

# Good standards of care research paper example

[Health & Medicine](#), [Stress](#)



## **Ventilator-associated pneumonia**

### Ventilator-Associated Pneumonia

Ventilator-associated pneumonia (VAP), defined as pneumonia that was absent or not developing at intubation, is the second most common hospital acquired infection (Bahrt, 2009, p. 49). It is the most prevalent hospital acquired infection amongst mechanically ventilated patients in critical care units with an estimated 10-20% incidence rate in some hospitals. It affects approximately 28% of patients requiring mechanical ventilation for > 48 hours (Button, Culmer, Southard, & Donaldson, 2005). Patients on mechanical ventilation for > 24 hours are 6 to 21 times more likely to acquire VAP than patients not on ventilator support. VAP is the most severe type of hospital-acquired pneumonia (Ledgerwood et al., 2013, p. 3). The exact mortality attributable to VAP is currently unknown, the condition, however, has the greatest associated mortality rates of all hospital acquired infections (25-50%) (Sandrock & Daly, 2012, p. 811). The condition is also associated with other adverse outcomes such as delayed extubation, increased morbidity, protracted intensive care unit (ICU) and hospital stays, increased use of antibiotics, increased use of healthcare resources, and increased healthcare costs (Sedwick, Lance-Smith, Reeder, & Nardi, 2012, p. 41; Sandrock & Daly, 2012, p. 811). The additional direct costs related to a single VAP case range from \$29, 000 to > \$57, 000. Patients who develop VAP are hospitalized for 4-19 days longer than patients who do not develop the complication.

Prevention of VAP is an important aim of healthcare delivery in ICUs. The percentage of VAP that is preventable is debatable, but there is little doubt

that a significant potential for harm reduction exists (Lambert et al., 2013). An array of strategies and guidelines for preventing VAP have been proposed and implemented to varying degrees in different settings (Sedwick et al., 2012, p. 42). Adherence to VAP prevention guidelines is hampered by lack of knowledge and training on VAP prevention amongst healthcare workers and the inadequacy of infection control programs (El-Khatib, Zeineldine, Ayoub, Husari, & Bou-Khalil, 2010, p. 273). Therefore, VAP remains a major foci of patient safety efforts and quality initiatives in the healthcare setting and has been put forth as a national safety goal (Lambert et al., 2013). The purpose of this paper is to review the current standards of care on, essential nursing interventions for VAP, and the role of respiratory therapists in the prevention of VAP.

The current methods for preventing VAP focus on preventing cross-infections, restricting the use of intubation to when needed and ensuring timely extubation, and minimization of the amount of secretions originating from the oropharynx that enters the airways through the glottis (Lambert et al., 2013). These practices include proper hand washing, personal protective equipment, and implementation of standard precautions. The standard precautions include the ventilator bundle, noninvasive positive pressure ventilation, oral care, continuous removal of subglottic secretions, and maintenance of the cuff pressure of the endotracheal tube (ET) tube. The ventilator bundle, incorporates the following practices: head-of-bed elevation, daily interruption of continuous intravenous sedation, prophylaxis measures for stress ulcers and deep venous thrombosis (DVT), and patient assessment for readiness for weaning with concomitant breathing trials

(Bahrt, 2009, p. 49-50; Sedwick et al., 2012, p. 42). Hospitals can also add other evidence-based strategies to the bundle like tight glycemic control (Lambert et al., 2013). Elevating the head of the bed by 30-40 degrees reduces the chances of aspiration of microbes in oropharyngeal secretions as well as the reflux of gastric secretions into the oropharynx (Bahrt, 2009, p. 49).

Noninvasive pressure ventilation allows delivery of continuous positive airway pressure through a face mask. It is recommended as the initial mode of ventilator support that should be considered for all patients requiring ventilator support (Bahrt, 2009, p. 49). Intubations should only be done when absolutely necessary and extubation done as soon as possible. Reintubations should be prevented if possible. In addition, nasotracheal and nasoenteral tubes should be avoided. After 48 hours, evidence suggests that the mix of microorganisms colonizing the oropharynx and gastrointestinal tract of critically ill patients in the ICU changes dramatically to include predominantly gram-negative pathogens (Sedwick et al., 2012, p. 44). Since microorganisms inhabiting the sinuses, trachea, oral cavity, and stomach are the prime source of bacteria that enter into the lungs, these pathogens contribute to the pathophysiology of VAP. The pathogens gain entry into the trachea and eventually the sterile lower respiratory tract through the following mechanisms: aspiration of oral and gastric secretions, during intubations, following exposure to contaminated equipments, and through formation of biofilms on the endotracheal tube (Bahrt, 2009, p. 49). Therefore, to prevent prevention of oropharyngeal colonization in critically ill patients, comprehensive oral care programs are recommended.

