



## Editor's Commentary

The effects of the primary ventilation mode on bronchopulmonary dysplasia (BPD) and long-term neurodevelopment outcomes are controversial. In our Editor's Choice paper, Sun et al compared high-frequency oscillatory ventilation (HFOV) and synchronized intermittent mandatory ventilation plus pressure support in preterm infants with severe respiratory distress syndrome (RDS). They found that initial ventilation with HFOV in preterm infants with severe RDS reduced the incidence of death and BPD, and improved long-term neurodevelopment outcomes. As Willson points out in his editorial, given the dramatically different results from previous studies comparing HFOV and conventional mechanical ventilation, this study is likely to be met with skepticism in the neonatal respiratory care community.

Gupta et al sought to determine whether the utilization of a respiratory therapist (RT) driven mechanical ventilation weaning protocol is associated with improvement in clinical outcomes in subjects with simple versus difficult weaning. They found that the RT-driven weaning protocol increased ventilator-free days among subjects with simple and difficult weaning, with no significant differences in ICU mortality or extubation failure. Kanouff reminds us that, if we want to stay the course with evidence-based practice (EBP), we must find ways to implement and standardize our practice of it. Protocols serve this purpose well, but still require the input from the entire ICU team without compromising care or clinical judgment.

Miu and colleagues created a prediction model of the need for reintubation, which incorporates variables contributing to extubation failure. In a multivariable analysis, only higher Simplified Acute Physiology Score II and suctioning frequency were associated with failed extubation. Thus a small number of independent variables explains a substantial portion of the variability of extubation failure, and can help identify patients at high risk of needing reintubation. As Abd El Aziz El Sayed Deab and Bellani write in their editorial, the timing of extubation is crucial because both a delayed and a premature discontinuation from mechanical ventilation are associated with an increased mortality. Thus, a prediction model for extubation success is welcome.

Whether it is safe for a medical emergency team (MET) to start noninvasive ventilation (NIV) in ward patients is unclear. Khalid et al evaluated outcomes of patients treated with NIV by a MET on the wards. They found that, in patients with COPD or pulmonary edema, NIV could be safely initiated by an MET.

CPAP is currently the treatment of choice for obstructive sleep apnea (OSA), but therapy adherence is poor. Falcone and colleagues tested the hypothesis that polysomnograph chart viewing by patients would improve CPAP adherence. They found that this strategy in patients with OSA could increase CPAP adherence, as evaluated by rate of return for the follow-up visit and mean nightly CPAP use.

Existing models developed to predict 30-day readmissions for pneumonia lack discriminative ability. Mather and colleagues attempted to increase model performance with the addition of variables found to be of benefit in other studies. The addition of socioeconomic status and healthcare utilization variables significantly improved model performance, compared to the model using only the Centers for Medicare and Medicaid Services variables.

Anxiety and depression are prevalent comorbidities in patients with COPD. Breathing techniques can improve anxiety and depression in patients hospitalized for COPD exacerbation. Valenza et al conducted a randomized clinical study of subjects hospitalized with COPD exacerbation. They found that controlled breathing exercises improve anxiety and depression in patients hospitalized for COPD exacerbation.

Some positive expiratory pressure (PEP) devices allow concomitant administration of aerosol. Berlinski hypothesized that this practice alters the aerosol characteristics and patient dose. It was found that concomitant use of nebulizer and PEP or vibratory PEP devices that obstruct the aerosol pathway significantly decrease the aerosol particle size and the patient dose.

Yildiz, on behalf of the Asthma Inhaler Treatment Study Group, evaluated the importance of inhaler device use status in the control of asthma in adults. Close follow-up with repeated checking of the patient's inhaler technique and correction of errors was associated with a significant decrease in the percent of patients who make basic errors in inhalation maneuvers and device-independent errors, which was associated with better control of persistent asthma.

Spirometry is used to assess patients with central airway obstruction (CAO) before and after interventional bronchoscopy, but is not always feasible in these patients and has significant limitations. This might be overcome with impulse oscillometry. Handa and colleagues assessed whether impulse oscillometry parameters can discriminate between fixed and dynamic CAO. They found that impulse oscillometry measurements correlate with symptom improvements after interventional bronchoscopy. Impulse oscillometry might be useful to discriminate variable from fixed central airway obstruction.

Oto et al compared the ability of 7 ICU ventilators and 3 dedicated NIV ventilators to compensate for leaks during simulated pediatric NIV. They found that leak compensation in NIV for pediatric use could partially compensate for leaks, but varies widely among ventilators, as well as simulated patient weight and lung mechanics.

Patients with COPD have reduced exercise tolerance associated with dyspnea. This exercise intolerance is primarily due to impaired ventilatory mechanics, but it is also associated with a combination of factors, including inefficient gas exchange, lactic acidosis at a low work rate, and exercise-induced hypoxemia. The study by Maekura and colleagues aimed to characterize life-threatening factors such as hypoxemia, acidosis, and sympathetic activation during exercise in these patients. They found that subjects with the most severely reduced exercise capacity had the characteristics of exercise-induced hypoxemia, sympathetic over-activity, and progressive respiratory acidosis at low-intensity exercise.

Xi et al developed models to quantify the growth of human nasal-laryngeal airways at early ages, and to evaluate the impact of that growth on breathing resistance and aerosol deposition. They found that age effects are significant in both breathing resistance and micrometer particle deposition. The image/computational-fluid-dynamics coupled method provides an efficient and effective approach in understanding patient-specific airflows and particle deposition, which have important implications in pediatric inhalation drug delivery and respiratory disorder diagnosis.

Patients with COPD have an increased risk of cardiovascular disease and increased cardiac mortality. Carotid femoral pulse wave velocity (cf-PWV) is a validated measure of arterial stiffness, a well-recognized predictor of adverse cardiovascular outcomes, and offers higher predictive value than classical cardiovascular risk factors. Cinarka and colleagues investigated the association between COPD and arterial stiffness using cf-PWV. Their results suggest that arterial stiffness is increased in subjects with more severe and advanced COPD than in those with mild to moderate COPD.

Weng et al investigated how RTs in Taiwan perceive the implementation of EBP. Unfortunately, they found that EBP is not widespread among RTs in Taiwan, and identified important factors in the implementation of EBP.