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VOL. 16 • NO. 1 • JANUARY 2021

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Courtesy NIH

Dr. Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases, receives the Moderna COVID-19 vaccine at the HHS/NIH COVID-19 Vaccine Kick-Off event at NIH on Dec. 20, 2020.

Call to arms: Vaccinating the health workforce of 21 million strong

BY MICHELE COHEN MARILL

As the first American health care workers rolled up their sleeves for a COVID-19 vaccine, the images were instantly frozen in history, marking the triumph of scientific know-how and ingenuity. Cameras captured the first trucks pulling out of a warehouse in Portage, Mich., to the applause of workers and area residents. A day later, Boston Medical Center employees – some dressed in scrubs and wearing masks, face shields, and protective gowns – literally danced on the sidewalk when doses arrived. Some have photographed themselves getting the vaccine and posted it on social media, tagging it #MyCOVIDVax.

But the real story of the debut of COVID-19 vaccination is more methodical than monumental, a celebration of teamwork rather than of conquest. As hospitals waited for their first allotment, they reviewed their carefully drafted plans. They relied on each other, reaching across the usual divisions of competition and working collaboratively to share the limited supply. Their priority lists for the first vaccinations included environmental services workers who clean patient rooms and the critical care physicians who work to save lives.

"Health care workers have pulled together throughout this pandemic," said Melanie Swift, MD, cochair of the COVID-19 Vaccine Alloca-

HEALTH WORKFORCE // *continued on page 7*

New COVID-19 vaccines: Be alert for reactions, adverse events

BY CALEB RANS, PHARMD
MDedge News

The Pfizer and Moderna COVID-19 vaccines have been shown to be highly effective in large trials, but clinicians will be waiting and watching for reactions and adverse events in their vaccinated patients.

A two-dose regimen of Pfizer's BNT162b2 mRNA COVID-19 vaccine was found to be safe and 95% effective in preventing SARS-CoV-2 infection in persons aged 16 years and older, according to an ongoing phase 2/3 trial.

The Modern mRNA-1273 trial showed similar strength among vaccine recipients age 18 and older at 94.5% vaccine efficacy (95% confidence interval, 86.5%-97.8%).

Pfizer BNT162b2 trial

Among 43,448 individuals aged 16 years and older, the efficacy, safety, and immunogenicity of the BNT162b2 vaccine candidate was evaluated in a continuous phase 1/2/3 study. Participants were randomly assigned (1:1) to receive two injections of either 30 mcg of BNT162b2

VACCINE // *continued on page 4*

INSIDE HIGHLIGHT

NEWS FROM CHEST

Sleep Strategies

AASM advocates for year-round standard time

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Why we write Esbriet

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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.

Genentech
A Member of the Roche Group

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

Safety of the vaccines appears comparable with that of other vaccines // *continued from page 1*

(n = 21,720) or saline placebo (n = 21,728) administered intramuscularly 21 days apart. The safety evaluation, where subjects were monitored 30 minutes post vaccination for acute reactions, was observer blinded.

The first primary endpoint was efficacy of BNT162b2 against laboratory-confirmed COVID-19 with onset at least 7 days following the second dose.

The primary safety endpoint was local and systemic reactions occurring within 7 days post injection of BNT162b2 or placebo.

Safety

"At the data cutoff date of Oct. 9, a total of 37,706 participants had a median of at least 2 months of safety data available after the second dose and contributed to the main safety data set," the authors wrote.

Overall, BNT162b2 had a favorable safety profile. Mild to moderate pain at the injection site within 7 days after the injection was the most frequently reported local reaction (<1% across all age groups reported severe pain). Most local reactions resolved within 1-2 days and no grade 4 reactions were reported.

The investigators reported: "Fever (temperature, ≥38° C) was reported after the second dose by 16% of younger vaccine recipients and by 11% of older recipients. Only 0.2% of vaccine recipients and 0.1% of placebo recipients reported fever (temperature, 38.9-40° C) after the first dose, as compared with 0.8% and 0.1%, respectively, after the second dose."

BNT162b2 recipients had more injection-site pain than those receiving the placebo. After the first and second doses, younger recipients (under 55 years) had more pain at the injection site (83 vs. 14 and 78 vs. 12 events, respectively), redness (5 vs. 1 and 6 vs. 1), and swelling (6 vs. 0 and 6 vs. 0), compared with placebo recipients.

The same trend was observed for patients aged over 55 years, with vaccine recipients reporting more pain at the injection site (71 vs. 9 and 66 vs. 8 events, respectively), redness (5 vs. 1 and 7 vs. 1), and swelling (7 vs. 1 and 7 vs. 1) than placebo recipients.

Pain was less common overall among vaccine recipients aged over 55 years (71% reported pain after the first dose; 66% post second dose) than among younger vaccine recipients (83% post first dose; 78% post second dose).

The most common systemic events following the second dose were fatigue and headache, which occurred in 59% and 52% of younger vaccine recipients and 51% and 39% of older vaccine recipients, respectively. But fatigue and headache were also reported by participants in the placebo group (23% and 24%, respectively, post second dose, among younger vaccine recipients; 17% and 14% among older recipients).

The incidence of serious adverse events was low and similar in the vaccine (0.6%) and placebo (0.5%) arms. Severe systemic events occurred in 2% or less of vaccine recipients following either dose, except for fatigue (3.8%) and headache (2.0%) post second dose.

Dr. Bowton

"The safety appears comparable to other vaccines, but the relatively short period of observation, 2 months, and the relatively small number of subjects who have received the vaccine (less than 30,000), compared to the hundreds of millions likely to ultimately receive the vaccine, precludes conclusions regarding the potential for rare long-term adverse effects," David L. Bowton, MD, FCCP, a pulmonologist and professor emeritus of critical care anesthesiology at Wake Forest University, Winston-Salem, N.C., said in an interview. "Clinicians should be aware of the risk of anaphylactic reactions and discuss it with their patients [who have] a history of these reactions."

Efficacy

Among 36,523 subjects without evidence of existing or prior COVID-19 infection, 8 cases of COVID-19 with onset at least 7 days after the second dose were seen among vaccine recipients and 162 among placebo recipients, corresponding to 95.0% vaccine efficacy (95% credible interval, 90.3%-97.6%).

"Supplemental analyses indicated that vaccine efficacy among subgroups defined by age, sex, race, ethnicity, obesity, and presence of a coexisting condition was generally consistent with that observed in the overall population," the authors wrote.

Between the first and second doses, 39 cases of COVID-19 were observed among BNT162b2 recipients and 82 cases among placebo recipi-

Continued on following page

Continued from previous page

ents, corresponding to 52% vaccine efficacy during the 21-day interval (95% CI, 29.5%-68.4%) suggesting early protection may begin as soon as 12 days after the first injection.

"This is an incredible achievement given that an effective vaccine has never been developed and approved for use in such a short timeframe," Dr. Bowton explained. "That the vaccine is highly effective in reducing the incidence of symptomatic COVID-19 seems incontrovertible."

"This vaccine has shockingly amazing efficacy and is well tolerated, and the results are beyond even optimistic projections," Douglas S. Paauw, MD, of the University of Washington, Seattle, said in an interview.

Moderna mRNA-1273 trial

Among 30,351 individuals aged 18 years and older, the efficacy, safety, and immunogenicity of the mRNA-1273 vaccine candidate was evaluated in a randomized, stratified, observer-blind, placebo-controlled phase 3 study. Participants were randomly assigned (1:1) to receive two injections of either 100 mcg of mRNA-1273 (n = 15,181) or saline placebo (n = 15,170) administered intramuscularly on day 1 and day 29.

Among 27,817 subjects included in the first interim analysis (data cutoff: Nov. 7, 2020), 5 cases of COVID-19 with onset at least 14 days after the second dose occurred among vaccine recipients and 90 among placebo recipients, corresponding to 94.5% vaccine efficacy (95% confidence interval, 86.5%-97.8%). The most common vaccine-related adverse reactions were injection-site pain (91.6%), fatigue (68.5%), headache (63.0%), muscle pain (59.6%), joint pain (44.8%), and chills (43.4%).

"The frequency of serious adverse

Dr. Paauw

events (SAEs) was low (1.0% in the mRNA-1273 arm and 1.0% in the placebo arm), without meaningful imbalances between study arms," they wrote.

Myocardial infarction (0.03%), nephrolithiasis (0.02%), and cholecystitis (0.02%) were the most common SAEs that were numerically greater in the vaccine arm than the placebo arm; however, the small number of cases does not infer a casual relationship.

Remaining questions

"It is not yet known if the vaccine prevents asymptomatic infections, with their attendant risk of contagion, as rates of seroconversion of trial participants against betacoronavirus nucleoproteins not included in the vaccine has not been reported," Dr. Bowton said.

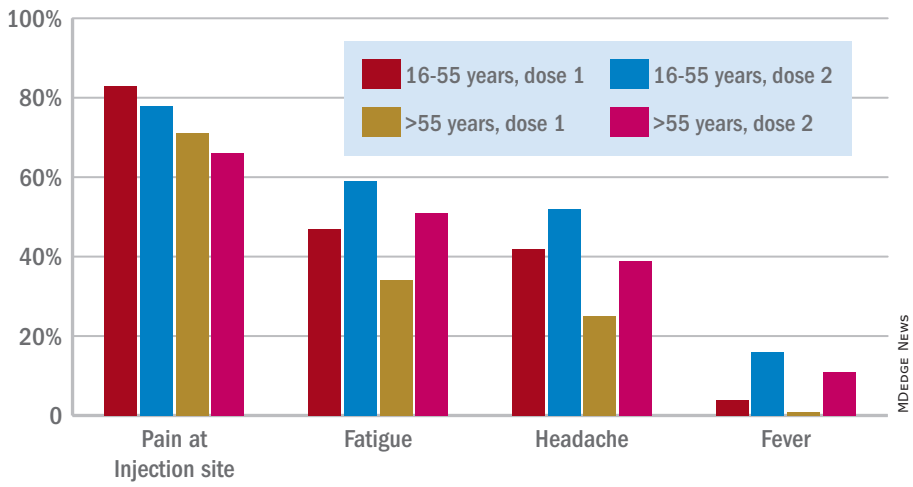
"Common questions our patients will ask us remain unanswered for now, [including] how long will the protection last, is it safe in pregnant women, and does it prevent asymptomatic infection," Dr. Paauw explained. "We do not know everything about longer-term side effects, but the benefits of this vaccine appear to outweigh the risks of the vaccine."

The BNT162b2 trial was supported by BioNTech and Pfizer. The mRNA-1273 trial was sponsored by ModernaTX. Dr. Bowton and Dr. Paauw had no conflicts.

chestphysiciannews@chestnet.org

SOURCES: Polack FP et al. N Engl J Med. 2020 Dec 10. doi: 10.1056/NEJMoa2034577; FDA Briefing Document: Moderna COVID-19 Vaccine. FDA Vaccines and Related Biological Products Advisory Committee.

Patients reporting adverse events after receiving BNT162b2



Note: Adverse events data were provided for all 43,252 particpants enrolled.
Source: N Engl J Med. 2020 Dec 10. doi: 10.1056/NEJMoa2034577

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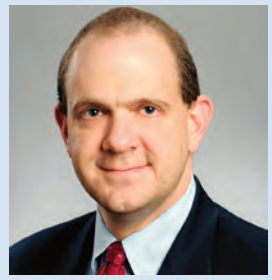

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CHEST PHYSICIAN (ISSN 1558-6200) is published Januaryly for the American College of Chest Physicians by Frontline Medical Communications Inc., 7 Century Drive, Suite 302, Parsippany, NJ 07054-4609. Subscription price is $244.00 per year. Phone 973-206-3434, fax 973-206-9378.

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Health workforce acted collectively to implement the vaccine rollout // *continued from page 1*

tion and Distribution Work Group at Mayo Clinic in Rochester, Minn. "We've gone through the darkest of years relying so heavily on each other," she said. "Now we're pulling together to get out of it."

Still, a rollout of this magnitude has hitches. Stanford issued an apology Dec. 18 after its medical residents protested a vaccine distribution plan that left out nearly all of its residents and fellows, many of whom regularly treat patients with COVID-19.

There have already been more than 287,000 COVID-19 cases and 953 deaths among health care workers, according to the Centers for Disease Control and Prevention. In its guidance, the agency pointed out that the "continued protection of them at work, at home, and in the community remains a national priority." That means vaccinating a workforce of about 21 million people, often the largest group of employees in a community.

"It collectively takes all of us to vaccinate our teams to maintain that stability in our health care infrastructure across the metro Atlanta area," Christy Norman, PharmD, vice president of pharmacy services at Emory Healthcare, told reporters in a briefing as the health system awaited its first delivery.

Don't waste a dose

One overriding imperative prevails: Hospitals don't want to waste any doses. The storage requirements of the Pfizer vaccine make that tricky.

Once vials are removed from the pizza box–shaped containers in ultracold storage and placed in a refrigerator, they must be used within 5 days. Thawed five-dose vials must be brought to room temperature before they are diluted, and they can remain at room temperature for no more than 2 hours. Once they are diluted with 1.8 mL of a 0.9% sodium chloride injection, the vials must be used within 6 hours.

COVID-19 precautions require employees to stay physically distant while they wait their turn for vaccination, which means the process can't mirror typical large-scale flu immunization programs.

To prioritize groups, the vaccination planners at Mayo conducted a thorough risk stratification, considering each employee's duties. Do they work in a dedicated COVID-19 unit? Do they handle lab tests or collect swabs? Do they work in the ICU or emergency department?

"We have applied some principles to make sure that, as we roll it out, we prioritize people who are at greatest risk of ongoing exposure and who are really critical to maintaining the COVID response and other essential health services," said Dr. Swift, associate medical director of Mayo's occupational health service.

Mayo employees who are eligible for the first doses can sign up for appointments through the medical record system. If it seems likely that some doses will be left over at the end of the vaccination period – perhaps because of missed appointments – supervisors in high-risk areas can refer other health care workers. Mayo gave its first vaccines on Dec. 18, but the vaccination program began in earnest the following week. With the pleasant surprise that each five-dose vial actually provides six doses, 474 vials will allow for the vaccination of 2,844 employees in the top-priority group. "It's going to expand each week or few days as we get more and more vaccine," Dr. Swift said.

Share vials with small rural hospitals

Minnesota is using a hub-and-spoke system to give small rural hospitals access to the Pfizer vaccine, even though they lack ultracold storage and can't use a minimum order of 975 doses. Large hospitals, acting as hubs, are sharing their orders. (The minimum order for Moderna is 100 doses.)

In south-central Minnesota, for example, two hub hospitals each have six spoke hospitals. Five of the 14 hospitals are independent, and the rest are part of large hospital systems, but affiliation doesn't matter, said Eric Weller, regional health care preparedness coordinator for the South Central Healthcare Coalition. "We are all working together. It doesn't matter what system you're from," he said. "We're working for the good of the community."