Another current modality in the prevention of VAP is continuous removal of subglottic secretions. It entails removal of secretions that pool in the oropharynx and gastrointestinal (GI) tract particularly in the subglottic space just above the tube cuff of the ET (Bahrt, 2009, p. 49). Overwhelming evidence suggests that aspiration of these secretions, which are usually colonized by pathogens, contributes to the development of VAP (Sedwick et al., 2012, p. 44). Equipments used for removal of these secretions include pre-packaged oral care kits with long catheters for suctioning of pooled secretions and special ET tubes. The special ET tubes have a separate lumen on their dorsal side that open above the cuff exiting to a subglottic suction port (Ledgerwood et al., 2013, p. 3). This port permits continuous suctioning of pooled secretions via low continuous suction (Bahrt, 2009, p. 50). Lastly, maintenance of the ET cuff pressure above 20 cm H<sub>2</sub>O prevents entry of subglottic secretions into the lungs. Although there are currently no regulation standards on VAP, the Center for Medicare and Medicaid Services (CMS) recently included VAP in the list of reasonable preventable diseases. As the CMS has already stopped payments for preventable adverse outcomes like pneumonia, it is also likely that they may stop hospital reimbursements for VAP (Sedwick et al., 2012, p. 41).

The best practice in relation to prevention of VAP is the ventilator bundle. As previously mentioned, it is a package of tested interventions that, when implemented together, improves patient outcomes. The ventilator bundle was first recommended as a best practice in the prevention of VAP by the Institute for Health Improvement (IHI) in 2005 (Sedwick et al., 2012, p. 41). In 2010, the IHI released an updated list listing of concepts that aid in the

prevention of VAP: elevation of the head of patient's beds by 30-40 degrees, prophylaxis for deep venous thrombosis and peptic ulcers, and daily vacation of sedation and evaluation of readiness for extubation. Having been proven effective in an array of studies utilizing different research designs, individual components of the ventilator bundle are evidence-based. Elevation of the head of the patient's bed by 30-45 degrees has been shown to be effective in studies by Drakulovic et al. (1999), as cited in Coffin et al., (2008), Grap et al. (2005), as cited in Sedwick et al. (2012, p. 43), and Metheny et al. (2006) as cited in Sedwick et al. (2012, p. 43) respectively. All of these studies utilized randomized controlled, longitudinal descriptive, prospective descriptive, and cross-sectional observational designs respectively. Prophylaxis against peptic ulcers and deep venous thrombosis are considered standard practices in ICU and other critical care units. They are informed by scientific rationale: prevention of DVT in sedentary patients and lowering of the PH of gastric contents to protect the airway against acidic gastric contents (Sedwick et al., 2012, p. 44). Interruption of daily sedation, coupled with daily assessment of patient readiness for extubation, have been shown to be effective in studies by Girard et al. (2008) as cited in Sedwick et al. (2012, p. 44) and Schweickert et al. (2004) as cited in et al. (2012, p. 44). These studies employed different research, such as randomized control and retrospective designs. Only a few of the studies cited employed the randomized controlled design, which is considered the bullion standard for clinical studies. Conspicuously missing amongst the studies are meta-analytic trials which are construed to present the highest level of clinical evidence.

## **Nursing Interventions**

The essential nursing interventions in the prevention of VAP include head of bed elevation, hand washing after every patient contact, oral care, timely administration of prescribed prophylactic medications for DVT and peptic ulcers, control of contamination of equipments, assessment of patient readiness for extubation together with respiratory therapists, subglottic suctioning, and interruption of sedation on a daily basis. These interventions help address the mechanisms through which VAP develops which are aspiration of subglottic secretions and colonization of the oropharynx and endotracheal tube by pathogenic microorganisms (Sedwick et al., 2012, p. 42). Intubation impairs the body's natural immunity systems by depressing the cough and gag reflexes and clearance of mucocilliary secretions. This leads to the pooling of secretions in the oropharynx and an increased risk of entry of pathogenic microorganisms into the sterile lower respiratory tract (Cooper & Haut, 2013, p. 23; Coffin et al., 2008). Therefore, the above cited interventions are essential because they address the risk factors that increase the probability of developing VAP.

## **Interprofessional Care**

If adherence to recommended strategies for preventing VAP is to be achieved, an interdisciplinary approach to the management of patients on ventilator support is essential. Nurses in the ICU setting have traditionally been given the responsibility for implementing VAP prevention strategies. However, because of a chronic shortage in nurses in the ICU setting, it is particularly important to implement an interdisciplinary approach for the management of patients on ventilator support is essential (Sandrock, 2012).

