Just uttering the word “mucus” is often sufficient to elicit amusement from those within earshot, but to patients with chronic inflammatory airway diseases, mucus is no laughing matter.

Under normal conditions, mucus plays an important protective role, trapping airway irritants such as smoke, pollen, and particulate matter, which are then moved by cilia out of the airways for expulsion through coughing.

But in cystic fibrosis (CF), for example, mucus hypersecretion can be deadly. The underlying pathology of CF – a mutation in the CFTR gene, which codes for the protein CF transmembrane conductance regulator – leads to buildup in the lungs of abnormally viscous and sticky mucus, resulting in frequent, severe infections (particularly with *Pseudomonas aeruginosa*), progressive lung damage, and prior to the development of effective disease management, significantly premature death.

Mucus hypersecretion is also a feature of chronic obstructive pulmonary disease (COPD), noted a team of editorialists in the American Journal of Respiratory and Critical Care Medicine (2019. doi: 10.1164/rccm.201808-1444ED).

In COPD, “mucus dysfunction arises from several mechanisms, including excess production due to inflammation, decreased elimination due to impaired ciliary clearance and reduced cough efficiency, and excessive concentration due to smoke-induced dysfunction of transepithelial anion transport resembling CF,” the editorialists wrote.

In patients with idiopathic pulmonary fibrosis,
MUCUS UNPLUGGED // continued from page 1

Under normal physiologic conditions, calcium-induced hypersecretion of muco-obstructive pathology, commonly called "mucus plugging" in the peripheral airways of patients with COPD and asthma.

"In the last decade or so, we've seen the emergence in obstructive lung diseases such as asthma and COPD of the use of more objective measures on CT scans, including for the problem of mucus plugging, which is unfortunately very common," Dr. Kim said in an interview. The discovery of the extent and severity of mucus in obstructive lung diseases has led to new strategies to combat mucus overproduction, including the use of devices for high-frequency chest wall oscillation. Unlike in CF, where treating the underlying genetic pathology can help to resolve the thick, sticky mucus problems and thereby significantly reduce risk of infections and progressive lung damage, treatment of mucus hypersecretion in other diseases is aimed at symptomatic relief; it is still unclear whether symptomatic improvement of mucus overproduction would correlate with other disease-related outcomes, Dr. Kim and Dr. Dickey noted.

Potential therapeutic strategies to reduce excess mucus in the lungs include the use of mucolytic agents to thin secretions for more effective expulsion, decreasing mucus production through the use of an interleukin-13 (IL-13) inhibitor such as atamivudine that has been shown to decrease mucus overproduction. In addition, available lumenal liquid is insufficient, concentrated mucus of excessive viscoelasticity and adhesivity can cause mucus stasis, they wrote.

Therapeutic strategies

In patients with CF, CFTR modulator therapy has markedly reduced not only the need for some patients to have mucolytic therapy, which may include dornase alfa, a recombinant human deoxyribonuclease that reduces the viscosity of lung secretions, hypertonic saline of optimal consistency and frequency chest wall oscillation. Unlike in CF, where treating the underlying genetic pathology can help to resolve the thick, sticky mucus problems and thereby significantly reduce risk of infections and progressive lung damage, treatment of mucus hypersecretion in other diseases is aimed at symptomatic relief; it is still unclear whether symptomatic improvement of mucus overproduction would correlate with other disease-related outcomes, Dr. Kim and Dr. Dickey noted.

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SEPSIS TRANSITION // continued from page 1

Study of IMPACTS
The study was a secondary analysis of patients from the IMPACTS (Improving Morbidity During Post–Acute Care Transitions for Sepsis) randomized clinical trial, focusing only on those patients who were discharged to a post–acute care facility. IMPACTS evaluated the effectiveness of STAR, a postsepsis transition program using nurse navigators to deliver best-practice postsepsis care during and after hospitalization, Dr. Colucciello, a primary care physician from Toledo, Ohio, said.

The interventions included comorbidity monitoring, medication review, evaluation for new impairments/symptoms, and goals of care assessment.

“Over one-third of sepsis survivors are discharged to post-acute care as they are not stable enough to go home,” said Dr. Colucciello, and among these patients there is a high risk for mortality and hospital readmission.

Dr. Colucciello and his colleagues randomly assigned patients hospitalized with sepsis and deemed high risk for post-discharge readmission or mortality to either STAR or usual care. The primary outcome was a composite of 30-day readmission and mortality, which was assessed from the electronic health record and social security death master file.

Of the 175 (21%) IMPACTS patients discharged to post–acute care facilities, 143 (82%) were sent to skilled nursing facilities, and 12 (7%) were sent to long-term acute care hospitals. The remaining 20 patients (11%) were sent to inpatient rehabilitation. A total of 88 of these patients received the STAR intervention and 87 received usual care.

Suggestive results
The study showed that the composite primary endpoint occurred in 26 (30.6%) patients in the UC group versus 18 (20.7%) patients in the STAR group, for a risk difference of –9.9% (95% CI, –22.9 to 3.1), according to Dr. Colucciello. As individual factors, 30–day all-cause mortality was 8.2% in the UC group, compared with 5.8% in the STAR group, for a risk difference of –2.5% (95% CI, –10.1 to 5.0) and the 30–day all-cause readmission was 27.1% in the UC group, compared with 17.2% in the STAR program, for a risk difference of –9.8% (95% CI, –22.2 to 2.5). On average, patients receiving UC experienced 26.5 hospital-free days, compared with 27.4 hospital-free days in the STAR group, he added.

The biggest limitation of the study was the fact that it was underpowered to detect statistically significant differences, despite the suggestive results, said Dr. Colucciello. However: “This secondary analysis of the IMPACTS randomized trial found that the STAR intervention may decrease 30–day mortality and readmission rates among sepsis patients discharged to a post–acute care facility.”

The study by Dr. Dickey and colleagues was supported by grants from the National Institutes of Health, the Cystic Fibrosis Foundation, and the Cystic Fibrosis Foundation Therapeutics. Dr. Fahy and Dr. Gitlin are named inventors on patents for mucolytic drugs, and shareholders in Aer Therapeutics.

Continued from previous page

MUCUS

the anti-asthma agent dupilumab (Dupixent), and a novel strategy, still in the experimental phase, aimed at “disrupting the fusion of mucin storage granules with the cell membrane, thereby blocking secretion,” wrote Irina Gitlin, PhD, and John Fahy, MD, from the University of California, San Francisco, in Nature (2022 Mar 23;603:798–9).

They were referring to research by Dr. Dickey and colleagues described in the same issue of Nature (2022 Mar 23;603:949–56) focusing on the inhibition of calcium-triggered mucous secretion by the use of hydrocarbon-stapled peptides, short chains of amino acids stabilized with a chemical bridge to a hydrocarbon molecule.

