Violence Risk Screening in the Emergency Department: Comparing the Predictive Validity of a Statistical Model to Nurses Clinical Judgment

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Acknowledgements

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• APA Scholarship 2013
• RMH Triage nurses who participated in observations
• ED Nurse Manager Liz Virtue
• Violence in ED Action Group
• Rebecca Waite - ED Nurse Educator
• Di Frew- Community Representative
Research Questions

• Can an integrated decision support process for violence risk screening at triage be successfully developed and implemented?

• Can a statistical model be developed to identify who is at risk?

• Can triage nurses accurately identify who is at risk of violence on arrival?
➢ Alert system identified patients correctly but tool needed refining and prevention was required once at risk patients were identified (Kling et al., 2006).

➢ Reduction in violence was not sustainable (Kling et al., 2011).

➢ Repetitively disruptive patients 96.1% reduction in violence- a flag system was used and focus on prevention N=48 (Drummond et al., 1989).

➢ Stare, Tone, Anxiety, Mumbling and Pacing (Luck et al., 2007).

➢ Focus Groups, what do you do once a person is identified as at risk and how ED staff see levels of risk (Daniel & Gerdtz, 2009).

# Existing Violence Risk Screen

**Triage**

**Triage Date:** 12 June 2012

**Arrival Date:** 12 June 2012

**Arrival Time:** 15:00

**Time:** 15:00

**Triage Comments:**
- [ ] Appears intoxicated
- [ ] Prevented Problem
- [ ] Alcohol-related problem
- [ ] Pressed Vital Signs?
  - [ ] Yes

**Triage Category:**
- [ ] Emergency
- [ ] ED Clinical Support
- [ ] ECATT
- [ ] Risk Screening?
  - [ ] Yes
  - [ ] No

**Triage Nurse:** marie gerdts

**Triage Score:**
- [ ] 9

**Available:**
- [ ] Yes

**Wait:**
- [ ] No

---

**Aggression Screening**

**Clear All**

**Any thoughts of harming self or others?**
- [ ] Yes
- [ ] No

**Any weapons or dangerous items in possession?**
- [ ] Yes
- [ ] No

**Involved in any violent incidents recently?**
- [ ] Staff Identified High Risk of Violence/Aggression
- [ ] No

**Cancel**

**Finish**

---

**Next action**

- [ ] Filter
- [ ] Soft

**Locations**

- [ ] Fielding, N
- [ ] Sutherland, Lucius
- [ ] Molenda, Neil
- [ ] Pavlidis, Angela
- [ ] Westen, Fiona
- [ ] Gunn, Jody Nicole
- [ ] Smith, Wayne John
- [ ] Aquilina, Caterina
- [ ] Steinhaus, Andrew

**ATN**

- [ ] NA

**WP/0**

- [ ] NA

**W/P**

- [ ] NA

**W/P/Q**

- [ ] NA

**Simmons, Barbara Joan**

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**Symphony Desktop 2.29.1.5 (Testing)**

**File**

- [ ] Edit
- [ ] View
- [ ] Tools
- [ ] System
- [ ] Window
- [ ] Help

---

**Start**

**Internet Explorer**

**Tables INS June 1...**

**Document3 - Microsoft...**

**Document4 - Microsoft...**

**Microsoft Excel**

**Symphony Desktop 2...**

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**Date:** 12 June 2012
Aims
1. Determine acceptability and useability
2. Integrate VRS into triage nurse practice
3. Compare 6 months matched data (Code Grey + Clinical)

Method

Observation of Triage nurse practice (N=167)

Consumer consultation (N=19)

Retrospective audit of Code grey data (N=1959)
65.6% (623/950) arrived by ambulance

67.3% (639/950) were male

37% (354/948) were allocated to the emergency stream

56.4% (536/950) had a triage category of 3

37% (350/950) were referred for a mental health assessment
**Frequency of presentation, code grey response, and use of hospital alert**

<table>
<thead>
<tr>
<th>Presentation frequency</th>
<th>Patients (N=857)</th>
<th>Code grey $^1$ (N=1796)$^3$</th>
<th>Use of hospital alert $^2$ (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One presentation and one code grey</td>
<td>498</td>
<td>498</td>
<td>9</td>
</tr>
<tr>
<td>Two or more presentations requiring at least one code grey</td>
<td>105</td>
<td>577</td>
<td>11</td>
</tr>
<tr>
<td>One presentation with 2 or more code greys</td>
<td>254</td>
<td>721</td>
<td>5</td>
</tr>
</tbody>
</table>

1. Code Grey is called by staff when they require security staff to attend to manage the potential or actual risk of clinical aggression.

