Mapping of Korean Healthcare Vocabulary to the UMLS

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Introduction

- An increasing need for successful terminology mapping
  - To achieve compatibility among terminologies
  - To allow clinicians and researchers familiar with one terminology to search and use other terminology schemes
- the Unified Medical Language System (UMLS)
  - To facilitate the development of computer systems that behave as if they “understand” the meaning of the language of biomedicine and health
- Goal
  - To evaluate the coverage of the UMLS as compared with medical terms collected by the National Health Information Standard Committee (NHISC)

Materials & Methods

Mapping of Korean health information vocabulary to the UMLS to evaluate the coverage of the UMLS

Structure Analysis → **Mapping** → **Coverage Evaluation**

Structure Analysis

- Korean health information vocabulary structure analysis
- UMLS structure analysis
  - MRCONSO table

Mapping

- Making domain tables into common format
- Mapping to the UMLS with mapping support tool

Coverage Evaluation

- Mapping result
- Unmapping concepts analysis

Outputs

- Health information vocabulary structure analysis result
- UMLS MRCONSO table structure analysis result
- Common format
- Mapping Method
- Mapping Rate
- Unmapping Rate
- The coverage evaluation

NHISC vocabulary → UMLS MRCONSO

Results

Number, Concept ID, Concept Name (Korean), Concept Name (English), Semantic Type, Definition, Source of data, Format type, Length, Created date, Expired date, Status

Standard Code, Product Name, Generic Name, Usage, Classified Number, Company, Name, Standard, Material Quality, Insurance Code…

Number, CUI, T classifier, KCD4 code, Concept Name (English), Synonym (English), Abbreviation, Concept Name (Korean), Concept Name (KCD4), Synonym (Korean), Using Domain

National Health Information Standard Committee (NHISC)

- Operations & Procedures
- Health Statistics
- Public Health
- Nursing
- Medical Device & Material
- Clinical Findings & Problems
- Diagnosis
- Drug & Medications
- Oriental Medicine
- Dentistry
- Imaging
- Laboratory

Business Domain, Control Number, ConceptID, Concept Name (Korean), Concept Name (English), Semantic Type, Definition, Source, Source of Data, Synonym

Control Number, CUI, Preferred Name (English), Preferred Name (Korean), Definition, Created date, Expired date, Status

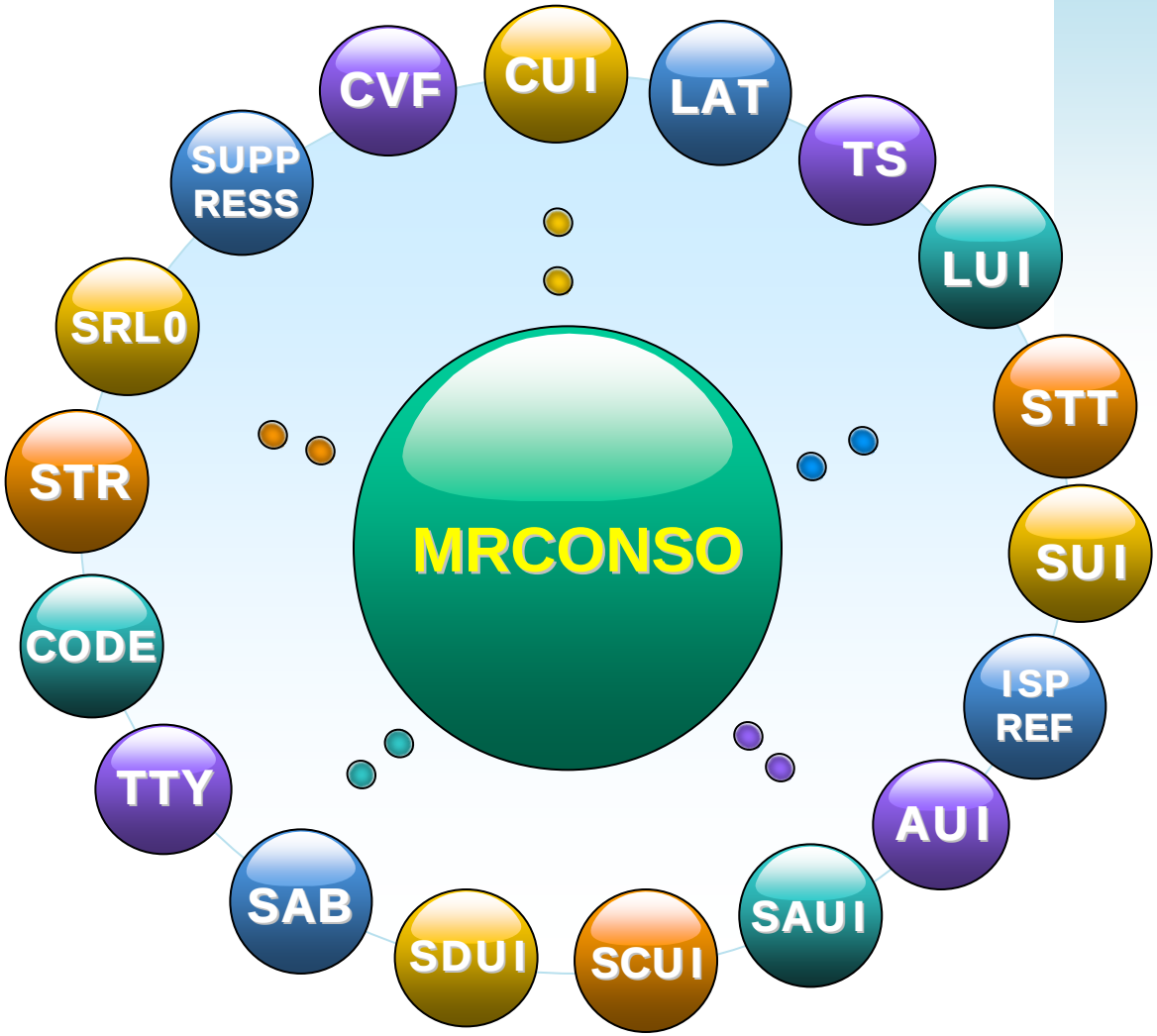
Number, EDI, Concept Name (Korean), Concept Name (English), Classified Name, CUI, Synonym Mapping Identifier

