This month's Editor's Choice is a paper by Dell'Olio and colleagues evaluating environmental contamination by SARS-CoV-2 from COVID-19 subjects receiving noninvasive ventilation (NIV). The presence of SARS-CoV-2 was measured using surface sampling in the ICU. Sampling was performed at 6, 12, and 24 h. In 256 samples, only 21 (8%) tested positive. The authors suggest these findings demonstrate that NIV does not increase risk of infection to healthcare workers.

Ramsey and others evaluated SARS-CoV-2 aerosols during noninvasive respiratory support (NRS) of COVID-19 patients. They used aerosol sampling techniques to collect air samples near 37 subjects with COVID-19. In a parallel study they evaluated aerosol collected from normal volunteers using NRS. The presence of SARS-CoV-2 was found in $< 10\%$ of samples, and only in close proximity to the subject. They concluded that use of NIV or high-flow nasal cannula (HFNC) in subjects with COVID-19 did not increase the risk of aerosol dispersal in the ICU. Li considers both papers in an accompanying editorial. She reviews the methods of both studies and discusses the difference between aerosol-generating procedures and aerosol dispersion. She suggests that NRS has been shown to be effective in select cases of COVID-19 and does not appear to increase risks to caregivers.

Delorme and coworkers performed a bench study of response of positive airway pressure (PAP) devices used during treatment of sleep-disordered breathing to simulated breathing patterns (ie, central hypopnea, central apnea, obstructive hypopnea, and obstructive apnea). They intended to test the response of the automatic adjustment algorithms of each device under controlled conditions. The findings included a wide range of responses with pressure settings resulting in delivered tidal volumes inconsistent with the target volumes. Scoring of events by devices was also inconsistent. The authors suggest that caregivers should understand the differences in devices and algorithms should be modified by manufacturers to meet patient demands.

Fasquel studied the impact of unintentional air leaks on PAP devices during a bench study of simulated sleep apnea events. Automatic PAP devices are commonly used to treat sleep-disordered breathing at home, automatically adjusting pressure using a variety of inputs. They evaluated 3 automatic PAP devices and found a wide range of inappropriate responses to air leaks. They concluded that automatic adjustments differ between devices and might make adjustments that lead to less effective treatment. Johnson and Johnson discuss both papers, pointing out that the same response by a device to different events undoubtedly leads to both appropriate and inappropriate changes in delivered pressures. They suggest that clinicians should understand the nuances of the devices they use and choose the best device for the pathophysiology of the patient.

DeCato et al evaluated the variability for oxygen consumption ($\dot{V}_{O_2}$), carbon dioxide production ($\dot{V}_{CO_2}$), and minute ventilation ($\dot{V}_E$) at various work rates under steady state conditions in multiple subjects over a 1-year period to assess and perform biologic control testing. Four healthy subjects were tested and performed 16–39 biocontrol studies. The mean coefficient of variation for $\dot{V}_{O_2}$, $\dot{V}_{CO_2}$ and $\dot{V}_E$ was $\sim 6\%$. They propose a method to determine whether results exceed the expected variability.

Leatherman and colleagues evaluated ventilatory parameters after one week of mechanical ventilation in 127 subjects with COVID-19 ARDS in order to define characteristics associated with survival. Mortality rate was 33% and was associated with higher ventilatory ratio (VR) and lower compliance (C_{RS}), but with no relationship to oxygenation (P_{aO_2}/F_{IO_2}). A composite score of VR, C_{RS}, and P_{aO_2}/F_{IO_2} differed between survivors and non-survivors, but there was a large overlap of values.

Jagan et al performed a retrospective analysis of time on NRS before intubation, C_{RS}, and driving pressures in patients with ARDS. Of 589 subjects, 33% had COVID-19 and 67% did not. In contrast to ARDS, COVID-19 ARDS was associated with no improvement in static compliance or driving pressures. Days of pre-intubation NRS were associated with worse overall compliance and driving pressure.

Gigliotti and others evaluated functional and clinical characteristics of COVID-19 patients referred to in-patient pulmonary rehabilitation (PR) across 17 months. In 203 subjects, 168 required invasive ventilation for an average of 26 days and nearly half experienced delirium. At presentation for PR, 85% were on oxygen therapy and less than a third could perform a 6-min walk test (6MWT). Just less than half experienced dysphagia. They concluded that following severe COVID-19, subjects entered in-patient PR with a host of disabilities requiring multidisciplinary care.

Laorden and coworkers retrospectively reviewed data for 1,306 subjects receiving NRS for COVID-19 in an intermediate respiratory care unit. NRS failed in 26% of subjects and 14% died. A Cox model showed a higher clinical failure with onset of symptoms, hospitalization was <10 d, and P_{aO_2}/F_{IO_2} <100 mm Hg. They concluded that male sex, advanced age, and blood chemistry were associated with worse prognosis. These factors along with lower oxygenation were associated with mortality.

Herasevich et al evaluated risk factors for ARDS following hematopoietic stem cell transplant (HCT) in a nested case-control study. In 170 subjects matched to non-ARDS controls, HCT subjects were more likely to be on steroids, have lower platelet counts, and higher creatinine. In the first day of hospitalization HCT subjects were more likely to receive a blood transfusion, opioids, and fluid resuscitation. Sepsis was the most common predisposing factor for ARDS. The authors concluded that these factors may help provide insights into the mechanisms of ARDS following HCT.

Willis and colleagues conducted a survey regarding home cleaning of PAP devices used in a pediatric sleep clinic. In a sample of nearly 100 respondents, most caregivers reported cleaning of circuits, humidifiers, and masks with soap and water. There was no relationship between time of use and cleaning practices. They concluded that care and cleaning practices varied from the instructions given in the clinic but that weekly cleaning was commonly reported.

Batista et al compared continuous oximetry during 6MWT to a single measurement at the end of the test. They studied a large sample of COPD subjects during the 6MWT using continuous pulse oximetry (S_{pO_2}) monitoring and defined desaturation as a fall in S_{pO_2} of $\geq 4\%$. Desaturation was observed in 71% of subjects during 6MWT and was lower than the end test S_{pO_2}. Only 19% of subjects exhibited a lower S_{pO_2} at 6MWT completion. The authors concluded that desaturation missed by end-exercise S_{pO_2} but observed during the 6MWT were independently associated with all-cause mortality and hospitalizations in subjects with COPD.

Dorado and others provide a short report regarding ventilator liberation in COVID-19 subjects. This epidemiologic study included finding a reintubation rate of almost 30%. Abroug et al contribute a short report suggesting early variation of the ROX index was a good predictor of HFNC failure. A ROX change of < 1.8 at 12 h was associated with the need for escalation of respiratory support.

Baker and Houin provide an invited review on national and global asthma management guidance documents. Branson and Rodriquez contribute the final New Horizons paper in the COVID-19 Lessons Learned symposium, providing an accounting and analysis of the response to the anticipated ventilator shortage in the U.S. Finally, Bhardwaj and others provide a figure-intensive review of radiographic abnormalities that demonstrate how anatomic or physiologic conditions drive radiographic appearance.