

Multidisciplinary Approach to Reduce Ventilator Associated Pneumonia

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CONTEXT

As part of a quality improvement effort to reduce hospital acquired infections (HAI) at Thomas Jefferson University Hospital (TJUH), a multidisciplinary team consisting of physicians, staff nurses, clinical nurse specialists, respiratory therapists, pharmacists, infection control practitioners and administrators representing all special care units was charged with reducing ventilator associated pneumonia rates to zero.

PROBLEM

Ventilator-associated pneumonia (VAP) is a leading cause of preventable deaths due to infection and is associated with increased hospitalization and treatment costs. In 2007, the VAP rates at TJUH ranged from 6.77 to 10.57 per 1,000 ventilator days.

AIM

Develop an evidence-based VAP prevention bundle in an effort to achieve a zero infection rate.

INTERVENTION

- Maintain head of bed > 30 degrees-Perform a daily sedation vacation
- Daily assessment of readiness to wean from mechanical ventilation
- Perform oral care Q4 hours with chlorhexidine mouth care Q12 hours
- Endotracheal tubes with subglottic secretion drainage
- Compliance monitoring of all bundle elements

STRATEGY FOR CHANGE

The VAP working group clarified definitions, standardized procedures, and employed educational strategies throughout all disciplines on the aspects of the VAP prevention bundle. Compliance results and VAP rates were reviewed monthly with unit directors and frontline staff.

MEASUREMENT OF IMPROVEMENT

The pre-intervention time period was Q1 of 2006 through Q4 of 2007 and the post-intervention time period began in Q1 2008 and continued through Q2 2012.

- VAP rate per 1,000 ventilator days
- Hospital cost savings associated with decreased VAP rate
- Variable cost associated with VAP diagnosis. The variable cost was calculated using 2010 administrative data from time of infection and is based on average accumulated cost of 4 days post-infection.

LESSONS LEARNED

The development of a collaborative team with the intent to implement evidence-based practice elements can lead to a significant decrease in ventilator-associated pneumonia rates and associated hospital costs. Implementation of the VAP bundle demonstrate that dedication across disciplines to a common goal results in high quality patient care.

RESULTS

The I-MR Chart above displays the individual (I) trend and Moving Range (MR) of the data points. The MR indicates a significant shift in VAP rate in Q2 2008, one quarter after bundle implementation. The significant favorable shift in VAP rate, has been sustained for 16 consecutive quarters. The mean VAP rate decreased from 8.33 (pre-intervention) to 2.21 (post-intervention) ($p < 0.000$). In 2010, we calculated the variable cost for a patient with a VAP diagnosis to be \$2,462 per day, an increase of \$852 from a non-VAP patient. The literature reports a 7-day increase in length of stay associated with a diagnosis of VAP. Therefore our estimate for cost associated with a VAP diagnosis is \$17,234 per patient ($\$2,462 \times 7$ days). The mean cost decreased from \$407,583 (pre-intervention) to \$93,995 (post-intervention) ($p < 0.000$).

