RxNav: Providing Standard Drug Information
Kelly Zeng, M.S., Olivier Bodenreider, M.D., PhD, John Kilbourne, MD, and Stuart J. Nelson, MD
U.S. National Library of Medicine, National Institutes of Health, Bethesda, Maryland, USA

RxNav\(^1\) is a browser for RxNorm\(^2\), the NLM repository of standard names for clinical drugs. RxNav displays links from clinical drugs, both branded and generic, to their active ingredients, drug components and related brand names. The current dataset (July 11, 2006) comprises 5,591 ingredients, 10,998 brand names, 13,913 clinical drug components, 17,788 clinical drugs, 13,850 branded drugs, 13,253 branded drug component, 8,296 clinical drug forms, 10,862 branded drug forms and 140 dose forms. RxNorm is one of a suite of designated standards for use in U.S. Federal Government systems for the electronic exchange of clinical health information.

Since its introduction at Medinfo 2004, RxNav has been successfully deployed for almost two years, with an average of about 20 users per day. Based on the feedback from the community, RxNav makes constant improvements. Today, it provides a variety of features that facilitates browsing standard drug information.

**Data Access.** RxNav provides direct access to the RxNorm data. The data is extracted from the RxNorm monthly release file and loaded into a MySQL database for access by the RxNav server. Because RxNorm data are not stored locally on the user’s computer, data updates of the RxNorm data are automatically reflected in RxNav in a timely manner.

**Graphic User Interface.** RxNav displays graphically all the relevant entities and the relations among them. Users can thus focus on a particular aspect (e.g., ingredient) while maintaining the overall perspective. Users may open any component table in a separate, resizable window, making it possible to see the entire content of large tables. A “back” navigation button allows users to access previously returned results.

**Search on Different Aspects.** Every aspect of the RxNorm database can be queried through RxNav, including the names and codes of drugs and components in the drug resources referenced by, but not included in, RxNorm. Spelling suggestions are offered when no exact match is found in RxNorm for a given input term.

**Open and Service Oriented Architecture.** RxNav is a Java-based, standalone application. Its architecture uses a number of open-source software components including Apache, Axis and Tomcat, and intends to be flexible, extensible and efficient. Its architecture also follows the service oriented philosophy. The workflow of RxNav consists of a number of reusable components. The spell checking module and the data retrieval module are both implemented as web services, which can be discovered and used by other applications.

**Easy Deployment for the Client.** RxNav employs Java WebStart as its distribution mechanism. The application is automatically installed locally to the user’s computer and started within the security boundary as the client accesses the RxNav website. The standard port 80 is used for the communication between the RxNav client and NLM’s server. Software updates are automatically downloaded when available.

In the future, an application programming interface (API) providing fine-grained control over RxNorm data retrieval will be released. Links to other drug information services (e.g., drug labeling information in DailyMed and personalized medication lists) will be added.

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1 \[\text{http://mor.nlm.nih.gov/download/rxnav/}\]
2 \[\text{http://www.nlm.nih.gov/research/umls/rxnorm_main.html}\]