Opportunities for Error in CPOE Alert Responses

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Ways Alerts Could Promote Error

- Erroneous Overrides [1]
  - Drug safety alerts override rates: 49-96%
  - May be due to alert fatigue, incorrect information, or clinician time shortage
- Errors of Commission [2]
  - Alert instructions may be followed contrary to clinical knowledge due to unwarranted trust in computer authority
- Errors of Distraction [3]
  - High cognitive complexity in CPOE systems can lead to missed steps when responding to alerts

Overall Alert Categorization

- Types
  - **Informational:** give timely information that may change patient care
  - **System Data Request:** collect information needed by electronic medical record and CPOE systems
  - **Critique:** detect a possible error in an order and request the clinician to change or confirm the order
  - **Suggestion:** anticipate an order and attempt to streamline the order process and/or ensure order correctness
- Features
  - Interruptive / Non-interruptive
  - Synchronous / Asynchronous
  - Enforced / Not Enforced
  - Triggered by Order Entry / Data Entry / User Interface

Current focus: Critique Alerts

- Usually Interruptive
  - Must break into clinical workflow
- Synchronous
  - Logic trigger = Display trigger
- Triggered by order entry
- Often Enforced
  - To continue with workflow, clinician must satisfy alert condition

Solution: “Offered Choices” [4]

- Selectable items from the alert which enable the clinician to specify their desired response
- Preconfigured to include most probable clinical choices
- Common options include
  - Write a new order (specified by alert)
  - Override the alert
  - Defer warning for later
  - Cancel pre-existing or current order
  - Edit pre-existing or current order

Possible Advantages of *Offered Choices*

- Rapid selection of desired alert response
  - → less clinician time pressure
  - → fewer incorrect alert overrides
- Explicit display of *Offered Choices*
  - → less perception of alert as decision maker
  - → fewer errors of commission
- Decreased cognitive load for alert responses
  - → fewer errors of distraction

Clinical Example with *Offered Choices*

Dr. Bright has decided to order paroxetine.

An alert notifies her that the patient is already receiving fluoxetine, which is the same class of drug as paroxetine.

Dr. Bright decides to cancel the previous order of fluoxetine and continue her current order for paroxetine.

Task Analysis With *Offered Choices*

1. Using *Offered Choices*, Dr. Bright selects “Cancel pre-existing order” and continues with her work.

Task Analysis Without *Offered Choices*

Option 1

Select “Go Back”

Save constructed but unsubmitted order for paroxetine

Find pre-existing order for fluoxetine in long list of current orders

Cancel fluoxetine order

Recall saved order for paroxetine

Submit order for paroxetine

Option 2

Select “Proceed”

Submit new order for paroxetine

Find pre-existing order for fluoxetine in long list of current orders

Cancel fluoxetine order

Task Analysis Comparison

- With *Offered Choices*
  - 1-step process
  - Less clinician time consumption
  - Less cognitive complexity
  - Explicit choices available
- Without *Offered Choices*
  - Either 4-step or 6-step process
  - Increased clinician time consumption
  - Increased cognitive complexity renders alert responses vulnerable to Error of Distraction
    - "Proceed" path → both drugs received
    - "Go Back" path → neither drug received

Further Advantages of *Offered Choices*

- Without *Offered Choices*, override rates are difficult to measure
  - "Go Back" vs. "Proceed" selection insufficient to determine whether alert advice was followed
  - Must laboriously examine order sets following alert triggering
- With *Offered Choices*, explicit selection allows clear determination whether alert advice was followed

Conclusions

Several types of errors are associated with clinical alerts, as demonstrated by our analysis of critique alerts.

Offered Choices, as a feature of critique alerts, provide significant theoretical potential for decreasing alert-related errors.

Further study is needed to evaluate improvements in alert efficacy and usability after implementation of *Offered Choices*.

Reference List

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