The Effect of an Electronic “Hard-stop” Alert on HIV Testing Rates in the Emergency Department

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Background – Electronic Alerts

Numerous studies have evaluated the use of electronic alerts

• Substantial research has centered on the use of these alerts for computerized provider order entry (CPOE) systems and for medication alerts

Mixed outcomes have been reported from this research

• Little research has explored electronic alerts for screening tests
The US Emergency Department

The ED is a major component of the US healthcare system, and considerably different from other hospital care areas.

ED has an open door policy – 24/7, providing care regardless of an individual’s ability to pay and irrespective of resources.

From 1999 -2009, it is estimated that there was a 32% increase in the number of annual ED visits.

The ED is an important healthcare setting for testing patients for HIV since:

- patients who use the ED as for primary care are racial and ethnic minorities and socioeconomically disadvantaged.
Policy Changes

2006 - CDC revised recommendations
Non-targeted rapid HIV screening in locations where prevalence rates are estimated to be $=> 0.1\%$

2010 – New York State legislation (S.8227/A.11487)
HIV testing must be offered to all persons (universal) between the ages of 13 and 64 receiving healthcare services
Use of Decision Support Systems

• Electronic alerts - low cost approach for ensuring adherence to this legislation

• Use of electronic order sets and “hard-stop” alerts -- ensure that all providers offer an HIV test to every patient treated in the ED

• Purpose: Assess the effectiveness of these electronic tools on HIV testing rates in the ED
Study Setting

- Adult ED at a large tertiary care center in New York City
- Annual ED volume > 83,000 patients (pediatric and adult visits)
- Level one trauma center and provides specialized Cardiac, Stroke and Burn care
- 850 inpatient beds
Methods

We analyzed time-stamped data files/system usage logs

Data set – no identifying patient information

- included data on patient gender, age, race, ethnicity and severity index (ESI)

Inclusion criteria: > 64 years of age

Exclusion: patients who left before being seen by a provider

- Study period: 4.5 month period of time
- Prior to the roll-out of the electronic order set, HIV testing was not done in this ED
# Electronic Order Set for HIV testing

## HIV Testing Order Set [1 orders of 5 are selected]

### HIV Testing Deferred

<table>
<thead>
<tr>
<th>Order</th>
<th>Reason</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Test Not Offered</td>
<td>Patient reports previous HIV Test is positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age &lt; 13 or &gt; 65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient unable to give informed consent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient treated for life-threatening emergency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient is already tested at our institution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other (explain in comments)</td>
<td></td>
</tr>
</tbody>
</table>

### HIV Testing

<table>
<thead>
<tr>
<th>Order</th>
<th>Present</th>
<th>Priority</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV 1 and 2 Rapid</td>
<td>*</td>
<td>Now</td>
<td>Only oral consent required</td>
</tr>
<tr>
<td>HIV-1 and 2 Antibody ELISA</td>
<td></td>
<td>Now</td>
<td>Written consent required</td>
</tr>
<tr>
<td>HIV 1 and 2 Antibody Oral (Peds ED only)</td>
<td></td>
<td>Now</td>
<td></td>
</tr>
</tbody>
</table>
Details of the “hard-stop”

• Providers could not discharge patients from the ED unless they documented that they had offered an HIV test to their patients.

• Electronic “hard-stop” alert appeared when a provider attempted to write an electronic ED discharge order.
Data Analysis

- Data were managed and analyzed using SPSS
- Descriptive statistics – number of HIV tests ordered before and after the electronic “hard-stop” alert
- Logistic regression
  - gender, ESI and age as covariates
3 Study Groups:

- 1) pre-intervention, no electronic “hard-stop” alert
- 2) post-intervention, no electronic “hard-stop” alert
  - patients admitted into hospital post ED visits
- 3) post-intervention, electronic “hard-stop” alert
  - patients treated and released from ED
Results

Pre-intervention period:

- 8,994 visits of patients between 21 and 64 years of age
- Of these patients, 7,048 were treated in the ED and released
- Overall compliance - 6.32% across all patients
## Results – Pre Intervention

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2%</td>
<td>Offered an HIV test and declined</td>
</tr>
<tr>
<td>1.9%</td>
<td>HIV test</td>
</tr>
<tr>
<td>0.3%</td>
<td>Documentation that the provider did not order the test</td>
</tr>
<tr>
<td>93.6%</td>
<td>Provider did not document</td>
</tr>
</tbody>
</table>

* august 26, 2013  Page 14
Results – Post Intervention – Group 2

• 2,006 patients who entered the ED, later admitted to the hospital
  • no “hard-stop” alert but were able to use the HIV order set

• 44.47% compliance rate with the HIV testing law
Results – Post Intervention – Group 3

• The “hard-stop” alert was live and providers were not able to discharge patients from the ED unless they completed the HIV testing order set

• 8,712 patients 21-64 years of age were seen in the adult ED

• 94.0% compliance rate with the HIV testing law
Discussion

• Our findings demonstrate that the effect of an electronic hard-stop alert was very effective at increasing documentation of offering an HIV test, as well as increasing the number of HIV tests performed.

• Age was a significant predictor of testing, with younger patients more likely to be offered a test than older patients.

• Gender was a significant predictor for offering an HIV test.
Points for further Study

- Increase in Detection of HIV+
- Cost-effectiveness
- Effect of this Policy on Congestion and LOS in the ED
Conclusion

• Usefulness and effectiveness of electronic “hard-stop” alerts for implementing mandatory screening tests in the ED
• “Hard-stop” alert significantly improved compliance with the HIV testing law
• Significant increase in the number of HIV tests performed
• Even if providers did not have a “hard stop” alert but had exposure to the intervention were more likely to offer their patients’ an HIV test
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The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.
## Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ED Treated-and-Released Patients</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED Treated-and-Released Patients</td>
<td>7048</td>
<td>6706</td>
</tr>
<tr>
<td>HIV Test Ordered</td>
<td>136 (1.9)</td>
<td>583 (8.7)</td>
</tr>
<tr>
<td>HIV Test Not Offered</td>
<td>18 (0.3)</td>
<td>374 (5.6)</td>
</tr>
<tr>
<td>HIV Test Offered and Declined</td>
<td>298 (4.2)</td>
<td>5348 (79.8)</td>
</tr>
<tr>
<td>No Documentation</td>
<td>6596 (93.6)</td>
<td>401 (6.0)</td>
</tr>
<tr>
<td>Compliance</td>
<td>452 (6.4)</td>
<td>6305 (94.0)</td>
</tr>
<tr>
<td><strong>Admitted Patients from the ED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admitted Patients from the ED</td>
<td>1946</td>
<td>2006</td>
</tr>
<tr>
<td>HIV Test Ordered</td>
<td>63 (3.2)</td>
<td>223 (11.1)</td>
</tr>
<tr>
<td>HIV Test Not Offered</td>
<td>8 (0.4)</td>
<td>120 (6.0)</td>
</tr>
<tr>
<td>HIV Test Offered and Declined</td>
<td>45 (2.3)</td>
<td>549 (27.4)</td>
</tr>
<tr>
<td>No Documentation</td>
<td>1830 (94.0)</td>
<td>1114 (55.5)</td>
</tr>
<tr>
<td>Compliance</td>
<td>116 (6.0)</td>
<td>892 (44.5)</td>
</tr>
</tbody>
</table>