Managing medication data in a longitudinal community-based registry & biorepository

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Abstract

Our goal is to convert free text unstructured participant self-reported medication data from the MURDOCK (Measurement to Understand the Reclassification of Disease of Cabarrus/Kannapolis) study, (Figure 1) to codified data, which can be utilized to generate a standardized electronic configuration for data entry and query. We present our process for coding the free text medication data into RxNorm. We also describe plans to use the freely available National Center for Biomedical Ontology (NCBO) API tool to map free text medication data with standard RxNorm codes at the point of data entry, thus, standardizing medication data at the point at which it is entered into the database. We plan to assess the validity of our process, and determine which elements do not map properly and the reasons why.

The MURDOCK study includes the collection of biospecimens, clinical data, and patient-reported data. The study plans to collect longitudinal clinical data from 50,000 participants (8,500 are currently enrolled).

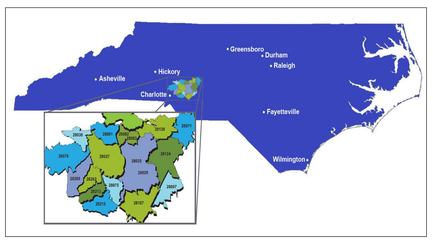

Figure 1. The MURDOCK Study catchment area – Cabarrus County and the city of Kannapolis, North Carolina.

Method

The registry's data entry interface was modified to include an auto-complete widget made available by the National Center for Biomedical Ontology (www.bioontology). This widget provides type-ahead functionality and allows users to easily select a term from a specified ontology or controlled vocabulary, in this case, RxNORM. Test data was entered into the electronic test data entry form from the participants' paper case report form. A screen shot of the electronic test form was obtained. (Figure 2). As the data was entered into the registry, a term was selected to accurately reflect the unstructured terminology. By utilizing the NCBO widget, the data was automatically mapped with ontology concepts and was assigned a concept unique identification code (CUI). These concepts come from the Unified Medical Language System (UMLS) and the NCBO BioPortal.

After all test data was entered into the test registry form, all assigned CUI codes were entered into the RxNav tool to determine the validity of the CUI. RxNav finds drugs in RxNorm from the names and codes in its constituent vocabularies.

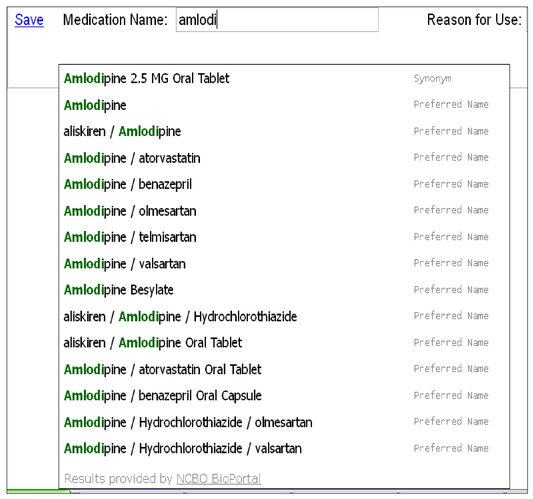

Figure 2. Screenshot of MURDOCK electronic test data entry form

Results

100% of the test data (n=57) was entered into the MURDOCK data registry test site after the NCBO API was wrapped into the registry. 87.7% of the test data (n=50) was mapped to a concept unique identifier (CUI). Each CUI that was assigned to the test data was manually entered into the RxNav search tool. 100% of the codeable test data matched to the correct CUI in the RxNav tool (Figure 3). The 12.3% un-coded data includes home remedies (e.g. hot water/vinegar/honey, vinegar, protein powder with milk, goji juice, nutmeg), or unspecified medications (e.g., birth control, and opthalmic suspensions).

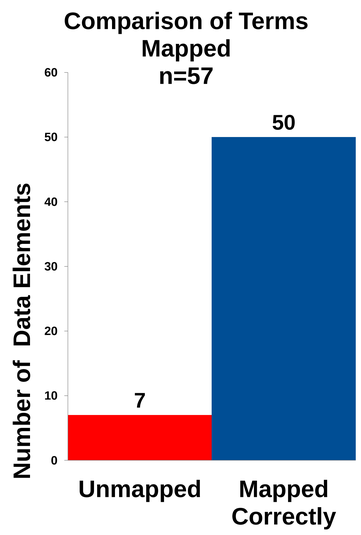

Figure 3. Results of test data mapping

MURDOCK STUDY

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Conclusion

As a result of utilizing the NCBO search API tool, a free source for data standardization, we have determined that this tool is a viable option for the MURDOCK study to use to enter participants' self-reported medications. It will allow researchers to query medication use more effectively. Our method of standardizing and validating medication data collected from participant reported unstructured free text can be applied by other research groups for standardizing data reporting. By utilizing our method, other research groups can reduce the resources required for medical manual review of study data and validation of coding. The use of the National Center for Bio-ontology BioPortal and publicly available tools is consistent with the mission and approach of all CTSAs and the CTSA consortium.

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Acknowledgements

The MURDOCK Study is funded by the David H. Murdock Institute for Business and Culture and the Duke CTSA grant (UL1RR024128).

Authorship represents MURDOCK Community Registry and Biorepository informatics and study leadership.

For more information on the MURDOCK Study, please visit us online:

www.murdock-study.com

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RxNav