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CTS INSPIRATIONS

CTS NEWS

President's Message

"We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard." – John F. Kennedy

This past month, CTS accomplished something that many would consider challenging. While it may not be equivalent to going to the moon, there were moments before and during [CTS's first virtual 2020 Annual Southern California Conference](#) that made it feel like we were voyaging to the moon. We knew that accomplishing a high caliber conference and a dedicated virtual exhibit hall was new to our society and national societies as well. For those that did not have the chance to attend ([it's not too late, you can still register now](#)) and wonder how it went? I felt that the words of others would best describe the conference and the content presented. To provide that additional perspective, I asked Dr. Jessica Goggin, a leader in CTS, who also serves as the director of pulmonary services at UCSD Health, to provide that additional lens.



"I recently had the pleasure to attend the Annual Southern California Virtual Conference presented by the California Thoracic Society. Admittedly, I was quite unsure of what to expect from a virtual conference. As one who struggles to sit and stay engaged under the best of circumstances during in-person conferences, how would I possibly stay engaged during a virtual conference? When I attend a conference, I treasure the connections made during the "gaps", the times we spend waiting for sessions to begin, in line for lunch, and the many informal conversations that are often as valuable as the sessions themselves. I coach others to "Mind the Gap" when they attend conferences, borrowing the phrase I've heard so many times when traveling on the train in the UK to encourage others to embrace these informal opportunities for learning and connection. So how did it go? In a word, brilliant!

The conference was engaging, and the day flew by much faster than expected. Following each session was a live Q&A session. Attendee questions stimulated rich discussion and ideas for future sessions and even research. Presentations by David Chooljian, MD, JD, HEC-C at Loma Linda University on both Business Ethics and Ethics in the ICU were especially thought provoking and timely. As a nurse, I was especially proud to see multidisciplinary colleagues demonstrating their expertise and commitment to our pulmonary community in California such as when Matthew Dartt, RCP, RRT, ACCS and Joseph VanVleet, RCP presented "Ubreathe at UCLA Leveraging RT Navigation & Telemedicine." I look forward to hearing more from and about our multidisciplinary colleagues across California--we are smarter together. Thank you to everyone who contributed to the Annual Southern California Virtual Conference. While I look forward to the day we can connect in person, I am thrilled to say that the virtual conference was a resounding success and I look forward to the next CTS Northern California virtual conference in January 2021." - Jessica Goggin, PhD, MAS, RN

I am ever grateful to those who made CTS's first virtual conference a success and for Dr. Goggin for providing her insight and dedication to making CTS stronger. I also did want to remind all of the CTS members of our "Disaster Guidance: 10 Tips for Staying Healthy During Wildfires" included in this newsletter. Our thoughts and prayers are with those directly and indirectly affected by the ravaging fires.



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EDITOR'S NOTE

How do we practice pulmonary medicine during a pandemic? How do we manage our patients with chronic lung disease, many of whom are on high risk medications? As the articles on management of ILD and COPD in this month's issue aptly illustrate, adapting our practices to the ever present infectious threat and filtering through the ongoing deluge of medical information pouring through traditional and novel media, depends on thoughtfully applying the fundamental biologic and physiologic principles that have always guided our care.

In fact, improving the care of our patients is more critical than ever during this pandemic and education is key to that effort. California held its annual conference on September 11-12, 2020. In addition to the usual innovative programming we have come to expect from our planning committees, we were the first state chapter to hold a completely virtual conference complete with exhibit hall.

As usual, the conference featured gifted teachers who clarified complex concepts for practicing clinicians to apply in real life. The virtual format was a great success. I loved the talks and live Q&A. I loved the flexibility, knowing that the virtual conference will be available for a few more weeks and that I can go back to review brilliant talks like the one given by Dr. Sam Louie, UC Davis on team building and leadership principles exemplified by the interdisciplinary ROAD program. Other outstanding offerings included chief of pulmonary [@LLUHealth](#) Dr. H. Bryant Nguyen's lecture which stresses fundamentals and the need to return to a more physiologic approach to treating sepsis and optimizing oxygen delivery. Former [@atscommunity](#) president [@AtulMalhotra13](#) key note lecture was a much needed expert review of Advancement in PAP Therapies. There were enough clinical pearls to string a long necklace including a succinct, practical approach to diagnosis and treatment of central sleep apnea by UCSD's [@MesarwiMD](#) which emphasized assessing and treating heart failure if present and that acetazolamide and oxygen may be considered for CSA if positive pressure is not possible.

An unexpected benefit of virtual conferences for this introvert was the ability to ask questions within the safe confines of a chat box without having to speak at an open mike in front of a live audience of hundreds of people. Personally, I found the curiosity, empathy and compassion that everyone displayed to be priceless and a huge morale booster. It's not too late to sign up. The lectures will be available for 3 more weeks!

To register for the September conference, click on the following link:

<https://calthoracic.org/events/2020-southern-california-annual-educational-conference/>

Your personal link will be emailed to you upon payment. Once received, you will be able to view all of the presentations and live-recorded question and answer sessions.

COPD Management During COVID-19: Key Takeaways from the Avalanche of Recent Literature

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Key Points:

- The COVID-19 pandemic has significantly affected the management of COPD, and patients with COPD are at higher risk for severe COVID-19 disease and poor outcomes.
- Telemedicine, online pulmonary rehabilitation, mental health support, and aggressive efforts at smoking cessation will be important for maintaining the health of this patient population.
- The backbone of inpatient management of acute COPD exacerbations, including short acting bronchodilators and noninvasive ventilation, should remain, with some modifications.
- There is no evidence to alter the use of inhaled or systemic corticosteroids, outside of standard COPD indications and guidelines

Introduction:

The SARS-CoV-2 viral pandemic (COVID-19) has, in many ways, upended the delivery of healthcare. The management of patients with chronic obstructive pulmonary disease (COPD) during this pandemic poses a unique set of challenges in both the outpatient and inpatient settings, and in the transition between the two. Although our understanding of the virus has improved, these dilemmas have largely been addressed through expert opinion rather than rigorous scientific evidence. This review provides pulmonologists with up-to-date recommendations from the literature for COPD management during this pandemic.

