



Evaluation of the Functionality of Subscription and Free Online Drug Information Databases

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Background

Given the estimate that the entire body of medical knowledge doubles every two years, it is no surprise that computer-based decision support resources have demonstrated their value in enhancing safety and improving patient outcomes.

In addition to online databases that provide access to the primary literature such as PubMed, commercially available databases are often used to assist with decision making. One example of this type of resource is the online drug information database. These online drug information databases are used to assist in enhancing clinical decision support regarding a number of patient-related therapeutic choices including: determining weight-based or renally-impaired dosing regimens, monitoring for drug interactions, and identifying safety risks.

Subjective reviews of these online drug databases are plentiful in the literature, but no published systematic evaluations are available.

Objective

The objective of this study was to systematically evaluate the functionality of seven of the most commonly used online drug information databases. Five subscription and two free online databases were assessed according to scope, completeness and ease of use.

Methodology

Fifteen categories (e.g. drug dosing, drug interactions, mechanism of action, side effects, and over-the-counter medications) of drug information questions were identified as important to healthcare professionals based on the published literature and the Nova Southeastern University Drug Information Centers' records of queries by primary care providers.

The number of questions placed in each category was weighted with more important categories receiving more questions. A grand total of 158 pairs of representative questions and answers were created by the authors to populate the categories. Scope was assessed by the presence or absence of an answer for each question. A 3-point scale was used to evaluate completeness, and ease of use was measured by the number of clicks or steps necessary to reach the answer. Scores were reported for each of those three categories. Additionally, a composite score of the three facets was generated by weighting the scope 70% and completeness 30%. Then, the ease of use score was subtracted from the weighted value to determine the final score.

The percentages for each evaluative component, along with mean scores and tabulated raw scores were compiled. Scope, completeness, ease of use and composite scores were all compared between databases using Scheffe's post-hoc multiple comparison test and the Chi-square test. The composite score was subjected to sensitivity analysis to investigate the effect of the choice of percentages for scope and completeness.

Results (1)

The ranking for the databases from highest to lowest, based on composite scores was Clinical Pharmacology (CP), Micromedex (MM), Lexi-Comp Online (LXC), Facts & Comparisons Online (F&C), Epocrates Online Premium (EOP), RxList.com (RXL), and Epocrates Online Free (EOF).

Figure 1. Composite Score And Average Scope (%) for Subscription and Free Databases