Knocking secretion down, but not out
The work has centered on decreasing overproduction of mucus with a focus on the signals for mucin production, including IL-13 and interleukin-1 beta, and on the signals for rapid release of mucus, including adenosine 5’-triphosphate (ATP), best known as an intracellular energy-storage module.

“But ATP is also steadily released by ciliated cells in response to the shear stress of tidal breathing, and it tells the neighboring secretory cells to slowly and steadily release mucin. But if the ciliated cells get stressed by any of a number of mechanisms, it can release a lot of ATP, and then the secretory cell can explosively release essentially all of its mucin content,” Dr. Dickey explained.

Other important signals for rapid release of mucins are acetylcholine and histamine, and all three of these agonists – ATP, acetylcholine, and histamine – cause a rise in intracellular calcium, which triggers calcium sensors that then lead to calcium-triggered membrane fusion and secretion.

Working as a postdoc in the Dickey laboratory, Dr. Evans had previously shown that deleting MUC5B in mice led to early development of serious lung abnormalities, some of which were fatal, indicating that MUC5B, a gene that is highly preserved in evolution, is essential for respiratory health.

This observation was later supported by a study of a family with a pattern of hereditary mucin deficiency (Am J Respir Crit Care Med. 2022;205[7]:761–8) caused by a homozygous loss-of-function mutation in MUC5B.

The main subject in this study was an adult woman with unexplained functional lung impairment.

The trick for the investigators, then, was to figure out how to reduce the stimulated release of stored mucins while still preserving normal release of mucins to allow for ciliary clearance of mucus, and Dr. Dickey and colleagues appear to have accomplished this, at least in mice.

They first validated as a potential therapeutic target a protein labeled synaptotagmin-2 (Syt2). Syt2 is a calcium sensor that is an essential part of the system that triggers calcium-regulated secretion.

In a model for allergic asthma, mice with Syt2 deleted from airway epithelia had marked reductions in both stimulated mucin secretion and in mucus occlusion in airway lumens, but remained otherwise healthy with normal lung function.

Working with structural biologist Axel Brunger, PhD, from Stanford (Calif.) University, Dr. Dickey and coinvestigators developed and validated a peptide that could specifically inhibit Syt2, and found that it mimicked the action of the Syt2 deletion, preventing mucus occlusion in the allergic asthma model without adversely affecting normal production.

Not ready for prime time
Dr. Dickey and colleagues are now working to translate the therapy into a form that can be used in humans, most likely as an aerosol that could be used for acute treatment of patients with mucus plugging from asthma and COPD, and also as a therapy for patients with chronic disease.

“In the chronic situation, what we would hope to do is identify patients with muco- obstructive lung disease – asthma, COPD, cystic fibrosis – who have airway mucous obstruction and then use the inhaled peptide on a regular basis as one part of a program to try to prevent this chronic mucus occlusion,” according to Dr. Dickey.

As Dr. Gitlin and Dr. Fahy wrote in their editorial, “by confirming that it is possible to block calcium-regulated mucin secretion, Lai and colleagues have shown the potential of such an approach as a new therapeutic strategy for lung illnesses associated with mucus pathology, including diseases such as asthma and COPD, for which there is a large unmet medical need.”

The study by Dr. Dickey and colleagues was supported by grants from the German Research Foundation, National Institutes of Health, and the Cystic Fibrosis Foundation.

Dr. Dickey disclosed consulting for Arrowhead Pharmaceuticals. Dr. Kim disclosed personal fees from Medscape and others. Dr. Evans reported no relevant disclosures. Dr. Fahy and Dr. Gitlin are named inventors on patents for mucolytic drugs, and shareholders in Aer Therapeutics.
At the front lines of long COVID, local clinics prove vital

BY DEBORAH SCHOC

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game hospital chains across the United States are opening dedicated centers to help patients dealing with long COVID. But so are the lower-profile clinics and hospitals run by cities, counties, and states — including Harborview Medical Center in Seattle.

The Harborview clinic, operated by King County, is an example of how public health agencies are stepping up to treat people experiencing long COVID. They serve areas ranging from Campbell County, Wyo., with 47,000 residents, to New York City, with its 8.4 million people. Many providers working there are searching for innovative ways to approach this lingering illness with its variety of symptoms, from brain fog to shortness of breath to depression and more.

Their efforts often fall below the radar, with still-scant serious media attention to long COVID or the public health employees working to treat ailing patients.

Why are state and local health agencies taking on these duties?

They’re leading the way in part because the federal government has made only limited efforts, said Lisa McCorkell, a cofounder of the Patient-Led Research Collaborative. The international group was founded in spring 2020 by researchers who are also long COVID patients.

“It’s a big reason why long COVID isn’t talked about as much,” Ms. McCorkell said. “It’s definitely a national issue. But it trickles down to state and local health departments, and there’s not enough resources.”

The government clinics may be accessible to people without insurance and often are cheaper than clinics at private hospitals.

Harborview has treated more than 1,000 patients with long COVID, and another 200 patients are awaiting treatment, said Jessica Bender, MD, a co-director of the University of Washington Post-COVID Rehabilitation and Recovery Clinic in Seattle’s First Hill neighborhood.

The group Survivor Corps offers lists by states of clinics. While the publicly run clinics may be cheaper or even free for some patients, methods of payment vary from clinic to clinic. Federally qualified health clinics offer treatment on a sliding scale. For instance, the Riverside University Health System in California has federally qualified centers. And other providers who are not federally qualified also offer care paid for on a sliding scale. They include Campbell County Health, where some residents are eligible for discounts of 25%-100%, said spokesman Norberto Orellana.

At Harborview, Dr. Bender said the public hospital’s post-COVID clinic initially began with a staff of rehabilitation doctors but expanded in 2021 to include family and internal medicine doctors. And it offers mental health programs with rehabilitation psychologists who instruct on how to deal with doctors or loved ones who don’t believe that long COVID exists.

“I have patients who really have been devastated by the lack of support from coworkers [and] family,” Dr. Bender said.

In Campbell County, Wyo., the pandemic surge did not arrive in earnest until late 2021. Physical therapists at Campbell County’s Health Rehabilitation Services organized a rehabilitation program for residents with long COVID after recognizing the need, said Shannon Sorensen, rehabilitation director at Campbell County Health.

“We had patients coming in showing chest pain, or heart palpitations. There were people trying to get back to work. They were frustrated,” Ms. Sorensen said.

Myalgic encephalomyelitis and chronic fatigue syndrome activists have embraced the fight to recognize and help long-COVID patients, noting the similarities between the conditions, and hope to help kickstart more organized research, treatment and benefits for long-COVID sufferers and myalgic encephalomyelitis/chronic fatigue syndrome patients alike.

In Ft. Collins, Colo., disability activist Alison Sbrana has long had myalgic encephalomyelitis. She and other members of the local chapter of ME Action have met with state officials for several years and are finally seeing the results of those efforts.

Colorado Gov. Jared Polis has created the full-time position of policy adviser for long COVID and post-viral infection planning.