Each hospital designed a process to provide vaccine education, prioritize groups, allocate appointments, register people for vaccination, obtain signed consent forms, administer vaccines in a COVID-safe way, and provide follow-up appointments for the second dose. "We're using some of the lessons we learned during H1N1," said Mr. Weller, referring to immunization during the 2009 influenza pandemic. "The difference is that, during H1N1, you could have lines of people."

Coordinating the appointments will be more important than ever. "One of the vaccination strategies is to get people in groups of five, so you use one vial on those five people and don't waste it," he said.

Logistics are somewhat different for the Moderna vaccine, which will come in 10-dose vials that can be refrigerated for up to 30 days.

Both vaccines may produce mild flulike symptoms, such as fatigue, headache, or muscle pain, particularly after the second dose. That's a sign that the immune system is reacting to the vaccine, but it's also another consideration in the vaccination plans, because health care workers might take a day or two off work. "We're not going to vaccinate a whole department at one time. It will be staggered," said Kevin Smith, MD, medical director of the occupational medicine program at ProMedica, a health care system based in Toledo, Ohio.

Dr. Smith said he plans to encourage employees to use V-Safe, an app created by the CDC to track adverse effects in people who receive the vaccine. He pointed out that a day or two of achiness will be better than coping with the symptoms of COVID-19. Some employees who recovered from the infection still feel fatigued or haven't regained their sense of taste and smell. "We are still monitoring quite a few employees to make sure they get back to 100%," he said.

U.S. Navy photo by Macy Hinds/CC BY 2.0

The first Pfizer-BioNTech COVID-19 vaccines are administered at Naval Health Clinic Hawaii.

Hope for end to the pandemic

Public health officials have worried about vaccine hesitancy, even among health care workers, but so far, that concern seems overshadowed by enthusiasm. Dr. Smith said his department has been fielding calls from employees who want to know when they will be able to get the vaccine. "I think everyone feels relief," he said. "We're at the beginning of the end."

At Mayo, Dr. Swift is surveying staff to gauge the willingness to get the vaccine, but she already senses excitement among employees. "No doubt there are still people who are hesitant, but I'm feeling a shift," she said. "I'm feeling this momentum building of health care workers coming on board and wanting to take this vaccine, which is good, because they will set an example for their patients."

For Colleen Kelley, MD, an infectious disease physician at Emory University in Atlanta who was principal investigator for an Emory-affiliated Moderna clinical trial site, it has been an emotional time. "Things were looking very bleak and dark for a time, and then we started to get these efficacy results that were greater than anyone imagined," she said.

Dr. Kelley spends time talking to journalists and educating physician colleagues and hospital employees about how the vaccine was developed so quickly and how it works. "Everyone asks me, 'Should I get it? Are you going to get it?' My answer is 'yes' and 'yes,'" she said. "I am 1,000% confident that the benefits of widespread vaccination outweigh the risks of continued COVID and a continued pandemic."

A version of this article first appeared on Medscape.com.

COVID-19 three times as deadly as seasonal flu

BY JAKE REMALY

About twice as many patients were admitted to hospitals in France for COVID-19 during a 2-month period than were admitted for seasonal influenza during a 3-month period the previous year, according to a study published online in The Lancet Respiratory Medicine.

In-hospital mortality was nearly three times higher for COVID-19 than for seasonal influenza, researchers found. In addition, patients with COVID-19 were more likely to require invasive mechanical ventilation (9.7% vs. 4%) and had longer average ICU stays (15 days vs. 8 days).

"SARS-CoV-2 appears to have a higher potential for respiratory pathogenicity, leading to more respiratory complications in patients with fewer comorbidities, and it is associated with a higher risk of mortality, particularly in adolescents, although any conclusions for this age group must be treated with caution considering the small number of deaths," wrote Lionel Piroth, MD, PhD, of the infectious diseases department, Dijon (France) University Hospital, and colleagues.

The study "is the largest to date to compare the two diseases and confirms that COVID-19 is far more serious than the flu," study author Catherine Quantin, MD, PhD, said in a news release. "The finding that the COVID-19 death rate was three times higher than for seasonal influenza is particularly striking when reminded that the 2018/2019 flu season had been the worst in the past 5 years in France in terms of number of deaths," continued Dr. Quantin, who jointly led the research. She is affiliated with the University Hospital of Dijon and Inserm.

Patients with COVID-19 were more likely to require invasive mechanical ventilation (9.7% vs. 4%) and had longer average ICU stays (15 days vs. 8 days).

The investigators analyzed data from a national database and compared 89,530 COVID-19 hospital admissions between March 1 and April 30, 2020, with 45,819 seasonal flu hospital admissions between Dec. 1, 2018, and Feb. 28, 2019.

The death rate was 16.9% among patients hospitalized with COVID-19, compared with 5.8% among patients hospitalized with influenza.

Fewer patients younger 18 years were hospitalized with COVID-19 than with seasonal influenza (1.4% vs. 19.5%; 1,227 vs. 8,942), but a larger proportion of those younger than 5 years required intensive care for COVID-19 (2.9% vs. 0.9%). The fatality rates in children younger than 5 years were similar for both groups (0.5% vs. 0.2%).

Among patients aged 11-17 years, 5 of 548 (1.1%) patients with COVID-19 died, compared with 1 of 804 (0.1%) patients with flu.

Testing practices for influenza likely varied across hospitals, whereas testing for COVID-19 may have been more standardized. This could be a limitation of the study, the researchers noted. In addition, flu seasons vary year to year, and influenza cases may depend on vaccination coverage and residual population immunity.

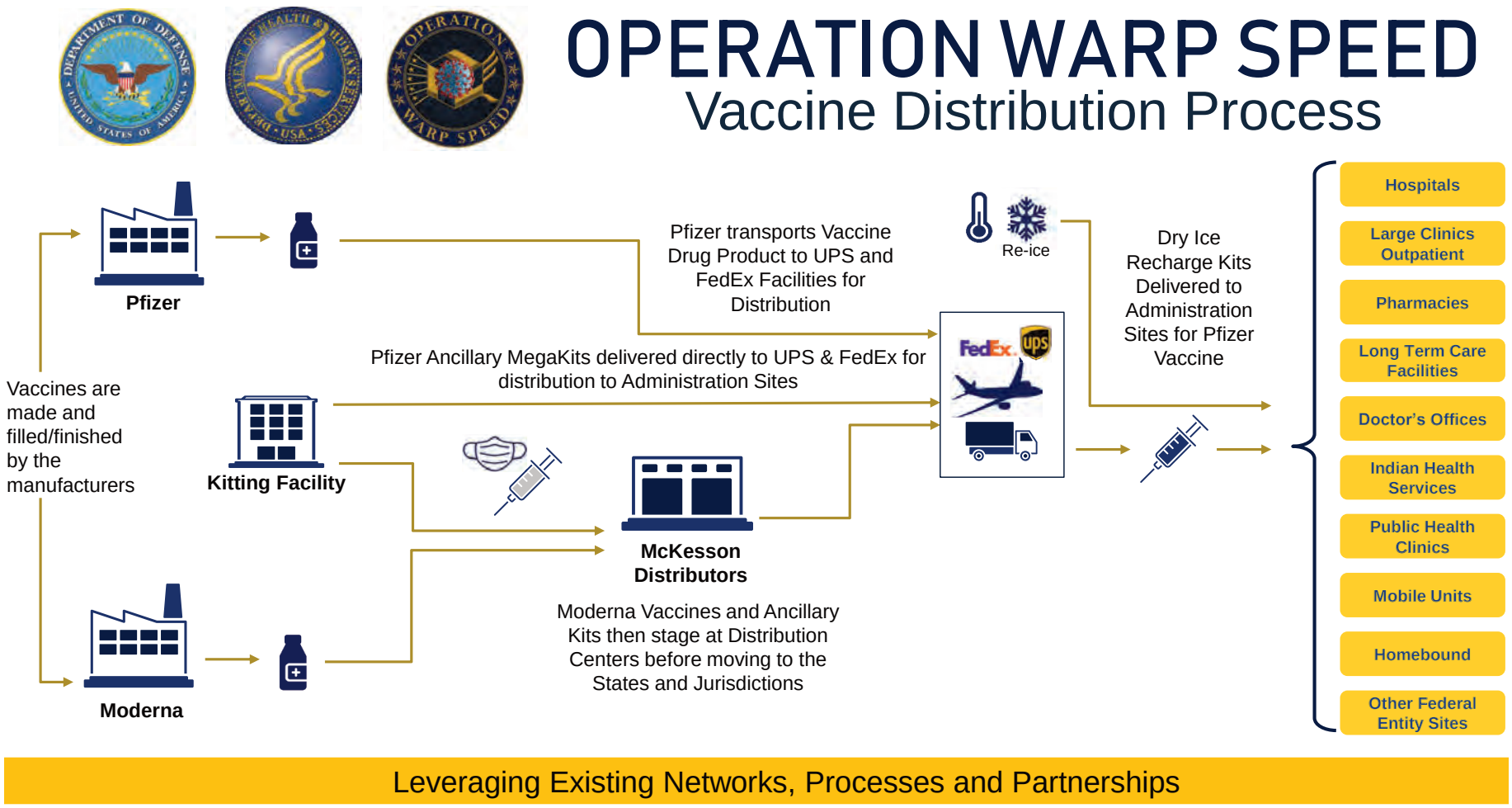
"The large sample size is an important strength of the study and it is assumed that the indication for hospital admission in the two periods was the same and thus does not bias the results," Eskild Petersen, MD, DMsc, wrote in a comment accompanying the study. "The results ... clearly show that COVID-19 is more serious than seasonal influenza."

Furthermore, this study and prior research show that "COVID-19 is not an innocent infection in children and adolescents," said Dr. Petersen, who is affiliated with the University of Aarhus in Denmark and the European Society for Clinical Microbiology and Infectious Diseases Emerging Infections Task Force.

The death rate was 16.9% among patients hospitalized with COVID-19, compared with 5.8% among patients hospitalized with influenza.

The study was funded by the French National Research Agency. Two authors have various financial ties to several pharmaceutical companies, details of which are available in the journal article. Dr. Petersen has disclosed no relevant financial relationships.

A version of this article first appeared on Medscape.com.



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HF patients at high risk for COVID-19 mortality

BY DEBRA L. BECK

Patients with heart failure who are infected with SARS-CoV-2 are at high risk for complications, with nearly one in four dying during hospitalization, according to a large database analysis that included more than 8,000 patients who had heart failure and COVID-19.

In-hospital mortality was 24.2% for patients who had a history of heart failure and were hospitalized with COVID-19, as compared with 14.2% for individuals without heart failure who were hospitalized with COVID-19.

For perspective, the researchers compared the patients with heart failure and COVID-19 with patients who had a history of heart failure and were hospitalized for an acute worsening episode: the risk for death was about 10-fold higher with COVID-19.

"These patients really face remarkably high risk, and when we compare that to the risk of in-hospital death with something we are a lot more familiar with – acute heart failure – we see that the risk was about 10-fold greater," said first author Ankeet S. Bhatt, MD, MBA, from Brigham and Women's Hospital and Harvard Medical School, both in Boston.

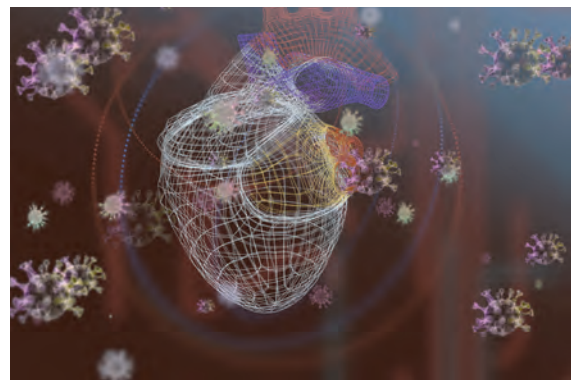
In an article published online in JACC Heart Failure on Dec. 28 (doi: 10.1016/j.jchf.2020.11.003), a group led by Dr. Bhatt and senior author Scott D. Solomon, MD, reported an analysis of administrative data on a total of 2,041,855 incident hospitalizations logged in the Premier Healthcare Database between April 1, 2020, and Sept. 30, 2020.

The Premier Healthcare Database comprises data from more than 1 billion patient encounters, which equates to approximately 1 in every 5 of all inpatient discharges in the United States.

Of 132,312 hospitalizations of patients with a history of heart failure, 23,843 (18.0%) were hospitalized with acute heart failure, 8,383 patients (6.4%) were hospitalized with COVID-19, and 100,068 (75.6%) were hospitalized for other reasons.

Outcomes and resource utilization were compared with 141,895 COVID-19 hospitalizations of patients who did not have heart failure.

Patients were deemed to have a history of heart failure if they were hospitalized at least once for heart failure from Jan. 1, 2019, to March 21, 2020, or had at least two heart failure outpatient visits during that period.



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In a comment, Dr. Solomon noted some of the pros and cons of the data used in this study.

"Premier is a huge database, encompassing about one-quarter of all the health care facilities in the United States and one-fifth of all inpatient visits, so for that reason we're able to look at things that are very difficult to look at in smaller hospital systems, but the data are also limited in that you don't have as much granular detail as you might in smaller datasets," said Dr. Solomon.

"One thing to recognize is that our data start at the point of hospital admission, so were looking only at individuals who have crossed the threshold in terms of their illness and been admitted," he added.

Use of in-hospital resources was significantly greater for patients with heart failure hospitalized for COVID-19, compared with patients hospitalized for acute heart failure or for other reasons. This included "multifold" higher rates of ICU care (29% vs. 15%), mechanical ventilation (17% vs. 6%), and central venous catheter insertion (19% vs. 7%; $P < .001$ for all).

The proportion of patients who required mechanical ventilation and care in the ICU in the group with COVID-19 but who did not have no heart failure was similar to those who had both conditions.

The greater odds of in-hospital mortality among patients with both heart failure and COVID-19, compared with individuals with heart failure hospitalized for other reasons, was strongest in April, with an adjusted odds ratio of 14.48, compared with subsequent months (adjusted OR for May-September, 10.11; P for interaction < .001).

"We're obviously not able to say with certainty what was happening in April, but I think that maybe the patients who were most vulnerable to COVID-19 may be more represented in that population, so the patients with comorbidities or who are immunosuppressed or otherwise," said Dr. Bhatt in an interview.

"The other thing we think is that there may be a learning curve in terms of how to care for patients with acute severe respiratory illness. That includes increased institutional knowledge – like the use of prone ventilation – but also therapies that were subsequently shown to have benefit in randomized clinical trials, such as dexamethasone," he added.