In addition, respiratory therapists can also provide a significant component of care in patients at high risk for VAP. They are usually involved in the control of endotracheal cuff pressure, prevention of aspiration of subglottic secretions, control of any contamination to ventilator equipment, assessment of patient readiness for weaning, and initiation of spontaneous breathing trials (El-Khatib et al., 2010, p. 272). As such, the components of the ventilator bundle fall squarely within their scope of practice. In addition, studies by Arroliga et al. (2011), as cited in Sandrock and Daly (2012) and Button et al., (2005) suggest that respiratory therapists can also successfully assume the role of providing oral care to intubated patients and documentation of the process. In the Arroliga et al. study (2011), as cited in Sandrock and Daly (2012), it was observed that the transfer of the responsibility for oral care from nurses to respiratory therapists showed more than 97% adherence improvement to standards of oral care. Reductions in VAP (4.27/1,000 ventilator days versus 1.20/1,000 ventilator days) and number of antibiotic days were also noted. Similarly, in the Button et al. (2005) study, respiratory therapists implementation of a two-hourly oral care protocol led to a decrease in VAP rates from 8.2%/1000 days in 2003 to 0% in 2004. This reduction saved the hospital an estimated \$440,000 in costs that would have otherwise been incurred for facility treatment.

## **Conclusion**

This paper has reviewed the current standards and best practices in the prevention of VAP. According to available evidence (Sedwick et al., 2012, p. 41), the ventilator bundle which embodies a group of interventions performed together that are head-of-bed elevation, daily interruption of



continuous intravenous sedation, prophylaxis measures for stress ulcers and deep venous thrombosis (DVT), and patient assessment for readiness for weaning with concomitant breathing trials is the best practice in the prevention of VAP. Adherence to care standards on VAP prevention is variable but CMS may soon be introducing policy changes on hospital reimbursement for VAP that may make it almost mandatory for all hospitals to adhere to these standards. Majority of the interventions for VAP prevention are implemented by nurses. Respiratory care therapists can, however, assume some of the VAP responsibilities such as oral care.

## References

- Bahrt, G. (2009). Current methods for combating VAP. *Nursing Management*, 49-52.
- Button, T. C., Culmer, D., Southard, T., & Donaldson, S. (2005). *Annihilating ventilator-associated pneumonia with a respiratory therapy emphasis on oral care*. San Antonio: AARC.
- Coffin, S. E., Klompas, M., Classen, D., Arias, K. M., Podgorny, K., Anderson, D. J., Yokoe, D. S. (2008). Strategies to prevent ventilator-associated pneumonia in acute care hospitals. Retrieved from <http://www.jstor.org/stable/10.1086/591062>
- Cooper, V. B. & Haut, C. (2013). Preventing ventilator-associated pneumonia in children: An evidence-based protocol. *Critical Care Nurse*, 33(3), 21-30.
- El-Khatib, M. E., Zeineldine, S., Ayoub, C., Husari, A., & Bou-Khalil, P. K. (2010). Critical care: Clinicians knowledge of evidence-based guidelines for preventing ventilator-associated pneumonia. *American Journal of Critical Care*, 19(3), 271-276. Retrieved from <http://www.aacn>.

org/wd/cetests/media/a101903. pdf

Lambert, M., Palomar, M., Agodi, A., Hiesmayr, M., Lepape, A., Ingenbleek, A., Frank, W. (2013). Prevention of ventilator-associated pneumonia in intensive care units: An international online survey. *Antimicrobial Resistance and Infection Control*, 2(9). doi: 10. 1186/2047-2994-2-9

Ledgerwood, L. G., Salgado, M. D., Black, H., Yoneda, K., Sievers, A., Belafsky, P. C. (2013). Tracheotomy tubes with suction above the cuff reduce the rate of ventilator-associated pneumonia in intensive care unit patients. *Annals of Oncology, Rhinology, & Laryngology*, 122(1), 3-8.

Sandrock, C. & Daly, J. (2012). The importance of a multidisciplinary approach to VAP prevention: The role of the respiratory therapist. *Respiratory Care*, 57(5), 811-812. doi: 10. 4187/respcare. 01855

Sedweek, M. B., Lance-Smith, M., Reeder, S. J., & Nardi, J. (2012). Using evidence-based practice to prevent ventilator-associated pneumonia. *Critical Care Nurses*, 32(4), 41-53. doi: [http://dx. doi. org/10. 4037/ccn2012964](http://dx.doi.org/10.4037/ccn2012964)