



# TARGETING VENTILATOR-ASSOCIATED PNEUMONIA

The numbers say it all. Research indicates a patient who contracts ventilator-associated pneumonia (VAP) will experience 9.6 more ventilator days, 6.1 additional days in the intensive care unit, 11.5 more days in the hospital, and incur on average an additional \$40,000 in hospital costs.

But it's the morbidity and mortality statistics associated with ventilator-associated pneumonia that are most troubling. This bacterial pneumonia affects one to two patients in 10 who require mechanical ventilation with endotracheal intubation. About half of the patients who contract VAP will die from it.

There is promise on the horizon, however. The Institute for Healthcare Improvement (IHI) has outlined evidence-based practices that can reduce the incidence of ventilator-associated pneumonia an average of 45 percent. These practices, when bundled together, have benefits that reach even beyond the strong reduction in VAP.

IHI's ventilator "bundle" focuses on four elements of care for ventilated patients:

- Raising the head of the bed between 30 and 45 degrees – Aids in ventilation and prevents aspiration of gastrointestinal, nasal and throat secretions

- Daily "sedative interruption" and assessment of readiness to extubate – Lessening sedation can help wean a patient off the ventilator sooner
- Administering peptic ulcer disease (PUD) prophylaxis – Stress ulcerations are a common cause of gastric bleeding in ICU patients
- Administering deep venous thrombosis (DVT) prophylaxis (unless contraindicated) – Reducing the risk of blood clots in the leg is particularly important for sedentary, critically ill patients

## Process Makes Perfect

When Melissa Lowder, RN, MSN, CCRN, first became aware of the literature on

reducing VAPs and of IHI's ventilator bundle, she knew she'd found a process that would improve the care of ventilated patients. Lowder, an ICU clinical nurse specialist at St. Francis Hospital in Beech Grove, Ind., part of Consorta shareholder Sisters of St. Francis Health Services, said the 600-bed hospital system experienced between five and 11 VAP cases per year through 2004.

"A patient who requires a ventilator to help him or her breathe is already critically ill," said Lowder. "Knowing there are infections that prey on these more susceptible patients puts you on guard for symptoms and makes you vigilant about procedures to keep them protected."

The ICU clinicians at St. Francis had been providing all the elements of care outlined in IHI's ventilator bundle, but not with the consistency outlined in the program. For example, nurses thought they were appropriately elevating the heads of beds, but on measuring the angles, their perceptions of 30 degrees was inaccurate, and often too low. Aiming to improve quality of care, a multidisciplinary team convened to implement the program and set an initial goal of reducing its overall VAP rate.

The team included St. Francis' ICU manager, an ICU clinical nurse specialist, an infection control nurse,

an infectious disease pharmacist, the hospital's quality manager, and ICU respiratory therapy staff. An extensive education program surrounded the program's launch.

"At the time, I heard accounts of other hospitals' goals of zero VAPs," said Lowder. "I thought to myself, 'It's great to have far-reaching goals, but this is impossible. It just can't be done.' And then **we did it**. We went 18 months without a VAP. It's an amazing feeling. Now we know a goal of 'none' is reasonable."

The team made process changes along the way. They put a communication in place between the respiratory department and physicians regarding patients who have a positive screen and are ready to be extubated. The process allows clinicians to extubate patients sooner, without having to wait for physicians to make their rounds.

"When we experienced our first VAP after 18 months without one, we were devastated," said Lowder. "We deconstructed the case and walked through exactly what happened and what steps could have been taken to prevent that outcome. We've only had a few cases since then, and when one occurs, we treat it as a very serious event. One VAP can cost someone's life and the hospital a lot of money."



Lowder said St. Francis is vigilant in its monitoring for VAP and regularly reports on its progress. To keep the goal of preventing VAP at the forefront of everyone's minds, the team celebrates every three months without a case of VAP and posts how many days or months they've been VAP-free in a public area of their ICU.

### Adding to the Bundle

At Mercy Medical Center in Springfield, Mass., a 182-bed acute care hospital in Consorta shareholder Catholic Health East's (CHE) system, the ICU staff has been working to reduce ventilator-associated pneumonia since 2001. Nursing focused on head of bed elevation to the standard of 30 degrees for ventilated patients, and physicians directed the PUD and DVT therapies.