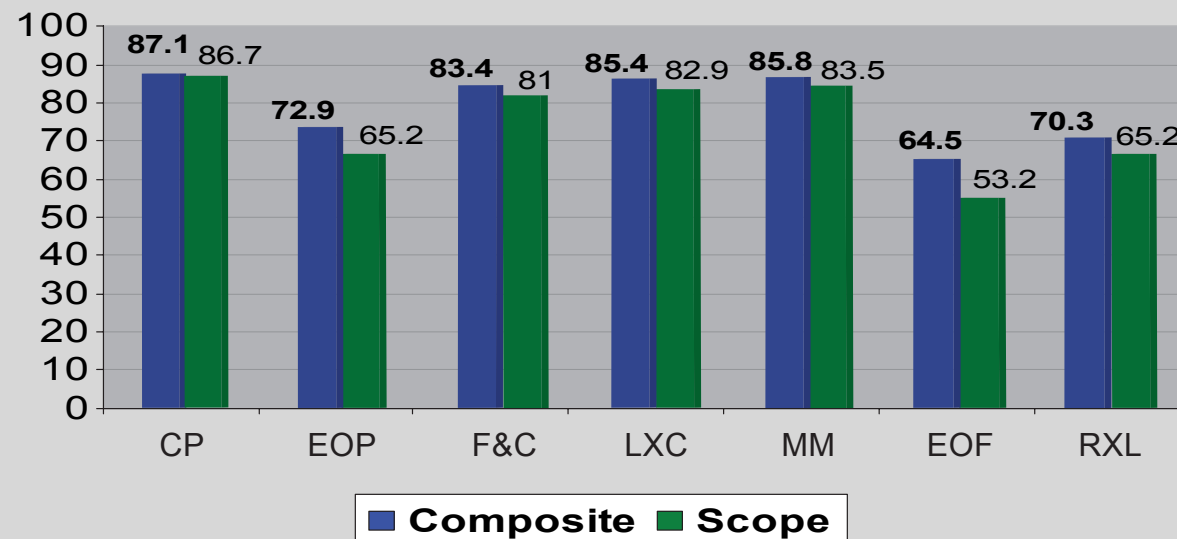


Figure 2. Average Scores for Completeness (%)

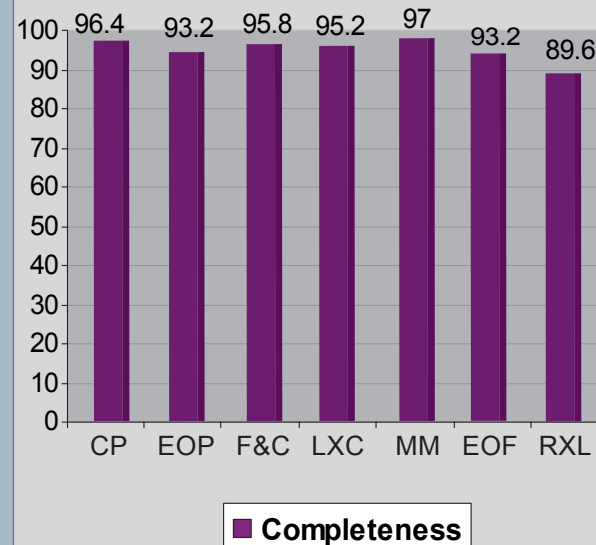
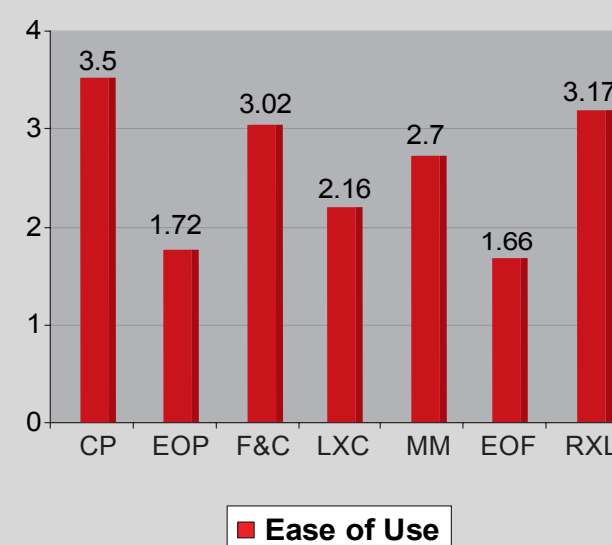


Figure 3. Average Scores for Ease of Use



Results (2)

Differences in scope produced three statistical groupings with Tier 1 (best) performers being: Clinical Pharmacology, Micromedex, Facts & Comparisons Online, Lexi-Comp Online, Tier 2: Epocrates Premium and RxList.com and Tier 3: Epocrates Free (p<0.05). Completeness scores were similarly stratified. Collapsing the databases into two groups by access (subscription or free), showed the subscription databases performed better than the free databases in the measured criteria (p<0.001).

Conclusions

Descriptive statistics indicated a top performer and a rank order, but direct comparisons did not establish that any of the top performers are statistically superior among Tier 1 databases.

For the seven top categories of questions, just two of the seven databases (CP and MM) accounted for, or tied for, all of the high scores for scope.

Given the wide difference in cost between databases, a finding of similarity or equivalence is very significant.

Future Directions

In addition to online databases, drug information databases on personal digital assistants (PDAs) are another source for clinical decision support tools. Results of a comparison between the databases examined here and their PDA counterparts will be reported.