RxNav: A Semantic Navigation Tool for Clinical Drugs

Olivier Bodenreider and Stuart J. Nelson

U.S. National Library of Medicine, National Institutes of Health, Bethesda, Maryland, USA

The RxNorm project[1] aims at creating a consistent representation for clinical drugs in the Unified Medical Language System® (UMLS®). A semantic normal form for a clinical drug, designed to represent the meaning of an expression typically seen in a practitioner's medication order, has been developed and is being created in the UMLS Metathesaurus®. The long-term goal of this project is to establish a relationship for every concept in the Metathesaurus with semantic type *Clinical Drug* with one or more of these semantic normal forms.

More precisely, there are two types of semantic normal form (SNF) concepts: one for drug components, consisting of an ingredient and a strength, and the other for the clinical formulation, consisting of at least one drug component and a dose form. The relationships among the various entities of the model have been defined and are illustrated in the example shown in Figure 1.

In previous work, we developed SemNav, a semantic navigation tool for the UMLS. Although integrated in the UMLS, RxNorm descriptions are not well represented in SemNav.

Unlike most domains in the UMLS, these descriptions follow a template (provided, in this case, by the SNF model). For this reason, we decided to develop a specific tool, RxNav, for the graphical representing and navigation of RxNorm.

An RxNorm description can be understood as a graph whose nodes are UMLS concepts corresponding to ingredients, drug forms, dose forms, etc. The relationships among these elements – edges in the graph – are taxonomic (isa), partonomic (ingredient_of), or associative (e.g., tradename_of). In RxNav, the ingredients and clinical drugs corresponding to a query are represented graphically with their interrelations.

Address for correspondence

Olivier Bodenreider, National Library of Medicine,
8600 Rockville Pike, MS 43, Bethesda, MD 20894, USA.
Email: olivier@nlm.nih.gov. Phone: (301) 435-3246.
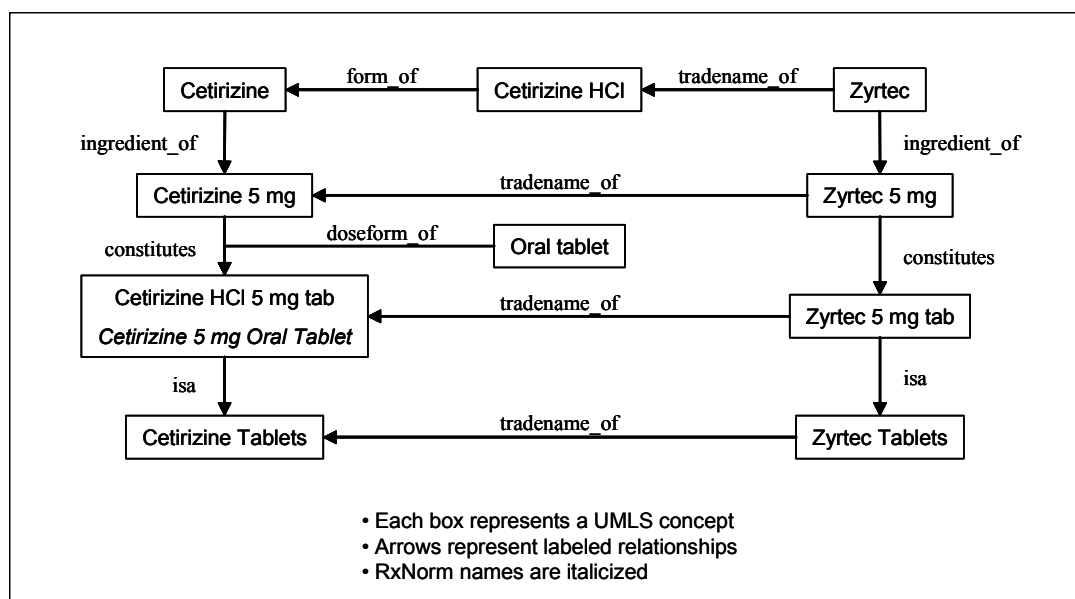
---

[1] http://umlsinfo.nlm.nih.gov/RxNorm.html

Figure 1 – RxNorm relationships for Cetirizine in the UMLS