

In our Editor's Choice paper, Berlinski and Pennington evaluate the effect of the interval between actuation of an albuterol hydrofluoralkane pressurized metered dose inhaler (pMDI) on aerosol delivery characteristics. Decreasing the interval between actuations from 60 s to 30 s to 15 s did not affect the aerosol characteristics of Proair and Ventolin. The use of a valved holding chamber increased fine particle mass, but introducing a 10-s delay between actuation and inhalation significantly reduced fine particle mass. As pointed out by Newhouse and Amirav, implementation of these findings could result in improved efficiency for healthcare providers in the hospital, a shorter time required for patient benefit, and time savings for the patient and caregiver at home.

In low resource settings, advanced respiratory support for neonates is limited by cost, technical expertise, and sporadic electricity. John et al developed a simple solution to provide respiratory support for these infants. In a neonatal manikin, a modified bubble CPAP system reliably provided alternating pressures consistent with bilevel positive airway pressure modes of respiratory support. The dual pressure technology is a simple, single connection add-on, which can readily be applied to existing bubble CPAP systems. Shepherd and Logan propose that, if perfected and confirmed in real-world situations, this device has the potential to save lives in resource-limited settings.

Spirometric Z-scores from the Global Lung Initiative (GLI) rigorously account for age-related changes in lung function and are thus age-appropriate when establishing spirometric impairments. However, GLI-defined spirometric impairments have not yet been evaluated regarding associations with static lung volumes and diffusing capacity. Vaz Fragoso and colleagues found that GLI-defined spirometric restrictive pattern was strongly associated with a restrictive ventilatory defect, while GLI-defined spirometric airflow obstruction was strongly associated with hyperinflation and air trapping. Both spirometric impairments were strongly associated with decreased diffusing capacity. George and Skabelund suggest that, while the authors propose that the need for lung volumes is no longer necessary, without better and more concrete evidence, the use of spirometry to diagnose restrictive disease is not yet ready for clinical practice.

Significant concern exists regarding the respiratory health of military personnel deployed to Southwest Asia, given their exposures to numerous environmental hazards. Skabelund et al evaluated the pulmonary function and respiratory health of military personnel prior to Southwest Asia deployment. Pre-deployment evaluation of military personnel identified numerous soldiers with active pulmonary symptoms and abnormal spirometry. Spirometry, combined with questions regarding asthma history, wheezing and exercise intolerance, may identify individuals at risk for deployment related respiratory complaints.

The objectives of the study by Gochicoa-Rangel were to validate the reference equations for impulse oscillometry previously published, and to compare the adjustment of new available reference equations for impulse oscillometry from different countries in a sample of healthy children. Because of the robust adjustment of the reference equations for impulse oscillometry, they can be recommended for both clinical and research purposes in this population. The differential

adjustment of other equations underscores the need to obtain local reference values.

Allen et al hypothesized that a small, turbine-driven ventilator would allow rescuers to adhere more closely to American Heart Association advanced cardiac life support (ACLS) guidelines. When compared to a ventilator, volunteers ventilated with a self-inflating bag within ACLS guidelines. However, volunteers ventilated with increased variation, at higher tidal volumes and higher peak pressures with the self-inflating bag. Hands-off time was also significantly lower with the ventilator.

Wenzel et al evaluated the resistance of coaxial tubing systems compared to a conventional circuit. The pressure gradient across the coaxial tubing system was up to 6 times higher compared to conventional circuits, and was higher during expiration compared to inspiration. The perceived breathing resistance was also higher in coaxial tubing systems. These findings suggest that the use of coaxial tubing systems should be carefully considered with respect to their increased resistance.

El-Haddad and colleagues conducted a retrospective cohort study of the ARDS Network randomized controlled trials to evaluate the effect of severity and etiology of ARDS on short-term patient outcomes. Severity of ARDS based on P_{aO_2}/F_{IO_2} did not impact 28-d mortality, ventilator-free days, or ICU-free days. Among the etiologies of ARDS, trauma had the lowest 28-d and 60-d mortality, while subjects with aspiration had more ICU-free days and ventilator-free days.

Dailey and colleagues conducted an in vitro study comparing aerosol delivery through adult high-flow nasal cannula (HFNC) with heliox and oxygen. With a distressed breathing pattern, aerosol delivery was greater at 30 and 50 L/min than with a quiet breathing pattern. There was a trend towards higher inhaled dose with heliox during HFNC that did not reach statistical significance.

Stéphan et al hypothesized that noninvasive ventilation (NIV) was superior to HFNC for preventing or resolving acute respiratory failure in obese subjects following cardiothoracic surgery. The use of continuous HFNC compared to intermittent NIV did not result in a worse rate of treatment failure. Because HFNC presents some advantages, the authors suggest that it might be used instead of NIV in obese patients after cardiothoracic surgery.

The study by Lim et al was performed to identify symptom clusters and the effects on quality of life in subjects with COPD. Their findings suggest that patients with COPD may have specific patterns of symptom clusters. The symptom clusters were related to clinical characteristics and had a negative impact on quality of life. To enhance symptom management and quality of life, approaches and interventions based on symptom clusters may be more effective than independent intervention for each symptom.

Soffler and colleagues review the physiology of respiratory sensations in dynamic hyperinflation. A thorough understanding of the physiology of dyspnea and pathophysiology of dynamic hyperinflation informs the interventions used to mitigate sensations of dyspnea and the physiologic effects of dynamic hyperinflation, respectively.