# HOW A GENERAL AND A SPECIFIC THESAURUS COVERS EXPRESSIONS IN PATIENTS' QUESTIONS AND PHYSICIANS' ANSWERS

Johanna Eerola & Pertti Vakkari
University of Tampere
Finland

# Background

- The aim of a KOS is to support actors to express their information needs for searching

- KOS are build typically on discipline or domain specific principles not necessarily observing users' ways of conceptualizing and expressing things

- The utility of a KOS to its users depends to a great extent to the degree of the match between users' and KOS' expressions of concepts
  - The degree of this match is an open question

# The aim of the study

- To compare the expressions of concepts in patients' questions and physicians' answers concerning cardiovascular diseases in terms of their thesaural relations

- To which degree these expressions are covered by a domain specific and a general thesaurus

# Earlier studies

- Comparation of word associations in users' problem statements and documents retrieved (Oddy & al 1986)

- Semantic relationships in patients' questions and physicians' answers for informing design of question-answering systems (Slaughter & Soergel 2003)

- Analyses of health consumers' or health professionals' expressions in texts for designing KOS (Tse & Soergel 2003; Haas & Travers 2004)

- Match between users' expressions of information needs and expressions in thesauri is an open question

# Data

- Fifty question-answer pairs (texts) concerning cardiovascular diseases from a popular medical site (www.verkkoklinikka.fi)
  - This disease is very common in Finland
  - Variation in questions, no editing
- Q-A pairs selected in chronological order from 31.12.2004 backwards
- Thesauri
  - Specific: FinMesh is a Finnish version of Mesh
  - General Finnish Thesaurus  (GFT) contains c. 20 000 terms and has a flat hierarchy

# Analysis

- Concepts concerning the disease and its symptoms in Q and A were identified

- Expressions of concepts were classified as
  - Narrower terms (NT) (hierarchical relations)
  - Related terms (RT) (associative relations)
  - Synonyms (SYN) (equivalence relations)

- Expressions were divided into official and lay ones
  - Official expressions are established medical terms commonly used in case records or FinMeSH

# The average number of expression types in Q and A

| Expression types | | Questions | Answers | p. |
|---|---|---|---|---|
| NT | Official | 4,9 | 5,6 | 0,28 |
| | Lay | 2,0 | 1,4 | 0,02* |
| | *Total* | *6,9* | *7,0* | *0,98* |
| RT | Official | 5,7 | 4,1 | 0,01** |
| | Lay | 1,7 | 1,6 | 0,84 |
| | *Total* | *7,4* | *5,7* | *0,04*|
| SYN | Official | 0,8 | 1,5 | 0,02* |
| | Lay | 0,7 | 0,7 | 0,85 |
| | *Total* | *1,5* | *2,2* | *0,21* |

# Expressions in Q and A

- Q were not so focused than A
  - Q contained more RT than A
  - Q contained relatively less NT than A
  - Q contained also more background concepts not semantically related to concepts of diseases
- Physicians used more official SYN for translating patients' lay terms
- The difference in the number of expressions was not great between Q and A
  - A were adapted to Q

# The proportion of expressions in Q and A matching FinMeSH and GFT (%)

| Thesaurus | NT | | RT | | SYN | |
|---|---|---|---|---|---|---|
| | Q | A | Q | A | Q | A |
| FinMeSH | 62 | 60 | 72 | 71 | 38 | 60 |
| GFT | 42 | 34 | 47 | 44 | 11 | 15 |
| Difference | 20 | 26 | 25 | 27 | 27 | 45 |

# Match with the terms in thesauri

- The expressions in Q and A matched better with FinMeSH than GTF -> mean:
  - FinMeSH Q=65%, A=64%; GTF Q=39%, A=35%
- FinMeSH matched evenly with NT and RT in Q and A, but better with SYN in A
  - Enrich FinMeSH with lay expressions of SYN
- GFT covered about evenly RT and SYN in Q and A, but slightly better NT in Q
  - GTF matched very poorly with SYN in Q and A

# Conclusions

- GFT is a poor terminological aid in searching, whereas FinMeSH is a reasonable one
  - If the match with a general thesaurus like GFT < 40 %, is it reasonable to design such tools?
    - GFT covered only 11-15 % of SYN
  - Focus on designing specific thesauri (ontologies)
- How validly Q and A represent queries?
  - Health queries are short (2-3 words)(Spink & al. 2004) and may match better with thesauri
    - Still it seems that general thesauri are poor tools for finding search keys due to their sparse vocabulary

# Further studies

- To which extent terms in Q and A in other health topics match with GFT and FinMeSH?

- To which extent terms in health queries in various user populations match with GFT and FinMeSH?

- To which extent GFT covers terms in web queries in various fields?