

Pneumonia Care – Antibiotics Within 6 Hours: Improve Compliance to the Pneumonia Bundle

Problem: Since the inception of the CMS HQID project, the Pneumonia composite score has been in the 9th or 10th decile, which poses a risk of monetary penalty to the organization. In reviewing the CMS HQID data for compliance with Pneumonia indicators it has been noted that an acute care adult hospital is at 72% for the particular indicator of “Antibiotics to be given within 6 hours of arrival” during fiscal year 2006.

Project: A team was formed to conduct a Six Sigma DMAIC project to understand root causes of non-compliance to the Pneumonia care bundle component of receiving antibiotics within 6 hours of arrival to the ED. The project team consisted of multiple disciplines and departments responsible for surgical care. The goal of the project was to improve the observed rate of compliance for “antibiotics given within 6 hours of arrival” from 72% to 90% by March 2008, and to position the hospital to achieve a monetary Attainment Award and Top Improvement Award from CMS.

Define - In order to understand the needs of customers and stakeholders, team members gathered the voice of the customer from ED staff, providers and radiology staff using a survey to begin formulating potential root causes of non-compliance.

Measure - The main deliverable from the Measure phase is to understand the current state condition. After walking through the process and interviewing stakeholders, the project team created a current state detailed process map. The process map provided a visual representation of how the patient and the patient’s information flowed from arrival to administration of the antibiotics. The project team created a data collection plan which described the questions to be answered and the data that needed to be collected in order to define baseline performance. After data analysis and creating cause and effect diagrams, the team determined that the potential root causes were the following:

- X1:** Incomplete/inaccurate nursing documentation causes non-compliance with the initial antibiotic within the 6 hours indicator.
- X2:** Patients not flagged as Pneumonia alerts causes non-compliance with the PN-5 indicator.
- X3:** The long delay in “x-ray reading available to antibiotic administered” causes non-compliance with the PN-5 indicator.
- X4:** Indicator compliance is directly related to daily staffing ratio’s in relation to ED census.
- X5:** Arrival type (walk-in or EMS) affects antibiotic administration time.
- X6:** Awaiting physician assessment causes delay in antibiotic administration.
- X7:** The long delay in “x-ray completed” to “reading available” causes non-compliance with PN-5 indicator.

Analyze - The main deliverable of the Analyze phase was to identify the vital few X’s or root causes that prohibit 100% compliance. The team tested the potential root causes using statistical

analysis tools such as regression, Mann-Whitney test and 2 Sample T tests. The root causes proven to be true included the following:

The vital few X's for improving Pneumonia compliance included:

- ✓ **X1:** Nursing documentation impacts compliance rates.
- ✓ **X2:** Pneumonia alerts increase compliance with the PN-5 indicator.
- ✓ **X3:** X-ray Reading available to antibiotic administered correlates to greet time to antibiotics administered.
- ✓ **X4:** ED census impacts antibiotic administration time (out of scope).
- ✓ **X7:** X-ray completed to reading available correlated to greet time to antibiotic administration.

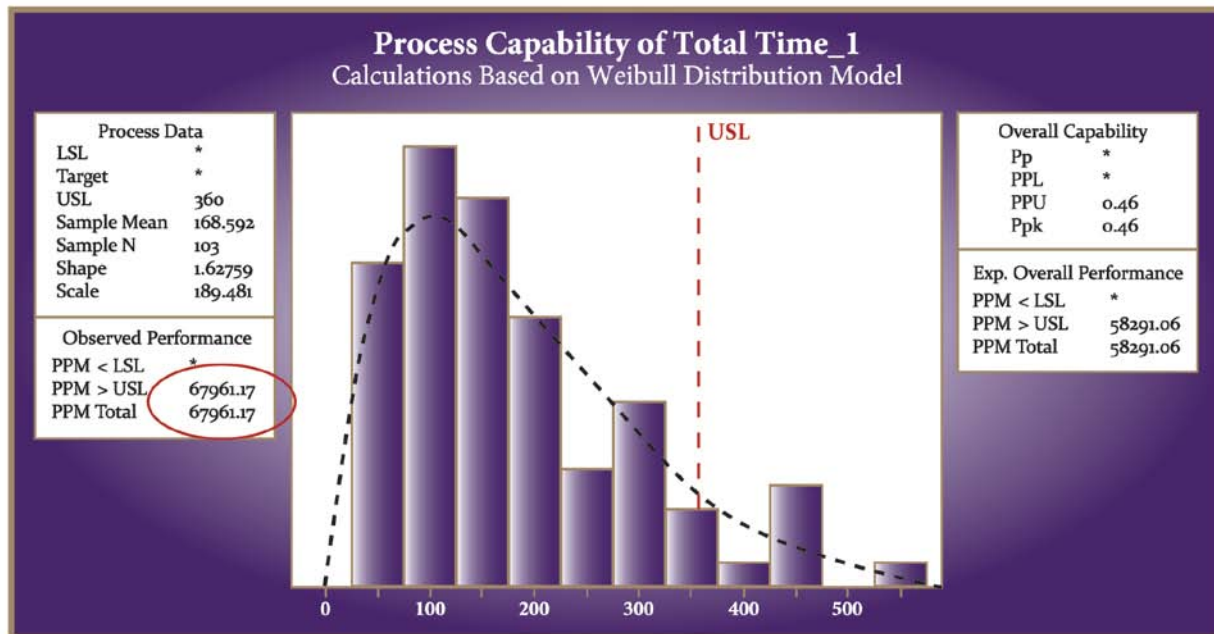
Improvements - The project team performed best practice research and brainstormed potential solutions to the vital few X's. Once the list of solutions were affinitized and prioritized using tools such as a weighted selection matrix and risk assessment, the team created an implementation plan and communication/training plan. The improvements selected included the following:

1. Create a Pneumonia diagnosis algorithm to improve identification of Pneumonia and documentation at triage.
2. Create a standardized **Red Rule** form that provides checklist mistake proofing to aid in the management of the patient through the length of stay.
3. Create a visual and auditory management system from Radiology to the Emergency Department to ensure faster turnaround times for chest x-ray results and notification.
4. Education, training and behavior-based monitoring for all staff in new processes.

Control - The purpose of the control plan was to maintain process changes and monitor results. The project team decided to create an observation audit in order to receive compliance performance data in real time. As part of the control plan, the process owner will report back status updates and control plan data to the project champion and leadership team to ensure sustainability and long-term results.

Results: The Emergency Department improved their compliance with the antibiotic component of the Pneumonia care bundle from 72% to 93%, exceeding the project goal by 3%.

The results obtained from the process control observation data are on the next page.



FOR MORE INFORMATION:

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