

의학용어 및 분류체계

Ju Han Kim, M.D., Ph.D., M.S.
<http://www.snubi.org/>

의학용어 및 분류체계

- 임상기록의 용도의 다면성
 - ✓ clinical document & archive
 - ✓ legal document
 - ✓ medium for communication among many parties
- 다양한 전문직종의 협조체계
- 방대한 전문용어 및 어휘록
- 자연어의 발달과정에 기반을 둔 전문용어 체계
 - ✓ ambiguity
 - ✓ imprecision
 - ✓ synonymy, polysemy
- 표준화, 분류체계, 코딩 시스템

의학용어, 코드화 및 분류체계

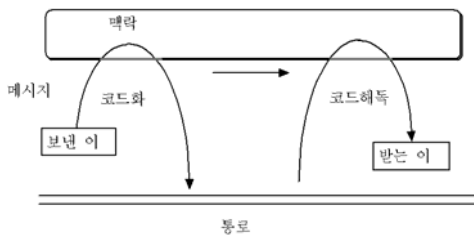
- **Dictionary: words / reference**
 - ✓ List of words with information about the words
- **Thesaurus: vocabulary, terminology**
 - ✓ a repertoire of communication (ex. a dancer's vocabulary of movement)
 - ✓ The sum of words used by, understood by, or a the command of a person or group.
- **Nomenclature: naming system, 이름의 체계**
- **Classification:**
 - ✓ An ordered system (and its principle) of concepts within a domain
- **Categorization:**
- **Codification: 1:1, 1:多, 多:1**

의학용어 및 분류체계

- **Dictionary vs. Thesaurus**
- **Classification vs. Nomenclature:**
- **Uniaxial vs. Multiaxial System:**
- **Global vs. Local Standard:**
- **Noun, Verb, and Modifier:**



Controlled Communication



가능한 코드화는 1:1로 이루어져야 한다.

분류체계 Classification System

An ordered system (and its principle) of concepts within a domain

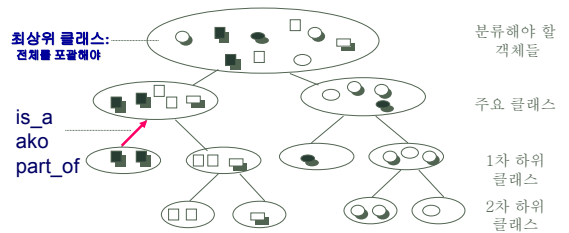
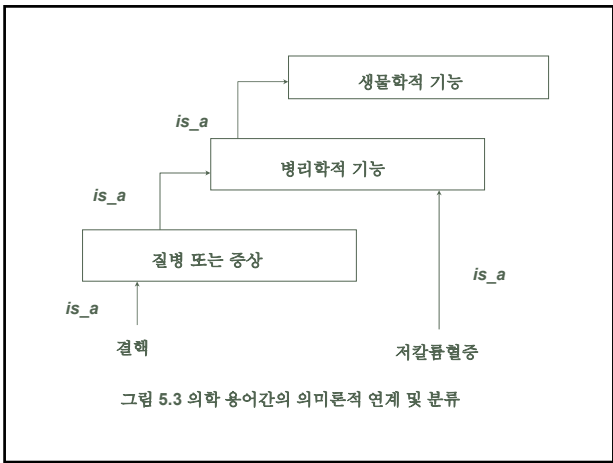


그림 5.2 : 계층적 분류 (Uni-axial system의 예)



Classification vs. Nomenclature

- 호흡기의 질환 – 감염성 호흡기 질환 – 폐결핵
- 세균 감염성 질환 – 호흡기의 감염 – 폐결핵
- 폐결핵: Lung (T-2800)
Granuloma (M-44060)
M. tuberculosis (E-2001)
Fever (F-03003)
Tuberculosis (D-0188)
- Which is better?
- How to fix?

