision to remove one of the sources in a family should also prompt a decision to remove all others in that family. A classic example of different sources in the same family is CPT and MTHCH (the MTH created hierarchical terms for CPT).

Source insertion - The complex process of inserting new or update data into the database. The process typically starts with the writing of an insertion recipe that describes how the src files will be loaded into the MID and merged with the existing content.

Split - Whereas a merge puts two concepts together, a split tears a concept apart into two concepts. A split happens when an editor decides that one or more atoms in a concept do not mean the same thing as the other atoms in the concept and removes those atoms from the concept and puts them in a new concept. Note: split is a term that generally refers to concepts, but generically it is a case of some constituent part of something larger being moved out. When comparing one version of the Metathesaurus to another, you will often see CUIs that have been split apart.

Src files - The inversion process takes source provider files in their native formats and converts them to our common format which are the src files. These files are then the input to the source insertion process. Full documentation for the src files is available at: http://meow.nlm.nih.gov/MEME/Data/src_format.html .

Stamping - An automated process for approving concepts. Editors are assigned worklists which are used to generate paper concept reports. Editors review the paper reports and use the editing interface to make required changes. An editor implicitly approves a concept on a worklists if they make no explicit changes to it in the interface. Those implicit approvals are made explicit by the stamping process.

String - a unique string or concept name that appears in one or more of the Metathesaurus source vocabularies. Any variation in upper-lower case, word order, punctuation, etc. is a separate string. The same string in different languages (e.g., English, Spanish) will have a different string identifier for each language. Alphanumeric characters that express the meaning (Eye, Eyes, Eye = 3 strings).

SUI - the unique identifier for each unique string in the Metathesaurus. Strings that differ in any way, e.g., by upper-lower case, will have different SUIs.

Supplementary concept [aka supplementary chemical] - A concept containing only MSH atoms with C# codes with a status of U. Eventually the MSH people will edit all of the status U content and there will no longer be supplementary concepts.

Suppressibility - certain concept names are tagged as suppressible in the Metathesaurus. This allows these names to be ignored or removed from the Metathesaurus for particular applications. Terms that lack face validity or are otherwise problematic are marked as "Suppressible Synonyms". Examples are names that do not express contextual meaning, unusual abbreviations, or informalities, which may be troublesome in applications. They are marked with the Term status (TS) value of 's' or “suppressible” in MRCON.

Synonym - names, which refer to the same meaning. They are part of the same concept.

Term - in the Metathesaurus, a term is the group of all strings that are lexical variants of each other. (Eye, eye = 1 term).

Term type - A value indicating the general nature of an atom. Term types include things like PT for "preferred term" or SY for "synonym" or MH for "main heading". Term types can be found at the end of termgroup values after the slash.

Termgroup - A piece of information indicating the source and term type of an atom. Termgroups have the microsyntax: <source>/<termtype>. For example, MSH2001/MH indicates that an atom has the source MSH2001 and the term type MH.

Worklist - A table containing a list of concepts generated by the WMS. Worklists exist to facilitate the bulk of the editing and are derived principally from the ME bins. They are tracked by the EMS throughout their entire life cycle, from assignment to editors, to being checked back in, to being stamped.

WMS - The Worklist Management System is a web application designed by the NLM to manage the life cycle of worklists. The WMS is also used for making checklists. It is available at http://meow.nlm.nih.gov/cgi-oracle-meowusers/wms.pl .

XX. Appendix A – Semantic Type examples

Semantic Types

Acquired Abnormality

An abnormal structure, or one that is abnormal in size or location, found in or deriving from a previously normal structure.

Acquired abnormalities are distinguished from diseases even though they may result in pathological functioning

Adhesion of <string>	Adhesion of lung
Atrophy of <string>	Atrophy of cervix
Carbuncle of <string>	Carbuncle of foot
Cyst of <string>	Cyst of parathyroid
Fistula of <string>	Fistula of esophagus
Furuncle of <string>	Furuncle of ear
Pustules	Pustules
<string> scar	Corneal scar

Activity

An operation or series of operations that an organism or machine carries out or participates in.

Few concepts will be assigned to this broad type. Wherever possible, one of the more specific types from this hierarchy will be chosen. For concepts assigned to this type, the focus of interest is on the activity. When the focus of interest is the individual or group that is carrying out the activity, then a type from the 'Behavior' hierarchy will be chosen. In general, concepts will not receive a type from both the 'Activity' and the 'Behavior' hierarchies.

	Expedition
	Information Distribution
	Social Planning
	Return Migration

Age Group

An individual or individuals classified according to their age.

	Adolescents

	Infants
Alga **A chiefly aquatic plant that contains chlorophyll, but does not form embryos during development and lacks vascular tissue.**	
	Chlorella
	Laminaria
	Seaweed
Amino Acid Sequence **The sequence of amino acids as arrayed in chains, sheets, etc., within the protein molecule. It is of fundamental importance in determining protein structure.**	
	Dringles
	Homologous Sequences
	Signal Peptides
Amino Acid, Peptide, or Protein **Amino acids and chains of amino acids connected by peptide linkages** When the concept is both an enzyme and a protein, this type and the type 'Enzyme' will be assigned.	
	Acetylcysteine
	Amino Acid
	Glycoproteins
	Glycylglutamine
	Peptidyl-Dipeptidase A
Amphibian **A cold-blooded, smooth-skinned vertebrate which characteristically hatches as an aquatic larva, breathing by gills. When mature, the amphibian breathes with lungs.**	
	Brazilian horned frog
	Salamandra

