Creative Change Management and Educational Strategies Ensure Compliance with VAP-Prevention Bundle and Adherence to NPSG #13 and Significantly Decreased VAP Rates in 2 Adult ICUs

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Abstract

Title:
Intensive change-management and enhanced compliance results in successful and consistent implementation of ventilator bundle and oral care protocol, 0 VAP for over 685 days, and substantial economic savings

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Background:
Ventilator-associated pneumonia (VAP) is calculated per 1,000 ventilator days, and ranges from 2.1 to 10.7, making it the most frequently reported healthcare-acquired infection in mechanically ventilated patients.[1] Patients intubated >72 hours have VAP incidence rates of 20%.[2] Prevalence rates are between 10% and 20%.[3] Two 16-bed Intensive Care Units (ICUs) noted that after implementation of the Institution for Healthcare Improvement (IHI) ventilator bundle, the ICUs continued to have cases of VAP. A clinical practice specialist from the Department of Respiratory Care conducted a literature review to determine best practices for VAP prevention, and implemented a protocol incorporating additional oral care, change management, and a focus toward ventilator bundle and oral care compliance.

Methods:
The protocol consisted of the IHI bundle and oral care with cetylpyridinium chloride suction toothbrush and hydrogen peroxide (H2O2) and cetylpyridinium chloride swabs q2h oral care kit (changed from prior H2O2 oral care kit); intensive change-management strategies including evidence-based caregiver bundle and oral care protocol education and multi-disciplinary team approach; compliance tracking; awards and incentives for protocol compliance; family education and “family involvement posters”; ongoing qualitative metrics to determine need for additional education and change management; and quantitative metrics to track compliance in relation to VAP rates.

Results:
- Compliance with oral care protocol increased from 30% in July 2006 to 96% by end-2008
- Compliance with oral care was 60% in 04/07 and the VAP rate was 12.82; however, in 05/07 compliance rose to 72% and continued with an upward trend, with VAP rates dropping to 0 through 2008
- 650 days with 0 VAPs indicate 28.4 VAPs were prevented and 14 lives possibly saved
- IHI bundle compliance is 100%

Conclusion:
Multidisciplinary change-management is essential to ensure compliance with a ventilator bundle and oral care protocol and prevention of VAP. Cost estimates range widely from $11,897 to $150,841 per case.[4,5] Savings are calculated based on prevention of 28 VAPs and a cost per case of $40,000, resulting in an estimated savings of $1,120,000.

1. Edwards JR, et al. *Am J Infect Control* 2008;36:609-26
2. Piazza O, et al. *Panminerva Med* 2005;47:265-7
3. Safdar N, et al. *Crit Care Med* 2005;33:2184-93
4. Warren DK, et al. *Crit Care Med* 2003;31:1312-7
5. Kollef MH, et al. *Chest* 2005;128:3854-62

Results

A statistical analysis was conducted to compare VAP rates before and after intervention. Our hypothesis was that VAP rates would decrease as compliance with the VAP-prevention bundle increased between pre- and post-intervention time periods.

The time period for comparison was July 2006 through March 2007 for the pre-intervention period, April 2007 was a “wash-out” month (due to full initiation of change management practices), and May 2007 through July 2009 was the post-intervention period. With data from over 13,000 VAP days, there was adequate statistical power to detect an absolute difference as small as 12.5% (i.e., VAP rate per 1000 ventilator days) as statistically significant with an alpha level of 5% and a beta level of 20%.

Fisher’s exact test was used to assess the change in the VAP rate over time, and counts per VAP days were presented as the VAP rates. In addition, the test statistics and *P* values were reported. A *P* value <.05 was considered statistically significant.