Outpatient COPD Management:

Patients with COPD often require frequent reassessment to ensure optimal disease control, particularly upon diagnosis and around episodes of exacerbation. However, nonessential health services have been limited or shut down to mitigate the spread of the virus, thus curtailing patient access to the fundamental elements of COPD management. Spirometry, integral for obtaining a diagnosis or assessing a change in clinical status, might not be available due to concern about viral aerosolization. Even if available, a negative COVID-19 test is frequently required in the days prior to testing. This can be a burden to patients, who might have difficulties with transportation or be wary of additional visits to healthcare settings.¹ In accordance with American Thoracic Society recommendations, routine pulmonary function testing, often performed annually for surveillance, should likely be deferred while viral transmission remains high².

Furthermore, due to changes in physician access, patients might not be able to be seen in clinic by their primary care physicians or pulmonologists unless they have advanced symptoms. Rather, non-emergent visits are frequently confined to the virtual domain. Elderly patients, who comprise the majority of the COPD population, can have difficulty adapting to the technological requirements of such interactions. Telephone visits are frequently hindered by language barriers or hearing impairment. Additionally, it is often difficult to remotely assess patient health literacy, and in particular, to instruct proper inhaler usage. Despite the above impediments, data from randomized control trials suggest that telemedicine in COPD is noninferior to face-to-face care in maintaining quality of life and preventing exacerbations and hospitalizations. More frequent visits might be necessary, however, particularly for less established and less health literate patients.³⁻⁷

Pulmonary rehabilitation is another mainstay of COPD treatment that has been affected by the pandemic. It is known to improve medication adherence, exercise capacity, dyspnea, and quality of life. Some studies suggest a decrease in exacerbations and hospitalizations, and even a mortality benefit.⁸⁻⁹ COVID-19, however, has severely restricted access to this pillar of COPD care. Online pulmonary rehabilitation programs have been growing, even prior to the pandemic, to allow access for more patients. Some smaller studies have demonstrated the noninferiority of such programs.¹⁰⁻¹² As we head into autumn and winter expecting a surge in COVID-19 cases, expansion of these online programs will be paramount to continuing optimal care for this population.

Finally, providers must recognize the deleterious effect on patients' mental health caused by living with a chronic respiratory condition during this pandemic. Fear of a higher risk of death from severe COVID-19 disease can precipitate significant anxiety and lead to extreme isolation. Virtual COPD support groups and other online resources, accessible through the COPD Foundation website, can help patients cope with this psychological burden¹³.

Inpatient COPD Management:

Hospital management of acute exacerbations of COPD (AECOPD) has also faced unique challenges since the pandemic began. Out of fear of viral exposure, patients might not present to the hospital until their symptoms are more severe, resulting in a delay of care^{1,14}. Given the overlapping respiratory symptoms between AECOPD and COVID-19, as well as the low sensitivity of rapid COVID-19 tests, patients might be kept in isolation for several days while waiting for the results of standard tests. For healthcare workers, the added time and psychological burden of donning and doffing personal protective equipment can lead to decreases in the quality and frequency of care.¹⁵ Many hospitals, out of concern for viral aerosolization, have restricted the use of nebulized short acting bronchodilators (SABDs) in COVID-19 positive patients and patients under investigation (PIs). Instead, these medications are delivered by metered dose inhalers (MDIs).¹⁶ The data is conflicting on whether MDIs, when compared to hand-held nebulizers, are an effective method of delivering SABDs during moderate to severe AECOPD. It should be noted that in studies that have shown noninferiority of MDIs, spacers were incorporated. As such, spacers should always be used when MDIs are the mode of delivery for SABDs in patients hospitalized with AECOPD.¹⁶⁻²⁰

Noninvasive positive-pressure ventilation (NIPPV) has been shown to be highly beneficial in AECOPD, and can prevent intubation.²¹ Given these known benefits, it should not be withheld in COVID-19 positive patients or PUIs with primarily hypercarbic respiratory failure.¹⁶ When hypoxemic respiratory failure/ARDS is concurrent, early intubation might be preferred as noninvasive ventilation has been associated with worse outcomes in these disease states.²² If NIPPV is used on COVID-19 positive patients or PUIs, negative pressure rooms and in-line viral filters should be employed to minimize viral aerosolization. Additionally, mask seal should be optimized to avoid air leakage¹⁶. If patients with COVID-19 and AECOPD have hypoxemic respiratory failure without ventilatory failure, high flow nasal cannula can be effective at improving oxygenation and reducing work of breathing through dead space washout of carbon dioxide²³. The level of aerosolization caused by high-flow nasal cannula is disputed, with some studies demonstrating minimal viral dispersal. At the minimum, a surgical mask over the patient's nose and mouth is recommended¹⁶.

COVID-19 Risk in COPD:

Bronchial epithelial cells of cigarette smokers and patients with COPD express elevated levels of the ACE-2 receptor, which binds to a SARS-CoV-2 envelope spike protein and facilitates viral entry. While this has not correlated with greater risk of contracting COVID-19, both cigarette smoking and COPD have been associated with increased severity of COVID-19 disease.^{1, 24-29} A meta-analysis of 22 retrospective studies with a cumulative 13,184 patients, showed a 2 to 3.5-fold increased risk of severe COVID-19 disease in cigarette smokers and a 4-fold increased risk of severe disease in patients with COPD.³⁰

Clearly, smoking cessation is of utmost importance. However, in the face of pandemic-driven anxiety, social isolation, and decreased opportunity for in-person counseling, this already difficult endeavor is all the more daunting for patients. Telemedicine has previously been shown to be effective at fostering smoking cessation³¹. Along with the usual pharmacologic therapies, patient education about the benefits of smoking cessation specific to COVID-19, referral to smoking-abstinence hotlines, and frequent telehealth visits with physicians and midlevel providers will all be essential to sustained success³².

The American College of Chest Physicians, American Lung Association, American Thoracic Society, and COPD Foundation jointly recommend that all patients with chronic lung disease wear a non-N95 facial covering to mitigate viral spread. There is no high quality evidence that facial coverings affect oxygen or carbon dioxide gas exchange. As such, most patients with COPD should wear non-N95 masks when in public. Exemptions for individuals with more severe dyspnea or gas exchange abnormalities, who might be intolerant to masks, should be made at the discretion of the patient's treating pulmonologist.³³

Data on the effect of inhaled and systemic corticosteroids on COVID-19 risk is evolving. Initially, it was thought that steroids should be avoided due to evidence for increased mortality and prolonged viral shedding during the SARS-CoV-1 and MERS epidemics³⁴⁻³⁶. Additionally, it is known that inhaled corticosteroids (ICS) increase the risk of respiratory infections in COPD, particularly bacterial pneumonia³⁷. However, more recent data indicates that ICS decrease ACE-2 receptor levels on the bronchial epithelium, lending to biological plausibility for a protective effect³⁸. We lack clinical evidence, however, for the introduction, withdrawal or titration of ICS for the sole purpose of modulating COVID-19 risk. Of note, the RECOVERY trial demonstrated a substantial mortality benefit for systemic dexamethasone in COVID-19 positive patients with an acute supplemental oxygen requirement³⁹. This may help allay concerns about the use of short courses of systemic corticosteroids in COPD patients with COVID-19, when necessary. Given current data, and realizing that uncontrolled COPD would undoubtedly be a risk for poor COVID-19 outcomes, inhaled and systemic steroids should be used as indicated in accordance with COPD guidelines.

