This month's Editor's Choice is a bench study by Enokidani et al evaluating the phenomena of pendelluft in a lung model. Several groups have described pendelluft as a potential mechanism for lung injury in patients with heterogeneous lung injury. Using separate test lungs, they evaluated the impact of altering model effort, ventilation settings, and differences in lung model mechanics. They reported that pendelluft severity increased with greater differences in effort between the models and was amplified by the differences in lung mechanics. Ventilator settings had little impact on the severity of pendelluft. Kacmarek contributes accompanying commentary regarding the presence of pendelluft in patients and the potential consequences.

Rice and colleagues evaluated the impact of COPD overdiagnosis on 30-d hospital readmissions. They retrospectively reviewed all subjects coded with a COPD diagnosis at discharge. In 424 subjects, 29% were overdiagnosed by lower limit of normal and 23% by FEV_1 < 70% of predicted. Overdiagnosis of COPD resulted in a significant increase in calculated readmission rates (6.6%). They concluded that accuracy of COPD diagnosis is critical given the penalties for COPD readmissions. MacIntyre provides commentary emphasizing the importance of accurate diagnoses and the financial ramifications of inaccuracies.

Rogerson and others describe a respiratory therapy-driven protocol to reduce the unnecessary use of inhaled nitric oxide (INO) in a children's hospital. They identified failures of INO, defined as lack of response and the use of sildenafil to aid in INO weaning. They reported a 40% decrease in hours of INO therapy and a cost savings of $900,000 per year. Todd Tzanetos' accompanying editorial describes the importance of respiratory therapy-driven protocols on both improving patient outcomes and limiting costs.

Li et all describe the impact of different noninvasive ventilation (NIV) interfaces on F_{IO_2} and CO_2 rebreathing. Using a lung model, the authors evaluated nasal and oronasal masks along with varying the site of circuit leak. They found that site of the leak had a far greater impact than the type of interface on both F_{IO_2} and CO_2 rebreathing.

Moretta and colleagues evaluated patient preferences for home oxygen equipment, comparing a portable oxygen concentrator (POC) to an oxygen cylinder. Subjects with chronic respiratory disease performed 6-min walk tests with each device while monitoring oxygen saturation (SpO_2), with a target of 92-95%. All participants completed a questionnaire related to quality of life and device preferences after using each device for one week. Subjects preferred a POC three-quarters of the time owing to improved mobility.

Meinen and others retrospectively evaluated the use of neurally-adjusted ventilatory assist (NAVA) in subjects with congenital diaphragmatic hernia. In this small trial of 10 subjects, NAVA was introduced following traditional modes of support. In several cases, NAVA was transitioned to noninvasive NAVA without incident. NAVA was associated with lower airway pressures and reduced oxygen requirement.

Yan et al studied the emotional labor of respiratory therapists employed in hospitals. Using a survey with over 350 responses they found that four risk factors impacted mental health: basic emotion expression, superficial emotion control, emodiversity extent, and weekly work hours. The authors developed an app to allow therapists to monitor their mental health and seek early treatment.

Schwartz and others evaluated preserved ratio impaired spirometry (PRISm) in a large database of over 18,000 tests. PRISm is a reduced FEV_1 and/or forced vital capacity (FVC) in the setting of a preserved FEV_1/FVC ratio. The incidence of PRISm in this database was 18% with middle age and increased body mass index associated factors. This reported prevalence was higher than previous reports.

Shevade et al performed a cross-sectional survey of respiratory therapy practice patterns in India. In a sample of 237 participants, 73% possessed a bachelor's degree and one in six a master's degree. The majority of respondents were employed in a hospital setting in the acute care environment. Assignment to home care was rare.

Wappel and colleagues performed a retrospective analysis of survivors of critical illness in a mobility-based rehabilitation program. In this small study, subjects who received high protein nutrition demonstrated improved weaning success and greater likelihood of discharge to home. These findings need formal hypothesis testing.

Andrello et al evaluated maximal voluntary ventilation (MVV) and FEV_1 as outcome predictors in COPD. Comparing these variables to other common measures of COPD severity, MVV was found to be a predictor of clinical outcomes and was a better predictor of respiratory muscle strength, functional exercise capacity, and patient-reported outcomes than FEV_1.

Fernandes and others evaluated noninvasive CPAP in a pediatric lung model. They varied upper airway models, leak, and simulated mouth breathing. They report that delivered CPAP was reduced by ≈ 25% depending upon the magnitude of leak. Their data suggest that a large cannula can provide CPAP in this model.

Haw et al used a bench model to evaluate aerosol delivery during NIV. They compared three nebulizer types using radiolabeled aerosol to determine inhaled mass, the effect of nebulizer device position, and leak. They concluded that during NIV, nebulizer placement at the ventilator outlet was more effective, and minimized deposition on the face and mask. The authors recommend that aerosol therapy should be avoided in the presence of a large mask leak.

Samady et al compared use of the asthma scale to the asthma score in predicted outcomes. The asthma scale categorizes patients into mild, moderate, or severe condition, while the asthma score uses the sum of the assessments to create a numerical score. They found that the asthma score showed better clinical predictability and correlation compared to the asthma scale.

Davis and others provide a study of aerosol therapy aimed at eliminating the severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) virus. In a basic science experiment, they used normal human airway epithelial cells grown in culture and exposed them to SARS CoV-2 and a compound (Optate) to alkalinize cell pH. In addition, a small trial of safety of the compound was accomplished by delivering the aerosol to 10 healthy subjects. The compound prevented viral replication in culture but had no impact on epithelial cell viability. Subjects breathing the aerosol experienced no changes in lung function or vital signs. The authors conclude that this treatment could prove useful in patients with confirmed SARS CoV-2 infection.

Torbic and others contribute a systematic review of neuromuscular blocking agents (NMBAs) for use in ARDS. Their analysis suggests that early use of NMBAs improves oxygenation and decreases 21-28 d mortality, but does not improve 90-d mortality. Teixeira et al provide a systematic review of spontaneous breathing trials (SBT) in the neonatal population. They conclude that SBTs in premature infants accurately predict extubation success but not extubation failure.

Papali and colleagues provide a special article on improving safety during intubation of patients with COVID-19. They developed a pre-intubation checklist tool to aid clinicians during the current pandemic.

Two new AARC clinical practice guidelines (CPGs) on tracheostomy care in adults and children are also presented. These multi-author papers review the evidence related to a host of routine procedures performed in the care of patients with a tracheostomy. Dean Hess provides an accompanying editorial tracing the history of AARC CPGs and evolution to the current day.