	Urodela
Anatomic Abnormality **An abnormal structure, or one that is abnormal in size or location.** Use this type if the abnormality in question can be either an acquired or congenital abnormality. Neoplasms are not included here. These are given the type 'Neoplastic Process'. If an anatomical abnormality has a pathologic manifestation, then it will additionally be given the type 'Disease or Syndrome', e.g., "Diabetic Cataract" will be double-typed for this reason.	
	Nose deformity
	Lateral Open Bite
	Torsion of Ovary
Anatomical Structure **A normal or pathological part of the anatomy or structural organization of an organism.** Few concepts will be assigned to this broad type.	
	Hair
Animal *An organism with eukaryotic cell and lacking stiff cell walls, plastids and photosynthetic pigments.*	
<string> animals	Laboratory Animals
	Poisonous Animals
	Newborn Animals
Antibiotic **A pharmacologically active compound produced by growing microorganisms which kill or inhibit growth of other microorganisms.**	
	Antibiotics
	Cephalosporins
	Methicillin

Archaeon

A member of one of the three domains of life, formerly called Archaebacteria under the taxon Bacteria, but now considered separate and distinct. Archaea are characterized by: 1) the presence of characteristic tRNAs and ribosomal RNAs; 2) the absence of peptidoglycan cell walls; 3) the presence of ether-linked lipids built from branched-chain subunits; and 4) their occurrence in unusual habitats. While archaea resemble bacteria in morphology and genomic organization, they resemble eukarya in their method of genomic replication.

	Haloferax volcanii
	Methanospirillum
	Thermoproteales

Bacteria

A small, typically one-celled, prokaryotic micro-organism

	Acetobacter
	Bacillus cereus
	Cytophagia

Behavior

Any of the psycho-social activities of humans or animals that can be observed directly by others or can be made systematically observable by the use of special strategies.

Few concepts will be assigned to this broad type. For concepts assigned to the 'Behavior' hierarchy, the focus of interest is on the individual or group that is carrying out the activity. When the activity is of paramount interest, then a type from the 'Activity' hierarchy will be chosen. In general, concepts will not receive a type from both the 'Behavior' and the 'Activity' hierarchies. This is used most frequently for concepts involving animal behaviors.

	Animal Migratory Behavior
	Nest Building

Biologic Function

A state, activity or process of the body or one of its systems or parts.

Few concepts will be assigned to this broad type.

	Adaptation

Biologically Active Substance

A generally endogenous substance produced or required by an organism, of primary interest because of its role in the biologic functioning of the organism that produces it.

If a substance is both endogenous and typically used as a drug, then this type and the type "Pharmacologic Substance" will be assigned.

	Enzyme Precursors
	Gastric Acid
	Growth Substances

Biomedical Occupation or Discipline

A vocation, academic discipline or field of study related to biomedicine.

	Adolescent Medicine
	Cellular Neurobiology
	Dentistry
	Dermatology
	Emergency Nursing

Biomedical or Dental Material

A substance used in biomedicine or dentistry predominantly for its physical, as opposed to chemical, properties. Included here are biocompatible materials, tissue adhesives, bone cements, resins, toothpastes, etc.

	Anion Exchange Resins
	Bone Cement
	Dental Casting Investment
	Elastosil

Bird

A vertebrate having a constant body temperature and characterized by the presence of feathers.

	Canaries
	Pigeons
	Quail

Body Location or Region

An area, subdivision, or region of the body demarcated for the purpose of topographical description.

When assigning this type, consider whether 'Body Part, Organ, or Organ Component' might be the correct choice. There is substantial overlap between Body Location or Region *and* Body Part, Organ, or Organ Component. In these instances, the overall meaning of the concept must be used to determine the most appropriate STY.

Border of <string>	Border of tongue
<string> facet	Articular facet of head of fourth rib
Surface of <string>	Surface of bladder
<string> area	Chest area

Body Part, Organ, or Organ Component

A collection of cells and tissues which are localized to a specific area or combine and carry out one or more specialized functions of an organism. This ranges from gross structures to small components of complex organs. These structures are relatively localized in comparison to tissues.

When assigning this type, consider whether 'Body Location or Region' might be the correct choice. Some concepts designated as Tissue of <string> or <string> Tissue are referring to a specific location or organ component which would be more appropriately typed as Body Part, Organ, or Organ Component.

	Femur
Kidney <string>	Kidney Glomerulus
<string> artery	Pulmonary artery
<string> tissue	Heart valve tissue
<string> capsule	Renal capsule
Structure of <string>	Structure of periprostatic tissue

Body Space or Junction

An area enclosed or surrounded by body parts or organs or the place where two anatomical structures meet or connect.

Canal of <string>	Canal of Hering
Insertion/Origination of <string>	Origination of posterior muscle thigh
<string> cavity	Peritoneal cavity
<string> fossa	Antecubital fossa
<string> joint	Wrist joint
<string> sinus	Frontal sinus
<string> space	Held's space

Body Substance

Extracellular material, or mixtures of cells and extracellular material, produced, excreted, or accreted by the body. Included here are substances such as saliva, dental enamel, sweat, and gastric acid.

<string> calculus	Renal calculus
<string> fluid	Amniotic fluid
<string> washings	Bronchial washings

Body System

A complex of anatomical structures that performs a common function.

<string> system	Limbic System
	Renin-Angiotensin System
	Reticuloendothelial System
	Skeletal System

Carbohydrate

A generic term that includes monosaccharides, oligosaccharides, and polysaccharides as well as substances derived from monosaccharides by reduction of the carbonyl group (alditols), by oxidation of one or more terminal group to carboxylic acids, or by replacement of one or more hydroxy groups by a hydrogen atom, an amino group, a thiol group or similar heteroatomic groups. It also includes derivatives of these compounds. Included here are sugar phosphates. Excluded are glycolipids and glycoproteins.