COVID-19 has significantly affected the care of patients with COPD. We must diligently adapt to these new realities so that we can continue to deliver optimal treatment to this patient population and mitigate its increased risk of poor COVID-19 outcomes.

References

1. Leung JM, Niikura M, Yang CWT, Sin DD. COVID-19 and COPD. *Eur Respir J.* 2020;56(2):2002108. Published 2020 Aug 13. doi:10.1183/13993003.02108-2020
2. McCormack M, Kaminsky D. "Pulmonary Function Laboratories: Advice Regarding COVID-19." *ATS: Disease Related Resources.* www.thoracic.org/professionals/clinical-resources/disease-related-resources/pulmonary-function-laboratories.php
3. Pinnock H, Hanley J, McCloughan L, et al. Effectiveness of telemonitoring integrated into existing clinical services on hospital admission for exacerbation of chronic obstructive pulmonary disease: researcher blind, multicentre, randomised controlled trial. *BMJ.* 2013;347:f6070. Published 2013 Oct 17. doi:10.1136/bmj.f6070
4. McDowell JE, McClean S, FitzGibbon F, Tate S. A randomised clinical trial of the effectiveness of home-based health care with telemonitoring in patients with COPD. *J Telemed Telecare.* 2015;21(2):80-87. doi:10.1177/1357633X14566575
5. Au DH, Macaulay DS, Jarvis JL, Desai US, Birnbaum HG. Impact of a telehealth and care management program for patients with chronic obstructive pulmonary disease. *Ann Am Thorac Soc.* 2015;12(3):323-331. doi:10.1513/AnnalsATS.201501-042OC
6. Hardinge M, Rutter H, Velardo C, et al. Using a mobile health application to support self-management in chronic obstructive pulmonary disease: a six-month cohort study. *BMC Med Inform Decis Mak.* 2015;15:46. Published 2015 Jun 18. doi:10.1186/s12911-015-0171-5
7. Ho TW, Huang CT, Chiu HC, et al. Effectiveness of Telemonitoring in Patients with Chronic Obstructive Pulmonary Disease in Taiwan-A Randomized Controlled Trial. *Sci Rep.* 2016;6:23797. Published 2016 Mar 31. doi:10.1038/srep23797
8. McCarthy B, Casey D, Devane D, Murphy K, Murphy E, Lacasse Y. Pulmonary rehabilitation for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2015;(2):CD003793. Published 2015 Feb 23. doi:10.1002/14651858.CD003793.pub3
9. Ries AL, Bauldoff GS, Carlin BW, et al. Pulmonary Rehabilitation: Joint ACCP/AACVPR Evidence-Based Clinical Practice Guidelines. *Chest.* 2007;131(5 Suppl):4S-42S. doi:10.1378/chest.06-2418
10. Bourne S, DeVos R, North M, et al. Online versus face-to-face pulmonary rehabilitation for patients with chronic obstructive pulmonary disease: randomised controlled trial. *BMJ Open.* 2017;7(7):e014580. Published 2017 Jul 17. doi:10.1136/bmjopen-2016-014580
11. Vasilopoulou M, Papaioannou AI, Kaltsakas G, et al. Home-based maintenance tele-rehabilitation reduces the risk for acute exacerbations of COPD, hospitalisations and emergency department visits. *Eur Respir J.* 2017;49(5):1602129. Published 2017 May 25. doi:10.1183/13993003.02129-2016
12. Paneroni M, Colombo F, Papalia A, et al. Is Telerehabilitation a Safe and Viable Option for Patients with COPD? A Feasibility Study. *COPD.* 2015;12(2):217-225. doi:10.3109/15412555.2014.933794
13. Philip KEJ, Lonergan B, Cumella A, et al. COVID-19 related concerns of people with long-term respiratory conditions: A qualitative study. *medRxiv;* 2020. DOI: 10.1101/2020.06.19.20128207.
14. Hartnett K, Kite-Powell A, Devies J, et al. "Impact of the COVID-19 Pandemic on Emergency Department Visits - United States, January 1, 2019-May 30, 2020." *CDC: Morbidity and Mortality Weekly Report.* <https://www.cdc.gov/mmwr/volumes/69/wr/mm6923e1.htm>
15. Abad C, Fearday A, Safdar N. Adverse effects of isolation in hospitalised patients: a systematic review. *J Hosp Infect.* 2010;76(2):97-102. doi:10.1016/j.jhin.2010.04.027
16. Attaway A, Hatipoğlu U. Management of patients with COPD during the COVID-19 pandemic [published online ahead of print, 2020 Jul 17]. *Cleve Clin J Med.* 2020;10.3949/ccjm.87a.ccc007. doi:10.3949/ccjm.87a.ccc007