“This is one way forward of how state governments are (finally) paying attention to infection-triggered chronic illnesses and starting to think ahead on them,” Ms. Sbrana said.

New York City’s Health + Hospitals launched what may be the most expansive long-COVID treatment program in the nation in April 2021. Called AfterCare, it provides physical and mental health services as well as community support systems and financial assistance.

A persistent issue for patients is that there isn’t yet a test for long COVID, like there is for COVID-19, said Amanda Johnson, MD, assistant vice president for ambulatory care and population health at New York Health + Hospitals. “It’s in many ways a diagnosis of exclusion. You have to make sure their shortness of breath isn’t caused by something else. The same with anemia,” she said.

California’s Department of Public Health has a detailed website devoted to the topic, including videos of “long haulers” describing their experiences.

Vermont is one of several states studying long COVID, said Mark Levine, MD, the state health commissioner. The state, in collaboration with the University of Vermont, has established a surveillance project to determine how many people have long COVID, as well as how severe it is, how long it lasts, and potential pre-dispositions.

The University of Utah, Salt Lake City, established a comprehensive COVID-19 clinic more than a year ago that also handles long COVID patients, said Jeanette Brown, MD, PhD, an associate professor at the school and director of the COVID-19 clinic.

Jennifer Chevinsky, MD, MPH, already had a deep understanding of long COVID when she landed in Riverside County, Calif., in the summer of 2021. She came from Atlanta, where as part of her job as an epidemic intelligence service officer at the Centers for Disease Control and Prevention (CDC), she heard stories of COVID-19 patients who were not getting better.

Now she is a deputy public health officer for Riverside County, in a region known for its deserts, sizzling summer temperatures and diverse populations. She said her department has helped launch programs such as post-COVID-19 follow-up phone calls and long-COVID training programs that reach out to the many Latino residents in this county of 2.4 million people. It also includes Black and Native American residents.

“We’re making sure information is circulated with community and faith-based organizations, and community health workers,” she said.

Ms. McCorkell said there is still much work to do to raise public awareness of the risks of long COVID and how to obtain care for patients. She would like to see a national public health campaign about long COVID, possibly spearheaded by the CDC in partnership with local health workers and community-based organizations.

“That,” she said, “could make a big difference.”

[Long COVID is] definitely a national issue. But it trickles down to state and local health departments, and there’s not enough resources.

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Trials data leave primary care docs in the dark

BY MARY CHRIS JAKLEVIC

Primary care clinicians often struggle to care for their patients with chronic obstructive pulmonary disease (COPD), thanks to a lack of real-world evidence as to which treatments work best.

As a result, potentially preventable life-threatening exacerbations are common among people with the condition. Central to the problem, some experts believe, is that the condition. Central to the problem, some experts believe, is that the average patient bears little resemblance to participants in clinical trials of the medications used to treat COPD.

Indeed, a recent study showed that many COPD patients who were receiving maintenance therapy that should have been controlling their disease experienced severe flare-ups — a finding that caught the researchers by surprise.

“We know the benefit of COPD treatments in the context of clinical trials. However, the kinds of patients in primary care may not completely mimic those in clinical trials,” one of the authors, Mei Lan Han, MD, a professor of medicine in the division of pulmonary and critical care at the University of Michigan, Ann Arbor, told this news organization. Dr. Han, a volunteer medical spokesperson for the American Lung Association, added that patients “may not be as adherent to medications in real life as they are in clinical trials.”

Randomized controlled trials that support regulatory drug approvals typically enroll patients who do not have comorbid conditions, who are younger than the average patient with COPD, and who typically are male. Patients are seen in resource-abundant settings designed to maximize adherence to treatment, with supports such as free medication and frequent monitoring — settings far different from those in which most primary care physicians practice.

The authors of the new article said trials conducted with typical patients in primary care settings could help physicians to optimize treatment.

Real-world evidence can shed light on physicians’ intent and on barriers to following guidelines, as well as important patient factors, such as adherence and good inhaler technique, Barbara Yawn, MD, an adjunct professor in the department of family and community health at the University of Minnesota, Minneapolis, and a coauthor of the study, said in an interview.

A window onto patient burden

According to the Centers for Disease Control and Prevention, an estimated 15 million Americans have COPD. Annual costs to the health care system approach $50 billion a year. The death rate for COPD has increased since 1969 as death rates of other major killers in the United States, such as heart disease and cancer, declined, according to a 2013 analysis of death records.

**Sachin Gupta, MD, FCCP, comments:** The time from symptom recognition to diagnosis, as well as from diagnosis to full and appropriate management in chronic lung conditions like COPD, is concerning prolonged. Concerns over the sensitivity of COPD screening tools (symptom scores, spirometry), lack of their timely widespread availability, and the incomplete adoption of formalized management checklists (such as with acute coronary syndrome and chronic heart failure) are some of the factors associated with persistently suboptimal long-term outcomes among patients with COPD. Time to adoption of new guideline-based recommendations in heart failure, for example, seems faster within primary care than what we see in COPD. Real-world evidence may be a piece of the solution as this article suggests; however, overall system-based changes in the processes for diagnosis and management, as well as better tools for screening/diagnosis, are likely to have greater benefit.
COVID attacks DNA in heart, unlike flu, study says

BY CAROLYN CRIST

COVID-19 causes DNA damage to the heart, affecting the body in a completely different way than the flu does, according to a study published in Immunology (doi: 10.1111/imm.13577).

The study looked at the hearts of patients who died from COVID-19, the flu, and other causes. The findings could provide clues about why coronavirus has led to complications such as ongoing heart issues.

“We found a lot of DNA damage that was unique to the COVID-19 patients, which wasn’t present in the flu patients,” said Arutha Kulasinghe, one of the lead study authors and a research fellow at the University of Queensland, Brisbane, Australia, in the Brisbane Times.

“So in this study, COVID-19 and flu look very different in the way they affect the heart,” he said.

Dr. Kulasinghe and colleagues analyzed the hearts of seven COVID-19 patients, two flu patients, and six patients who died from other causes. They used transcriptomic profiling, which looks at the DNA landscape of an organ, to investigate heart tissue from the patients.

“We found a lot of DNA damage that was unique to the COVID-19 patients, which wasn’t present in the flu patients.”

Because of previous studies about heart problems associated with COVID-19, he and colleagues expected to find extreme inflammation in the heart. Instead, they found that inflammation signals had been suppressed in the heart, and markers for DNA damage and repair were much higher. They’re still unsure of the underlying cause.

“The indications here are that there’s DNA damage here, it’s not inflammation,” Dr. Kulasinghe said. “There’s something else going on that we need to figure out.”

The damage was similar to the way chronic diseases such as diabetes and cancer appear in the heart, he said, with heart tissue showing DNA damage signals.

Dr. Kulasinghe said he hopes other studies can build on the findings to develop risk models to predict which patients may face a higher risk of serious COVID-19 complications. The research is a preliminary step, Dr. Kulasinghe said, because of the small sample size.