"These results should remind us to be innovative and thoughtful in our management of patients with heart failure while trying to maintain equity and good health for all," wrote Nasrien E. Ibrahim, MD, from Massachusetts General Hospital, Boston; Ersilia DeFillipis, MD, Columbia University, New York; and Mitchel Psotka, MD, PhD, Innova Heart and Vascular Institute, Falls Church, Va., in an editorial accompanying the study.

The data emphasize the importance of ensuring equal access to services such as telemedicine, virtual visits, home nursing visits, and remote monitoring, they noted.

"As the COVID-19 pandemic rages on and disproportionately ravages socioeconomically disadvantaged communities, we should focus our efforts on strategies that minimize these inequities," the editorialists wrote.

Dr. Solomon noted that, although Black and Hispanic patients were overrepresented in the population of heart failure patients hospitalized with COVID-19, once in the hospital, race was not a predictor of in-hospital mortality or the need for mechanical ventilation.

Dr. Bhatt has received speaker fees from Sanofi Pasteur and is supported by a National Institutes of Health/National Heart, Lung, and Blood Institute postdoctoral training grant. Dr. Solomon has received grant support and/or speaking fees from a number of companies and from the NIH/NHLBI. The editorialists disclosed no relevant financial relationships.

A version of this article first appeared on Medscape.com.

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Obesity and hypoxia predict disease severity in children with COVID-19

BY HEIDI SPLETE
MDedge News

Obesity and hypoxia at the time of hospital admission predicted more severe disease in children diagnosed with COVID-19, based on data from 281 patients at eight locations.

Manifestations of COVID-19 in children include respiratory disease similar to that seen in adults, but the full spectrum of disease in children has been studied mainly in single settings or with a focus on one clinical manifestation, wrote Danielle M. Fernandes, MD, of Albert Einstein College of Medicine, New York, and colleagues.

In a study published in the Journal of Pediatrics, the researchers identified 281 children hospitalized with COVID-19 and/or multisystem inflammatory syndrome in children (MIS-C) at eight sites in Connecticut, New Jersey, and New York. A total of 143 (51%) had respiratory disease, 69 (25%) had MIS-C, and 69 (25%) had other manifestations of illness including 32 patients with gastrointestinal problems, 21 infants with fever, 6 cases of neurologic disease, 6 cases of diabetic ketoacidosis, and 4 patients with other indications. The median age of the patients was 10 years, 60% were male, 51% were Hispanic, and 23% were non-Hispanic Black. The most common comorbidities were obesity (34%) and asthma (14%).

Independent predictors of disease severity in children found

After multiple variables were controlled, obesity and hypoxia at hospital admission were significant independent predictors of severe respiratory disease, with odds ratios of 3.39 and 4.01, respectively. In addition, lower absolute lymphocyte count (OR, 8.33 per unit decrease in 10^9 cells/L) and higher C-reactive protein (OR, 1.06 per unit increase in mg/dL) were significantly predictive of severe MIS-C ($P = .001$ and $P = .017$, respectively).

"The association between weight and severe respiratory COVID-19 is consistent with the adult literature; however, the mechanisms of this association require further study," Dr. Fernandes and associates noted.

Overall, children with MIS-C were significantly more likely to be non-Hispanic Black, compared with children with respiratory disease, an 18% difference. However, neither race/ethnicity nor socioeconomic status were significant predictors of disease severity, the researchers wrote.

During the study period, 7 patients (2%) died and 114 (41%) were admitted to the ICU.

"We found a wide array of clinical manifestations in children and youth hospitalized with SARS-CoV-2," Dr. Fernandes and associates wrote. Notably, gastrointestinal symptoms, ocular symptoms, and dermatologic symptoms have rarely been noted in adults with COVID-19, but occurred in more than 30% of the pediatric patients.

"We also found that SARS-CoV-2 can be an incidental finding in a substantial number of hospitalized pediatric patients," the researchers said.

The findings were limited by several factors including a population of patients only from Connecticut, New Jersey, and New York, and the possibility that decisions on hospital and ICU admission may have varied by location, the researchers said. In addition, approaches may have varied in the absence of data on the optimal treatment of MIS-C.

"This study builds on the growing body of evidence showing that mortality in hospitalized pediatric patients is low, compared with adults," Dr. Fernandes and associates said. "However, it highlights that the young population is not universally spared from morbidity, and that even previously healthy children and youth can develop severe disease requiring supportive therapy."

Findings confirm other clinical experience

The study was important to show that, "although most children are spared severe illness from COVID-19, some children are hospitalized both with acute COVID-19 respiratory disease, with MIS-C and with a range of other complications," Adrienne Randolph, MD, of Boston Children's Hospital and Harvard Medical School, Boston, said in an interview.

Dr. Randolph said she was not surprised by the study findings, "as we are also seeing these types of complications at Boston Children's Hospital where I work."

Additional research is needed on the outcomes of these patients, "especially the longer-term sequelae of having COVID-19 or MIS-C early in life," she emphasized.

The take-home message to clinicians from the findings at this time is to be aware that children and adolescents can become severely ill from COVID-19–related complications, said Dr. Randolph. "Some of the laboratory values on presentation appear to be associated with disease severity."

The study received no outside funding. The researchers had no financial conflicts to disclose. Dr. Randolph disclosed funding from the Centers for Disease Control and Prevention to lead the Overcoming COVID-19 Study in U.S. Children and Adults.

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SOURCE: Fernandes DM et al. J Pediatr. 2020 Nov 13. doi: 10.1016/j.jpeds.2020.11.016.

Brandon M. Seay, MD, comments: Although pediatric deaths are not as prevalent as those in adults from COVID-19, there is significant morbidity with some cases. Knowing that obesity and asthma might be two indicators of increased disease severity is important in a season that already hits the asthmatic population hard. As we are caring for asthma patients this winter, we should continue to endorse masking and social distancing based in this increased risk of morbidity in our patient population.

Nicotine vaping tapers off among teens

BY HEIDI SPLETE
MDedge News

Levels of nicotine and marijuana vaping among adolescents remain elevated but did not increase significantly in the past year, data from the annual Monitoring the Future survey show.

The 2020 survey included responses from 11,821 individuals in 112 schools across the United States from Feb. 11, 2020, to March 14, 2020, at which time data collection ended prematurely because of the COVID-19 pandemic. The results represent approximately 25% of the usual data collection.

A key positive finding in this year's survey was the relatively stable levels of nicotine vaping from 2019 to 2020, following a trend of notably increased use annually since vaping was added to the survey in 2017.

Dr. Volkow

During the years 2017-2019, the percentage of teens who reported vaping nicotine in the past 12 months increased from 7.5% to 16.5% among 8th graders, from 15.8% to 30.7% among 10th graders, and from 18.8% to 35.3% among 12th graders. However, in 2020, the percentages of teens who reported past-year nicotine vaping were relatively steady at 16.6%, 30.7%, and 34.5%, for 8th-, 10th-, and 12th-grade students, respectively. In addition, reports of daily or near-daily nicotine vaping (defined as 20 occasions in the past 30 days) decreased significantly, from 6.8% to 3.6% among 10th graders and from 11.6% to 5.3% among 12th graders.

"The rapid rise of teen nicotine vaping in recent years has been unprecedented and deeply concerning since we know that nicotine is highly addictive and can be delivered at high doses by vaping devices, which may also contain other

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toxic chemicals that may be harmful when inhaled," said Nora D. Volkow, MD, director of the National Institute on Drug Abuse in a press release accompanying the release of the findings. "It is encouraging to see a leveling off of this trend though the rates still remain very high."

Reports of past-year marijuana vaping remained similar to 2019 levels after a twofold increase in the past 2 years, according to the survey. In early 2020, 8.1%, 19.1%, and 22.1% of 8th, 10th, and 12th graders reported past-year use. However, daily marijuana vaping decreased by more than half from 2019, to 1.1% among 10th graders and 1.5% among 12th graders.

Past-year use of the JUUL devices specifically also declined among older teens, from 28.7% in 2019 to 20% in 2020 among 10th graders and from 28.4% in 2019 to 22.7% in 2020 among 12th graders.

Other trends this year included the increased past-year use of amphetamines, inhalants, and cough medicines among 8th graders, and relatively low reported use among 12th graders of LSD (3.9%), synthetic cannabinoids (2.4%), cocaine (2.9%), ecstasy (1.8%), methamphetamine (1.4%), and heroin (0.3%).

The findings were published in JAMA Pediatrics (2020 Dec 15. doi: 10.1001/jamapediatrics.2020.5667).

Early data show progress

"The MTF survey is the most referenced and reliable longitudinal study reporting current use of tobacco, drugs, and alcohol among young people," said Mark S. Gold, MD, of Washington University, St. Louis, in an interview.

"The new data, collected before data collection stopped prematurely due to the COVID-19 pandemic, suggests that some progress is being made in slowing the increase in substance use among these, the most vulnerable," he said.

"The best news was that nicotine vaping decreased significantly after its meteoric increase over the past few years," Dr. Gold emphasized. "Past-year vaping of marijuana remained steady at alarming levels in 2020, with 8.1% of 8th graders, 19.1% of 10th graders, and 22.1% of 12th graders reporting past-year use, following a twofold increase over the past 2 years." The use of all forms of marijuana, including smoking and vaping, did not significantly change in any of the three grades for lifetime use, past 12–month use, past 30–day use, and daily use from 2019 to 2020.

"Teen alcohol use has not significantly changed over the past 5 years," and cigarette smoking in the last 30 days did not significantly change from 2019 to 2020, said Dr. Gold. However, "as with adults, psychostimulant use is increasing. Past-year nonmedical use of amphetamines among 8th graders increased, from 3.5% in 2017 to 5.3% in 2020."

Dr. Gold

COVID era may affect use

"The data suggest that pre-COVID pandemic vaping, smoking cigarettes, marijuana, and alcohol use had stabilized," Dr. Gold said. "However, it is very difficult to predict what the COVID era data will show as many young people are at home, on the streets, and unsupervised; while adult substance misuse, substance use disorders, and overdoses are increasing. Drug supplies and access have increased for alcohol, cannabis, vaping, and tobacco as have supply synthetics like methamphetamine and fentanyl."

"It is very difficult to predict what the COVID era data will show as many young people are at home, on the streets, and unsupervised."

In addition, "access to evaluation, intervention, and treatment have been curtailed during the pandemic," Dr. Gold said. "The loss of peer role models, daily routine, and teacher or other adult supervision and interventions may interact with increasing despair, social isolation, depression, and anxiety in ways that are unknown. "It will not be clear until the next survey if perceived dangerousness has changed in ways that can protect these 8th, 10th, and 12th graders and increase the numbers of never users or current nonusers."

The Monitoring the Future survey is conducted each year by the University of Michigan's Institute for Social Research, Ann Arbor, and supported by NIDA, part of the National Institutes of Health. Dr. Gold had no relevant financial conflicts to disclose.

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NHLBI asthma guidelines update ICS, FeNO therapy

BY RICHARD MARK KIRKNER
MDedge News

A long-awaited update to asthma management guidelines, developed by an expert panel at the National Heart, Lung, and Blood Institute, has been released.

The updated guidelines address six priority topics, including refined recommendations for the use of fractional exhaled nitric oxide (FeNO) testing, intermittent inhaled corticosteroids (ICS), long-acting muscarinic antagonists (LAMA), and bronchial thermoplasty, but notably exclude any recommendations for the use of fast-emerging biological therapy.

"Biological therapy is the major step forward," said William W. Busse, MD, professor of allergy and immunology at the University of Wisconsin–Madison, and lead author of the previous guidelines (Bethesda, Md.: NHLBI, 2007). "It wasn't within the scope of work, so it's not a criticism, but it is an important shortcoming," he said. The omission identifies the need for the next update. "This is an area that has to be dealt with," Dr. Busse stated in an interview.

Including biologic agents would have delayed the release of the recommendations for another year or 2, wrote the expert panel working group of the NHLBI, "and this was felt to be unacceptable." The working group, overseen by the National Asthma Education and Prevention Program Coordinating Committee, also acknowledged the update is "not a complete revision" of the 2007 guidelines.

The guidelines update provides


Dr. Busse


Dr. Cataletto

an evdenced-based review of six key topics in asthma care, as Mary Cataletto, MD, FCCP, professor of pediatrics at New York University Long Island, Mineola, pointed out: use of FeNO, indoor allergen mitigation, use of intermittent ICS and LAMA for asthma, role of subcutaneous and sublingual immunotherapy in the treatment of allergic asthma, and the use of bronchial thermoplasty.

"It has been 13 years since the last update and substantial progress has been made since then in understanding how to best treat children and adults with asthma," said working group member Michael Schatz, MD, MS, FCCP, an allergy specialist at Kaiser Permanente Medical Center in San Diego.

According to Dr. Schatz, the most important updated recommendations are:

- Conditional recommendation for the use of ICS in children aged infant to 4 years with recurrent wheezing with respiratory infections.
- Use of combination ICS-formoterol for maintenance and to relieve flares in patients with moderate to severe asthma.
- Addition of the LAMA inhaled bronchodilator as add-on therapy for severe asthma not controlled by long-acting beta-agonist (LABA)/ICS combination medications.

Another important update, Dr. Cataletto said, is "shared decision-making among members of asthma teams in order to improve asthma care across all age groups."

In all, the update includes 19 recommendations in the six subject areas. Each recommendation is notated with two values: its strength, either strong or conditional, and the certainty of evidence behind it, either low, moderate, or high. For example, the recommendation for ICS in young children that Dr. Schatz referred to has a conditional strength of recommendation with moderate certainty of evidence.

Using the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) methodology to determine strength of recommendation is a notable innovation of the latest guidelines, Dr. Busse noted.


Dr. Schatz

One of the key elements of the guidelines is the use of the SMART (single maintenance and reliever therapy) approach to evaluate the comparative effectiveness of intermittent ICS with formoterol, Dr. Busse noted. "I think that's a very significant advance. The literature is replete with evidence to support this. Secondly, it really makes life convenient for patients; you have one inhaler."

