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# CHEST Physician®

THE NEWSPAPER OF THE AMERICAN COLLEGE OF CHEST PHYSICIANS

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Various factors influence the resulting mental health issues arising after a stay in the ICU.

## Mental health after an ICU stay: It's complicated

**BY JIM KLING**
*MDedge News*

**FROM CHEST** ▪ It is well known that survivors of critical care are at heightened risk of mental health disorders even months after they are discharged, but it's less clear what factors might contribute to those outcomes. A new attempt to identify risk factors for post-ICU depression, anxiety, or posttraumatic stress disorder, as well as worse quality of life, paints a complex picture.

Age, preexisting mental health concerns, acute emotional stress at the time of critical care, and post-care physical impairment all may play a role, according to the multicenter, prospective cohort study conducted in Brazil, which was published in CHEST journal (2021;160[1]:157-64).

Previous systematic reviews have shown raised frequencies of mental health disorders following ICU discharge, including anxiety (32%-40%), depression (29%-34%), and PTSD (16%-23%). Few studies have looked at the potential impact of preexisting conditions or post-ICU disability on these outcomes, yet that information is critical to designing effective prevention and rehabilitation interventions.

The results suggest that preexisting mental health and factors associated with the critical illness, which have gained attention as potential factors, aren't sufficient to explain these out-

**MENTAL HEALTH** // *continued on page 4*

## Long COVID seen in patients with both severe and mild disease

**BY TARA HAELLE**

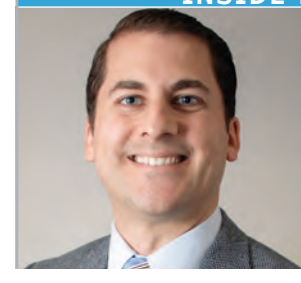
People hospitalized with acute COVID-19 who developed acute severe respiratory distress syndrome (ARDS) had poorer exercise capacity, health-related quality of life, and overall health than the general population a median of 8 months after initial COVID diagnosis, according to a prospective cohort study.

Findings from the cohort, composed of 113 COVID-19 survivors who developed ARDS after admission to a single center before to April 16, 2020, were presented online at the 31st European Congress of Clinical Microbiology & Infectious Diseases by Judit Aranda, MD, from Complex Hospitalari Moisés Broggi in Barcelona.

Median age of the participants was 64 years, and 70% were male. At least one persistent symptom was experienced during follow-up by 81% of the cohort, with 45% reporting shortness of breath, 50% reporting muscle pain, 43% reporting memory impairment, and 46% reporting physical weakness of at least 5 on a 10-point scale.

**LONG COVID** // *continued on page 7*

**INSIDE HIGHLIGHT**



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# Why we write Esbriet

**Your patients trust you. That's why you trust Esbriet for efficacy, safety, and tolerability.**

## INDICATION

Esbriet® (pirfenidone) is indicated for the treatment of idiopathic pulmonary fibrosis (IPF).

## SELECT IMPORTANT SAFETY INFORMATION

**Elevated liver enzymes and drug-induced liver injury (DILI):** DILI has been observed with Esbriet. In the postmarketing period, non-serious and serious cases of DILI, including severe liver injury with fatal outcome, have been reported. Patients treated with Esbriet had a higher incidence of ALT and/or AST elevations of ≥3x ULN (3.7%) compared with placebo patients (0.8%). Increases in ALT and AST ≥3x ULN were reversible with dose modification or treatment discontinuation.

Conduct liver function tests (ALT, AST, and bilirubin) prior to the initiation of therapy with Esbriet, monthly for the first 6 months, every 3 months thereafter, and as clinically indicated. Measure liver function promptly in patients who report symptoms that may indicate liver injury, including fatigue, anorexia, right upper abdominal discomfort, dark urine, or jaundice. Dosage modification or interruption may be necessary for liver enzyme elevations.

**Photosensitivity reaction or rash:** Patients treated with Esbriet had a higher incidence of photosensitivity reactions (9%) vs placebo (1%). Patients should avoid or minimize exposure to sunlight and sunlamps, regularly use sunscreen (SPF 50 or higher), wear clothing that protects against sun exposure, and avoid concomitant medications that cause photosensitivity. Dosage reduction or discontinuation may be necessary.

**Gastrointestinal (GI) disorders:** Patients treated with Esbriet had a higher incidence of nausea, diarrhea, dyspepsia, vomiting, gastroesophageal reflux disease (GERD), and abdominal pain. GI events required dose reduction or interruption in 18.5% of 2403 mg/day Esbriet-treated patients, compared with 5.8% of placebo patients; 2.2% of 2403 mg/day Esbriet-treated patients discontinued treatment due to a GI event, vs 1.0% of placebo patients. The most common (>2%) GI events leading to dosage reduction or interruption were nausea, diarrhea, vomiting, and dyspepsia. Dosage modification may be necessary.

**Adverse reactions:** The most common adverse reactions (≥10%) were nausea, rash, abdominal pain, upper respiratory tract infection, diarrhea, fatigue, headache, dyspepsia, dizziness, vomiting, anorexia, GERD, sinusitis, insomnia, weight decreased, and arthralgia.

**Drug Interactions:**

**CYP1A2 inhibitors:** Concomitant use of Esbriet and strong CYP1A2 inhibitors (e.g., fluvoxamine) is not recommended, as CYP1A2 inhibitors increase systemic exposure of Esbriet. If discontinuation of the CYP1A2 inhibitor prior to starting Esbriet is not possible, dosage reduction of Esbriet is recommended. Monitor for adverse reactions and consider discontinuation of Esbriet.

Concomitant use of ciprofloxacin (a moderate CYP1A2 inhibitor) at the dosage of 750 mg BID and Esbriet are not recommended. If this dose of ciprofloxacin cannot be avoided, dosage reductions of Esbriet are recommended, and patients should be monitored.

Moderate or strong inhibitors of both CYP1A2 and other CYP isoenzymes involved in the metabolism of Esbriet should be avoided during treatment.

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# ESBRIET OFFERS ESTABLISHED SAFETY BUILT ON MULTIPLE CLINICAL STUDIES

### Esbriet was rigorously analyzed in three phase 3, randomized, double-blind, placebo-controlled, multicenter trials in patients with idiopathic pulmonary fibrosis (IPF)[1]

Serious adverse events (AEs), including elevated liver enzymes and drug-induced liver injury, photosensitivity reactions, and gastrointestinal disorders, have been reported with Esbriet[1]

The most common AEs (>1%) leading to discontinuation were rash and nausea. The most common AEs (>3%) leading to dosage reduction or interruption were rash, nausea, diarrhea, and photosensitivity reaction.

### Some AEs with Esbriet were mild to moderate, occurred early, and decreased over time[1,2]

Photosensitivity reactions and GI events typically occurred in the first 3 to 6 months of treatment and infrequently led to discontinuation

<9% of photosensitivity events and <8% of GI events in three phase 3 trials were severe. The remaining photosensitivity and GI events were mild to moderate in severity[2]

>1400 patients were evaluated for safety of Esbriet, with >170 on treatment for more than 5 years in clinical trials[1]

### Dose modifications, interruptions, and discontinuations with Esbriet 267 mg may help manage potential AEs like GI events and photosensitivity reactions[1]

### Demonstrated efficacy

In ASCEND and CAPACITY 004, Esbriet delayed disease progression by slowing lung function decline vs placebo[1,3]

In CAPACITY 006, no statistically significant difference vs placebo in change in %FVC or decline in FVC volume from baseline to 72 weeks was observed[1,4]

Learn more at **EsbrietHCP.com**

**CYP1A2 inducers:** Concomitant use of Esbriet and strong CYP1A2 inducers should be avoided, as CYP1A2 inducers may decrease the exposure and efficacy of Esbriet.

**Specific Populations:**

**Mild to moderate hepatic impairment:** Esbriet should be used with caution in patients with Child Pugh Class A and B. Monitor for adverse reactions and consider dosage modification or discontinuation of Esbriet as needed.

**Severe hepatic impairment:** Esbriet is not recommended for patients with Child Pugh Class C. Esbriet has not been studied in this patient population.

**Mild ($CL_{cr}$ 50–80 mL/min), moderate ($CL_{cr}$ 30–50 mL/min), or severe ($CL_{cr}$ <30 mL/min) renal impairment:** Esbriet should be used with caution. Monitor for adverse reactions and consider dosage modification or discontinuation of Esbriet as needed.

**End-stage renal disease requiring dialysis:** Esbriet is not recommended. Esbriet has not been studied in this patient population.

**Smokers:** Smoking causes decreased exposure to Esbriet which may affect efficacy. Instruct patients to stop smoking prior to treatment and to avoid smoking when on Esbriet.

**You may report side effects to the FDA at 1-800-FDA-1088 or www.fda.gov/medwatch or to Genentech at 1-888-835-2555.**

**Please see Brief Summary of Prescribing Information on adjacent pages for additional Important Safety Information.**

**Study design:** The safety and efficacy of Esbriet were evaluated in three phase 3, randomized, double-blind, placebo-controlled, multicenter trials in which 1247 patients were randomized to receive Esbriet (n=623) or placebo (n=624).[1] In ASCEND, 555 patients with IPF were randomized to receive Esbriet 2403 mg/day or placebo for 52 weeks. Eligible patients had percent predicted forced vital capacity (%FVC) between 50%–90% and percent predicted diffusing capacity of lung for carbon monoxide (%$DL_{co}$) between 30%–90%. The primary endpoint was change in %FVC from baseline at 52 weeks.[1,3] In CAPACITY 004, 348 patients with IPF were randomized to receive Esbriet 2403 mg/day or placebo. Eligible patients had %FVC ≥50% and %$DL_{co}$ ≥35%. In CAPACITY 006, 344 patients with IPF were randomized to receive Esbriet 2403 mg/day or placebo. Eligible patients had %FVC ≥50% and %$DL_{co}$ ≥35%. For both CAPACITY trials, the primary endpoint was change in %FVC from baseline at 72 weeks.[1,4] Esbriet had a significant impact on lung function decline and delayed progression of IPF vs placebo in ASCEND.[1] Esbriet demonstrated a significant effect on lung function for up to 72 weeks in CAPACITY 004, as measured by %FVC and mean change in FVC (mL).[1] **No statistically significant difference vs placebo in change in %FVC or decline in FVC volume from baseline to 72 weeks was observed in CAPACITY 006.[1]**

**References: 1.** Esbriet Prescribing Information. Genentech, Inc. July 2019. **2.** Data on file. Genentech, Inc. 2019. **3.** King TE Jr, Bradford WZ, Castro-Bernardini S, et al; for the ASCEND Study Group. A phase 3 trial of pirfenidone in patients with idiopathic pulmonary fibrosis [published correction appears in *N Engl J Med.* 2014;371(12):1172]. *N Engl J Med.* 2014;370(22):2083–2092. **4.** Noble PW, Albera C, Bradford WZ, et al; for the CAPACITY Study Group. Pirfenidone in patients with idiopathic pulmonary fibrosis (CAPACITY): two randomised trials. *Lancet*. 2011;377(9779):1760–1769.

Esbriet® (pirfenidone) tablets 267 mg 801 mg

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comes. "Our data suggest that the network of potential risk factors for mental illness among patients who have been discharged from the ICU is much more complex and may involve risk factors from multiple domains. ... Long-term mental health disorders after critical illness may be the result of the interaction among stressors before ICU stay, during ICU stay, and after ICU stay, calling attention to the need for interdisciplinary and multifaceted strategies aimed at preventing and screening for mental health disorders after ICU discharge," Cassiano Teixeira, MD, PhD, of the Postgraduation of Pulmonology–Federal University of Rio Grande do Sul, Brazil, Porto Alegre, and colleagues wrote.

The researchers also noted that some risk factors could be screened and may be modifiable, including anxiety and depression symptoms at ICU discharge, as well as reduced physical function status.

## Complications or risk factors?

The findings are significant, though they may represent complications of emotional distress following ICU stays, rather than risk factors

that predict it, according to an accompanying editorial (Chest. 2021 Jul;160[1]:9-10). The author, O. Joseph Bienvenu III, MD, PhD, is a professor of psychiatry and behavioral sciences at Johns Hopkins Medicine, Baltimore. He called for prospective studies to determine the predictive value of these factors. "If we are to improve long-term mental health after critical illnesses, this predictive information will be vital to selective prevention efforts."

Potential interventions could include psychological treatment in the ICU, ICU follow-up clinics, support groups, and cognitive-behavioral therapy, among others. Whichever approach is used, it should be targeted, according to Dr. Bienvenu, since patients who have greater emotional distress seem to gain the most benefit from such interventions.

The researchers examined outcomes among 579 adults who had spent at least 72 hours in the ICU. The median age was 61 years, and 47% were women.

Six months after release from the ICU, telephone assessments by trained researchers revealed that 48% had impairment in physical function, compared with the time preceding ICU admission. 36.2% of participants had a mental health disorder: 24.2% reported anxiety, 20.9% had depression, and 15.4% had PTSD.

Increasing numbers of psychiatric syndromes, from 0 to 3, was associated with worse scores on the mental dimension on the health-related quality of life (HRQoL) score, but there was no relationship with scores on the physical dimension.

## Risks to mental health

Clinical characteristics associated with risk of anxiety at 6 months post discharge included being 65 years or older (prevalence ratio, 0.63; $P$ = .009), a history of depression (PR, 1.52; $P$ = .009), anxiety at discharge (PR, 1.65; $P$ = .003), depression at discharge (PR, 1.44; $P$ = .02), physical dependence (PR, 1.48; $P$ = .01), and reduced physical functional status at 6 months post discharge (PR, 1.38; $P$ = .04).

Characteristics associated with depression at 6 months post discharge included a history of depression (PR, 1.78; $P$ = .001), symptoms of depression at discharge (PR, 3.04; $P$ < .001), and reduced physical functional status at 6 months (PR, 1.53; $P$ = .01).

Characteristics associated with PTSD at 6 months post discharge were depression symptoms at discharge (PR, 1.70; $P$ = .01), physical dependence (PR, 1.79; $P$ = .01), and reduced physical status at 6 months (PR, 1.62; $P$ = .02).

Characteristics associated with any mental health disorder included higher education (PR, 0.74; $P$ = .04), a history of depression (PR, 1.32; $P$ = .02), anxiety symptoms at discharge (PR, 1.55; $P$ = .001), depression symptoms at discharge (PR, 1.50; $P$ = .001), and physical dependence at 6 months following discharge (PR, 1.66; $P$ < .001).

"The lower HRQoL found in ICU survivors with mental health disorders in comparison with those without is a reason for concern. This finding, in association with the higher prevalence of psychiatric syndromes among ICU survivors, reinforces the importance of assessing anxiety, depression, and PTSD symptoms among ICU survivors, because these syndromes typically are long lasting and underdiagnosed, and their occurrence may affect quality of life, survival, and costs in the context of care after ICU discharge," according to the researchers.

The authors and Dr. Bienvenu have no relevant disclosures.

# FDA's fast-track approval process exposed as lax, in need of reform

BY MEGAN BROOKS

Since the U.S. Food and Drug Administration established its accelerated drug approval pathway 28 years ago, more than two in five drugs granted fast-track approval have not been confirmed clinically effective as required, an in-depth investigation published in the BMJ has determined.

"Despite the pathway's good intentions to accelerate 'the availability of drugs that treat serious diseases,' experts are concerned that it is now being exploited – to the detriment of patients, who may be prescribed a drug that offers little benefit and possible harm, and to taxpayers," writes Elisabeth Mahase, clinical reporter at The BMJ, who carried out the analysis.

The FDA's accelerated approval pathway is intended to provide earlier access to drugs for serious diseases when there is lingering uncertainty at the time of approval regarding the drug's ultimate clinical benefit.

## Required studies rarely completed

As part of this fast-track pathway, drug manufacturers must conduct postapproval, phase 4 confirmatory trials to verify the anticipated clinical benefit. If these trials indicate no benefit, FDA approval can be withdrawn.

However, the analysis of FDA data shows once they are approved drugs are rarely taken off the market.

The BMJ investigation that analyzed data up to the end of 2020 shows that 112 of the 253 (44%) medications granted accelerated approval have not been confirmed to be effective.

In addition, 24 (21%) of these questionable drugs have been on the market for more than 5 years and some have been on the market for more than 20 years – often with a hefty price tag.

Furthermore, only 16 drugs approved through the accelerated approval process have ever been withdrawn, and most were shown to be ineffective, but in some cases the confirmatory trials were never done, Ms. Mahase reports.

For example, the COX-2 inhibitor celecoxib (Celebrex), which was granted accelerated approval in 1999 for the treatment of familial adenomatous polyposis, was on the market for 12 years before the FDA finally asked Pfizer to voluntarily withdraw it for this indication because efficacy trials were never completed.

As part of the BMJ's investigation, Ms. Mahase asked manufacturers of the 24 drugs that have remained on the market for more than 5 years whether they had conducted the required phase 4 confirmatory trials. Six of the drugs had been withdrawn, approved, or postponed.

> *"These products routinely have side effects, but the benefit information is a lot less certain. ... We may have drugs on the market that don't have any benefits, but certainly predictably have harms associated with them."*

Of the remaining 18 drugs, the manufacturers provided the relevant trial information for only 6. Only four drugmakers had started to recruit patients; two said they were still in discussion with the FDA over the final trial design.

"These products routinely have side effects, but the benefit information is a lot less certain. That's what we're concerned about – that we may have drugs on the market that don't have any benefits, but certainly predictably have harms associated with them," Huseyin Naci, PhD, MHS, with the London School of Economics, comments in the report.

## Call for reform

As reported by this news organization, a 2015 report by the General Accountability Office concluded that the FDA does not do an effective job of tracking the clinical efficacy or the safety of drugs with expedited approval after they hit the market.

In April of this year, the Institute for Clinical and Economic Review cited a lack of "credible threats" to

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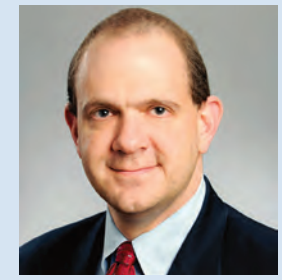

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Of the 104 participants who completed a 6-minute walk test, 30% had a decrease in oxygen saturation level of at least 4%, and 5% had an initial or final level below 88%. Of the 46 participants who underwent a pulmonary function test, 15% had a forced expiratory volume in 1 second below 70%.

And of the 49% of participants with pathologic findings on chest x-ray, most were bilateral interstitial infiltrates (88%). In addition, more than 90% of participants developed depression, anxiety, or PTSD, Dr. Aranda reported.

## Not the whole picture

This study shows that sicker people – "those in intensive care units with acute respiratory distress syndrome" – are "more likely to be struggling with more severe symptoms," said Christopher Terndrup, MD, from the division of general internal medicine and geriatrics at Oregon Health & Science University, Portland.

But a Swiss study, also presented at the meeting, "shows how even mild COVID cases can lead to debilitating symptoms," Dr. Terndrup said in an interview.

The investigation of long-term COVID symptoms in outpatients was presented online by Florian Desgranges, MD, from Lausanne (Switzerland) University Hospital. He and his colleagues found that more than half of those with a mild to moderate disease had persistent symptoms at least 3 months after diagnosis.

The prevalence of long COVID has varied in previous research, from 15% in a study of health care workers (JAMA. 2021;325[19]:2015-6), to 46% in a study of patients with mild COVID (Clin Microbiol Infect. 2021 Feb 16;27[5]:769-74), 52% in a study of young COVID outpatients (Nat Med. 2021 Jun 23. doi: 10.1038/s41591-021-01433-3), and 76% in a study of patients hospitalized with COVID (Lancet. 2021 Jan 16;397[10270]:220-32).

Dr. Desgranges and colleagues evaluated patients seen in an ED or outpatient clinic from February to April 2020.

