Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

studies to investigate asthma as a risk factor.[5] Thus, these early findings may not be applicable for patients with asthma in other countries. Indeed, recent reports from the Centers for Disease Control and Prevention indicate that chronic lung disease in 18- to 49-year-old age group is the second most prevalent underlying condition and that this was driven primarily by asthma.[6]

In our small case series, all patients were under the age of 55 years, African American, and on an ICS/LABA at baseline. Wheezing, which is not a symptom associated with COVID-19, was present in all patients. Moreover, 2 of 4 patients who had blood work had leukopenia. Furthermore, all 4 patients had a history of allergic rhinitis to tree pollen. Tree sensitivity is another variable that may have affected their asthma status and/or response to this virus and cannot be excluded as a cause for their exacerbation. Although a previous study found limited association between atopy and COVID-19 infection, this might not be applicable to our patient population and needs to be further investigated.[2] In addition, obesity was identified in 2 of these patients who required admission indicating a possible accumulative risk. Obesity is a known risk factor for poor outcome in asthma and appears to affect their outcome in the setting of COVID-19 infection.

The limitations of our study included a small sample size that was limited to a single site. This case series illustrates 4 cases of COVID-19 infection in patients with asthma. COVID-19 infection was associated with prolonged asthma exacerbation in these cases, especially in those with obesity who needed hospitalization. Our report calls for future multicenter studies on asthma during the COVID-19 pandemic.

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Rethinking respiratory function laboratories in the era of coronavirus disease 2019

Considerations for today and the day after

The members of the 2020 Proficiency Standards for Pulmonary Function Testing Committee of the American Thoracic Society recently raised concerns about pulmonary function testing (PFT) "as a potential avenue for COVID 19 [coronavirus disease 2019] transmission due to the congregation of patients with lung disease and because of the potential for coughing and droplet formation."[1] The committee recommended that "PFT be limited to tests that are only essential for immediate treatment decisions" and that "personal protective equipment (PPE) for healthcare workers should be discussed with local infection control teams."

These concerns are appropriate because spirometry (particularly when forced maneuvers are applied), exercise testing, methacholine challenge, and titration of continuous positive airway pressure for severe obstructive sleep apnea syndrome are all procedures able to generate aerosol. Moreover, although highly efficient antibacterial and antiviral filters are widely adopted as stated by the European Respiratory Society/American Thoracic Society guidelines,[2] ensuring body plethysmograph disinfection and air quality of the laboratory between patient visits is mandatory. However, how long can we postpone all these procedures? Common indications for PFT include evaluation of respiratory symptoms, such as cough and dyspnea; assessment and monitoring of disease severity and progression; monitoring for drug toxicity and efficacy; preoperative assessment[3]; evaluation of the effects of occupational or hazardous exposures; and participation in epidemiologic surveys. In particular, PFT is needed for the diagnosis and management of a considerable group of respiratory diseases, represents a major contributor to the *phenotypic* recognition of treatable traits of airway obstructive diseases (asthma and chronic obstructive pulmonary disease),[4] and is a key element of the future risk assessment of asthma.[5] Furthermore, the measurement of lung volumes is an essential part of severe asthma evaluation because the severity of asthma seems to be linked to enhanced air trapping rather than the level of airflow obstruction. Finally, PFT is used and recommended for the assessment and management of interstitial lung diseases, such as idiopathic pulmonary fibrosis; in particular, the pulmonary function indexes, such as forced vital capacity and carbon monoxide diffusion capacity, are part of the flowchart for pirfenidone or nintedanib prescription.[6]

We believe that in the COVID era, respiratory function laboratories should be considered places with a high intrinsic risk of respiratory infections and cross-contaminations. Until highly effective drug treatments or vaccines are available, we cannot assume that PFT can be performed without adequate PPE for health care personnel. Respiratory function laboratories should be considered highly specialized laboratory units directed by a chief with full responsibility for the safety of health care personnel and quality control. These laboratories should be located in dedicated areas with enough space and ventilation for patients undergoing respiratory function measurements. The use of air purification or ultraviolet and ozone decontamination systems should be applied according to the indications of the hospital or company management staff for rooms where aerosol-generating procedures are performed.[7,8] Time between each procedure should be enough to avoid aggregation and allow for disinfection of the exterior surfaces of the spirometer (and

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plethysmographic cabin) and air-quality generation. More dedicated rooms with more dedicated instruments will be the only way that more tests can be performed simultaneously.