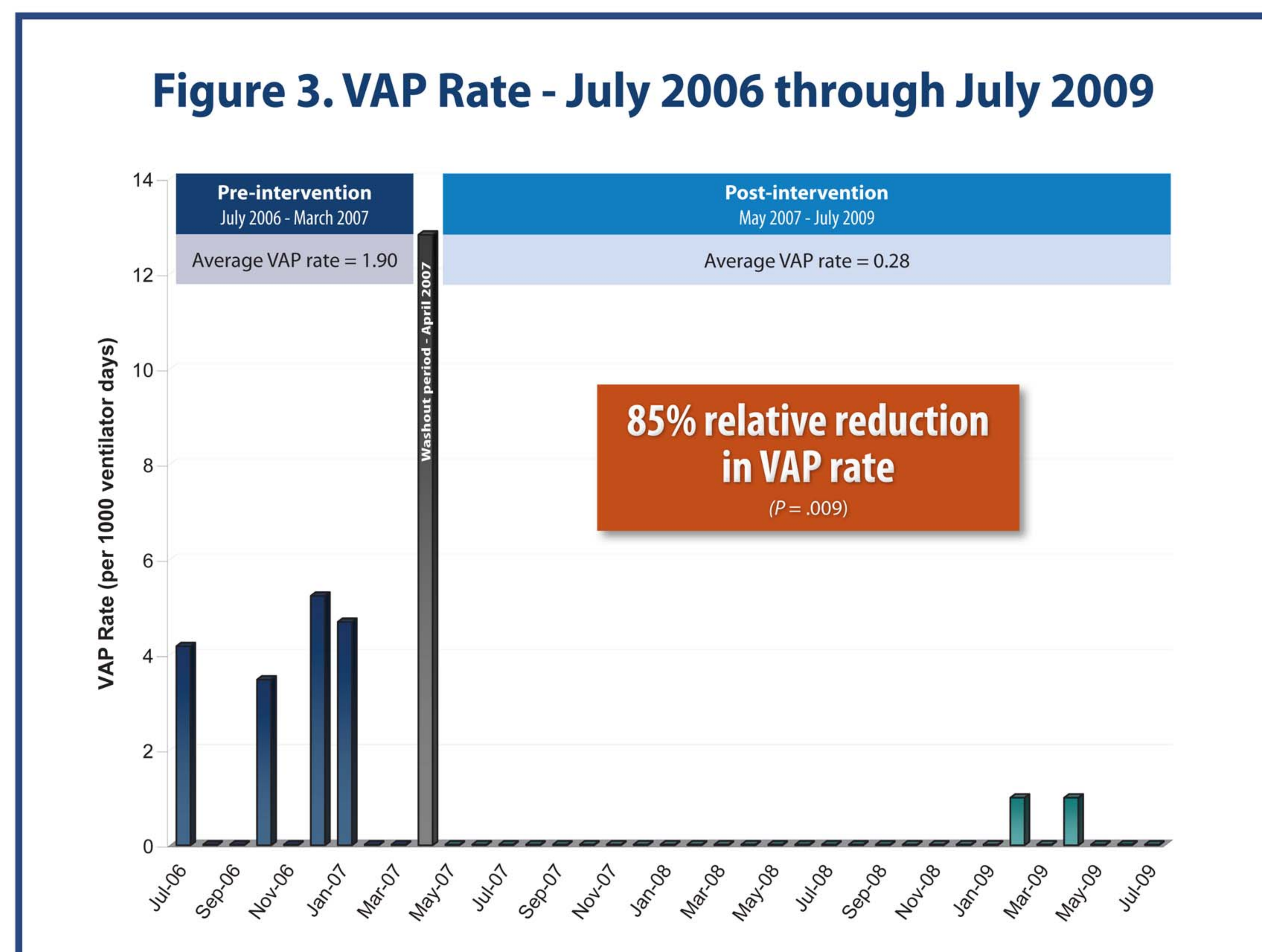
The data revealed a reduction in the VAP rate from 1.9 (4/2089 per 1000 ventilator days) to 0.28 (2/7229 per 1000 ventilator days). The **relative reduction was 85%,** and the result was statistically significant (test statistic = 6.76, *P* = .009) (Figure 3).