While the hospital saw a slight reduction of incidences of VAP, they weren't implementing the interventions in a standard fashion, nor measuring the outcomes, so ICU clinicians weren't certain where the impact was greatest.

This changed in early 2005 when CHE was considering participation in IHI's 100,000 Lives Campaign, a nationwide initiative to improve patient safety and standardize healthcare procedures. The ventilator bundle was presented as one of the quality improvements hospitals were urged to undertake. CHE committed to the campaign, and Mercy Medical Center fully implemented the ventilator bundle in its ICU. The dramatic result in implementing all four elements



Saint Joseph HealthCare, Lexington, Ky., was a pioneer in reducing the incidence of ventilator-associated pneumonia by elevating the heads of ventilated patients 30 degrees. The Institute for Healthcare Improvement recognized Saint Joseph's excellent and early work with this intervention, which became part of the organization's bundle of recommendations for preventing VAP.

of care together is a turning point for most hospitals, including Mercy Medical. Communication and adherence to process are intrinsic to the success of the program.

At nearly the same time, an intensivist and ICU nurses from Mercy Medical Center attended a Society for Critical Care Medicine conference and learned of compelling research on the importance of oral care for ventilated patients. The most prevalent etiology of ventilator-associated pneumonia is aspiration of oral contents. Studies show decontaminating the oral cavity decreases the incidence of VAP.

Mercy's existing oral care routine relied on their own setups, using inline suctioning, oral swabs and mouthwash. The procedure was left to the individual nurses to decide when to implement and the practice was regarded as an oral hygiene effort.

Armed with new research, the Mercy team began product reviews. Their focus was on making the practice of oral care better and easier for clinicians and more comfortable and comprehensive for patients. The team settled on Sage

Products, with a solution that included self-contained packets to give nurses all the tools they needed to maintain an oral care protocol every four hours. Sage also addresses suctioning tools in their oral care packages, which sealed the deal for Mercy.

Nurses use a Yankauer catheter to aspirate a patient's mouth and airway to remove fluids and particles during oral care. But this generally requires breaking the suction line between suctioning the mouth and lungs, which can add to the risk of infection.

"The Sage product includes a connector to bifurcate the suction lines without disconnecting them and also includes a guard to keep the tool clean between uses," said Kathleen Hutchins, RN, MSN, ICU Clinical Nurse Specialist, Mercy Medical Center. "These may all seem like small things, but when tightly woven in a complete process, it can make a world of difference."

Hutchins said when nurses saw how sound oral care procedures could actually reduce risk for patients they were completely onboard with the process.

St. Francis also began an aggressive oral care protocol every two hours using Sage Products. The company is a Consorta contracted supplier.

"With this product, we can turn a patient's mouth around in a few hours," said St. Francis' Lowder. "Our nurses feel like it really makes a difference, and we've seen that play out in decreased VAP rates."

The move to Sage Products represented an increase in cost compared to the oral care equipment both hospitals previously used, but in preventing even one case of VAP per year, the system paid for itself.

### Watching VAP Rates Drop

A hospital's VAP rate is the total number of cases of ventilator-associated pneumonia for a particular time period, reported as a rate per 1,000 ventilator days. The Centers for Disease Control's National Nosocomial Infections Surveillance (NNIS) tracks national VAP rates and uses data from its voluntary, hospital-based reporting system to establish national risk-adjusted VAP rate benchmarks.

Mercy Medical Center had tracked its VAP rates since 1997 and never hit the NNIS benchmark. Until 2005, that is.

"We fully implemented our ventilator bundle and oral care protocol in May 2005 and set a yearly goal of a 25 percent reduction in our VAP rates," said Mercy's Hutchins. "In just eight months, our rate was 6.5 – a reduction of 48 percent.

"We then set our 2006 goal for a rate of 4.9, and we surpassed that as well with an actual VAP rate of 3.57.

"We'll continue to target 25 percent rate reductions, but we know we can get it to zero," said Hutchins. "As important, Mercy achieved a VAP rate reduction of 71.7 percent in less than two years. It takes focus and dedication to put a process like this in place, but if everyone knows what you're trying to accomplish and why, and exactly how their role contributes to the project, you'll succeed much more often than not." 