The 418 patients with a confirmed COVID-19 diagnosis were compared with a control group of 89 patients who presented to the same centers during the same time frame with similar symptoms – cough, shortness of breath, or fever – but had a negative SARS-CoV-2 test.

The number of patients with comorbidities was similar in the COVID and control groups (34% vs. 36%), as was median age (41 vs. 36 years) and the prevalence of women (62% vs 64%), but the proportion of health care workers was lower in the COVID group (64% vs 82%; $P$ =.006).

Symptoms that persisted for at least 3 months were more common in the COVID than in the control group (53% vs. 37%). And patients in the COVID group reported more symptoms than those in the control group after adjustment for age, gender, smoking status, comorbidities, and timing of the survey phone call.

Levels of sleeping problems and headache were similar in the two groups.

"We have to remember that with COVID-19 came the psychosocial changes of the pandemic situation" Dr. Desgranges said.

This study suggests that some long-COVID symptoms – such as the fatigue, headache, and sleep disorders reported in the control group – could be related to the pandemic itself, which has caused psychosocial distress, Dr. Terndrup said.

## The COVID HOME study

That prospective longitudinal COVID HOME study, which assessed long-term symptoms in people who were never hospitalized for COVID, was presented online by Adriana Tami, MD, PhD, from the University Medical Center Groningen (the Netherlands).

The researchers visited the homes of patients to collect data and blood samples, and perform polymerase chain reaction (PCR) testing 1, 2, and 3 weeks after a diagnosis of COVID-19. If their PCR test was still positive, testing continued until week 6 or a negative test. In addition, participants completed questionnaires at week 2 and at months 3, 6, and 12 to assess fatigue, quality of life, and symptoms of depression and anxiety.

Three-month follow-up data were available for 134 of the 276 people initially enrolled in the study.

At least 40% of participants reported long-lasting symptoms at some point during follow-up, and at least 30% said they didn't feel fully recovered at 12 months. The most common symptom was persistent fatigue, reported at 3, 6, and 12 months by at least 44% of participants. Other common symptoms – reported by at least 20% of respondents at 3, 6, and 12 months – were headache, mental or neurologic symptoms, sleep disorders, shortness of breath, lack of smell or taste, and severe fatigue.

"We have a high proportion of nonhospitalized individuals who suffer from long COVID after more than 12 months," Dr. Tami concluded, adding that the study is ongoing. "We have other variables that we want to look at, including duration of viral shedding and serological results and variants."

"These cohort studies are very helpful, but they can lead to inaccurate conclusions," Dr. Terndrup cautioned.

They only provide pieces of the big picture, but they "do add to a growing body of knowledge about a significant portion of COVID patients still struggling with symptoms long after their initial infection. The symptoms can be quite variable but are dominated by both physical and mental fatigue, and tend to be worse in patients who were sicker at initial infection," he said in an interview. As a whole, these studies reinforce the need for treatment programs to help patients who suffer from long COVID.

"There is still a great deal to learn about long COVID," said Dr. Terndrup. Data on underrepresented populations – such as Black, Indigenous, and other people of color – are lacking from these and other studies.

"We are in desperate need of an equity lens in these studies," particularly in the United States, where there are "significant disparities" in the treatment of different populations.

However, "I do hope that this work can lead to a better understanding of how other viral infections can cause long-lasting symptoms," said Dr. Terndrup.

Dr. Aranda and Dr. Desgranges have disclosed no relevant financial relationships or study funding. Dr. Terndrup disclosed no relevant financial relationships

### Association between persistent symptoms and COVID-19

| Persistent symptom | Adjusted odds ratio | *P* value |
|---|---|---|
| Loss of smell or taste | 26.5 | .01 |
| Memory impairment | 5.7 | .01 |
| Shortness of breath | 2.8 | .03 |
| Fatigue | 2.1 | .02 |
| Any | 2.0 | .02 |

**Note:** Based on data for 418 patients with confirmed COVID-19 and a control group of 89 patients with similar symptoms but a negative SARS-CoV-2 test.

**Source:** Dr. Desgranges

MDedge News

*Continued from previous page*

withdraw approval if companies don't do confirmatory trials – meaning drugmakers have little incentive to do the trials.

"There are some instances where the companies really do seem to be taking advantage of the accelerated approval pathway and are using it in a way that makes it harder to get at the truth about whether these products really are safe and effective," Rachel Sachs, JD, MPH, Washington University, St. Louis, said in the BMJ article.

In addition, the authors of a recent viewpoint article in JAMA Internal Medicine assert the recent approval of the controversial anti-amyloid drug aducanumab (Aduhelm, Biogen) shows that the accelerated approval pathway needs to be reformed.

Despite the concerns, Ms. Mahase said all experts who spoke to the BMJ believe the accelerated approval pathway is still useful and can be beneficial to patients, although some changes are needed.

One effective reform might be to have confirmatory trials designed, and even started, as part of accelerated approval.

"One important piece of the puzzle is for the FDA itself to be tougher on these companies, to hold them to the bargain that they have agreed to, and to take action when the company has not met their obligations," Ms. Sachs told the journal.

An FDA spokesperson told the BMJ that the agency is "committed to working with sponsors to ensure that confirmatory studies are completed in a timely manner."

"We expect sponsors to commit all resources needed to move trials forward as effectively as possible, with the aim of completing trials as soon as is feasible, while assuring the quality of the data and the robustness of the results," the agency said.

# Resistant tuberculosis: Adjustments to linezolid in the BPaL regimen reduce AEs, not efficacy

BY NANCY A. MELVILLE

Lower doses of linezolid in the BPaL drug regimen (bedaquiline, pretomanid, and linezolid) significantly reduce the adverse events associated with the treatment for patients with highly drug-resistant tuberculosis without compromising its high efficacy, new research shows.

"The ZeNix trial shows that reduced doses and/or shorter durations of linezolid appear to have high efficacy and improved safety," said first author Francesca Conradie, MB, BCh, of the clinical HIV research unit, faculty of health sciences, University of Witwatersrand, Johannesburg, South Africa, in presenting the findings at the virtual meeting of the International AIDS conference.

As recently reported in the pivotal Nix-TB trial (N Engl J Med. 2020;382:893-902), the BPaL regimen yielded a 90% treatment success rate among people with highly drug-resistant forms of TB.

However, a 6-month regimen that included linezolid 1,200 mg resulted in toxic effects: 81% of patients in the study experienced peripheral neuropathy, and myelosuppression occurred in 48%. These effects often led to dose reductions or treatment interruption.

Adjustments in the dose of linezolid in the new ZeNix trial substantially reduced peripheral neuropathy to 13% and myelosuppression to 7%, with no significant reduction in the treatment response.

Importantly, the results were similar among patients with and those without HIV. This is of note because TB is the leading cause of death among patients with HIV.

"In the ZeNix trial, only 20% of patients were HIV infected, but in the [previous] Nix-TB trial, 30% were infected, so we have experience now in about 70 patients who were infected, and the outcomes were no different," Dr. Conradie said in an interview.

Experts say the findings represent an important turn in the steep challenge of tackling highly resistant TB.

"In our opinion, these are exciting results that could change treatment guidelines for highly drug-resistant tuberculosis, with real benefits for the patients," said Hendrik Streeck, MD, International AIDS Society cochair and director of the Institute of Virology and the Institute for HIV Research at the University Bonn (Germany), in a press conference.

Payam Nahid, MD, MPH, director of the Center for Tuberculosis at theUniversity of California, San Francisco, agreed.

"The results of this trial will impact global practices in treating drug-resistant TB as well as the design and conduct of future TB clinical trials," Dr. Nahid said in an interview.

## ZeNix trial

The phase 3 ZeNix trial included 181 patients with highly resistant TB in South Africa, Russia, Georgia, and Moldova. The mean age of the patients was 37 years; 67.4% were men, 63.5% were White, and 19.9% were HIV positive.

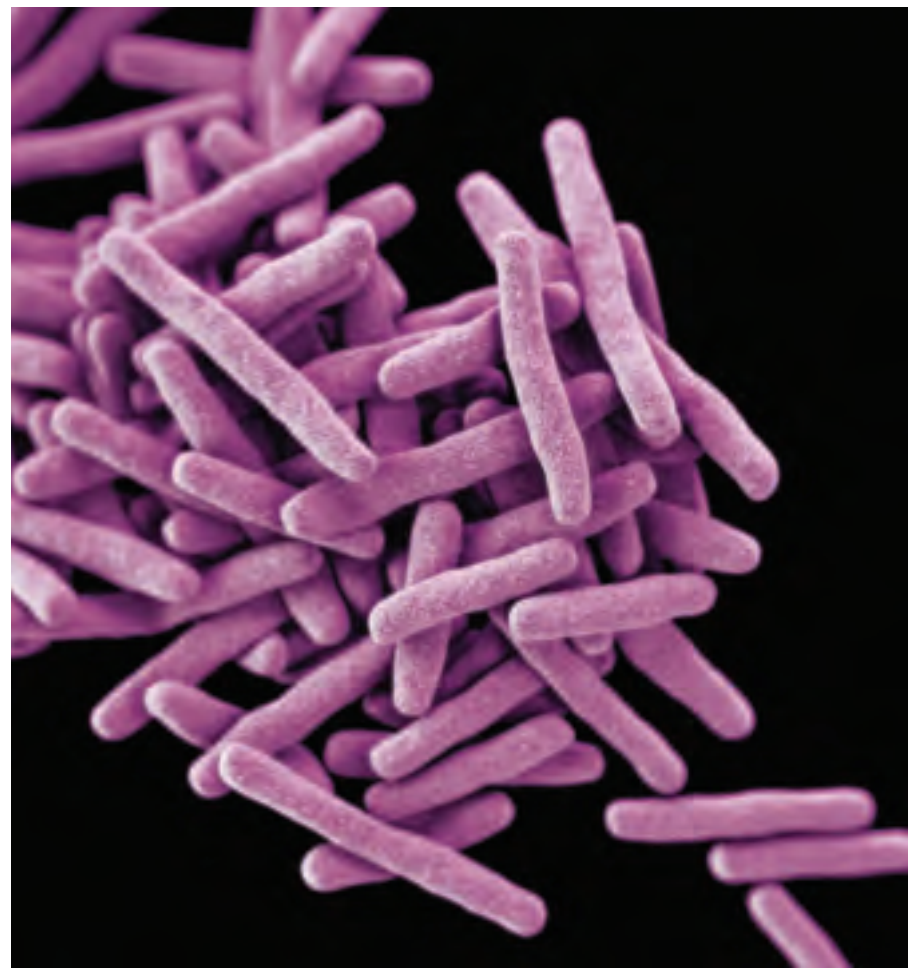
All patients were treated for 6 months with bedaquiline 200 mg daily for 8 weeks followed by 100 mg daily for 18 weeks, as well as pretomanid 200 mg daily.

The patients were randomly assigned to receive one of four daily doses of linezolid: 1,200 mg for 6 months (the original dose from the Nix-TB trial; n = 45) or 2 months (n = 46), or 600 mg for 6 or 2 months (45 patients each).

Percentages of patients with HIV were equal among the four groups, at about 20% each.

The primary outcomes – resolution of clinical disease and a negative culture status after 6 months – were observed across all linezolid dose groups. The success rate was 93% for those receiving 1,200 mg for 6 months, 89% for those receiving 1,200 mg for 2 months, 91% for those receiving 600 mg for 6 months, and 84% for those receiving 600 mg for 2 months.

With regard to the key adverse events of peripheral neuropathy and myelosuppression, manifested as anemia, the highest rates were among those who received linezolid 1,200 mg for 6 months, at 38% and 22%, respectively, compared with 24% and 17.4% among those who received 1,200 mg for 2 months, 24% and 2% among those who received 600 mg for 6 months, and 13% and 6.7% among those who received 600 mg for 2 months.



CDC/James Archer

**A three-dimensional computer-generated image depicts of a cluster of rod-shaped drug-resistant *Mycobacterium tuberculosis* bacteria.**

Four cases of optic neuropathy occurred among those who received 1,200 mg for 6 months; all cases resolved.

Patients who received 1,200 mg for 6 months required the highest number of linezolid dose modifications; 51% required changes that included reduction, interruption, or discontinuation, compared with 28% among those who received 1,200 mg for 2 months and 13% each in the other two groups.

On the basis of these results, "my personal opinion is that 600 mg at 6 months [of linezolid] is most likely the best strategy for the treatment of this highly resistant treatment population group," Dr. Conradie told this news organization.

## Findings represent 'great news' in addressing concerns

Dr. Nahid further commented that the results are highly encouraging in light of the ongoing concerns about the effects of linezolid in the BPaL regimen.

"This is great news," he said. "The ZeNix trial addresses a key concern that providers and patients have had regarding the safety and tolerability of taking 6 months of linezolid at 1,200 mg/d as part of the BPaL regimen.

"The findings that doses lower and durations shorter than the current 1,200 mg linezolid daily for 6 months will significantly expand the usability of the BPaL regimen worldwide."

The inclusion of patients with HIV was essential in the trial, he noted.

"There are drug-drug interactions to be considered, among other factors that impact drug exposure," Dr. Nahid said.

"Inclusion of patients living with HIV in this study means that any modifications to the BPaL regimen considered by the WHO [World Health Organization] and other policy decision makers will include data from this key population," he said. "Of course, more data are needed on safety, tolerability, and efficacy on BPaL in general, and there are international cohorts and demonstration projects underway that will enhance our understanding of the regimen in HIV and in other special populations."

The authors, Dr. Streeck, and Dr. Nahid have disclosed no relevant financial relationships.

SLEEP MEDICINE

# Short sleep associated with future dementia

**BY JIM KLING**
*MDedge News*

Sleep patterns may influence risk of dementia, even decades before the onset of symptoms, according to a new analysis of data from the Whitehall II cohort study (Int J Epidemiol. 2005;34[2]:251-6).

Previous work had identified links between short sleep duration and dementia risk, but few studies examined sleep habits long before onset of dementia. Those that did produced inconsistent results, according to Séverine Sabia, PhD, who is a research associate at Inserm (France) and the University College London.

"One potential reason for these inconstancies is the large range of ages of the study populations, and the small number of participants within each sleep duration group. The novelty of our study is to examine this association among almost 8,000 participants with a follow-up of 30 years, using repeated measures of sleep duration starting in midlife to consider sleep duration at specific ages," Dr. Sabia said in an interview. She presented the research at the 2021 Alzheimer's Association International Conference.

Those previous studies found a U-shaped association between sleep duration and dementia risk, with lowest risk associated with 7-8 hours of sleep, but greater risk for shorter and longer durations. However, because the studies had follow-up periods shorter than 10 years, they are at greater risk of reverse causation bias. Longer follow-up studies tended to have small sample sizes or to focus on older adults.

The longer follow-up in the current study makes for a more compelling case, said Claire Sexton, DPhil, director of Scientific Programs & Outreach for the Alzheimer's Association. Observations of short or long sleep closer to the onset of symptoms could just be a warning sign of dementia. "But looking at age 50, age 60 ... if you're seeing those relationships, then it's less likely that it is just purely prodromal," said Dr. Sexton. But it still doesn't necessarily confirm causation. "It could also be a risk factor," Dr. Sexton added.

## Multifactorial risk

Dr. Sabia also noted that the magnitude of risk was similar to that seen with smoking or obesity, and many factors play a role in dementia risk. "Even if the risk of dementia was 30% higher in those with persistent short sleep duration, in absolute terms, the percentage of those with persistent short duration who developed dementia was 8%, and 6% in those with persistent sleep duration of 7 hours. Dementia is a multifactorial disease, which means that several factors are likely to influence its onset. Sleep duration is one of them, but if a person has poor sleep and does not manage to increase it, there are other important prevention measures. It is important to keep a healthy lifestyle and cardiometabolic measures in the normal range. All together it is likely to be beneficial for brain health in later life," she said.

Dr. Sexton agreed. "With sleep we're still trying to tease apart what aspect of sleep is important. Is it the sleep duration? Is it the quality of sleep? Is it certain sleep stages?" she said.

Regardless of sleep's potential influence on dementia risk, both Dr. Sexton and Dr. Sabia noted the importance of sleep for general health. "These types of problems are very prevalent, so it's good for people to be aware of them. And then if they notice any problems with their sleep, or any changes, to go and see their health care provider, and to be discussing them, and then to be investigating the cause, and to see whether changes in sleep hygiene and treatments for insomnia could address these sleep problems," said Dr. Sexton.


**Dr. Sabia**

## Decades of data

During the Whitehall II study, researchers assessed average sleep duration ("How many hours of sleep do you have on an average weeknight?") six times over 30 years of follow-up. Dr. Sabia's group extracted self-reported sleep duration data at ages 50, 60, and 70. Short sleep duration was defined as fewer than 5 hours, or 6 hours. Normal sleep duration was defined as 7 hours. Long duration was defined as 8 hours or more.

A questioner during the Q&A period noted that this grouping is a little unusual. Many studies define 7-8 hours as normal. Dr. Sabia answered that they were unable to examine periods of 9 hours or more because of the nature of the data, and the lowest associated risk was found at 7 hours.

The researchers analyzed data from 7,959 participants (33.0% women). At age 50, compared with 7 hours of sleep, 6 or few hours of sleep was associated with a higher risk of dementia over the ensuing 25 years of follow-up (hazard ratio, 1.22; 95% confidence interval, 1.01-1.48). The same was true at age 60 (15 years of follow-up HR, 1.37; 95% CI, 1.10-1.72). There was a trend at age 70 (8 years follow-up; HR, 1.24; 95% CI, 0.98-1.57). For 8 or more hours of sleep, there were trends toward increased risk at age 50 (HR, 1.25; 95% CI, 0.98-1.60). Long sleep at age 60 and 70 was associated with heightened risk, but the confidence intervals were well outside statistical significance.

Twenty percent of participants had persistent short sleep over the course of follow-up, 37% had persistent normal sleep, and 7% had persistent long sleep. Seven percent of participants experienced a change from normal sleep to short sleep, 16% had a change from short sleep to normal sleep, and 13% had a change from normal sleep to long sleep.

Persistent short sleep between age 50 and 70 was associated with a 30% increased risk of dementia (HR, 1.30; 95% CI, 1.00-1.69). There were no statistically significant associations between dementia risk and any of the changing sleep pattern groups.

Dr. Sabia and Dr. Sexton have no relevant financial disclosures.

ENVIRONMENT

# Reducing air pollution linked to slowed brain aging and lower dementia risk, study shows

**BY PAULINE ANDERSON**

Reducing exposure to air pollution may slow brain aging and reduce the risk of dementia, new research reveals. The findings have implications for individual behaviors, such as avoiding areas with poor air quality, but they also have implications for public policy, said study investigator, Xinhui Wang, PhD, assistant professor of research neurology, department of neurology, University of Southern California, Los Angeles.

"Controlling air quality has great benefits not only for the short-term, for example for pulmonary function or very broadly mortality, but can impact brain function and slow memory function decline and in the long run may reduce dementia cases."

The findings were presented at the 2021 Alzheimer's Association International Conference.

## New approach

Previous research examining the impact of reducing air pollution, which has primarily examined respiratory illnesses and mortality, showed it is beneficial. However, no previous studies have examined the impact of improved air quality on cognitive function.

The current study used a subset of participants from the Women's Health Initiative Memory Study-Epidemiology of Cognitive Health Outcomes (WHIMS-ECHO), which evaluated whether postmenopausal women derive cognitive benefit from hormone therapy. The analysis included 2,232 community-dwelling older women aged 74-92 (mean age, 81.5 years) who did not have dementia at study enrollment.

