Intrinsic Configuration of Alarm Parameters
A Quality Improvement Project to Attenuate Non-Actionable Alarms in a Neurosciences Critical Care Unit

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Background/Clinical Significance
Detecting, interpreting, and intervening in response to physiologic alarms are essential tasks of a nurse.

Prior to this project the physiologic monitor alarm settings in the Neurosciences Critical Care Unit (NCCU), a 24-bed critical care unit in an academic medical center, produced an average of 20,479 physiologic alarms per week.

Frequent alarms can desensitize nurses, leading to alarm fatigue and increased response times to or neglect of critical alarms. Skills in alarm management are taught in orientation of new staff and are not reviewed regularly. A multidisciplinary team undertook a quality improvement project, translating evidence-based alarm configuration guidelines into clinical practice.

Pre-Intervention Alarm Data

<table>
<thead>
<tr>
<th>Most Frequent Alarms</th>
<th>Ave. Number / Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Systolic Pressure (High and Low)</td>
<td>3852</td>
</tr>
<tr>
<td>Heart Rate (High)</td>
<td>3135</td>
</tr>
<tr>
<td>Arterial Mean Arterial Pressure (High and Low)</td>
<td>2369</td>
</tr>
<tr>
<td>SpO2 Probe Searching</td>
<td>2167</td>
</tr>
<tr>
<td>Cardiac Leads Fail</td>
<td>2155</td>
</tr>
<tr>
<td>Arterial Diastolic Pressure (High and Low)</td>
<td>2089</td>
</tr>
<tr>
<td>SpO2 (Low)</td>
<td>1787</td>
</tr>
<tr>
<td>Check ETCO2 Adapter</td>
<td>1564</td>
</tr>
<tr>
<td>Heart Rate (Low)</td>
<td>1046</td>
</tr>
</tbody>
</table>

Results

SpO2 low alarm is triggered after 15 seconds (instead of 5 seconds)
Diastolic blood pressure alarm defaulted to OFF
SpO2 probe search audible alarm defaulted to OFF; visual alarm remains
Detect pacing mode defaulted to ON

Average Alarms/Bed/Day (by month)

Total Alarms (by month)

Review Of Literature
Intrinsic alarm management is an evidence-based practice that yields alarm reduction by adjusting or eliminating alarm parameters based on unit specific patient population characteristics and risks. The literature confirms that intrinsic alarm configuration is safe and effective (Graham & Cvach, 2010).

A study conducted by Mammone (2014) demonstrated that by re-configuring two parameters (lower SpO2 low-limit threshold and increase alarm delay), it has resulted in significant reduction in SpO2 alarms (p <0.001) while maintaining patients' safety.

Conclusions

- Analysis of alarm data collected for two months prior and two months after the re-configuration has shown a 43.1% (95% CI 4208.3 – 12472.2, p < 0.0023) reduction in overall alarms.
- Data has also demonstrated an incremental decrease in total alarms per month.
- There were no reports of patient harm associated with default alarms adjustment in the unit.

Recommendations

- Obtain baseline unit-based alarms incidence data to review and analyze the baseline frequency of physiologic monitor alarms.
- Utilize published recommendations to re-configure default alarm parameters that reflect characteristics and risks of a specific patient population.
- Collaborate with medical and nursing staff, along with clinical engineering to review and approve the configurations.