Introduction

Ventilator-associated pneumonia (VAP) is a hospital-acquired infection occurring in high-risk patients, and the most recent national report estimates that VAP rates range between 2.1 and 10.7 incidents per 1000 ventilator days.[1] VAP is associated with increased morbidity and mortality,[2] an extended length stay in the intensive care unit (ICU),[3] and increased economic expenditures.[3,4] Preventive bundles of care have been recommended by many associations, including, but not limited to, the Institute for Healthcare Improvement (IHI)[5] and the Society for Healthcare Epidemiology of America (SHEA).[6]

In addition to standard clinical prevention measures for VAP, our facility implemented the IHI VAP-prevention bundle of care in May 2007 which included elevation of the head of the bed to between 30 and 45 degrees; daily “sedative interruption” and assessment of readiness to extubate; peptic ulcer disease prophylaxis; and deep venous thrombosis prophylaxis unless otherwise indicated. We also initiated regular oral care as part of the VAP-prevention bundle. We continued to note incidents of VAP, and a quality improvement initiative was started in 2007 to incorporate appropriate change-management and educational strategies into our preventive bundle of care.

The Joint Commission National Patient Safety Goal 13 (NPSG #13) was published in January 2007, which strongly recommends that facilities encourage patients’ active involvement in their own care as a patient safety strategy and defines and communicates the means for patients and their families to report concerns about safety and encourages them to do so.[7] This was viewed as an excellent opportunity to partner with patient families on VAP prevention, and a comprehensive plan was implemented to ensure compliance with the prevention bundle and to empower staff and patient families to participate in bundle compliance.



Materials & Methods

A clinical practice specialist from the Department of Respiratory Care of two 16-bed ICUs conducted an extensive literature review to determine best practices for prevention of VAP, change management, and educational strategies for ensuring successful prevention efforts. The results of this literature review revealed the need for the following:

1. Increased tracking of compliance with the VAP prevention bundle
2. Additional compliance tracking to ensure q2h oral care
3. Intensive change-management strategies, including evidence-based caregiver bundle and oral care protocol education using a multidisciplinary team approach
4. Staff empowerment and awards for protocol compliance
5. Family education and involvement posters
6. Ongoing qualitative metrics to understand the need for additional education and change management and to identify knowledge gaps that should be addressed
7. Quantitative metrics that demonstrate compliance and VAP rates and the need to visually share this information with staff on an ongoing basis

Comprehensive education

The clinical practice specialist leading this quality improvement initiative instituted comprehensive and mandatory in-servicing for all respiratory therapists. Inservicing re-emphasized the importance of the VAP-prevention bundle and appropriate q2h oral care, and the preventable nature of VAP. The facility concomitantly introduced hourly rounds, and respiratory staff and nurses met frequently to provide updates on patients and clinical care, and communicated the needs of each patient on an individual basis. A best-practices award program was also initiated, whereby clinicians who adhered to VAP-prevention protocols and bundles were awarded with a gift certificate valid at the hospital gift shop. The clinical practice specialist ensured that staff had access to the results of their preventive efforts, which indicated the number of potential VAPs prevented and lives saved.

VAP-prevention bundle and q2h oral care compliance

The clinical practice specialist leading the quality improvement initiative used an Adult Respiratory Performance Improvement Monitor flowsheet (Figure 1) to determine whether the VAP-prevention bundle was being adhered to on an ongoing basis. Furthermore, the individually packaged cetylpyridinium chloride suction toothbrush and hydrogen peroxide and cetylpyridinium chloride swabs q2h oral care kits* were kept at the patients’ bedside. Every time a nurse would take a kit, they would mark the time at which the kit was pulled with a black marker (e.g., 8 am), and the next kit due for the patient remained hanging at the bedside with the appropriate time marked on it. This served as a constant reminder to the nurses and family when the next oral care treatment was due.

Family education and involvement posters

ZAP VAP posters were hung in the patients’ rooms (Figure 2), which described the facility’s promise to them and how the family could help with VAP prevention. These posters received considerable approval from patient families and adhered to the NPSG #13 by enhancing communications with the families of critically ill patients.