Researchers obtained measures of participants' annual cognitive function from 2008 to 2018. These measures included general cognitive status assessed using the Telephone Interview for Cognitive Status-modified (TICSm) and episodic memory assessed by the telephone-based Califor-

*Continued on page 13*

Pulmonary arterial hypertension (PAH, WHO Group I) is a silently progressive disease[1]

## The ONLY Oral Prostacyclin Pathway Therapy Proven to Reduce the Risk of Disease Progression and PAH-related Hospitalization[2]

## INDICATION

UPTRAVI® (selexipag) is indicated for the treatment of pulmonary arterial hypertension (PAH, WHO Group I) to delay disease progression and reduce the risk of hospitalization for PAH.

Effectiveness was established in a long-term study in PAH patients with WHO Functional Class II-III symptoms.

Patients had idiopathic and heritable PAH (58%), PAH associated with connective tissue disease (29%), and PAH associated with congenital heart disease with repaired shunts (10%).

## IMPORTANT SAFETY INFORMATION

### CONTRAINDICATIONS

Concomitant use of strong inhibitors of CYP2C8 (eg, gemfibrozil) with UPTRAVI is contraindicated.

### WARNINGS AND PRECAUTIONS

**Pulmonary Veno-Occlusive Disease (PVOD)**

Should signs of pulmonary edema occur, consider the possibility of associated PVOD. If confirmed, discontinue UPTRAVI.

### ADVERSE REACTIONS

Adverse reactions more frequent compared to placebo (≥3%) are headache (65% vs 32%), diarrhea (42% vs 18%), jaw pain (26% vs 6%), nausea (33% vs 18%), myalgia (16% vs 6%), vomiting (18% vs 9%), pain in extremity (17% vs 8%), flushing (12% vs 5%), arthralgia (11% vs 8%), anemia (8% vs 5%), decreased appetite (6% vs 3%), and rash (11% vs 8%).

These adverse reactions are more frequent during the dose titration phase.

Hyperthyroidism was observed in 1% (n=8) of patients on UPTRAVI and in none of the patients on placebo.

### DRUG INTERACTIONS

**CYP2C8 Inhibitors**

Concomitant administration with gemfibrozil, a strong inhibitor of CYP2C8, doubled exposure to selexipag and increased exposure to the active metabolite by approximately 11-fold. Concomitant use of UPTRAVI with strong inhibitors of CYP2C8 is contraindicated.

Concomitant administration of UPTRAVI with clopidogrel, a moderate inhibitor of CYP2C8, had no relevant effect on the exposure to selexipag and increased the exposure to the active metabolite by approximately 2.7-fold. Reduce the dosing of UPTRAVI to once daily in patients on a moderate CYP2C8 inhibitor.

**Please see additional Important Safety Information on the adjacent page.**

# BEFORE PROGRESSION TAKES MORE AWAY

## Add UPTRAVI Earlier
in FC II and FC III

Add UPTRAVI as part of early comprehensive treatment to help delay disease progression

**Visit UptraviHCP.com to learn more.**

## IMPORTANT SAFETY INFORMATION (cont'd)

### DRUG INTERACTIONS

**CYP2C8 Inducers**

Concomitant administration with an inducer of CYP2C8 and UGT 1A3 and 2B7 enzymes (rifampin) halved exposure to the active metabolite. Increase UPTRAVI dose, up to twice, when co-administered with rifampin. Reduce UPTRAVI when rifampin is stopped.

### DOSAGE AND ADMINISTRATION

**Recommended Dosage**

Recommended starting dose is 200 mcg twice daily. Tolerability may be improved when taken with food. Increase by 200 mcg twice daily, usually at weekly intervals, to the highest tolerated dose up to 1600 mcg twice daily. If dose is not tolerated, reduce to the previous tolerated dose.

**Patients With Hepatic Impairment**

For patients with moderate hepatic impairment (Child-Pugh class B), the starting dose is 200 mcg once daily. Increase by 200 mcg once daily at weekly intervals, as tolerated. Avoid use of UPTRAVI in patients with severe hepatic impairment (Child-Pugh class C).

**Co-administration With Moderate CYP2C8 Inhibitors**

When co-administered with moderate CYP2C8 inhibitors (eg, clopidogrel, deferasirox and teriflunomide), reduce the dosing of UPTRAVI to once daily. Revert back to twice daily dosing frequency of UPTRAVI when co-administration of moderate CYP2C8 inhibitor is stopped.

**Dosage Strengths**

UPTRAVI tablet strengths: 200, 400, 600, 800, 1000, 1200, 1400, and 1600 mcg.

**Please see Brief Summary of Prescribing Information on the adjacent page.**

#1 MOST-PRESCRIBED ORAL PROSTACYCLIN PATHWAY THERAPY[2]*

*Based on Pharmacy Benefit Manager claims data from Express Scripts and Prime Therapeutics as of June 30, 2019.

FC=functional class; WHO=World Health Organization.

**References: 1.** Lau EM, Humbert M, Celermajer DS. Early detection of pulmonary arterial hypertension. *Nat Rev Cardiol.* 2015;12(3):143-155.
**2.** Data on file, Actelion Pharmaceuticals.

Uptravi selexipag tablets | 200-1600 mcg ®

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cp-126169v2 1020

**BRIEF SUMMARY OF FULL PRESCRIBING INFORMATION**
Please see full Prescribing Information.

**INDICATIONS AND USAGE**

**Pulmonary Arterial Hypertension** UPTRAVI® (selexipag) is indicated for the treatment of pulmonary arterial hypertension (PAH, WHO Group I) to delay disease progression and reduce the risk of hospitalization for PAH.

Effectiveness was established in a long-term study in PAH patients with WHO Functional Class II-III symptoms.

Patients had idiopathic and heritable PAH (58%), PAH associated with connective tissue disease (29%), and PAH associated with congenital heart disease with repaired shunts (10%).

**CONTRAINDICATIONS**

Concomitant use of strong inhibitors of CYP2C8 (e.g., gemfibrozil) *[see Drug Interactions (CYP2C8 Inhibitors) and Clinical Pharmacology (Pharmacokinetics)]*.

**WARNINGS AND PRECAUTIONS**

**Pulmonary Veno-Occlusive Disease (PVOD)** Should signs of pulmonary edema occur, consider the possibility of associated PVOD. If confirmed, discontinue UPTRAVI.

**ADVERSE REACTIONS**

**Clinical Trial Experience** Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The safety of UPTRAVI has been evaluated in a long-term, placebo-controlled study enrolling 1156 patients with symptomatic PAH (GRIPHON study). The exposure to UPTRAVI in this trial was up to 4.2 years with median duration of exposure of 1.4 years.

The following list presents adverse reactions more frequent on UPTRAVI (N=575) than on placebo (N=577) by ≥3%: headache 65% vs 32%, diarrhea 42% vs 18%, jaw pain 26% vs 6%, nausea 33% vs 18%, myalgia 16% vs 6%, vomiting 18% vs 9%, pain in extremity 17% vs 8%, flushing 12% vs 5%, arthralgia 11% vs 8%, anemia 8% vs 5%, decreased appetite 6% vs 3%, and rash 11% vs 8%.

These adverse reactions are more frequent during the dose titration phase.

Hyperthyroidism was observed in 1% (n=8) of patients on UPTRAVI and in none of the patients on placebo.

Laboratory Test Abnormalities

*Hemoglobin* In a Phase 3 placebo-controlled study in patients with PAH, mean absolute changes in hemoglobin at regular visits compared to baseline ranged from −0.34 to −0.02 g/dL in the selexipag group compared to −0.05 to 0.25 g/dL in the placebo group. A decrease in hemoglobin concentration to below 10 g/dL was reported in 8.6% of patients treated with selexipag and 5.0% of placebo-treated patients.

*Thyroid function tests* In a Phase 3 placebo-controlled study in patients with PAH, a reduction (up to −0.3 MU/L from a baseline median of 2.5 MU/L) in median thyroid-stimulating hormone (TSH) was observed at most visits in the selexipag group. In the placebo group, little change in median values was apparent. There were no mean changes in triiodothyronine or thyroxine in either group.

**Postmarketing Experience** The following adverse reactions have been identified during postapproval use of Uptravi. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Symptomatic hypotension

**DRUG INTERACTIONS**

**CYP2C8 Inhibitors** Concomitant administration with gemfibrozil, a strong inhibitor of CYP2C8, doubled exposure to selexipag and increased exposure to the active metabolite by approximately 11-fold. Concomitant administration of UPTRAVI with strong inhibitors of CYP2C8 (e.g., gemfibrozil) is contraindicated *[see Contraindications and Clinical Pharmacology (Pharmacokinetics)]*.

Concomitant administration of UPTRAVI with clopidogrel, a moderate inhibitor of CYP2C8, had no relevant effect on the exposure to selexipag and increased the exposure to the active metabolite by approximately 2.7-fold. When co-administered with moderate CYP2C8 inhibitors (e.g., clopidogrel, deferasirox and teriflunomide), reduce the dosing of UPTRAVI to once daily. Revert back to twice daily dosing frequency of UPTRAVI when co-administration of moderate CYP2C8 inhibitor is stopped *[see Clinical Pharmacology (Pharmacokinetics)]*.

**CYP2C8 Inducers** Concomitant administration with an inducer of CYP2C8 and UGT 1A3 and 2B7 enzymes (rifampin) halved exposure to the active metabolite. Increase dose up to twice of UPTRAVI when co-administered with rifampin. Reduce UPTRAVI when rifampin is stopped *[see Clinical Pharmacology (Pharmacokinetics)]*.

**USE IN SPECIFIC POPULATIONS**

**Pregnancy** *Risk Summary* There are no adequate and well-controlled studies with UPTRAVI in pregnant women. Animal reproduction studies performed with selexipag showed no clinically relevant effects on embryofetal development and survival. A slight reduction in maternal as well as in fetal body weight was observed when pregnant rats were administered selexipag during organogenesis at a dose producing an exposure approximately 47 times that in humans at the maximum recommended human dose. No adverse developmental outcomes were observed with oral administration of selexipag to pregnant rabbits during organogenesis at exposures up to 50 times the human exposure at the maximum recommended human dose.

The estimated background risk of major birth defects and miscarriage for the indicated population is unknown. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2-4% and 15-20%, respectively. *Data Animal Data* Pregnant rats were treated with selexipag using oral doses of 2, 6, and 20 mg/kg/day (up to 47 times the exposure at the maximum recommended human dose of 1600 mcg twice daily on an area under the curve [AUC] basis) during the period of organogenesis (gestation days 7 to 17). Selexipag did not cause adverse developmental effects to the fetus in this study. A slight reduction in fetal body weight was observed in parallel with a slight reduction in maternal body weight at the high dose.

Pregnant rabbits were treated with selexipag using oral doses of 3, 10, and 30 mg/kg (up to 50 times the exposure to the active metabolite at the maximum recommended human dose of 1600 mcg twice daily on an AUC basis) during the period of organogenesis (gestation days 6 to 18). Selexipag did not cause adverse developmental effects to the fetus in this study.

**Lactation** It is not known if UPTRAVI is present in human milk. Selexipag or its metabolites were present in the milk of rats. Because many drugs are present in the human milk and because of the potential for serious adverse reactions in nursing infants, discontinue nursing or discontinue UPTRAVI.

**Pediatric Use** Safety and effectiveness in pediatric patients have not been established.

UPTRAVI® (selexipag) Rx Only

**Geriatric Use** Of the 1368 subjects in clinical studies of UPTRAVI 248 subjects were 65 years of age and older, while 19 were 75 and older. No overall differences were observed between these subjects and younger subjects, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity cannot be ruled out.

**Patients with Hepatic Impairment** No adjustment to the dosing regimen is needed in patients with mild hepatic impairment (Child-Pugh class A).

A once-daily regimen is recommended in patients with moderate hepatic impairment (Child-Pugh class B) due to the increased exposure to selexipag and its active metabolite. There is no experience with UPTRAVI in patients with severe hepatic impairment (Child-Pugh class C). Avoid use of UPTRAVI in patients with severe hepatic impairment *[see Clinical Pharmacology (Pharmacokinetics)]*.

**Patients with Renal Impairment** No adjustment to the dosing regimen is needed in patients with estimated glomerular filtration rate >15 mL/min/1.73 $m^2$.

There is no clinical experience with UPTRAVI in patients undergoing dialysis or in patients with glomerular filtration rates <15 mL/min/1.73 $m^2$ *[see Clinical Pharmacology (Pharmacokinetics)]*.

**OVERDOSAGE**

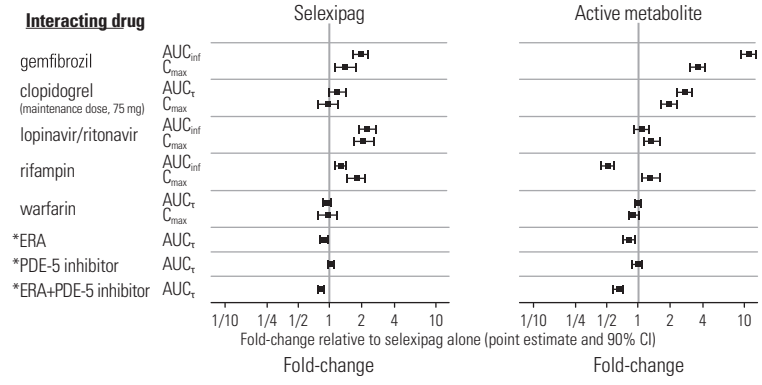
Isolated cases of overdose up to 3200 mcg were reported. Mild, transient nausea was the only reported consequence. In the event of overdose, supportive measures must be taken as required. Dialysis is unlikely to be effective because selexipag and its active metabolite are highly protein-bound.

**CLINICAL PHARMACOLOGY**

**Pharmacokinetics** Specific Populations: *Hepatic Impairment:* In subjects with mild *(Child-Pugh class A)* or moderate *(Child-Pugh class B)* hepatic impairment, exposure to selexipag was 2- and 4-fold that seen in healthy subjects. Exposure to the active metabolite of selexipag remained almost unchanged in subjects with mild hepatic impairment and was doubled in subjects with moderate hepatic impairment. *[see Use in Specific Populations]*. Based on pharmacokinetic modeling of data from a study in subjects with hepatic impairment, the exposure to the active metabolite at steady state in subjects with moderate hepatic impairment (Child-Pugh class B) after a once daily regimen is expected to be similar to that in healthy subjects receiving a twice daily regimen. The exposure to selexipag at steady state in these patients during a once daily regimen is predicted to be approximately 2-fold that seen in healthy subjects receiving a twice-daily regimen. *Renal Impairment:* A 40-70% increase in exposure (maximum plasma concentration and area under the plasma concentration-time curve) to selexipag and its active metabolite was observed in subjects with severe renal impairment (estimated glomerular filtration rate ≥ 15 mL/min/1.73 $m^2$ and < 30 mL/min/1.73 $m^2$) *[see Use in Specific Populations]*. Drug Interaction Studies: *In vitro studies* Selexipag is hydrolyzed to its active metabolite by carboxylesterases. Selexipag and its active metabolite both undergo oxidative metabolism mainly by CYP2C8 and to a smaller extent by CYP3A4. The glucuronidation of the active metabolite is catalyzed by UGT1A3 and UGT2B7. Selexipag and its active metabolite are substrates of OATP1B1 and OATP1B3. Selexipag is a substrate of P-gp, and the active metabolite is a substrate of the transporter of breast cancer resistance protein (BCRP). Selexipag and its active metabolite do not inhibit or induce cytochrome P450 enzymes and transport proteins at clinically relevant concentrations.

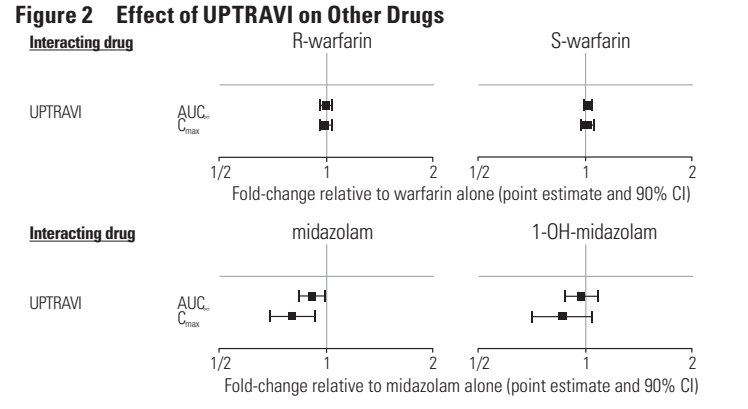
The results on in vivo drug interaction studies are presented in Figure 1 and 2.

**Figure 1 Effect of Other Drugs on UPTRAVI and its Active Metabolite**




*ERA and PDE-5 inhibitor data from GRIPHON.

**Figure 2 Effect of UPTRAVI on Other Drugs**




**Manufactured for:** Actelion Pharmaceuticals US, Inc. 5000 Shoreline Court, Ste. 200, South San Francisco, CA 94080, USA ACT20190806

**Reference:** UPTRAVI full Prescribing Information. Actelion Pharmaceuticals US, Inc.



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# No link between childhood vaccinations and allergies

**BY JOEL N. SHURKIN**

A meta-analysis by Australian researchers found no link between childhood vaccinations and an increase in allergies and asthma. In fact, children who received the BCG vaccine actually had a lesser incidence of eczema than other children, but there was no difference shown in any of the allergies or asthma.

The researchers, in a report published in the journal Allergy (2021 Feb 11. doi: 10.1111/all.14771), write, "We found no evidence that childhood vaccination with commonly administered vaccines was associated with increased risk of later allergic disease."

"Allergies have increased worldwide in the last 50 years, and in developed countries, earlier," said study author Caroline J. Lodge, PhD, principal research fellow at the University of Melbourne, in an interview. "In developing countries, it is still a crisis." No one knows why, she said. That was the reason for the recent study.

Allergic diseases such as allergic rhinitis (hay fever) and food allergies have a serious influence on quality of life, and the incidence is growing. According to the Global Asthma Network, there are 334 million people living with asthma. Between 2% and 10% of adults have atopic eczema, and more than a 250,000 people have food allergies. This coincides temporally with an increase in mass vaccination of children.

Unlike the controversy surrounding vaccinations and autism, which has long been debunked as baseless, a hygiene hypothesis postulates that, when children acquire immunity from many diseases, they become vulnerable to allergic reactions. Thanks to vaccinations, children in the developed world now are routinely immune to dozens of diseases.

That immunity leads to suppression of a major antibody response, increasing sensitivity to allergens and allergic disease. Suspicion of a link with childhood vaccinations has been used by opponents of vaccines in lobbying campaigns jeopardizing the sustainability of vaccine programs. In recent days, for example, the state of Tennessee has halted a program to encourage vaccination for COVID-19 as well as all other vaccinations, the result of pressure on the state by anti-vaccination lobbying.

*Melbourne researchers reported that the meta-analysis of 42 published research studies doesn't support the vaccine–allergy hypothesis.*

But the Melbourne researchers reported that the meta-analysis of 42 published research studies doesn't support the vaccine–allergy hypothesis. Using PubMed and EMBASE records between January 1946 and January 2018, researchers selected studies to be included in the analysis, looking for allergic outcomes in children given BCG or vaccines for measles or pertussis. Thirty-five publications reported cohort studies, and seven were based on randomized controlled trials.

The Australian study is not the only one showing the same lack of linkage between vaccination and allergy. The International Study of Asthma and Allergies in Childhood found no association between mass vaccination and atopic disease. A 1998 Swedish study of 669 children found no differences in the incidence of allergic diseases between those who received pertussis vaccine and those who did not.

"The bottom line is that vaccines prevent infectious diseases," said Matthew B. Laurens, associate professor of pediatrics at the University of Maryland, Baltimore, in an interview. Dr. Laurens was not part of the Australian study.

"Large-scale epidemiological studies do not support the theory that vaccines are associated with an increased risk of allergy or asthma," he stressed. "Parents should not be deterred from vaccinating their children because of fears that this would increase risks of allergy and/or asthma."

Dr. Lodge and Dr. Laurens have disclosed no relevant financial relationships.

*Continued from page 9*

nia Verbal Learning Test (CVLT).

