This month's Editor's Choice is a prospective observational study of high frequency percussive ventilation (HFPV) in pediatric bronchiolitis. White and colleagues describe the changes in gas exchange following transition from invasive mechanical ventilation to HFPV in 41 infants. Most subjects met criteria for pediatric ARDS. Following transition to HFPV, subjects had improvements in ventilation despite a reduction in peak inspiratory pressure. Changes in oxygenation were mixed. They concluded that HFPV provided improved ventilation at reduced airway pressures in pediatric bronchiolitis. Dominick and others provide an accompanying editorial which suggests that HFPV appears to have a role in improving ventilation, but that inconsistent application of HFPV settings limits the utility of the findings. They call for larger trials of HFPV with consistent application of the technique and defined outcomes to provide evidence for a method often used, but not completely understood.

Roberts and others evaluated a tele-ICU clinical rotation for respiratory therapy students who were prevented from in-person clinical rotations as a consequence of COVID-19 restrictions. Students spent two 4-h clinical rotations under the supervision of experienced respiratory therapists (RTs). Students performed remote patient-ventilator assessments, including interpretation of ventilator waveforms, arterial blood gases, and chest radiographs. Students then completed pre- and post-rotation surveys assessing their confidence managing mechanical ventilation and experience with telemedicine. Students expressed greater confidence in patient assessment, and students as well as preceptors had positive perceptions of the program. Varekojis opines that the study demonstrates that a tele-ICU rotation is feasible and beneficial. However, she cautions that the interactive and highly psychomotor nature of respiratory therapy practice makes it unlikely that tele-ICU clinical education could replace hands-on ICU clinical rotations.

Tolson and others demonstrate the impact of filters placed in the circuit of noninvasive ventilators to reduce environmental contamination. In this bench study, the addition of filters at various circuit positions altered trigger sensitivity and impacted delivered and estimated tidal volume. This paper concludes that modifications to ventilator circuits, with the best of intentions, may negatively alter performance.

Joshi and colleagues surveyed the perceptions of patients with respiratory disease using pulse oximeters at home. Thirty respondents completed a structured survey. They found that the majority of respondents reported that using a pulse oximeter at home was helpful in judging their physical limitations, providing reassurance and confidence in their disease management.

Tan et al performed a bench study of aerosol delivery during noninvasive ventilation (NIV) using single- and dual-limb circuits and a vibrating mesh nebulizer with and without humidification. Aerosol deposition was measured by collecting drug on a filter between the test lung and patient model. They found that during NIV, aerosol delivery was best when the vibrating mesh nebulizer was placed between a non-vented mask and 15 cm from the exhalation port in the single-limb circuit or 15 cm from the Y-piece in dual-limb circuit. They also noted that humidification had little effect on aerosol delivery and that aerosol delivery was poor in a single-limb circuit with a vented mask.

Alqahtani and co-workers evaluated the impact of mental health on the use of e-cigarettes in subjects with chronic lung disease. Using data from the 2018 Behavioral Risk Factor Surveillance System, they explored whether the number of bad mental health days in the past 30 days explained the association between chronic lung disease and e-cigarette use and if respiratory symptoms moderated the association between chronic lung disease and e-cigarette use. They concluded that e-cigarette use may be due to poor mental health in individuals with chronic lung disease.

Decavèle et al evaluated the impact of dyspnea measured using self-reported respiratory discomfort and the 5-item intensive care respiratory distress observation scale, (IC-RDOS) at ICU admission on mortality. Dyspnea was assessed dichotomously (yes/no), with a visual analog scale, and IC-RDOS was calculated. Dyspnea was reported in over half the subjects and the IC-RDOS was higher in dyspneic subjects. They concluded that IC-RDOS, an observational correlate of dyspnea, but not dyspnea alone was associated with higher mortality in ICU subjects.

Tan and others describe a quality improvement project to improve implementation of an RT-led screening of pediatric mechanically ventilated subjects for an extubation readiness test (ERT). They developed an ERT and verified 80% adherence. They measured extubation failure within 48 h and found a reduction in extubation failures and use of rescue NIV. Duration of mechanical ventilation was unchanged but ICU length of stay was reduced. They concluded that the ERT protocol improved outcomes in pediatric subjects on mechanical ventilation.

Kanj et al retrospectively reviewed a pulmonary function database and evaluated radiologic findings associated with isolated elevations in residual volume (RV). They matched subjects with elevated RV with subjects with normal RV. They found that subjects with elevated RV were more likely to have smoked and had a maximum voluntary ventilation less than 30 times the FEV_1. Asthma and non-tuberculosis mycobacterial infections were more common in the elevated RV subjects. They concluded that elevated RV is associated with airway-centered pulmonary disease.

Centorrino and others performed a bench study of oscillation transmission in 5 neonatal ventilators. Using lung models simulating normal, restrictive, and mixed respiratory mechanics they measured oscillations with a pressure transducer validated for high frequency oscillation and the oscillatory pressure ratio was calculated to estimate the oscillation transmission. They concluded that oscillation transmission was more dependent on the ventilator model than on the mechanical lung conditions.

Liu and Chatburn performed a bench study to evaluate the impact of inspiratory effort on circuit compensation in volume targeted modes. They set a ventilator in volume and adaptive pressure targeting and varied the maximum inspiratory pressure (simulating less and more aggressive efforts). In both breath types, the tidal volume (V_T) fell as inspiratory effort was increased. They concluded that circuit compensation corrected the delivered V_T for volume lost in the patient circuit and that compensation volume decreased as simulated patient inspiratory effort increased.

Hyun and others compared venous blood gases (VBGs) to arterial blood gases (ABGs) in critically ill subjects to ascertain if VBGs could substitute for ABGs. They compared 292 sets of blood gases from 82 subjects admitted to the ICU. Intraclass correlation coefficient (ICC) and Bland-Altman limits of agreement (LOA) were obtained. Bland-Altman plots showed clinically unacceptable LOA between all parameters. ICC was improved in a subset of blood gases where mixed venous oxygen saturation was > 70%. They suggest that a VBG could substitute for an ABG following restoration of tissue perfusion.

Kotok and colleagues evaluated radiographic abnormalities in COVID-19 subjects using the Radiographic Assessment of Lung Edema [RALE] score in subjects over 6 months. They assessed the association of baseline and longitudinal evolution of radiographic edema with severity of hypoxemia and clinical outcomes. They found that in adult subjects presenting to the emergency department with COVID-19, the RALE score closely followed clinical deterioration and could be used for triage or prognostication in patients with worsening radiographic edema.

Teng and others provide a systematic review of NIV comparing neurally-adjusted ventilatory assist (NAVA) and pressure support ventilation (PSV). Relying on data from 15 studies, they concluded that NAVA improves patient-ventilator interaction compared to PSV, but that important outcomes including duration of mechanical ventilation were lacking.

Willis provides a Cochrane Corner comparing airway clearance methods in cystic fibrosis (CF). Airway clearance is an important technique in CF which includes a variety of maneuvers and devices with variable effectiveness.