



## NON-INVASIVE VENTILATION: A CALL TO ACTION!

**B**reathing. It's something most of us take for granted. But for some, breathing can be downright difficult. With smoking, obesity and heart disease on the rise, and with millions of baby boomers getting older, emergency room physicians will be faced with an increasing case load presenting with respiratory challenges. ED physicians stand at the forefront of deciding which treatment the patient in respiratory distress will undergo: intubation or noninvasive ventilation (NIV)? The choice that pre-hospital personnel and emergency room doctors make can directly impact the patient's morbidity and mortality and can significantly increase overall cost for the hospital. Conventional invasive mechanical ventilation is used in the majority of cases, yet it carries with it considerable costs and risks. On the other hand, in the appropriate patient population, NIV offers multiple clinically proven advantages.

With unprecedented challenges in saving patients and hospitals alike from costly and invasive treatments, physicians are in fact turning to NIV in increasing numbers. As hospitals face deteriorating finances, increasing numbers of uninsured patients, the advent of pandemics like H1N1, and growing pressures placed on the ED departments, the reasons for using NIV have become even more compelling. Add to this acute staff shortages, increased patient loads, sicker patients, and a general move to less costly, non-invasive medicine and one has even more reason, at the very least, to evaluate NIV.

What makes NIV so appealing is its simplicity. With basic training, it becomes easy to use and apply (versus invasive intubation). It is dramatically more comfortable for patients because they can communicate with

caregivers and require less sedation. Hospitals save money through shorter hospital stays and reduced mortality and morbidity. In the pre-hospital setting, appropriate use of CPAP (a form of noninvasive ventilation) can greatly ease the ventilation burden in the ED upon admission. Furthermore, during a pandemic crisis NIV can help meet patient ventilation needs when all other ICU ventilators are fully utilized; this can help reduce the burden on overcrowded ICUs.

Dr. Janice L. Zimmerman, MD, FCCP, FCCM (Professor of Clinical Medicine, Weill Cornell College of Medicine; Division Head,

### FAVORABLE NIV DIAGNOSES

#### Strong Evidence

- COPD exacerbation
- Acute pulmonary edema/CHF
- Immunocompromised patients
- Facilitate weaning of COPD patients

#### Intermediate Evidence

- Asthma
- Community-acquired pneumonia in COPD patients
- COPD and CHF patients with DNR/DNI status
- Post-operative respiratory failure (lung resection, bariatric, CABG)

#### Weaker Evidence (Caution)

- ARDS with single-organ involvement
- Community-acquired pneumonia (non-COPD patients)
- Cystic fibrosis
- Neuromuscular disease/scoliosis
- OSA/obesity hypoventilation
- Upper airway obstruction

Figure 1. A summary of indications for NIV.

Critical Care; Director, Medical Intensive Care Unit, The Methodist Hospital, Houston, TX) has seen noninvasive ventilation needs from both sides: she spent years in the ER and now runs the medical ICU at a major hospital. Dr. Zimmerman said, “I use NIV quite a bit. I avoid invasive [ventilation] when I can, which helps patients and reduces the hospital length of stay; it also avoids complications. The longer patients remain intubated the greater the chances of nosocomial infections such as pneumonia; NIV avoids this.” When asked about her experience with costs, she commented, “NIV costs are lower; ICU ventilators that cost 30K-40K with all the bells and whistles can be useful for many critically ill patients, but avoiding an endotracheal tube and using ventilators designed for NIV will result in a lower cost for the hospital.” As for her experience in the ER, she added, “when NIV is used in the ER certain patients can actually avoid the need for ICU admission completely.”


To be fair, there are situations where intubation is the method of choice. For example, patients with upper airway and maxillofacial trauma or severely altered cardiopulmonary function may be better protected with intubation. However, even when intubation is called for the difficulties encountered during the process are not insignificant. Intubation is frequently associated with complications like upper airway trauma and increased risk of nosocomial infection, which can seriously impact hospital length of stay. Patients must also be sedated, which introduces other risks.

Why the shift towards NIV? It is because of a rare confluence of benefits in medical technology: NIV is good for the patient as well as good for the doctors, nurses, EMS personnel, respiratory therapists, hospitals and insurance companies. In spite of this, fewer than 30% of mechanically ventilated patients in the US are treated noninvasively. Compare this with countries like France where over 50% of mechanically ventilated patients are treated with NIV, and it's easy to appreciate how much more convincing still needs to be done.

NIV's full impact is felt when ED doctors and EMS teams coordinate their trainings and techniques to use CPAP (continuous positive airway pressure) and NPPV (noninvasive positive pressure ventilation) as the method of choice. It's not just about using a new technology, it's about adopting new ventilation protocols and applying a new form of non-invasive therapy.

Dr. Marvin A. Wayne, MD, FACEP, FAAEM (Bellingham & Whatcom County, WA; Director EMS Services) has seen the advantages of such a scenario. He says, “NIV is simple to use, inexpensive and improves patient care. In addition, the system that they use is compatible with what the hospital uses. When EMS uses NIV and admits a patient to the ED, they simply switch the patient to the hospital CPAP/BiPAP device since the hospital uses the same NIV mask as does the EMS system. This ability to coordinate device components reduces the overall cost for CPAP use.” Dr. Wayne goes on to state “CPAP and NIV are like a ‘miracle cure’ with very

low risk for patients and ease-of-use for caregivers. After using it for a few years, our intubation rates have dropped almost 30%.”

NIV is the kind of medical breakthrough that only comes along once or twice in a lifetime. As medical professionals it is our responsibility to work hard to bring the latest treatments and therapies to our patients and to choose less invasive solutions wherever appropriate. Given that NIV has consistently demonstrated medical and financial advantages, hospital administrators, ED doctors and EMS leaders need to come together and develop a plan to improve patient care and – where indicated – reduce their reliance on conventional mechanical ventilation. In the midst of an economic recession and on the eve of a pandemic, every intubation that is avoided potentially represents one ICU bed saved and thousands of dollars in savings. Now more than ever, as the hospital gatekeepers for patients presenting with respiratory distress, ED physicians need to carefully decide between invasive and noninvasive ventilation. Which will you choose? 

### To Learn More

Nicholas Hill, MD, (Professor of Medicine, Chief Critical Care, Pulmonary and Sleep Medicine, Tufts University) has partnered with Philips Respironics to create a comprehensive Physician NIV Education Program which includes a detailed NIV protocol (see Figure 1 for a summary of indications for NIV). Dr. Hill's complete program is available at no charge, and can be ordered by calling 1-760-918-1045, or emailing [pam.nelson-artibey@philips.com](mailto:pam.nelson-artibey@philips.com).