The recommendation on SABA use is also significant, Dr. Busse said. "Data have emerged to suggest that, if you're having a need for one of these rescue medications, it's due to an increase in inflammation in the lower airway, and you want to

Continued on following page

Strength of recommendation/certainty of evidence)

- Use of FeNO in children and adults when the asthma diagnosis is uncertain (**conditional/moderate**) or in those with allergic asthma and an uncertain course of management (**conditional/low**).
- Avoid standalone FeNO to evaluate asthma control or the likelihood or severity of future exacerbations, or for in infants to 4-year-olds with recurrent wheezing (**strong/low for both**).
- Avoid allergen mitigation in routine asthma management for patients who don't have sensitivity to specific indoor allergens (**conditional/low**).
- Multicomponent allergen-specific mitigation when specific allergen sensitivity has been identified and pest management alone for symptoms related to specific pest exposure (**conditional/low for both**).
- Impermeable bedding covers should be part of a multicomponent mitigation strategy, not as a standalone tool, for patients with asthma and dust mite sensitivity (**conditional/moderate**).
- Daily ICS at onset of a respiratory tract infection along with as-needed short-acting beta-agonists in children aged 4 years and younger with recurrent wheezing but no wheezing between infections rather than as-needed standalone SABA (**conditional/high**).
- For adults and children aged 12 years and older with mild persistent asthma, either daily low-dose ICS with as-needed SABA or as-needed ICS and SABA concomitantly (**conditional/moderate**).
- Avoid short-course increased ICS dosing for patients aged 4 years and older with good adherence to daily ICS therapy (**conditional/low**).
- For patients aged 4 years and older with moderate to severe persistent asthma, a preference for combined ICS-formoterol inhaler over higher dose ICS daily and intermittent SABA or daily ICS-LABA with intermittent SABA (**strong/high [aged 12 years and older]; moderate [aged 4-11 years]**).
- A preference for combined ICS-formoterol for both daily and relief therapy for patients 12 years and older with severe persistent asthma over higher-dose ICS-LABA daily and intermittent SABA (**conditional/high**).
- A preference for adding LABA rather than LAMA to ICS in patients aged 12 years and older with uncontrolled persistent asthma (**conditional/moderate**).
- If LABA isn't used, add LAMA to ICS in patients aged 12 years and older with uncontrolled persistent asthma rather than continuing the same dose of ICS alone (**conditional/moderate**).
- In those same patients already on combined ICS-LABA therapy, add LAMA rather than continuing the same dose of ICS-LABA (**conditional/moderate**).
- Use subcutaneous immunotherapy as a potential adjunct to standard drug therapy in patients aged 5 years and older with mild to moderate allergic asthma when their asthma is controlled on immunotherapy (**conditional/moderate**).
- Avoid sublingual immunotherapy in patients with persistent allergic asthma (**conditional/moderate**).
- Avoid bronchial thermoplasty in those 18 years and older with persistent asthma, but consider it in patients who can accept the short-term worsening symptoms or unknown long-term side effects in exchange for the potential benefits (**conditional/moderate**).

FDA expands flu indication for baloxavir marboxil

BY MEGAN BROOKS

The Food and Drug Administration has expanded the indication for the antiviral baloxavir marboxil (Xofluza) to include postexposure prophylaxis of uncomplicated influenza in people aged 12 years and older.

"This expanded indication for Xofluza will provide an important option to help prevent influenza just in time for a flu season that is anticipated to be unlike any other because it will coincide with the coronavirus pandemic," Debra Birnkrant, MD, director, Division of Antiviral Products, FDA Center for Drug Evaluation and Research, said in a press release.

In addition, Xofluza, which was previously available only in tablet form, is also now available as granules for mixing in water, the FDA said.

The agency first approved baloxavir marboxil in 2018 for the treatment of acute uncomplicated influenza in people aged 12 years or older who have been symptomatic for no more than 48 hours.

A year later, the FDA expanded the indication to include people at high risk of developing influenza-related complications, such as those with asthma, chronic lung disease, diabetes, heart disease, or morbid obesity, as well as adults aged 65 years or older.

The safety and efficacy of Xofluza for influenza postexposure prophylaxis is supported by a randomized, double-blind, controlled trial involving 607 people aged 12 years and older. After exposure to a person with influenza in their household, they received a single dose of Xofluza or placebo.

The primary endpoint was the proportion of individuals who became infected with influenza and presented with fever and at least one respiratory symptom from day 1 to day 10.

Of the 303 people who received Xofluza, 1% of individuals met these criteria, compared with 13% of those who received placebo.

The most common adverse effects of Xofluza include diarrhea, bronchitis, nausea, sinusitis, and headache.

Hypersensitivity, including anaphylaxis, can occur in patients taking Xofluza. The antiviral is contraindicated in people with a known hypersensitivity reaction to Xofluza.

A version of this article first appeared on Medscape.com.

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give an ICS which will act on the inflammation along with the bronchodilator. That's a new concept, and it's a very significant step forward."

Dr. Schatz disclosed financial relationships with Merck, Teva, and ALK-Abello, but was recused from the writing, discussion, and voting related to the immunotherapy recommendation. Dr. Cataletto and Dr. Busse have no relevant relationships to disclose.

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SOURCE: Schatz M et al. J Allergy Clin Immunol. 2020;146:1217-70.

Lung and blood cancers worsen COVID-19 outcomes

BY M. ALEXANDER OTTO, PA, MMS

Patients with cancer are at significantly increased risk for COVID-19 and worse outcomes, a new review confirms. It also found that patients with leukemia, non-Hodgkin lymphoma, and lung cancer are at greatest risk.

Black patients with cancer are at even higher risk, and for patients with colorectal cancer and non-Hodgkin lymphoma, the risk is higher for women than for men. (This contrasts with findings in noncancer populations, where men are more at risk from COVID-19 and severe outcomes than women.)

These findings come from a huge review of electronic health records of 73.4 million patients in the United States. They "highlight the need to protect and monitor patients with cancer as part

IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS (CONT'D)

Elevated Liver Enzymes and Drug-Induced Liver Injury (cont'd)

- In the SSc-ILD study, a maximum ALT and/or AST greater than or equal to 3 times ULN was observed in 4.9% of patients treated with OFEV.
- Patients with low body weight (less than 65 kg), patients who are Asian, and female patients may have a higher risk of elevations in liver enzymes. Nintedanib exposure increased with patient age, which may result in increased liver enzymes.
- Conduct liver function tests prior to initiation of treatment, at regular intervals during the first three months of treatment, and periodically thereafter or as clinically indicated. Measure liver function tests promptly in patients who report symptoms that may indicate liver injury, including fatigue, anorexia, right upper abdominal discomfort, dark urine, or jaundice. Dosage modifications, interruption, or discontinuation may be necessary for liver enzyme elevations.

Gastrointestinal Disorders

Diarrhea

- Events were primarily mild to moderate in intensity and occurred within the first 3 months.
- In IPF studies, diarrhea was the most frequent gastrointestinal event reported in 62% versus 18% of patients treated with OFEV and placebo, respectively. Diarrhea led to permanent dose reduction in 11% and discontinuation in 5% of OFEV patients versus 0 and less than 1% in placebo patients, respectively.
- In the chronic fibrosing ILDs with a progressive phenotype study, diarrhea was reported in 67% versus 24% of patients treated with OFEV and placebo, respectively. Diarrhea led to permanent dose reduction in 16% and discontinuation in 6% of OFEV patients, compared to less than 1% of placebo-treated patients, respectively.
- In the SSc-ILD study, diarrhea was the most frequent gastrointestinal event reported in 76% versus 32% of patients treated with OFEV and placebo, respectively. Diarrhea led to permanent dose reduction in 22% and discontinuation in 7% of OFEV patients versus 1% and 0.3% in placebo patients, respectively.
- Dosage modifications or treatment interruptions may be necessary in patients with diarrhea. Treat diarrhea at first signs with adequate hydration and antidiarrheal medication (e.g., loperamide), and consider dose reduction or treatment interruption if diarrhea continues. OFEV treatment may be resumed at the full dosage (150 mg twice daily), or at the reduced dosage (100 mg twice daily), which subsequently may be increased to the full dosage. If severe diarrhea persists, discontinue treatment.

Nausea and Vomiting

- In IPF studies, nausea was reported in 24% versus 7% and vomiting was reported in 12% versus 3% of patients treated with OFEV and placebo, respectively. Nausea and vomiting led to discontinuation of OFEV in 2% and 1% of patients, respectively.
- In the chronic fibrosing ILDs with a progressive phenotype study, nausea was reported in 29% versus 9% and vomiting was reported in 18% versus 5% of patients treated with OFEV and placebo, respectively. Nausea led to discontinuation of OFEV in less than 1% of patients, and vomiting led to discontinuation of OFEV in 1% of the patients.

of the strategy to control the pandemic," the authors wrote.

The review was published online Dec. 10, 2020, in JAMA Oncology (doi: 10.1001/jamaoncol.2020.6178).

The greater risk for COVID-19 among patients with cancer is well known, but breaking the risk down by cancer type is novel, wrote the investigators, led by Quanqiu Wang, MS, Center for Artificial Intelligence in Drug Discovery, Case Western Reserve University, Cleveland.

Cancer patients are immunocompromised and have more contact with the health care system, which increases their risk for COVID-19. But which bodily systems are affected by cancer seems to matter. In patients with blood cancer, for example, COVID-19 is probably more dangerous, because blood cancer weakens the immune system directly, the authors suggested.

The increased risk for infection and hospitalization with SARS-CoV-2 among Black patients with cancer might be because of biology, but it is more likely because of factors that weren't captured in the database review. Such factors include social adversity, economic status, access to health care, and lifestyle, the researchers noted.

For this study, the investigators analyzed electronic health records held in the IBM Watson Health Explorys system, which captures about

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15% of new cancer diagnoses in the United States.

The analysis found that, as of Aug. 14, 2020, 16,570 patients (0.02%) had been diagnosed with COVID-19; about 1,200 also had been diagnosed with cancer. Of those, 690 were diagnosed with cancer in the previous year, which counted as a recent cancer diagnosis in the analysis. The study included 13 common cancers, including endometrial, kidney, liver, lung, gastrointestinal, prostate, skin, and thyroid cancers, among others.

Patients with any cancer diagnosis (adjusted odds ratio, 1.46) as well as those with a recent cancer diagnosis (aOR, 7.14) had a significantly higher risk for COVID-19 than those without cancer, after adjusting for asthma, cardiovascular diseases, nursing home stays, and other risk factors.

The risk for COVID-19 was highest among patients recently diagnosed with leukemia (aOR, 12.16), non-Hodgkin lymphoma (aOR, 8.54), and lung cancer (aOR 7.66). The risk for COVID-19 was lower for patients with cancers associated with worse prognoses, including pancreatic (aOR, 6.26) and liver (aOR, 6.49) cancer. It was weakest for patients with thyroid cancer (aOR, 3.10; *P* for all < .001).

Hospitalization was more common in recent cancer patients with

Dr. Desai

COVID-19 than in COVID-19 patients without cancer (47.46% vs. 24.6%), as was COVID-19–related death (14.93% vs. 5.26%). Among cancer patients who did not have COVID-19, 12.39% were hospitalized, and 4.03% died. The findings suggest a synergistic effect between the COVID-19 and cancer, the team noted.

Among patients recently diagnosed with cancer, Black patients – 10.3% of the overall study population – had a significantly higher risk for COVID-19 than White patients. The racial disparity was largest for patients with breast cancer (aOR, 5.44), followed by patients with prostate cancer (aOR, 5.10), colorectal cancer (aOR, 3.30), and lung cancer (aOR, 2.53; *P* for all < .001).

Hospitalizations were more common among Black patients with cancer and COVID-19 than White patients. There was also a trend toward higher mortality among Black patients (18.52% vs. 13.51%; *P* = .11)

However, these differences may not be related to race, oncologist Aakash Desai, MBBS, of the Mayo Clinic, Rochester, Minn., and colleagues noted in an accompanying commentary (JAMA Oncol.

Continued on following page

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2020 Dec 10. doi: 10.1001/jamaoncol.2020.5461). "Interestingly, a previous study of hospitalized patients with COVID-19 without cancer demonstrated that mortality rates for Black patients were comparable to those for White patients after adjustment for both comorbidities and deprivation index, suggesting that observed differences are mainly owing to societal disparities rather than biology."

The editorialists also noted that the finding that Black patients with cancer are at greater risk for COVID-19 (aOR, 1.58-5.44, depending on cancer) echoes the findings in the general population. The Centers for Disease Control and Prevention estimates a severalfold increased risk among Black patients. These higher rates may largely be explained by social determinants, they suggested. Such factors include increased burden of comorbidities, crowded living conditions (inner cities, multigenerational homes, etc.), dependence on public transportation or child care, and higher work-related exposures. "Until such societal disparities are accounted for, we cannot presume these findings are caused by any inherent differences among racial groups," the editorialists wrote.

"Clearly, the haunting spotlight of COVID-19 has dramatically illuminated known U.S. health care and societal disparities," Dr. Desai

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 miscarriage in clinically recognized

and colleagues wrote.

"This situation should be a wake-up call that brings much-needed improvements in U.S. equity policies, including but not limited to better health care access.

Nothing appears more critical for alleviating these disparate clinical outcomes in this time of crisis and beyond," they declared.

The study was funded by the National Institutes of Health, the American Cancer Society, and other organizations. The investigators disclosed having no relevant financial relationships.

A version of this article first appeared on Medscape.com.

LUNG CANCER

FDA OKs osimertinib as first adjuvant drug for non–small cell lung cancer

BY MEGAN BROOKS

The Food and Drug Administration has approved osimertinib (Tagrisso) as the first adjuvant treatment for adults with early-stage non–small cell lung cancer (NSCLC) bearing EGFR exon 19 deletions or exon 21 L858R mutations.

Osimertinib was first approved in the United States in 2018 for the first-line treatment of patients with metastatic EGFR-mutated NSCLC.

With this new indication, "patients may be treated with this targeted therapy in an earlier and potentially more curative stage of non–small cell lung cancer," Richard Pazdur, MD, director of the FDA's Oncology Center of Excellence and acting director of the Office of Oncologic Diseases in the FDA's Center for Drug Evaluation and Research, said in a news release.

The expanded indication is based on results of the ADAURA clinical trial, which compared osimertinib with placebo following complete resection of localized or locally advanced NSCLC with negative margins.

In the trial, adjuvant osimertinib reduced the relative risk of disease recurrence or death by 83% in patients with stage II and IIIA disease (hazard ratio, 0.17; 95% confidence interval, 0.12 - 0.23; $P <$ .0001). Disease-free survival (DFS) in the overall trial population of patients with stage IB-IIIA disease showed osimertinib reduced the risk of disease recurrence or death by 80% (HR, 0.20; 95% CI, 0.15-0.27; $P < .0001$).

At 2 years, 89% of patients treated with the targeted agent remained alive and disease free vs. 52% on placebo after surgery.

The safety and tolerability of osimertinib in the adjuvant setting was consistent with previous trials in the metastatic setting.

The trial of 682 patients was unblinded early and halted on the recommendation of the independent data-monitoring committee, because of the efficacy of osimertinib.

"If I were on the committee, I would have done the same thing. These are extraordinary results," study investigator Roy S. Herbst, MD, PhD, chief of medical oncology at the Yale Cancer Center, New Haven, Conn., said at a press briefing prior to the study presentation at the American Society of Clinical Oncology's virtual scientific program in 2020.

In a commentary, Mark Kris, MD, of Memorial Sloan Kettering Cancer Center in New York, said

Dr. Roy S. Herbst

the data with osimertinib in the adjuvant setting are "important and practice changing."

"The potential for this drug to improve outcomes has been there for a long time. This phase 3 randomized trial presented at the plenary session of ASCO showed a more than doubling of disease-free survival at 2 years. It shows that we can use therapies in the earlier stages of disease," Dr. Kris noted.