The investigators used complex geographical covariates to estimate exposure to fine particulate matter ($PM_{2.5}$) and nitrogen dioxide ($NO_2$), in areas where individual participants lived from 1996 to 2012. The investigators averaged measures over 3-year periods immediately preceding (recent exposure) and 10 years prior to (remote exposure) enrollment, then calculated individual-level improvements in air quality as the reduction from remote to recent exposures.

The researchers examined pollution exposure and cognitive outcomes at different times to determine causation.

"Maybe the relationship isn't causal and is just an association, so we tried to separate the timeframe for exposure and outcome and make sure the exposure was before we measured the outcome," said Dr. Wang.

The investigators adjusted for multiple sociodemographic, lifestyle, and clinical characteristics.

## Reduced dementia risk

The analysis showed air quality improved significantly for both $PM_{2.5}$ and $NO_2$ before study enrollment. "For almost 95% of the subjects in our study, air quality improved over the 10 years," said Dr. Wang.

During a median follow-up of 6.2 years, there was a significant decline in cognitive status and episodic memory in study participants, which makes sense, said Dr. Wang, because cognitive function naturally declines with age.

However, a 10% improvement in air quality $PM_{2.5}$ and $NO_2$ resulted in a respective 14% and 26% decreased risk for dementia. This translates into a level of risk seen in women 2-3 years younger.

Greater air quality improvement was associated with slower decline in both general cognitive status and episodic memory. "Participants all declined in cognitive function, but living in areas with the greatest air quality improvement slowed this decline," said Dr. Wang.

"Whether you look at global cognitive function or memory-specific function, and whether you look at $PM_{2.5}$ or $NO_2$, slower decline was in the range of someone who is 1-2 years younger."

The associations did not significantly differ by age, region, education, APOE E4 genotypes, or cardiovascular risk factors.

Patients concerned about cognitive decline can take steps to avoid exposure to pollution by wearing a mask; avoiding heavy traffic, fires, and smoke; or moving to an area with better air quality, said Dr. Wang. "But our study mainly tried to provide some evidence for policymakers and regulators," she added.

Another study carried out by the same investigators suggests pollution may affect various cognitive functions differently. This analysis used the same cohort, timeframe, and air quality improvement indicators as the first study but examined the association with specific cognitive domains, including episodic memory, working memory, attention/executive function, and language.

The investigators found women living in locations with greater $PM_{2.5}$ improvement performed better on tests of episodic memory ($P = .002$), working memory ($P = .01$) and attention/executive function ($P = .01$), but not language. Findings were similar for improved $NO_2$.

When looking at air quality improvement and trajectory slopes of decline across cognitive functions, Dr. Wain said that only the association between improved $NO_2$ and slower episodic memory decline was statistically significant ($P < 0.001$). "The other domains were marginal or not significant."

"This suggests that brain regions are impacted differently," she said, adding that various brain areas oversee different cognitive functions.

## Important policy implications

Commenting on the research, Rebecca Edelmayer, PhD, senior director of scientific engagement, Alzheimer's Association, said: Whereas previous studies have linked long-term air pollution exposure to accumulation of Alzheimer's disease–related brain plaques and increased risk of dementia, "these newer studies provide some of the first evidence to suggest that actually reducing pollution is associated with lower risk of all-cause dementia."

Individuals can control some factors that contribute to dementia risk, such as exercise, diet, and physical activity, but it's more difficult for them to control exposure to smog and pollution, she said.

"This is probably going to require changes to policy from federal and local governments and businesses, to start addressing the need to improve air quality to help reduce risk for dementia."

# As common respiratory viruses resurface, children are at serious risk

BY JALEESA BAULKMAN

Geber86/Getty Images

Younger children may be vulnerable to the reemergence of common respiratory viruses such as influenza and respiratory syncytial virus (RSV) as COVID-19 restrictions wane, experts say. The impact could be detrimental.

The COVID-19 pandemic and the implementation of preventive measures such as social distancing, travel restrictions, mask use, and shelter in place reduced the transmission of respiratory viruses, according to the Centers for Disease Control and Prevention. However, because older infants and toddlers have not been exposed to these bugs during the pandemic, they are vulnerable to suffering severe viral infections.

"[We've] been in the honeymoon for 18 months," said Christopher J. Harrison, MD, professor of pediatrics and pediatric infectious diseases at Children's Mercy Hospitals and Clinics in Kansas City, Mo. "We are going to be coming out of the honeymoon and the children who didn't get sick are going to start packing 2 years' worth of infections into the next 9 months so there's going to be twice as many as would be normal."

The CDC issued a health advisory in June for parts of the southern United States, such as Texas, the Carolinas, and Oklahoma, encouraging broader testing for RSV – a virus that usually causes mild, cold-like symptoms and is the most common cause of bronchiolitis and pneumonia in children – among those who test negative for COVID-19. Virtually all children get an RSV infection by the time they are 2 years old, according to the CDC.

Dr. Harrison

In previous years, RSV usually spread during the fall and spring seasons and usually peaked late December to mid-February. However, there's been an offseason spike in the common illness this year, with nearly 2,000 confirmed cases each week of July.

Richard J. Webby, PhD, of the infectious diseases department at St. Jude Children's Research Hospital, Memphis, said that, although RSV transmits more easily during the winter, the virus is able to thrive during this summer because many children have limited immunity and are more vulnerable to catching the virus than before.

Population immunity normally limits a virus to circulating under its most favorable conditions, which is usually the winter. However, because there are a few more "susceptible hosts," it gives the virus the ability to spread during a time when it typically wouldn't be able to.

"Now we have a wider range of susceptible kids because they haven't had that exposure over the past 18 months," said Dr. Webby, who is on the World Health Organization's Influenza Vaccine Composition Advisory Team. "It gives the virus more chances to transmit during conditions that are less favorable."

Dr. Harrison said that, if children continue to take preventative measures such as wearing masks and sanitizing, they can delay catching the RSV – which can be severe in infants and young children – until they're older and symptoms won't be as severe.

*"Hopefully, the mask means that, if you get exposed, instead of getting a million virus particles from your classmate or your playmate, you may only get a couple thousand."*

"The swelling that these viruses cause in the trachea and the bronchial tubes is much bigger in proportion to the overall size of the tubes, so it takes less swelling to clog up the trachea or bronchial tube for the 9-month-old than it does of a 9-year-old," Dr. Harrison said. "So if a 9-year-old was to get RSV, they're not going to have nearly the same amount symptoms as the 9-month-old.

Dr. Harrison said delaying RSV in children was never an option before because it's a virus that's almost impossible to avoid.

"Hopefully, the mask means that if you get exposed, instead of getting a million virus particles from your classmate or your playmate, you may only get a couple thousand," Dr. Harrison explained. "And maybe that's enough that you can fight it off or it may be small enough that you get a mild infection instead of a severe infection."

A summer surge of RSV has also occurred in Australia. A study published in Clinical Infectious Diseases (2020 Sep 24. doi: 10.1093/cid/ciaa1475) found that Western Australia saw a 98% reduction in RSV cases. This suggests that COVID-19 restrictions also delayed the RSV season.

Dr. Webby said the lax in penetrative measures against COVID-19 may also affect this upcoming flu season. Usually, around 10%-30% of the population gets infected with the flu each year, but that hasn't happened the past couple of seasons, he said.

"There might be slightly less overall immunity to these viruses," Dr. Webby said. "When these viruses do come back, there's a little bit more room for them to take off."

Although a severe influenza season rebound this winter is a possibility, Australia continues to experience a historically low flu season. Dr. Harrison, who said the northern hemisphere looks at what's happening in Australia and the rest of the "southern half of the world because their influenza season is during our summer," hopes this is an indication that the northern hemisphere will also experience a mild season.

However, there's no indication of how this upcoming flu season will hit the United States and there isn't any guidance on what could happen because these historically low levels of respiratory viruses have never happened before, Dr. Webby explained.

He said that, if COVID-19's Delta variant continues to circulate during the fall and winter seasons, it will keep other viruses at low levels. This is because there is rarely a peak of activity of different viruses at the same time.

"When you get infected with the virus, your body's immune response has this nonspecific reaction that protects you from anything else for a short period of time," Dr. Webby explained. "When you get a lot of one virus circulating, it's really hard for these other viruses to get into that population and sort of set off an epidemic of their own."

To prepare for an unsure influenza season, Dr. Harrison suggests making the influenza vaccine available in August as opposed to October.

Dr. Harrison and Dr. Webby reported no conflicts of interest.

# Exposure to marijuana smoke linked to increased risk of respiratory infections in children

**BY JALEESA BAULKMAN**
*MDedge News*

Exposure to secondhand marijuana smoke is more strongly associated with viral respiratory infections in children, compared with children who were exposed to tobacco smoke and those with no smoke exposure, new research shows.

"The findings of this study are interesting and pleasantly raise further questions," said Kristen Miller, MD, attending physician in the division of pulmonary and sleep medicine at Children's Hospital of Philadelphia, who was not involved in the study. "Given the robust literature regarding secondhand smoke exposure and the current landscape surrounding marijuana, this is a timely study to evaluate the prevalence of marijuana use and the associated effects of marijuana exposure among children."

Prior research has linked primary marijuana use with respiratory effects. A 2020 study associated cannabis use with an increased risk of severe bronchitis, lung hyperinflation, and increased central airway resistance. However, according to the Centers for Disease Control and Prevention, there are still a lot of unanswered questions surrounding secondhand marijuana smoke exposure and its effects.

"If kids are exposed to enough secondhand smoke, regardless of what the substance is, they're going to have some negative health outcomes with it," study author Adam Johnson, MD, of Wake Forest University, Winston-Salem, N.C., said in an interview.

The study, published in Pediatric Research (2021 Jul 29. doi: 10.1038/s41390-021-01641-0), looked at rates of reported ED and urgent care visits and specific illnesses – such as otitis media, viral respiratory infections, and asthma exacerbations – among children with marijuana exposure and tobacco exposure.

For the study, Dr. Johnson and colleagues surveyed 1,500 parents and caregivers who went to an academic children's hospital between Dec. 1, 2015, and July 30, 2017. Researchers found that children exposed to marijuana smoke had higher rates of ED visits at 2.21 within the past 12 months, compared with those exposed to tobacco smoke (2.14 within the past 12 months) and those with no smoke exposure (1.94 within the past 12 months). However, the difference in these visits were not statistically significant.


Cabezonication/Getty Images

Researchers saw that children exposed to secondhand marijuana smoke saw a 30% increase in viral respiratory infections, compared with those who were not exposed to tobacco or marijuana smoke, Dr. Johnson said. Caregivers who smoked marijuana reported a rate of 1.31 viral infections in their children within the last year.

Meanwhile those who smoked tobacco reported a rate of 1.00 infections within the last 12 months and caregivers who did not smoke reported 1.04 infections within the year.

"It suggests that components in marijuana smoke may depress the body's immune responses to viral infections in children," Dr. Miller said in an interview.

When it came to otitis media episodes, children exposed to marijuana had a rate of 0.96 episodes within the past 12 months. Children experiencing secondhand tobacco smoke had a rate of 0.83 episodes and those with no smoke exposure had 0.75 episodes within the past 12 months. Researchers did not note this difference as statistically significant.

When it came to asthma exacerbations, children exposed to marijuana smoke also had statistically insignificantly higher rates of exacerbations, compared with those exposed to tobacco smoke and those not exposed to smoke.

"I think it was surprising that the survey results found that marijuana seemed to be more strongly associated with the viral respiratory infections than tobacco," Dr. Johnson said. "We know that secondhand tobacco smoke exposure in kids does lead to things like otitis media or ear infections, asthma attacks, and other processes, including colds. It was interesting that we didn't find that association [in the new study], but we found that with marijuana."

Dr. Johnson said the findings are especially concerning with increases in the acceptance and accessibility of marijuana as it becomes legalized in many states.

A 2015 study examined the effect of secondhand marijuana smoke exposure. Researchers found that exposure to secondhand marijuana smoke can increase heart rate, have mild to moderate sedative effects, and produce detectable cannabinoid levels in blood and urine. However, another study published in 2012 found that low to moderate primary marijuana use is less harmful to users' lungs than tobacco exposure.

Dr. Miller added that little is known about how exposure to marijuana smoke can affect the innate responses to pathogens and there is a need to "study this in more detail" to figure out if secondhand marijuana smoke is a risk factor for either an increase in respiratory virus infections or their severity.

"These questions could have considerable implications for the health of our children and public health measures regarding marijuana use," she explained. "As documented marijuana use increases, health care providers need to be aware of the effects of marijuana use and exposure."

Neither Dr. Johnson nor Dr. Miller has any relevant financial disclosures.

# Consider treating severe PH in the context of COPD

BY JEFF CRAVEN

FROM CHEST ▪ Patients with pulmonary hypertension (PH) as a complication of chronic obstructive pulmonary disease (COPD) have worse functional impairment and higher mortality, compared with patients who have idiopathic pulmonary arterial hypertension (IPAH). Despite these factors, some patients with more severe PH in COPD may respond to treatment and show clinical improvement after treatment, according to recent research published in CHEST journal (2021 Aug;160[2]:678-89).

Carmine Dario Vizza, MD, of Sapienza University of Rome, and colleagues evaluated patients in the Comparative, Prospective Registry of Newly Initiated Therapies for Pulmonary Hypertension (COMPERA) database, enrolled up to August 2020, identifying 68 patients with moderate PH and COPD and 307 patients with severe PH and COPD. The researchers compared the PH and COPD groups with 307 patients who had IPAH.

Oral monotherapy for patients with PH and COPD was the main treatment, consisting of phosphodiesterase-5 inhibitors, while most patients with IPAH received endothelin receptor antagonists.

On functional tests, patients in the PH and COPD group tended to perform poorer on the 6-minute walking distance (6MWD) and World Health Organization functional class (WHO FC) than patients with IPAH. Specifically, among 42.7% of patients in both group for whom follow-up data were available, there was a similar frequency of improvement for 6MWD of 30 meters or more from baseline for both PH and COPD and IPAH groups (46.9% vs. 52.6%; $P = .294$), but there were significant differences between 6MWD between patients with moderate and severe PH and COPD (51.6% vs. 31.6%; $P = .04$).

There was a nonsignificant improvement in WHO FC of one or more classes for 65.6% of patients with PH and COPD and 58.3% of patients with IPAH with follow-up data available, with 28.5% of patients with PH and COPD improving compared with 35.8% of patients with IPAH ($P = .078$).

Follow-up data were available for 84% of patients with IPAH and 94% of patients with PH and COPD. Dr. Dario Vizza and colleagues found 45.7% of patients in the PH and COPD group and 24.9% of patients in the IPAH group died during follow-up, while 1.1% in the PH and COPD group and 1.5% of patients in the IPAH group underwent lung transplantations. For patients with moderate PH and COPD, 31.3% died and none underwent lung transplantation, while 49.0% of patients in the severe PH and COPD group died and 1.4% underwent lung transplantations.

Patients in the moderate PH and COPD group were more likely to discontinue treatment (10.9%), compared with patients with IPAH (6.6%) and patients with severe

PH and COPD (5.2%). The most common reasons for discontinuations were tolerability and efficacy failure; the IPAH group had 63% of patients discontinue because of tolerability and 7% for efficacy failure, 47% of patients in the severe PH and COPD group discontinued because of tolerability and efficacy, and 29% discontinued treatment for tolerability and 57% for efficacy failure in the moderate and COPD group.

The researchers said male sex, low 6MWD, and high pulmonary vascular resistance at baseline were predictive of poorer outcomes for PH and COPD, but patients with more severe PH and COPD had better outcomes if they improved by 30 meters or more in 6MWD, or improved in WHO FC after receiving medical therapy. For patients with IPAH response to therapy was better among patients who were younger, had higher WHO FC, had high diffusing capacity of the lung for carbon monoxide, had high mean pulmonary artery pressure, and had low $PCO_2$.

"Our data suggest that PH-targeted drug therapy in patients with COPD and severe PH may improve exercise tolerance and WHO FC in a subgroup of patients and that patients with COPD and PH who re-

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spond to therapy may have a better prognosis than patients who do not show clinical improvement. These findings need to be explored further in prospective, randomized controlled clinical studies," the authors concluded.

In a related editorial, James R. Klinger, MD (2021 Aug 1. doi: 10.1016/j.chest.2021.03.010), of Brown University, Providence, R.I., said there is a "keen interest" in treating PH in COPD despite a lack of consistency on whether treatment is effective in this patient population. He questioned whether current medications designed for PAH could improve pulmonary hemodynamics for PH in COPD.

"What is needed now is well-designed randomized controlled studies to determine whether improved outcomes can be achieved in this population and which patients are most likely to benefit," he concluded. "How bad does PH need to be in patients with COPD before treatment is helpful, and how severe does COPD need to be before PH treatment is futile?"

The authors reported personal and institutional relationships for a variety of pharmaceutical companies. Dr. Klinger he has been an unpaid consultant for Bayer.

# Why are third COVID shots being recommended?

BY DAMIAN MCNAMARA

Following the White House administration's August announcement to start booster COVID-19 vaccinations for American adults in September, experts weighed in on the evidence for choosing an 8-month cutoff, how breakthrough infections figure in, and why calling one mRNA vaccine better than the other could be misleading.

Timing came up more than once at the Aug. 18 White House briefing announcing the booster plans. Reporters asked about the start time of Sept. 20 and people waiting at least 8 months after their second mRNA vaccine dose to get a booster.

Anthony S. Fauci, MD, chief medical adviser to the president and director of the National Institute of Allergy and Infectious Diseases, explained

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that late September gives the United States time to set up the logistics.

Centers for Disease Control and Prevention Director Rochelle P. Walensky, MD, MPH, added that 8 months is in part based on data from Israel and other countries on the waning of vaccine effectiveness over time.

"It is possible that 8 [months] is associated with the amount of time that we've been able to follow large groups of people, especially those who are 65 and older," Julie Swann, PhD, said during a subsequent media briefing sponsored by Newswise on Aug. 18. "I know that Pfizer has said that they think a booster sometime between 6 and 12 months would be reasonable."

Dr. Swann supported the administration's booster shots plan. She said it is important "that we continue to get people the full amount of protection if it's recommended by CDC and ACIP [Advisory Committee on Immunization Practices] that would come from a booster shot." Dr. Swann is at the University of North Carolina at Chapel Hill.

Also on Aug. 18, news emerged that breakthrough cases are on the rise in seven U.S. states, likely because of the Delta variant.

These SARS-CoV-2 infections among the fully vaccinated account

for 20% of cases in six of the seven states cited in a New York Times report, for example. Researchers also suggested that hospitalization and deaths associated with breakthrough cases could be higher than previously appreciated.

After release of a Mayo Clinic study reporting lower effectiveness of the Pfizer mRNA vaccine at 42% versus 76% for the Moderna product, some people started asking if one vaccine was better than the other.

"To begin with, the vaccines are not being compared side-by-side," said Juan Wisnivesky, MD, DrPH, of Mount Sinai Health System in New York said. "So we only know the effectiveness of each vaccine versus placebo, but we don't know one versus the other." More evidence will be needed, Dr. Wisnivesky said, before public health officials can recommend that someone who received one mRNA vaccine switch to another for their booster shot.

Continuing to recommend masks is essential, Dr. Swann added. "With this Delta variant, it does appear that the possibility of reinfection or of a disease case breaking through vaccination can occur. So that makes it even more important to consider using nonpharmaceutical interventions while we continue to vaccinate people."

Gastrointestinal Perforation [*see Warnings and Precautions*].

