Editor's Commentary

This months' Editor's Choice is a bench evaluation of continuous flow and pulsed dose oxygen delivery from portable oxygen concentrators (POCs). Chen and colleagues used a sophisticated 3D-printed replica of the human respiratory system to determine the volume of oxygen reaching gas exchange units. They found that the highest oxygen delivery was achieved at the highest pulse dose settings, but that continuous flow delivered the greatest absolute volume-averaged F_{IO_2}. They conclude that while pulse dose was a more efficient mode of oxygen delivery, continuous flow delivered a greater absolute volume of oxygen per breath. The accompanying editorial describes the issues related to POCs and how the operation of these devices befuddles patients, confuses caregivers, and often obfuscates the goal of oxygen delivery. Targeted oxygen saturation should be preferred to an order of flow and performance of POCs made understandable for stakeholders.

Nakanishi et al compare passive and active humidification in adult subjects with tracheostomy. Not surprisingly, heated humidification far outperformed the heat-and-moisture exchanger with respect to absolute humidity. The major difference being temperature and absolute humidity, as relative humidity was 100% with both devices. Gomaa opines that the differences here are expected but that cost and portability also play important roles in humidification device decision-making.

Mendes and coworkers describe the impact of diaphragmatic breathing exercise with and without pursed lips in a group of COPD subjects over a 4-week period of observation. The main outcomes were evaluations of chest wall kinematics, breathlessness, and chest wall asynchrony. They report that both breathing exercises studied reduced breathing frequency, but increased chest wall asynchrony compared to quiet breathing. Dyspnea remained unaffected.

Misu et al describe the role of exercise-induced oxygen desaturation in monitoring functional decline in subjects with COPD. They report that exercise-induced desaturation during a 6-min walk test predicted a decline in functional capacity in these subjects. These findings were mirrored by airflow limitation.

The impact of altitude on physiology is a frequent field of study. Cid-Juárez and others report on the inspiratory and vital capacity of subjects living in Mexico City at a moderate altitude (2,200 m). They found that inspiratory capacity in healthy subjects at this altitude was higher than reported values at sea level for same height, gender, and age. These data are important for pulmonary function interpretation.

Alghamdi et al endeavored to describe the perceptions of respiratory therapy students on the clinical learning environment using an evaluation scale. In the small sample ($N = 34$) of students they studied, the majority rated the clinical learning environment positively and were satisfied with the clinical instructor/team model.

COPD is a major health burden around the world. Quiros Roldan and coworkers describe the incidence of COPD in a cohort of subjects with HIV infection. They found that COPD was underdiagnosed in HIV-infected individuals and encourage evaluation of these patients for chronic respiratory disease.

Oates and others evaluated the difference in objective and self-reported adherence to airway clearance therapy in subjects with cystic fibrosis. All subjects were using high frequency chest wall oscillation equipped with a data logger to record use. They found that only a third of subjects had an adherence > 80% of prescribed measured by the device. In contrast, two-thirds of subjects self-reported high adherence. Subjects prescribed > 60 min of airway clearance therapy a day were 3 times as likely to over-report adherence. Lower income and therapy in multiple households increased over-reporting.

Meys et al describe the use of a mobile device to record inspiratory capacity during a 6-min walk test. The mobile system was reasonably tolerated and could differentiate between healthy subjects and those with COPD. The utility of this device in clinical practice is yet to be proven.

Ozsoy and coworkers describe the primary factors impacting activities of daily living in subjects with COPD using the London Chest Activity of Daily Living scale. In a small group of subjects ($N = 44$) they found that functional exercise capacity and expiratory muscle strength were associated with a reduction in activities of daily living. They suggest that programs to improve functional exercise capacity are warranted.

Tracheobronchopathia osteochondroplastica (TO) are benign lesions of tracheal and bronchial mucosa with multiple nodular hyperplasia of bone or cartilage tissue protruding into the airway lumen. Meng and others report the major clinical findings in a group of 73 subjects with TO. Cough was the primary presenting symptom, followed by hemoptysis. The infrequent incidence of TO requires that diagnosis be accomplished using clinical suspicion, bronchoscopy, histopathology, and radiographic findings.

A number of recent studies have evaluated transcutaneous monitoring of carbon dioxide (T_{cCO_2}) in pediatric subjects. Bhalla and others compare arterial carbon dioxide (P_{aCO_2}) to T_{cCO_2} in 184 pediatric subjects, the majority of whom were receiving mechanical ventilation. They also attempted to predict a second P_{aCO_2} using data from the first comparison. They concluded that T_{cCO_2} was a useful adjunct monitoring method, but it cannot reliably replace P_{aCO_2} measurement.

Caudron et al provide a review of pulmonary thromboses in pediatrics ARDS and advance an algorithm triggered by an increase in deadspace to identify patients at risk. They suggest that early identification and treatment may improve outcomes. Karthika and others describe the use of lung ultrasound in clinical medicine and the role of the respiratory therapist in bringing this technology to the bedside.