"This approval dispels the notion that treatment is over after surgery and chemotherapy, as the ADAURA results show that Tagrisso can dramatically change the course of this disease," Dave Fredrickson, executive vice president, AstraZeneca oncology business unit, said in a news release.

Osimertinib had orphan drug status and breakthrough therapy designation for treatment of EGFR mutation–positive NSCLC.

A version of this article first appeared on Medscape.com.

CHEST NETWORKS

Hepatitis C donors in thoracic organ transplantation

Cardiovascular Medicine and Surgery

Use of hepatitis C donors in thoracic organ transplantation: Reportedly associated with increased risk of rejection

Transplanting organs from hepatitis C (HCV) antibody and/or antigen-positive donors is associated with a greater than 8%-90% likelihood that the recipient will acquire the infection. Several studies reported that if HCV conversion happened, the outcomes in both heart and lung recipients were worse, even if treated with interferon/ribavirin (Haji SA, et al J Heart Lung Transplant. 2004;23:277; Wang BY, et al. Ann Thorac Surg. 2010 May;89[5]:1645; Carreno MC, et al. J Heart Lung Transplant. 2001;20(2):224). Thus, despite the shortage of thoracic organ donors and high wait-list mortality, the practice was strongly discouraged.

In 2016, the successful use of a direct-acting antiviral (DAA) for 12 weeks to eliminate HCV in a lung transplant recipient of a seropositive organ was published (Khan B, et al. Am J Transplant. 2017;17:1129). Two years later, the outcomes of seronegative heart (n=8) or lung (n=36) transplant recipients receiving organs from seropositive donors were presented (Woolley AE, et al. N Engl J Med. 2019;380:1606). Forty-two of the patients had viremia within days of the operation. All patients were treated with 4 weeks of a DAA and, of the 35 patients available for 6-month analysis, viral load was undetectable in all. Of concern, however—more cellular rejection requiring treatment was seen in the lung recipients of HCV+ donors compared with recipients of HCV- donors. The difference was not statistically significant.

The largest analysis of the safety of HCV+ donors in HCV- thoracic organ transplant recipients involved 343 heart transplant recipients (Kilic A, et al. J Am Heart Assoc. 2020;9(2):e014495). No differences were noted in outcomes, strokes, need for dialysis, or incidence of treated rejection during the first year. However, the observation regarding rejection was not subsequently confirmed by the NYU team (Gidea CG, et al. J Heart Lung Transplant. 2020;39:1199). Of 22 HCV- recipients of an HCV donor with viremia, the rate of rejection was 64% vs 18% in 28 patients receiving a donor without viremia (through day 180 (P=.001)).

In summary, the ability of DAAs to render 97%-99% of immunosuppressed transplant recipients HCV seronegative has transformed the landscape and HCV viremia in the donor (or recipient) and is no longer an absolute contraindication to transplantation. However, more information is needed as to whether there is an increased incidence of rejection.

Mark Jay Zucker, MD, JD, FCCP
Vice-Chair

Hospital staffing support available for COVID-19

As the COVID-19 pandemic persists with increasing pressure on hospital systems and clinicians, the Clinician Matching Network can help with finding physician resources needed. Hospital systems experiencing high demand can quickly and easily apply for assistance using the clinician request form (https://bit.ly/2KZQ5Ms). The Clinician Matching Network pairs volunteer doctors with hospitals based on their need. This program combines the resources of the American College of Chest Physicians (CHEST), American Association for Respiratory Care (AARC), American Thoracic Society (ATS), and partners with PA Consulting. Learn more and sign up today (https://bit.ly/3n9RQnr).

Updates from the AMA House of Delegates special meeting

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

The American Medical Association (AMA) had its November 2020 AMA Special Meeting of the AMA House of Delegates (HOD) from November 13-17.

Delegates from over 170 societies (state societies, specialties, subspecialties, and uniformed services), including physicians, residents, and students, gathered virtually for the meeting(https://tinyurl.com/y7494mwa) to consider a wide array of proposals to help fulfill the AMA's core mission of promoting medicine and improving public health. The AMA House of Delegates, also known as the "House" or the "HOD," is the principal policy-making body of the AMA. This democratic forum represents the views and interests of a diverse group of member physicians from more than 170 societies. These delegates meet twice per year to establish policies on health; medical, professional, and governance matters; and the principles within which the AMA's business activities are conducted.

Dr. Desai

During the COVID-19 pandemic, the AMA has been the leading physician and patient ally—voicing recommendations to key Congressional leaders and agency staff, state policymakers, and private sector stakeholders.

Acting on both federal and state levels, examples of AMA's recent efforts include actions in financial relief, telehealth, testing and vaccine development, health equity, and more.

CHEST is an active member, and through the HOD and Specialty and Service Society (SSS), CHEST can partner with AMA other societies to support 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 voting in 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.

Policy and resolutions

Overview of the process

Policies originate via resolutions submitted by individuals or societies. These resolutions then go to one of several Reference Committees for open discussion. These committees then report their recommendations back to the HOD, which then discusses and votes on the recommendations. In some instances, the question is referred for further studies by one of several Councils, which reports go to the Board of Trustees or back to the House. Details can be found in the April 2018 CHEST Physician® article on the process. (https://tinyurl.com/yacysxar).

This year, due to the virtual nature, prioritization matrix was utilized and based on urgency. Resolutions were divided into top priority, priority, medium priority, low priority, and not a priority.

The following reference committees convened at this Special Meeting Constitution & Bylaws, Medical Service, Legislation Medical Education, Public Health, Science and Technology, Finance and Medical Practice.

Some of the issues discussed at the House of Delegates are as follows:

Medical education

Continuing board certification (Adapted as a new policy)

The policy states that American Medical Association (AMA), through its Council on Medical Education, continue to work with the American Board of Medical Specialties (ABMS) and ABMS member boards to implement key recommendations outlined by the Continuing Board Certification: Vision for the Future Commission in its final report, including the development of new, integrated standards for continuing certification programs by 2020 that will address the Commission's recommendations for flexibility in knowledge assessment and advancing practice, feedback to diplomates, and consistency.

Graduate medical education and the corporate practice of medicine (modified existing policy)

The existing policy was amended to urge AMA to continue to monitor issues, including waiver of due process requirements, created by corporate-owned graduate medical education sites.

Public health

Bullying in the practice of medicine

Health-care organizations, including academic medical centers, should establish policies to prevent and address bullying in their workplaces. An effective workplace policy should:

- Describe the management's commitment to providing a safe and healthy workplace.
- Show the staff that their leaders are concerned about bullying and unprofessional behavior and that they take it seriously.
- Clearly define workplace violence, harassment, and bullying, specifically including intimidation, threats, and other forms of aggressive behavior.
- Specify to whom the policy applies (ie, medical staff, students, administration, patients, employees, contractors, vendors, etc).
- Define both expected and prohibited behaviors.
- Outline steps for individuals to take when they feel they are a victim of workplace bullying.
- Provide contact information for a confidential means for documenting and reporting incidents.
- Prohibit retaliation and ensure privacy and confidentiality.
- Document training requirements and establish clear expectations about the training objectives.

Availability of personal protective equipment (PPE)

That our American Medical Association actively support that physicians and health-care professionals are empowered to use workplace modifications to continue professional patient care when they determine such action to be appropriate and in the best interest of patient and physician wellbeing.

Physicians and health-care professionals must be permitted to use their professional judgment and augment institution-provided PPE with additional, appropriately decontaminated, personally provided personal protective equipment (PPE) without penalty (Directive to Take Action); and be it further that AMA affirm that the medical staff of each health-care institution should integrally be involved in disaster planning, strategy, and tactical management of ongoing crises (New HOD Policy).

AMA governance and finance

The establishment of private practice physicians' section was approved.

Medical practice

Merit-based incentive payment system (MIPS)

That our American Medical Association (AMA) support legislation that ensures Medicare physician payment is sufficient to safeguard beneficiary access to care, replaces or supplements budget neutrality in MIPS with incentive payments, or implements positive annual physician payment updates. (Directive to Take Action).

Establishing professional services claims-based payment enhancement for activities associated with the COVID-19 pandemic

American Medical Association work with other interested parties to advocate for regulatory action on the part of the Centers for Medicare & Medicaid Services to implement a professional services claims-based payment enhancement to help recognize the enhanced, nonseparately reimbursable work performed by physicians during the COVID-19 Public Health Emergency. (Directive to Take Action).

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 Jennifer Nemkovich at jnemkovich@chestnet.org for details.

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. He is also the CHEST Delegate to the AMA House of Delegates.

BREZTRI is indicated for the maintenance treatment of patients with chronic obstructive pulmonary disease (COPD).

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In Study 1 (52 weeks), BREZTRI significantly reduced the annual rate of moderate or severe exacerbations by 24% vs LAMA/LABA (rate ratio=0.76; 95% CI: 0.69, 0.83; *P*<0.0001) and 13% vs ICS/LABA (rate ratio=0.87; 95% CI: 0.79, 0.95; *P*=0.0027).[1]*
Annual rate estimate: BREZTRI 1.08 (n=2137); LAMA/LABA 1.42 (n=2120); ICS/LABA 1.24 (n=2131).[1]

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IMPORTANT SAFETY INFORMATION

- BREZTRI is contraindicated in patients who have a hypersensitivity to budesonide, glycopyrrolate, formoterol fumarate, or product excipients
- BREZTRI is not indicated for treatment of asthma. Long-acting $beta_2$-adrenergic agonist (LABA) monotherapy for asthma is associated with an increased risk of asthma-related death. These findings are considered a class effect of LABA monotherapy. When a LABA is used in fixed-dose combination with ICS, data from large clinical trials do not show a significant increase in the risk of serious asthma-related events (hospitalizations, intubations, death) compared with ICS alone. Available data do not suggest an increased risk of death with use of LABA in patients with COPD
- BREZTRI should not be initiated in patients with acutely deteriorating COPD, which may be a life-threatening condition
- BREZTRI is NOT a rescue inhaler. Do NOT use to relieve acute symptoms; treat with an inhaled short-acting $beta_2$-agonist
- BREZTRI should not be used more often than recommended; at higher doses than recommended; or in combination with LABA-containing medicines, due to risk of overdose. Clinically significant cardiovascular effects and fatalities have been reported in association with excessive use of inhaled sympathomimetic drugs
- Oropharyngeal candidiasis has occurred in patients treated with orally inhaled drug products containing budesonide. Advise patients to rinse their mouths with water without swallowing after inhalation
- Lower respiratory tract infections, including pneumonia, have been reported following ICS. Physicians should remain vigilant for the possible development of pneumonia in patients with COPD as the clinical features of pneumonia and exacerbations frequently overlap
- Due to possible immunosuppression, potential worsening of infections could occur. Use with caution. A more serious or fatal course of chickenpox or measles can occur in susceptible patients
- Particular care is needed for patients transferred from systemic corticosteroids to ICS because deaths due to adrenal insufficiency have occurred in patients during and after transfer. Taper patients slowly from systemic corticosteroids if transferring to BREZTRI
- Hypercorticism and adrenal suppression may occur with regular or very high dosage in susceptible individuals. If such changes occur, consider appropriate therapy
- Caution should be exercised when considering the coadministration of BREZTRI with long-term ketoconazole and other known strong CYP3A4 Inhibitors. Adverse effects related to increased systemic exposure to budesonide may occur
- If paradoxical bronchospasm occurs, discontinue BREZTRI immediately and institute alternative therapy
- Anaphylaxis and other hypersensitivity reactions (eg, angioedema, urticaria or rash) have been reported. Discontinue and consider alternative therapy
- Use caution in patients with cardiovascular disorders, especially coronary insufficiency, as formoterol fumarate can produce a clinically significant cardiovascular effect in some patients as measured by increases in pulse rate, systolic or diastolic blood pressure, and also cardiac arrhythmias, such as supraventricular tachycardia and extrasystoles

ICS=inhaled corticosteroids; LABA=long-acting $beta_2$-adrenergic agonist; LAMA=long-acting muscarinic antagonist.
*Moderate exacerbations were defined as those leading to treatment with systemic corticosteroids and/or antibiotics, and severe exacerbations were defined as those resulting in hospitalization or death.

Study 1 was a 52-week, Phase 3, randomized, double-blind, parallel-group, multicenter study of 8588 patients with moderate to very severe COPD that compared BREZTRI MDI 320/18/9.6 (n=2157) with budesonide/glycopyrrolate/formoterol fumarate MDI 160/18/9.6 (n=2137), glycopyrrolate/formoterol fumarate MDI 18/9.6 (n=2143), and budesonide/formoterol fumarate MDI 320/9.6 (n=2151), each administered as 2 inhalations twice daily. Patients were current or former smokers with a smoking history of ≥10 pack-years, aged 40-80 years, with symptomatic COPD despite receiving 2 or more inhaled maintenance therapies, and a history of ≥1 moderate or severe exacerbation(s) in the previous year. The primary endpoint was the estimated annual rate of moderate or severe COPD exacerbations.[1]

BREZTRI is administered as 2 inhalations twice daily.

Reference: 1. BREZTRI AEROSPHERE [package insert]. Wilmington, DE: AstraZeneca Pharmaceuticals LP; 2020.

BREZTRI is not indicated for the relief of acute bronchospasm or for the treatment of asthma.

- Decreases in bone mineral density have been observed with long-term administration of ICS. Assess initially and periodically thereafter in patients at high risk for decreased bone mineral content
- Glaucoma and cataracts may occur with long-term use of ICS. Worsening of narrow-angle glaucoma may occur, so use with caution. Consider referral to an ophthalmologist in patients who develop ocular symptoms or use BREZTRI long term. Instruct patients to contact a healthcare provider immediately if symptoms occur
- Worsening of urinary retention may occur. Use with caution in patients with prostatic hyperplasia or bladder-neck obstruction. Instruct patients to contact a healthcare provider immediately if symptoms occur
- Use caution in patients with convulsive disorders, thyrotoxicosis, diabetes mellitus, and ketoacidosis or unusually responsive to sympathomimetic amines
- Be alert to hypokalemia or hyperglycemia
- Most common adverse reactions in a 52-week trial (incidence ≥ 2%) were upper respiratory tract infection (5.7%), pneumonia (4.6%), back pain (3.1%), oral candidiasis (3.0%), influenza (2.9%), muscle spasms (2.8%), urinary tract infection (2.7%), cough (2.7%), sinusitis (2.6%), and diarrhea (2.1%). In a 24-week trial, adverse reactions (incidence ≥ 2%) were dysphonia (3.3%) and muscle spasms (3.3%)
- BREZTRI should be administered with extreme caution to patients being treated with monoamine oxidase inhibitors and tricyclic antidepressants, as these may potentiate the effect of formoterol fumarate on the cardiovascular system
- BREZTRI should be administered with caution to patients being treated with:
  - Strong cytochrome P450 3A4 inhibitors (may cause systemic corticosteroid effects)
  - Adrenergic drugs (may potentiate effects of formoterol fumarate)
  - Xanthine derivatives, steroids, or non-potassium sparing diuretics (may potentiate hypokalemia and/or ECG changes)
  - Beta-blockers (may block bronchodilatory effects of beta-agonists and produce severe bronchospasm)
  - Anticholinergic-containing drugs (may interact additively). Avoid use with BREZTRI
- Use BREZTRI with caution in patients with hepatic impairment, as budesonide and formoterol fumarate systemic exposure may increase. Patients with severe hepatic disease should be closely monitored

Please see Brief Summary of Prescribing Information on adjacent pages.

