Applying Human Factors Research to Alert-Fatigue in E-prescribing

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Abstract
The application of computer-human interaction research may offer new presentations of alerts in clinical systems. The goal of this study is to investigate the attention cost of a set of novel interfaces applied to e-prescribing. Attributes of common alert types were mapped to a set of user interfaces. These interfaces have been prototyped and will undergo pilot testing with a group of clinicians.

Introduction
Current estimates suggest that between 5% and 18% of clinicians use e-prescribing.1 Despite the availability of drug knowledgebases and decision support modules, systems containing this functionality often disable it or customize it at the request of users. These modifications are required to minimize irrelevant or insignificant alerts, due to concerns about alert fatigue (i.e., decreasing the “attention cost” of alerts).2 We postulate that novel user interfaces may decrease attention cost, as has been shown in inpatient order entry by Miller and colleagues.3 This study explores alternative approaches to displaying alerts.

Methods
Two methods were employed. First, existing literature about human-computer interfaces was reviewed. Second, we completed information mapping based on common axes in existing drug knowledgebases. Information mapping is a scientific methodology used to divide and label information for easy comprehension, use, and recall. The mapping results were used to construct prototype interfaces.

Results
Initial computer-human interface review suggested a series of interface approaches that appeared to have promise. A prototype e-prescribing application has been developed, implementing decision support using Treemap-view, Thermometer-view (depicted in the Figure 1) and Tree-view (depicted in Figure 1.)

Three attributes were included in our information mapping. A fourth attribute (strength of evidence) was available in some knowledgebases and was included because of its potential value to clinicians.

The mappings, to two representative interfaces are shown in Figure 1.

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Conclusions/Next Steps
We have been able to map existing alert attributes to prototype user interfaces. We are now conducting testing using a confusion matrix approach, designed to assess the correlation between novice users mapping of information to these interfaces and the intended mapping of information. We will use these data to select an optimal set of prototype user interfaces, and then conduct formal usability testing to evaluate the effectiveness of each approach in minimizing the time to assess a medication’s risk to the patient.

References