“Our challenge now is to draw a clinical finding from this, which we can’t at this stage,” he added. “But it’s a really fundamental biological difference we’re observing [between COVID-19 and flu], which we need to validate with larger studies.”

DATA continued from previous page

The new study, published in the July/August issue of the Annals of Family Medicine (2022;20[4]:319-27), provides a snapshot of COPD’s toll on patients.

Researchers examined electronic health records of 17,192 patients treated at primary care clinics in five states using a dataset maintained by DARTNet Institute, a nonprofit organization that supports research and quality improvement. They also analyzed self-reported assessments from 1,354 patients in the dataset who are in a registry called Advancing the Patient Experience in COPD.

Over half (56%) of patients were female, 64% were aged 55-84 years, and 81% did not smoke or exsmokers (80%). The vast majority had at least one comorbidity, including hypertension, diabetes, and depression.

Serious flare-ups were common; 38% of patients had experienced one or more exacerbations in the previous year. Of registry respondents, half said they had had at least one exacerbation, and 20% said they had been hospitalized for COPD during that period.

Among patients in the registry, 43% reported that COPD had a high or very high impact on their health, and 45% could not walk at a normal pace without losing their breath.

Almost 90% of patients were receiving a maintenance therapy regimen. The number of exacerbations was “somewhat surprising,” the authors say. They write that the findings may indicate that patients were not receiving appropriate treatment or were not complying with their medication regimens and that there may be a need for nonpharmacologic interventions, such as smoking cessation. They also write that physician education is needed to support earlier diagnosis and treatment so as to delay declines in lung function.

The researchers say their findings highlight “the need for more realistic effectivness trials to better support decision-making at the primary care level.”

Dr. Yawn is a coinvestigator of one such study, called CAPTURE, which is assessing a screening tool for COPD in primary care practices.

At the University of Illinois, Chicago, Jerry Krishnan, MD, PhD, pulmonologist and professor of medicine and public health, is running the RELIANCE study, which is comparing the use of azithromycin and roflumilast in preventing hospitalization and death among patients with COPD who continue to have exacerbations.

Although RELIANCE involves pulmonologists, Dr. Krishnan told this news organization, it offers a model for building real-world evidence on questions relevant to primary care. “We don’t really know if medications used by patients in my clinic are as effective as reported in clinical trials that were used to obtain regulatory approvals by the U.S. Food and Drug Administration,” he said.

Wilson Pace, MD, a family physician and chief medical officer and chief technology officer of DARTNet, said funders of research are becoming aware of the need for real-world studies along with “gold standard” efficacy trials.

Dr. Pace, who helped conduct the new study, said a remaining obstacle to improving care is “a defeatist attitude of clinicians” who are skeptical about the ability of therapy to have an effect.

Real-world evidence could remedy clinician frustrations, he said. When clinicians are shown that they can improve patients’ quality of life and maybe even reduce the cost of care, “then they will hopefully pay attention,” he said.

Some experts who were not involved in the study said the findings offer an illuminating, although incomplete, picture. Nonpharmacologic interventions, the management of other health problems, and access to specialty care are not addressed, and the researchers didn’t have data on treatment adherence, inhaler technique, and patients’ peak inspiratory flow—factors that influence the effectiveness of medications.

The study also lacked information on whether patients received pulmonary rehabilitation to help their heart and lungs work better.

Nicola Hanania, MD, a professor of medicine and director of the Airways Clinical Research Center at Baylor College of Medicine, Houston, said the study “adds a lot to what we have known” but pointed out that COPD is grossly underdiagnosed.

According to one analysis of National Health and Nutrition Examination Surveys, 72% of individuals with COPD don’t know they have the condition. Such patients were not included in the study, Dr. Hanania noted.

“We need pragmatic studies over multiple years to better understand the condition,” Dr. Yawn said. Real-world evidence “based in an academic setting or specialty practices is not sufficient,” she added. “We need to see results from patients and clinics that look like what we have.”

The registry was established and funded by Optimum Patient Care Global, a nonprofit organization, and Boehringer Ingelheim. Dr. Han has consulted for Boehringer Ingelheim, GlaxoSmithKline, and AstraZeneca and has received research support from Novartis and Sunovion. Dr. Yawn has served on advisory boards for GlaxoSmithKline, Astra-Zeneca, Novartis, and Boehringer Ingelheim and has received research funds from GlaxoSmithKline, Boehringer Ingelheim, AstraZeneca, and Novartis. Dr. Krishnan has disclosed no relevant financial relationships. Dr. Hanania has received honoraria for serving as consultant or advisory board member for GSK, Boehringer Ingelheim, Novartis, Sanofi, AstraZeneca, Teva, Genentech, and Amgen. His institution has received research grant support on his behalf from GSK, Sanofi, Boehringer Ingelheim, AstraZeneca, Genentech, Teva, and Novartis. Dr. Pace is on the advisory board for Mylan and has received stock from Novo Nordisk, Pfizer, Novartis, Johnson & Johnson, Stryker, Amgen, Gilead, and Sanofi.
The first multicenter randomized controlled trial of a home-based rehabilitation program for patients with chronic obstructive pulmonary disease (COPD) showed highly positive results, according to findings presented at the annual meeting of the American College of Chest Physicians (CHEST).

At the end of 12 weeks, those randomly assigned to the intervention had a significant and clinically meaningful improvement in all domains of the Chronic Respiratory Questionnaire (CRQ), including activity levels and emotional well-being, reported Roberto P. Benzo, MD, a consultant in the division of pulmonary and critical care medicine, Mayo Clinic, Rochester, Minn.

Presenting soon-to-be-published data, Dr. Benzo said that the intervention is based on a tablet-based app. On the tablet, the patient finds a daily schedule of exercises and videos to guide performance. The tablet is programmed to upload data captured from an activity monitor and pulse oximeter. Along with documentation of app usage, this information can then be downloaded for the remote coach to review with the patient.

The primary outcome of the randomized study were the physical and emotional domains of the CRQ quality of life, but a long list of secondary outcomes – including physical activity, symptoms of depression, sleep quality, and health care utilization, such as emergency room visits – was also analyzed.

In addition to the significant benefit on the primary outcomes, the home-based rehabilitation program relative to a wait list for intervention was associated with benefit or a trend for benefit on essentially every outcome measured. Health care utilization was a possible exception, but even then, the absolute number of visits was lower in the treatment arm. "With a study period of only 12 weeks, we were limited to our ability to show a difference in emergency room visits," said Dr. Benzo, who also noted that the study was conducted during the COVID-19 pandemic, when hospital visits were already occurring at a lower than usual rate. Based on the other findings, he suspects that a reduction in health care utilization could also be shown in more typical circumstances, particularly with a longer follow-up.
In the study, 375 patients with COPD were randomly assigned to a home health care regimen delivered by an app with remote coaching or to a wait list and usual care. The median age was 69 years. Fifty-nine percent were women. The median FEV₁ at enrollment was 45% of predicted.

