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Adapting SNOMED CT® for use in Denmark – the Tools and the Process of Concept Based Translation

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Abstract

A common clinical terminology is a cornerstone for well structured documentation in electronic health records and a precondition for secondary use of data and semantic interoperability. The Danish authorities have selected SNOMED CT® as the main reference terminology for healthcare. The entire human medical domain of SNOMED CT® will be translated into Danish. Instead of just translating the terms, a concept based translation method is used. The terms' position in the terminological network, i.e. the relations and the attributes, are mapped to a corresponding Danish concept model. Professional translators, terminologists and domain experts are involved in the translation. A translation tool supporting all involved actors has been developed in order to manage this complex and distributed process. This paper describes the translation process and the developed translation tool.

Keywords:

SNOMED CT®, translation, terminology, electronic health record, software tool

Introduction

The use of information technology has a high penetration in the Danish society and in the healthcare sector. Hospitals, laboratories and pharmacies have implemented it-systems. Nearly all primary care doctors are using electronic health records (EHR), and around 50 % of all hospital beds are served by EHR. Electronic messages based on national standards are extensively used by all parties.

In order to harmonise the data content and structure in EHR, the National Board of Health (NBH) has developed a national model for EHR. The model supports a problem-oriented, longitudinal, cross professional and cross sectorial EHR for the purpose of continuity of care. The intention is to improve semantic interoperability using structured data for clinical documentation as well as secondary use of EHR data. A comprehensive and granular, multi professional clinical reference terminology then becomes a prerequisite.

Methods

NBH have assessed possible terminologies to support semantic interoperability. SNOMED CT® with it's more than 380.000 concepts, 900.000 terms and 1400.000 relationships, was found to be the most comprehensive and detailed terminology. The poly-hierarchy and different levels of granularity were seen as an advantage. The reference model for SNOMED CT® was considered robust and offered an evolutionary development, handling of multilingual use and language extensions.

However, it has been important ensuring the terminology is adjusted to Danish conditions and that professionals, patients and relatives can recognise and understand the terminology used. Therefore the entire human medical domain of SNOMED CT® will be translated into Danish. Instead of just translating the terms, a concept based translation method is used. The terms' position in the terminological network, the relations and the attributes, are mapped to a corresponding Danish concept model. This requires extensive use of healthcare domain experts in a distributed process.

A translation tool has been developed supporting the actors, manage the authoring process and monitor the quality.

The translation process

During the process, the National Board of Health (NBH) cooperates with a translation agency, language specialist, terminologists and Subject Matter Experts (SMEs). (See figure 1.)

Each month 10.000 concepts are selected for translation and distributed to the translators - a 1st translator and a 2nd translator for review. The 2nd translator can accept the suggested translation and forward it to NBH for approval. He may also ask the first translator to revise the term. If specific clinical knowledge is required, he may consult the SMEs. In more difficult cases, the editorial board may be consulted. The editorial board consists of terminologists, medical domain experts, and representatives from the NBH.

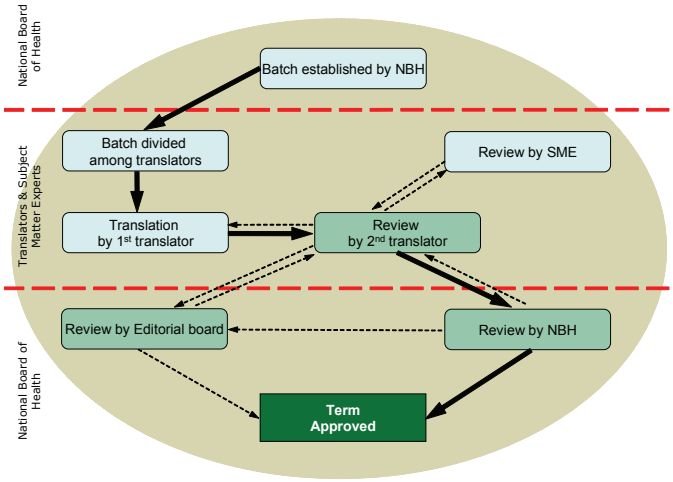

Figure 1 - The translation workflow process

The translation tool

The Danish National Board of Health has partnered with the IT supplier Carecom, to develop a web-based IT system, containing the functionalities necessary for the management of the entire SNOMED CT® translation: A common space for translators and the reviewers where all documentation of the translation takes place; Management of the translation workflow, showing the current stage for each term, and providing statistics on progress; Access to similar already made translations and supporting of addition of synonyms and modelling of new concepts for the Danish extensions; Development of discipline oriented subsets or subsets for specific purposes; Access to terminologies, updated translation guidelines, medical textbooks etc.

Results

The translation is progressing according to the plan with 10.000 concepts translated each month. In the first phase of the project only concepts are translated and only one term per concept is produced. In a second phase the synonyms will be identified. The entire human medical domain of SNOMED CT® is expected to be finished within 2-3 years with a cost of 6 million USD. By December 2007 200.000 concepts of the expected 250.000 are translated.

Approximately 80% of the concepts have been processed without problems, i.e. followed the direct path shown with broad arrows in figure 1. In case of doubt or questions were raised, the Editorial Board and SMEs were consulted. To avoid overload of the Editorial Board, precise translation guidelines were developed.

The translation is an intensive process, and especially the costs of the review board experts are substantial. To control the cost and achieve a high quality, the review feedback loop (between the 2nd translator, NBH, and the Review board) must be strictly managed and optimised.

Discussion

SNOMED CT® is today translated into Spanish, German and GB-English. There is an extensive experience of mapping between SNOMED CT® and other terminologies and meta-thesauruses as well as using natural language techniques. These techniques require that the "natural language" text and the terminology are in the same language. By processing bilingual parallel text corpora it has been possible to identify translations of medical terms in controlled vocabularies, including SNOMED CT®.

These methodologies have not been found to substitute the manual translation of SNOMED CT® to Danish, since the Danish work has been focusing on the concepts behind the terms. A similar focus has been demonstrated feasible in a project where ontology driven tools were used for bilingual translation of coding systems for clinical procedures.

To ensure the provision of scientific and psychological accepted terms is has been crucial to have a close cooperation with clinicians from different specialities and disciplines.

Earlier translation experiences have demonstrated the possibility of semantic drift when synonyms are translated. Therefore synonyms for the preferred Danish terms will be provided in a second phase of the translation.

Provision of synonyms and subsets/catalogues for use in specific situations is seen as crucial to get clinical acceptance. The maintenance of these as well maintenance of the terminology itself, will be a substantial task.

Exchange of experiences on SNOMED CT® translation and multilingual issues is needed. A new International Health Terminology Standards Development Organisation (IHTSDO) will support this. It has been established January 1st 2007 and is hosted in Denmark.

Conclusion

Health care provision is internationalised, and there is an increased demand for valid, structured, and globally standardised data supporting clinical and administrative processes.

Many countries need to manage translation process and the use translation tools, and it is imperative to evaluate the processes closely and exchange experiences. The newly formed IHTSDO is expected support this efforts.

The implementation of SNOMED CT® in practical use must take place in cooperation with the clinical community. Only if a structured terminology can facilitate clinical work processes and provide relevant decision support, the clinicians will produce valid data for the clinical documentation as well as secondary use, i.e. for quality development and management.

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