Glycoproteins should only be typed as 'Amino Acid, Peptide, or Protein'. Sugar phosphates should only be typed as 'Carbohydrate'. Glycolipids should only be typed as 'Lipid'.

	Deoxyglucose
	Glycosides
	Polysaccharides
	Sepharose

Carbohydrate Sequence

The sequence of carbohydrates within polysaccharides, glycoproteins, and glycolipids.

	Carbohydrate Sequence

Cell

The fundamental structural and functional unit of living organisms.

<string> cells	Dendritic cells
<string> cytes	Erythrocytes
	Histiocytes

Cell Component

A part of a cell or the intercellular matrix, generally visible by light microscopy.

	Abnormal microsomes
Cytoplasmic <string>	Cytoplasmic Golgi bodies
	Organelles

Cell Function

A physiologic function inherent to cells or cell components.

	Cell Cycle
	Cell Division
	Erythrocyte Aggregation
	Phagocytosis

Cell or Molecular Dysfunction

A pathologic function inherent to cells, parts of cells, or molecules.

This is not intended to be a repository for diseases whose molecular basis has been established.

	Aneuploidy of chromosomes
	Atypical squamous metaplasia
	DNA damage

Chemical

Compounds or substances of definite molecular composition. Chemicals are viewed from two distinct perspectives in the network, functionally and structurally. Almost every chemical concept is assigned at least two types, generally one from the structure hierarchy and at least one from the function hierarchy.

Few concepts will be assigned to this broad type. Frequently “Substance” is a better choice.

	Bulk Chemicals
	Crude extracts

Chemical Viewed Functionally

A chemical viewed from the perspective of its functional characteristics or pharmacological activities.

A specific chemical will not be assigned here. Groupings of chemicals viewed functionally, such as "Aerosol Propellants" may appropriately be assigned here.

	Aerosols
	Gas sterilants

Chemical Viewed Structurally

A chemical or chemicals viewed from the perspective of their structural characteristics. Included here are concepts which can mean either a salt, an ion, or a compound (e.g., "Bromates" and "Bromides").

Concepts are assigned to this type if they can be both organic and inorganic, e.g. sulfur compounds. Do not use this type if the concept has an important functional aspect, e.g., "Mylanta Double Strength Liquid" contains Al(OH)3, Mg(OH)2, and simethicone, but would be assigned only to 'Pharmacologic Substance'.

	Ammonium Compounds
	Cations
	Siloxanes
	Sulfur Compounds

Classification

A term or system of terms denoting an arrangement by class or category.

	Baby Food Types
	Dewey Decimal Classification
	Emerging Technology, Services and Procedures

Clinical Attribute

An observable or measurable property or state of an organism of clinical interest.

These are the attributes that are being evaluated or measured, not the results of the evaluation.

Body <string>	Body density
	ALANINE AMINOTRANSFERASE:CATALYTIC CONCENTRATION:POINT IN TIME:SERUM/PLASMA:QUANTITATIVE:WITHOUT P-5'-P;
Urine <string>	Urine acidity

Clinical Drug

A pharmaceutical preparation as produced by the manufacturer. The name usually includes the substance, its strength, and the form, but may include the substance and only one of the other two items.

Clinical Drug is never double typed; Drug Delivery Device is appropriate for Clinical drugs that include a mode of delivery.

	ACETOHEXAMIDE 250 MG ORAL TABLET
	Oral aspirin
	Sleeping pill
	Zovirax Cold Sore 5% cream

Conceptual Entity

A broad type for grouping abstract entities or concepts.

Few concepts will be assigned to this broad type.

	Fractals
	Pluralism

Congenital Abnormality

An abnormal structure, or one that is abnormal in size or location, present at birth or evolving over time as a result of a defect in embryogenesis. Congenital Abnormalities must be structural on a macroscopic level; do not include chromosomal or genetic abnormalities.

If the congenital abnormality involves multiple defects or requires treatment, the semantic type 'Disease or Syndrome' will also be assigned. Examples of concepts that are **not** Congenital Abnormalities include G6PD deficiency, Lysosomal Storage Diseases, Trisomy 21, etc.

	Acrosyndactyly of the fingers
	Aortic atresia
	Cleft palate
Congenital cyst of <string>	Congenital cyst of parathyroid

Daily or Recreational Activity

An activity carried out for recreation or exercise, or as part of daily life.

	Daily shaving
	Moutaineering
	Sports
	Swimming

Diagnostic Procedure

A procedure, method, or technique used to determine the nature or identity of a disease or disorder. This excludes procedures which are primarily carried out on specimens in a laboratory.

Biopsy of <string>	Biopsy of lung
CAT Scan <string>	CAT Scan brain
<string> auscultation	Cardiac auscultation
<string> scopy	Endoscopy
Xray of <string>	Xray of Arm

Disease or Syndrome

A condition which alters or interferes with a normal process, state, or activity of an organism. It is usually characterized by the abnormal functioning of one or more of the host's systems, parts, or organs. Included here is a complex of symptoms descriptive of a disorder.

Any specific disease or syndrome that is modified by such modifiers as "acute", "prolonged", etc. will also be assigned to this type. If an anatomic abnormality has a pathologic manifestation, then it will be given this type as well as a type from the 'Anatomical Abnormality' hierarchy, e.g., "Diabetic Cataract" will be double-typed for this reason.

	Diabetes Mellitus
<string> Syndrome	Dumping Syndrome
	Malabsorption Syndrome
<string> lithiasis	Broncholithiasis

Drug Delivery Device

A medical device that contains a clinical drug or drugs.