Classification and codification systems

- ICD: uni-axial classification system
- SNOMED: multi-axial classification system
- MeSH: directed acyclic graph
- UMLS: meta-thesaurus, semantic network

ICD: International Classification of Disease

1853: W. Farr (1807-1883) 사망 원인의 표준 명명법
Standard nomenclature for causes of death

1893: J. Bertillon (1851-1922) 사인의 새 분류법
New classification of causes of death

1946: WHO International Statistical Classification of Disease, Trauma and Causes of Death

1975: 아홉 번째 개정판(ICD-9)

1979: 임상용 수정판(ICD-9-CM, HCIMO)

1992: International Statistical Classification of Disease and Related Health Problems (ICD-10)

ICD: International Classification of Disease

- Hierarchical system
- Mixed (Etiology, System, Process)
- Mortality
- Morbidity
- ICD-9-CM

Revision	ICD Code	Years Covered
1st	ICD-1	1900-1909
2nd	ICD-2	1910-1920
3rd	ICD-3	1921-1929
4th	ICD-4	1930-1938
5th	ICD-5	1939-1948
6th	ICD-6	1949-1957
7th	ICD-7	1958-1967
8th	ICDA-8	1968-1978
9th	ICD-9	1979-1998
0th	ICD-10	1999-present

ICD: International Classification of Disease

- ICD-9은 원인론, 해부학적 위치, 상세한 증상에 기초한 분류들을 뭉뚱그려 놓은 것이다.
- 질병의 병태생리를 이 코드에서 알 수는 없으며 한 환자의 임상적인 상태를 자세히 기술하는 코드도 없다.
- 이 코드를 만든 처음의 목적이 사인 분류였기 때문에 시간에 관한 언급(재발성, 진행성 등)이나 병태 생리(호흡성 알칼리혈증, 기관지 과민성 등)를 표현할 방법이 없다.
- 1977년 미국에서 ICD-9-CM이란 이름으로 임상에 맞게 수정된 안이 나왔으며 매년 Health Care Financing Administration(HCFA)에 의해 개정안이 나온다

I.	Infectious and parasitic diseases
II.	Neoplasms
III.	Endocrine, nutritional and metabolic diseases, and immunity disorders
IV.	Disease of the blood and blood-forming organs
V.	Mental disorders
VI.	Diseases of the nervous system and sense organs
VII.	Diseases of the circulatory system
VIII.	Diseases of the respiratory system
IX.	Diseases of the digestive system
X.	Diseases of the genitourinary system
XI.	Complications of pregnancy, childbirth, and the puerperium
XII.	Diseases of the skin and subcutaneous tissue
XIII.	Diseases of the musculoskeletal system and connective tissue
XIV.	Congenital anomalies
XV.	Certain conditions originating in the perinatal period
XVI.	Symptoms, signs, and ill-defined conditions
XVII.	Injury and poisoning
Supplementary Classifications	
E.	External causes of injury and poisoning
V.	Factors influencing health status and contact with health services

그림 5.5 : ICD-9의 제법주

I.	Certain infectious and parasitic diseases
II.	Neoplasms
III.	Disease of the blood and blood-forming organs and certain disorders involving the immune mechanism
IV.	Endocrine, nutritional and metabolic diseases
V.	Mental and behavioral disorders
VI.	Diseases of the nervous system
VII.	Diseases of the eye and adnexa
VIII.	Diseases of the ear and mastoid process
IX.	Diseases of the circulatory system
X.	Diseases of the respiratory system
XI.	Diseases of the digestive system
XII.	Diseases of the skin and subcutaneous tissue
XIII.	Diseases of the musculoskeletal system and connective tissue
XIV.	Diseases of the genitourinary system
XV.	Pregnancy, childbirth, and the puerperium
XVI.	Certain conditions originating in the perinatal period
XVII.	Congenital malformations, deformations and chromosomal abnormalities
XVIII.	Symptoms, signs, and abnormal clinical and laboratory findings, not classified elsewhere
XIX.	Injury, poisoning and certain other consequences of external causes
XX.	External causes of morbidity and mortality
XXI.	Factors influencing health status and contact with health services

