Editor's Commentary

This Month's Editor's Choice is a retrospective review of the rate of occult hypoxemia in over 7,500 subjects to determine the impact of race on oximetry accuracy. Chesley and colleagues evaluated over 100,000 paired observations of arterial oxygen saturation (S_{aO_2}) and pulse oximetry saturation (S_{pO_2}) in a mixed race population. Occult hypoxemia was defined as an $S_{aO_2} < 88\%$ when S_{pO_2} was 92–96%. They found occult hypoxemia was 2.5 times more common in subjects who self-identified as Black and two-thirds of all measurements demonstrated a difference of ≥ 4% (S_{aO_2} vs S_{pO_2}). The authors recommend a pulse oximetry value of >94–98% in all patients to reduce occult hypoxemia. Moore and others provide accompanying commentary reviewing the well-known impact of skin pigment on oximeter accuracy. They point out that self-identification of race is an unreliable substitute for skin pigment and that retrospective reviews of data where the timing of arterial blood sampling and recording of S_{pO_2} complicate these comparisons. Moore et al suggest mitigation strategies should include not relying on a single S_{aO_2}:S_{pO_2} relationship and that care should be taken when using S_{pO_2} to define cutoffs for therapeutic decisions. Finally, they urge harmonization of data and prospective data collection.

Martí and others evaluated mechanical insufflation-exsufflation (MI-E) in a porcine model using 8 combinations of inspiratory and expiratory pressures. They measured mucus displacement, respiratory flows, respiratory mechanics, and hemodynamics. Velocity and direction of mucus movement was measured using a simulant containing radio-opaque markers. In all cases MI-E increased mucus velocity, with +40/-70 cm H_2O being most effective, increasing mucus velocity almost 5-fold. They found no safety issues. Ntoumenopoulos comments that MI-E represents a method of secretion clearance that mimics the body's normal mechanism, the cough. He suggests that patient positioning, standard ventilator settings, hemodynamic status, and prevention of de-recruitment all impact secretion clearance and the selection of a clearance strategy.

Mosher and others evaluated the outcomes and risk factors for noninvasive ventilation (NIV) in subjects hospitalized for COPD exacerbation. They retrospectively reviewed 427 subjects in whom the failure rate was 12%. The median time to failure was 8 h while success occurred at 16 h. Increased age, body mass index, creatinine, and bicarbonate were associated with NIV failure and requirement for persistent treatment. Devaraj and colleagues opine that these data argue for early, close observation of patients on NIV to avoid delays in intubation.

Pezzimenti et al describe a competence-based simulation to improve orientation success in a pediatric facility. They provided a 9-week orientation program with simulation-based competence in 90 new staff. Two-thirds of new graduates advanced to ICU training following the program. They concluded that competence-based simulation helped complete successful orientation.

Gallardo et al retrospectively compared high-flow nasal cannula (HFNC) to standard oxygen therapy in 84 subjects with COVID-19. Subjects were age- and sex-matched pairs. Use of HFNC was not an independent predictor of endotracheal intubation after adjusting for confounders. They concluded that HFNC did not offer an advantage over standard oxygen therapy in this analysis.

Baedorf Kassis and others performed a crossover study comparing adaptive pressure ventilation to adaptive support ventilation (ASV) in 20 subjects with ARDS over a period of 1–2 h. The primary outcome was V_T corrected for ideal body weight, secondary outcomes included driving pressure, mechanics, gas exchange, and mechanical power following crossover. There were no significant differences in measured values. ASV did provide a lower V_T as compliance diminished.

Plotnikow et al performed a bench study of heated humidifiers used to deliver HFNC, evaluating the impact of different devices and circuits across a range of flows from 30–100 L/min. Delivered temperatures and humidity were higher across devices in the invasive versus noninvasive operation. They concluded that at flows ≥50 L/min, invasive mode of operation should be selected.

Kortchinsky and coworkers prospectively evaluated whether the Clinical Pulmonary Infection Score (CPIS) or SOFA ≥2 can predict pneumonia in subjects after cardiothoracic surgery. They used derivation and validation cohorts and calculated the area under the receiver operating characteristic curve for each. They found no advantage of adding an increase of ≥2 in the SOFA score for prediction of post-operative pneumonia.

Kondo et al performed a bench evaluation of particle release properties of two blister pack, dry powder inhalers (DPIs). They compared particle release volume and peak inspiratory flow of the DPIs as well as the resistance of each and reported differences in required inspiratory flows and resultant differences in particle volume. These investigators concluded that in patients with more severe disease, a DPI requiring a lower inspiratory flow would be desirable.

Cullum et al interviewed respiratory therapists (RTs) who had participated in withdrawal of advanced life-sustaining therapies. Interviews were recorded, transcribed, and evaluated. They identified 3 themes, the impact of power relationships during the process, required tools to provide withdrawal of life support, and emotional exposure. These findings provide a framework for improving the experience and knowledge of RTs participating in withdrawal of life support.

Strickland and others provide a qualitative analysis of burnout among RTs during the COVID-19 pandemic. Using a post-hoc analysis of a survey of RT burnout, they reported 5 overarching themes. These included staffing, workload, physical/emotional consequences, lack of effective leadership, and lack of respect. The authors concluded that these areas can be targeted for improvement.

Roberts and others describe the well-being of RTs in a single academic health center during COVID-19. They analyzed a quarterly survey using thematic analysis. In this cohort, 75% of RTs experienced burnout and over half reported symptoms of depression. They identified staffing challenges, safety concerns, workplace conflict, and lack of work-life balance as precursors for burnout. They concluded that institutions should design and implement strategies to reduce burnout.

Acho and others evaluated the impact of a one-day mechanical ventilation course on the ability of RTs to interpret ventilator waveforms and identify asynchrony. RTs with less experience had the greatest improvement in their scores. The authors concluded that RTs may benefit from additional training in ventilator waveform interpretation early in their careers. The optimal length and content of training needs to be elucidated.

Duprez and others provide a short report comparing two types of masks for oxygen delivery. They describe the double trunk mask, a mask with two pieces of aerosol tubing connected to the exhaust ports placed over top of HFNC. In their experience, this device improved oxygenation while conserving oxygen flow.

Zhong et al describe the use of HFNC for COVID-19 subjects cared for on the general floor. They found that HFNC provided on the general floors reduced ICU crowding and was safe and effective. Quach et al provide a narrative review regarding underrepresentation of RTs as experts in Delphi studies of respiratory care practices and research. They found that RTs were rarely included as expert participants and, when involved, were minimally represented.