Alert Overrides: The Impact of Chained Events

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Introduction

Clinical decision support (CDS) can prevent medical errors when implemented appropriately[1]. Drug-drug interaction (DDI) alerts are a type of CDS that aim to avert hazardous medication prescribing.

However, DDI alerts are routinely overridden (>60%) due to their low specificity and human factor issues[2,3,4]. Previous work has focused on rates of alert responses without considering presentation features such as display in groups or strings.

To contribute to the improvement of the system we studied the impact of alert presentation on override rates.

We hypothesize there is a statistically significant difference between override rates when the user is presented with a group of alerts, an alert chain, as compared to isolated alerts.

In this study we:

- Identify patterns of user behavior when rapidly presented with sequential alerts and consider the likelihood of dismissing alerts based on an individual alert's position in an alert string.

Data Source

- Alerts were pulled from a database of EHR records from six ambulatory care centers in a major metropolitan area
- 444,638 alert records were found over an 18 month period
- Only medication alerts, excluding dosage alerts, were included.

Methods

- Override rates were calculated, based on clinician response to alerts, in two formats: isolates and chains.
- Chained alerts were defined as multiple alerts occurring with less than a 60 second gap between notifications for the same user.
- Alert chains were grouped in three categories, short, medium and long, according to their length (Fig 1) .
- For each chained alert, we identified their position, classified them by chain segment and calculated the override rates for each group (Fig 2) .

Results

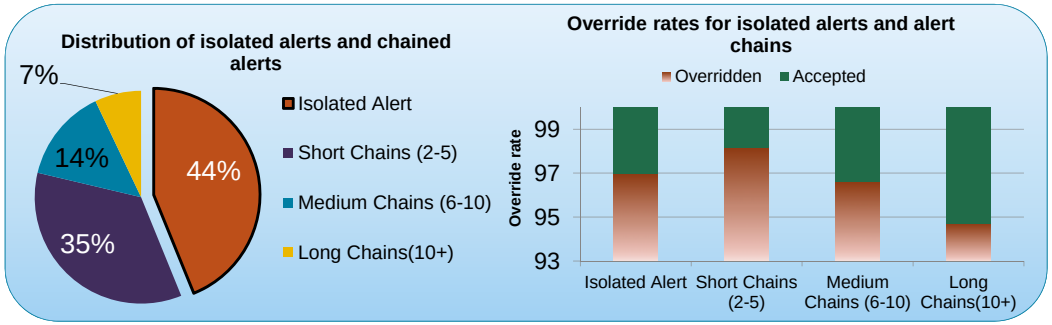

*Figure 1- **Alert response considering presentation and chain length.***
97.18% of total alerts are overridden. Majority of alerts occur in chains.
Statistically significant difference found between override rates for individual and chained alerts (χ^2=56.60, p<.0001).

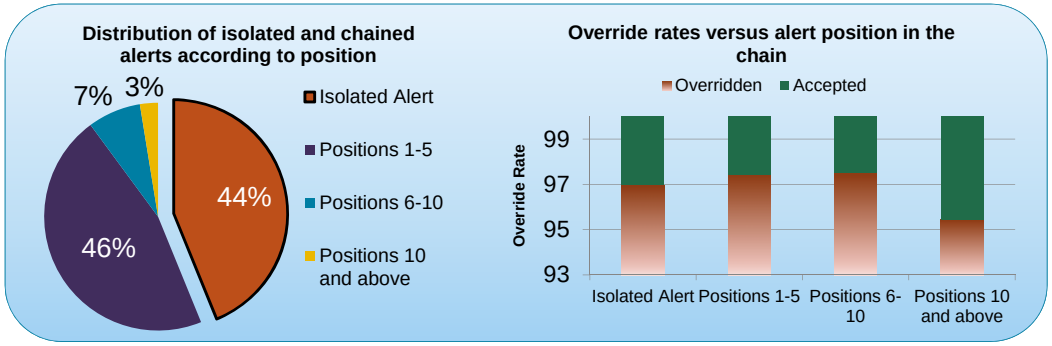

*Figure 2 – **Alert response considering position in the chain.***
90% of alerts were isolated alerts or found in positions 1 thru 5. The remaining 10% were found in positions 6 or later.
Later alerts present lower override rates(χ^2= 212.49, p<.0001) showing a change in user input after repeated prompting.

Summary of Conclusions

The evidence suggests the following:

(1) alerts within chains are overridden more frequently than isolates,

(2) shorter alert chains, compared to longer chain, have higher override rates,

(3) and an alerts in later positions within a chain tend to have lower override rates.

Chained alerts increase the tendency to override and user response seems to change with chain length as well as the alert's position within the chain.

To avoid the described effects, DDI alert display designs must consider presentation effects and provide support for grouped notifications.

References

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