*You are encouraged to report negative side effects of prescription drugs to the FDA. Visit **www.FDA.gov/medwatch** or call 1-800-FDA-1088.*

BREZTRI AEROSPHERE™
(budesonide 160 mcg, glycopyrrolate 9 mcg and formoterol fumarate 4.8 mcg) Inhalation Aerosol

AstraZeneca

BREZTRI AEROSPHERE™

(budesonide, glycopyrrolate, and formoterol fumarate) inhalation aerosol, for oral inhalation use

BRIEF SUMMARY of PRESCRIBING INFORMATION.

For full Prescribing Information, see package insert.

INDICATIONS AND USAGE

BREZTRI AEROSPHERE is indicated for the maintenance treatment of patients with chronic obstructive pulmonary disease (COPD).

Limitations of Use:

BREZTRI AEROSPHERE is not indicated for the relief of acute bronchospasm or for the treatment of asthma *[see Warnings and Precautions (5.1, 5.2) in the full Prescribing Information]*.

CONTRAINDICATIONS

BREZTRI AEROSPHERE is contraindicated in patients who have demonstrated hypersensitivity to budesonide, glycopyrrolate, formoterol, or any of the excipients *[see Warnings and Precautions (5.11) and Description (11) in the full Prescribing Information]*.

WARNINGS AND PRECAUTIONS

Serious Asthma-Related Events – Hospitalizations, Intubations, Death

The safety and efficacy of BREZTRI AEROSPHERE in patients with asthma have not been established. BREZTRI AEROSPHERE is not indicated for the treatment of asthma.

Use of long-acting $beta_2$-adrenergic agonists (LABA) as monotherapy [without inhaled corticosteroid (ICS)] for asthma is associated with an increased risk of asthma-related death. Available data from controlled clinical trials also suggest that use of LABA as monotherapy increases the risk of asthma-related hospitalization in pediatric and adolescent patients. These findings are considered a class effect of LABA monotherapy. When a LABA is used in fixed-dose combination with ICS, data from large clinical trials do not show a significant increase in the risk of serious asthma-related events (hospitalizations, intubations, death) compared with ICS alone.

Available data do not suggest an increased risk of death with use of LABA in patients with COPD.

Deterioration of Disease and Acute Episodes

BREZTRI AEROSPHERE should not be initiated in patients with acutely deteriorating COPD, which may be a life-threatening condition. BREZTRI AEROSPHERE has not been studied in patients with acutely deteriorating COPD. The use of BREZTRI AEROSPHERE in this setting is not appropriate.

BREZTRI AEROSPHERE should not be used for the relief of acute symptoms, i.e., as rescue therapy for the treatment of acute episodes of bronchospasm. BREZTRI AEROSPHERE has not been studied in the relief of acute symptoms and extra doses should not be used for that purpose. Acute symptoms should be treated with an inhaled short-acting $beta_2$-agonist.

When beginning treatment with BREZTRI AEROSPHERE, patients who have been taking inhaled, short-acting $beta_2$-agonists on a regular basis (e.g., four times a day) should be instructed to discontinue the regular use of these drugs and use them only for symptomatic relief of acute respiratory symptoms. When prescribing BREZTRI AEROSPHERE, the healthcare provider should also prescribe an inhaled, short-acting $beta_2$-agonist and instruct the patient on how it should be used. Increasing inhaled $beta_2$-agonist use is a signal of deteriorating disease for which prompt medical attention is indicated.

COPD may deteriorate acutely over a period of hours or chronically over several days or longer. If BREZTRI AEROSPHERE no longer controls symptoms, or the patient's inhaled, short-acting $beta_2$-agonist becomes less effective or the patient needs more inhalations of short-acting $beta_2$-agonist than usual, these may be markers of deterioration of disease. In this setting, re-evaluate the patient and the COPD treatment regimen at once. The daily dosage of BREZTRI AEROSPHERE should not be increased beyond the recommended dose.

Avoid Excessive Use of BREZTRI AEROSPHERE and Avoid Use with other Long-Acting $Beta_2$-Agonists

As with other inhaled drugs containing $beta_2$-adrenergic agents, BREZTRI AEROSPHERE should not be used more often than recommended, at higher doses than recommended, or in conjunction with other medications containing LABA, as an overdose may result. Clinically significant cardiovascular effects and fatalities have been reported in association with excessive use of inhaled sympathomimetic drugs.

Patients using BREZTRI AEROSPHERE should not use another medicine containing a LABA (e.g., salmeterol, formoterol fumarate, arformoterol tartrate, indacaterol) for any reason *[see Drug Interactions (7.1) in the full Prescribing Information]*.

Oropharyngeal Candidiasis

BREZTRI AEROSPHERE contains budesonide, an ICS. Localized infections of the mouth and pharynx with *Candida albicans* have occurred in subjects treated with orally inhaled drug products containing budesonide. When such an infection develops, it should be treated with appropriate local or systemic (i.e., oral) antifungal therapy while treatment with BREZTRI AEROSPHERE continues. In some cases, therapy with BREZTRI AEROSPHERE may need to be interrupted. Advise the patient to rinse his/her mouth with water without swallowing following administration of BREZTRI AEROSPHERE to help reduce the risk of oropharyngeal candidiasis.

Pneumonia

Lower respiratory tract infections, including pneumonia, have been reported following the inhaled administration of corticosteroids. Physicians should remain vigilant for the possible development of pneumonia in patients with COPD as the clinical features of pneumonia and exacerbations frequently overlap.

In a 52-week trial of subjects with COPD (n = 8,529), the incidence of confirmed pneumonia was 4.2% for BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg (n = 2144), 3.5% for budesonide, glycopyrrolate and formoterol fumarate [BGF MDI 160 mcg/18 mcg/9.6 mcg] (n = 2124), 2.3% for GFF MDI 18 mcg/9.6 mcg (n = 2125) and 4.5% for BFF MDI 320 mcg/9.6 mcg (n = 2136).

Fatal cases of pneumonia occurred in 2 subjects receiving BGF MDI 160 mcg/18 mcg/9.6 mcg, 3 subjects receiving GFF MDI 18 mcg/9.6 mcg, and no subjects receiving BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg.

In a 24-week trial of subjects with COPD (n = 1,896), the incidence of confirmed pneumonia was 1.9% for BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg (n = 639), 1.6% for glycopyrrolate and formoterol fumarate [GFF MDI 18 mcg/9.6 mcg] (n = 625) and 1.9% for budesonide and formoterol fumarate [BFF MDI 320 mcg/9.6 mcg] (n = 320). There were no fatal cases of pneumonia in the study.

Immunosuppression and Risk of Infections

Patients who are using drugs that suppress the immune system are more susceptible to infection than healthy individuals. Chicken pox and measles, for example, can have a more serious or even fatal course in susceptible children or adults using corticosteroids. In such children or adults who have not had these diseases or been properly immunized, particular care should be taken to avoid exposure. How the dose, route, and duration of corticosteroid administration affects the risk of developing a disseminated infection is not known. The contribution of the underlying disease and/or prior corticosteroid treatment to the risk is also not known. If a patient is exposed to chickenpox, prophylaxis with varicella zoster immune globulin (VZIG) may be indicated. If exposed to measles, prophylaxis with pooled intramuscular immunoglobulin (IG) may be indicated (see the respective package inserts for complete VZIG and IG prescribing information). If chicken pox develops, treatment with antiviral agents may be considered.

ICS should be used with caution, if at all, in patients with active or quiescent tuberculosis infections of the respiratory tract; untreated systemic fungal, bacterial, viral, or parasitic infections; or ocular herpes simplex.

Transferring Patients from Systemic Corticosteroid Therapy

HPA Suppression/Adrenal Insufficiency

Particular care is needed for patients who have been transferred from systemically active corticosteroids to ICS because deaths due to adrenal insufficiency have occurred in patients during and after transfer from systemic corticosteroids to less systemically available ICS. After withdrawal from systemic corticosteroids, a number of months are required for recovery of hypothalamic-pituitary-adrenal (HPA) function.

Patients who have been previously maintained on 20 mg or more per day of prednisone (or its equivalent) may be most susceptible, particularly when their systemic corticosteroids have been almost completely withdrawn. During this period of HPA suppression, patients may exhibit signs and symptoms of adrenal insufficiency when exposed to trauma, surgery, or infection (particularly gastroenteritis) or other conditions associated with severe electrolyte loss. Although BREZTRI AEROSPHERE may provide control of COPD symptoms during these episodes, in recommended doses it supplies less than normal physiological amounts of glucocorticoid systemically and does not provide the mineralocorticoid activity that is necessary for coping with these emergencies.

During periods of stress, or a severe COPD exacerbation, patients who have been withdrawn from systemic corticosteroids should be instructed to resume oral corticosteroids (in large doses) immediately and to contact their healthcare practitioner for further instruction. These patients should also be instructed to carry a warning card indicating that they may need supplementary systemic corticosteroids during periods of stress, or a severe COPD exacerbation.

Patients requiring oral corticosteroids should be weaned slowly from systemic corticosteroid use after transferring to BREZTRI AEROSPHERE. Prednisone reduction can be accomplished by reducing the daily prednisone dose by 2.5 mg on a weekly basis during therapy with BREZTRI AEROSPHERE. Lung function (forced expiratory volume in 1 second [FEV_1] or morning peak expiratory flow [PEF]), beta-agonist use, and COPD symptoms should be carefully monitored during withdrawal of oral corticosteroids. In addition, patients should be observed for signs and symptoms of adrenal insufficiency, such as fatigue, lassitude, weakness, nausea and vomiting, and hypotension.

Unmasking of Allergic Conditions Previously Suppressed by Systemic Corticosteroids

Transfer of patients from systemic corticosteroid therapy to BREZTRI AEROSPHERE may unmask allergic conditions previously suppressed by the systemic corticosteroid therapy (e.g., rhinitis, conjunctivitis, eczema, arthritis, eosinophilic conditions).

Corticosteroid Withdrawal Symptoms

During withdrawal from oral corticosteroids, some patients may experience symptoms of systemically active corticosteroid withdrawal (e.g., joint and/or muscular pain, lassitude, depression) despite maintenance or even improvement of respiratory function.

Hypercorticism and Adrenal Suppression

Inhaled budesonide is absorbed into the circulation and can be systemically active. Effects of budesonide on the HPA axis are not observed with the therapeutic doses of budesonide in BREZTRI AEROSPHERE. However, exceeding the recommended dosage or coadministration with a strong cytochrome P450 3A4 (CYP3A4) inhibitor may result in HPA dysfunction *[see Warnings and Precautions (5.9) and Drug Interactions (7.1) in the full Prescribing Information]*.

Because of the possibility of significant systemic absorption of ICS, patients treated with BREZTRI AEROSPHERE should be observed carefully for any evidence of systemic corticosteroid effects. Particular care should be taken in observing patients postoperatively or during periods of stress for evidence of inadequate adrenal response.

It is possible that systemic corticosteroid effects, such as hypercorticism and adrenal suppression (including adrenal crisis) may appear in a small number of patients who are sensitive to these effects. If such effects occur, appropriate therapy should be initiated as needed.

Drug Interactions with Strong Cytochrome P450 3A4 Inhibitors

Caution should be exercised when considering the coadministration of BREZTRI AEROSPHERE with long-term ketoconazole, and other known strong CYP3A4 inhibitors (e.g., ritonavir, atazanavir, clarithromycin, indinavir, itraconazole, nefazodone, nelfinavir, saquinavir, telithromycin) because adverse effects related to increased systemic exposure to budesonide may occur *[see Drug Interactions (7.1) and Clinical Pharmacology (12.3) in the full Prescribing Information]*.

Paradoxical Bronchospasm

As with other inhaled therapies, BREZTRI AEROSPHERE can produce paradoxical bronchospasm, which may be life-threatening. If paradoxical bronchospasm occurs following dosing with BREZTRI AEROSPHERE, it should be treated immediately with an inhaled, short-acting bronchodilator; BREZTRI AEROSPHERE should be discontinued immediately and alternative therapy should be instituted.

Hypersensitivity Reactions including Anaphylaxis

Immediate hypersensitivity reactions have been reported after administration of budesonide, glycopyrrolate or formoterol fumarate, the components of BREZTRI AEROSPHERE. If signs suggesting allergic reactions occur, in particular, angioedema (including difficulties in breathing or swallowing, swelling of tongue, lips, and face), urticaria, or skin rash, BREZTRI AEROSPHERE should be stopped at once and alternative treatment should be considered *[see Contraindications (4) in the full Prescribing Information]*.

Cardiovascular Effects

Formoterol fumarate, like other $beta_2$-agonists, can produce a clinically significant cardiovascular effect in some patients as measured by increases in pulse rate, systolic or diastolic blood pressure, and also cardiac arrhythmias, such as supraventricular tachycardia and extrasystoles *[see Clinical Pharmacology (12.2) in the full Prescribing Information]*.

If such effects occur, BREZTRI AEROSPHERE may need to be discontinued. In addition, beta-agonists have been reported to produce electrocardiographic changes, such as flattening of the T wave, prolongation of the QTc interval, and ST segment depression, although the clinical significance of these findings is unknown. Therefore, BREZTRI AEROSPHERE should be used with caution in patients with cardiovascular disorders, especially coronary insufficiency, cardiac arrhythmias, and hypertension.

Reduction in Bone Mineral Density

Decreases in bone mineral density (BMD) have been observed with long-term administration of products containing ICS. The clinical significance of small changes in BMD with regard to long-term consequences such as fracture is unknown. Patients with major risk factors for decreased bone mineral content, such as prolonged immobilization, family history of osteoporosis, postmenopausal status, tobacco use, advanced age, poor nutrition, or chronic use of drugs that can reduce bone mass (e.g., anticonvulsants, oral corticosteroids) should be monitored and treated with established standards of care. Since patients with COPD often have multiple risk factors for reduced BMD, assessment of BMD is recommended prior to initiating BREZTRI AEROSPHERE and periodically thereafter. If significant reductions in BMD are seen and BREZTRI AEROSPHERE is still considered medically important for that patient's COPD therapy, use of therapy to treat or prevent osteoporosis should be strongly considered.