Moreover, it is also possible that our approach to respiratory diseases will change, assuming that PFT will have an acceptable risk-benefit ratio only after the failure of a therapeutic trial for an obstructive disease (asthma or chronic obstructive pulmonary disease) that integrated other procedures (ie, chest radiography or computed tomography and lung ultrasonography). It also seems conceivable that we should think about a shift from the classic bronchoprovocation test to a methacholine test, which generates high amounts of aerosol, or to other more feasible tests (ie, mannitol or acetylcholine tests).

In conclusion, PFT is associated with an increasing risk of COVID-19 transmission among patients and medical teams. Effective prevention and control strategies must be immediately implemented to prevent nosocomial infection diffusion. This recommendation is intended to be followed by health care workers of a PFT laboratory when COVID-19 (or other highly infectious disease) is in an epidemic phase. On the basis of the features of PFT, precaution principles and strategies must be developed that account for 3 specific factors: operating procedure, environment, and equipment. Furthermore, indications of PFT should be followed strictly. We think it is perfectly reasonable to suspend PFT for patients with confirmed or suspected COVID-19 during the contagious phase and to postpone the testing of other patients if it is not imperative. Medical personnel should mandatorily adhere to the standard precautional protocols, and patients should be isolated in a separate area for testing. Disposable inline filters must be used during PFT, and cleaning and disinfection procedures for environment and equipment in PFT laboratories should be consistently performed. Finally, pandemic respiratory infection from COVID-19 opens a new era for respiratory functionalists, who should guarantee as soon as possible safe procedures that cannot be avoided for screening, diagnosis, and follow-up. Impulse oscillometry and fractional exhaled nitric oxide measurement, which do not require forced maneuvers and reduce the potential for coughing and droplet formation, could represent a possible first functional approach to diagnosis and assessment of patients with asthma. In fact, the involvement of small airways has recently gained greater recognition in asthma.[9] We call on the international and national scientific societies to deliver statements on this topic.

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The effect of tezepelumab on hospitalizations and emergency department visits in patients with severe asthma

Check for updates

Asthma affects more than 300 million people worldwide[1] of whom approximately 10% have severe asthma.[2] Up to 87% of patients with severe asthma have uncontrolled disease despite available inhaled therapies.[3] These patients experience frequent exacerbations, which can result in hospitalizations or emergency department (ED) visits, placing a burden on health care systems.[3] In the United States, asthma exacerbations account for approximately 1.8 million ED visits and 189,000 hospitalizations annually,[4] with a mean hospitalization cost of US $14,479 (2016).[5] Thus, there remains a major unmet need in the treatment of severe asthma that could be addressed through the development of therapies that successfully prevent the need for unplanned hospital care.

Tezepelumab is a human monoclonal antibody (IgG2λ) that specifically blocks thymic stromal lymphopoietin from interacting with its receptor complex.[6,7] Thymic stromal lymphopoietin is an upstream epithelium-derived cytokine released in response to inflammatory triggers and is critical to the initiation and persistence of airway inflammation in asthma.[8] In the phase 2b PATHWAY study (Study to Evaluate the Efficacy and Safety of MEDI9929 [AMG 157] in Adult Subjects With Inadequately Controlled, Severe Asthma), tezepelumab significantly reduced exacerbations by up to 71% compared with placebo ($P < .001$) and improved lung function and asthma control in patients with severe, uncontrolled asthma.[6] In a previous analysis, tezepelumab-treated patients had fewer asthma exacerbation-related hospitalizations than those who received placebo.[6] To further our understanding of the treatment effects of

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