The patients were able to access their own data to monitor their progress at any time, not just at the time of coaching, but contact with the remote coach occurred on a weekly basis. Patients rated their level of energy, how they felt generally, and their progress toward daily goals, which was also captured on the app and could be discussed with the coach during the review of the previous week’s activity.

At 12 weeks, the favorable 0.54-point change (P < .001) and 0.51-point change (P < .001) in the physical and emotional summary scores, respectively, met the criteria for a clinically meaningful change, Dr. Benzo reported. There were also significantly favorable changes from baseline and relative to controls in CRQ domains of self-management, sleep quality, and depression (all P ≤ .01).

Other data collected are supportive. For example, Dr. Benzo reported that those in the rehabilitation group took 624 more steps on average per day than those in the control group. The experimental group also spent nearly an hour more performing moderate or greater levels of activity.

“The app promotes behavioral change,” said Dr. Benzo, who said that this “completely home-based model” of rehabilitation is likely to be cost effective given the relatively low costs of remote coaching and reasonable costs of the activity monitor, tablet, and other equipment.

Importantly, home-based rehabilitation is a billable practice under currently available CPT codes, according to Dr. Benzo, who believes this approach is not only effective but “feasible and practical.”

Two clinicians active in the care of patients with COPD believe this approach could fulfill an unmet need if further validated. Andrew Berman, MD, professor of medicine, New Jersey Medical School, Newark, thinks the premise is sound.

“Digital competency is still a big issue as is access to adequate quality Internet, but this could be a very useful approach for many...
Black Americans are 80% more likely to be hospitalized for the flu, compared with White Americans, according to new federal data. Black, Hispanic, and American Indian/Alaska Native (AI/AN) adults in the United States also have had lower influenza vaccination rates, compared with their White counterparts, since 2010, researchers at the Centers for Disease Control and Prevention revealed in a report. The inequalities are the result of barriers to care, distrust of the medical system, and misinformation, the report said.

“We have many of the tools we need to address inequities and flu vaccination coverage and outcomes,” said CDC Acting Principal Deputy Director Debra Houry, MD, MPH.

DIVERSITY IN MEDICINE

People of color more likely to be hospitalized for flu

BY LUCY HICKS

FLU continued on following page
The most frequent serious adverse events reported in 2009 to 2022 and vaccination rates from 2010 to 2022 were similar in White and Asian adults (about 54%), coverage was lower in Black (42%), Hispanic (38%), AI/AN (41%), and other/multiracial (43%) adults.

This disparity persisted even among individuals who had medical insurance, a personal health care provider, and a routine checkup within the last year.

“Health disparities have been documented for many years, but this report adds to the body of evidence that shows people from certain racial and ethnic minority groups have more severe outcomes at higher rates than White adults,” Carla Black, PhD, MPH, an epidemiologist at the CDC’s Immunization Services Division, said during the press call.

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CHEST Physician

The Newsweekly of the American College of Chest Physicians

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14 • NOVEMBER 2022 • CHEST PHYSICIAN
End the year on a wine note at the final Viva La Vino event of 2022

Don’t miss your last chance to join the CHEST Foundation for a celebration of excellent initiatives – and equally excellent wines – at the last Viva La Vino event of 2022, happening on December 1 at 7:00 PM. This event will focus on white and red varietals from Piedmont, a

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With their ticket, attendees will receive one bottle of white wine and two bottles of red wine as well as an Italian-themed snack kit.

Join CHEST CEO Bob Musacchio, PhD, as he guides attendees through a virtual and interactive exploration of the history, varietals, and techniques of Piedmont wines. Plus, hear from other CHEST leaders and friends of the Foundation about the important work currently being done and the evolution of the Foundation’s many initiatives since its inception.

With their ticket, attendees will receive one bottle of white wine and two bottles of red wine – including
disaster. In 2020, 45,222 people died of gun-related injuries, an increase of 5,155 (14%) since 2019 (Kegler, et al. MMWR Morb Mortal Wkly Rep. 2022;71[19]:656). This is the highest death rate since 1994, and includes increases in both homicides and suicides. Mass shootings constitute a fraction of this total, but there have already been 530 deaths from mass shooting incidents in 2022.

Opinions about the appropriate degree of firearm regulations remain divided, but the need to improve our response as clinicians is clear. The National Center for Disaster Medicine and Public Health recently published consensus recommendations for health care response in mass shootings (Goolsby, et al. J Am Coll Surg. 2022; published online July 18, 2022). These recommendations address readiness training, triage, communications, public education, patient tracking, family reunification, and mental health services.

Stop the Bleed is a program originally based on the military's Tactical Combat Casualty Care standards. It offers training on hemorrhage control for both the public and clinicians, similar to basic life support programs. It encourages bystanders to become trained and empowered to help in a bleeding emergency before professional help arrives. Opportunities for training are a frequent offering at the CHEST Annual Meeting, and additional information can be found at https://www.stopthebleed.org.

Stella Ogake, MD
Member-at-Large

Pediatric Chest Medicine Section
CPAP for pediatric OSA: “Off-label” use
Pediatric providers are well aware of the “off-label” uses of medications/devices. While it’s not a stretch to apply “adult” diagnostic and therapeutic criteria to older adolescents, more careful consideration is needed for our younger patients. Typically, adenotonsillectomy is first-line treatment for pediatric OSA, but CPAP can be essential for those for whom surgical intervention is not an option, not an option yet, or has been insufficient (residual OSA). Unfortunately, standard
CPAP devices are not approved for use in children, and often have a minimum weight requirement of 30 kg. There are respiratory assist devices and home mechanical ventilators that are approved for use in pediatric patients (minimum weight 13 kg or 5 kg) and designed for more complex ventilatory support, and that also are capable of providing continuous pressure. Alternatively, pediatric providers may proceed with the “off-label” use of simpler CPAP-only medical devices and face obstacles in attaining insurance approval. The recent American Academy of Sleep Medicine position statement (Amos, et al. J Clin Sleep Med. 2022;18[8]:2041-2043) acknowledges that CPAP therapy can be safe and effective when management is guided by a pediatric specialist and is typically initiated in a monitored setting (inpatient or polysomnogram). The authors bring up excellent points regarding unique considerations for pediatric CPAP therapy, including the need for desensitization and facial development monitoring, lack of technology/software designed for younger/smaller patients, and limited published data (small and diverse cohorts). Ultimately, evaluation of effectiveness and safety, while distinct, must both be seriously considered in this risk-benefit analysis of care.