17. Abad C, Fearday A, Safdar N. Adverse effects of isolation in hospitalised patients: a systematic review. *J Hosp Infect.* 2010;76(2):97-102. doi:10.1016/j.jhin.2010.04.027
18. Attaway A, Hatipoğlu U. Management of patients with COPD during the COVID-19 pandemic [published online ahead of print, 2020 Jul 17]. *Cleve Clin J Med.* 2020;10.3949/ccjm.87a.ccc007. doi:10.3949/ccjm.87a.ccc007
19. Berry RB, Shinto RA, Wong FH, Despars JA, Light RW. Nebulizer vs spacer for bronchodilator delivery in patients hospitalized for acute exacerbations of COPD. *Chest.* 1989;96(6):1241-1246. doi:10.1378/chest.96.6.1241
20. Maguire GP, Newman T, DeLorenzo LJ, Brown RB, Stone D. Comparison of a hand-held nebulizer with a metered dose inhaler-spacer combination in acute obstructive pulmonary disease. *Chest.* 1991;100(5):1300-1305. doi:10.1378/chest.100.5.1300
21. Rottman SJ, Robinson NE, Birnbaum ML. Comparison of inhaled metaproterenol via metered-dose and hand-held nebulization in prehospital treatment of bronchospasm. *Prehosp Disaster Med.* 1996;11(4):280-284. doi:10.1017/s1049023x00043132
22. Van Geffen WH, Douma WR, Slebos DJ, Kerstjens HA. Bronchodilators delivered by nebuliser versus pMDI with spacer or DPI for exacerbations of COPD. *Cochrane Database Syst Rev.* 2016;(8):CD011826. Published 2016 Aug 29. doi:10.1002/14651858.CD011826.pub2
23. Lightowler JV, Wedzicha JA, Elliott MW, Ram FS. Non-invasive positive pressure ventilation to treat respiratory failure resulting from exacerbations of chronic obstructive pulmonary disease: Cochrane systematic review and meta-analysis. *BMJ.* 2003;326(7382):185. doi:10.1136/bmj.326.7382.185
24. Frat JP, Thille AW, Mercat A, et al. High-flow oxygen through nasal cannula in acute hypoxemic respiratory failure. *N Engl J Med.* 2015;372(23):2185-2196. doi:10.1056/NEJMoa1503326
25. Sun J, Li Y, Ling B, et al. High flow nasal cannula oxygen therapy versus non-invasive ventilation for chronic obstructive pulmonary disease with acute-moderate hypercapnic respiratory failure: an observational cohort study [published correction appears in *Int J Chron Obstruct Pulmon Dis.* 2019 Jul 15;14:1567]. *Int J Chron Obstruct Pulmon Dis.* 2019;14:1229-1237. Published 2019 Jun 5. doi:10.2147/COPD.S206567
26. Leung JM, Yang CX, Tam A, et al. ACE-2 expression in the small airway epithelia smokers and COPD patients: implications for COVID-19. *Eur Respir J.* 2020;55(5):2000688. Published 2020 May 14. doi:10.1183/13993003.00688-2020
27. Cai G, Bossé Y, Xiao F, Kheradmand F, Amos CI. Tobacco Smoking Increases then Lung Gene Expression of ACE2, the Receptor of SARS-CoV-2. *Am J Respir Crit Care Med.* 2020;201(12):1557-1559. doi:10.1164/rccm.202003-0693LE
28. Li G, He X, Zhang L, et al. Assessing ACE2 expression patterns in lung tissues in the pathogenesis of COVID-19. *J Autoimmun.* 2020;112:102463. doi:10.1016/j.jaut.2020.102463
29. Zhang H, Rostami MR, Leopold PL, et al. Expression of the SARS-CoV-2 ACE2 Receptor in the Human Airway Epithelium. *Am J Respir Crit Care Med.* 2020;202(2):219-229. doi:10.1164/rccm.202003-0541OC
30. Leung JM, Yang CX, Sin DD. COVID-19 and nicotine as a mediator of ACE-2. *Eur Respir J.* 2020;55(6):2001261. Published 2020 Jun 4. doi:10.1183/13993003.01261-2020
31. Russo P, Bonassi S, Giacconi R, Malavolta M, Tomino C, Maggi F. COVID-19 and smoking: is nicotine the hidden link?. *Eur Respir J.* 2020;55(6):2001116. Published 2020 Jun 4. doi:10.1183/13993003.01116-2020
32. Maguire GP, Newman T, DeLorenzo LJ, Brown RB, Stone D. Comparison of a hand-held nebulizer with a metered dose inhaler-spacer combination in acute obstructive pulmonary disease. *Chest.* 1991;100(5):1300-1305. doi:10.1378/chest.100.5.1300
33. Rottman SJ, Robinson NE, Birnbaum ML. Comparison of inhaled metaproterenol via metered-dose and hand-held nebulization in prehospital treatment of bronchospasm. *Prehosp Disaster Med.* 1996;11(4):280-284. doi:10.1017/s1049023x00043132
34. Van Geffen WH, Douma WR, Slebos DJ, Kerstjens HA. Bronchodilators delivered by nebuliser versus pMDI with spacer or DPI for exacerbations of COPD. *Cochrane Database Syst Rev.* 2016;(8):CD011826. Published 2016 Aug 29. doi:10.1002/14651858.CD011826.pub2
35. Lightowler JV, Wedzicha JA, Elliott MW, Ram FS. Non-invasive positive pressure ventilation to treat respiratory failure resulting from exacerbations of chronic obstructive pulmonary disease: Cochrane systematic review and meta-analysis. *BMJ.* 2003;326(7382):185. doi:10.1136/bmj.326.7382.185
36. Frat JP, Thille AW, Mercat A, et al. High-flow oxygen through nasal cannula in acute hypoxemic respiratory failure. *N Engl J Med.* 2015;372(23):2185-2196. doi:10.1056/NEJMoa1503326