**6.1 Clinical Trials Experience:** Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The safety of OFEV was evaluated in over 1000 IPF patients, 332 patients with chronic fibrosing ILDs with a progressive phenotype, and over 280 patients with SSc-ILD. Over 200 IPF patients were exposed to OFEV for more than 2 years in clinical trials. Idiopathic Pulmonary Fibrosis: OFEV was studied in three randomized, double-blind, placebo-controlled, 52-week trials. In the phase 2 (Study 1) and phase 3 (Studies 2 and 3) trials, 723 patients with IPF received OFEV 150 mg twice daily and 508 patients received placebo. The median duration of exposure was 10 months for patients treated with OFEV and 11 months for patients treated with placebo. Subjects ranged in age from 42 to 89 years (median age of 67 years). Most patients were male (79%) and Caucasian (60%). The most frequent serious adverse reactions reported in patients treated with OFEV, more than placebo, were bronchitis (1.2% vs. 0.8%) and myocardial infarction (1.5% vs. 0.4%). The most common adverse events leading to death in patients treated with OFEV, more than placebo, were pneumonia (0.7% vs. 0.6%), lung neoplasm malignant (0.3% vs. 0%), and myocardial infarction (0.3% vs. 0.2%). In the predefined category of major adverse cardiovascular events (MACE) including MI, fatal events were reported in 0.6% of OFEV-treated patients and 1.8% of placebo-treated patients. Adverse reactions leading to permanent dose reductions were reported in 16% of OFEV-treated patients and 1% of placebo-treated patients. The most frequent adverse reaction that led to permanent dose reduction in the patients treated with OFEV was diarrhea (11%). Adverse reactions leading to discontinuation were reported in 21% of OFEV-treated patients and 15% of placebo-treated patients. The most frequent adverse reactions that led to discontinuation in OFEV-treated patients were diarrhea (5%), nausea (2%), and decreased appetite (2%). The most common adverse reactions with an incidence of greater than or equal to 5% and more frequent in the OFEV than placebo treatment group are listed in Table 1.

**Table 1 Adverse Reactions Occurring in ≥5% of OFEV-treated Patients and More Commonly Than Placebo in Studies 1, 2, and 3**

| Adverse Reaction | OFEV, 150 mg n=723 | Placebo n=508 |
|---|---|---|
| **Gastrointestinal disorders** | | |
| Diarrhea | 62% | 18% |
| Nausea | 24% | 7% |
| Abdominal pain[a] | 15% | 6% |
| Vomiting | 12% | 3% |
| **Hepatobiliary disorders** | | |
| Liver enzyme elevation[b] | 14% | 3% |
| **Metabolism and nutrition disorders** | | |
| Decreased appetite | 11% | 5% |
| **Nervous system disorders** | | |
| Headache | 8% | 5% |
| **Investigations** | | |
| Weight decreased | 10% | 3% |
| **Vascular disorders** | | |
| Hypertension[c] | 5% | 4% |

[a] Includes abdominal pain, abdominal pain upper, abdominal pain lower, gastrointestinal pain and abdominal tenderness.
[b] Includes gamma-glutamyltransferase increased, hepatic enzyme increased, alanine aminotransferase increased, aspartate aminotransferase increased, hepatic function abnormal, liver function test abnormal, transaminase increased, blood alkaline phosphatase-increased, alanine aminotransferase abnormal, aspartate aminotransferase abnormal, and gamma-glutamyltransferase abnormal.
[c] Includes hypertension, blood pressure increased, hypertensive crisis, and hypertensive cardiomyopathy.

In addition, hypothyroidism was reported in patients treated with OFEV, more than placebo (1.1% vs. 0.6%). Combination with Pirfenidone: Concomitant treatment with nintedanib and pirfenidone was investigated in an exploratory open-label, randomized (1:1) trial of nintedanib 150 mg twice daily with add-on pirfenidone (titrated to 801 mg three times a day) compared to nintedanib 150 mg twice daily alone in 105 randomized patients for 12 weeks. The primary endpoint was the percentage of patients with gastrointestinal adverse events from baseline to Week 12. Gastrointestinal adverse events were in line with the established safety profile of each component and were experienced in 37 (70%) patients treated with pirfenidone added to nintedanib versus 27 (53%) patients treated with nintedanib alone. Diarrhea, nausea, vomiting, and abdominal pain (includes upper abdominal pain, abdominal discomfort, and abdominal pain) were the most frequent adverse events reported in 20 (38%) versus 16 (31%), in 22 (42%) versus 6 (12%), in 15 (28%) versus 6 (12%) patients, and in 15 (28%) versus 7 (14%) treated with pirfenidone added to nintedanib versus nintedanib alone, respectively. More subjects reported AST or ALT elevations (greater than or equal to 3x the upper limit of normal) when using pirfenidone in combination with nintedanib (n=3 (6%)) compared to nintedanib alone (n=0) [*see Warnings and Precautions*]. Chronic Fibrosing Interstitial Lung Diseases with a Progressive Phenotype: OFEV was studied in a phase 3, double-blind, placebo-controlled trial (Study 5) in which 663 patients with chronic fibrosing ILDs with a progressive phenotype were randomized to receive OFEV 150 mg twice daily (n=332) or placebo (n=331) for at least 52 weeks. At 52 weeks, the median duration of exposure was 12 months for patients in both treatment arms. Subjects ranged in age from 27 to 87 years (median age of 67 years). The majority of patients were Caucasian (74%) or Asian (25%). Most patients were male (54%). The most frequent serious adverse event reported in patients treated with OFEV, more than placebo, was pneumonia (4% vs. 3%). Adverse events leading to death were reported in 3% of patients treated with OFEV and in 5% of patients treated with placebo. No pattern was identified in the adverse events leading to death. Adverse reactions leading to permanent dose reductions were reported in 33% of OFEV-treated patients and 4% of placebo-treated patients. The most frequent adverse reaction that led to permanent dose reduction in the patients treated with OFEV was diarrhea (16%). Adverse reactions leading to discontinuation were reported in 20% of OFEV-treated patients and 10% of placebo-treated patients. The most frequent adverse reaction that led to discontinuation in OFEV-treated patients was diarrhea (6%). The safety profile in patients with chronic fibrosing ILDs with a progressive phenotype treated with OFEV was consistent with that observed in IPF patients. In addition, the following adverse events were reported in OFEV more than placebo in chronic progressive fibrosing ILD: nasopharyngitis (13% vs. 12%), upper respiratory tract infection (7% vs 6%), urinary tract infection (6% vs. 4%), fatigue (10% vs. 6%), and back pain (6% vs. 5%). Systemic Sclerosis-Associated Interstitial Lung Disease: OFEV was studied in a phase 3, randomized, double-blind, placebo-controlled trial (Study 4) in which 576 patients with SSc-ILD received OFEV 150 mg twice daily (n=288) or placebo (n=288). Patients were to receive treatment for at least 52 weeks; individual patients were treated for up to 100 weeks. The median duration of exposure was 15 months for patients treated with OFEV and 16 months for patients treated with placebo. Subjects ranged in age from 20 to 79 years (median age of 55 years). Most patients were female (75%). Patients were mostly Caucasian (67%), Asian (25%), or Black (6%). At baseline, 49% of patients were on stable therapy with mycophenolate. The most frequent serious adverse events reported in patients treated with OFEV, more than placebo, were interstitial lung disease (2.4% nintedanib vs 1.7% placebo) and pneumonia (2.8% nintedanib vs 0.3% placebo). Within 52 weeks, 5 patients treated with OFEV (1.7%) and 4 patients treated with placebo (1.4%) died. There was no pattern among adverse events leading to death in either treatment arm. Adverse reactions leading to permanent dose reductions were reported in 34% of OFEV-treated patients and 4% of placebo-treated patients. The most frequent adverse reaction that led to permanent dose reduction in the patients treated with OFEV was diarrhea (22%). Adverse reactions leading to discontinuation were reported in 16% of OFEV-treated patients and 9% of placebo-treated patients. The most frequent adverse reactions that led to discontinuation in OFEV-treated patients were diarrhea (7%), nausea (2%), vomiting (1%), abdominal pain (1%), and interstitial lung disease (1%). The safety profile in patients with or without mycophenolate at baseline was comparable. The most common adverse reactions with an incidence of greater than or equal to 5% in OFEV-treated patients and more commonly than in placebo are listed in Table 2.

**Table 2 Adverse Reactions Occurring in ≥5% of OFEV-treated Patients and More Commonly Than Placebo in Study 4**

| Adverse Reaction | OFEV, 150 mg n=288 | Placebo n=288 |
|---|---|---|
| Diarrhea | 76% | 32% |
| Nausea | 32% | 14% |
| Vomiting | 25% | 10% |
| Skin ulcer | 18% | 17% |
| Abdominal pain[a] | 18% | 11% |
| Liver enzyme elevation[b] | 13% | 3% |
| Weight decreased | 12% | 4% |
| Fatigue | 11% | 7% |
| Decreased appetite | 9% | 4% |
| Headache | 9% | 8% |
| Pyrexia | 6% | 5% |
| Back pain | 6% | 4% |
| Dizziness | 6% | 4% |
| Hypertension[c] | 5% | 2% |

[a] Includes abdominal pain, abdominal pain upper, abdominal pain lower, and esophageal pain.
[b] Includes alanine aminotransferase increased, gamma-glutamyltransferase increased, aspartate aminotransferase increased, hepatic enzyme increased, blood alkaline phosphatase increased, transaminase increased, and hepatic function abnormal.
[c] Includes hypertension, blood pressure increased, and hypertensive crisis

**6.2 Postmarketing Experience:** The following adverse reactions have been identified during postapproval use of OFEV. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure. The following adverse reactions have been identified during postapproval use of OFEV: drug-induced liver injury *[see Warnings and Precautions]*, non-serious and serious bleeding events, some of which were fatal [*see Warnings and Precautions*], pancreatitis, thrombocytopenia, rash, pruritus.

**7 DRUG INTERACTIONS: 7.1 P-glycoprotein (P-gp) and CYP3A4 Inhibitors and Inducers:** Nintedanib is a substrate of P-gp and, to a minor extent, CYP3A4. Coadministration with oral doses of a P-gp and CYP3A4 inhibitor, ketoconazole, increased exposure to nintedanib by 60%. Concomitant use of P-gp and CYP3A4 inhibitors (e.g., erythromycin) with OFEV may increase exposure to nintedanib. In such cases, patients should be monitored closely for tolerability of OFEV. Management of adverse reactions may require interruption, dose reduction, or discontinuation of therapy with OFEV *[see Dosage and Administration]*. Coadministration with oral doses of a P-gp and CYP3A4 inducer, rifampicin, decreased exposure to nintedanib by 50%. Concomitant use of P-gp and CYP3A4 inducers (e.g., carbamazepine, phenytoin, and St. John's wort) with OFEV should be avoided as these drugs may decrease exposure to nintedanib. **7.2 Anticoagulants:** Nintedanib is a VEGFR inhibitor and may increase the risk of bleeding. Monitor patients on full anticoagulation therapy closely for bleeding and adjust anticoagulation treatment as necessary [*see Warnings and Precautions*]. **7.3 Pirfenidone:** In a multiple-dose study conducted to assess the pharmacokinetic effects of concomitant treatment with nintedanib and pirfenidone, the coadministration of nintedanib with pirfenidone did not alter the exposure of either agent. Therefore, no dose adjustment is necessary during concomitant administration of nintedanib with pirfenidone. **7.4 Bosentan:** Coadministration of nintedanib with bosentan did not alter the pharmacokinetics of nintedanib.

**8 USE IN SPECIFIC POPULATIONS: 8.1 Pregnancy:** Risk Summary: Based on findings from animal studies and its mechanism of action, OFEV can cause fetal harm when administered to a pregnant woman. There are no data on the use of OFEV during pregnancy. In animal studies of pregnant rats and rabbits treated during organogenesis, nintedanib caused embryo-fetal deaths and structural abnormalities at less than (rats) and approximately 5 times (rabbits) the maximum recommended human dose *[see Data]*. Advise pregnant women of the potential risk to a fetus. The estimated background risk of major birth defects and miscarriage for the indicated population is unknown. In the U.S. general population, the estimated background risk of major birth defects is 2% to 4% and

# CDC: Vaccination may cut risk of reinfection in half

**BY BRENDA GOODMAN**

The Centers for Disease Control and Prevention has recommended that everyone get a COVID-19 vaccine, even if they've had the virus before. Yet many skeptics have held off getting the shots, believing that immunity generated by their previous infection will protect them if they should encounter the virus again.

A new study published in the CDC's Morbidity and Mortality Weekly Report (2021 Aug 6. doi: 10.15585/mmwr.mm7032e1) pokes holes in this notion. It shows people who have recovered from COVID-19 but haven't been vaccinated have more than double the risk of testing positive for the virus again, compared with someone who was vaccinated after an initial infection.

The study looked at 738 Kentucky residents who had an initial bout of COVID-19 in 2020. About 250 of them tested positive for COVID-19 a second time between May and July of 2021, when the Delta variant became dominant in the United States.

*"Getting the vaccine is the best way to protect yourself and others around you, especially as the more contagious Delta variant spreads around the country."*

The study matched each person who'd been reinfected with two people of the same sex and roughly the same age who had caught their initial COVID infection within the same week. The researchers then cross-matched those cases with data from Kentucky's Immunization Registry.

They found that those who were unvaccinated had more than double the risk of being reinfected during the Delta wave. Partial vaccination appeared to have no significant impact on the risk of reinfection.

Among those who were reinfected, 20% were fully vaccinated, while 34% of those who did not get reinfected were fully vaccinated.

The study is observational, meaning it can't show cause and effect; and the researchers had no information on the severity of the infections. Alyson Cavanaugh, PhD, a member of the CDC's Epidemic Intelligence Service who led the study, said it is possible that some of the people who tested positive a second time had asymptomatic infections that were picked up through routine screening.

Still, the study backs up previous research and suggests that vaccination offers important additional protection.

"Our laboratory studies have shown that there's an added benefit of vaccine for people who've had previous COVID-19. This is a real-world, epidemiologic study that found that, among people who'd previously already had COVID-19, those who were vaccinated had

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# COVID-19 mitigation measures led to shifts in typical annual respiratory virus patterns

BY TARA HAELLE

Nonpharmaceutical interventions, such as masking, staying home, limiting travel, and social distancing, have been doing more than reducing the risk for COVID-19. They're also having an impact on infection rates and the timing of seasonal surges of other common respiratory diseases, according to an article published in Morbidity and Mortality Weekly Report.

Typically, respiratory pathogens such as respiratory syncytial virus (RSV), common cold coronaviruses, parainfluenza viruses, and respiratory adenoviruses increase in the fall and remain high throughout winter, following the same basic patterns as influenza. Although the historically low rates of influenza remained low into spring 2021, that's not the case for several other common respiratory viruses.

"Clinicians should be aware of increases in some respiratory virus activity and remain vigilant for off-season increases," wrote Sonja J. Olsen, PhD, and her colleagues at the Centers for Disease Control and Prevention. She told this news organization that clinicians should use multipathogen testing to help guide treatment.

The authors also underscore the importance of fall influenza vaccination campaigns for anyone aged 6 months or older.

Timothy Brewer, MD, MPH, a professor of medicine in the Division of Infectious Diseases at the University of California, Los Angeles (UCLA), and of epidemiology at the UCLA Fielding School of Public Health, agreed that it's important for health care professionals to consider off-season illnesses in their patients.

"Practitioners should be aware that if they see a sick child in the summer, outside of what normally might be influenza season, but they look like they have influenza, consider potentially influenza and test for it, because it might be possible that we may have disrupted that natural pattern," Dr. Brewer told this news organization. Dr. Brewer, who was not involved in the CDC research, said it's also "critically important" to encourage influenza vaccination as the season approaches.

The CDC researchers used the U.S. World Health Organization Collaborating Laboratories System and the CDC's National Respiratory and Enteric Virus Surveillance System to analyze virologic data from Oct. 3, 2020, to May 22, 2021, for influenza and Jan. 4, 2020, to May 22, 2021, for other respiratory viruses. The authors compared virus circulation during these periods to circulation during the same dates from four previous years.

Data to calculate influenza and RSV hospitalization rates came from the Influenza Hospitalization Surveillance Network and RSV Hospitalization Surveillance Network.

*The "unusually timed" late spring increase in RSV "is probably associated with various nonpharmaceutical measures that have been in place but are now relaxing."*

The authors report that flu activity dropped dramatically in March 2020 to its lowest levels since 1997, the earliest season for which data are available. Only 0.2% of more than 1 million specimens tested positive for influenza; the rate of hospitalizations for lab-confirmed flu was 0.8 per 100,000 people. Flu levels remained low through the summer, fall, and on to May 2021.

A potential drawback to this low activity, however, is a more prevalent and severe upcoming flu season, the authors write. The repeated exposure to flu viruses every year often "does not lead to illness, but it does serve to boost our immune response to influenza viruses," Dr. Olsen said in an interview. "The absence of influenza viruses in the community over the last year means that we are not getting these regular boosts to our immune system. When we finally get exposed, our body may mount a weak response, and this could mean we develop a more clinically severe illness."

Children are most susceptible to that phenomenon because they haven't had a lifetime of exposure to flu viruses, Dr. Olsen said.

"An immunologically naive child may be more likely to develop a severe illness than someone who has lived through several influenza seasons," she said. "This is why it is especially important for everyone 6 months and older to get vaccinated against influenza this season."

Rhinovirus and enterovirus infections rebounded fairly quickly after their decline in March 2020 and started increasing in May 2020 until they reached "near prepandemic seasonal levels," the authors write.

RSV infections dropped from 15.3% of weekly positive results in January 2020 to 1.4% by April and then stayed below 1% through the end of 2020. In past years, weekly positive results climbed to 3% in October and peaked at 12.5% to 16.7% in late December. Instead, RSV weekly positive results began increasing in April 2021, rising from 1.1% to 2.8% in May.

The "unusually timed" late spring increase in RSV "is probably associated with various nonpharmaceutical measures that have been in place but are now relaxing," Dr. Olsen stated.

The RSV hospitalization rate was 0.3 per 100,000 people from October 2020 to April 2021, compared to 27.1 and 33.4 per 100,000 people in the previous 2 years. Of all RSV hospitalizations in the past year, 76.5% occurred in April-May 2021.

Rates of illness caused by the four common human coronaviruses (OC43, NL63, 229E, and HKU1) dropped from 7.5% of weekly positive results in January 2020 to 1.3% in April 2020 and stayed below 1% through February 2021. Then they climbed to 6.6% by May 2021. Infection rates of parainfluenza viruses types 1-4 similarly dropped from 2.6% in January 2020 to 1% in March 2020 and stayed below 1% until April 2021. Since then, rates of the common coronaviruses increased to 6.6% and parainfluenza viruses to 10.9% in May 2021.

Normally, parainfluenza viruses peak in October-November and May-June, so "the current increase could represent a return to prepandemic seasonality," the authors write.

Human pneumoviruses' weekly positive results initially increased from 4.2% in January 2020 to 7% in March and then fell to 1.9% the second

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lower odds of being reinfected," Dr. Cavanaugh said.

"If you have had COVID-19 before, please still get vaccinated," said CDC Director Rochelle P. Walensky, MD, in a written media statement. "This study shows you are twice as likely to get infected again if you are unvaccinated. Getting the vaccine is the best way to protect yourself and others around you, especially as the more contagious Delta variant spreads around the country."

In a White House COVID-19 Response Team briefing in May, Anthony S. Fauci, MD, chief medical advisor to the President, and director of the National Institute of Allergy and Infectious Disease, explained why vaccines create stronger immunity than infection.

He highlighted new research showing that two doses of an mRNA vaccine produce levels of neutralizing antibodies that are up to 10 times higher than the levels found in the blood of people who've recovered from COVID-19. Vaccines also enhance B cells and T cells in people who've recovered from COVID-19, which broadens the spectrum of protection and helps to fend off variants.

The study has some important limitations, which the authors acknowledged. The first is that second infections weren't confirmed with genetic sequencing, so the researchers couldn't definitively tell if a person tested positive a second time because they caught a new virus, or if they were somehow still shedding virus from their first infection. Given that the tests were at least 5 months apart, though, the researchers think reinfection is the most likely explanation.