그림 5.6 : ICD-10의 제법주

Salmonella pneumonia



- 003 Other salmonella infections**
- 003.0 Salmonella gastroenteritis
 - 003.1 Salmonella septicemia
 - 003.2 Localized salmonella infections
 - 003.20 Localized salmonella infection, unspecified
 - 003.21 Salmonella meningitis
 - 003.22 Salmonella pneumonia
 - 003.29 Other
 - 003.8 Other specified salmonella infections
 - 003.9 Salmonella infection, unspecified
- 481 Pneumococcal pneumonia**
- 482 Other bacterial pneumonia
 - 482.0 Pneumonia due to Klebsiella pneumoniae
 - 482.1 Pneumonia due to Pseudomonas
 - 482.2 Pneumonia due to Hemophilus influenzae
 - 482.3 Pneumonia due to Streptococcus
 - 482.4 Pneumonia due to Staphylococcus
 - 482.8 Pneumonia due to other specified bacteria
 - 482.9 Bacterial pneumonia unspecified
 - 483 Pneumonia due to other specified organism
 - 484 Pneumonia in infectious diseases classified elsewhere

SNOMED

Systematized Nomenclature of Medicine

- **SNOP (Systematic Nomenclature of Pathology)**
- **SNOMED International**
- **North American Pathologists**
- **Multi-axial system**
- **Each axis has hierarchical elements**
- **One can create new concept by combination**

SNOMED

Systematized Nomenclature of Medicine

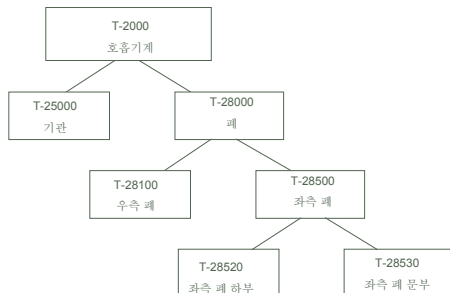


그림 5.12 : SNOMED-International의 지형학 축의 계층적 구성

SNOMED

Systematized Nomenclature of Medicine

1. **T (topography)**는 몸의 일부, 장기, 부위를 설명하는 지형학을 의미함(12,385 용어)
2. **M (morphology)**은 해부학, 세포, 장기의 선천성, 또는 후천성 변형을 의미하는 형태학을 의미함. 이 모듈에는 1990년 제정된 ICD-O(International Classification of Disease for Oncology)에 기술된 종양의 형태에 따른 명명법이 포함되어 있다(4,991 용어).
3. **F (function)**는 정상 및 이상 상태와 생체 기능에 대한 용어를 설명한다(16,352 용어).
4. **L (living organism)**은 살아 있는 생물, 즉 동물과 식물 중에서 인간의 질병을 일으키거나 질병의 병소로 작용하는 것들의 분류(25,265 용어).
5. **C (chemicals)**는 화학물질, 약물, 생물학적 산물들로서 식물 추출물도 포함한다(14,075 용어).

SNOMED

Systematized Nomenclature of Medicine

- A (physical agents)**는 물리적 요인, 질병이나 외상과 관련된 활동과 기구들과 관련된 것이다(1,355 용어)
- J (occupation)**는 직업이며 ILO(International Labour Office)에 의해 개발된 직업 활동의 분류를 코드화한 것이다(1,886 용어).
- S (social context)**는 사회적 맥락으로서 의학적 관점에서 흥미 있는 사회적 인 상황의 목록이다(433 용어).
- D (disease)**는 질병으로서 질병명과 증상 및 징후를 결합한 것이다. ICD-9-CM의 진단명들과 비교할 수 있게 되어있다(28,622 용어).
- P (procedure)**는 처치의 약자로서 질병을 치료하거나 예방하기 위한 행정, 진단, 치료 활동의 코드이다(약 25,000 용어).
- G (general linkage/modifier)**는 일반적인 연계/수정자로서 서로 다른 모델에 속한 용어들을 연관짓고 특성을 나타내는데 필요한 용어의 목록이다 (1,176 용어).