Pallavi P. Patwari, MD, FAAP, FAAAA Member-at-Large

DIFFUSE LUNG DISEASE & TRANSPLANT NETWORK
Pulmonary Physiology & Rehabilitation Section
Exercise tolerance in untreated sleep apnea
Numerous cardiovascular, respiratory, neuromuscular, and perceptual factors determine exercise tolerance. This makes designing a study to isolate the contribution of one factor difficult. A recently published study (Elbeihary, et al. Chest. 2022; published online September 29, 2022) explores exercise tolerance in patients with untreated OSA compared with age- and weight-matched controls. The authors found that at an equivalent work rate, patients with OSA had greater minute ventilation, principally due to higher breathing frequency. Dead space volume, dead space ventilation, and dead space to tidal volume ratio (Vd/Vt) were higher in patients with OSA, likely due to a reduction in pulmonary vessel recruitment relative to ventilation. VD/VT decreased more from rest to peak in controls than in patients with OSA, an adaptation that is expected with exercise. Patients with OSA had greater arterial stiffness measured by pulse wave velocity and higher blood pressures, which may have affected cardiac output augmentation. Patients with OSA also had higher resting mean pulmonary artery pressures and exercise dyspnea scores. Regression models predicting peak oxygen uptake and peak work rate were statistically significant, with predictors being age, pulse wave velocity, and resting mean pulmonary artery pressure. The role of diastolic dysfunction remains to be determined. Prior studies have shown that some effects of OSA on exercise may be reversed with CPAP treatment (Arias, et al. Eur Heart J. 2006;27[9]:1106-1113; Chalegre, et al. Sleep Breath. 2021;25[3]:1195-1202). Understanding the mechanisms of exercise limitation in OSA will help physicians address symptoms, reinforce CPAP adherence, and design tailored pulmonary rehabilitation programs.

Fatima Zeba, MD
Fellow-in-Training

PULMONARY VASCULAR & CARDIOVASCULAR NETWORK
Pulmonary Vascular Disease Section
Key messages from the 2022 ESC/ERS Guidelines for the Diagnosis and Management of Pulmonary Hypertension
1. Per coverage by the American College of Cardiology, "Pulmonary hypertension (PH) is now defined by a mean pulmonary arterial pressure >20 mm Hg at rest. The definition of pulmonary arterial hypertension (PAH) also implies a pulmonary vascular resistance (PVR) >2 Wood units and pulmonary arterial wedge pressure ≤15 mm Hg." These cut-off values do not translate into new therapeutic recommendations.
2. The diagnostic algorithm for PH now follows a simplified three-step approach, involving first suspicion by first-line physicians, then detection by echocardiography, and confirmation with right-sided heart catheterization, preferably in a PH center.
3. Pulmonary vasoreactivity testing is only recommended in patients with idiopathic PAH, heritable PAH, or drug/toxin associated PAH to identify potential candidates for calcium channel blocker therapy.

Inhaled nitric oxide or inhaled iloprost are the recommended agents.
4. The role of cardiac MRI in prognostication of patients with PAH has been confirmed such that measures of right ventricular volume, right ventricular ejection fraction, and stroke volume are included as risk assessment variables.
5. The primary limitation of the 2015 ESC/ERS three-strata risk-assessment tool is that 60% to 70% of the patients are classified as intermediate risk (IR). A four-strata risk stratification, dividing the IR group into IR “low” and IR “high” risk, is proposed at follow up.
6. No general recommendation is made for or against the use of anticoagulation in PAH given the absence of robust data and increased risk of bleeding.
7. In patients with PH-ILD, inhaled treprostinil may be considered based on findings from the INCREASE trial, but further long-term outcome data are needed.
8. Improved recognition of the signs of chronic thromboembolic pulmonary hypertension (CTEPH) on CT and echocardiographic imaging at the time of an acute pulmonary embolism (PE) event, along with systematic follow-up of patients with acute PE, is recommended to help mitigate the underdiagnosis of CTEPH.
9. The treatment algorithm for PAH has been simplified, and now includes a focus on cardiopulmonary comorbidities, risk assessment, and treatment goals. Current standards include initial combination therapy and treatment escalation at follow-up, when appropriate.
10. Per coverage by the American College of Cardiology, “The recommendations on sex-related issues in patients with PAH, including pregnancy, have been updated, with information and shared decision making as key points." Calcium channel blockers, inhaled/IV/subcutaneous prostacyclin analogues, and phosphodiesterase 5 inhibitors all and are considered safe during pregnancy, despite limited data on this use.
11. Per the guideline, “Patients with PAH should be treated with the best standard of pharmacological treatment and be in stable clinical condition before embarking on a supervised rehabilitation program.” Additional studies have shown that exercise training has a beneficial impact on 6-minute walk distance, quality of life, World Health Organization function classification, and peak VO2.

12. Immunosuppression of PAH patients against SARS-CoV-2, influenza, and Streptococcus pneumoniae is recommended. This edition of clinical practice guidelines focuses on early diagnosis of PAH and optimal treatments.

Vijay Balasubramanian, MD, FCCP
Chair
Mary Jo S. Farmer, MD, PhD
Member-at-Large

References

CRITICAL CARE NETWORK
Sepsis/Shock Section
Fluid Resuscitation – Back to BaSICS
The age-old debate regarding the appropriate timing, volume, and type of fluid resuscitation for patients in septic shock rages on – or does it? In October 2021, the Surviving Sepsis Campaign published updated guidelines for the management of sepsis. One of the biggest changes from prior versions was downgrading the recommendation for an initial 30mL/kg bolus of IV crystalloid for the initial resuscitation of a patient in septic shock to a suggestion, based on dynamic measures to assess individual patients’ fluid balance (Evans, et al. Crit Care Med. 2021;49[11]:e1063-e1143).

Traditionally, 0.9% saline had been the resuscitative fluid of choice in sepsis. But it has a propensity to cause physiologic derangements such as hyperchloremic metabolic acidosis, renal afferent vasoconstriction, and reduced glomerular filtration.
rate – not to mention, can be a signal for possibly increased mortality, as seen in the SMART trial (Semler, et al. *N Engl J Med*. 2018;378[9]:829-839).

Normal saline had subsequently fallen from grace in favor of balanced crystalloids such as Lactated Ringer’s and Plasma-Lyte. However, the recent PLUS and BaSICS trials showed no significant difference in 90-day mortality or secondary outcomes of acute kidney injury, need for renal replacement therapy, or ICU mortality (Finfer, et al.*N Engl J Med*. 2022;386[9]:815-826; Zampieri, et al.*JAMA*. 2021;326[9]:818-829).

While these are large randomized controlled trials, a major weakness is the administration of uncontrolled resuscitative fluids prior to randomization and even postenrollment, which may have biased results.

Ultimately, does the choice between salt water or balanced crystalloids matter? Despite the limitations in the newest trials, probably less than the timely administration of antibiotics and pressors, unless your patient also has a traumatic TBI – then go with the saline. But, in the everlasting quest for medical excellence, choosing the balanced fluid that causes the least physiologic derangement seems to make the most sense.

LCDR Meredith Olsen, MD, USN
Fellow-in-Training
Ankita Agarwal, MD
Fellow-in-Training
The views expressed are those of the authors and do not reflect the official policy or position of the US Navy, Department of Defense, or the US Government.