Another bias in the study could have something to do with vaccination. Vaccinated people may have been less likely to be tested for COVID-19 after their vaccines, so the association or reinfection with a lack of vaccination may be overestimated.

Also, people who were vaccinated at federal sites or in another state were not logged in the state's immunization registry, which may have skewed the data.

# Tachycardia syndrome: A marker for long COVID?

**BY MARCIA FRELLICK**

Tachycardia is commonly reported in patients with post-acute COVID-19 syndrome (PACS), also known as long COVID, authors report in a new article. The researchers say tachycardia syndrome should be considered a distinct phenotype.

The study by Marcus Ståhlberg, MD, PhD, of Karolinska University Hospital, Stockholm, and colleagues was published online in The American Journal of Medicine (2021. doi: 10.1016/j.amjmed.2021.07.004).

Dr. Ståhlberg told this news organization that "We have diagnosed a large number of patients with postural orthostatic tachycardia syndrome [POTS] and other forms of COVID-related tachycardia at our post-COVID outpatient clinic at Karolinska University Hospital and wanted to highlight this phenomenon," he said.

Between 25% and 50% of patients at the clinic report tachycardia and/or palpitations that last 12 weeks or longer, the authors report.

"Systematic investigations suggest that 9% of Post-acute COVID-19 syndrome patients report palpitations at six months," the authors write.

The findings also shed light on potential tests and treatments, he said.

"Physicians should be liberal in performing a basic cardiological workup, including an ECG, echocardiography, and Holter ECG monitoring in patients complaining of palpitations and/or chest pain," Dr. Ståhlberg said.

"If orthostatic intolerance is also reported – such as vertigo, nausea, dyspnea – suspicion of POTS should be raised and a head-up tilt test or at least an active standing test should be performed," he said.

*"Systematic investigations suggest that 9% of post-acute COVID-19 syndrome patients report palpitations at six months."*

If POTS is confirmed, he said, patients should be offered a heart rate–lowering drug, such as low-dose propranolol or ivabradine. Compression garments, increased fluid intake, and a structured rehabilitation program also help.

"According to our clinical experience, ivabradine can also reduce symptoms in patients with inappropriate sinus tachycardia and post-COVID," Dr. Ståhlberg said. "Another finding on Holter-ECG to look out for is frequent premature extrasystoles, which could indicate myocarditis and should warrant a cardiac MRI."

Dr. Ståhlberg said the researchers think the mechanism underlying the tachycardia is autoimmune and that primary SARS-CoV-2 infections trigger an autoimmune response with formation of autoantibodies that can activate receptors regulating blood pressure and heart rate.

Long-lasting symptoms from COVID are prevalent, the authors note, especially in patients who experienced severe forms of the disease.

In the longest follow-up study to date of patients hospitalized with COVID, more than 60% experienced fatigue or muscle weakness 6 months after hospitalization.

PACS should not be considered a single syndrome; the term denotes an array of subsyndromes and phenotypes, the authors write. Typical symptoms include headache, fatigue, dyspnea, and mental fog but can involve multiple organs and systems.

Tachycardia can also be used as a marker to help gauge the severity of long COVID, the authors write.

"[T]achycardia can be considered a universal and easily obtainable quantitative marker of Post-acute COVID-19 syndrome and its severity rather than patient-reported symptoms, blood testing, and thoracic CT-scans," they write.

## Underrecognized complication

Erin D. Michos, MD, MHS, director of women's cardiovascular health and associate director of preventive cardiology at Johns Hopkins University, Baltimore, said in an interview that she has seen many similar symptoms in the long-COVID patients referred to her practice.

Dr. Michos, who is also an associate professor of medicine and epidemiology, said she's been receiving a "huge number" of referrals of long-COVID patients with postural tachycardia, inappropriate sinus tachycardia, and POTS.

"I think this is all in the spectrum of autonomic dysfunction that has been recognized a lot since COVID. POTS has been thought to have [a potentially] viral cause that triggers an autoimmune response. Even before COVID, many patients had POTS triggered by a viral infection. The question is whether COVID-related POTS for long COVID is different from other kinds of POTS."

She says she treats long-COVID patients who complain of elevated heart rates with many of the cardiac workup procedures the authors list and that she treats them in a way similar to the way she treats patients with POTS.

She recommends checking resting oxygen levels and having patients walk the halls and measure their oxygen levels after walking, because their elevated heart rate may be related to ongoing lung injury from COVID.

The authors and, Dr. Michos disclosed no relevant financial relationships.

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week of April and remained below 1% through May 2021. In typical years, these viruses peak from 6.2% to 7.7% in March-April. Respiratory adenovirus activity similarly dropped to historically low levels in April 2021 and then began increasing to reach 3% by May 2021, the usual level for that month.

"The different circulation patterns observed across respiratory viruses probably also reflect differences in the virus transmission routes and how effective various nonpharmaceutical measures are at stopping transmission," Dr. Olsen said in an interview. "As pandemic mitigation measures continue to be adjusted, we expect to see more changes in the circulation of these viruses, including a return to prepandemic circulation, as seen for rhinoviruses and enteroviruses."

Rhinovirus and enterovirus rates dropped from 14.9% in March 2020 to 3.2% in May – lower than typical – and then climbed to a peak in October 2020. The peak (21.7% weekly positive results) was, however, still lower than the usual median of 32.8%. After dropping to 9.9% in January 2021, it then rose 19.1% in May, potentially reflecting "the usual spring peak that has occurred in previous years," the authors write.

The authors note that it's not yet clear how the COVID-19 pandemic and related mitigation measures will continue to affect respiratory virus circulation.

The authors hypothesize that the reasons for a seeming return to seasonal activity of respiratory adenoviruses, rhinoviruses, and enteroviruses could involve "different transmission mechanisms, the role of asymptomatic transmission, and prolonged survival of these nonenveloped viruses on surfaces, all of which might make these viruses less susceptible to nonpharmaceutical interventions."

Dr. Brewer, of UCLA, agreed.

All the viruses basically "flatline except for adenoviruses and enteroviruses, and they behave a little differently in terms of how they spread," he said. "Enteroviruses are much more likely to be fecal-oral spread than the other viruses [in the study]."

The delayed circulation of parainfluenza and human coronaviruses may have resulted from suspension of in-person classes through late winter 2020, they write, but that doesn't explain the relative absence of pneumovirus activity, which usually affects the same young pediatric populations as RSV.

Dr. Brewer said California is seeing a surge of RSV right now, as are many states, especially throughout in the South. He's not surprised by RSV's deferred season, because those most affected – children younger than 2 years – are less likely to wear masks now and were "not going to daycare, not being out in public" in 2020. "As people are doing more activities, that's probably why RSV has been starting to go up since April," he said.

Despite the fact that, unlike many East Asian cultures, the United States has not traditionally been a mask-wearing culture, Dr. Brewer wouldn't be surprised if more Americans begin wearing masks during flu season. "Hopefully another thing that will come out of this is better hand hygiene, with people just getting used to washing their hands more, particularly after they come home from being out," he added.

Dr. Brewer similarly emphasized the importance of flu vaccination for the upcoming season, especially for younger children who may have poorer natural immunity to influenza, owing to its low circulation rates in 2020-2021.

The study was funded by the CDC. Dr. Brewer and Dr. Olsen have disclosed no relevant financial relationships.

# Bullying in academic medicine rife, underreported

BY BATYA SWIFT YASGUR MA, LSW

Bullying in academic medicine, especially among women, is rife, underreported, and remains largely unaddressed, new research suggests.

Men were identified as the most common perpetrators – close to 70% of respondents – whereas women were the most common victims (56%). Collectively, respondents in all of the studies identified the most common bullies to be consultants (54%), followed by residents (22%), and nurses (15%). Disturbingly, less than one-third of victims overall reported that they were bullied, and close to 60% who formally reported the abuse said they did not have a positive outcome.

"We found that bullies are commonly men and senior consultants, while more than half of their victims are women," senior author Harriette G.C. Van Spall, MD, MPH, associate professor of medicine and director of e-health and virtual care, Division of Cardiology, McMaster University, Hamilton, Ont., said in an interview.

"The greatest barriers to addressing academic bullying are the fear of reprisal, lack of impact of reporting, and non-enforcement of anti-bullying policies," she added.

The study was published online in BMJ Open (2021. doi: 10.1136/bmjopen-2020-043256).

To investigate, the researchers reviewed 68 studies (n = 82,349 respondents) conducted between 1999 and 2021 in academic medical settings, in which victims were either consultants or trainees. "Bullying" was defined as "the abuse of authority by a perpetrator who targets the victim in an academic setting through punishing behaviors that include overwork, destabilization, and isolation in order to impede the education or career of the target."

Bullying behaviors, reported in 28 studies (n = 35,779 respondents), were grouped into destabilization, threats to professional status, overwork, and isolation, with overwork found to be the most common form of bullying.

The most common impact of being bullied was psychological distress, reported by 39.1% of respondents in 14 studies, followed by considerations of quitting (35.9%; 7 studies), and worsening of clinical performance (34.6%, 8 studies).

"Among demographic groups, men were identified as the most common perpetrators (67.2% of 4,722 respondents in 5 studies) and women the most common victims (56.2% of 15,246 respondents in 27 studies)," the authors report.

"Academic medicine in many institutions is encumbered by systemic sexism that is evident in processes around remuneration, recognition, opportunities for advancement, and leadership positions," said Dr. Van Spall.

"There are fewer women at decision-making tables in academic medicine, the climb is uphill at the best of times, and women are likely easier targets for bullies, as their voices are easier to drown out," she added.

Thirty-one studies (n = 15,868) described characteristics of the bullies and showed the most common to be consultants (53.6% [30 studies]), residents (22% [22 studies]), and nurses (14.9% [21 studies]). Only a minority of victims (28.9% of 9,410 victims [10 studies]) formally reported the bullying.

When a formal complaint was submitted (n = 1,139 respondents), it most frequently had no perceived effect (35.6%); more than one-fifth (21.9%) experienced worsening of the bullying, and only 13.7% reported improvement.

The common institutional facilitators of bullying, described in 25 studies, included lack of enforcement of anti-bullying policies (13 studies), the hierarchical structure of medicine (7 studies), and normalization of bullying (10 studies).



# 2021 AMA Meeting of the House of Delegates

BY N.R. DESAI, MD, MBA, FCCP

The American Medical Association (AMA) conducted its June 2021 AMA Special Meeting of the AMA House of Delegates (HOD) from June 11-16 virtually. Delegates from more than 170 societies (state societies, specialties, subspecialties, and uniformed services) comprised the nearly 700 physicians, residents, and medical students, gathered for the HOD meeting to consider a wide array of proposals.

CHEST is an active member, and through the HOD and Specialty and Service Society Caucus, CHEST has partnered with AMA and its sister societies to work with each other on important regulatory issues. CHEST/Allergy Section Council (participants at this meeting were from the AAAAI, AAOA, AASM, ACAAI, ATS, CHEST, and SCCM) met before the proceedings of the House to discuss pending business.

The meeting was hosted by the current CHEST/Allergy Council chair Dr. Wesley Vander Ark (AMA Delegate AAOA) and Jami Lucas, CEO AAOA.

## Brief updates on the resolutions

*Continuity of care of patients discharged from hospital settings (Adapted as a new policy)*
The policy focuses on key issues around the continuity of care of patients. It includes protections of continuity of care for medical services and medications that are prescribed during patient hospitalizations, including when there are formulary or treatment coverage changes that have the potential to disrupt therapy following discharge.


Dr. Desai

*Licensure and telehealth*
The policy urges AMA to continue to support state efforts to expand physician licensure recognition across state lines in accordance with the standards and safeguards Coverage and Payment for Telemedicine. (New HOD Policy)

AMA to conduct or commission a study on the effect that telemedicine services have had on health insurance premiums, focusing on the differences between states that had telehealth payment parity provisions in effect prior to the pandemic vs those that did not, and report back at the 2021 Interim Meeting of the AMA House of Delegates. (Directive to Take Action). CHEST has taken an active role in supporting this resolution through advocating for telemedicine services and reimbursement, as well as leading the CHEST Clinician Matching Network that pairs volunteer doctors with hospitals based on their need throughout the country.

*Vaccines (Adopted as a new policy)*
The policy urges AMA to advocate for the prohibition of the use of patient/customer information collected by retail pharmacies for COVID-19 vaccination scheduling and/or the vaccine administration process for the purpose of commercial marketing or future patient recruiting purposes, especially any targeting based on medical history condition. AMA opposes the sale of medical history data and contact information accumulated through the scheduling or provision of government-funded vaccinations to third parties for use in marketing or advertising.

Additionally, as it relates to vaccines, CHEST has joined a joint society statement supporting a vaccine mandate for all health care workers.

*Optimizing match outcomes (Directive to Take Action)*
The policy urges AMA to encourage the Association of American Medical Colleges, American Association of Colleges of Osteopathic Medicine, National Resident Matching Program, and other key stakeholders to jointly create a no-fee, easily accessible clearinghouse of reliable and valid advice and tools for residency program applicants seeking cost-effective methods for applying to and successfully matching into residency.

*Ensuring adequate health care resources to address the long COVID crisis and call for increased funding and research for post-viral syndromes*
The policy directs AMA to support the development of an ICD-10 code or family of codes to recognize Post-Acute Sequelae of SARS-CoV-2 infection ("PASC" or "Long COVID") and other novel post-viral syndromes as distinct diagnoses. (New HOD Policy). Further, the policy

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directs AMA to advocate for legislation to provide funding for research, prevention, control, and treatment of post-viral syndromes and long-term sequelae associated with viral infections, such as COVID-19 and AMA provide physicians and medical students with accurate and current information on post-viral syndromes and long-term sequelae associated with viral infections, such as COVID-19; and further that AMA collaborate with other medical and educational entities to promote education among patients about post-viral syndromes and long-term sequelae associated with viral infections, such as COVID-19, to minimize the harm and disability current and future patients face. (Directive to Take Action)

*Medical misinformation in the age of social media (Directive to Take Action)*
AMA encourage social media organizations to further strengthen their content moderation policies related to medical misinformation, including, but not limited to, enhanced content monitoring, augmentation of recommendation engines focused on false information, and stronger integration of verified health information. AMA should encourage social media organizations to recognize the spread of medical misinformation over dissemination networks and collaborate with relevant stakeholders, and work with public health agencies to establish relationships with journalists and news agencies to enhance the public reach in disseminating accurate medical information.

*Promoting equity in global vaccine distribution*
AMA call for the cooperation of all governments and international agencies to share data, research, and resources for the production and distribution of medicines, vaccines, and personal protective equipment (Directive to Take Action); and be it further, AMA promote and support efforts to supply COVID vaccines to 21health care agencies in other parts of the world to be administered to individuals who can't afford them. (Directive to Take Action). AMA urge the US government to provide all possible assistance, including surplus vaccines and vaccines that have not had emergency use authorization, to the citizens of India and other countries in a similar situation in this humanitarian crisis (New HOD Policy).

CHEST has taken an active role in promoting equity in health care and vaccine distribution in partnership with the American Lung Association and the American Thoracic Society, including establishing a research grant program focused on this topic.

*Addressing inflammatory and untruthful online ratings (Directive to Take Action)*
AMA take action that would urge online review organizations to create internal mechanisms ensuring due process to physicians before the publication of negative reviews.

This is just a small sampling of the activities and more information, including reports from the various Councils, are available on the AMA website, http://ama-assn.org.

CHEST members interested in the AMA policy-making process may observe any AMA-HOD meeting or participate in the AMA's democratic processes. Attendees will also be able to increase their knowledge and skills at no cost. They will also be able to connect with more than 1,500 peers and other meeting attendees from across the country. CHEST members with the time (there are two 5-day meetings each year) and interest are invited to apply to be an official CHEST delegate to the AMA. Contact Suzanne Sletto at ssletto@chestnet.org for details.

Delegates and alternate delegates to the House of Delegates (HOD) play a critical role in the democratic policy-making process that is the foundation of the AMA. Their role is multi-dimensional and includes:

- Advocacy for patients within the HOD to improve the health of the public and the health care system;
- Representation of the perspectives of their sponsoring organization to the HOD;
- Representation of their physician and medical student constituents in the decision-making process of the HOD;
- Representation of the AMA and its House of Delegates to member and nonmember physicians, medical associations, and others; and
- Solicitation of input from and provision of feedback to constituents.

Also, HOD delegates and alternate delegates are expected to foster a positive and useful two-way relationship between grassroots physicians and the CHEST leadership.

*Dr. Desai is with the Chicago Chest Center and AMITA Health Suburban Lung Associates; and the Division of Pulmonary, Critical Care, Sleep and Allergy, University of Illinois at Chicago.*

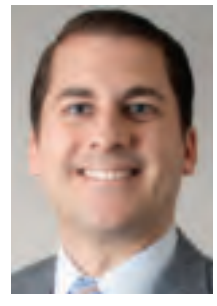
# Update – CHEST clinical practice guidelines

**BY JONATHAN M. IACCARINO, MD, MS**
*Director, Guidelines and Statements*

CHEST has a long history of developing high quality clinical practice guidelines based on rigorous methodology, particularly in Thoracic Oncology, Pulmonary Vascular/Venous Thromboembolic Disease, and Clinical Pulmonary Medicine/Cough. Using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach, CHEST guidelines aim to optimize patient care by providing evidence-based recommendations that are transparent and free from bias.

Recently, CHEST invested in reassessing how we could further enhance the relevance, timeliness, and impact of guidelines on patient care and outcomes. We re-evaluated how we prioritize guideline topics to ensure we identify conditions in which patient care might be significantly improved by the application of evidence-based recommendations. In addition to re-committing to the rigorous GRADE approach, we also committed to timelier guideline development that would cover a broader scope of clinical topics, better mirroring the needs of our membership.

Since resuming our guideline process last year, we completed four Expert Panel Reports covering COVID-19–related topics, as well as several CHEST clinical practice guidelines. This includes publications on the management of cough in various conditions and populations – chronic bronchitis, acute bronchitis in the immunocompromised adult, asthma and nonasthmatic eosinophilic bronchitis, and in children. We also published *Diagnosis and Evaluation of Hypersensitivity Pneumonitis* earlier this year. This guideline outlines a patient-centered and interdisciplinary diagnostic approach to aid clinicians and patients in navigating many of the uncertainties in the evaluation of this condition.


**Dr. Iaccarino**

Updates from two of our guidelines following our 'living guideline' model were also recently published – *Screening for Lung Cancer* and *Antithrombic Therapy for VTE Disease*. The *Screening for Lung Cancer* update provides guidance on patient selection for lung cancer screening, updating the age and smoking history criteria based on new evidence published since the original CHEST guideline. The updated guideline also provides recommendations for implementing high-quality lung cancer screening programs to optimize the overall benefits of screening.

In *Antithrombotic Therapy for VTE*, the structure of recommendations follows the chronology of VTE management: 'Whether to treat,' 'Interventional and adjunctive treatments,' 'Initiation phase,' 'Treatment phase,' 'Extended phase,' and 'Complications of VTE.' This guideline was designed to provide a comprehensive reference for VTE management in patients at any stage of the disease. Several recommendations are new from prior versions of the guideline, including whether patients with cerebral venous sinus thrombosis should be treated with anticoagulation and the choice of anticoagulant therapy for patients with antiphospholipid syndrome and thrombosis.

As we look toward the future of guideline development at CHEST, we are excited by the opportunity to expand the CHEST guideline portfolio. Starting in 2022, we will be broadening the scope of CHEST guidelines to include topics in nine clinical domains: Airway Disorders, Chest Infections, Clinical Pulmonary Medicine, Critical Care, Interstitial Lung Disease, Interventional Pulmonology, Pulmonary Vascular Disease (including venous thromboembolic disease), Thoracic Oncology, and Sleep. We anticipate issuing a Request for Proposals in select areas from these domains in the Spring of 2022, allowing CHEST members the opportunity to propose topics for which clinical guidance is needed.