<string> bandage	Antibiotic impregnated bandage
<string> Inhaler	Intal Inhaler

Educational Activity

An activity related to the organization and provision of education.

	Academic training
	Community Health Education
	Family Planning Training
	Preceptorship

Eicosanoid

An oxygenated metabolite from polyunsaturated 20 carbon fatty acids including lipoxygenase and cyclooxygenase products and their synthetic analogs. This includes the prostaglandins and thromboxanes.

Naturally occurring eicosanoids will also be assigned to a type from the 'Biologically Active Substance' hierarchy. Synthetic eicosanoids will also be assigned to the type 'Pharmacologic Substance'.

	8, 11, 14- Eicosatrienoic Acid
	Alprostadil
	Thromboxane A2
	Rioprostil

Element, Ion, or Isotope

One of the presently known fundamental substances in the Periodic Table that comprise all matter at and above the atomic level. This includes elemental metals, rare gases, and most abundant naturally occurring radioactive elements, as well as the ionic counterparts of elements (NA+, Cl-), and the less abundant isotopic forms. This does not include organic ions such as iodoacetate to which the type 'Organic Chemical' is assigned.

Group terms such as sulfates would be assigned to the type 'Chemical Viewed Structurally'. Substances such as aluminum chloride would be assigned the type 'Inorganic Chemical'. Technetium Tc 99m Aggregated Albumin would not receive this type.

	Carbon
<string> Isotopes	Chromium Isotopes
<string> Radioisotopes	Cobalt Radioisotopes
	Deuterium Radioisotopes
	Uranium

Embryonic Structure

An anatomical structure that exists only before the organism is fully formed; in mammals, for example, a structure that exists only prior to the birth of the organism. This structure may be normal or abnormal.

	Blastoderm
	Fetal Heart
	Neural Crest

Entity

A broad type for grouping physical and conceptual entities.

Few concepts will be assigned to this broad type.

	No examples

Environmental Effect of Humans

A change in the natural environment that is a result of the activities of human beings.

	Acid Rain
	Water Pollution
	Soil Degradation

Enzyme

A complex chemical, usually a protein, that is produced by living cells and which catalyzes specific biochemical reactions. There are six main types of enzymes: oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases.

Generally when a concept is assigned to this type, it will also be assigned to the type 'Amino Acid, Peptide, or Protein'.

<string> Enzymes	Complement Activating Enzymes
	Glucose Oxidase

Event

A broad type for grouping activities, processes and states.

	Funeral
	Birthday Party

Experimental Model of Disease

A representation in a non-human organism of a human disease for the purpose of research into its mechanism or treatment

	Alloxan Diabetes
	Erhlich Tumor
	Experimental Melanoma

Family Group

An individual or individuals classified according to their family relationships or relative position in the family unit.

	Siblings
	Surrogate Mothers

Finding:

That which is discovered by direct observation or measurement of an organism or clinical attribute or condition, including the history of the patient. The history of the presence of a disease is a 'Finding' and is distinguished from the disease itself.

Only in rare circumstances will findings be double-typed with either 'Pathologic Function' or 'Anatomical Abnormality'. Most findings will be assigned the types 'Laboratory or Test Result' or 'Sign or Symptom'. Observations relating to patient history or involving interpretation of data will be assigned the type 'Finding'.

Absent <string>	Absent tendon reflex
Alteration in <string>	Alteration in lipid metabolism
Decreased <string>	Decreased Capillary fragility
Family History of <string>	Family History of Kidney Disease
History of <string>	History of bladder neoplasm
Personal History of <string>	Personal History of Drug Allergy
Potential for <string>	Potential for Infection
Risk for <string>	Risk for Disorganized Infant Behavior
<string> findings	Renal Findings *(could be Sign/Symptom)*
<string> increased	CKMB increased
<string> normal	Hgb normal, EKG normal, CXR normal
<string(referring to patient)> status	Post amputation status

Fish

A cold-blooded aquatic vertebrate characterized by fins and breathing by gills. Included here are fishes having either a bony skeleton, such as a perch, or a cartilaginous skeleton, such as a shark, or those lacking a jaw, such as a lamprey or hagfish.

	Bass
	Salmonidae
	Trout

Food

Any substance generally containing nutrients, such as carbohydrates, proteins, and fats, that can be ingested by a living organism and metabolized into energy and body tissue. Some foods are naturally occurring, others are either partially or entirely made by humans.

Nutritional Supplements administered through the gastrointestinal tract should be assigned this STY. Food and Plant are never concomitant STY's.

	Beverages
	Egg Yolks
	Ensure supplement
	Feeding tube solutions
	Food additives
	Margarine
	Nuts
	Potato

Fully Formed Anatomical Structure

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

Few concepts will be assigned to this broad type.

	Carcass
	Male Body

Functional Concept

A concept which is of interest because it pertains to the carrying out of a process or activity.

	Altered
	Interviewer Effect
	Metaplastic

Fungus **A eukaryotic organism characterized by the absence of chlorophyll and the presence of a rigid cell wall. Included here are both slime molds and true fungi such as yeasts, molds, mildews, and mushrooms.**	
	Aspergillis clavatus
	Blastomyces
	Helminthosporium
	Neurospora
Gene or Genome **A specific sequence, or in the case of the genome the complete sequence, of nucleotides along a molecule of DNA or RNA (in the case of some viruses) which represent the functional units of heredity.**	
	Human Genome
<string> Genes	Structural Genes
	c-Ha-ras Genes
Genetic Function **Functions of or related to the maintenance, translation or expression of the genetic material.**	
	Amino Acid Activation
	Early Gene Transcription
	Gene Amplification
	RNA Splicing
Geographic Area **A geographic location, generally having definite boundaries.**	
	Americas
	Artic Regions
	Baltimore
	Canada
	Far East

Governmental or Regulatory Activity

An activity carried out by officially constituted governments, or an activity related to the creation or enforcement of the rules or regulations governing some field of endeavor.

