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Opportunities for Error in CPOE Alert Responses

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Abstract

The default alert response options in a commercial Computerized Physician Order Entry (CPOE) system are markedly different from the clinical cognitive model. This difference can contribute to alert fatigue, incorrect alert overrides, and increased errors in patient treatment. By examining an interruptive, overridable alert from the perspective of both cognitive and workflow analyses, this paper presents insights into potential errors and proposes a novel testable model for alert conflict resolution.

Keywords:

CPOE, user computer interface

Introduction

CPOE systems have been shown to both prevent errors and open opportunities for new types of errors. Overriding alerts is a serious and common problem, with 49-96% of all alerts being overridden.(1) Many alerts are interruptive. They stop the clinician's workflow until the alert receives a response. When encountering this type of alert, clinicians are more likely to respond, rather than automatically overriding it, if they are provided with a reasonable set of alternative actions.(2)

Clinical cognitive model vs. workflow constraints

Consider the scenario in which the clinician is presented with an alert of the form "Item A conflicts with Item B". There are three possible responses to this alert form: delete or modify Item A; delete or modify Item B, or override the alert. The specific implementations vary depending on what A and B are. Drugs can be canceled or modified. Allergies can be marked as inaccurate, or narrowed in scope, if the patient had tolerated a related substance. Lab values could be marked as unreliable.

In a currently implemented commercial system, the two response options for this type of alert are *Go Back* and *Proceed,* as in Figure 1. Pre-existing orders (Item A) cannot be modified until the new orders are submitted or cancelled.

Opportunities for error

Tracking Errors: (a) The alert is logged as cancelled, but the user did change their orders. (b) The alert is logged as overridden, but user changed orders in a separate session.

Patient Care Errors: Without the ability to immediately modify Item A, the user is forced to recall the conflict state for later correction. This imposes an unnecessary cognitive workload which is vulnerable to interruption and error.

Hypothesis and implications for future studies

We hypothesize that the ability to change both preexisting and new items when responding to alerts is both desired by clinicians and necessary to reduce errors. To confirm this, alerts of the form "A conflicts with B" will be presented to clinicians who will be asked about their possible responses. Then they will be asked to respond to these alerts while unable to modify any pre-existing items in the same order session.

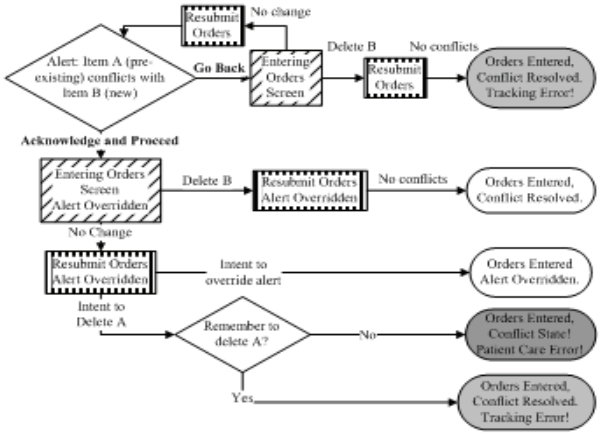

Figure 1 – Alert response task flow

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