New K code, LOINC_NUM, CUI, Component, Property, Time_aspct, System, Scale_typ, Method_typ, Class, Insurance code, Insurance Name, Short name, Synonym

Very various & complex

Results

NHISC vocabulary → UMLS MRCONSO



Results

Common Format → Mapping Method

Control Number	Concept Identifier	Preferred Name (English)	Preferred Name (Korean)	Semantic Type	Definition
1	K0000726	Abdomen	배, 복부	Body Location or Region	That portion of the body that lies between the THORAX and the PELVIS
2	K0000729	Abdominal Cramps		Sign or Symptom	
3	K0000731	Abdominal distension	복부팽만	Finding	
4	K0000733	Abdominal Injuries	복부손상	Injury or Poisoning	General or unspecified injuries involving organs in the abdominal cavity
5	K0000734	Abdominal mass	복부종괴	Finding	
6	K0000737	Abdominal Pain	복통	Sign or Symptom	Sensation of discomfort, distress, or agony in the abdominal region; generally associated with functional disorders, tissue injuries, or diseases

Results

NHISC common fields

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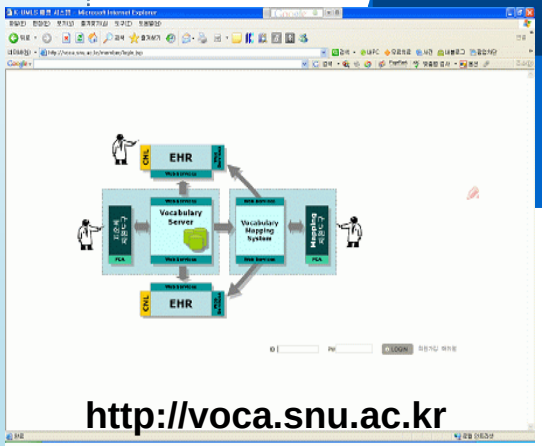
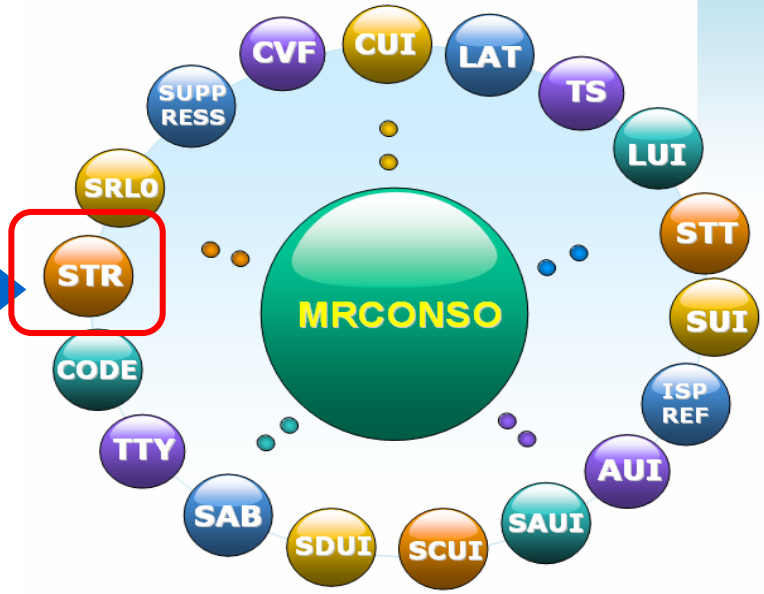
Mapping support tool