	Hospital Accreditation
	Policeman's Pension Fund
	Teacher Credentialing

Group

A conceptual entity referring to the classification of individuals according to certain shared characteristics.

Few concepts will be assigned to this broad type

	Focus Groups
	Jury

Group Attribute

A conceptual entity which refers to the frequency or distribution of certain characteristics or phenomena in certain groups.

	Family Size
	Group Structure
	Life Expectancy
	Neonatal Mortality

Hazardous or Poisonous Substance

A substance of concern because of its potentially hazardous or toxic effects. This would include most drugs of abuse, as well as agents that require special handling because of their toxicity.

Most pharmaceutical agents, although potentially harmful, are excluded here and are assigned to the type 'Pharmacologic Substance'. All pesticides are assigned to this type.

	Carcinogens
	Crack Cocaine
	Paraquat
	Sodium Cyanide

Health Care Activity

An activity of or relating to the practice of medicine or involving the care of patients.

This includes activities which are not clearly diagnostic or therapeutic or both.

	Ambulatory Care
	Communicable disease control
<string> Health Services	Preventative Health Services
	Pre Admission process
	Cholesterol screening

Health Care Organization

An established organization which carries out specific functions related to health care delivery or research in the life sciences

Concepts for health care related professional societies are assigned the type 'Professional Society'.

<string> Clinic	Outpatient Clinic **(+ Manufactured Object)**
<string> Facilities	Ambulatory Care Facilities**(+ Manufactured Object)**
<string> Hospital	George Washington Hospital **(+ Manufactured Object)**
	World Health Organization
	American Cancer Society

Hormone

In animals, a chemical usually secreted by an endocrine gland whose products are released into the circulating fluid. Hormones act as chemical messengers and regulate various physiologic processes such as growth, reproduction, metabolism, etc. They usually fall into two broad classes, steroid hormones and peptide hormones.

Synthetic hormones that are used as drugs should receive this type and 'Pharmacologic Substance'. Plant hormones are assigned only to the type 'Pharmacologic Substance'.

	Glucocorticoids
	Gonadotropins
<string> Hormones	Pituitary Hormones
	Pentagastrin

Human

Modern man, the only remaining species of the Homo genus.

If a concept describes a human being from the point of view of occupational, family, social status, etc., then a type from the 'Group' hierarchy will be assigned instead.

	Hominidae
	Jean Piaget

Human –caused Phenomenon or Process

A phenomenon or process that is a result of the activities of human beings.

If the concept refers to the activity itself, rather than the result of that activity, a type from the 'Activity' hierarchy will be assigned instead.

	Accident
	Aviation
	Baby Boom
	Cultural Evolution

Idea or Concept

An abstract concept, such as a social, religious or philosophical concept.

	Capitalism
	Civil Rights
	Ethics
	Freedom
	Spiritualism

Immunologic Factor

A biologically active substance whose activities affect or play a role in the functioning of the immune system.

Antigens and antibodies are assigned to this type. Unlike most biologically active substances, some immunologic factors may be exogenous. Vaccines should be given this type and the type 'Pharmacologic Substance'.

<string> Globulin	Antilymphocyte Globulin
<string > Factor	Autocrine Motility Factor
<string> antibody	Blood Group Antibody 754

Indicator, Reagent, or Diagnostic Aid

A substance primarily of interest for its use in laboratory or diagnostic tests and procedures to detect, measure, examine, or analyze other chemicals, processes, or conditions.

Radioactive imaging agents should be assigned to this type and not to the type 'Pharmacologic Substance' unless they are also being used therapeutically.

	Congo Red
	Dansyl Compounds

Individual Behavior

Behavior exhibited by a human or an animal that is not a direct result of interaction with other members of the species, but which may have an effect on others.

'Individual Behavior' is carried out by an individual, though others may be present, and is, thus, distinguished from 'Social Behavior' which requires the direct participation of others.

Addicted to <string>	Addicted to Smoking
	Assertiveness
	Finger Sucking
	Risk Taking
	Self – Disclosure

Injury or Poisoning

A traumatic wound, injury, or poisoning caused by an external agent or force.

An `Injury or Poisoning' is distinguished from a 'Disease or Syndrome' that may be a result of prolonged exposure to toxic materials.

Adverse effect of <drug>	Adverse effect of anticholinergics
Injury caused by <string>	Injury caused by dog bite
<string> Bite	Snake Bite
<string> Caused by accident	Broken arm caused by motor vehicle collision
<string> From birth trauma	Brachial palsy from birth trauma
<string> Injury	Abdominal Injury
<string> Overdose	Haldol overdose
<string> Poisoning	Carbon Monoxide Poisoning
Toxic effects of <string>	Toxic effects of mercury

Inorganic Chemical

Chemical elements and their compounds, excluding the hydrocarbons and their derivatives (except carbides, carbonates, cyanides, cyanates and carbon disulfide). Generally inorganic compounds contain ionic bonds. Included here are inorganic acids and salts, alloys, alkalies, and minerals.

<string> acid	Carbonic Acid
	Sodium Chloride
	Talc

Intellectual Product

A conceptual entity resulting from human endeavor. Concepts assigned to this type generally refer to information created by humans for some purpose.