37. Sun J, Li Y, Ling B, et al. High flow nasal cannula oxygen therapy versus non-invasive ventilation for chronic obstructive pulmonary disease with acute-moderate hypercapnic respiratory failure: an observational cohort study [published correction appears in *Int J Chron Obstruct Pulmon Dis*. 2019 Jul 15;14:1567]. *Int J Chron Obstruct Pulmon Dis*. 2019;14:1229-1237. Published 2019 Jun 5. doi:10.2147/COPD.S206567
38. Leung JM, Yang CX, Tam A, et al. ACE-2 expression in the small airway epithelia smokers and COPD patients: implications for COVID-19. *Eur Respir J*. 2020;55(5):2000688. Published 2020 May 14. doi:10.1183/13993003.00688-2020
39. Cai G, Bossé Y, Xiao F, Kheradmand F, Amos CI. Tobacco Smoking Increases the Lung Gene Expression of ACE2, the Receptor of SARS-CoV-2. *Am J Respir Crit Care Med*. 2020;201(12):1557-1559. doi:10.1164/rccm.202003-0693LE
40. Li G, He X, Zhang L, et al. Assessing ACE2 expression patterns in lung tissues in the pathogenesis of COVID-19. *J Autoimmun*. 2020;112:102463. doi:10.1016/j.jaut.2020.102463
41. Zhang H, Rostami MR, Leopold PL, et al. Expression of the SARS-CoV-2 ACE2 Receptor in the Human Airway Epithelium. *Am J Respir Crit Care Med*. 2020;202(2):219-229. doi:10.1164/rccm.202003-0541OC
42. Leung JM, Yang CX, Sin DD. COVID-19 and nicotine as a mediator of ACE-2. *Eur Respir J*. 2020;55(6):2001261. Published 2020 Jun 4. doi:10.1183/13993003.01261-2020
43. Russo P, Bonassi S, Giacconi R, Malavolta M, Tomino C, Maggi F. COVID-19 and smoking: is nicotine the hidden link?. *Eur Respir J*. 2020;55(6):2001116. Published 2020 Jun 4. doi:10.1183/13993003.01116-2020
44. Sanchez-Ramirez DC, Mackey D. Underlying respiratory diseases, specifically COPD, and smoking are associated with severe COVID-19 outcomes: A systematic review and meta-analysis [published online ahead of print, 2020 Jul 30]. *Respir Med*. 2020;171:106096. doi:10.1016/j.rmed.2020.106096
45. "American College of Chest Physicians, American Lung Association, American Thoracic Society and COPD Foundation Statement on Importance of Patients with Chronic Lung Disease Wearing Facial Coverings During COVID-19 Pandemic." ATS: 2020 Press Releases. www.thoracic.org/about/newsroom/press-releases/journal/2020/statement-on-importance-of-patient-with-chronic-lung-disease-wearing-face-masks.php
46. Stockman LJ, Bellamy R, Garner P. SARS: systematic review of treatment effects. *PLoS Med*. 2006;3(9):e343. doi:10.1371/journal.pmed.0030343
47. Alfaraj SH, Al-Tawfiq JA, Assiri AY, Alzahrani NA, Alanazi AA, Memish ZA. Clinical predictors of mortality of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection: A cohort study. *Travel Med Infect Dis*. 2019;29:48-50. doi:10.1016/j.tmaid.2019.03.004
48. Arabi YM, Mandourah Y, Al-Hameed F, et al. Corticosteroid Therapy for Critically Ill Patients with Middle East Respiratory Syndrome. *Am J Respir Crit Care Med*. 2018;197(6):757-767. doi:10.1164/rccm.201706-1172OC
49. Kew KM, Seniukovich A. Inhaled steroids and risk of pneumonia for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2014;(3):CD010115. Published 2014 Mar 10. doi:10.1002/14651858.CD010115.pub2
50. Peters MC, Sajuthi S, Deford P, et al. COVID-19-related Genes in Sputum Cells in Asthma. Relationship to Demographic Features and Corticosteroids. *Am J Respir Crit Care Med*. 2020;202(1):83-90. doi:10.1164/rccm.202003-0821OC
51. RECOVERY Collaborative Group, Horby P, Lim WS, et al. Dexamethasone in Hospitalized Patients with Covid-19 - Preliminary Report [published online ahead of print, 2020 Jul 17]. *N Engl J Med*. 2020;NEJMoa2021436. doi:10.1056/NEJMoa2021436

Management of interstitial lung disease during the COVID-19 Pandemic: An expert-based opinion statement.

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Key Points:

1. Data specific to COVID-19 infected patients with interstitial lung disease (ILD) is sparse but suggests increased mortality and morbidity.
2. Based on our observation during this time, ILD patients have become more socially isolated and have experienced delays in care. Telehealth visits in conjunction with home vital sign monitoring are recommended for follow up of stable ILD patients. New evaluations should not be delayed
3. Antifibrotics (Nintendanib and Pirfenidone) and immunosuppressive medications may be continued at previous doses in patients without active COVID 19 infection to reduce progression of their ILD.
4. In the setting of active COVID-19 infection, antifibrotics should be continued if there are no active contraindications. Immunosuppressive medications may need to be stopped or dose-adjusted with careful monitoring of their lung disease.
5. Current evidence-based standard of care therapies for COVID-19 should be administered to hospitalized patients with ILD with COVID-19.

Introduction :

The COVID-19 pandemic has infected over 6 million people and caused over 200,000 deaths in the United States. The ubiquity of this virus has fundamentally changed the practice of medicine. Compulsory viral testing prior to elective procedures, increases in telemedicine usage, in-person pre visit screening, waiting room physical distancing, systematic room cleaning, and universal face mask requirements reflect a new dynamic in outpatient practice. Patients with certain co-morbidities such as diabetes, obesity, cardiovascular disease, and chronic lung disease are at increased risk for complications due to COVID-19 (3, 6). Interstitial lung disease (ILD) includes a diverse group of diseases that may cause inflammation and scarring of the lung parenchyma resulting in impairment of lung function. Treatment options are based on the sub-type of disease and can be limited; outcomes can often be poor. Based on current guidelines, antifibrotic therapy (nintendanib and pirfenidone) is recommended for use in patients with Idiopathic pulmonary fibrosis (IPF) and certain other progressive fibrotic ILDs. Immunosuppressive therapy (steroids and steroid sparing agents) are frequently used in the management of inflammatory ILDs, including Sarcoidosis, connective tissue disease related ILD, and hypersensitivity pneumonitis, for the purpose of disease stabilization (18). While data in ILD patients with COVID-19 is limited, these patients appear to be less likely to contract COVID-19 than the general population but are particularly at risk for hospitalization and

death if they are infected (13, 27). This statement, based on a comprehensive review of current literature as well as our ILD center experience, is designed to help guide pulmonologists in the management of ILD patients during the COVID-19 pandemic.

ILD Patient experience during the COVID-19 pandemic:

The COVID 19 pandemic has brought unique challenges to patients living with ILD. Already socially isolated due to reduced functional status and sometimes the need for supplemental oxygen, many patients have become further isolated from their support system which may lead to further negative consequences on their mental health (12). In addition, ILD patients have described concern regarding their personal vulnerability in the event of an infection and the perception that they may be denied aggressive care due to their underlying condition; this may further exacerbate feelings of depression and anxiety (12). Many patients with persistent cough and shortness of breath describe themselves as increasingly isolated by society as their symptoms are regarded with suspicion and concern publicly.

Based on these observations, it is our recommendation that patients should be encouraged to be in regular contact with family or caregivers either virtually or judiciously in person, to continue to maintain some level of social support. Additionally, we encourage patients to virtually attend support groups sponsored by their local institutions, and national societies such as the American Lung Association (ALA) <https://www.lung.org/help-support/better-breathers-club> and the Pulmonary Fibrosis Foundation (PFF) <https://www.pulmonaryfibrosis.org/life-with-pf/support-groups>.

