

RxNorm API usage analysis: Proposal for next steps

Holly Thompson, Associate Fellow 2013-2014

Project Sponsor

Olivier Bodenreider, MD, PhD

Lister Hill National Center for Biomedical Communications

Abstract

Background: RxNorm was developed by NLM and provides normalized names for clinical drugs and links its names to many of the drug vocabularies commonly used in pharmacy management and drug interaction software. There are two RxNorm APIs (SOAP/WSDL and RESTful) available to provide developers with functions for retrieving RxNorm data from the most current RxNorm dataset. The RxNorm Application Programming Interface (API) was developed by Dr. Olivier Bodenreider (LHNCBC) and has been in production since March 2008.

Objective: Conduct a user and usage analysis of the RxNorm API for the purpose of improving and refining the RxNorm API service and product.

Methods: The initial methods for performing this analysis focused on searching the published literature, mining customer service email archives, and searching internet community forums. Soliciting direct feedback from users was later added to methodology to further understand the results and provide context for the use cases.

Results: Locating RxNorm API references and citations in the published literature proved to be a challenge. Many authors refer to their use of RxNorm data but not their methods for accessing data. However, several recent publications specifically cite the RxNorm API as part of larger research efforts including mobile application development, patient portal development related to electronic health records (EHRs), and computer science research. Mining the email archives revealed several areas for improvement including the need for a Terms of Service document, enhanced tutorials and training materials, and enhanced documentation differentiating between the RxNorm data sources.

Conclusions: The user group for the RxNorm API is specific and predictable given the specialized nature of the data. The users range from mobile application and software developers to graduate students to computer science researchers. Most uses focus on developing tools for prescribing drugs, monitoring prescriptions, and interacting with patient portals. However, RxNorm API is largely appreciated and meets the needs of its users.

Recommendations: In addition to exploring enhancements to the Terms of Service, tutorials and training, and other general documentation, the RxNorm API developers should also consider enhancing technical documentation and the Frequently Asked Questions (FAQs) page. Increased and/or expanded promotion and outreach regarding this product is also recommended. In order to address these recommendations, a proposal for next steps has been developed.

Top Recommendations:

1. Follow-up with survey responses, specifically and in priority order:
 - a. Contact #1 – persistent question/dissatisfied with previous NLM response, might need more in depth explanation (might also just lack understanding of API).
 - b. Contact #2 – made clear suggestions for API
 - c. Contact #3 – made one suggestion for improvement to API
 - d. Contact #4 – made clear suggestions for API
 - e. Contact #5 – cited “lean documentation” as drawback and made clear suggestions for API
 - f. Contact #6 – Found use of APIs impractical, why?
 - g. Contact #7 – follow-up for more detail on projects
 - h. Contact #8 – Struggles with use of RxMix, how?
 - i. Contact #9 – has outdated impressions of API functionality, would benefit from an update
 - j. Contact #10 – follow-up for more detail regarding request for drug and allergy interactions
2. Update/create documentation
 - a. Terms of Service
 - Possible references:
 1. <https://open.fda.gov/terms/>
 2. <http://clinicaltrials.gov/ct2/about-site/terms-conditions>
 3. <http://www.nlm.nih.gov/medlineplus/connect/technical.html>
 - b. Support documentation
 - Possible references:
 1. <https://open.fda.gov/drug/event/reference/>
3. Promote the RxNorm API service
 - a. Page describing current users and uses of RxNorm API (with permission)
 - b. Create an App gallery
4. Develop a Frequently Asked Questions (FAQ) page answers:
 - a. Can users access the source code?
 - b. Accessibility (license requirements)
 - c. Updates to the data (any lag between updates, how users can receive update notifications)
 - d. Information for properly citing the API
 - e. Differences between RxNorm v. RxNav v. RxMix v. RxNorm API in simple table
5. Investigate possible modifications/adjustments/improvements to API based on user feedback
 - a. Invite feedback and suggestions from users
 - Invite feedback clearly on drug information APIs websites
 - Providing simple web form requesting
 1. Suggestion
 2. Use case/justification for suggestion
 3. User’s area of expertise
 4. User’s contact information
 - Follow-up with users
6. Enhance/create training and/or tutorial material (low priority)

- a. For developers lacking familiarity with drug terminologies
- b. For users familiar with drug terminologies but unfamiliar with application and software development

** Refer to other API tutorials to develop basic tutorials and adjust accordingly for the RxNorm API:

- <http://www.w3schools.com/googleAPI/>

Proposal:

Project Title:

Give the users what they want! Improving documentation for the RxNorm API.