SNOMED

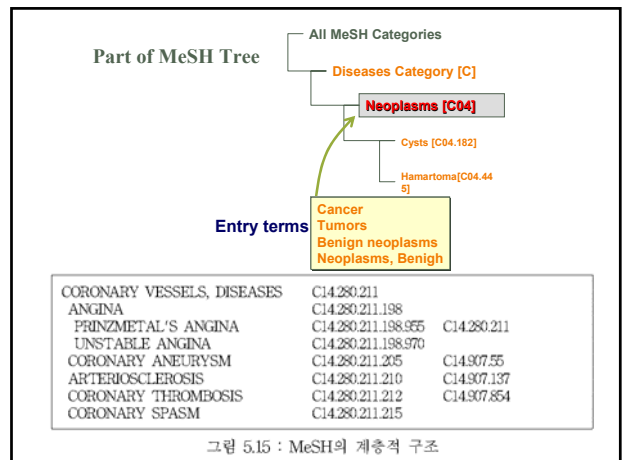
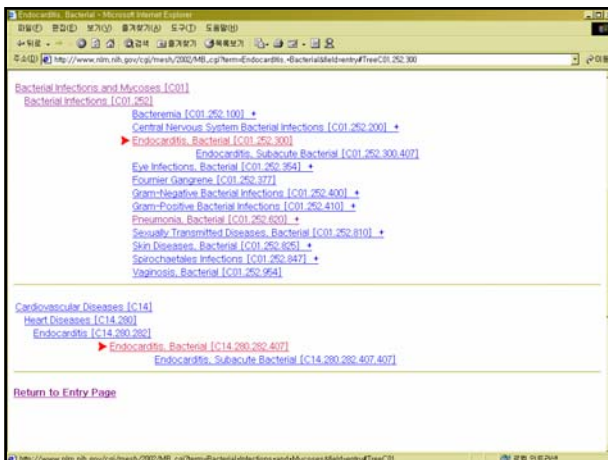
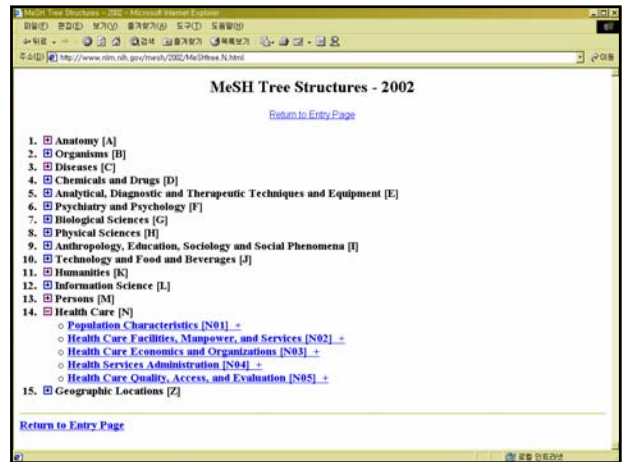
Systematized Nomenclature of Medicine

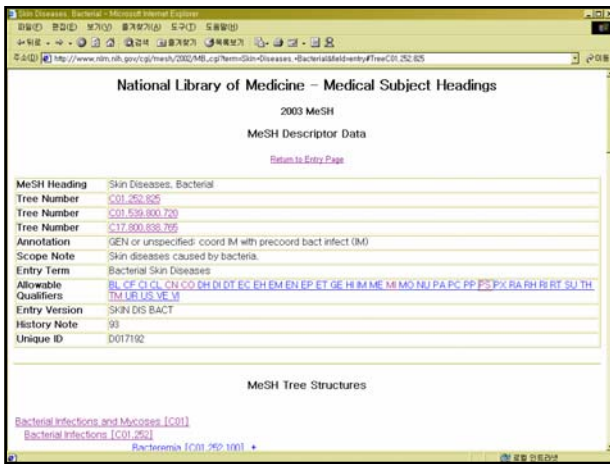
T	+	M	+	E	+	F	+	D
Lung		Granuloma		<i>M.tuberculosis</i>		Fever		Tuberculosis
T-2800		M-44060		E-2001		F-03003		D-0188

