Feedback and training to improve use of an electronic prescribing system: A randomised controlled trial

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Computerised alerts

Common form of decision support in electronic prescribing systems

Trigger at the point of prescribing to warn doctors of possible risks in orders, like drug duplications or drug-drug interactions
Alert effectiveness

Studies evaluating the use of alerts often report positive effects. But, there is also a large body of work demonstrating that doctors override alerts (i.e. click past alerts without following recommendations), up to 95% of the time.

Alert fatigue - mental state resulting from excessive numbers of alerts being triggered.

Presentation of large numbers of alerts leads to:
- User frustration and annoyance
- Prescribers learning to ignore all alerts
Previous research

Previous research at the study hospital showed:

1. Approximately 1/3 of orders initiated by doctors triggered one or more computerised alerts
2. During interviews, doctors reported receiving too many alerts and many were perceived to be irrelevant
3. Therapeutic duplication alerts were the most frequently encountered (representing 61% of alerts) and were also viewed to be the least useful
4. 1/3 of duplication alerts were technically preventable – triggered because prescribers were not using particular short-cut functions in the system
Duplication alerts

These trigger when a doctor prescribes a medication that is identical to (or belongs to the same medication class as) another medication which is currently active on the patient’s chart or was ceased within 24 hours.
Example shortcut

To make a change to an order on a patient’s chart, a doctor should click on the order and edit the parameter (e.g. change the dose), instead of ceasing and re-ordering the medication.
Study aim

To improve uptake of the short-cut functions in the electronic prescribing system, and so reduce the number of unnecessary duplication alerts being triggered

We trialed 2 methods:
1. Individualised feedback
2. Refresher training
Method - Participants

Doctors (any level or specialty) that prescribed >80 medications in a 4-month period were randomised to:

Training or Feedback or Control

(Doctors were excluded if they left the hospital, served a term in the ED (where there was no system), or were seconded out to another networked hospital)

Final numbers: Training = 11, Feedback = 19, Control = 20
Method - Procedure

A sample of prescription data was extracted from the electronic prescribing system 4 months prior to and 4 months following the implementation of interventions.

Doctors in the control group did not receive an intervention.
Training

Doctors received a 5-min face-to-face refresher training session
- Delivered by a medical science student
- Delivered at a convenient time and place for participants
- System’s ‘training environment’ was used
- Short-cut functions were demonstrated using a set of scenarios
- Given a 1-page summary sheet outlining the short-cut functions
- Following the session, doctors could provide feedback on the training or the system in general
Doctors received an email with an individualised feedback report containing:
- Information on the number of duplication alerts they triggered in the 4-month period
- Information (+ screen shots) on how to use the short-cut functions to avoid duplication alerts
- A contact email address for any questions or feedback
Main outcome measure

Proportion of medication orders that triggered at least one duplication alert

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\text{Medication orders that triggered a duplication alert} = \frac{\text{Total medication orders prescribed}}{\text{Total medication orders prescribed}}
\]
## Results – Orders and alerts

<table>
<thead>
<tr>
<th></th>
<th>Number of orders</th>
<th></th>
<th>Number of alerts</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
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<tr>
<td>Control</td>
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<td>166</td>
<td>245</td>
<td>240</td>
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<tr>
<td>Feedback</td>
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<tr>
<td>Training</td>
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<td>180</td>
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<tr>
<td>Average</td>
<td>205</td>
<td>161</td>
<td>306</td>
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</tr>
</tbody>
</table>
Result – Main outcome measure

Proportion of orders which triggered at least one duplication alert (%)

- Control
- Feedback Group
- Training

Pre
Post
Feedback from doctors

System-related
- Short-cuts were intentionally being avoided because they were perceived to be inefficient and did not align well with thought processes

Institution-related
- Multiple doctors often used a single doctor’s log-in
- Prescribers were in different specialties during pre and post periods

Intervention-related
- Training was only delivered once and was rushed because doctors did not view it as a priority
- Training was delivered by a student
Discussion

Interventions were not effective in increasing uptake of short-cut functions and reducing alert numbers.

We learned some valuable lessons about conducting studies using real-time prescription data:

1. Long-term studies are limited by doctors rotating through different specialties.

2. Data may not reflect an individual doctor’s prescribing practice (more likely to be the team’s prescribing).

3. Doctors will workaround a system if not perceived to be efficient (feedback and training are unlikely to work here).
Conclusions

This study highlighted a number of difficulties associated with using prescription data extracted from a hospital system to evaluate interventions.

Behaviour change interventions, such as training and feedback, are unlikely to be effective when users are intentionally not using functions.

Instead, redesign of the system is needed to make short-cuts more efficient and to align their use with prescriber workflow.
Thank you

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