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## Commentary

### *SNOMED - A Step Toward the Electronic Health Record*

Reflections on F.A. Côté's paper:

*The SNOP - SNOMED concept: Evolution towards common medical nomenclature and classification.*

The article on SNOP-SNOMED by R.A. Côté [1] is a milestone on the road toward the present electronic health record, because it moves away from traditional monoaxial classification systems, such as the International Classification of Diseases, to the field of structuring of concepts.

Medical natural language can be decomposed into expressions, made of strings of terms, that represent specific concepts. Each term can be allocated to a field of knowledge, such as the six axes that were proposed by SNOMED: topography, morphology, etiology, function, disease, and procedure. Health informaticians owe very much to Roger Côté for his "Benedictine work" of composing a comprehensive list of terms that he classified with his team under these headings, allowing SNOMED to diffuse all over the world.

The multiaxial approach of medical vocabulary was mostly successful for pathology, but less so in clinical practice.

As a matter of fact, SNOMED could be fully implemented if an automatic translation could identify each term and transform it into the appropriate code. A traditional non-computerized, book-oriented, coding

system was too cumbersome to be performed routinely by hand. The article opened the way for linkage to natural language rather than for classical manual coding.

To the successes of SNOMED belongs its integration into the Unified Medical Language System Metathesaurus, and its visionary concept that much influenced the building of a multiaxial structure for surgical procedures, in Europe by the CEN/TC251 standardization body, and in the USA by 3M.

Some of the early views expressed in 1977 have, however, to be revisited. Concepts in medicine are rarely expressed by one single term but by a multitude of atomic concepts, which go beyond the elementary axes of SNOMED.

As stated by Elkin et al. [2], an atomic concept is a notion represented by a language, which identifies one idea. An example of this type of construction would be "Coronary artery disease status post CBAG". There are various granular ways to represent concepts.

Without a fully functional natural

language processing system, we cannot fully represent clinical medicine within a formalized and controlled vocabulary. One solution might be compositionality from a manageable number of atomic concepts, estimated to be somewhere between 20,000 and one million concepts.

Maintaining and updating a vocabulary and concepts is a very difficult task. Hopefully, it can be done in one place, for all users to benefit. SNOMED had some problems to be able to follow the requests from users universally, like any other classification system. Definition of terms as well as of atomic concepts would be extremely helpful for users, but is still lacking. Some terms might be classified in areas other than by the chosen axes. Some association of terms might interact as modifiers, i.e., concepts that change the meaning of another concept in a clinical sense.

Although the use of SNOMED has been a big step forward for the Electronic Health Record, one should not forget two other areas of great importance for health care: statistics and financing. For these purposes, free compositions are more difficult to handle, as both statistics and billing

require reference to a uniform classification that has to remain simple and easy to interpret. It is most often monoaxial. Both approaches have their limitations. They are complementary. They share the difficulty of completeness, but a moving target is likely never to be reached.

#### References

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2. Elkin PL, Tuttle M, Kerk K, Campbell K, Atkin G, Chute CG. The role of compositinality in standardized list generation. In: Cesnik et al, eds. *Proceedings*

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