Concepts referring to theorems, models, and systems are assigned here. In some cases, a concept may be assigned to both 'Intellectual Product' and 'Research Activity'. For example, the concept "Comparative Study" might be viewed as both an activity and the result, or product, of that activity.

	Decision Support Systems
	Information Systems
<inventory number>	Institution Inventory Number
	Literature
<model number>	Vendor Model Number
<serial number>	Vendor Serial Number
	Discharge form, AMA form
	Population Projection

Invertebrate

An animal which has no spinal column

This type has no children in the network and is assigned to all invertebrate animals.

	Earthworm
	Platyhelminths
	Starfish
	Strongylus
	Wasp

Laboratory Procedure

A procedure, method, or technique used to determine the composition, quantity, or concentration of a specimen, and which is carried out in a clinical laboratory. Included here are procedures which measure the times and rates of reactions.

<string> Measurement	Hemoglobin Measurement
	Blood Protein Electrophoresis
	Radioimmunoassay
	Urinalysis

Laboratory or Test Result

The outcome of a specific test to measure an attribute or to determine the presence, absence, or degree of a condition.

Laboratory or test results are considered inherently quantitative and, thus, are not assigned the additional type 'Quantitative Concept'

<string> level	Carbon monoxide level
<string> negative	Aceto white reaction negative

Language

The system of communication used by a particular nation or people.

	Afrikaans Language
	Braille
	Italian

Lipid

An inclusive group of fat or fat-derived substances that are soluble in nonpolar solvents related to fatty acid esters, fatty alcohols, sterols, waxes, etc. Included in this group are the saponifiable lipids such as glycerides (fats and oils), essential (volatile) oils, and phospholipids.

Phospholipids should not also be typed with 'Organophosphorus Compound'. Fatty acids are composed of a chain of alkyl groups containing from 4-22 carbon atoms (usually even-numbered) and characterized by a terminal carboxyl group.

	Ceroid
	Glycerides

	Sphingolipids
Machine Activity *An activity carried out primarily or exclusively by machines.*	
	Computer Simulation
	Equipment Failure
	Natural Language Processing
	Word Processing
Mammal **A vertebrate having a constant body temperature and characterized by the presence of hair, mammary glands and sweat glands.**	
	Bears
	Hamsters
	Kangaroos
	Macaca
Manufactured Object **A physical object made by human beings.**	
	Car Seats
	Cooking and Eating Utensils
<string> clinic	Outpatient Clinic **(+ Health Care Organization)**
<string> hospital	George Washington Hospital **(+ Health Care Organization)**
Medical Device **A manufactured object used primarily in the diagnosis, treatment, or prevention of physiologic or anatomic disorders.** A medical device may be used for research purposes, but since its primary use is for routine medical care, it is distinguished from a 'Research Device' which is used primarily for research purposes.	
<string> Screws	Bone Screws
<string> Pumps	Infusion Pumps
<string> Forceps	Obstetrical Forceps

	Oxygenators
Mental Process **A physiologic function involving the mind or cognitive processing.**	
	Anger
	Auditory Fatigue
	Avoidance Learning
	Cognition
Mental or Behavioral Dysfunction *A clinically significant dysfunction whose major manifestation is behavioral or psychological. These dysfunctions may have identified or presumed biological etiologies or manifestations.*	
	Agoraphobia
<string> Dependency	Nicotine dependency
	Cyclothymic Disorder
	Memory Disorders
	Hallucinations
Molecular Biology Research Technique **Any of the techniques used in the study of or the directed modification of the gene complement of a living organism.**	
	Blotting, Northern
	Genetic Engineering
	Heterozygote Detection
	Sequence Homology Determination
Molecular Function **A physiologic function occurring at the molecular level.**	
	Competitive Binding
	Electron Transport
	Glycolysis

Molecular Sequence

A broad type for grouping the collected sequences of amino acids, carbohydrates, and nucleotide sequences. Descriptions of these sequences are generally reported in the published literature and/or are deposited in and maintained by databanks such as GenBank, European Molecular Biology Laboratory (EMBL), National Biomedical Research Foundation (NBRF), or other sequence repositories.

	Homologous Sequence

Natural Phenomenon or Process

A phenomenon or process that occurs irrespective of the activities of human beings.

	Air Movements
	Antibiosis
	Corrosion
	Lightning

Neoplastic Process

A new and abnormal growth of tissue in which the growth is uncontrolled and progressive. The growths may be malignant or benign.

All neoplasms are assigned to this type. Do not also assign a type from the 'Anatomical Abnormality' hierarchy.

<string> epithelioma	Tonsillar lymphoepithelioma
	Carcinoma of the Testes
<string> Leukemia	Chronic Lymphocytic Leukemia
<string> Neoplasms	Abdominal Neoplasms
<string> polyp	Cardiac polyp

Neuroreactive Substance or Biogenic Amine

An endogenous substance whose activities affect or play an important role in the functioning of the nervous system. Included here are catecholamines, neuroregulators, neurophysins, etc.

Unlike many of the other types under 'Biologically Active Substance', do not assign this type to drugs that are used on the nervous system unless the compound is endogenous.

	Gamma- Aminobutyric Acid
	Neurotensin

	Norepinephrine

Nucleic Acid, Nucleoside, or Nucleotide

A complex compound of high molecular weight occurring in living cells. These are basically of two types, ribonucleic (RNA) and deoxyribonucleic (DNA) acids. Nucleic acids are made of nucleotides (nitrogen-containing base, a 5-carbon sugar, and one or more phosphate group) linked together by a phosphodiester bond between the 5' and 3' carbon atoms. Nucleosides are compounds composed of a purine or pyrimidine base (usually adenine, cytosine, guanine, thymine, uracil) linked to either a ribose or a deoxyribose sugar.