**THORACIC ONCOLOGY & CHEST IMAGING NETWORK**

**Ultrasound & Chest Imaging Section**

VExUS scan: The missing piece of hemodynamic puzzle?

Volume status and tailoring the correct level of fluid resuscitation is challenging for the intensivist. Determining “fluid overload,” especially in the setting of acute kidney injury, can be difficult. While a Swan-Ganz catheter, central venous pressure, or inferior vena cava (IVC) ultrasound measurement can suggest elevated right atrial pressure, the effect on organ level hemodynamics is unknown.

Abdominal venous Doppler is a method to view the effects of venous pressure on abdominal organ venous flow.

An application of this is the Venous Excess Ultrasound Score (VExUS) (Rola, et al. *Ultrasound J*. 2021;13[1]:32). VExUS uses IVC diameter and pulse wave Doppler waveforms from the hepatic, portal, and renal veins to grade venous congestion from none to severe.

VExUS has a strong physiologic basis, and early clinical experience indicates a strong role in improving assessment of venous congestion, an important aspect of volume status.


This practice of identifying venous congestion and avoiding over-resuscitation could improve patient care. However, acquiring quality images and waveforms may prove to be difficult, and interpretation may be confounded by other disease states such as cirrhosis. Though it is postulated that removing fluid could be beneficial to patients with high VExUS scores, this has yet to be proven and may be difficult to prove.

While the score estimates volume status well, the source of venous congestion is not identified such that it should be used as a clinical supplement to other data.

VExUS has a strong physiologic basis, and early clinical experience indicates a strong role in improving assessment of venous congestion, an important aspect of volume status. This is an area of ongoing research to ensure appropriate and effective use.

Kyle Swartz, DO
Fellow-in-Training
Steven Fox, MD
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John Levasseur, DO

Dr. Agarwal

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SLEEP STRATEGIES

Inpatient sleep medicine: An invaluable service for hospital medicine

BY CHRISTINE DEL PRADO RICO, MD, AND ROBERT C. STANSBURY, MD

Estimates suggest that nearly 1 billion adults worldwide could have sleep apnea (Benjafied AV, et al. Lancet Respir Med. 2019;7[8]:687-698). Even with the current widespread use of portable sleep testing, cheap and innovative models of OSA care will need to be developed to address this growing epidemic. This fact is particularly true for communities with significant health disparities, as the evidence suggests diagnostic rates for OSA are extremely poor in these areas (Stansbury R, et al. J Clin Sleep Med. 2022;18[3]:817-824). Current models of care for OSA are predominantly outpatient based. Hospital sleep medicine offers a potential mechanism to capture patients with OSA who would otherwise go undiagnosed and potentially suffer adverse health outcomes from untreated disease.

What is hospital sleep medicine?
Hospital sleep medicine includes the evaluation and management of sleep disorders, including, but not limited to, insomnia, restless legs syndrome, and circadian rhythm disorders, in hospitalized patients.

Evidence for hospital sleep medicine
While there has been interest in hospital-based sleep medicine since 2000, the most well-validated clinical pathway was first described by Sharma and colleagues in 2015 (Sharma, et al. J Clin Sleep Med. 2015;11[7]:717-723). This initial application of a formal sleep program demonstrated a high prevalence of SDB in hospitalized adult patients and led to a substantial increase in SDB diagnoses in the system. Subsequent studies have demonstrated improved outcomes, particularly in patients with cardiopulmonary disease. For example, there are data to suggest that hospitalized patients with congestive heart failure or COPD have increased rates of readmission, and early diagnosis and intervention are associated with decreased rates of subsequent readmission and ED visits (Konikkara J, et al. Hosp Pract. 2016;44[1]:41-47; Sharma S, et al. Am J Cardiol. 2016;117[6]:940-945). Long-term data also suggest survival benefit (Sharma S, et al. Am J Med. 2017;130[10]:1184-1191). Adherence to inpatient PAP trials has also been shown to predict outpatient follow-up and adherence to PAP therapy (Sharma S, et al. Sleep Breath. 2022; published online June 18, 2022).

Establishing a team
Establishing a hospital sleep medicine program requires upfront investment and training and begins with educating key stakeholders. Support from executive administration and various departments is essential. Table 1. Description of individual components of SEAT-COM protocol for hospital sleep medicine

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Use of EMR-generated reports and using STOP/STOP-BANG questionnaires for initial assessment in appropriate patients. Explain significance of OSA.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Individuals with positive screening findings undergo high-resolution pulse oximetry or portable sleep monitor assessment. Reports are downloaded and prepared for review. Results and recommendations made to primary service.</td>
</tr>
<tr>
<td>Acclimatization</td>
<td>Education on OSA and treatment with positive airway pressure (PAP) therapy. Appropriately introduce individuals to the PAP device and interface.</td>
</tr>
<tr>
<td>Treatment</td>
<td>Develop a plan with individuals to meet adherence guidelines for PAP therapy. Interrogate PAP devices to ensure therapy is optimized. Debrief and adjust PAP therapy based on individual’s feedback.</td>
</tr>
<tr>
<td>Communications</td>
<td>Final recommendations communicated to members of the multidisciplinary team, including the discharge navigator, primary care team, sleep laboratory, and pulmonary/sleep team. Information is placed in an appropriate database for quality improvement and possible research purposes.</td>
</tr>
</tbody>
</table>

Note: SEAT-COM = Screening Evaluating Acclimatization Treatment and Communication Protocol; STOP = Snoring, Tiredness During Daytime, Observed Apnea, High BP; STOP-BANG = Snoring, Tiredness During Daytime, Observed Apnea, High BP, BMI, Age, Neck-collar size, Gender. Source: Chest. 2022;161(4):1083-91. (reprinted with permission from the American College of CHEST Physicians)
Life-Changing Grants Throughout the Years

Each year, the CHEST Foundation offers grants to respected clinicians, generous community-based health advocates, and distinguished scholars.

RUNNING WATER IN PERU | 2010

“It made a big difference for us to be able to use our clinic more fully (and) more comfortably...” he said. “It’s been roughly 10 years, and that equipment is still in use today.”

REMOVING LANGUAGE BARRIERS TO CARE | 2017

“The learners really appreciated having up-to-date, peer-reviewed, high-quality written material for them to refer to and take home from the course because that’s so rare,” says Dr. Silverman. “Even to this day, [to] go to different pediatric facilities around Haiti and see those manuals still dog-eared and coffee-stained, but well-used, is really a testament to how much impact putting on these courses and having French materials available for the learners really provided.”

OFFERING A HAND UP, NOT A HAND OUT | 2021

“They just need a helping hand. They need a friendly face. They need someone who they trust,” Andrews said. “So me, as a community supporter—I just feel compelled to help out. To be that conduit between them and their doctor.”

In 2022, the CHEST Foundation awarded more than $600,000 in clinical research and community service grants to 23 individuals.

Support lung health initiatives like these by donating to the CHEST Foundation.