Diagnosis of the ILD patient during the COVID-19 pandemic:

In person visits have long presented challenges to patients with ILD due to logistical difficulties. During the COVID-19 pandemic, many ILD patients test positive for symptom-based screening for COVID due to their baseline symptoms, which may preclude them from being seen in person. These challenges may cause unnecessary delays in routine health care. Patients with stable ILD should be encouraged to use telemedicine visits as a default to avoid any delays in care. In-person visits are recommended to evaluate for changes in clinical status or if virtual visits do not provide the necessary information required to provide optimal care.

New referrals for ILD evaluation should be evaluated expeditiously. Delays in diagnosis of ILD, particularly IPF, have been shown to lead to an increase in mortality (14), so even in the setting of a pandemic, delays should be avoided if possible. At our institution, new patients meet their clinician initially through a virtual visit to provide a detailed history and undergo initial work up. Once patients are known to the clinician, the second visit is arranged in-person for physical examination, oxygen testing and review of work up. If there is any concern for COVID infection, patients are asked to get COVID testing prior to their in-person visit. The in-person visit tends to be shorter and focused, thus minimizing contact with health care centers and reduces staff and room utilization in clinic. Since clinic rooms need to be disinfected in between patients, this approach also saves time. Patients are asked to get full pulmonary function testing (PFTs) to assess severity of the disease in our PFT labs which are operating with COVID-19 specific protocols in place. Patients are instructed about masking, hand sanitization, and social distancing while in the medical center to minimize potential aerosol exposure.

If a diagnosis is not overtly evident after initial evaluation and HRCT, cases are presented to an expert multidisciplinary discussion (MDD) for further evaluation. At UCSD Health, MDD continue to be held twice monthly as before but are now held virtually to reduce faculty exposure risk. Decisions to pursue invasive testing, per usual guidelines, continue to be based on the consensus opinion of the MDD and have not been affected by the pandemic except for the need for COVID testing prior to procedures. We recommend considering patient characteristics, speed of ILD progression, diagnostic certainty of MDD, and rates of community spread of COVID within the community for other centers in their decision to obtain invasive testing (15). In instances where patients do not wish to pursue further testing due to concern for infection, we have employed empiric therapy with close follow up.

Outpatient Management of ILD patients during the COVID-19 Pandemic:

a) General Precautions

As per CDC and ATS guidelines, standard preventative measures should be taken by all ILD patients including frequent hand washing, avoidance of sick contacts, and avoidance of touching the eyes, nose and mouth with unwashed hands. Face masks should be worn in public with oxygen supplementation without affecting oxygenation or causing hypercapnia (16). If individuals with ILD cannot tolerate face masks, we recommend physical distancing and frequent handwashing. ILD patients should stay at home as much as possible and avoid crowds and non-essential travel. We advise patients to stock up with at least 3 months of supplies and necessary medications. In our practice, ILD patients with mild disease may return to work if their work permits them to practice social distancing and avoid contact with others.

Family members, caretakers, and household help should also adhere to the standard preventative measures described above. Caretakers are advised to help monitor patients for atypical symptoms, and stock groceries and medications for them. Any caretaker showing symptoms should avoid contact until cleared by a physician.

b) Medications

Antifibrotic therapy (pirfenidone/nintedanib) may be initiated and continued for patients, per guideline recommendations, as prior to the pandemic with shared thoughtful care and consideration of the challenges to side effect management and challenges of routine lab monitoring (15). In terms of immunomodulatory medications, there is some data that suggests that community acquired respiratory viruses may cause more severe disease in immunocompromised patients. However, COVID positive ILD patients on chronic immunosuppression were not found to have an elevated risk of death compared to COVID positive ILD patients on no immunosuppression (27). Therefore, based on limited data and societal guidelines, it is reasonable to continue immunosuppressive medications for patients already on therapy and to initiate therapy for ILD patients with a clear clinical indication (10, 11, 15, 21, 22). If patients feel anxious about initiating or continuing immunosuppressants, shared decision making that factors the risks and benefits should occur (15). At our institution, we have initiated and continued anti-fibrotics as usual and continued immunosuppressants at previous doses in most patients. Initiation of new immunosuppressants is done on a case-by-case basis depending on the rate of disease progression, patient preference and risk of COVID exposure.

c) Pulmonary Rehabilitation and Support Groups

Patients may resume pulmonary rehabilitation in areas where facilities have re-opened due to low prevalence of COVID-19 after ensuring that COVID-19 specific precautions are in place at the facility. Patients should be reminded to practice established precautions while at pulmonary rehab facilities. In areas where facilities are still closed or if patients are hesitant to travel to the facility, home exercises may serve as an adjunct to pulmonary rehabilitation. There are videos available [online](#) thru the Pulmonary Fibrosis Foundation that demonstrate home exercises (25, 26). ATS resources for PR programs include <https://www.thoracic.org/members/assemblies/assemblies/pr/resources/ats-pr-assembly-re-opening-pr-document-final.pdf>

Local support groups are invaluable, and many have resumed virtually at routine intervals. These may be used as opportunities to reinforce safety measures to minimize risk of COVID and refer to home rehab exercises. We encourage patients to routinely attend their local and national support groups via video conferencing.

d) Monitoring

Based on ILD guidelines, patients with known ILD should be routinely re-assessed every 3-6 months. With the aforementioned access issues, telemedicine has a role in the on-going care of stable patients. We encourage the use of remote home spirometry and vital signs to monitor for signs of clinical deterioration, when available. In our lung transplant program, home spirometry

replaced hospital-based spirometry entirely during the early days of the pandemic. As patients return to clinic, we plan to investigate how closely home spirometry correlates with testing performed by a clinic-based respiratory therapist. The spirometry is subsequently uploaded into the electronic medical record by the patient and is instantly available for the provider to review. Formal PFTs and spirometry should only be done in centers where rates of COVID infection are low and COVID specific protocols have been put in place. PFTs or spirometry at our institution are done based on the stability of patients' disease. Patients with relatively stable disease are monitored with less frequent spirometry (every 6-12 months) as long as their clinical status is unchanged. Patients with worsening symptoms or home spirometry are evaluated promptly with an in-person clinic visit which includes a COVID-19 nasal swab, formal PFTs, 6 minute walk test and chest x-ray. Follow up care, dictated by initial testing, including potential procedures and CT scans is not delayed due to the pandemic.

Inpatient Management of ILD patients during the COVID-19 Pandemic

a) The COVID-19 positive ILD patient

As patients with ILD are at higher risk for deterioration (13, 27), mild and early COVID infections need to be managed promptly. At our program, we encourage admission of ILD patients with COVID infection to the hospital for close monitoring even if they have mild symptoms and adequate oxygen saturation. Pulmonary consultation is obtained for any ILD patient admitted with COVID-19 pneumonia. We assess goals of care early with the assistance of Palliative Care.