If this type has been assigned, the type 'Organophosphorus Compound' will not also be assigned. Naturally occurring nucleic acids, nucleosides, or nucleotides will also be assigned a type from the 'Biologically Active Substance' hierarchy.

	Adenosine
<string> Nucleotides	Guanine Nucleotides
	Nicotinamide Mononucleotide

Nucleotide Sequence

The sequence of purines and pyrimidines in nucleic acids and polynucleotides. Included here are nucleotide-rich regions, conserved sequence, and DNA transforming region.

	AT Rich Sequence
	Base Sequence
	Direct Repeat

Occupation or Discipline

A vocation, academic discipline, or field of study, or a subpart of an occupation or discipline.

If the concept refers to the individuals who have the vocation, the type 'Professional or Occupational Group' will be assigned instead.

	Aviation, Craniology, Ecology
	Gardening, Genetics

Occupational Activity

An activity carried out as part of an occupation or job.

	Collective Bargaining

	Commerce
	Containment of Biohazards
Organ or Tissue Function **A physiologic function of a particular organ, organ system, or tissue.**	
	Renal Circulation
	Tooth Calcification
Organic Chemical **The general class of carbon-containing compounds, usually based on carbon chains or rings, and also containing hydrogen (hydrocarbons), with or without nitrogen, oxygen, or other elements in which the bonding between elements is generally covalent.** Salts of organic chemicals (such as Calcium Acetate) would be considered organic chemicals and should not also receive the type 'Inorganic Chemical'.	
<string> Derivatives	Benzine derivatives
	Busulfan
	Methane
	Toluene
Organism **Generally, a living individual, including all plants and animals.**	
	Homozygote
	Radiation Chimera
	Sporocyst
Organism Attribute **A property of the organism or its major parts**	
	Ambidexterity
	Body Temperature
	Body Weight
	Eye Color

Organism Function

A physiologic function of the organism as a whole, of multiple organ systems, or of multiple organs or tissues.

	Breeding
	Hibernation
	Homeostasis
	High Altitude acclimation

Organization

The result of uniting for a common purpose or function. The continued existence of an organization is not dependent on any of its members, its location, or particular facility. Components or subparts of organizations are also included here. Although the names of organizations are sometimes used to refer to the buildings in which they reside, they are not inherently physical in nature

	Labor Unions
	United Nations
	United States Environmental Protection Agency
	Universities

Organophosphorus Compound

An organic compound containing phosphorus as a constituent. Included here are organic phosphinic, phosphonic and phosphoric acid derivatives and their thiophosphorus counterparts. Excluded are phospholipids, sugar phosphates, phosphoproteins, nucleotides, and nucleic acids.

	Diphosphonates
	Phosphonoacetic Acid
	Phosphoric Acid Esters
	Thiamine Triphosphate

Pathologic Function

A disordered process, activity, or state of the organism as a whole, of a body system or systems, or of multiple organs or tissues. Included here are normal responses to a negative stimulus as well as pathologic conditions or states that are less specific than a disease. Pathologic functions frequently have systemic effects.

If the process is specific, for example to a site or substance, then 'Disease or Syndrome' will be assigned and not 'Pathologic Function'. For example, "cerebral anoxia" and "brain edema" will be assigned to 'Disease or Syndrome' only.

Atrophy	Atrophy
Complications of <string>	Complications of normal delivery
Hemorrhage <string>	Hemorrhage placental
Inflammation of <string>	Inflammation of Mouth
	Leukopenia
	Shock
<drug> allergy	Sulfonamide allergy
<string> effusion	Pulmonary effusion
<string> malfunction	Pacemaker malfunction
<string> side effects	Extrapyramidal side effects

Patient or Disabled Group

An individual or individuals classified according to a disability, disease, condition or treatment.

	Amputees
	Child
	Chronically Ill Persons
	Mentally Ill Persons

Pharmacologic Substance

A substance used in the treatment or prevention of pathologic disorders. This includes substances that occur naturally in the body and are administered therapeutically.

If a substance is both endogenous and typically used as a drug, then this type and the type 'Biologically Active Substance' or one of its children are assigned. Body substances that are used therapeutically such as whole blood preparation, NOS would only receive the type 'Body Substance'. Substances used in the diagnosis or analysis of normal and abnormal body functions should be given the type 'Indicator, Reagent, or Diagnostic Aid'.

	Antiemetics
<string> Agents	Cardiovascular Agents
	Morphine Sulfate

Phenomenon or Process

A process or state which occurs naturally or as a result of an activity

Accident caused by <string>	Accident caused by power saw
	Disaster
Explosion caused by <string>	Explosion caused by conflagration in house
	Motor Traffic Accidents

Physical Object

An object perceptible to the sense of vision or touch.

	Garbage
	Meteor

Physiologic Function

A normal process, activity, or state of the body.

	Physiological Arousal
	Physiological Effects of Drugs
	Physiologic Tolerance

Plant

An organism having cellulose cell walls, growing by synthesis of inorganic substances, generally distinguished by the presence of chlorophyll, and lacking the power of locomotion. Plant parts are included here as well.

If the common name of the plant is used and the general intent of the concept is referring to the edible plant, then the STY 'Food" is appropriate. If the general intent of the concept is more scientific in nature, then 'Plant' may be more appropriate.

	Pollen
	Solanum tuberosum
	Petal

Population Group

An individual or individuals classified according to their sex, racial origin, religion, common place of living, financial or social status, or some other cultural or behavioral attribute.

	Asian Americans
	Low Income Population
	Adult Offenders

Professional or Occupational Group

An individual or individuals classified according to their vocation.