http://voca.snu.ac.kr

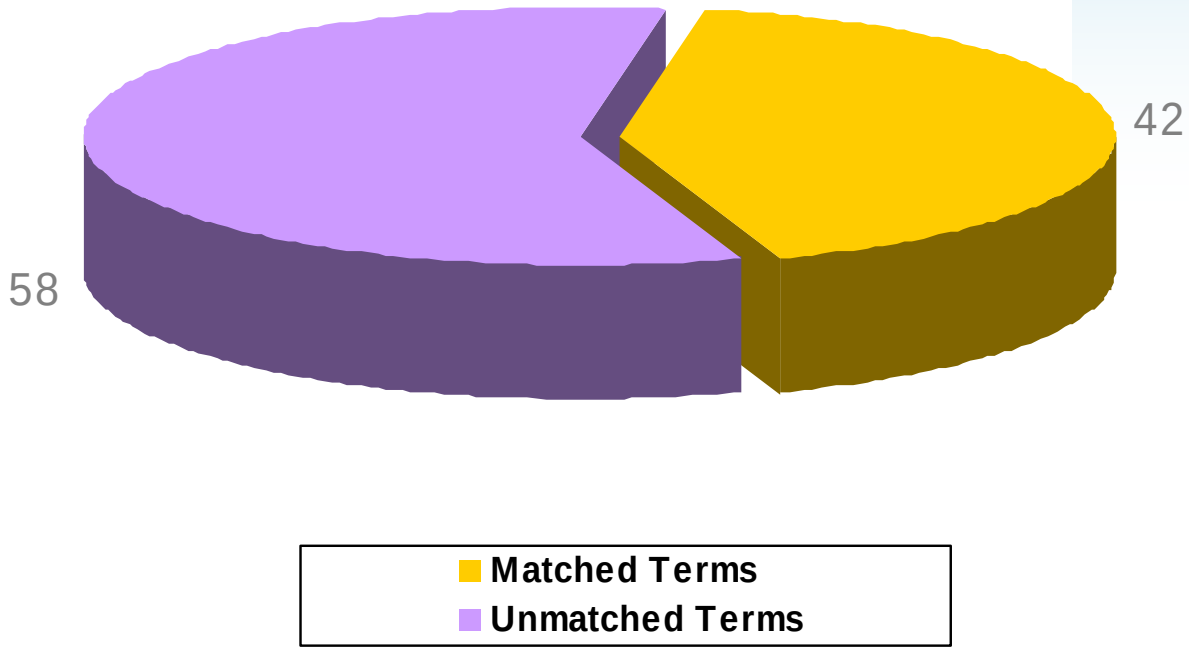
Exact String Matching



Results

Domain	Matched terms (%)	Unmatched terms (%)	Total
Clinical Findings & Problems	39,927 (61.0)	25,523 (39.0)	65,450
Diagnoses	24,453 (84.8)	4,381 (15.0)	28,834
Operations & Procedures	5,661 (74.7)	1,915 (25.0)	7,576
Nursing	93 (12.8)	634 (87.0)	727
Laboratory	13,256 (79.5)	3,412 (20.0)	16,668
Imaging	5 (0.1)	3,888 (99.9)	3,893
Medical Device	0 (0.0)	130 (100.0)	130
Dentistry	5,867 (27.1)	15,763 (73.0)	21,630
Oriental Medicine	76 (2.1)	3,534 (98.0)	3,610
Drug	395 (0.6)	65,045 (99.0)	65,440
Public Health	1,313 (54.0)	1,117 (46.0)	2,430
Health Statistics	10 (3.2)	299 (97.0)	309
Total	91,056 (42.0)	125,641 (58.0)	216,697

Results



Results

Diagnoses Domain

- The highest mapping rate (84.8%)
- This domain collected concepts based on the UMLS ones

Medical Device Domain

- The lowest mapping rate (0%)
- This domain has product names, but UMLS doesn't have these concepts

Results

- Unmapping concepts analysis
  - Korean Concepts
  - Composite Concepts
  - Misspelling Concepts
  - Etc.
- Because we did only string match, there were some of un-mapping terms which were included conceptually in the UMLS MT
- The UMLS MT has many terms
  - which are related to diagnoses, laboratory, operations and procedures, and clinical findings and problems
- The UMLS MT has a few terms
  - which are related to medical device, imaging, drug, and oriental medicine

Conclusion

- References
  - Vizine-Goetz D, Hickey C, Houghton A, and Thompson R. Vocabulary Mapping for Terminology Services. Journal of Digital Information. 2004 Mar [cited 2006 Mar 13]; 4(4): [about 23 p]. Available from http://jodi.tamu.edu/Articles/v04/i04/Vizine-Goetz/
  - UMLS Knowledge Sources. Bethesda (MD): National Library of Medicine, 2006AA.
- Acknowledgments
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