그림 5.13 : SNOMED 코드화의 일례

MeSH: Medical Subject Headings

- National Library of Medicine
- for the automated indexing of INDEX MEDICUS
- “descriptor” → ex. C14.280.211.198 “angina”
- more than 19,000 main headings
- 103,500 headings called Supplementary Concept Records
- Qualifiers
- Unique ID
- Organized into a series of “trees” (down to 7 levels)
- Can belong to multiple trees
- Entry term





Unified Medical Language System

- In 1986, National Library of Medicine
- To improve the ability of computer programs to “understand” the biomedical meaning in user inquiries and to use this understanding to retrieve and integrate relevant machine-readable information for users

To overcome

1. The variety of ways the same concepts are expressed in different machine-readable sources and by different people.
2. The distribution of useful information among many disparate databases and systems

Unified Medical Language System

- Conceptual connection as well as physical, NN/LM.
- Disparities will continue to exist because of the different purpose and perspective
- Patient record systems, Bibliographic databases, Knowledge-based systems....

Consists of

- Metathesaurus
- Semantic Network
- Information Source Map (discarded)
- Specialist Lexicon

Metathesaurus

- New canonical classification of biomedical concepts to which existing vocabularies could be mapped.
- Direct linking of alternative names for concepts taken from existing machine-readable vocabularies
- Organized by concept, or meaning
 - ✓ Strings of lexical variants → term → preferred form
 - ✓ Terms of Synonyms → alternate names → preferred name
 - ✓ Based on the order of precedence among the source vocabularies.
 - ✓ Translations
 - ✓ Polysemy
 - ✓ Associated expression: ex. Aortography
 - ✓ Co-occurrence: ex. partial hearing loss & hemoptysis

Metathesaurus Example

Concepts (CUIs)	Terms (LUIs)	Strings (SUIs)
C0004238	L0004238	S0016668
(preferred)	(preferred)	(preferred)
Atrial Fibrillation	Atrial Fibrillation	Atrial Fibrillation
Atrial Fibrillations	Atrial Fibrillations	S0016669
		(plural variant)
Auricular Fibrillation		Atrial Fibrillations
Fibrillation, auricular	L0004327	S0016899
	(synonym)	(preferred)
	Auricular Fibrillation	Auricular Fibrillation
	Fibrillation, auricular	S0220833
		(same word variant)
		Fibrillation, auricular

(Adapted from Kathy Schoeffler, Duke University, 12/96)

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Semantic Network

- A structure for metathesaurus
- Semantic Network not of the individual concepts but of the semantic types (or broad categories of concepts)
- Assignment of semantic types to concepts
- The scope is broader than any single vocabulary, yet the granularity uneven.

UMLS Semantic Network

- Acyclic directed graph
- Provides consistent categorization of all concepts
- Important interrelationships between concepts
- Semantic types #132
- Relationships # 53

(Adapted from Kathy Schoeffler, Duke University, 12/96)

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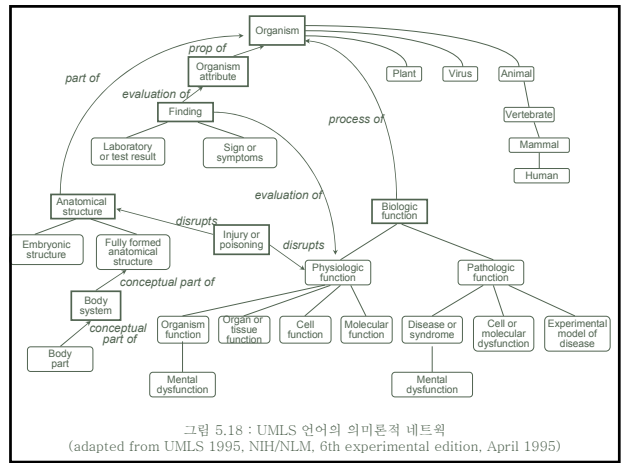
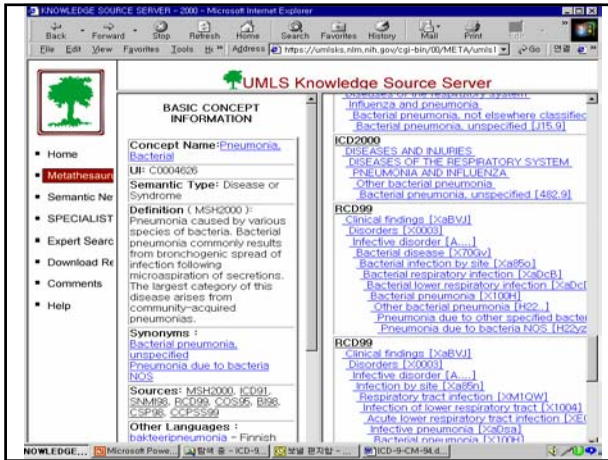