If the concept refers to the discipline or vocation itself, rather than to the individuals who have the vocation, then the type 'Occupation or Discipline' will be assigned instead.

	Clergy
<string>ist	Geneticist
	Military Personnel
<string> surgeons	Plastic surgeons

Professional Society

An organization uniting those who have a common vocation or who are involved with a common field of study.

	American Medical Association
	International Council of Nurses

	Library Association of America
Qualitative Concept **A concept which is an assessment of some quality, rather than a direct measurement.**	
	Clinical Competence
	Consumer Satisfaction
	Esthetics
	Health Status
Quantitative Concept **A concept which involves the dimensions, quantity or capacity of something using some unit of measure, or which involves the quantitative comparison of entities.** If the concept refers to rate or distribution, the type 'Temporal Concept' is not also assigned.	
	Age Distribution
	Metric System
	Secretory Rate
Receptor **A specific structure or site on the cell surface or within its cytoplasm that recognizes and binds with other specific molecules. These include the proteins on the surface of an immunocompetent cell that binds with antigens, or proteins found on the surface molecules that bind with hormones or neurotransmitters and react with other molecules that respond in a specific way.**	
<string> Receptor	Adenosine A2Receptor
	T-Cell Receptor
Regulation or Law **An intellectual product resulting from legislative or regulatory activity.**	
	Building Codes
	Criminal Law
	Health Planning Guidelines
	Security Measures

Reptile **A cold-blooded vertebrate having an external covering of scales or horny plates. Reptiles breathe by means of lungs and are generally egg-laying.**	
	Iguanas
	Lizards
	Snakes
Research Activity **An activity carried out as part of research or experimentation.** In some cases, a concept may be assigned to both this type and the type 'Intellectual Product'. For example, the concept "Comparative Study" might be viewed as both an activity and the result, or product, of that activity.	
	Animal Experimentation
	Biomedical Research
	Experimental Replication
Research Device **A manufactured object used primarily in carrying out scientific research or experimentation.** A research device is distinguished from a 'Medical Device', which though it may be used for research purposes is used primarily for routine medical care.	
	Cell Free System
	DNA Microarrays
Rickettsia or Chlamydia **An organism intermediate in size and complexity between a virus and a bacterium, and which is parasitic within the cells of insects and ticks. Included here are all the chlamydias, also called "PLT" for psittacosis- lymphogranuloma venereum-trachoma.**	
	Anaplasma
	Chlamydia trachomatis
	Ehrilichia risticii

Self-help or Relief Organization

An organization whose purpose and function is to provide assistance to the needy or to offer support to those sharing similar problems.

	Alcoholics Anonymous
	Charities
	Red Cross
	Tuberculosis Society

Sign or Symptom

An observable manifestation of a disease or condition based on clinical judgment, or a manifestation of a disease or condition which is experienced by the patient and reported as a subjective observation.

	Dyspnea
	Abdominal pain
	Finger paresthesia
	Facial tenderness
	Pallor

Social Behavior

Behavior that is a direct result or function of the interaction of humans or animals with their fellows. This includes behavior that may be considered anti-social.

'Social Behavior' requires the direct participation of others and is, thus, distinguished from 'Individual Behavior' which is carried out by an individual, though others may be present.

	Acculturation
	Communication
	Infanticide
	Interpersonal Relations
	Social Conformity

Spatial Concept

A location, region, or space, generally having definite boundaries

<string> approach	Dorsal surgical approach
<string> site	Enteral tube site

Steroid

One of a group of polycyclic, 17-carbon-atom, fused-ring compounds occurring both in natural and synthetic forms. Included here are naturally occurring and synthetic steroids, bufanolides, cardanolides, homosteroids, norsteroids, and secosteroids.

	Bufanolides
	Ketosteroids
	Norandrostanes
	Prednisone

Substance

A material with definite or fairly definite chemical composition

	Air
	Copper Dust
	Foreign Bodies
	Fossils

Temporal Concept

A concept which pertains to time or duration.

If the concept refers to a phase, stage, cycle, interval, period, or rhythm, it is assigned to this type.

	Birth Interval
	Half Life
	Postimplantation Phase
	Post Operative Period
	Puerperium

Therapeutic or Preventive Procedure

A procedure, method, or technique designed to prevent a disease or a disorder, or to improve physical function, or used in the process of treating a disease or injury.

<monitoring>	Monitoring temperature
	Cesearean Section
	Hemodialysis
	Vaccine Therapy

Tissue

An aggregation of similarly specialized cells and the associated intercellular substance. Tissues are relatively non-localized in comparison to body parts, organs or organ components.

	Basophilic muscle fibers
	Cartilage
	Endothelium
	Epidermis

Vertebrate

An animal which has a spinal column.

Few concepts will be assigned to this broad type

	Homeotherms

Virus

An organism consisting of a core of a single nucleic acid enclosed in a protective coat of protein. A virus may replicate only inside a host living cell. A virus exhibits some but not all of the usual characteristics of living things.

	Coliphages
	Echovirus
	Parvoviridae

Vitamin

A substance, usually an organic chemical complex, present in natural products or made synthetically, which is essential in the diet of man or other higher animals. Included here are vitamin precursors, provitamins, and vitamin supplements.

Essential amino acids are not assigned to this type. They will be assigned to the type 'Amino Acid, Peptide, or Protein'. This can be used with 'Pharmacologic Substance' if the compound is being administered therapeutically or if the source has it classified as therapeutic (i.e., N'ICE Sugarless Vitamin C Drops).

	25-Hydroxyvitamin D 2
	Biotin
	Folinic acid preparation
	Pantothenic Acid
	Retinol