In a subset of COPD patients in a 24-week trial with a 28-week safety extension that evaluated BREZTRI AEROSPHERE 320/18/9.6 mcg and GFF MDI 18/9.6 mcg, the effects on BMD endpoints were evaluated. BMD evaluations were performed at baseline and 52-weeks using dual energy x-ray absorptiometry (DEXA) scans. Mean percent changes in BMD from baseline was -0.1% for BREZTRI AEROSPHERE 320/18/9.6 mcg and 0.4% for GFF MDI 18/9.6 mcg *[see Clinical Studies (14) in the full Prescribing Information]*.

Glaucoma and Cataracts, Worsening of Narrow-Angle Glaucoma

Glaucoma, increased intraocular pressure, and cataracts have been reported in patients with COPD following the long-term administration of ICS or with use of inhaled anticholinergics. BREZTRI AEROSPHERE should be used with caution in patients with narrow-angle glaucoma. Prescribers and patients should be alert for signs and symptoms of acute narrow-angle glaucoma (e.g., eye pain or discomfort, blurred vision, visual halos or colored images in association with red eyes from conjunctival congestion and corneal edema). Instruct patients to consult a physician immediately should any of these signs or symptoms develop. Consider referral to an ophthalmologist in patients who develop ocular symptoms or use BREZTRI AEROSPHERE long term.

In a 52-week trial that evaluated BREZTRI AEROSPHERE 320/18/9.6 mcg, GFF MDI 18/9.6 mcg, and BFF MDI 320/9.6 mcg in subjects with COPD, the incidence of cataracts ranged from 0.7% to 1.0% across groups.

Worsening of Urinary Retention

BREZTRI AEROSPHERE, like all therapies containing an anticholinergic, should be used with caution in patients with urinary retention. Prescribers and patients should be alert for signs and symptoms of prostatic hyperplasia or bladder-neck obstruction (e.g., difficulty passing urine, painful urination), especially in patients with prostatic hyperplasia or bladder neck obstruction. Instruct patients to consult a physician immediately should any of these signs or symptoms develop.

Coexisting Conditions

BREZTRI AEROSPHERE, like all therapies containing sympathomimetic amines, should be used with caution in patients with convulsive disorders or thyrotoxicosis and in those who are unusually responsive to sympathomimetic amines. Doses of the related beta$_2$-adrenoceptor agonist albuterol, when administered intravenously, have been reported to aggravate preexisting diabetes mellitus and ketoacidosis.

Hypokalemia and Hyperglycemia

Beta-adrenergic agonists may produce significant hypokalemia in some patients, possibly through intracellular shunting, which has the potential to produce adverse cardiovascular effects. The decrease in serum potassium is usually transient, not requiring supplementation. Beta$_2$-agonist therapies may produce transient hyperglycemia in some patients.

ADVERSE REACTIONS

The following adverse reactions are discussed in greater detail in other sections of the labeling.

- Serious asthma-related events – hospitalizations, intubations, death *[see Warnings and Precautions (5.1) in the full Prescribing Information]*
- *Candida albicans* infection *[see Warnings and Precautions (5.4) in the full Prescribing Information]*
- Increased risk of pneumonia in COPD *[see Warnings and Precautions (5.5) in the full Prescribing Information]*
- Immunosuppression and risk of infections *[see Warnings and Precautions (5.6) in the full Prescribing Information]*
- Hypercorticism and adrenal suppression *[see Warnings and Precautions (5.8) in the full Prescribing Information]*
- Paradoxical bronchospasm *[see Warnings and Precautions (5.10) in the full Prescribing Information]*
- Hypersensitivity reactions including anaphylaxis *[see Contraindications (4) and Warnings and Precautions (5.11) in the full Prescribing Information]*
- Cardiovascular effects *[see Warnings and Precautions (5.12) in the full Prescribing Information]*
- Reduction in bone mineral density *[see Warnings and Precautions (5.13) in the full Prescribing Information]*
- Worsening of narrow-angle glaucoma and cataracts *[see Warnings and Precautions (5.14) in the full Prescribing Information]*
- Worsening of urinary retention *[see Warnings and Precautions (5.15) in the full Prescribing Information]*

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 with rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The safety of BREZTRI AEROSPHERE is based on the safety data from one 52-week exacerbation trial (Trial 1) and one 24-week lung function trial with a 28-week safety extension study, resulting in up to 52 weeks of treatment (Trial 2). In Trials 1 and 2, a total of 2783 subjects have received at least 1 dose of BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg *[see Clinical Studies (14) in the full Prescribing Information]*.

In Trials 1 and 2, subjects received one of the following treatments: BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg, glycopyrrolate and formoterol fumarate [GFF MDI 18 mcg/9.6 mcg], or budesonide and formoterol fumarate [BFF MDI 320 mcg/9.6 mcg]. Each treatment was administered twice daily.

In Trial 1, a 52-week, randomized, double-blind clinical trial, a total of 2144 subjects with COPD received at least 1 dose of BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg (mean age: 64.7 years, 84.9% Caucasian, 59.7% male across all treatments) *[see Clinical Studies (14) in the full Prescribing Information]*.

In Trial 2, a 24-week, randomized, double-blind clinical trial, with a 28-week long-term safety extension resulting in up to 52 weeks of treatment, a total of 639 subjects received at least 1 dose of BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg (mean age: 65.2 years, 50.1% Caucasian, 71.2% male across all treatments) *[see Clinical Studies (14) in the full Prescribing Information]*.

The incidence of adverse reactions from the 52-week trial (Trial 1) is presented in Table 1 for subjects treated with BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg, GFF MDI 18 mcg/9.6 mcg, or BFF MDI 320 mcg/9.6 mcg.

Table 1: Adverse reactions occurring at an incidence of ≥ 2% of subjects and more common in BREZTRI AEROSPHERE compared to GFF MDI and BFF MDI (Trial 1)

Adverse Reaction	BREZTRI AEROSPHERE[1] 320 mcg/18 mcg/9.6 mcg N=2144 (%)	GFF MDI[1] 18 mcg/9.6 mcg N=2125 (%)	BFF MDI[1] 320 mcg/9.6 mcg N=2136 (%)
Upper Respiratory Tract Infection	123 (5.7)	102 (4.8)	115 (5.4)
Pneumonia	98 (4.6)	61 (2.9)	107 (5.0)
Back pain	67 (3.1)	55 (2.6)	64 (3.0)
Oral candidiasis	65 (3.0)	24 (1.1)	57 (2.7)
Influenza	63 (2.9)	42 (2.0)	61 (2.9)
Muscle spasms	60 (2.8)	19 (0.9)	53 (2.5)
Urinary tract infection	58 (2.7)	60 (2.8)	41 (1.9)
Cough	58 (2.7)	50 (2.4)	51 (2.4)
Sinusitis	56 (2.6)	47 (2.2)	55 (2.6)
Diarrhea	44 (2.1)	37 (1.7)	38 (1.8)

[1] BREZTRI AEROSPHERE = budesonide/glycopyrrolate/formoterol fumarate 320 mcg/18 mcg/9.6 mcg; GFF MDI = glycopyrrolate/formoterol fumarate 18 mcg/9.6 mcg; BFF MDI = budesonide/formoterol fumarate 320 mcg/9.6 mcg; all treatments were administered twice daily.

In 24-week data from Trial 2, adverse reactions that occurred in subjects treated with BREZTRI AEROSPHERE 320 mcg/18 mcg/9.6 mcg (n=639) at an incidence of ≥ 2% included dysphonia (3.3%) and muscle spasms (3.3%).

Additional Adverse Reactions

Other adverse reactions that have been associated with one or more of the individual components of BREZTRI AEROSPHERE include: hyperglycemia, anxiety, insomnia, headache, palpitations, nausea, hypersensitivity, depression, agitation, restlessness, nervousness, tremor, dizziness, angina pectoris, tachycardia, cardiac arrhythmias (e.g., atrial fibrillation, supraventricular tachycardia, and extrasystoles), throat irritation, bronchospasm, dry mouth, bruising, urinary retention, chest pain, sign or symptoms of systemic glucocorticoid steroid effects (e.g., hypofunctional adrenal gland), and abnormal behavior.

DRUG INTERACTIONS

No formal drug interaction studies have been performed with BREZTRI AEROSPHERE.

Inhibitors of Cytochrome P450 3A4

The main route of metabolism of corticosteroids, including budesonide, a component of BREZTRI AEROSPHERE, is via cytochrome P450 isoenzyme 3A4 (CYP3A4). After oral administration of ketoconazole, a strong inhibitor of CYP3A4, the mean plasma concentration of orally administered budesonide increased. Concomitant administration of a CYP3A4 inhibitor may inhibit the metabolism of, and increase the systemic exposure to, budesonide. Caution should be exercised when considering the coadministration of BREZTRI AEROSPHERE with long-term ketoconazole and other known strong CYP3A4 inhibitors (e.g., ritonavir, atazanavir, clarithromycin, indinavir, itraconazole, nefazodone, nelfinavir, saquinavir, telithromycin) *[see Warnings and Precautions (5.9) in the full Prescribing Information]*.

Adrenergic Drugs

If additional adrenergic drugs are to be administered by any route, they should be used with caution because the sympathetic effects of formoterol, a component of BREZTRI AEROSPHERE, may be potentiated *[see Warnings and Precautions (5.3) in the full Prescribing Information]*.

Xanthine Derivatives, Steroids, or Diuretics

Concomitant treatment with xanthine derivatives, steroids, or diuretics may potentiate the hypokalemic effect of beta$_2$-adrenergic agonists such as formoterol, a component of BREZTRI AEROSPHERE.

Non-Potassium Sparing Diuretics

The hypokalemia and/or ECG changes that may result from the administration of non-potassium sparing diuretics (such as loop or thiazide diuretics) can be acutely worsened by beta$_2$-agonists, especially when the recommended dose of the beta$_2$-agonist is exceeded.

Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, QTc Prolonging Drugs

BREZTRI AEROSPHERE, as with other beta$_2$-agonists, should be administered with extreme caution to patients being treated with monoamine oxidase inhibitors or tricyclic antidepressants or other drugs known to prolong the QTc interval because the action of adrenergic agonists on the cardiovascular system may be potentiated by these agents. Drugs that are known to prolong the QTc interval may be associated with an increased risk of ventricular arrhythmias.

Beta-adrenergic Receptor Blocking Agents

Beta-adrenergic receptor antagonists (beta-blockers) and BREZTRI AEROSPHERE may interfere with the effect of each other when administered concurrently. Beta-blockers not only block the therapeutic effects of beta$_2$-agonists, but may produce severe bronchospasm in COPD patients. Therefore, patients with COPD should not normally be treated with beta-blockers. However, under certain circumstances, e.g., as prophylaxis after myocardial infarction, there may be no acceptable alternatives to the use of beta-blockers in patients with COPD. In this setting, cardioselective beta-blockers could be considered, although they should be administered with caution.

Anticholinergics

There is a potential for an additive interaction with concomitantly used anticholinergic medications. Therefore, avoid coadministration of BREZTRI AEROSPHERE with other anticholinergic-containing drugs as this may lead to an increase in anticholinergic adverse effects *[see Warnings and Precautions (5.9, 5.10) and Adverse Reactions (6) in the full Prescribing Information]*.

OVERDOSAGE

No cases of overdose have been reported with BREZTRI AEROSPHERE. BREZTRI AEROSPHERE contains budesonide, glycopyrrolate, and formoterol fumarate; therefore, the risks associated with overdosage for the individual components described below apply to BREZTRI AEROSPHERE. Treatment of overdosage consists of discontinuation of BREZTRI AEROSPHERE together with institution of appropriate symptomatic and/or supportive therapy. The judicious use of a cardioselective beta-receptor blocker may be considered, bearing in mind that such medication can produce bronchospasm. Cardiac monitoring is recommended in case of overdosage.

Budesonide

If used at excessive doses for prolonged periods, systemic corticosteroid effects, such as hypercorticism may occur *[see Warnings and Precautions (5.8) in the full Prescribing Information]*.

Glycopyrrolate

High doses of glycopyrrolate, a component of BREZTRI AEROSPHERE, may lead to anticholinergic signs and symptoms such as nausea, vomiting, dizziness, lightheadedness, blurred vision, increased intraocular pressure (causing pain, vision disturbances or reddening of the eye), obstipation, or difficulties in voiding.

Formoterol Fumarate

An overdose of formoterol fumarate would likely lead to an exaggeration of effects that are typical for beta$_2$-agonists: seizures, angina, hypertension, hypotension, tachycardia, atrial and ventricular tachyarrhythmias, nervousness, headache, tremor, palpitations, muscle cramps, nausea, dizziness, sleep disturbances, metabolic acidosis, hyperglycemia, hypokalemia. As with all sympathomimetic medications, cardiac arrest, and even death may be associated with overdosage of formoterol fumarate.

Manufactured for: AstraZeneca Pharmaceuticals LP, Wilmington, DE 19850

Manufactured by: AstraZeneca Dunkerque Production (AZDP), Dunkerque, France

Issued: 07/20 US-42033 7/20

How the Foundation's virtual listening tour aims to help patients like James

Constance Baker was juggling the dual stresses of mothering a newborn and raising a teenager when she noticed a skin patch on her father looked discolored. His breathing soon became labored, and the skin on his hands turned calloused. Then he passed out. Initially, doctors thought his problems were cardiovascular.

Since James didn't have a primary doctor, Constance repeatedly took him to the emergency room to receive care. His frequent visits attracted the attention of a medical intern who ordered tests and asked James to see a specialist. More than half a year later, Constance and James met pulmonologist Dr. Demondes Haynes and learned the cause of James' troubled breathing. James has a rare disease called scleroderma, which hardens patches of skin and created scarring of his lung tissue. He also had pulmonary hypertension. James needed rapid intervention with a complicated regimen of medication.

Dr. Haynes

At first, James didn't want to go along with the program, but Dr. Haynes' attentive and gentle nature changed his mind. "Dr. Haynes always made us comfortable, taking the time to listen, and show us his concern. He even explained that we wouldn't have to worry about paying for anything, which was a huge relief."

Before Dr. Haynes, James and Constance had never met a doctor who didn't treat them like a case file. "He actually acknowledged our circumstances, which meant he acknowledged us."

"Dr. Haynes always made us comfortable, taking the time to listen, and show us his concern. He even explained that we wouldn't have to worry about paying for anything, which was a huge relief."

As a native Mississippian, Dr. Haynes knows the plight of many of his patients. "Not everyone with lung disease can access a pulmonologist, like me, and not everyone can afford appropriate treatment. You have to recognize these disparities in order to build a relationship of trust with your patients."

James was ready to start treatment with Dr. Haynes' guidance, but since he couldn't read, he couldn't understand how to put the medication together. That's when Constance had to step up. They worked together to change and clean the tubing to the port by his heart and make his medication. "We leaned on each other a lot during that time, and you know what? We made it through."