Submitted by:

Brief Description:

NLM produces Application Programming Interfaces (APIs) to some of its resources. APIs provide access to data without the need for a website, app, or another application to serve the data to users. Users of APIs can make data calls and consume the data or present the information in their own applications. NLM has over 20 APIs that provide access to many of its different datasets. And while these APIs have been collected and catalogued for users (<http://www.nlm.nih.gov/api/>), documentation of these APIs, including type, methods, outputs, etc., has not been standardized. In the Spring of 2013, NLM Associate Fellow Rose Hedberg produced a set of guidelines/best practices for documenting NLM APIs – including usability standards and HHS 508 and plain language requirements.

The RxNorm API provides programmatic access to the RxNorm data and has been available since March 2008. Its usage has increased over time to over 50 million queries annually and about 40,000 unique users. While logs are monitored, the lack of mandatory registration makes it difficult to know who the users are and what they are using the RxNorm API for.

In the Spring of 2014, NLM Associate Fellow Holly Thompson conducted an environmental scan to determine the users and uses of the RxNorm API. After conducting a literature review, broad internet searches, and an informal survey a list of recommendations for next steps was compiled. The most reasonable next step is to address a common issue identified throughout the information gathering process: improve RxNorm API documentation. A wide variety of users acknowledged the desire to have more detailed documentation for Terms of Service and other support documents.

This goal can be accomplished in a variety of ways not limited to:

- I. Review Rose Hedberg's guidelines and best practices for understanding of basic documentation requirements
- II. Conduct an environmental scan of documentation produced by other API developers at NLM, NIH, and related agencies.
- III. Work closely with the RxNorm API developers to identify:
 - a. key information for documentation to address feedback from users
 - b. an appropriate level of detail for documentation, including screen shots
 - c. create a Terms of Service document
- IV. Maintain a detailed log of process for best practices guide
- V. *Optional:* Collect and address commonly asked questions in a FAQ section of the website that can be answered via support documentation.

One challenge for this project is that there are currently no internal NLM standards for developing documentation for APIs. With this in mind, the project will require a degree of self-motivation and comfort with making progress with limited models to follow.

Total Duration/ Elapsed Time: 40-50 Hours

External schedules/Deadlines:**Primary learning objectives for Associate:**

- Develop an understanding of the best API documentation practices
- Learn about RxNorm API and related technical products produced by NLM

Expected project experiences:

- Development and presentation of recommendations
- Examination of unfamiliar technical area
- Identification of others' technical expertise
- Observation of management styles
- Observation of organizational politics
- Responsibility and accountability for a discrete product
- Website update and/or creation

Expected outputs/Products:

- Best practices guide for culling and curating API documentation
- Updated support documentation
- Updated Terms of Service documentation
- *Optional*: Organization of a Frequently Asked Questions (FAQ) section on website

Suggested methodologies:

- Environmental scan
- Interviews
- Website creation
- Websites review
- Other: Documentation drafting and mockups
- *Optional*: Focus groups

Benefits to NLM:

- Enhance usability of NLM products with improved documentation.
- Provide guidance to other NLM producers of APIs for incorporating more comprehensive documentation into their product websites.
- Strengthen relationships with NLM users by actively responding to feedback.

Project Leader(s):**Other resource people:**

Patrick McLaughlin, UMLS & RxNorm Support, MMS, LO
Lee Peters, Senior software developer, RxNorm API