Supporting Postcoordination in an Electronic Problem List

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**Background.** Precoordinated medical terminologies will never be complete and detailed enough to accurately capture clinical descriptions, such as those found in problem lists. Administrative terminologies are inadequately detailed to properly risk adjust patients,¹² and the combinatorial explosion in the number of precoordinated terms as detail increases is easily demonstrated. Furthermore, it is impossible for terminology authors to anticipate every term that will ever be needed³. Thus, support for postcoordination—formal composition of existing terms to express an intended concept—is a prerequisite to accurate encoding of problem list entries.

**Metaphrase.** Metaphrase is a software component—middleware—that helps caregivers navigate from casual input to formal expressions; in particular, it takes informal input strings and retrieves a list of lexically contained concepts from a database built upon the UMLS® Metathesaurus⁴ (see **Figure 1**). Since, in general, no existing precoordinated term will match the input in its entirety, there needs to be a way for the caregiver to quickly and easily select a suitable postcoordination of existing terms.

**Problem.** Such support is being demonstrated in the Metaphrase™ electronic poster.⁵ Metaphrase is a software component—middleware—that helps caregivers navigate from casual input to formal expressions; in particular, it takes informal input strings and retrieves a list of lexically contained concepts from a database built upon the UMLS® Metathesaurus (see **Figure 1**). Since, in general, no existing precoordinated term will match the input in its entirety, there needs to be a way for the caregiver to quickly and easily select a suitable postcoordination of existing terms.

**Solution.** Rather than attempting to develop the complex semantic model which would be necessary for accurate and complete semantic normalization, we have developed a shallow information model which exploits some of the semantic information already in the Metathesaurus—namely, the Semantic Types. It consists of an aggregation of Semantic Types into Semantic Classes, and a grammar over these Semantic Classes.

The Semantic Classes resemble the axes of a multi-axial coding system, such as SNOMED®, but are practically, rather than philosophically, motivated. Examples of Semantic Classes are atomic problem, qual/quant modifier (qualitative or quantitative modifier), and diag/lab procedure (diagnostic or laboratory procedure). Some sample rules in the grammar are:

- `<problem>`: `<atomic problem>`.
- `<problem>`: `<diag/lab procedure>` `<qual/quant modifier>`.
- `<problem>`: `<problem>` due to `<etiological agent>`.

**Figure 2 - Sample Grammar Rules**

Thus, since the Semantic Class diag/lab procedure includes the Semantic Type Laboratory Procedure (T059), the Class qual/quant modifier includes Qualitative Concept (T169), and the Class etiological agent includes [both] Disease or Syndrome, (T047) and Neoplastic Process (T191), the query results in **Figure 1** can be [algorithmically] postcoordinated as C0086250 C0205399 due to C0019829, and rendered for the user as “ESR, Elevated, due to Hodgkin disease” as a suggested postcoordination.

One or more versions of Metaphrase are scheduled for deployment in Fall, 1997. Initial results will be reported in the poster.

**References**

3. Roger Côté, MD, FCAP, Editor of SNOMED International, relates the anecdotal example of a sudden outbreak of “Cinnamon oil glossitis” traced to a bad batch of chewing gum.
4. Partially supported by the NLM+AHCPR EMR Collaborative Grant U01 HS/LM-08751.
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