Improving the Communication of Critical Action Values in Intensive Care:
A DMAIC Approach

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Type: Acute Care Hospital
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**IDENTIFICATION:**

Critical Action value management is an element of performance (EP) in the Joint Commissions national patient safety goal of improving communication among caregivers. Incomplete communication of critical values contributes to delays or inadequate care delivery to patients. In October, November and December of 2007 we were 80% noncompliant with documented communication of the current critical action process. The problem occurred during communication between the lab, nursing and the Licensed Independent Practitioner when critical values were identified. Delay or miscommunication of critical values can result in death, additional procedures and increased length of stay. Improved communication reduces liability costs, decreases length of stay and improves the timeliness of care and patient safety.

Our Goal was to reduce the time to communicate critical values to the Licensed Independent Practitioner to less than 45 minutes. The team focused on the communication time of critical values identified in the department of chemistry to the 20 bed ICU and the Licensed Independent Practitioners who are caring for those patients. The Process started with the identification of the critical value in the Chemistry lab and ended when the practitioner received the result and decided to act on or not act on the value. The process of running the test and the practitioner’s action/order related to the critical value were out of bounds for this project.

**PROCESS:**

DMAIC (define, measure, analyze, improve and control) methodology was used to define the scope and contributing factors of the delay in communication of critical action values. The DMAIC team consisted of representatives from nursing, medicine, operational process improvement, information systems, communications and Lab. The team reported to executive sponsors as needed. The team worked to identify current process flow, review policy, define performance standards, identify vital causes of communication delay and developed a data collection plan. The team then brainstormed and identified possible solutions to the causing factors of the communication delay. Rapid cycle testing was performed to test the solution proposals and follow up data was collected.
SOLUTION:

Three key improvements were made following rapid cycle testing and data collection. These included changes to the communication process flow involving critical action values, policy updates and implementation of a control plan.

The Critical Action Value Policy changed to reflect current practice around critical action value treatment thereby removing outliers leading to unnecessary delays in the communication process. Implementation of a tiered communication plan enables the lab to directly reach the bedside caregiver prior to calling the unit station. This is the most direct approach for communication to the providers whom can directly intervene and respond to the critical values in a timely manner. In order to ensure the process remains intact we will poll the medical staff bi-annually to ensure treatment is occurring in a timely fashion. We will also record those events in which communication could not be directly provided to the bedside care giver and review as needed. The process will move house wide to include all laboratory values and inpatient nursing units.

OUTCOMES:

The solutions have contributed to improving teamwork as well as the quality and timeliness of communication among caregivers. Following implementation of identified solutions the mean communication time of critical action values in ICU was 6.57 minutes (n=7) as compared to 23.2 minutes (n=31) prior to implementation of change. There was also a decrease in the amount of values requiring communication to a licensed independent practitioner following policy change implementation (n=31 to n=7).

Before Implementation of Changes

<table>
<thead>
<tr>
<th>LB</th>
<th>Target</th>
<th>USL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Sample Mean: 23.1935</td>
<td>Sample N: 31</td>
<td>Shape: 1.64891</td>
</tr>
</tbody>
</table>

After Implementation of Changes

<table>
<thead>
<tr>
<th>LB</th>
<th>Target</th>
<th>USL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Sample Mean: 6.57143</td>
<td>Sample N: 7</td>
<td>StDev (Within): 2.65957</td>
</tr>
</tbody>
</table>

Process Capability of Y

Calculations Based on Weibull Distribution Model

Overall Capability

Z.Bench: 2.07
Z.USL: -
Z.LB: -

Potential (Within) Capability

PPM < LB: 0.00
PPM > USL: 0.00
PPM Total: 0.00

Expected (Overall) Capability

PPM < LB: 0.00
PPM > USL: 0.00
PPM Total: 0.00

Expected Overall Performance

Cp: 0.12
Cpk: 6.75
Z.USL: 20.26