As we recommit to the rigorous guideline methodology for which CHEST is known and broaden our impact across the spectrum of chest disease, we seek to ensure CHEST remains the leading resource for evidence-based guidelines in the field of chest medicine.

SLEEP STRATEGIES

# Staying up to date with consumer sleep technology

BY SEEMA KHOSLA, MD, FCCP, FAASM

With Siri and Alexa sitting at our kitchen tables and listening to our conversations, we have all but forgotten about the before times – when we had to use the Yellow Pages to look up a number or address and when we had no idea how many steps we took in a given day. Wearable technology has become ubiquitous and has us watching not only our step count but also our sleep. Did I get enough deep sleep? What does my sleep score of 82 mean? Should I be worried?

As clinicians, we must also navigate how this information impacts our clinical decision-making and consider how our patients are interpreting these data on a daily basis. There is an inherent assumption that we, as sleep clinicians, will understand the nuances of each consumer-facing sleep technology (CST) whether it is a wearable, a nearable (a device that sits near the body but not on the body), or an app. Very little validation data exist, as most of these technologies are marketed as wellness devices and are not intended to render a diagnosis. It therefore falls to us to determine how to utilize this information in an already busy clinic.

One strategy is to use these technologies as patient engagement tools – a way to increase public awareness of the importance of sleep. While this certainly should be beneficial, oftentimes, the data are confusing and can lead to misunderstandings about what normal sleep should look like. Approaching these data as partners to our patients allows us to set expectations around normal sleep cycles and sleep duration. It also allows us to discuss appropriate sleep timing and sleep hygiene.

Many wearable devices have incorporated oximetry into their metrics, and some claim to have accuracy that is better than hospital-grade oximeters. Many of these companies are no longer in business. Others specify higher accuracy in dark-skinned individuals ("CIRCUL Ring Pulse Oximeter in Dark-Pigmented Individuals: Clinical Study Validates Efficacy and Reliability," *Medical Device News Magazine*, Feb. 26, 2021 https://tinyurl.com/advtnttk).

Despite these claims, they are registered as wellness devices with the FDA and are not diagnostic devices. Logically, if one of these devices demonstrates worrisome data, then it can prompt further clinical queries and, potentially, objective testing for obstructive sleep apnea (OSA). The reverse, however, cannot be claimed. A normal reading by CST does not obviate the need for objective testing if the clinical symptoms warrant it.

Dr. Khosla

*Very little validation data exist, as most of these technologies are marketed as wellness devices and are not intended to render a diagnosis. It therefore falls to us to determine how to utilize this information in an already busy clinic.*

There are CSTs that have been created around very specific needs - such as jet lag- and provide guidance for how to quickly acclimate to the destination time zone by providing nudges for light exposure and timed melatonin or dark glasses (https://www.timeshifter.com/).

Others analyze the sleep space for extrinsic sounds (https://www.sleepcycle.com/), while a plethora of apps provides advice for how to optimize your sleep environment and wind-down routine. There is even a sleep robot designed to facilitate sleep onset (https://somnox.com/). This bean-shaped device is designed to "breathe" as you hold it, and the user is meant to emulate those same breathing patterns. It is a take on the 4-7-8 breathing pattern long endorsed by yogis.

Although validation data are lacking for the vast majority of CST, a recent study (www.ncbi.nlm.nih.gov/pmc/articles/PMC8120339/pdf/zsaa291.pdf . Accessed Aug 25, 2021) demonstrated that CST had high performance when compared with actigraphy in assessing sleep and wakefulness and, as such, may improve the evaluation of sleep and wake opportunities prior to MSLT or improve identification of circadian sleep-wake disorders. Many practices do not currently utilize actigraphy due to its expense and very limited potential for reimbursement. Using a patient's sleep-tracking device may allow access to these data without financial outlay. While these data demonstrate the ability of CST to potentially differentiate sleep from wakefulness, it is notable that this study also found that the determination of individual sleep stages is less robust. In general, CST cannot identify an underlying sleep disorder, however, may raise awareness that a disorder might be present.

This leads to more reflection on the role of CST in a typical sleep clinic. Many years ago, discussion around this technology was primarily patient-initiated and often times met with skepticism on the part of the clinician. As technology has improved and has become more accessible, there appears to be more acceptance among our colleagues – not, perhaps, in terms of absolute actionable data, but rather as an opportunity to discuss sleep with our patients and to support their own efforts at improving their sleep. Trends in the data in response to CBT-I or medications can be observed. Abnormalities identified via CST often serve as the initial prompt for a clinical visit and, as such, should not be eschewed. Rather, reframing the use of this information while also addressing other sleep issues is likely to be the more appropriate path forward.

Assessing this information can be time-consuming, and best practice suggests establishing expectations around this process (*J Clin Sleep Med* 2018 May 15. doi: 10.5664/jcsm.7128. [https://tinyurl.com/2veb5v7p]).

Agreements can be made with patients that the data are reviewed in the context of a clinical visit rather than longitudinally as data are uploaded and then sent via messaging unless such an understanding has already been agreed upon. RPM billing codes may ultimately allow for reimbursement and recognition of this workload. At the present time, RPM billing is limited to FDA-cleared, prescription devices, and CST does not yet qualify.

There also needs to be recognition of potential harm from CST. Inevitably, some patients will develop orthosomnia, a term coined by Dr. Kelly Baron, where patients become so fixated on achieving perfect sleep scores that it contributes to insomnia. In this case, identification of orthosomnia is made via the clinical visit and patients are advised to stop tracking their sleep for a set period of time. This allows the anxiety around achieving "perfect sleep" to dissipate.

Google and the AASM recently announced a partnership (https://tinyurl.com/ndj9akm4). Essentially, the Google Nest Hub will serve to detect sleep concerns (such as timing of sleep, snoring, insufficient sleep, etc.) and will direct the user to educational resources such as www.sleepeducation.org. The idea behind this is that people are often unaware of an underlying sleep disorder such as OSA and don't know what to search for. The Nest Hub uses information it collects and directs users to appropriate resources, thus obviating the need to know what to Google.

Clearly, big tech has invested heavily in our field. Between the copious wearables, nearables, and apps that are sleep-focused, these industry giants obviously believe that sleep is worthy of such a significant allocation of resources. This has improved the overall awareness of the importance of sleep and of identifying and treating sleep disorders. While these technologies are no replacement for a clinical evaluation, they can serve as patient engagement tools, as well as potentially large-scale OSA screening tools and may help us improve the percentage of patients with undiagnosed OSA, estimated to be 80% (Frost and Sullivan, "Hidden Health Crisis Costing America Billions," American Academy of Sleep Medicine, 2016. https://tinyurl.com/5bjvjsjx).

CST may allow us to better identify circadian sleep-wake disorders and evaluate sleep satiation prior to MLST that no longer requires investment in expensive actigraphy devices. They also allow us to partner with our patients by meeting them where they are and recognizing the efforts they have already made to improve their sleep before we even meet them.

*Dr. Khosla is Medical Director, North Dakota Center for Sleep, Fargo, North Dakota.*

NETWORKS

# Destruction in the air; Empathy in the ICU; Respiratory therapist shortage; COPD and sleep-disordered breathing; and more....

Photographer's Mate 2nd Class Jim Watson/U.S. Navy/Wikimedia Commons

**A firefighter emerges from the smoke and debris of the World Trade Center.**

## Occupational and environmental health

**Destruction in the air**

Building collapse, such as that of the Surfside condominiums in Miami, Florida, results not only in tragic loss of life but also leads to devastating effects on lung health. Following the World Trade Center collapse, a massive particle dust cloud of up to 11,000 tons of $PM_{2.5}$ was dispersed, 90% of which was particles greater than 10 mcm (Rom et al. *Proc Am Thorac Soc.* 2010 May;7[2]:142-5).

Fine particulate matter has been associated with multiple lung conditions. Those w ho arrive on site in the first 24 hours may have immediate changes in $FEV_1$ and FVC. Acute eosinophilic pneumonia has also been described in the initial aftermath (Rom et al. *Am J Respir Crit Care Med.* 2002;166(6):785).

Chronic lung diseases such as chronic obstructive pulmonary disease and asthma, may worsen with repeated exposure. One Swedish study demonstrated an increased incidence of chronic lower respiratory disease in cement and demolition workers compared with the general labor force (Purdue et al. *Thorax.* 2007 Jan;62[1]:51-6). Clean-up sites may contain a variety of materials associated with occupational lung diseases, like chrysolite asbestos, silica, and heavy metals.

**Dr. Church**

**Dr. Balakrishnan**

Prevention remains key. In the United States, the Occupational Safety and Health Administration requires all construction and demolition sites to have a dust control plan. Primary prevention includes the use of N-95 masks and watering sites. N-95 masks protect against particulate matter $PM_{2.5}$ and smaller (Zhou et al. *J Thorac Dis.* 2018 Mar;10[3]:2059-69. Watering sites, while useful, can be challenging depending on the size and temperature of the area. Workers in high-risk occupations should have prior screening with pulmonary function testing. After an exposure, it is recommended pulmonary function testing be repeated, with close interval monitoring.

Disclaimer: The views expressed in this article are those of the author(s) and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or U.S. Government.

*Tyler Church, DO*
*Jason Unger, MD*
*Fellow-in-training Members*
*Bathmapriya Balakrishnan, MD*
*Steering Committee Member*

## Palliative care and end of life

**Empathy in the ICU**

The importance of empathetic patient care has never seemed so significant with patients isolated from the standard support systems in a pandemic that has pushed health care to its limits. While empathy can clearly impact patient outcomes (Rakel DP et al. *Fam Med.* 2009;41[7]:494-501), the practicality of delivering empathic care is less well defined. Into this void step Dr. Jessica Bunin and colleagues (Bunin J et al. *J Crit Care.* 2021;29;65:156-63), who present a scoping review of the limited literature in an effort to address gaps in the practice of empathy. Perhaps unsurprising but most critically, the authors found that far from being a dichotomous construct, empathy is a "complex phenomenon" that exists on a continuum. It is inconsistently defined in the existing literature, with the inclusion of cognitive, affective, and somatic processes variable. Equally important, they identified that practicing empathy carries risk in addition to its beneficial applications for both patients and intensivists.

Far from being easily identifiable, measured, and taught, this concept of empathy as a nuanced and contextually charged skill that requires practice and reflection aligns it with other skills and tools used in the care of our critically ill patients. This group has suggested that a clear definition of empathy, transparent discussion of the risks and benefits of using empathy, attention to developing environments that minimize barriers and facilitate the practice of empathy in clinical care, and the growth of educational practice to promote attention to self-care in the use of empathy will overall benefit both patient and physician well-being. At the very least, we need to allow ourselves grace to fail and learn as we strive to provide empathic care for our patients and ourselves.

**Dr. Johnson**

*Laura Johnson, MD, FCCP*
*NetWork Ex-Officio*

## Respiratory care

**National campaign to address respiratory therapist shortage**

As our population grows, hospitals and physician practices face a rapidly growing need for more specialized, high-quality respiratory care; but the numbers of respiratory therapists are not keeping pace. (*U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. Respiratory Therapists.* https://tinyurl.com/47k5ds3w).

**Dr. Gardner**

To inspire a new generation of respiratory therapists and promote this lifesaving profession, the American Association for Respiratory Care (AARC), the Commission on Accreditation for Respiratory Care (CoARC), and The National Board

for Respiratory Care (NBRC) are pursuing a multiyear, national campaign called The World Needs More RTs. This campaign has three primary goals:

1. Enhance the value of the respiratory care profession.
2. Recruit and retain more respiratory therapists.
3. Shape future leadership in respiratory care.

There are factors behind the current and impending future inadequate numbers of respiratory therapists:

- Decrease in undergraduate enrollment.
- Increase in retirements.
- Escalation of burnout in health care.

This campaign aims to address these factors, enhance interest in the profession, and prevent further decline in RT numbers.

Respiratory therapists make an invaluable impact on patient care, and simply put, the world needs more RTs. More RTs are needed to provide lifesaving care in the critical care units, emergency departments, and clinics (Shaw RC, Benavente, IL. *AARC Human Resources Survey of Acute Care Hospital Employers.* NBRC 2020). More RTs are needed to educate the next RT generation (Shaw RC, Benavente JL. *AARC Human Resources Survey of Education Programs.* NBRC 2020). To see how you can champion the campaign, visit MoreRTs.com.

*Lori Tinkler, MBA*
*CEO, NBRC*
*Steering Committee Member*
*De De Gardner, DrPH, RRT, FCCP*
*Vice-Chair*

## Sleep disorders

### COPD and sleep-disordered breathing: Updates and steps forward

The presence of sleep breathing disorders in individuals with COPD, in the form of COPD and OSA overlap syndrome (OVS) or chronic hypercarbic respiratory failure (CHRF), portend poor outcomes when untreated. Treatment of OVS and CHRF are among few interventions that positively impact mortality, readmission rates, and quality of life in patients with COPD.

Higher mortality and readmission rates are seen in those admitted with COPD exacerbations who have OVS compared with COPD alone. Initiation and adherence to PAP therapy decreases mortality and COPD-related hospitalizations (Ioachimescu OC et al. J *Clin Sleep Med.* 2020;16[2]:267-77; Singh G et al. *Sleep Breath*. 2019;23[1]:193).

**Dr. Lowery**

**Dr. Naik**

In CHRF, initiation of high intensity noninvasive ventilation (NIV) at least 2 weeks after resolution of acute respiratory failure reduces mortality and prolongs time to readmission (Murphy PB et al. *JAMA*. 2017;317[21]:2177-86; Kohnlein T et al. *Lancet Respir Med.* 2014;2:698-705). Initiating home NIV in individuals with acute hypercarbic respiratory failure does not improve readmission rates or time to readmission (Struik FM et al. *Thorax.* 2014;69:826-34). The new ATS guidelines, therefore, recommend NIV initiation for stable CHRF in COPD, screening for OVS prior to NIV initiation, and targeting $PaCO_2$ normalization (Macrea M et al. *Am J Respir Crit Care Med.* 2020;202[4]:e74-e87).

Identification and treatment of OVS and CHRF pose unique challenges for clinicians, particularly when navigating current testing and reimbursement guidelines. A multisociety Technical Expert Panel, including members of CHEST, has recently published its recommendations for changes to CMS national coverage determinations for NIV to take the next steps forward (Gay PC et al. *CHEST.* 2021;S0012-3692[21]01481-1).

*Megan Lowery, MD*
*Sreelatha Naik, MD*
*Steering Committee Members*

## Thoracic oncology

### CHEST releases its newest edition of the tobacco treatment toolkit

Tobacco remains the greatest single cause of morbidity and mortality. Left unaddressed, tobacco is projected to kill 1 billion people worldwide this century. Despite this, only 5% of all tobacco-dependent patients in the United States receive both a medication and even minimal counseling for their addiction.

Tobacco dependence is a severe chronic life-threatening disease. It is with this focus that CHEST released its latest iteration of the Tobacco Dependence Treatment Toolkit. This edition focuses on treating tobacco addiction as a chronic disease, titrating all seven FDA-approved medications toward tobacco abstinence, and medical practice/hospital reimbursement.

The CHEST toolkit is divided into eight sections: Motivational Interviewing, Testing/Diagnostics, Treatment Basics (pharmacologic and nonpharmacologic), Treatment Pearls, Clinical Vignettes and Studies, Special Populations, Treatment for e-Cigarettes and Other Tobacco Products, and Insurance Billing and Telehealth.

Special attention is given to tobacco addiction diagnostics and using these findings to treat the chronic disease of tobacco addiction just like any other chronic disease by aggressively and successfully titrating FDA-approved medications in various permutations and combinations, as needed.

The therapeutic goal is assisting the patient to feel normal, minimizing withdrawal throughout the process, so that tobacco abstinence can ultimately be obtained and maintained.

Clinicians and medical centers can receive insurance reimbursement for these diagnostics and associated interventions. This includes both in-office procedures and via telehealth. The CHEST toolkit discusses both in-depth.

A new unique associated feature is our Clinician Interactive Toolkit. This multimedia interactive platform reviews clinician interactions with a tobacco-dependent patient via avatars and can be found here: Clinician Interactive Toolkit (https://tinyurl.com/fyr37636).

The American College of Chest Physicians' Tobacco Dependence Treatment Toolkit can be downloaded here: https://tinyurl.com/zdv63eju.

The toolkit also included the development of a new video game for tobacco users. Smoke Out: Tobacco Pirates is available for download for free to all at the Apple App Store for iPhones and iPads (https://tinyurl.com/b2s66d4z), and at Google Play (play.google.com/store/apps/details?id=com.gforcelearning.smokeout&hl=en_US&gl=US).

The game is fun, the theme is immersive, and the educational content is specifically focused on tobacco users, although clinicians will enjoy it too.

*Matthew Bars, MS*
*Faculty Steering Committee Member*
*for the Tobacco Dependence*
*Treatment Toolkit*

# Remember the past, be wary of the future

## *A perspective on the intended Philip Morris International acquisition of Vectura*

*On July 9, Philip Morris International Inc. (PMI) issued a statement of intent to purchase Vectura Group plc (Vectura), a provider of inhaled drug delivery solutions. According to the statement, the acquisition contributes to the PMI goal to move "beyond nicotine" by leveraging Vectura's expertise in inhalation and aerosolization into adjacent areas.*

*Given PMI's strong ties to tobacco, the acquisition raises concerns across the medical field. D. Robert McCaffree, MD, Master FCCP, shares his thoughts on the prospective acquisition in the following guest feature.*

In 2018, Dr. Neeraj Desai and I published an editorial in the journal *CHEST*®. The title was, in part, "Is Big Tobacco Still Trying to Deceive the Public? ... "[1] Before I give an opinion about the answer, I should give some background on events eliciting the editorial.

**Dr. McCaffree**

In 1999, the US Department of Justice (DOJ) sued major tobacco companies (Philip Morris, USA; Altria; RJ Reynolds; and Lorillard) for being in violation of the Racketeer Influenced Corrupt Organization Act (RICO) in that they colluded for decades to mislead the public about the risks of smoking and risks of secondhand smoke, downplayed the addictiveness of nicotine, manipulated nicotine levels, marketed cigarettes as "low tar" or "light" when they knew these were no less hazardous than full-flavored cigarettes, purposefully targeted youth, and failed to produce a safer cigarette.

In 2006, Judge Gladys Kessler of the D.C. District Court issued a 1700-page opinion finding the defendants had violated RICO. In her words,

- "[This case] is about an industry, and in particular these defendants, that survives, and profits, from selling a highly addictive product which causes diseases that lead to ... [an] immeasurable amount of human suffering ... they have consistently, repeatedly and with enormous skill and sophistication, denied these facts to the public, the Government, and to the public health community."

"Defendants have marketed and sold their lethal products with zeal, with deception, with a single-minded focus on their financial success, and without regard for the human tragedy ... exacted."

- "Over the course of more than 50 years, defendants lied, misrepresented, and deceived the American public, including ... the young people they avidly sought as 'replacement' smokers."
- "The evidence in this case clearly establishes that defendants have not ceased engaging in unlawful activity ... "

Since, under RICO, the government could not recover monetary damages but only require corrective actions going forward, the court ordered them to publish "corrective statements" (five different ones in total) in major publications and on television during prime time over the course of several months, as well as at the point of sale. (They are still appealing the point-of-sale display.)

Of course, the defendants appealed, but those appeals were largely thwarted until the (almost) final order in 2017, which then led to our editorial in 2018.

While this is a rather long introduction, I thought it necessary to depict the long-standing nature and behavioral patterns of deception, distortion, and destructive behavior of this industry – all designed to maintain their incredible profits - before trying to answer the question posed in our editorial.

