The type of aerosol generator and the position in the ventilator circuit are crucial to determine aerosol delivery during mechanical ventilation. In this month's Editor's Choice paper, Berlinski and Willis used an in vitro model of pediatric mechanical ventilation to compare delivery of albuterol generated by 4 different nebulizers placed in-line in 4 different positions. The mesh nebulizer was found to be the most efficient. The nebulizers were more efficient when placed at either the ventilator or the humidifier, and less efficient when placed at either the Y-piece or 30 cm from the Y-piece. As stated by Mansour in his editorial, these data can be used to either choose to utilize a different nebulizer position, a different fill volume, and/or a different loading dosage to enhance aerosol delivery to mechanically ventilated patients.

Friedman et al evaluated nasal CPAP, early surfactant treatment, and rapid extubation in very-low-birth-weight newborns. Using this approach, the average percentage of very-low-birth-weight newborns with bronchopulmonary dysplasia decreased from 35% to 26%. There was also a significant decrease in retinopathy of prematurity, an increase in low-grade intraventricular hemorrhage, and a decrease in ductal ligations. As Claure and colleagues point out in their editorial, this study underlines the point that prevention of BPD requires a multifaceted strategy and reminds us that, following the institution of strategies to improve an outcome, it is prudent to monitor for occurrences of unexpected increases in morbidity and mortality.

Siobal et al calculated mixed exhaled P_{CO_2} and V_D/V_T from ventilator-derived volumetric CO_2 measurements of CO_2 production and compared them to metabolic analyzer and volumetric CO_2 monitor measurements. They found that mixed exhaled P_{CO_2}, and therefore V_D/V_T, can be accurately calculated directly from the Dräger XL ventilator volumetric capnography measurements without use of a metabolic analyzer or volumetric CO_2 monitor. As Dechert writes in his editorial, the available evidence is inadequate to adopt dead space measurements as a standard of care for mechanically ventilated patients, and further work is needed in this area.

The study by Pekdemir and colleagues assessed agreement between P_{ETCO2} measurements performed by mainstream and sidestream methods with P_{aCO2} values. The study was conducted in spontaneously breathing adults in an emergency department. P_{ETCO2} values obtained by mainstream and sidestream methods were significantly lower than the P_{aCO2} values. There was essentially no agreement between the measurements obtained by the 2 different methods and the P_{aCO2} values.

Uchiyama et al estimated tracheal pressure and imposed expiratory work of breathing by the endotracheal tube, heat and moisture exchanger, and ventilator during mechanical ventilation. Their hypothesis was that imposed expiratory work of breathing would increase with heightened ventilatory demand. They found an increased imposed expiratory work of breathing due to an increase in expiratory resistance by the endotracheal tube and the heat and moisture exchanger. They conclude that imposed expiratory work of breathing should be considered in patients with higher minute ventilation.

The objective of the study by Mehring and colleagues was to evaluate a disease management program for asthma. Over the first 4 years of the disease management program there was an improvement in pharmacotherapy and patient self-management. The proportion of subjects requiring hospitalization decreased. The results of this study suggest that this disease management program for asthma has been effective in enhancing the quality of care in regard to improved symptom frequency, adherence to guidelines, pharmacotherapy, and hospitalization.

We publish 2 papers this month related to obstructive sleep apnea (OSA). The aim of the study by Tedeschi et al was to compare home unattended portable monitoring and automatic CPAP titration with attended in-laboratory analysis in a sample of patients with high risk for moderate to severe OSA. There were no significant differences among groups in baseline and with-CPAP values of apnea-hypopnea index (AHI), oxygen desaturation index, and total sleep time with S_{pO2} below 90%. Li et al conducted a systematic review and meta-analysis to compare CPAP and oral appliances in the treatment of patients with OSA. CPAP yielded better polysomnography outcomes, especially in reducing AHI, than oral appliances, indicating that oral appliances were less effective than CPAP in improving sleep-disordered breathing. However, similar results from oral appliances and CPAP in terms of clinical and other related outcomes were found, suggesting that it would seem appropriate to offer oral appliances to patients who are unable or unwilling to persist with CPAP.

In a cross-sectional study, Horita and colleagues evaluated depression in individuals with COPD. They found probable depression in 38% of these persons. A number of physical parameters were associated with depression in this group of Japanese outpatients with COPD.

Kollert et al measured hemoglobin levels in 309 subjects with COPD and chronic respiratory failure prior to initiation of noninvasive ventilation. In these subjects undergoing treatment with noninvasive ventilation and long-term oxygen therapy, high hemoglobin levels were associated with better long-term survival.

We publish 2 papers this month related to ventilator-associated pneumonia (VAP). Pérez-Granda and colleagues assessed knowledge of and adherence to guidelines for prevention of VAP among physicians, nurses, and students in adult ICUs. They found that a simple, easy-to-complete questionnaire enabled them to rapidly evaluate individual knowledge and clinical practice in prevention of VAP in a large institution. Restrepo et al assessed differences in the bacterial etiology of early-onset versus late-onset VAP. There were no significant differences in the prevalence of potential multidrug-resistant pathogens associated with early-onset or late-onset VAP, even in subjects receiving prior antibiotics. Thus empiric therapy for early-onset VAP should also include agents likely to be effective for potential multidrug-resistant pathogens.

Airway acidification plays a role in disorders of the pulmonary tract. Davis et al hypothesized that the inhalation of alkalinized glycine buffer would alkalinize the airways without compromising lung function or causing adverse events. They found that alkalinization of airway lining fluid is accomplished with inhalation of alkaline glycine buffer and causes no adverse effects on pulmonary function or vital signs.

Manual ventilation in the delivery room is provided with devices such as self-inflating bags, flow-inflating bags, and T-piece resuscitators. The objective of the study by Jayaram and colleagues was to compare the effect of type of manual ventilation device on response to resuscitation among preterm neonates born at < 35 weeks gestation. They found no significant differences in effectiveness between the T-piece and self-inflating bag in preterm resuscitations.