2. A hospital alert is added to a patients file when a risk is identified on previous admission.

3. There were an additional 163 code greys that were not matched to a clinical presentation due to lack of information.
## Significant Factors and Odds Ratio for a Code Grey Response

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p value</th>
<th>OR</th>
<th>95% CI. OR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode of Arrival</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulance</td>
<td>1.929</td>
<td>0.122</td>
<td>251.495</td>
<td>1</td>
<td>.000</td>
<td><strong>6.88</strong></td>
<td>5.421 8.732</td>
</tr>
<tr>
<td>Police</td>
<td>2.944</td>
<td>0.197</td>
<td>222.36</td>
<td>1</td>
<td>.000</td>
<td><strong>18.997</strong></td>
<td>12.901 27.973</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.701</td>
<td>0.1</td>
<td>49.16</td>
<td>1</td>
<td>.000</td>
<td><strong>2.016</strong></td>
<td>1.657 2.452</td>
</tr>
<tr>
<td>ECATT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seen by ECATT</td>
<td>2.458</td>
<td>0.126</td>
<td>382.71</td>
<td>1</td>
<td>.000</td>
<td><strong>11.683</strong></td>
<td>9.133 14.946</td>
</tr>
<tr>
<td>Presenting Complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Related</td>
<td>0.263</td>
<td>0.178</td>
<td>2.174</td>
<td>1</td>
<td>.140</td>
<td>1.3</td>
<td>0.917 1.843</td>
</tr>
<tr>
<td>Drug/Alcohol</td>
<td>1.021</td>
<td>0.18</td>
<td>32.258</td>
<td>1</td>
<td>.000</td>
<td><strong>2.776</strong></td>
<td>1.951 3.948</td>
</tr>
<tr>
<td>CNS disturbance</td>
<td>0.413</td>
<td>0.148</td>
<td>7.738</td>
<td>1</td>
<td>.005</td>
<td>1.511</td>
<td>1.13 2.02</td>
</tr>
<tr>
<td>ED Length of Stay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minutes</td>
<td>0.001</td>
<td>0</td>
<td>59.83</td>
<td>1</td>
<td>.000</td>
<td>1.001</td>
<td>1.001 1.002</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years</td>
<td>-0.025</td>
<td>0.003</td>
<td>93.907</td>
<td>1</td>
<td>.000</td>
<td>0.976</td>
<td>0.971 0.981</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.727</td>
<td>0.162</td>
<td>1257.244</td>
<td>1</td>
<td>.000</td>
<td>0.003</td>
<td></td>
</tr>
</tbody>
</table>
Violence Risk Screening Decision Support Process

Actuarial Risk Factors

Static factors (7%)
• Eg. Mental health assessment or arriving with police.

Clinical Judgement

Dynamic factors 56%
(Observable warning signs)
• Lack of cooperation
• Verbal abuse or threats of violence
• Intrusion into personal space

Violence risk screening decision support (56%)
## Predictive analysis (N=30122)

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower Limit</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>56.36%</td>
<td>51.66</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>97.28%</td>
<td>97.08</td>
</tr>
<tr>
<td><strong>Positive predictive value</strong></td>
<td>24.13%</td>
<td>21.61</td>
</tr>
<tr>
<td><strong>Negative predictive value</strong></td>
<td>99.32%</td>
<td>99.21</td>
</tr>
<tr>
<td><strong>Positive likelihood ratio</strong></td>
<td>20.69</td>
<td>18.62</td>
</tr>
<tr>
<td><strong>Negative likelihood ratio</strong></td>
<td>0.45</td>
<td>0.40</td>
</tr>
</tbody>
</table>
Number of Patients Identified at Risk

- Nov-12
- Dec-12
- Jan-13
- Feb-13
- Mar-13
- Apr-13
- May-13
- Jun-13
- Jul-13
98% physical and 76% mechanical
Use of meds reduced

Total Number of Coercive Interventions used at each Code Grey Response

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>399</td>
<td>243</td>
<td>205</td>
<td>57</td>
</tr>
<tr>
<td>Post</td>
<td>395</td>
<td>140</td>
<td>219</td>
<td>143</td>
</tr>
</tbody>
</table>
Key Findings of this Thesis – Evaluation

• Triage nurses identify 56% of patients who will require a Code Grey on arrival and staff were forewarned of the risk of violence prior to 61% of Code Greys

• iPM alert use increased and resulted in staff being forewarned prior to 24% of Code Greys (↑ from 7%)

• Not all patients will have warning signs of violence

• Use of coercive interventions has increased

• Significant reduction in the duration of Code Grey responses

• No ↑ in the number of Code Greys or presentations who required a Code Grey

Is it quicker to restrain now and ask questions later?
Access to Clinical Care

- No change in time from triage to review by mental health \( (p<.118) \).

- Patients who have a Code Grey are seen more quickly by medical staff \( (p<.002) \).

- LOS for patients who have a Code Grey has increased \( (p<.001) \).

- Reduced frequency of Code Greys at triage following the introduction of violence risk screening \( (p<.001) \).

- There was a significant increase in the median time from triage to the first Code Grey following the introduction of violence risk screening \( (p<.001) \).
Limitations

➢ Not all violence/aggression will require emergency response = incomplete data, no severity measure
➢ Success depend on technology and usability
➢ Focus on ED only, yet there are other ward areas
➢ Identifying prevention strategies remains unknown
➢ VRS is one strategy in an organisational approach for prevention

➢ Risk factors for a Code Grey response have been identified

➢ There are a small proportion of patients that account for several code greys

➢ Screening must be integrated into clinical practice-setting/population

➢ Confirms the problem of violence in complex, and research and testing of interventions specific to ED is warranted

➢ Potential to focus on cultural change and interventions such as Safewards
Thank you