SLEEP

continued from previous page

departments including respiratory, sleep medicine, information technology, nursing, physicians, mid-level providers, and discharge planning is essential. Data are available, as outlined here, showing significant improvement in patient outcomes with a hospital sleep medicine program. This information can garner significant enthusiasm from leadership to support the initiation of a program. A more detailed account of key program elements, inpatient protocols, and technologies utilized is available in our recent review (Sharma S, Stansbury R. Chest. 2022;161[4]:1083-1091). Table 1 from this article is highlighted below and outlines the essential components (SEAT-COM) of our hospital sleep medicine model. While each component of this model is important, further refine the optimal timing of screening and intervention for SDB in hospitalized patients (Stansbury, et al. Sleep Breath. 2022; published online January 20, 2022).

A common question that arises is the program’s impact regarding payment for rendered service in the context of Medicare’s prospective payment system. Given that the program focuses on screening for SDB and does not utilize formal testing for diagnosis, there is no additional cost for diagnostic tests or procedural codes. Thus, the diagnosis-related group is not impacted (Sharma S, Stansbury R. Chest. 2022;161[4]:1083-1091). Importantly, hospital sleep medicine has the potential for cost savings given the reduction in hospital readmissions and decreased adverse events during a patient’s hospital stay. The economics of the initial investment in a hospital sleep program versus potential savings from improved patient outcomes warrants evaluation.

Conclusion

SDB is a prevalent disorder with potential deleterious impacts on a patient’s health. Despite this, it is underrecognized and, thus, undertreated. Hospital sleep medicine is a growing model of care that may expand our capability for early diagnosis and intervention. Studies have demonstrated benefits to patients, particularly those with cardiopulmonary disease. However, additional studies are required to further validate hospital-based sleep medicine in more diverse populations and environments.

Dr. Del Prado Rico and Dr. Stansbury are with the Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Medicine, Health Science Center North, West Virginia University. Dr. Stansbury is also with the Division of Pulmonary, Allergy, and Critical Care Medicine, Department of Medicine, University of Pittsburgh.

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Time travel and thoughts on leadership

BY DAVID SCHULMAN, MD, MPH, FCCP

This is an odd column for me to write. First, because of the nature of print publication, this writing for the November issue is being crafted just before the annual meeting is to be held in Nashville. Therefore, while I have a pretty good sense of what is in store for CHEST 2022, I have yet to see the final product, or the audience’s reaction to it. However, I will make some bold predictions as to what occurred therein:

• Even in the context of 3 years of separation, thousands CHEST members gathered in droves to rekindle friendships and to experience the best education in pulmonary, critical care, and sleep medicine that the world has to offer, leading to our second-biggest meeting ever.

• Neil Pasricha’s presentation helped attendees rekindle the “Art of Happiness.”

• Hundreds of attendees participated in, and successfully solved, our newest escape room, “Starship Relics.”

• Our valued CHESC members were able to successfully thwart Dr. Didactic and save the future of educational innovation.

• “CHEST After Hours” trended on social media and will become a normal and highly-anticipated part of the CHEST meeting moving forward.

• The most uncomfortable moment of the meeting centered on mayonnaise; for those of you who know what I am referencing, I am a little sorry…but only a little.

• Despite my best efforts, we were not able to recruit Neil Patrick Harris to participate.

Predicting the future of medical meetings is something we’ve spent a lot of time trying to do over the last year as we planned for CHEST 2022. But given the talented individuals involved in that planning, foreseeing the meeting’s success did not require any time travel; it was hardly a difficult task at all. Program Chair Subani Chandra and Vice-Chair Aneesa Das were exactly the people we needed at the helm for this all-important return to in-person meetings, and I cannot thank them enough for their creativity, effort, and leadership in bringing CHEST 2022 to fruition. And while I expect to have been seven-for-seven in my predictions above, I do hope I got that NPH one wrong.

The other reason that this column was a challenge to craft is because it represents my final formal presidential missive in these esteemed pages. And as I planned this final walk of the path, I gave careful consideration to the message with which I wanted to conclude my year. And as I put together my predictions for the future, my mind also turned to the past, considering things I wish I had known (or spent more time considering) as I started this journey. Some of this information may prove useful to the next generation of CHEST leaders, and some may be already well engrained for those of you with leadership experience. Here, in no particular order, are some thoughts for those of you in the audience who are considering future leadership opportunities at CHEST (or elsewhere in life; I suspect some of this advice is applicable to other venues). That said, the recommendations also come from you truly, so take them with an appropriately large grain of salt, as your mileage may vary, and reasonable people could take issue here or there.

• The most important conversations should happen in person. The past 3 years have shown us the amazing things that modern technology can accomplish, but when it comes to providing important information, asking for input on a crucial issue, or providing feedback on a sensitive matter, there is no adequate substitute for a discussion in which all parties are in the same room.

• You are going to get things wrong sometimes; sometimes, this is because there wasn’t a way to get a right answer, and sometimes it will be because you tried something that didn’t work. You will learn far more from one of these experiences than from a dozen things that went as well as (or better than) expected.

• It is profoundly difficult to change someone’s mind if you aren’t interacting with them. I believe there is no gap so large that warrants breakdown of communication. Going that extra mile to talk to people who have a drastically different opinion than your own is the only way that you might be able to change someone’s mind and is a great way to ensure that your own opinion withstands pushback. With the growth of social media over the last decade, we’ve gotten very good at blocking people on social media; while this can sometimes be good (or even necessary) for emotional well-being, there can be value to interacting with such folks in a real-world environment.

• You do not have to bring everything to the table. The best leaders surround themselves with other really smart folks who, in aggregate, will provide support in areas in which you are deficient. That said, you need to know where these gaps in your knowledge and experience are, and when it is the right time to listen to those trusted advisors.

• When it comes time to identify folks for your “cabinet,” make sure to choose people who think differently than you and who may disagree with you on some fundamental things. Surrounding yourself with friends and close colleagues can lead to groupthink and poor decision making. The best results often stem from challenging and difficult decision-making processes.

• As a corollary to the above, every leader will bring their own sensibility and personality to the role. Make sure to bring yours, even if it involves silly jokes about holding a medical meeting in a former President’s base-ment or getting another former President to eat a big spoonful of the aforementioned condiment.

• Fun is important. Fun builds relationships, and teams, and trust. Make sure you are having it, as much as you possibly can, throughout your leadership tenure.

On that note, I will sign off for good, at least in these pages. I’ll still be bumbling around, proposing new educational experiences, hosting Pardon the Interruption, and serving as a sounding board for anyone who wants to chat. But I cannot wait to see what the next 3 years bring for our organization, under the leadership of Drs. Addrizzo-Harris, Buckley, and Howington. And for those of you who are just taking your first steps in leadership, and who will be following in their footsteps years down the road, I hope that you get just as much enjoyment from and fulfillment in the role of President as I have. #SchulmanOut

Dr. Schulman

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