It is our practice to routinely give empiric coverage for community acquired pneumonia for any ILD patient admitted with COVID-19. Patients should be continued on their pre-existing FDA approved anti-fibrotic therapy (nintedanib / pirfenidone) in the absence of any active contraindication. Renal failure and transaminitis are frequently seen in COVID-19 infection and may require temporary discontinuation or dose adjustment of antifibrotic therapy. Additionally, we recommend that patients requiring full dose anticoagulation discontinue nintedanib due to a theoretically increased risk of bleeding with concomitant use.

There is little evidence regarding the minimization or management pattern of immunosuppression, especially in the ILD population infected by COVID-19. Based on case reports and studies from SARS/MERS epidemics, we recommend holding medications like Mycophenolate mofetil, Azathioprine, Tocilizumab, or Rituximab for the first 2 weeks of the infection to improve chances of viral clearance especially in hospitalized patients and resuming after the virus has cleared and patients is asymptomatic (21, 22). Dexamethasone has been shown to reduce the risk of death in COVID-19 patients who are critically ill or requiring supplemental oxygen. We recommend use of dexamethasone for the ILD patient with COVID-19 who is requiring oxygen, at doses similar to those used in the trial (6). The role of steroids in asymptomatic and oxygen independent cases is unclear at this time. In patients with severe COVID-19 pneumonia, we consider administration of pulse dose steroids on a case by case basis.

ILD patients with COVID-19 pneumonia may receive a 5-day course of remdesivir to help with viral clearance (7). At our institution, we recommend against the use of tocilizumab for ILD patients with COVID-19 pneumonia based on the published results of the COVACTA trial (23). We also recommend against the routine use of hydroxychloroquine or lopinavir/ritonavir (Kaletra) based on published data (2).

Specific studies for COVID-19 typically exclude patients with chronic lung disease, but study drugs may be given for compassionate use to ILD patients at the discretion of the treating pulmonologist.

b) The COVID-19 positive ILD patient requiring ICU admission

ILD patients with COVID-19 should be informed of the high risk of mortality associated with intubation upon admission. At our institution, intubation is generally avoided for COVID positive ILD patients, and when utilized, is generally time limited. We may perform a bronchoscopy with bronchoalveolar lavage if tolerated in intubated patients with ILD to rule out alternative etiologies of decompensation. At our center, a lung protective ventilation strategy and early proning is employed for intubated patients (19). All hospitalized ILD patients with COVID-19 should receive venous thromboembolic (VTE) prophylaxis. Full dose anticoagulation may be considered for patients with evidence of arterial or venous thrombosis or in the event of rapid clinical deterioration (20). Both nintedanib and pirfenidone are only available in oral formulations so these medications would need to be discontinued in the event of intubation.

Conclusion

Management of ILD patients during the COVID19 pandemic is challenging. Use of telehealth and closer monitoring of patients is needed to prevent delays in care and harm. Recommendations regarding treatment of COVID in ILD patients is mostly clinical practice and expert opinion based at this time and there is a pressing need for more research to establish guidelines for this patient population.

References:

- 1) Akram A. Overwhelming COVID-19 Sepsis in a Patient With Idiopathic Pulmonary Fibrosis. *Cureus*. 2020;12(7):e9320. Published 2020 Jul 21. doi:10.7759/cureus.9320
- 2) Corrao S, Natoli G, Cacopardo B. A Trial of Lopinavir-Ritonavir in Covid-19. *N Engl J Med*. 2020;382(21):e68. doi:10.1056/NEJMc2008043
- 3) George PM, Wells AU, Jenkins RG. Pulmonary fibrosis and COVID-19: the potential role for antifibrotic therapy. *Lancet Respir Med*. 2020;8(8):807-815. doi:10.1016/S2213-2600(20)30225-3
- 4) Lan SH, Lai CC, Huang HT, Chang SP, Lu LC, Hsueh PR. Tocilizumab for severe COVID-19: a systematic review and meta-analysis. *Int J Antimicrob Agents*. 2020;56(3):106103. doi:10.1016/j.ijantimicag.2020.106103
- 5) Rajasurya V, Gunasekaran K, Damarla V, Kolluru A. A Fatal Case of Coronavirus Disease 2019 (COVID-19) in a Patient With Idiopathic Pulmonary Fibrosis. *Cureus*. 2020;12(6):e8432. Published 2020 Jun 3. doi:10.7759/cureus.8432
- 6) RECOVERY Collaborative Group, Horby P, Lim WS, et al. Dexamethasone in Hospitalized Patients with Covid-19 - Preliminary Report [published online ahead of print, 2020 Jul 17]. *N Engl J Med*. 2020; doi:10.1056/NEJMoa2021436
- 7) Spinner CD, Gottlieb RL, Criner GJ, et al. Effect of Remdesivir vs Standard Care on Clinical Status at 11 Days in Patients With Moderate COVID-19: A Randomized Clinical Trial [published online ahead of print, 2020 Aug 21]. *JAMA*. 2020; doi:10.1001/jama.2020.16349
- 8) <https://www.pulmonaryfibrosis.org/medical-community/covid-19-resources>
- 9) <https://pulmonaryfibrosisnews.com/>
- 10) Thng ZX, De Smet MD, Lee CS, et al. COVID-19 and immunosuppression: a review of current clinical experiences and implications for ophthalmology patients taking immunosuppressive drugs *British Journal of Ophthalmology* Published Online First: 12 June 2020. doi: 10.1136/bjophthalmol-2020-316586
- 11) López V, Vázquez T, Alonso-Titos J, et al. Recommendations on management of the SARS-CoV-2 coronavirus pandemic (Covid-19) in kidney transplant patients, *Nefrología* 2020; 40(3): 265-271
- 12) Gisli Jenkins G, Tom Drake, Annemarie B Docherty Outcome of hospitalisation for COVID-19 in patients with Interstitial Lung Disease: An international multicentre study. medRxiv 2020.07.15.20152967; doi: <https://doi.org/10.1101/2020.07.15.20152967>
- 13) Huang, H, Zhang, M, Chen, C, et al. Clinical characteristics of COVID-19 in patients with preexisting ILD: A retrospective study in a single center in Wuhan, China. *J Med Virol*. 2020; 1–9.