그림 5.18 : UMLS 언어의 의미론적 네트워크
(adapted from UMLS 1995, NIH/NLM, 6th experimental edition, April 1995)



Information Source Map

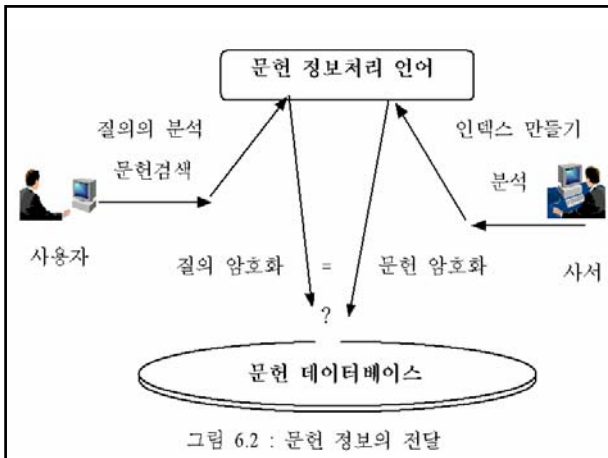


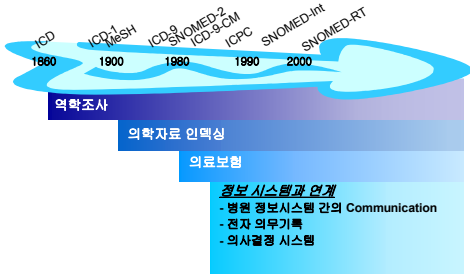
그림 6.2 : 문헌 정보의 전달

의학용어 및 분류체계

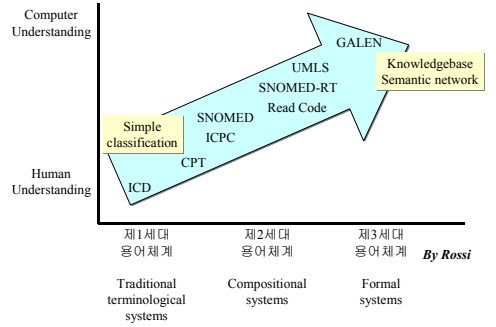
	ICD-10	SNOMED	MeSH	UMLS
완전성	No	Yes	Yes	Yes
비모호성	No	Yes	No	Yes
미중복성	Yes	No	Yes	Yes
동어어	Yes	Yes	Yes	Yes
명시적 관계	Yes	Yes	Yes	Yes

그림 5.19 : 여러 분류체계의 비교

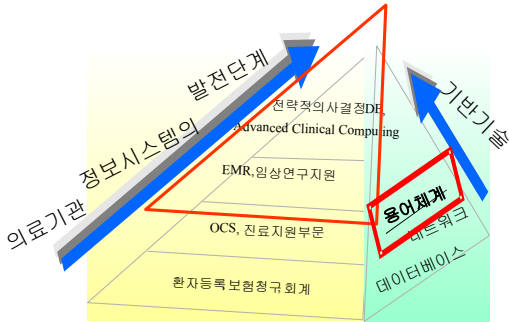
의학용어 및 분류체계



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