Figure 1.
Adult Respiratory Performance Improvement Monitor

Date ________________ Shift ________________

Tooth Fairy ____________ ICU ___ CCU ___ 3S ___ 5C ___

Complete each question for every patient that is on a ventilator. Complete survey based on direct observation and chart review. Review the documentation for the previous 24 hours.

1. Resuscitation bags are hung near the bed/not on the bed?
   ☐ yes ☐ no
2. ZAP VAP! Poster is visible in the room?
   ☐ yes ☐ no
3. Oral cleansing completed every 2 hours in the previous 24 hours (or applicable duration)? Check documentation as well as number of swabs used.
   ☐ yes ☐ no
4. Kits dated, timed and labeled with patient’s name?
   ☐ yes ☐ no
5. Head of bed elevated to at least 30 degrees?
   ☐ yes ☐ no
6. “Y” connector is utilized to provide designated lines for oral care and continuously attached in-line suction.
   ☐ yes ☐ no
7. Ventilator tubing angled downward towards ventilator?
   ☐ yes ☐ no
8. Yankauer is completely covered by white sheath and hung at bedside appropriately.
   ☐ yes ☐ no
9. Ventilator Bundle and Ventilator Weaning Protocols utilized (critical care only).
   ☐ yes ☐ no

Figure 2. Family Empowerment ZAP VAP Poster

Our Promise:

As part of our commitment to providing Excellent Care, we promise to help avoid pneumonias that can occur while on a ventilator by:

- Providing oral care for your loved one every 2 hours, with brushing to clean and swab in between
- Always washing our hands prior to care
- Elevating the head of the bed to at least 30 degrees at all times
- Providing appropriate sedation and making every effort to wean the patient from the ventilator
- Never setting the resuscitation bag on the bed
- Being diligent about keeping the endotracheal tube secure and changing the tape as needed

How You Can Help:

- Wash your hands before caring for your loved one
- Ask the nurse or respiratory care practitioner what you can do to participate in your loved one’s excellent care!

WORKING TOGETHER TO ZAP VAP!
(Ventilator Acquired Pneumonia)

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Conclusions

VAP prevention is a complex effort that should incorporate multidisciplinary change-management and ongoing education. Our facility found that empowerment of staff and patient families was beneficial in ensuring VAP-prevention bundle compliance. Furthermore, the use of a compliance tracking flowsheet, family educational posters, ongoing caregiver feedback and internal communications, and incentives for employing the best practices have proved to be a successful strategy for ensuring patients in our ICUs receive the highest quality of VAP preventive care.

* Q-Care® w/Suction Handle Q2H Oral Cleansing and Suctioning System #6802 (Sage Products Inc., Cary, IL)

References

1. Edwards JR, Peterson KD, Andrus ML, et al. National Healthcare Safety Network (NHSN) Report, data summary for 2006 through 2007, issued November 2008. *Am J Infect Control.* 2008;36:609-626.
2. Ibrahim EH, Tracy L, Hill C, et al. The occurrence of ventilator-associated pneumonia in a community hospital: risk factors and clinical outcomes. *Chest.* 2001;20(2):555-561.
3. Rello J, Ollendorf DA, Oster G, et al. VAP Outcomes Scientific Advisory Group. Epidemiology and outcomes of ventilator-associated pneumonia in a large US database. *Chest.* 2002;22(6):2115-2121.
4. Tablan OC, Anderson LJ, Besser R, et al. CDC; Healthcare Infection Control Practices Advisory Committee. Guidelines for preventing health-care-associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. MMWR Recomm Rep. 2004;53(RR-3):1-36.
5. 5 Million Lives Campaign. *Getting Started Kit: Prevent Ventilator-Associated Pneumonia How-to Guide.* Cambridge, MA: Institute for Healthcare Improvement; 2008. (Available at www.ihi.org.)
6. Coffin SE, Klompas M, Classen D, et al. Strategies to prevent ventilator-associated pneumonia in acute care hospitals. *Infect Control Hosp Epidemiol.* 2008;29 (Suppl 1):S31-S40.
7. The Joint Commission National Patient Safety Goals 2007. Available at: http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/07_bhc_npsgs.htm. Accessed on November 3, 2009.

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