- 14) Lamas DJ, Kawut SM, Bagiella E, Philip N, Arcasoy SM, Lederer DJ. Delayed access and survival in idiopathic pulmonary fibrosis: a cohort study. *Am J Respir Crit Care Med*. 2011;184(7):842-847. doi:10.1164/rccm.201104-0668OC
- 15) Wong AW, Fidler L, Marcoux V, et al. Practical Considerations for the Diagnosis and Treatment of Fibrotic Interstitial Lung Disease During the Coronavirus Disease 2019 Pandemic, *Chest* 2020; 158 (3): 1069-1078
- 16) Diagnosis of Idiopathic Pulmonary Fibrosis, An Official ATS/ERS/JRS/ALAT Clinical Practice Guideline *Am J Respir Crit Care Med*. 2018; 198 (5)
- 17) <https://www.lung.org/media/press-releases/accp-ala-ats-copd-foundation-urge-masks-for-all>
- 18) Demoruelle MK, Mittoo S, Solomon JJ. Connective tissue disease-related interstitial lung disease. *Best Pract Res Clin Rheumatol*. 2016;30(1):39-52. doi:10.1016/j.berh.2016.04.006
- 19) Southern B. Patients with interstitial lung disease and pulmonary sarcoidosis are at high risk for severe illness related to COVID-19. *Cleveland Clinic Journal of Medicine* May 2020, DOI:10.3949/ccjm.87a.ccc026
- 20) <https://www.covid19treatmentguidelines.nih.gov/adjunctive-therapy/antithrombotic-therapy>
- 21) British Society for Rheumatology. COVID-19: guidance for rheumatologists. Available: <https://www.rheumatology.org.uk/news-policy/details/covid19-coronavirus-update-members>
- 22) British Society of Gastroenterology. BSG expanded consensus advice for the management of IBD during the COVID-19 pandemic, 2020. Available: <https://www.bsg.org.uk/covid-19-advice/bsg-advice-for-management-of-inflammatory-bowel-diseases-during-the-covid-19-pandemic>
- 23) <https://www.roche.com/investors/updates/inv-update-2020-07-29.htm>
- 24) Cavalcanti AB, Zampieri FG, Rosa RG et al. Hydroxychloroquine with or without Azithromycin in Mild-to-Moderate Covid-19. *N Engl J Med*. 2020; DOI: 10.1056/NEJMoa2019014
- 25) <https://www.youtube.com/watch?v=nwxy9FLBMjk&feature=youtu.be>
- 26) <https://www.pulmonaryfibrosis.org/life-with-pf/pff-educational-resources/webinars/pulmonary-rehabilitation>
- 27) Esposito AJ, Menon AA, Ghosh AJ, et al. Increased Odds of Death for Patients with Interstitial Lung Disease and COVID-19: A Case-Control Study [published online ahead of print, 2020 Sep 8]. *Am J Respir Crit Care Med*. 2020;10.1164/rccm.202006-2441LE. doi:10.1164/rccm.202006-2441LE

Disaster Guidance: 10 Tips for Staying Healthy During Wildfires

Fire season challenges all Californians: clinicians, patients, families and the public. We hope to support the needs of all Californians with this **wildfire resource guide**. Important resources include local Area Air Quality Management Districts links, including South Coast, Bay Area, Sacramento and San Diego below which provide up to date information about air quality.

California Map for Local Air District Websites

<https://ww3.arb.ca.gov/capcoa/dismap.htm>

South Coast Air Quality Management District

<https://www.aqmd.gov/>

South Coast AQMD Mobile App

<http://www.aqmd.gov/mobileapp>

Bay Area Air Quality Management District

<https://www.baaqmd.gov/>

Sacramento Air Quality Management District

<http://www.airquality.org/>

San Diego Air Pollution Control District

<https://www.sdapcd.org/>

Wildfire smoke can irritate your eyes, nose, throat, and lungs. It can make you cough and wheeze, or just make it hard to breathe. Inhaling smoke can be especially dangerous for asthmatics but anyone at risk, including those with lung or heart disease, pregnant women, older individuals or children need to take special care and consider consulting with their doctor about specific precautions.

1. **Stay indoors** with windows and doors closed.
2. **Reduce physical activity**
3. **Reduce other sources of indoor air pollution**
(smoking cigarettes, vaping, wood-burning stove, frying meat.)
Do not vacuum anywhere in the house.
4. **Use central air conditioner or filters:**
(A home's heater set to the fan mode may be able to filter out some of the particles by "re-circulating" the indoor air through the filter.
5. **Use air purifiers with HEPA filters.**
(Note: do not use ones that produce ozone such as "super oxygenators")
6. When traveling in a vehicle, keep windows and doors closed and run the air conditioner. Set air to "re-circulate" to reduce smoke.

7. **An N95 or greater mask** can help reduce inhalation of particulates IF properly fitted. None of these masks protect against hazardous gas inhalation. The following video demonstrates how to properly put on an N95 mask. https://m.youtube.com/watch?v=0d_RaKdqeck
8. **Consider evacuation** to areas with lower AQI (air quality index) for persons with respiratory health problems (especially with asthma, COPD / emphysema, pulmonary fibrosis.)
9. **Create a clean room at home**, Use an interior room with fewer doors and windows and run an air conditioner and room air cleaner if possible.
10. **Patient with asthma or COPD** should ensure that they taking their maintenance (“controller”) medications or discuss an appropriate regimen with their physician.

References/Resources

- <https://www.airnow.gov/fires/>
- <https://www.cdc.gov/disasters/wildfires/smoke.html>
- California Department of Public Health Emergency Preparedness Office
<https://www.cdph.ca.gov/Programs/EPO/Pages/Program-Landing1.aspx>
- <https://www.cdph.ca.gov/Programs/EPO/Pages/Wildfire%20Pages/Wildfires--.aspx>
- <http://www.aqmd.gov/home/air-quality/air-alerts>
- <http://wildfirerecovery.caloes.ca.gov/general-info/consumer-awareness/>

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Title (Click on title to open the manuscript, CME in Bold)	Journal Section	First Author	Year	Vol	Issue	Pages	Date Posted
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Acute Type A Aortic Dissection in a Young Weightlifter: A Case Study with an In-Depth Literature Review	Critical Care	Pak SC	2020	21	2	39-53	8/7/20
Medical Image of the Month and Brief Review: Aspiration Pneumonia in an Intubated Patient with COVID-19	Imaging	Head JP	2020	21	2	35-38	8/2/20
August 2020 Imaging Case of the Month: Piecing Together a Cause for Multisystem Abnormalities	Imaging	Panse PM	2020	21	2	23-34	8/1/20

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