Since all of the above, is there evidence the industry's behaviors have changed? On the negative side, there is a recent study published on the Tobacco Free Kids website documenting the past and continued marketing to women and girls, with all the adverse consequences to women's health.[2] The industry continues to produce and market cigarettes to everyone, including youths and focused markets such as Blacks and LGBTQ populations. However, they are quite aware that the future of combustible tobacco, the major source of their incredible profits, is threatened.

Currently, most of the profits from Philip Morris International (PMI), as well as the other major players, come from combustible products.

Mauro_Scarone/Getty Images

But, the CEO of PMI has stated that he thinks combustible tobacco products will be gone in 10 to 15 years and PMI will be selling only smoke-free products by 2025. So, to preserve similar profits as their combustible products diminish, they have made major investments in vaping products and development of other noncombustible tobacco products.

But these are still addictive, and any reduction in health consequences is still being evaluated. A prime example of trying to change their image is Philip Morris' Beyond Nicotine campaign. However, currently all the companies continue to produce combustible products in large amounts, both locally and internationally.

One way of assessing the vision of any company is to see where it is putting its money. Currently, all major tobacco companies are investing in marijuana companies. For example, Philip Morris has invested $2.4 billion into Cosmos, a Canadian marijuana company.

They also recently purchased Vectura, Fertin, and Kraft Foods. I know, it's hard to see where Kraft Foods fits in here, but Vectura, an inhalational device manufacturer, and Fertin, which makes nicotine gum, as well as vehicles such as powders, pouches that dissolve in the mouth, and lozenges, certainly do fit in.

My take on these recent acquisitions is that tobacco companies realize combustibles are dying. However, they continue to develop and market nicotine in noncombustible forms. They are likely looking to move into marijuana, at least as an investment. It's not a huge leap to consider the possibility that the purchase of Vectura will help develop delivery systems for nicotine, marijuana, and possibly medications. It's unclear whether PMI intends to get further into inhaled pharmaceuticals.

Bottom line is that, as pulmonary physicians, we need to be aware of all developments in inhaled substances and delivery methods. On the upside, everything the industry is currently doing is apparently more transparent than they have been in the past. They are not yet, however, ceasing production and marketing of cigarettes.

It's also important that we remind ourselves of their past actions because, personally, that past still bothers me, and I'm not quite ready to trust them. When it comes to "Big Tobacco," it is appropriate that we always keep in mind the immortal words, often repeated in various forms, of Edgar Allen Poe, master teller of horror stories, "Believe nothing you hear and only half that you see."[3]

### References


1. McCaffree DR, Desai NR. Is big tobacco still trying to deceive the public? This is no time to rest on our laurels. *Chest*. 2018 May;153(5):1085-6. doi: 10.1016/j.chest.2018.01.012.

2. A lifetime of damage: How Big Tobacco's predatory marketing practices harms the health of women and girls. Tobacco-Free Kids. May 2021 (https://tinyurl.com/379uyh85).

3. Quote Investigator. 2017 Jun 23. "The system of Dr. Tarr and Prof. Fether," from Graham's Magazine, November 1845 (https://tinyurl.com/y6cpfcfz).

## The Opportunity

Baylor University Medical Center (BUMC) in Dallas, Texas, as part of Baylor Scott and White Health (BSWH), the largest healthcare provider in the State of Texas, is seeking a transformational, visionary, and collaborative pulmonary leader with a strong clinical and academic foundation as the Chief of Pulmonary and Critical Care Medicine.

BUMC is consistently ranked one of the best hospitals in the US by US News and World Reports. BUMC is a 1,000 bed Level 1 trauma facility with cutting edge cardiovascular surgery, neurosurgery, orthopedic surgery, transplant surgery (including bone marrow, kidney, liver, heart, lung, and more), and excellent medical subspecialty support. BUMC also is affiliated with Texas A&M's Medical School and as such teaching opportunities are readily available. BUMC is also home to the T. Boone Pickens Cancer Center, the #1 inpatient cancer center in North Texas.

**Summary of the Position:**

As the leader of pulmonary and critical care medicine at Baylor University Medical Center (BUMC), the Chief will set a vision through the advancement of clinical programs, research and education. He/she will guide the transformation of care delivery in pulmonary and critical care medicine on behalf of the patients we serve, simultaneously promoting exemplary outcome performance in nationally recognized domains and under the perpetual goal of Zero Harm.

The Chief will provide direction and leadership in the Pulmonary Center of Excellence mission and strategic objectives to support the pulmonary and critical care service line growth at BUMC and identify opportunities for expansion of the system's comprehensive pulmonary service line.

The successful candidate should be a modern leader with a demonstrated ability to create a vision and effectively inspire, manage, mentor and develop a preeminent pulmonary and critical medicine service line. The Chief will be an individual who has a passion to improve processes and systems that lead to cutting-edge clinical research and the delivery of high quality care.

The Chief will report to the President of BUMC, the Chief Medical Officer at BUMC, the Vice President Chief Operating Officer of Oncology and Transplantation and will maintain a close relationship to the Chief of Internal Medicine and other key stakeholders.

Candidate Qualifications

- Board certified and practicing in a pulmonary critical care medicine field complementary to current offerings and needs at BUMC
- Leadership experience as a Chair, Chief, Service Line Director or similar position in pulmonary and critical care medicine
- A minimum of five years clinical operations, research and management experience at a major pulmonary center or a large health system
- Scholarly activity in an academic environment with a national reputation of excellence in research, education and clinical care, gained within an advanced and highly complex market
- A creative individual with an entrepreneurial spirit and willingness to innovate and to inspire/align staff to embrace change
- Demonstrated interest and understanding of importance of the role of philanthropy in sustaining and funding the research and educational programs in critical care
- A charismatic leader, who demonstrates effective communication, interpersonal and persuasive skills, to be applied toward building relationships with an emphasis on listening

Please note: a comprehensive list of duties and position summary will be provided upon further screening and conversation with each candidate

Procedure for Candidacy: Nominations and applications, including a CV and letter of interest, can be sent in confidence to Megan Davis at **Megan.Davis@BSWHealth.org** or phone 214.865.2689.

*Baylor Scott & White Health is an equal opportunity employer.*

323898A

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Baylor Scott & White Health in Dallas Ft. Worth (DFW) is currently looking for a few Pulmonary & Critical Care and Advanced Lung Disease Physicians to work within the largest hospital system in the state of Texas. Our employed opportunities include significant practice support, strong salary and benefits packages, relocation assistance and malpractice insurance with 1M – 3M limits and no tail coverage required.

- Pulmonologist specializing in Asthma and other airway disease
- Pulmonary Hypertension & Lung Transplant Physician
- Cystic Fibrosis
- General Outpatient
- Inpatient/ICU

**Position Details and Qualifications:**

- Full time schedule
- Must be BC/BE in specialty field
- Employed position through HealthTexas Provider Network (HTPN), Baylor Scott & White employment group in DFW
- Competitive Salary, Benefit Package and Relocation Assistance
- Faculty appointment with Texas A&M Health Sciences Center is available to interested candidates
- Candidates in training welcome to apply
- No visa sponsorship available

Baylor Scott & White Health, the organization formed from the merger between Baylor Health Care System and Scott & White Healthcare, is today the largest not-for-profit health care system in the state of Texas. With total assets of $8.6 billion and serving a geographic area larger than the state of Maine, BS&W Health has the vision and resources to provide its patients continued quality care while creating a model system for a dramatically changing health care environment.

**For additional information, please call or send your CV to:**

**Megan Davis, Physician Recruiter**
**Baylor Scott & White Health / HealthTexas Provider Network**
**E: Megan.Davis@bswhealth.org**

323898B

# The beginning of the rest of your career

*Is this your first CHEST Annual Meeting? Co-Chair David Zielinski, MD, FCCP, shares some words of wisdom recounting his first experience at CHEST and what first-time attendees can expect from the annual meeting.*

My very first CHEST meeting was 10 years ago at CHEST 2011 in Honolulu, Hawaii. I clearly remember my first session being a postgraduate course on Respiratory Management of Neuromuscular Disease and having the opportunity for hands-on teaching with devices and techniques.

**Dr. Zielinski**

Simulation was unique at medical conferences at that time and has continued to evolve at subsequent CHEST meetings.

Looking back, what really sticks out about this experience is what it started for me in terms of my career and learning. I was in a session with some of the biggest names in the field—people who I always looked up to as a relatively junior faculty. I was encouraged to get more involved at CHEST and with the committees. It put the bug in my ear.

A few years later, I started to get involved in the NetWorks. Eventually, I became a faculty member myself alongside these individuals at subsequent CHEST meetings. Meeting these chest medicine professionals also led to more collaborations with them outside of CHEST.

I never imagined this during my first meeting ten years ago. I have now been back to every meeting but one since that first one.

The CHEST Annual Meeting has always stood out for its focus on quality clinical teaching, being ahead of the curve on interactivity and adjusting to the audience's learning needs.

For me personally, though, the three things that I have always enjoyed are as follows:

## Simulation opportunities

One thing that sets apart CHEST 2021 from other conferences is the simulation sessions being offered online.

These sessions are an opportunity to practice your skills and techniques with some of the best educators anywhere in the world. I have always come out of these sessions impressed. I encourage you to try it at least once.

## The fun

From the receptions, the meet-ups, pop-up events, CHEST Challenge, the games… the list goes on: the fun element of CHEST makes it a more immersive atmosphere. When the meeting was solely virtual last year, CHEST still aimed to provide fun and will continue to do the same this year.

Challenge your colleagues and new friends to games at the CHEST Player Hub online to see which one of you rises to the top of the leaderboard.

## The community

CHEST 2021 (and CHEST the organization) helps you make connections and provides opportunities for leadership involvement. CHEST committees are always looking for leaders at all stages of their careers. Attending satellite meetings, like the NetWork open forums that are occurring online before the meeting starts this year, will allow you to begin networking with those with similar interests to your own and hopefully will spark your interest in getting more involved in the future.

For many of us at CHEST, the NetWorks were a great place to start, and you can join one in the area that interests you most.

Through my involvement in CHEST, I have become a part of the community, meeting so many other clinicians and educators in my field. I have made great friendships, which keep me coming back every year.

## Moving forward

From the beginning, we have been planning CHEST 2021 so that if we needed to go entirely online, we could do so as seamlessly as possible. With the recent decision to cancel the in-person meeting and go fully online, plans are already underway to make CHEST 2021 just as successful as last year's meeting.

We can give you our commitment that your CHEST 2021 experience will live up to being a world-class event that separates itself from other current online offerings. I will be in attendance and hope to see you online.

**David Zielinski, MD, FCCP**
**Co-Chair, CHEST 2021**

# This month in the journal *CHEST*®

## *Editor's picks*

**PETER J. MAZZONE, MD, FCCP**
*Editor in Chief*

**Point: E-cigarettes for harm reduction in tobacco use disorder: Pro.**
By Dr. C. Bates.

**Counterpoint: E-cigarettes for harm reduction in tobacco use disorder: Con.**
By Dr. H. Kathuria, et al.

**Eosinophilic and non-eosinophilic asthma: an expert consensus framework to characterize phenotypes in a global real-life severe asthma cohort.**
*By Dr. L. G. Heaney, et al.*

**Symptoms of mental health disorders in critical care clinicians facing the COVID-19 second wave: A cross-sectional study.**
*By Dr. E. Azoulay, et al.*

**Tobacco smoking and risk for pulmonary fibrosis: A prospective cohort study in UK Biobank.**
*By Dr. V. Bellow, et al.*

**Sleep in the hospitalized child: A contemporary review.**
*By Dr. J. Berger, et al.*

**Avoid the Trap: Non-expanding Lung.** *By Dr. D. Gillett, et al.*

**Resuscitation a la Carte: Ethical concerns about the practice and theory of partial codes.**
*By Dr. B. Gremmels, et al.*

# In memoriam

**Paul D. Stein, MD, Master FCCP**
Past President (1992-1993) of the American College of Chest Physicians (CHEST), Dr. Paul D. Stein, Master FCCP, died on July 15, 2021, in Boynton Beach, Florida. His long career in cardiovascular research included monumental studies in pulmonary embolism, pulmonary hypertension, and valvular heart disease. Dr. Stein was regarded as a world expert on pulmonary embolism. His contributions to medicine include hundreds of published articles, five books, and countless lectures that have given the world its current understanding of heart and pulmonary diseases. Throughout his almost 50 years as a member of CHEST, as Past President, and as a Master Fellow, Dr. Stein served the College graciously in these and many other leadership roles.

**Dr. Paul D. Stein**

We extend heartfelt condolences to the Stein family.

*Editor's Note: In 2016, Dr. Stein provided CHEST Physician with a wonderful update on his current activities. You can find it in the November 2016 issue on page 54 (https://tinyurl.com/32ry96hf).*

# Community service grants bedrock of support for communities in need

Community service grants are one way the Foundation strives to make a tangible, lasting impact on the lives of the patients we serve – they're not just one-off projects with limited effects. But how do we really know that we're making a difference?


Dr. Kato

For Dr. Roberta Kato, it's when she gets to witness an "Aha!" moment – a time when everything clicks and a parent finally understands how to better care for their child. For Marina Lima, MD, MSc, it's knowing that one more teen isn't gasping for air. And for Dr. Joseph Huang, it's seeing a country of 100 million people gain access to 14 pulmonologists when there was previously only one.

Whether it's hosting family workshops in children's museums across Los Angeles, developing a gaming app to help children in Brazil control their asthma symptoms, or establishing a pulmonary and critical care training program in Uganda, the Foundation community service grants all focus on the same goal: to enable our underserved patients gain access to the resources and care they need when they need it most.

## Why community service grants?

The Foundation began giving community service grants in 1997 under the leadership of CHEST President D. Robert McCaffree, MD, Master FCCP. He believed the program would be the best way to support his colleagues in achieving their community service endeavors. To date, over $2 million has been given specifically to community service projects. "

Our physicians experience the limitations of our health care system first-hand – a system that isn't built to assist the people who need help the most. Finding solutions requires a willingness to think and operate creatively. The funding the Foundation provides through our community service grants supplies the resources to do just that – implement real-world solutions that will help patients gain better access to care.


Dr. Huang

## Cases in point

Marina Lima, MD, MSc, was seeing an inordinate number of children and teens with uncontrolled asthma symptoms in Brazil. She applied for and was awarded a grant to make Asthmaland, the first gamified pediatric asthma educational program in Portuguese.

Besides her "Aha!" moments, Dr. Roberta Kato revealed a way she knows her work is making a difference: the funding is helping to shift the nonprofit landscape in her community.

"Sometimes there is a rift between different organizations. When I ask them to collaborate or advertise together, I get resistance. However, when I've reached out and said that I've received funding for an initiative, all of a sudden, there is forward movement. That is how I am hoping to make the biggest difference," explained Dr. Kato.

Dr. Joseph Huang, who received a grant to fund the East Africa Training Initiative (EATI), is faced with a different obstacle. "We've been awarded the grant many times, and I know the Foundation is focused on supporting new, up-and-coming programs. Therefore, I'm committed to ensuring that my program can continue even after we stop receiving funding."

How is Dr. Huang going to do that? Besides procuring ICU equipment, EATI focuses on training pulmonology fellows in east Africa. The fellows who graduate will train other physicians and care team members across the continent, both in hospitals and rural clinics, safeguarding the future of his program.

## A clear vision for the future

While the Foundation is ready to tackle new problems, community service grants will remain the constant thread woven throughout the work, and it's obvious why. As Dr. Huang emphasized, his grant "will ensure that the people living in Africa have a better chance at getting access to the care they need."

When you strip away everything else, community service grants boil down to one thing: helping people live healthier, more fulfilled lives. What can be more worthwhile?

Help us continue this important work

While we are privileged to award numerous grants over the past 2 decades, our community service grants have always held a special place in the hearts and minds of everyone involved with the CHEST Foundation. We hope they hold a special place in your heart too.

Please consider donating so that we can continue this work together (https://foundation.chestnet.org/donate/).

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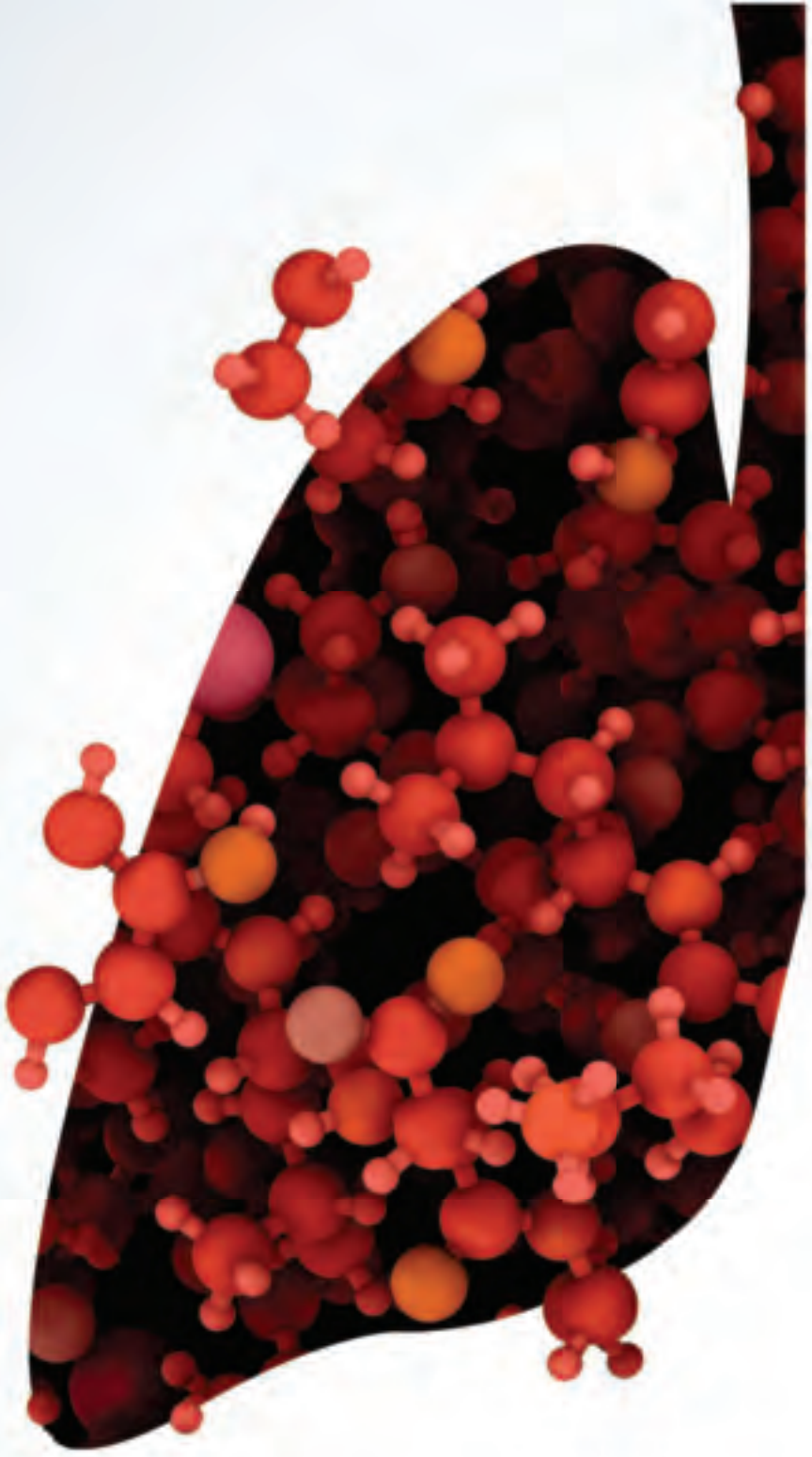
## Correction

In the July 2021 issue of CHEST Physician, the title for the Airways Disorders NetWork article on page 18 should read "Eosinophils in COPD."



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