Public Abstract
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Title:Measuring the Speed and Efficacy of Clinical Decision-Making When Comparing Two Different Data Visualizations for Medications

Background: The percentage of patients with polypharmacy needs is increasing among a growing patient population. As a result, the amount of time health care professionals require to make clinical decisions based on current and past medications is increasing. Health care professionals need methods for increasing the speed of clinical decision making without sacrificing the quality of care. The goal of this study is to demonstrate how modifying the data visualization for patient medication histories will change decision making speed or efficacy.
Methods: We compared two groups across five randomized blocks. Group 1 responded to questions based on the control data visualizations derived from an existing electronic health record. Group 2 responded to questions based on the experimental data visualization based on a medication history developed by a team led by Dr. Jeffrey Belden. All medical information presented to both groups is identical.
Each block represents a core clinical task associated with leveraging the medication history for a clinical decision extrapolated from anecdotal scenarios in primary care. Block 1 asks the participant to identify current prescriptions. Block 2 asks the participant to identify past prescriptions. Block 3 asks the participant to identify the length of time a patient has been prescribed a specific drug. Block 4 asks the participant to identify all new prescriptions in a given time interval. Block 5 asks the participant to identify a dosage change for any prescription in a given time interval.
Each block holds two questions, identical in wording, differing only on the visualization presented to the participant. The survey is configured to randomly present one question from each block to each participant. Regardless of the question presented, we additionally track the response time for each block measured as the last click on the survey page before the “submit” or “next” button is clicked. Participants are shown only one question per page to increase the relevance of time tracking.
Results: Twenty-three participants enrolled in the study. A total of 112 observations were collected across five randomized blocks. The average task time for control was 1366.3+/-10.35 and the average response time for treatment 1773.23+/-10.4; however, the T-value was -1.313, thus the results were not statistically significant. The average task correctness for control was 30.61% and the average task correctness for treatment was 66.67% with a p-value of 0.000502.
Conclusions: Task correctness saw a significant increase in the probability for a correct response when using the treatment visualization versus the control visualization. Additional research is required to determine the effect of the treatment visualization on task time. The findings may have a significant impact on how medication histories are presented to care provided through the electronic health record.