Even though James' disease can be debilitating at times, and his care can seem completely overwhelming, Constance wouldn't have it any other way. "It's always been my father and I, just us two. He's always taken care of me, and now it's my turn to take care of him."

Unfortunately, Constance and James' story is not unique. So many patients don't have access to doctors, specialists, and caregivers, and many aren't empowered enough to take their medications. These stories don't get posted on Instagram and they don't make the evening news. Underprivileged and underserved patients have been left behind – left without a voice.

That's why the foundation launched its virtual listening tours across America in September. Our tours give patients, caregivers, and physicians the opportunity to raise issues that they believe are impacting health care in their communities.

How can physicians work to understand their patients better? How can patients learn to trust their providers? These are all the questions we aim to answer.

James is doing as well as he is because of his relationship with Dr. Haynes. What can we do with that information? We can listen, we can learn, and we can spread the word.

Read more about the work of the CHEST Foundation in its 2020 Impact Report at chestfoundation.org.

This month in the journal *CHEST*®: Editor's picks

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

Original Research

A behaviour change intervention aimed at increasing physical activity improves clinical control in adults with asthma: a randomised controlled trial.
By Dr. C. Carvalho, et al.

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By Dr. D. Janz, et al.

Mortality trends of idiopathic pulmonary fibrosis in the United States from 2004 to 2017.
By Dr. N. Jeganathan, et al.

United States Pulmonary Hypertension Scientific Registry (USPHSR): Baseline characteristics.
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Pulmonary exacerbations in adults with cystic fibrosis: A grown-up issue in a changing CF landscape.
By Dr. G. Stanford, et al.

Computed tomography imaging and comorbidities in chronic obstructive pulmonary disease: Beyond lung cancer screening.
By Dr. J. Bon, et al.

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By Dr. B. Rivera-Lebron, et al.

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By Dr. E. Kiernan, et al.

SLEEP STRATEGIES

American Academy of Sleep Medicine (AASM) advocates for year-round standard time

BY KIN M. YUEN, MD, MS; AND M. ADEEL RISHI, MBBS, FCCP

Although the United States has observed daylight saving time (DST) continuously, in some form, for the last 5 decades (Table), the twice a year switches have never been less popular. In 2019, an American Academy of Sleep Medicine (AASM) survey of more than 2,000 US adults found that 63% support the elimination of seasonal time changes in favor of a national, fixed, year-round time, and only 11% oppose it. Indeed, multiple states have pending legislations to adopt year-round daylight saving time or year-round standard time (Updated September 30, 2020, Congressional Research Service. https://crsreports.congress.gov. R45208 Daylight Saving Time. Accessed Dec 14, 2020). Adjacent states, to limit confusion to interstate travel and commerce, tend to lobby for similar changes together. Most importantly, because of the scientific evidence of detrimental health effects to the public and safety concerns, the American Academy of Sleep Medicine has issued a position statement for year-round standard time (Rishi MA, et al. Daylight saving time: an American Academy of Sleep Medicine position statement. *J Clin Sleep Med*. 2020;16[10]:1781).

Adaptation of a year-round time schedule will need to balance the impact and disruption to the health and well-being of its citizens, as well as the interests of its commercial sector.

Railroad industry successfully lobbied the US government for consistent time in the United States to keep transportation schedules uniform in 1883; standard time was implemented. When war efforts were over, DST was dropped. Some regions, such as New York and Chicago, maintained DST, but no national standard was applied. Retailers and the recreational activity industry advocated for DST to increase business after work in the afternoon and evenings. In 1966, Congress passed the Uniform Time Act of 1966 to implement 6 months of DST and 6 months of standard time (Waxman OB. The real reason why daylight saving time is a thing. https://time.com/4549397/daylight-saving-time-history-politics/; November 1, 2017. Accessed Dec 14, 2020). Local jurisdictions can opt out of DST, but it requires an act of congress to enforce perennial DST.

When the OPEC embargo occurred, the Emergency Daylight Saving Time Energy Conservation Act was enacted in 1973, but it was quickly ended in October 1974 due to its unpopularity. The dairy industry was opposed to earlier rise time that disrupted the animals' feeding schedules and their farm operations (Feldman R. Five myths about daylight saving time. https://www.washingtonpost.com/opinions/five-myths-about-daylight-saving-time/2015/03/06/970092d4-c2c1-11e4-9271-610273846239_story.html. Accessed Dec 14, 2020.). Public safety was raised as a concern as early as 1975. The Department of Transportation found increased fatalities of school-aged children in the mornings from January to April of 1974 as compared with 1973. However, the National Bureau of Standards, that performed a review subsequently, stated that other factors might also be at play. Further extension of DST from 6 months of the year to the subsequent 7, and then 8 months per year was enacted in 1986 and 2005, respectively (The reasoning behind changing daylight saving. https://www.npr.org/templates/story/story.php?storyId=7779869. NPR. Accessed Nov 1, 2020).

An exemption of a state from DST is allowable under existing law, but to establish permanent DST will require an act of Congress. Since then, Arizona and Hawaii, as well as US territories, such as Puerto Rico, Guam, American Samoa and Northern Mariana Islands, and US Virgin Islands, have all opted out of DST by state exemption. Because of Hawaii's proximity to the equator, the timing of sunrise and sunset were fairly constant throughout the year that made DST unnecessary. The Navajo Nation in Arizona, because of its extension into adjacent New Mexico and Utah, participates in DST.

Most of the countries along the tropics, parts of Australia, China, Japan, South Korea, India, and majority of African countries do not observe DST. The European Union has voted to abolish twice yearly change in time in 2021; and individual member states will be able to decide whether they wish to remain on permanent standard time or DST. Since 2015, more than 45 states have proposed legislation to change their observance of DST.

The human biological rhythm is most consistent with standard time (Antle M. Circadian rhythm expert argues against permanent daylight saving time. https://www.ucalgary.ca/news/circadian-rhythm-expert-argues-against-permanent-daylight-saving-time. Accessed Dec 14, 2020.). Since the biological clock for most individuals is not exactly 24 hours long, zeitgebers such as sunlight, exercise, and feeding behaviors are important time cues to foster a regular rhythm. Acutely, the adjustment to 1 hour's sleep loss at the spring switch from standard time to DST generally requires several days to adapt (Kalidindi A. Daylight saving time is bad for your health. https://massivesci.com/articles/daylight-saving-savings-time-dst-november-standard-time. Accessed Dec 14, 2020). During this adjustment period, the internal bodily functions are disrupted. The sense of sleepiness and fatigue are increased with earlier morning awakenings, and the inability to fall asleep earlier leads to symptoms of insomnia and poor sleep quality.

Dr. Yuen

Dr. Rishi

The health and economic costs due to accidents, injuries, and medical errors are now well known. Individual biological rhythm disruptions at the spring switch from standard time to DST with the loss of sleep likely contributes to higher risks of myocardial infarctions (Janszky I, et al. Shifts to and from daylight saving time and incidence of myocardial infarction. *N Engl J Med*. 2008; 359[18]:1966) that are not mostly seen during the fall switch from DST to standard time. An estimated 40 minutes of sleep loss occurs within the Sunday to Monday transition of DST in the spring.

Medical errors, car crashes, suicide risks, and fatigue are all reportedly higher on the Monday after the spring switch. Some of these effects have been cited as remaining elevated through the first week and possibly chronically during the entire duration of DST. Some people have difficulty adapting to sleep loss from DST, creating social jetlag, and complaints of fatigue and increased prevalence of metabolic syndromes are more common in this population (Koopman ADM, et al. The association between social jetlag, the metabolic syndrome, and type 2 diabetes mellitus in the general population: The New Hoorn study. *J Biol Rhythms*. 2017; Aug:32[4]:359; Roenneberg T, et al. Social jetlag and obesity. *Curr Biol.* 2012; May 22; 22[10]:939).

"Cyber-loafing," describing those at work but who chose to peruse entertaining websites, reportedly occurred more during DST compared with the fall.

Delaying school start time has been associated with improved school attendance and performance. The American Academy of Pediatrics and AASM support delaying school start time; this measure has been adopted by California, and legislation is pending in other states (https://www.startschoollater.net/legislation.html . Accessed Dec 29, 2020). In spring, the loss of 1 hour's sleep would negate any benefit of beginning the school day later. Students would suffer

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inattention, decrease ability to focus, and be less effective learners. Obesity and metabolic syndromes that have been found in adults, are also observed in children whose biological rhythms are delayed compared with their peers who have morning lark tendencies. Risks of mood disorder may be elevated at onset of DST due to earlier arise time or standard time when less sunlight is available in the evenings.

During the current pandemic with SARS-CoV-2, there are new reports of teens and college students able to obtain more sleep because of online education (How children's sleep habits have changed in the pandemic. https://www.nytimes.com/2020/08/17/well/family/children-sleep-pandemic.html. Accessed Dec 14, 2020). and they had more restful sleep and improved mood. This positive trend will be monitored closely with some schools returning to in-person instruction.

Societal costs of decreased productivity, on the job accidents and injuries, and increased risk of motor vehicle crashes (Robb D, et al. Accident rates and the impact of daylight saving transitions. *Accid Anal Prev.* 2018; Feb; 111:193), in addition to individual well-being, have also been reported. Energy savings that propelled arguments for DST did not translate into significant savings after all. Although less electricity was used with more abundance of sunlight in the afternoon, people drove more and used more gasoline to attend their after work activities.

Although less electricity was used with more abundance of sunlight in the afternoon, people drove more and used more gasoline to attend their after work activities.

Adaptation of a year-round time schedule will need to balance the impact and disruption to the health and well-being of its citizens, as well as the interests of its commercial sector. The argument for maintaining year-round standard time states that to prevent the loss of the 1 hour's sleep that DST creates in the spring. Therefore, it preserves a more aligned biological rhythm, lowers the risks of preventable myocardial infarction, improves attention and focus, lessens daytime fatigue, and improves sense of well-being year round. Certainly, it will ensure that the teens who are likely to have later sleep schedules, will not lose more sleep and negate the benefit of starting school later.

Dr. Yuen is Assistant Professor, UCSF Department of Internal Medicine-Pulmonary Department, and Adjunct Clinical Assistant Professor at Department of Psychiatry & Behavioral Sciences at Stanford (Calif.) University. Dr. Rishi is Consultant – Pulmonary, Critical Care and Sleep Medicine, Mayo Clinic Health System, Eau Claire, WI; and Assistant Professor of Medicine, Alix School of Medicine, Mayo Clinic, Rochester, MN.

Timeline for DST

1784 Benjamin Franklin advocated to rise earlier so as to burn less candles in evenings.

1883 Railroads need standard time for operations.

1890 Merchants and retailers (clothing, cigars) advocated for longer shopping hours.

1916 Germany conserves energy.

1918 DST: fuel conservation during World War I.

1942 DST during World War II.

1963 "Chaos of clocks" needs uniform time for commerce.

1966 Uniform Time Act: DST 6 Januarys per year.

1973 Emergency DST Energy Conservation Act: Arab oil embargo to extend DST to 8 Januarys; ended prematurely in October 1974.

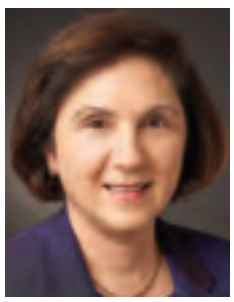
1986 Extended start date from last Sunday of April to first Sunday of November.

2005 Energy Act of 2005: first Sunday in March to first Sunday in November.

Meet the new members of the CHEST Physician® Editorial Board

We're happy to introduce these new board members whose primary responsibility is the active review each month of potential articles for publication that could have an impact on or be of interest to our health-care professional readership.

Carolyn M. D'Ambrosio, MD, FCCP
is the Program Director for the Harvard-Brigham and Women's Hospital Fellowship in Pulmonary and Critical Care Medicine and is Associate Professor of Medicine at Harvard Medical School. Most recently, she was awarded the Pillar Award for Educational Program Leadership, the top award for program directors throughout the Mass General Brigham institutions. In addition to teaching and clinical work, Dr. D'Ambrosio has conducted research on sleep and menopause, sleep and breathing in infants, and participated as the sleep medicine expert in two systemic reviews on home sleep apnea testing and fixed vs auto-titrating CPAP. She continues her work in Medical Ethics as a Senior Ethics Consultant at Brigham and Women's Hospital.


Dr. D'Ambrosio

Jonathan (Jona) Ludmir, MD, FCCP
After completing internal medicine/pediatrics, cardiology, and critical care training, Dr. Ludmir joined the Massachusetts General Hospital staff as a cardiac intensivist and noninvasive cardiologist. His clinical focus is in the heart center ICU, the echocardiography lab, as well as in outpatient cardiology. Additionally, he is the lead physician for the Family-Centered Care Initiative, where he focuses on incorporating evidence-based guidelines and leads in the science of family-centered cardiovascular care delivery. Dr. Ludmir's research focuses on identifying and addressing psychological symptoms in the ICU, optimizing ICU communication, and enhancing delivery of family-centered care.


Dr. Ludmir

Abbie Begnaud, MD, FCCP
Dr. Begnaud hails from south Louisiana and reveals that she attended her first CHEST Annual Meeting in 2011 in Hawaii, and she was "instantly hooked." Clinically, she practices general pulmonology, critical care, and interventional pulmonology and focuses her research on lung cancer screening and health disparities. She has been on faculty at the University of Minnesota since 2013 and is passionate about lung cancer, health equity, and mentoring.


Dr. Begnaud

Shyam Subramanian, MD, FCCP
Dr. Subramanian is currently the Section Chief for Specialty Clinics and the Division Chief for Pulmonary/Critical Care and Sleep Medicine at Sutter Gould Medical Foundation, Tracy, California.
He previously was Systems Director at Baylor College of Medicine in Houston and Section Chief at Case Western Reserve University in Cleveland. Dr. Subramanian currently serves as Chair for the CHEST Clinical Pulmonary NetWork and has previously served as Chair of the Practice Operations NetWork. He is a member of the Executive Committee of the Council of NetWorks and the Scientific Program Committee for the CHEST Annual Meeting.


Dr. Subramanian

Mary Jo S. Farmer, MD, PhD, FCCP
Dr. Farmer is a pulmonary, critical care, and sleep medicine physician at Baystate Medical Center (Springfield, MA); Assistant Professor of Medicine, University at Massachusetts Medical School – Baystate; and adjunct faculty Tufts University School of Medicine. Dr. Farmer serves as director of pulmonary hypertension services for the Pulmonary & Critical Care Division. Pulmonary vascular disease, interprofessional education, clinical trials research, endobronchial ultrasound, and medical student, resident, and fellow education are her major interests. She is a member of the CHEST Interprofessional NetWork and Clinical Pulmonary NetWork.


Dr. Farmer

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BFR0001-0716-01